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The export-diversifying impact of and U.S. foreign direct investments in indian manufacturing sector

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WORKING PAPER NO. 110

**The Export-Diversifying Impact of Japanese and U.S. Foreign
Direct Investments in Indian Manufacturing Sector**

RASHMI BANGA

September 2003



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Foreword

The conventional wisdom in India has been that foreign direct investment (FDI) has not entered the export-oriented sectors. This has led to the belief that FDI has not played any significant role in exports from India. The current study shows to the contrary that FDI has not only led to diversification of India's exports but has also indirectly improved Indian exports via export spillovers. The study also brings out the significance of the country-of-origin of the FDI in influencing exports.

The paper has two main objectives. First, it analyses whether FDI has led to diversification in India's exports. Secondly, the paper estimates the export spillovers from aggregate FDI and FDI from Japan and U.S on the export-orientation of domestic firms. The analysis is undertaken in two steps. First, industry-level analysis is undertaken for 74 disaggregated industries for the period 1995-96 to 1999-2000. The differential impact of Japanese and U.S. FDI is studied at this level. Secondly, spillover effects on export-intensity of domestic firms from Japanese and U.S. FDI are studied. It is shown that FDI from the U.S. has a positive and significant effect on the export-intensity of the industries in the non-traditional export sector, while the impact of Japanese FDI is not significant. U.S. firms are found to have larger spill-over effects on the exports of domestic firms as compared to Japanese firms. Higher exports by foreign firms from India reduce the fixed cost of entering international markets for the domestic firms. Differences in the inter-industry pattern; and within the same industry, higher level of technology and more networking within the host country by U.S. firms vis-a-vis Japanese firms seem to be possible reasons for the differential impact of Japanese and U.S. FDI.

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September 2003

Abstract

The paper highlights the export-diversifying impact of FDI in a developing country. FDI from a particular source may lead to export diversification of developing countries if it positively affects the export-intensity of the non-traditional export sector. Indirectly, FDI may encourage export diversification by spillover effects on the export intensity of domestic firms in the non-traditional export sector. The empirical results for the Indian economy in the post liberalization period show that FDI from U.S. has led to diversification of India's exports both directly as well as indirectly. However, Japanese FDI has had no significant impact on India's exports.

JEL CODES: F14, F23, L6, O1.

Key Words: FDI and Exports, Indian Exports, Export-Diversification, Japanese FDI, U.S. FDI

I Introduction*

The role played by the inward foreign direct investment in export performance of developing countries has been perhaps one of the most fiercely debated issues in the literature of foreign direct investment (FDI). Studies have argued that the impact of FDI on export performance of host countries varies according to the type of FDI¹ [Dunning 1988] and source of FDI [Kojima 1973]. However an important aspect of the impact of FDI that has been ignored in the literature is the export-diversifying impact of FDI and export spillovers from FDI. FDI may lead to diversification of the host country's exports both directly as well as indirectly. FDI may not enter the traditional export sector of the developing country, however, it may lead to export diversification of the host country if it increases the export-intensity of the non-traditional export sector. Given the ownership advantages of the foreign firms² (e.g., higher levels of technological skills, better marketing skills and international orientation) it is expected that foreign firms may have an advantage over the domestic firms in terms of their capabilities to export and therefore may lead to diversification of the exports of the host country.

Indirectly, FDI can lead to diversification of exports through spillover effects on the export-intensity of the domestic firms in the non-traditional export sector. An important spillover effect that may occur from the exports of foreign firms in this sector

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¹ It has been found that resource-seeking, efficiency-seeking and export-oriented FDI would promote exports while market-seeking FDI and technology-seeking FDI may not be catalyst to export growth.

² See Dunning (1988)

is lowering of the fixed cost of introducing the products of this sector in the international market. The domestic firms may also learn from the export behavior of the foreign firms and become aware of the foreign markets. Thus an increase in export-intensity of the domestic firms in this sector may lead to further diversification of the host country's exports.

