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**Emerging Multinationals:
Trends, Patterns and Determinants of
Outward
Investment by Indian Enterprises**

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RIS-DP # 117



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Emerging Multinationals: Trends, Patterns and Determinants of Outward Investment by Indian Enterprises

Nagesh Kumar*

Abstract: This paper has analyzed the trends, patterns and determinants of outward Investments by Indian enterprises that have increased notably since the onset of reforms. It finds that the sharp rise in outward investments since 1991 has been accompanied by a shift in geographical and sectoral focus of Indian investments. It develops an analytical framework for explaining the probability of an Indian enterprise investing abroad in an exclusive large dataset of Indian enterprises. The findings suggest that Indian enterprises draw their ownership advantages from their accumulated production experience, cost effectiveness of their production processes and other adaptations to imported technologies made with their technological effort, and some times with their ability to differentiate product. Firm size exerts a positive but a non-linear effect. Enterprises that are already in export markets are more likely to be outward investors. Finally, policy liberalization of 1990s turns out to have pushed Indian enterprises abroad.

Introduction

Growing outward direct investments (ODI) from some developing countries especially in Asia over the past decade represent another and perhaps more dynamic aspect of their growing economic integration with the world economy besides their deepening trade linkages and FDI inflows.

*Director-General, RIS. This paper draws upon an earlier paper (coauthored with Jaya Prakash Pradhan) prepared as a part of a larger study on competitiveness of Indian enterprises supported by the Department of Scientific and Industrial Research (DSIR), Government of India at RIS. I am grateful to Late Sanjaya Lall for his invitation to write this paper for a special issue of *Transnational Corporations* and to anonymous reviewers for their comments on an earlier version. However, the usual disclaimer applies.

UNCTAD's *World Investment Report 2004* has noted that India stood out among Asian developing countries not only because of recent significant increase in the ODI flows but also because of 'its potential to be a large outward investor' with annual outflows averaging US\$ 1 billion during 2001-03 (UNCTAD 2004: 27). A growing number of Indian enterprises are beginning to see outward investments as important aspects of their corporate strategy and are emerging as multinational in their own right.

Although a few Indian enterprises were investing abroad in the mid-1960s (see Lall 1983, Lall 1986 for details), outward investment activity became significant only since the onset of economic reforms in 1991. The outward investment activity has undergone a considerable change in the 1990s, in terms not only of the magnitude but also the geographical focus and sectoral composition of flows (Kumar 2004). It has been argued that this change in the geographical and sectoral composition of investment activity has been in tune with their changing motivation from essentially market-seeking operations to more export supporting ones with local presence (see Kumar 1996, 1998).

The theory of international operations of firm, evolved over the years with the contributions of Hymer (1976), Caves (1971), Dunning (1979) among many others posits that ownership of some unique advantages having revenue productivity abroad subject to the presence of internalization and locational advantages leads to outward investment. Enterprises based in the industrialized countries have emerged as multinational enterprises on the strength of ownership advantages derived from the innovative activity that is largely concentrated in these countries in addition to other resources and account for the bulk of FDI outflows. Very little is known about the sources of strength of enterprises based in developing countries such as India that leads to their overseas investments. It is of potential analytical and policy interest to examine the determinants of outward investment activity of Indian enterprises. However, lack of corporate statistics in India giving information on outward investments has prevented such an analysis. This paper quantitatively analyzes the patterns and determinants of outward

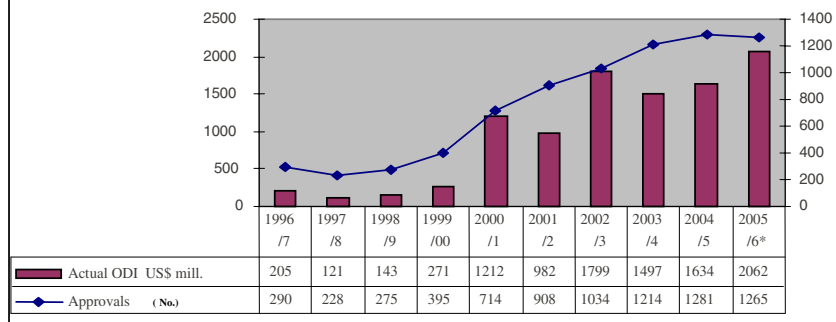
investment activity of Indian enterprises using an exclusive panel dataset covering 4271 Indian enterprises in manufacturing for the period 1989/90 to 2000/01. Rest of the paper is organized as follows. Section 2 briefly discusses the Indian government's policy towards ODI and broad trends and patterns of Indian outward investments. Section 3 develops a framework for analyzing the determinants of outward investments of Indian enterprises. Section 4 presents the results of quantitative analysis and draws inferences from them. Section 5 concludes the paper with a few remarks for policy.

2. Liberalization and Patterns of Outward Investments by Indian Enterprises

Alongside the liberalization of policy dealing with inward FDI, the policy governing outward FDI has also been liberalized since 1991. The Guidelines for Indian Joint Ventures and Wholly Owned Subsidiaries Abroad as amended in October 1992, in May 1999 and July 2002 provide for the automatic approval of outward FDI proposals upto a certain limit that has been expanded progressively from \$ 2 million in 1992 to \$ 100 million in July 2002. In January 2004 the limit of \$100 million was removed and Indian enterprises are now permitted to invest abroad upto 100 per cent of their net worth on automatic basis.

The magnitudes of ODI flows as well as their numbers have shown considerable rise over the past years as apparent from Figure 1. In 2005/06, the latest year for which the data is available, India's ODI flows crossed US\$ 2 billion. A more detailed examination of the patterns of ODI is made with the help of RIS Database compiled from published and unpublished sources (see Annex 1 for details). As is apparent from Table 1, the pattern of outward investment activity has also undergone a considerable change in the post-liberalization period in terms of geographical focus as well as the sectoral composition. In the pre-1991 period, as much as 86 per cent of Indian investments had concentrated in other developing countries. However, in the 1990s, an overwhelming (nearly 60 per cent) proportion of these investments was directed to developed countries.