The impact of FDI on exports, however, may differ according to the source of FDI. The importance of the source of FDI in export promotion was first discussed by Kojima. The theoretical framework developed by Kojima [1973, 1975, 1978, 1982] shows that "American-type FDI" is a substitute for trade, but "Japanese-type FDI" enhances trade in the host country. However, Kojima's approach has been criticized on various grounds³. These criticisms, notwithstanding, Kojima's work has led to a complementary strand of theoretical and empirical literature that compares various aspects of the nature and the impact of FDI from these two sources [Dunning (1988, 1994), Doyle, Saunders and Wong (1992), Schroath, Hu and Chen (1993), Yamamura (1994), Encarnation (1999) and Ravenhill (1999)]. What emerges from these studies is that the differences in the economic, financial and institutional environment of these two sources of FDI lead to important differences in their nature of operations.

Given the differences in the nature of Japanese and U.S. FDI that emerge from literature the paper attempts to examine the direct and indirect impact of these two sources of FDI on the exports of Indian manufacturing sector in the post-reform period.

³ for criticisms see Dunning 1981, Hill 1988, Hill 1990, Ramstetter 1987.

To examine the direct impact the analysis is carried out separately for the aggregate manufacturing sector, traditional export sector and non-traditional export sector. The panel data estimations are carried out for 52 industries in the non-traditional export sector and 22 industries in the traditional export sector and total of 74 three-digit level industries in the manufacturing sector for the period 1994-95 to 1999-2000. The spillover effects in the non-traditional export sector are estimated on 1,448 domestic firms using the *Tobit* model estimates.

The rest of the paper is organised as follows: Section 2 presents the hypotheses of the paper, Section 3 discusses the sample, variables and methodology used by the study, Section 4 presents panel data estimation results at the industry-level and Section 5 presents the spillover-effects results on the domestic firms. Finally Section 6 summaries and concludes.

II FDI and Indian Exports: Hypotheses

The Indian economy in the 1990s underwent a structural change following the economic reforms of 1991. The impact of FDI on exports in the new regime has now drawn attention of many economists and studies have tried to re-analyze the role of FDI in the post reforms period (Siddharthan and Nolan, 2000, Sharma 2000, Pailwar 2001). However, most of these studies show that majority of the inward FDI aim to explore India's sizeable and expanding domestic market and have not significantly contributed to exports. It is felt that it may be too early to expect efficiency seeking FDI to start flooding the country. Also, in an era of stiff competition among developing countries to attract

export-oriented FDIs, liberalization of policies alone may not be sufficient to attract export-oriented FDI. (see Kumar 1994 for empirical evidence). However, the above studies have considered aggregated FDI ignoring the source of FDI and have also not tried to examine whether FDI has led to any diversification of Indian exports, that is to say, whether FDI has had any impact on the exports of the non-traditional export industries.

The current literature on international trade has emphasised the role of technology in trade [Kumar and Siddharthan, 1997]. It is expected that an enterprise, which enjoys better endowment of a technology and knowledge base, is likely to be more export oriented in comparison to others. Subsequent to entering the export market, the firm may have to spend more on in-house R&D and technology imports to remain globally competitive. Thus, the higher the level of technology at which a firm operates, given international demand, the higher will be its competitive advantage (hence exports) vis-à-vis other firms in the industry. We thus expect foreign firms to have larger impact on export-intensity as compared to domestic firms in the non-traditional export sector, which in a developing country comprises mainly of high-tech industries. From this we derive our first hypothesis, i.e.,

***Hypothesis 1:** FDI in India has not been attracted to traditional export-oriented industries but they have led to diversification of India's exports.*