Figure 1: Indian Outward Investments, 1996/97 to 2005/6



Source: India, Ministry of Finance
*upto February 2006

Similarly, Table 2 shows that Indian ODI before 1990 was largely concentrated in manufacturing which accounted for over 65 per cent of flows. Since 1991, however, nearly 60 per cent of these flows have gone to services. Even within these broad groups, ODI is concentrated in the sectors

Table 1: Geographical Distribution of Approvals of Outward FDI from India, 1975-2001

Region	1975-90		1991-March 2001		1975-90		1991-March 2001	
	No	Equity (% of total)	No	Equity (% of total)	No	Equity (% of total)	No	Equity (% of total)
South-East and East Asia	67	80.79	29.26	36.32	379	399.35	14.79	9.37
South Asia	30	20.91	13.10	9.40	197	157.39	7.69	3.69
Africa	29	37.83	12.66	17.01	254	513.94	9.91	12.06
West Asia	19	21.54	8.30	9.68	185	376.5	7.22	8.83
Central Asia	4	23.2	1.75	10.43	49	50.99	1.91	1.20
Latin America & the Caribbean	2	0.58	0.87	0.26	36	180.6	1.41	4.24
Developing Countries	165	191.52	72.05	86.09	1176	1719.82	45.90	40.35
Western Europe	40	17.29	17.47	7.77	565	1450.2	22.05	34.02
North America	23	13.51	10.04	6.07	749	1029.52	29.23	24.15
Developed Countries	64	30.89	27.95	13.89	1386	2542.6	54.10	59.65
Total	229	222.46	100	100	2562	4262.52	100	100

Source: RIS Database

Table 2: Sectoral Composition of Outward FDI Flows from India, 1975- 2001

(million US \$)

Sector	1975-90		1991-March2001		1975-90		1991-March2001	
	No	Equity (% of total)	No	Equity (% of total)	No	Equity (% of total)	No	Equity (% of total)
Exploration & refining of oil	1	0.02	0.43	0.01	5	61.10	0.20	1.43
Exploration of minerals & precious stones	2	4.02	0.87	1.81	2	0.04	0.08	0.00
Total Extractive	3	4.04	1.30	1.82	7	61.14	0.27	1.43
Oilseeds, food products & processing	10	9.06	4.35	4.07	91	69.34	3.55	1.63
Textiles and garments	12	9	5.22	4.05	158	112.56	6.17	2.64
Wood, pulp and paper	3	11.51	1.30	5.17	11	17.72	0.43	0.42
Leather, shoes & carpets	4	20.55	1.74	9.24	63	28.41	2.46	0.67
Chemicals, petro-chemicals & paints	18	7.82	7.83	3.52	94	92.13	3.67	2.16
Drugs & pharmaceuticals	8	4.72	3.48	2.12	163	270.24	6.36	6.34
Rubber, plastic & tyres	6	2.32	2.61	1.04	45	85.80	1.76	2.01
Cement, glass & building material	2	4.19	0.87	1.88	58	79.78	2.26	1.87
Iron and steel	10	16.17	4.35	7.27	47	50.65	1.84	1.19
Electrical & electronic equipments	6	2.11	2.61	0.95	63	90.86	2.46	2.13
Automobiles and parts there of	6	3.21	2.61	1.44	26	24.00	1.02	0.56
Gems & jewellery	1	0	0.43	0.00	56	17.85	2.19	0.42
Electronic goods & consumer durables	2	0.27	0.87	0.12	29	20.75	1.13	0.49
Beverages & tobacco	7	3.24	3.04	1.46	37	142.05	1.44	3.33
Engineering goods & metallurgical items	18	8.53	7.83	3.83	84	66.24	3.28	1.55

Table 2 continued

Table 2 continued

Sector	1975-90				1991-March2001			
	No	Equity (% of total)	No (% of total)	Equity (% of total)	No	Equity	No (% of total)	Equity (% of total)
Fertilizers, pesticides & seeds	5	39.93	2.17	17.95	27	326.96	1.05	7.67
Miscellaneous	10	2.59	4.35	1.16	184	183.58	7.18	4.31
Total Manu- facturing	128	145.22	55.65	65.28	1236	1678.92	48.26	39.39
IT,communication & software	6	5.64	2.61	2.54	761	1354.49	29.71	31.78
Hotels, restaur- ants tourism	24	24.96	10.43	11.22	53	112.45	2.07	2.64
Civil Contracting & engineering services	6	1.8	2.61	0.81	44	16.57	1.72	0.39
Consultancy	7	0.43	3.04	0.19	31	8.07	1.21	0.19
Trading & marketing	27	12.47	11.74	5.61	146	96.45	5.70	2.26
Media broadcasting & publishing	2	0.01	0.87	0.00	61	739.64	2.38	17.35
Financial services & leasing	17	26.32	7.39	11.83	96	95.49	3.75	2.24
Transport services	3	0.55	1.30	0.25	44	48.33	1.72	1.13
Other professional services	7	1.05	3.04	0.47	82	50.69	3.20	1.19
Total Services	99	73.2	43.04	32.91	1318	2522.17	51.46	59.17
Grand Total	230	222.45	100.00	100.00	2561	4262.23	100	100

Source: RIS Database

like drugs and pharmaceuticals in the manufacturing and in IT, communication and software and media, broadcasting and publishing services among the services viz. the areas of comparative advantage of Indian enterprises.

It has been argued that the outward investment activity during the pre-1991 was of market-seeking type where Indian enterprises established presence in developing countries on the basis of their intermediate technologies in relatively low technology industries such as light engineering (Lall 1983; Lall 1986; Kumar 1996). In the 1990s, however, outward investments have been undertaken by Indian enterprises to improve their

global competitiveness with local presence in major markets, acquiring strategic assets, and strategic access to markets in emerging trading blocs in the context of increased emphasis on outward orientation as a part of reforms (see Kumar 1996, 1998). Therefore, it is clearly concentrated in the countries that are key destinations for Indian exports (viz. EU and the North America) and in the sectors of Indian strength.