FDI from different sources, however, may have differential impact on the exports of developing country. Literature posits that the nature of FDI that originates from Japan and U.S. differ. In the American economy, there exists a dualistic structure in industry comprising of (a) innovative and oligopolistic industries and (b) traditional industries (textile, steel, agriculture, etc.). The U.S. FDI successively takes place mostly from within the first group, i.e., new industries that are capital and knowledge-intensive type. It can therefore be said that the U.S. FDI is based heavily on a comparative advantage in the generation of innovation and is associated with oligopoly. On the other hand, the share of small and medium firms (SMEs) is greater in Japanese FDI and investments from these SMEs are more likely to be driven by location-specific advantages such as cheap labor. The Japanese FDI is therefore more likely to concentrate in labour-intensive sectors [JETRO 1995]. U.S. FDI is thus associated with large and oligopolistic firms producing differentiated products while Japanese FDI is associated with small and medium sized firms producing standardized products.

This distinction in the type of FDI emerging from Japan and U.S. implies that the pattern of specialisation of Japanese and U.S. firms may differ within the same sector. Kodama and Honda [1986] shows that, in the high-tech areas, U.S. FDI dominate science-based industries such as chemicals that are dominated by large firms, which can finance their basic science research necessary for the innovation, while Japanese FDI still has not developed a strong comparative advantage in chemicals⁴. Conversely, Japanese FDI has fared better in high-tech pattern industries where research is more products

⁴ Japan's unexpected weakness in chemicals has been identified by Dixit(1987).

specific, and management of research activities more important. Thus, even within the same sector the two sources of FDI may concentrate at different levels of activities. Given the higher levels of technology of U.S. firms vis-à-vis Japanese firms in the non-traditional export sector we expect U.S. firms to have higher competitive advantage and therefore higher exports as compared to Japanese firms. Our second hypothesis is therefore:

Hypothesis 2: U.S. firms are likely to have higher competitive advantage in the non-traditional export sector as compared to the Japanese firms and therefore are expected to have higher impact on the export-intensity of this sector.

The eclectic theory of FDI has emphasised the OLI⁵ advantages of foreign firms over the domestic firms. Proponents of importance of FDI in developing countries argue that such (OLI) advantages can spill to the local firms (Lall and Mohammad 1983). This argument assumes that foreign firms institute horizontal linkages with the domestic firms and consequently create changes in the structure, conduct and performance of the local firms (Blomstrom and Pearson 1983). However, studies show that country-of-origin effects may be important. Ravenhill [1999] argues that the subsidiaries of US corporations are more likely than their Japanese counterparts to interact with the host economy in a manner that facilitated local acquisition of technology, an essential dimension in the growth of capabilities of domestically-owned firms. The empirical studies also show that Japanese firms are internationally vertically integrated and

⁵ Dunning [1988]

therefore generally do not engage in both “downstream” activities and “upstream” activities in the host country. They therefore do not add much value in the host country, measured by ratio of value-added to total sales. U.S. direct investment by contrast are horizontally integrated and therefore the “upstream” and “downstream” activities are both undertaken in the same host country⁶.

Encarnation [1999] supports this argument. His finds that during 1992, intra-company trade between the parents and subsidiaries of Japanese multinationals was roughly twice the comparable level of intra-company trade recorded for American multinationals. All this suggests that Japanese firms tend to be more networked with their subsidiaries in other countries as compared the U.S. firms who form greater linkages with the local firms in the host country. The domestic firms therefore may not learn much from the export policies of the Japanese firms. Higher exports of U.S. firms in this sector may also lower of fixed cost of introducing the products of this sector in the international market encouraging the exports of domestic firms. We therefore expect that spillover effects on the export-intensity of the domestic firms will be higher from U.S. firms as compared to Japanese firms, i.e.,

Hypothesis 3: US FDI are expected to have larger spillover effects as compared to Japanese FDI on exports of domestic firms since they are expected to have higher linkages with the domestic firms in the host country.

⁶ Some economists have, however, criticized this distinction and have attributed this difference to the ‘vintage effect’, i.e., the stage of industrialization.