With growing web of overseas operations, a number of Indian enterprises are beginning to look like multinationals in their own right. These include pharmaceutical companies such as Ajanta Pharma with 18 overseas investment approvals by 2001, Ranbaxy Laboratories (14) and Dr Reddy's Laboratories (9); IT software development enterprises such as NIIT Ltd. (15), Aptech (12), Infosys Technologies (10), Mastek (9); engineering companies like L&T, Voltas and Usha Beltron (11 approvals each); Asian Paints (13); Essel Packaging (12), among others. Of late Indian enterprises have also started using overseas acquisitions as modes of establishing foreign presence. The motives of these acquisitions are often similar to those of greenfield entries viz. building marketing networks in foreign markets but sometimes are also strategic to fill gaps in the capabilities or get access to technologies, brands, natural resources or other assets. Hence, these are also generally concentrated in the areas of comparative advantage of Indian companies for instance, Ranbaxy acquired RPG Aventis in France, Dr Reddy's Labs acquired Beetapharm in Germany, Cadila acquired generics business of Alpharma also in France; Asian Paints acquired Berger International and thus got a foothold in 22 countries across the world; Tata Steel set up a subsidiary in South Africa and acquired NatSteel in Singapore; Tata Tea acquired Tetley of the UK, one of the world's biggest tea maker for US\$ 430 million and in the process got control of the full value chain in tea processing; Titan Industries has emerged as a watch maker that is trying to build its brand in highly skill intensive and competitive industry. It has set up a network of foreign subsidiaries in Europe and Asia to conduct its overseas business. Indian companies are also acquiring stakes abroad to strengthen their access to resources. These include ONGC Videsh Ltd.'s investments/acquisitions of oil equity abroad, Aditya Birla Group's acquisition of two copper mines in Australia and Reliance Group's acquisition of the Flag International.

3. Determinants of Outward Direct Investment: Analytical Framework and Hypotheses

As per the Ownership, Location, and Internalization (OLI) theory, a prerequisite for a firm to become international is the ownership of unique advantages that outweigh the disadvantages of being foreign in overseas markets. Therefore, a key question in identifying the determinants of overseas investment is the nature of ownership advantages or unique assets of Indian enterprises that may facilitate their outward expansion. It has been argued that the main source of advantage enjoyed by Indian enterprises was their ability to absorb, adapt and build upon the technologies imported from abroad rather than completely novel technologies. Indian enterprises have accumulated considerable learning and technological capability, managerial and technical expertise under the strategy of import substituting industrialization pursued during the first four decades of Independence (see Lall 1986; Kumar 1996). Some times these included adaptations to the imported designs to make them appropriate for local climatic conditions and cost-effective given their experience of handling highly price conscious and demanding customers in India. A number of Indian pharmaceutical and chemical enterprises developed cost effective processes of known chemical entities, helped by absence of product patents in India. With this capability they began to enter the generics market in the US and other developed countries after the expiry of product patents. Therefore, strengths of Indian enterprises are likely to be concentrated in relatively standardized and matured technologies dominated by price competition. They are not likely to move abroad primarily or generally on the strength of their novel or innovative proprietary technologies and globally recognized brand names like the established developed country MNEs. In what follows we develop a model for explaining the probability of an Indian enterprise making investment abroad in terms of these observations.

To explain the ODI decision of Indian manufacturing firms we have formulated a simple qualitative response model where the dependent variable takes on the value of one if the enterprise has invested abroad and zero otherwise. Denoting X_{it} as a vector of k ($k=1...k$) factors capturing ownership advantages and other factors explaining i th firm's overseas investment decision in t th time period. These factors are expected to provide

the outward investing Indian enterprise some edge over local rivals in order to overcome the cost of 'foreignness' in the host location. Thus, our empirical model is of the following form:

$$L_i = X_{it} \beta + u_{it} \quad [1]$$

Where the β is the vector of Logit coefficients and u_{it} is a normally distributed error term. L_i is the log of the odds ratio, viz. the probability that an Indian enterprise will undertake ODI. L_i viz. logit is linear in X and in the parameters (see Gurarati, 2003: 596).

We now identify different factors in X_{it} that are the sources of ownership advantages for Indian enterprises investing abroad. We have specified X_{it} to include three sets of factors, viz; firm-specific intangibles, industry-specific characteristics, and policy factors. The firm-specific intangible assets in turn are assumed to be dependent upon a host of firm-specific characteristics such as age, technology, product differentiation, managerial skill, firm size, export orientation and ownership. Theoretical argument for including these variables in the model is being provided in the following discussion.

3.1 Ownership Advantages of Enterprises

Here we identify certain variables that can be measured objectively to capture the possible sources of ownership advantages of Indian enterprises.

Accumulated Learning and Managerial Skills

The accumulated production experience is a source of considerable learning and absorption of know how. This learning is source of a number of incremental innovations at the shop floor that are not captured by indicators of more formal innovative activity. Accumulated experience also helps an enterprise develop endowments of managerial skills, market information, goodwill among other advantages. These advantages can be valuable for overseas investments especially in relatively matured and standardized industries, if not in more skill or knowledge-intensive industries. Hence, other things being equal we expect accumulated learning (*LEARNING*) measured in terms of years the enterprise has been in production to favorably affect its probability to undertake ODI.

Technological Effort

Further technological effort at the enterprise level is often required for absorption and adaptation of knowledge imported from abroad before it can lend an advantage to them except in for very matured and low technology industries. Technological effort is also likely to capture the ability of the enterprises to replicate processes and methods in a foreign location. It is also a source of cost effective process development that Indian firms have been engaged in the chemicals and pharmaceuticals industries. Hence, technological effort (*TECHEFFORT*) of enterprises, measured in terms of R&D intensity is posited to increase their probability of being outward investors, holding other factors constant.

Product Differentiation

Developing country firms are not likely to be strong in terms of their ability to differentiate their product with brand/trade names having goodwill worldwide. However, enterprises that are able to differentiate their product and build their brand names in domestic markets would be better placed to tap the opportunities abroad than others. This ability of branding (*BRANDS*) or differentiating the product measured in terms of advertising intensity may be valuable atleast in certain knowledge-intensive industries where quality enjoys a relatively high premium and hence may favourably affect the probability of ODI by enterprises.

Cost Effectiveness of Processes

As argued earlier, one of the unique advantages enjoyed by Indian enterprises could be their ability to bring about adaptations and incremental changes in production processes to make them cost effective in view of their experience of operating in highly price competitive environment. Hence, we expect ownership of cost effective processes or methods of production (*COSTEFFECT*) measured in terms of profitability to be positively associated with the probability of investing abroad by the enterprise.

Firm Size

Larger firms are more likely to diversify abroad than smaller firms due to their greater ability to bear risk and uncertainty, market information and financial strength, and lower overhead costs. Firm size has turned out

to be an important determinant of overseas operations for developed as well as developing country enterprises (Caves 1996 for a review). Hence, firm size (*SIZE*) is posited to have a favourable effect on the probability of enterprise crossing borders. The effect of size, however, is generally observed to be non-linear in many firm level studies of R&D activity and export performance. To check the possible non-linearity of the effect a quadratic term of *SIZE* will be introduced in the estimation.

Export-Orientation

Overseas investment is postulated to follow initial exploration of overseas markets through exports in the product cycle theory, among other literature (see Vernon 1966). It has been argued that the recent boom of overseas investments by developing country enterprises such as by Indian enterprises has been motivated to support and assist export markets with local presence, develop marketing networks, provide after-sales services etc. (Kumar 1998). Exporting activity captures the international competitiveness of the enterprise and may also provide to it valuable information on emerging opportunities in other countries. Hence, export-intensity (*EXPORT*) of Indian enterprises is posited to be positively linked to the probability of overseas operations. One may argue that there could be a simultaneity bias in the export intensity and overseas operations as the network of overseas operations may also generate exports for the firm. Studies for developed countries find exports and outward FDI to be related (see for instance Lipsey and Weiss 1984; Liu and Graham 1998). Indian enterprises, however, appear to be in rather an early stage of their evolution on the international scene with overseas operations following the exports. In any case a verification of simultaneity bias in the present context is constrained by availability of methodological tools.

Technological Dependence

Outward investments activity is posited to be based on firms' own 'created' ownership assets which may be adapted from knowledge imported in the past. They are unlikely to have an edge over other enterprises in foreign markets on the basis of imported know-how and imported equipment. Therefore, dependence of enterprises on imported technology (*TECHIM*)

and capital goods (*MACHIM*) are likely to be inversely related to the probability of their being outward investors.

Foreign Ownership

The overseas expansion of operations from India is likely to be limited to domestic enterprises as foreign owned enterprises in India come to India to primarily explore Indian market. Any overseas expansion of foreign subsidiaries in India will be subject to centralized corporate decisions at the headquarter level. Hence, a dummy identifying foreign owned firms (*FOREIGN*) is likely to be inversely related to overseas expansion.

3.2. Liberalization of Outward Investment Policy

In the pre-1991 phase the Indian government policy towards outward investments was rather restrictive and required overseas investments only through capitalization of exports of machinery and know-how fees. Outflow of liquid investments was generally restricted. As observed above, however, the policy has been progressively liberalized since 1991 along with that governing inward investments. Hence, a dummy identifying the 1991 liberalization (*LIBERAL*) is expected to have a positive effect on the probability of outward investments of Indian enterprises.

3.3. Industry Effects

The incidence of overseas activity can be expected to vary across industries because of the industry-specific comparative advantages and specialization of the country. In particular, Indian enterprises are likely to be active overseas in the sectors of industry that offer adaptations or that require high inputs of skilled manpower or managerial resources. The inter-industry differences in the intensity of outward orientation is controlled in the estimation with the help of a set of industry dummies (*INDDUM_{it}*).

Having identified various components of vector X_1 , we may now expand the model [1] as follows:

$$L_i = \beta + \beta_1 LEARNING + \beta_2 SIZE + \beta_3 SIZE^2 + \beta_4 TECHEFFORT + \beta_5 TECHIM + \beta_6 MACHIM + \beta_7 BRANDS + \beta_8 COSTEFFECT + \beta_9 EXPORT + \beta_{10} FOREIGN + \beta_{11} LIBERAL + \sum_n \delta_n INDDUM_n + u_{it} \quad [2]$$

4. Empirical Estimations

The Model 2 is estimated using an exclusive RIS Dataset described earlier, constructed by pooling company annual report statistics for 4271 Indian manufacturing firms listed on stock exchanges from Centre for Monitoring Indian Economy (CMIE)'s *Prowess* database and linking it with the outward investment information compiled from various published and unpublished sources for 1988/89 to 2000/01 (see Annex 1 for more details and measurements of variables).

The logit model has been estimated using maximum likelihood method with the robust standard errors. The statistical package *STATA* provides the robust standard errors using the Huber-White sandwich estimators that can effectively deal with problems of not meeting some assumptions like normality, homoscedasticity, or some observations that exhibit large residuals, leverage or influence. Standardized logit coefficients that are free of scale and hence are useful in assessing the relative strength of the independent variables in addition to marginal effects are estimated.

4.1 Full-sample Estimations

Table 3 presents estimation results for Model 2 for the full sample. The overall fitted model in terms of Wald Chi-squares, is statistically highly significant. The explanatory power in the case of total manufacturing is about 16 percent. The performance of individual variables is discussed below.

The variable *LEARNING* capturing accumulated learning by the firm comes up with a strong positive effect on the probability of Indian enterprises to undertake ODI. Therefore, accumulated learning from their production experience by itself is an important source of ownership advantages for Indian enterprises. It could give them an edge especially in other developing countries and in relatively low technology and matured industries.