III Sample, Variables and Methodology:

For the purpose of our analysis we have collected data from publicly available corporate database *Capitaline 2000* provided by Capital Market Ltd. an Indian information services firm. The reason for using this database extensively is that it is the only tractable database for the Indian economy to distinguish the foreign ownership based on country-code. It provides a panel data of about 10,000 listed and unlisted companies in India from 115 industrial categories. However, one limitation of the *Capitaline 2000* is that it does not include fully foreign-owned firms or all the joint ventures that are not listed on any Indian stock exchange. This is supplemented with data taken from various issues of Annual of Survey of Industries (ASI), various issues of National Accounts Statistics and some publications of Ministry of Industry. For the purpose of our analysis we define all firms with direct foreign equity participation of greater than 10% as foreign affiliates (in other words, we exclude the cases of foreign institutional investments and technical cooperation).

Variables:

Many studies have used the sales of foreign firms to total sales in the industry as a proxy for foreign presence. However, this is the market share of foreign firms, which may not truly capture the extent of presence of foreign firms in an industry. Foreign firms in large industries may have smaller market share. Also, the market share of foreign firms is likely to be correlated with the exports of the firms. Therefore, the variable used in the study for foreign presence is the ratio of foreign equity invested to total equity invested in the industry. The variables representing foreign presence therefore are:

- a) Foreign equity as a ratio of total equity invested in the industry (FEQ)
- b) Japanese Equity as a proportion of total equity invested in the industry (JEQ)
- c) US Equity as a proportion of total equity invested in the industry (USEQ)

The data on foreign equity invested for the years 1994-95 and 1995-96 is not directly available in *Capitaline 2000* and therefore has been constructed using ratio of the dividends paid in foreign exchange by the firms to total dividends paid. This may also include the dividends paid to foreign institutional investors. However, it is not expected to be large for this period.

The export intensity of the industry is related to a number of industry-specific variables. In order to examine the impact of FDI on the export intensity of the industries we control for the following variables: size of the Industry; effective rate of protection in the industry; capital-labour ratio in the industry; R&D intensity of the industry; advertisement intensity; skill intensity; gross profitability in the industry with a lag; extent of vertical-integration in the industry; concentration ratio of the industry; capital imports by the industry; imports of spares and stores in the industry; and payments made for royalty and technical fees by the industry.

At the firm level analysis, we expect that the export intensity of the firms is dependent on both industry-specific as well as firm-specific variables. We control for the following firms-specific variables: size of the firm; capital-intensity of the firm; R&D intensity of the firm; advertisement intensity in the firm; capital imports by the firm;

imports of spares and stores by the firm; and payments made for royalty and technical fees by the firm.

Table of Definitions of the Variables Used

Industry-Specific Variables	
R&D	ratio of research & development expenditure to total sales.
K/L	ratio of gross block to employee cost.
SKILL	number of high-salaried employees / total number of employees.
SIZE	total fixed assets / number of firms in the industry
CR4	four firm concentration ratio
ADVT	ratio of advertisement expenditure to total sales
ERP	effective rate of protection
GP	Gross profitability / sales in the industry with a lag
VI	Extent of vertical-integration in the industry
IMPCAP	Capital imports/total sales by the industry
IMPSPS	Imports of Spares and stores / total sales in the industry
ROY	Payments for royalty and technical fees / total ales in the industry
Firm-Specific Variables	
SIZE _F	Size of the firm i.e., log of sales of the firms
R&D _F	R&D Intensity of the firm i.e., R&D expenditure/sales
KI _F	Capital-Intensity of the firm / total sales
ADVT _F	Advertisement intensity / total sales in the firm
GP _F	Gross profitability / total sales in the firm in the lag period
IMPCAP _F	Capital imports / total sales by the firm /
IMPSPS _F	Imports of Spares and stores / total sales by the firm
ROY _F	Payments for royalty and technical fees / total sales by the firm

Methodology:

The Model estimated is as follows:

$$X_{jt} = f((ERP_t, SIZE_t, K/L_t, R\&D_t, ADVT_t, SKILL_t, GP_{t-1}, VI_t, CR4_t, IMPCAP_t, IMPSPS_t, ROY, FP_{jt}))$$

Where X_{jt} is the export-intensity of the j^{th} industry in period t ;

Where $t = 1994-95, 1996-97, \dots, 1999-2000$; $j = 1, 2, \dots, 74$,

In this equation, FP_{jt} is the variable that captures the impact of foreign participation, i.e., aggregate FDI (FEQ), Japanese FDI (JEQ) and U.S. FDI (USEQ). Exports are further divided into exports from traditional sector and non-traditional sector. The industry level

analysis is undertaken using the panel data estimation and the results of OLS, Fixed Effect Model and Random Effect Model are reported. To choose between the two models we use the Lagrangian multiplier statistic and the Hausman (1978) test statistic. Autoregressive estimates (AR1) and heteroscedasticity consistent standard errors are reported wherever required.

To estimate the spillover effects from foreign, Japanese and U.S. foreign direct investments, the export-intensity of domestic firms is used as the dependent variable and industry-specific as well as firm-specific variables are controlled for.

$$X_{djt} = f(\text{Industry specific effects, Firm specific effects, } FP_{jt})$$

where X_{djt} is exports of domestic firms in industry j and period t

Tobit model, using (0,1) as limits is estimated. The application of *Tobit* model is appropriate because many of the firms may have zero values for exports. To take into account the fluctuations in the world demand for exports and industry-specific effects that are not captured by the model, time dummies as well as industry dummies are introduced.

IV Empirical Results: Industry-level Analysis

The empirical analysis is undertaken in two steps. Firstly, an industry-level analysis is undertaken to test whether foreign direct investment in India has led to export diversification and whether U.S. FDI has had a larger diversifying effect as compared to Japanese FDI in the post liberalisation period in the Indian manufacturing sector.

Secondly, the spillover effects are compared from U.S. and Japanese FDI on the export-intensity of domestic firms. The analysis is undertaken separately for the traditional export sector, non-traditional export sector and aggregate-manufacturing sector.

To examine the impact of FDI on exports we first analyse the inter-industry pattern of FDI. The industrial pattern of FDI in India (Table A.1) shows that foreign shares are high in electronics and electrical, chemicals (especially pharmaceuticals, plastics, paints, and toiletries), automobiles and automotive components, engineering, cigarettes, domestic appliances and food-processing industries. However, the traditional export-oriented industries according to their share in world exports, (see Table A.2) are mainly, tea, leather and leather manufactures, gems and jewelry, garments, iron ore and metal ferrous ores, and medicinal and pharmaceutical products. Though all the traditional export industries, with the exemption of tea and gems & jewelry have received some foreign participation, it can be said that the traditional export-oriented industries have not received FDI in a big way and FDI has more or less concentrated in non-traditional export sector. It is interesting to note that the share of almost all the non-traditional industries in world exports has increased since 1990. The share of total exports of India in world exports has also increased from 0.5% to 0.6% since 1995. It is found that in the Indian manufacturing sector a higher proportion of foreign equity is invested in the non-traditional export sector vis-à-vis traditional export sector. The result confirms the results arrived at by the earlier studies that FDI in India has not been attracted to export-oriented industries.

Table A.3 presents the mean values of export intensity of foreign firms, Japanese firms and U.S. firms. We find that U.S. firms have higher average export intensity as compared to the Japanese firms in the Indian manufacturing sector. This contradicts Kojima's hypothesis but supports the results arrived at by Encarnation (1999) for the two decades, 1970s and 1980s. He found that Japanese multinationals have been less reliant on their foreign subsidiaries' sales to generate international trade in Asia than have American multinationals.