The variable capturing technological effort of enterprises *TECHEFFORT*, as expected, turns out to have a significant positive effect on the probability of outward investment by Indian enterprises. Enterprise level technological effort as represented by in-house R&D activity leads to adaptations and innovations in the products and processes that could often-

Table 3: Determinants of Probability of Outward Investments of Indian Enterprises

Independent Variables	Coefficients	Robust Z-Statistics
<i>LEARNING</i>	0.01404869***	14.87
<i>TECHEFFORT</i>	0.04872711***	2.74
<i>BRANDS</i>	0.02689367*	1.66
<i>COSTEFFECT</i>	0.00017099	1.51
<i>SIZE</i>	0.00287626***	22.74
<i>SIZE</i> ²	-0.00000034***	10.60
<i>EXPORTS</i>	0.01977054***	25.28
<i>FOREIGN</i>	-1.35730201***	9.29
<i>TECHIM</i>	-0.00010668	0.39
<i>MACHIM</i>	-0.00161704***	3.00
<i>LIBERAL</i>	0.46447587***	6.77
<i>DTEXTIL&LEATHER</i>	0.41846904***	4.73
<i>DWOOD&PAPER</i>	0.15081544	0.96
<i>DRUBBER&PLASTICS</i>	0.59830256***	5.27
<i>DNONMETALICMINERAL</i>	-1.49406861***	3.19
<i>DCEMENT&GLASS</i>	0.56007601***	4.22
<i>DBASICMETAL</i>	0.35157936***	3.28
<i>DCHEMICALS</i>	0.29241594***	2.73
<i>DELECTRICALS</i>	0.51836462***	4.24
<i>DMACHINERY</i>	0.28631712**	2.08
<i>DAUTOMOTIVE</i>	-0.09043282	0.57
<i>DPHARMACEUTICALS</i>	0.97833303***	9.34
<i>DELECTRONICS</i>	0.40439671***	2.90
Constant	-4.28644974***	39.96
Pseudo R-square	0.1564	
Wald chi ²	1723.80	
Log likelihood	-6688.3925	
Number of obs.	29051	

Source: Estimations as explained in the text.

Note: * Significant at 10%; ** Significant at 5%; *** Significant at 1%. Food & beverages products has been treated as the base industry.

lend Indian enterprises an advantage abroad. Similarly, *BRANDS* capturing the ability of Indian enterprises to differentiate their products certainly helps in promoting their probability of undertaking outward investments.

As expected *SIZE* and *SIZE*² have statistically significant positive and negative impact respectively suggesting a favourable but a non-linear effect of firm size on the probability of undertaking ODI. Size increases the probability of undertaking ODI upto a threshold limit beyond which it turns negative.

EXPORTS, a variable capturing the export intensity of enterprise has an expected positive effect on the probability of outward investment. It appears that a part of Indian outward investments are undertaken by exporters to support their exporting activity with local presence, develop a marketing network and provide after-sales service.

The two variables capturing the technological dependence viz., *TECHIM* and *MACHIM* have expected negative signs and the latter also reaches statistical significance. Obviously outward investment activity is not possible on the basis of borrowed knowledge and capital goods alone. An enterprise needs to develop a base of created assets to be able to move abroad. Similarly *FOREIGN*, a variable capturing the foreign ownership of Indian enterprise also comes up with a statistically significant negative effect indicating that foreign MNEs come to India for exploring the Indian domestic market and not to go abroad from India. Outward investment activity is undertaken by Indian enterprises on the strength of their own created assets.

LIBERAL the variable capturing the effect of 1991 liberalization of the Indian government policy towards investments, inwards as well as outwards, has been a robust positive one. The liberalization has removed the policy constraints on outward investments besides promoting the external orientation of enterprises.

The sectoral dummy variables are generally significant with positive sign but being the intercept coefficients they only indicate that compared to food and beverages industry, these industries have better probability of outward investment. A more direct analysis of inter-industry pattern of ODI is observed with the sectoral estimations which are reported later.

4.2 Technology Intensity and Determinants of Outward Investments: Sub-sample Estimations

The full sample estimations were followed up with separate estimations for four sub-samples of Indian manufacturing grouped by technology-intensity of the industry following the revised OECD technological classification (see Annex 1) viz., high technology, medium-high technology, medium-low technology and low technology. Eventually, we also estimate the determinants of probability of ODI for each of the 13 broad industry groups that are summarized in Annex Table 1. These sub-samples estimations may provide additional insights into the relative importance of ownership advantages across industries. The estimations summarized in Tables 4 and Annex Table 1 are broadly similar to the full sample estimations except for some variation across technology classes and industries in terms of the relative importance of individual variables. Hence we confine ourselves to a discussion of the major differences from the general pattern.

LEARNING representing the accumulated production experience of the enterprise continues to have a positive and statistically significant effect on the probability of outward investment in all technology classes except for high technology industries where it has actually a significant negative effect. Apparently in high technology industries because of rapidly moving technology frontier, accumulated experience is not an advantage. Younger firms are perhaps more dynamic and flexible to respond to challenges of fast moving technological change in these industries. Among the individual industries, it follows the general pattern of significant positive effect on ODI in 8 of the 13 industries viz. textiles and leather, rubber and plastics, cement and glass, metals, chemicals, electrical machinery, non-electrical machinery, and transport equipments. In the rest of the industries, it has a negative effect as in pharma and electronics, food and beverage, and non-metallic mineral products.

Enterprise level technological effort (*TECHEFFORT*) has a statistically significant positive effect in the case of Medium-high technology and Medium-low technology groups. However, it has a coefficient that is not significantly different from zero in statistical terms in the case of low technology industries. Apparently in these industries because of matured

and standardized technology, the ownership advantage based on accumulated production experience is generally adequate. In the High technology industries group, *TECHEFFORT* just misses the statistical significance, suggesting that in these industries local technological effort alone may not be adequate and firms would need other advantages to be able to operate abroad. In the estimations at the level of individual industries, *TECHEFFORT* has a significant positive effect in the case of food and beverage, non-metallic metal products, chemicals, non-electrical machinery, and pharmaceuticals; and a positive and nearly significant effect in rubber and plastics, cement and glass, automotives, electrical machinery and electronics. Its effect is not significantly different from zero only in those industries that are highly matured like textiles and leather, metals. It is therefore, clear that enterprise level technological effort of firms is an important source of their unique ownership advantages for outward investment.

BRANDS is able to favour outward investment in a significant positive manner only in the case of Medium-high technology industries. In other groups its coefficient is not significantly different from zero. Obviously the ability of Indian enterprises to differentiate their product as a source of advantage abroad has been effective only in select industries that are characterized by moderate technology intensity. Industry level estimations suggest that production differentiation or branding is a source of advantage for Indian enterprises in food and beverages, textiles and clothing (nearly significant), cement and glass, chemicals, electrical machinery, non-electrical machinery, and pharmaceuticals. It is clear that enterprises that pay attention to develop their brand identities and pay attention to their quality do better in international markets.

Finally, *COSTEFFECT* is only relevant in the case of low technology industries. Among the industries, cost advantage has a strong positive effect in the case of textiles and leather, cement and glass, chemicals and electronics. Therefore, experience of Indian enterprises in developing cost effective processes and products could be a source of advantage in their overseas forays atleast in certain industries.

The technology dependence variables follow the general pattern of either a negative or not significantly different from zero effect except for

Table 4: Determinants of Probability of Outward Investments of Indian Enterprises: Sub-samples by Technology-Intensity

<i>Independent Variables</i>	High Technology	Medium-high Technology	Medium-low Technology	Low Technology
<i>LEARNING</i>	-0.01225145** (2.55)	0.01983054*** (9.35)	0.02839336*** (12.94)	0.00601868*** (4.28)
<i>TECHEFFORT</i>	0.03825016 (1.60)	0.03738665* (1.92)	0.14036360** (2.51)	0.04089900 (0.34)
<i>BRANDS</i>	0.00070178 (0.09)	0.17323670*** (9.81)	0.01918220 (0.67)	0.01431513 (1.32)
<i>COSTEFFECT</i>	0.00035855 (1.07)	0.00002231 (0.34)	0.00004253 (0.38)	0.00031543** (2.48)
<i>SIZE</i>	0.00721355*** (9.05)	0.00220079*** (11.30)	0.00218862*** (13.66)	0.00524463*** (16.23)
<i>SIZE²</i>	-0.00000220*** (3.78)	-0.00000025*** (5.41)	-0.00000026*** (9.81)	0.00000054*** (13.60)
<i>EXPORT</i>	0.01846809*** (8.23)	0.02167980*** (12.08)	0.02491160*** (13.09)	0.01883140*** (16.37)
<i>FOREIGN</i>	-1.79946462*** (4.61)	1.79051006*** (7.54)	-3.31540517*** (3.38)	1.25973224*** (3.11)
<i>TECHIM</i>	0.00089860 (1.30)	-0.01566338 (1.33)	-0.00502218 (1.11)	0.07882066 (0.49)
<i>MACHIM</i>	-0.00169882** (2.12)	-0.00110926 (1.51)	-0.00028239 (0.95)	0.00134145 (1.14)
<i>LIBERAL</i>	0.75100189*** (3.27)	0.32023588*** (2.59)	0.49989376*** (3.71)	0.32389356*** (2.75)
Constant	-4.16541252*** (15.93)	-4.01165425*** (26.94)	-4.02677182*** (25.40)	4.21724622*** (29.53)
Pseudo R-square	0.2318	0.1608	0.1832	0.1747
Wald chi ²	345.29	526.93	628.55	567.08
Log likelihood	-812.36787	-1776.4646	-1649.1752	2243.1509
Number of obs	3198	8282	7227	10344

Source: Estimations as explained in the text.

Note: Robust z-statistics in parentheses; * Significant at 10%; ** Significant at 5%; *** Significant at 1%. Relevant industry dummies have been included in the estimations but suppressed here.

pharmaceuticals industry for which *TECHIM* representing imports of technology in the form of designs and drawings or patents has a significant positive effect. The Indian pharmaceuticals industry has a long tradition of building on knowledge imported from abroad and absorbing other spillovers with its own technological effort. Hence, it could be interpreted to mean that the source of unique ownership advantages of Indian enterprises in this industry is adaptations of imported know-how as reflected by significant positive effects of both own technological effort as well as imported knowledge variables.

A striking trend is the consistent performance of *SIZE*, *FOREIGN*, *EXPORT*, and *LIBERAL* across different technology classes and across most of the individual industries. Apparently, economic reforms and policy liberalization have had an important effect on the outward orientation of Indian enterprises. Export-orientation exposes Indian enterprises to the opportunities available in foreign markets and hence facilitates outward investments.

5. Concluding Remarks

This paper has analyzed the trends, patterns and determinants of outward Investments by Indian enterprises. Among the developing countries, outward investment from India have increased notably over the past decade following the reforms and liberalization of policy undertaken by the government since 1991 which have increasingly pushed outward-orientation of Indian enterprises besides removing the policy barriers to such integration. Hence, outward investment has emerged as an important mechanism of global economic integration of Indian economy besides growing proportion of trade and inward FDI.

The trends summarized suggest that sharp rise in outward investments since 1991 has been accompanied by a shift in geographical and sectoral focus of Indian investments. Indian investments are now more evenly distributed across the world compared to a heavy concentration in poorer developing countries in the pre-1990 period. They have also diversified sectorally to focus on areas of India's emerging comparative advantage such as pharmaceuticals and IT software. Indian enterprises have also

started acquiring companies abroad to get access to marketing networks, brands, natural resources, technology and other strategic assets. With a growing web of outward investments, some of these enterprises are emerging as multinationals in their own right.