Table 1, 2 and 3 presents the results of the regression analyses for industries in non-traditional export sector, traditional export sector and aggregate manufacturing sector respectively. Using the random effect model, as supported by the Hausman statistic, we find that the impact of FDI on the export-intensity of the industry in non-traditional export sector (Table 1) is positive and significant. However, FDI is not found to have a significant influence on export-intensity of industry in traditional export sector (Table 2) and in the aggregate-manufacturing sector (Table 3). The export-intensity is found to be higher in industries, which have low protection; are labour-intensive with low level of skills; higher profitability (in the lagged period) and have lower royalty payments⁷. The results with respect to FDI for aggregate manufacturing sector are consistent with the results of earlier studies, which have also found that FDI has not played any role in

⁷ Following transaction costs analysis, FDI will dominate as the mode of foreign market entry when transaction costs through the external market are high and internalization is preferred, whereas licensing will be the preferred mode in cases where transaction costs through the market are low. In this view, FDI and licensing are alternatives or substitutes. The interaction between FDI stake and license payments affecting exports may therefore be negative.

improving export performance of Indian industries. However, the results lend support to our hypothesis that FDI has led to a diversification in India's exports.

The results of the impact of Japanese and U.S. FDI on the export-intensity of the industry in non-traditional export sector (Tables 1) show that U.S. and Japanese FDI have differential impact on the export-intensity of the industry after controlling for other industrial characteristics. Unlike Japanese FDI, U.S. FDI positively influences the export-intensity of the non-traditional export sector⁸ and therefore it can be said that U.S. FDI has led to diversification of Indian exports. The empirical evidence also support this result since industries where U.S. FDI is prominent, namely, chemicals, pharmaceuticals, personal care and electrical have witnessed an increase in their share in the world exports after 1995 (Table A.2). However, we find that the impact of Japanese and U.S. FDI in the traditional export sector (Table 2) and aggregate manufacturing sector (Table 3) is not significant.

⁸ This is contrary to Kojima's hypothesis (1973). However, the results are consistent with those found by Encarnation (1999) for the two decades, 1970s and 1980s. He found that Japanese multinationals have been less reliant on their foreign subsidiaries' sales to generate international trade in Asia than have American multinationals.

**Table 1: Impact of Japanese FDI, U.S. FDI and aggregate FDI on export intensity of industries in non-traditional export sector:
Random Effects Model**

Variables	Coefficient (1)	t-value	Coefficient (2)	t-value
Constant	0.10***	3.35	0.08***	2.44
FEQ	-	-	0.04***	2.51
JEQ	-0.02	-0.19	-	-
USEQ	0.02***	2.64	-	-
ERP	-0.02***	-2.87	-0.01***	-2.22
SIZE	-0.05	-0.44	-0.05	-0.41
KI	-0.01**	-1.81	-0.01**	-1.80
R&D	-0.78***	-2.23	-0.58	-0.71
ADVT	-0.45	-1.08	-0.40	-0.96
SKILL	-0.12*	-1.76	-0.14***	-2.01
GP	0.33***	5.82	0.32***	5.59
VI	0.04	0.73	0.03	0.76
CR4	0.02	1.1	0.01	0.74
IMPCAP	-0.04	-0.61	-0.38	-0.52
IMPSPS	0.05	0.48	0.03	0.31
ROY	0.60	1.47	0.92*	1.66
Adj.R ²	0.19		0.17	
N	312		312	
LM	398.38***		407.15***	
HAUSMAN	16.06		16.15	
F Test	9.46***		9.91***	

- Notes:
1. Heteroscedasticity consistent standard errors are presented.
 2. Hausman statistic tests Random Effects vs. Fixed Effects Models
 3. The ERP series used has been estimated by NCAER for the years 1995-96 to 1998-99.
 4. Period of the analysis is 1994-95 to 1999-2000
 5. * indicates significant at 10% ** indicates significant at 5% *** indicates significant at 1%.
 6. For notations refer to Table of Definitions.