The paper developed a framework for explaining the probability of an Indian enterprise investing abroad. It was contended that the source of ownership advantages of Indian enterprises that are key to outward investments emanated from their accumulated learning from production experience, further technological effort and adaptations on the knowledge imported from abroad especially on development of cost-effective processes and products, ability to differentiate product with brands and quality consciousness, among other factors.

This analytical framework was used to explain the probability of outward investments by Indian enterprises with an exclusive panel dataset covering over 4270 manufacturing companies for 1989-2001 period. The empirical estimations suggest that in tune with hypotheses, Indian enterprises draw their ownership advantages from their accumulated production experience, cost effectiveness of their production processes and other adaptations to imported technologies made with their technological effort, and some times with their ability to differentiate product. Firm size exerts a positive but a non-linear effect. Enterprises that are already in export markets are more likely to be outward investors. Outward orientation, however, is unlikely to be obtained on the basis of heavy dependence on foreign technology, machinery or foreign ownership. Apparently foreign MNEs come to India to explore the domestic market. Finally, policy liberalization of 1990s turns out to have pushed Indian enterprises abroad.

The sub-sample estimations highlighted some variation across industries in terms of the relative importance of explanatory variables. In the low technology industries, expectedly the accumulated production experience and cost effectiveness are adequate and enterprise level technological effort is not seen crucial for outward investment. In the high-technology industries, younger enterprises rather than those with

longer production experience appear more dynamic given their technological dynamism and flexibility to respond to rapidly changing technological frontier in these industries.

The key lessons coming out from the above analysis for the policy seeking to strengthen the globalization of Indian enterprises and their overall international competitiveness are the importance of their own technological effort and focus on absorption and adaptation of knowledge that alone gives them confidence to move beyond the confines of domestic markets. They also need to pay attention to building brand identities and position them as providers of qualitatively superior product or services as the case may be. Firm size is certainly an advantage in international markets atleast upto a threshold level. Hence, some consolidation of fragmented capacities in key industries may be useful. Finally, an enabling policy framework and macroeconomic environment such as that developing with progressive liberalization of policy does seem to foster external orientation of Indian enterprises.

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Annex 1

Dataset and Measurements of Variables

The study uses the exclusive RIS Database on Outward Investments of Indian Enterprises. RIS Database that has been compiled mainly from the published data of India Investment Centre (IIC), supplemented by the unpublished data from the Ministry of Commerce and Ministry of Finance, Government of India. The constructed dataset contains information on Indian enterprises investing abroad, sector of investment, the amount and share of Indian ownership, year of approval of projects and the status of implementation of the projects. The constructed database on Indian investment abroad over 1975-March 2001 then was merged with the firm-level financial data obtained from the Prowess Data Base (2002) of the Centre for Monitoring Indian Economy (CMIE). The outcome is a panel dataset covering 4271 Indian enterprises in manufacturing for the period 1989/90 to 2000/01.

Variable Measurements

ODI : A dummy variable for Indian firms taking value 1 for firms undertaking O-FDI and 0 otherwise.

LEARNING_{it} : The age of *it*h firm in number of years.

SIZE_{it} : Total sales of *it*h firm in *t*th year.

SIZE²_{it} : The squared term of the sales of *it*h firm in *t*th year.

TECHEFFORT_{it} : Total R&D expenditure as a percentage of total sales of *it*h firm in *t*th year.

TECHIM_{it} : Royalties, technical and other professional fees remitted abroad by *it*h firm as a percentage of sales in the year *t*.

MACHIM_{it} : Imports of capital goods by *it*h firm as a percentage of sales in *t*th year.

BRANDS_{it} : Advertising expenditure of the *it*h firm as a percentage of sales in the year *t*.

COSTEFFECT_{it} : The ratio of profit before tax (PBT) of the *it*h firm to net worth (%) in *t*th year.

EXPORT_{it} : Exports of *it*h firm as a percentage of sales in the year *t*.

FOREIGN: Dummy variable for majority foreign owned firm taking value 1 for firms with 25 % or more foreign equity participation and 0 otherwise.

LIBERAL: Liberalization dummy taking 1 for post-reform period 1993-94 to 2000-01 and 0 for the pre-reform period 1989-90 to 1992-93.

INDDUM_j denotes sectoral dummies included in the estimation.

Technological Classification of Indian Manufacturing Industries

Technology category	Industry
Low technology	1. Food, beverages & tobacco products
	2. Textile, leather & footwear
	3. Wood, paper & paper products
Medium-low technology	4. Rubber & plastic products
	5. Other non-metallic mineral products
	6. Cement & glass
	7. Basic metal & metal products
Medium-high technology	8. Chemicals excluding pharmaceuticals
	9. Electrical machinery
	10. Non-electrical machinery
	11. Automotives
High technology	12. Pharmaceuticals
	13. Electronics

Note: The above technological classification is based on OECD (2001) 'OECD Science, Technology and Industry Scoreboard, 2001'

Annex Table 1: Determinants of Probability of Outward Investments of Indian Enterprises: Industry-wise

Industry Independent Variables	Food, bev. & tobacco	Textiles & Leather	Wood & paper	Rubber & plastics	Other non -metallic	Cement & glass mineral products	Metals
<i>LEARNING</i>	-0.00747009** (2.39)	0.01005395*** (5.98)	-0.00623802 (0.93)	0.02406590*** (6.65)	0.905979740.*** (3.07)	0.03698831*** (6.28)	0.02823189*** (9.39)
<i>TECH-EFFORT</i>	0.10175822** (2.13)	-0.07647313 (1.04)	-7.35617829** (2.32)	0.07046386 (1.55)	6.66783085*** (2.91)	0.44935156 (1.38)	-0.00368027 (0.02)
<i>BRANDS</i>	0.02134473 (1.61)	0.01685106 (1.48)	-0.07653573 (0.78)	-0.02291589 (0.44)	-5.25637265** (2.04)	0.26485907*** (2.74)	-1.91587103*** (2.77)
<i>COSTEFFECT</i>	0.00012532 (1.39)	0.00126456** (2.25)	0.00194693 (1.44)	-0.00052320** (2.03)	-0.00687360* (1.82)	0.00066816* (1.74)	0.00016222 (0.30)
<i>SIZE</i>	0.00555460*** (10.37)	0.00892902*** (2.18)	0.00430171*** (2.64)	0.00249933*** (7.69)	0.68481605 (1.29)	0.00409309*** (6.82)	(0.00180214)*** (9.05)
<i>SIZE2</i>	-0.00000054*** (8.95)	-0.000000474*** (5.42)	0.00000165 (1.12)	-0.00000033*** (4.65)	-0.02590137 (0.99)	-0.00000104*** (4.42)	-0.000000021*** (7.08)
<i>EXPORTS</i>	0.01029237*** (4.52)	0.02310179*** (15.00)	0.03808611*** (4.42)	0.02187285*** (7.84)	0.05081438* (1.87)	0.02795647*** (4.07)	0.02733743*** (9.11)
<i>FOREIGN</i>	-2.02568237** (2.33)	-0.50660449 (1.16)		-2.76729307*** (2.82)			

Annexure I continued

Industry Independent Variables	Food, bev. & tobacco	Textiles & Leather	Wood & paper	Rubber & plastics	Other non-metallic	Cement & glass mineral products	Metals
TECHIM	-0.71152894 (1.42)	-0.01886787 (0.17)	-0.02065755 (0.80)	-0.04656017 (0.39)		-0.00376338* (1.69)	0.01053096 (0.60)
MACHIM	-0.00298487 (1.52)	-0.00115727 (0.97)	-0.01403288 (0.69)	-0.00024432 (0.28)	0.00011892 (0.06)	-0.00008515 (1.15)	-0.00100808 (0.67)
LIBERAL	0.11459941 (0.53)	0.41448666*** (2.65)	0.28905317 (0.76)	0.38381885 (1.64)		0.76956380* (1.93)	0.45745358** (2.42)
Constant	-3.48877965*** (16.02)	-4.38465087*** (26.53)	-3.63931168*** (9.47)	-3.78051629*** (15.20)	-5.24456562** (2.31)	-5.20789075*** (11.93)	-4.10096000*** (20.10)
Pseudo R-square	0.1892	0.1911	0.2124	0.1521	0.5842	0.2698	0.1879
Wald chi2	162.21	561.10	87.99	199.84	26.96	161.60	331.72
Log likelihood	-690.15802	-1302.3585	-178.96438	-573.36415	-9.475484	-261.4862	-764.05338
Number of obs	3890	5249	1158	2343	178	1197	3317

Annexure I continued

Annexure I continued

	Chemicals	Electrical Machinery	Non-electrical Machinery	Transport equipments	Pharmaceuticals	Electronics
LEARNING	0.01855550*** (4.85)	0.02306959*** (4.79)	0.01981240*** (4.32)	0.01061348*** (2.64)	-0.02737287*** (3.15)	-0.04630854*** (4.52)
TECHEF-FORT	0.09014240** (2.07)	0.15454497 (1.57)	0.02738876*(1.75) (1.75)	0.11454221 (1.36)	0.03469031* (1.80)	0.04933230 (1.56)
BRANDS	0.18287934*** (7.91)	0.17951839*** (2.75)	0.21412778*** (3.51)	0.01923598 (0.12)	0.10029626*** (3.02)	-0.16750628* (1.96)
COST-EFFECT	0.00075075** (2.55)	-0.00041418 (0.89)	0.00003403 (0.37)	-0.00002435 (0.34)	0.00008224 (0.11)	0.00159732* (1.65)
SIZE	0.00336443*** (12.08)	0.00467657*** (5.77)	0.00793652*** (7.47)	0.00149688*** (7.74)	0.01719057*** (11.37)	0.00423678*** (6.07)
SIZE2	-0.00000054*** (5.50)	-0.00000187*** (3.00)	-0.00000436*** (4.00)	-0.00000012*** (5.06)	-0.00000828*** (7.29)	-0.00000060* (1.68)
EXPORTS	0.01934662*** (7.79)	0.02309955*** (5.43)	0.01840023*** (2.99)	0.03972878*** (6.22)	0.01749393*** (5.05)	0.01486872*** (4.07)
FOREIGN	-2.42700671*** (5.62)		-1.48559935*** (3.66)	-0.90903682 (1.30)	-3.31551633*** (5.30)	-1.57986211*** (2.63)
TECHIM	0.01093690 (0.49)	-0.02124700 (0.43)	-0.01617508* (1.85)	-0.89579637** (2.56)	0.18339891* (1.87)	-0.04626719 (0.59)
MACHIM	-0.00018232 (0.72)	-0.00210436 (0.65)	-0.00036276 (0.08)	-0.00624566 (0.67)	-0.01022129* (1.92)	-0.00088192 (0.55)

Annexure I continued

	Chemicals	Electrical Machinery	Non-electrical Machinery	Transport equipments	Pharmaceuticals	Electronics
LIBERAL	0.20719872 (1.04)	0.74848122** (2.41)	0.62088083** (1.97)	-0.49205187** (2.11)	0.09137886 (0.36)	1.45054567*** (3.41)
Constant	-4.11667846*** (18.90)	-4.60694798*** (12.69)	-4.69081972*** (13.81)	-3.14900133*** (11.98)	-3.34818376*** (11.72)	-3.67815205*** (8.32)
Pseudo R-square	0.2334	0.1764	0.1799	0.1838	0.3583	0.2093
Wald chi2	319.84	163.96	153.34	140.54	219.81	150.15
Log likelihood	-646.543	-357.47414	-332.59283	-338.31366	-433.84898	-294.91317
Number of obs	3148	1489	1842	1613	1829	1369

Source: Estimations as explained in the text.

Note: Robust z-statistics in parentheses; * Significant at 10%; ** Significant at 5%; *** Significant at 1%. In many industries, FOREIGN is found to predict failure perfectly and hence has been dropped from the estimation. In the case of other non-metallic mineral products *TECHIM* and *LIBERAL* has been dropped for the same reason.

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