Table 2: Impact of Japanese FDI, U.S. FDI and aggregate FDI on export intensity of industries in traditional export sector: Fixed Effects Model

Variables	Coefficient	t-value	Coefficient	t-value
FEQ	-	-	-0.1**	-1.92
JAEQ	0.04	0.71	-	-
USEQ	-0.04	-0.68		
ERP	-0.05	-0.07	-0.08	-0.11
SIZE	-0.09	-0.57	-0.09	-0.55
KI	-0.03	-1.56	-0.03**	-1.73
R&D	0.19	1.50	0.26	1.53
ADVT	0.63	0.24	0.14	0.05
SKILL	-0.22	-1.05	-0.18	-0.91
GP	0.03	0.15	-0.09	-0.43
VI	-0.27	-0.95	-0.46*	-1.67
CR4	0.02	0.55	0.05	1.18
IMPCAP	0.13	0.60	0.11	0.53
IMPSPS	1.94	0.73	1.83	0.71
ROY	0.27	0.93	0.93	1.37
Adj.R ²	0.87		0.87	
N	132		132	
LM	74.06***		70.77***	
HAUSMAN	44.73****		65.14***	
F Test	8.47***		28.51***	

Note: 1.Hetroscedasticity consistent standard errors are presented.
2. Hausman statistic tests Random Effects vs. Fixed Effects Models
3.The ERP series used has been estimated by NCAER for the years 1995-96 to 1998-99.
4.Period of the analysis is 1994-95 to 1999-2000
5. *indicates significant at 10%** indicates significant at 5%*** indicates significant at 1%.
6. For notations refer to Table of Definitions.

Table 3: Impact of Japanese FDI, U.S. FDI and aggregate FDI on export intensity of all industries: Random Effects Model

Variables	Coefficient	t-value	Coefficient	t-value
Constant	0.19***	6.20	0.19***	5.64
FEQ	-		0.06	0.30
JEQ	0.05	0.30		
USEQ	0.01	0.75		
ERP	-0.01**	-1.89	-0.01*	-1.77
SIZE	-0.05	-0.37	-0.05	-0.37
KI	-0.01***	-2.11	-0.01***	-2.11
R&D	0.17	0.17	0.29	0.30
ADVT	-0.40	-0.71	-0.39	-0.69
SKILL	-0.22***	-2.92	-0.22***	-2.97
GP	0.26***	4.07	0.26***	4.03
VI	0.03	0.65	0.03	0.67
CR4	-0.07	-0.87	-0.08	-0.90
IMPCAP	0.03	0.41	0.03	
IMPSPS	-0.04	-0.29	-0.04	-0.37
ROY	-0.54	-1.08	-0.67	-1.14
Adj.R ²	0.09		0.09	
NO.OF.OBS	444		444	
LM	736.59***		734.47***	
HAUSMAN	15.58		14.85	
F Test	7.09***		7.68***	

V Empirical Results: Spillover effects Of FDI

To examine the spillover effects of foreign firms on the export-intensity of the domestic firms in the non-traditional export sector, Tobit model is estimated with export-intensity of domestic firms as the dependent variable and the extent of presence of Japanese FDI, U.S. FDI and aggregate FDI as the spill variables. Since the spill effects are found to be industry-specific these industries are divided into ten broad categories and industry dummies are included to control for the industry-specific effects. Five time-dummies are also included to control for the year- to- year fluctuations in the world demand for exports. The results presented in Table 4 show that, after controlling for industry specific effects, aggregate FDI is found to have a significant impact on exports of the domestic firms. U.S. FDI, however, has larger and more significant spillover effects on the export-intensity of the domestic firms as compared to Japanese FDI. The other characteristics of the domestic firms that lead to higher export-intensity are the size of the firm, R&D intensity of the firm, imports of capital goods, spares and stores and royalty payments by the firms (disembodied technology imports). This implies that technology level in the firm has a significant impact on its export intensity. While at the industry level we find that export-intensity of the industry, i.e., the competitive advantage of the industry is an important variable affecting the exports of domestic firms.

The empirical results thus support our hypotheses. The results show that U.S. firms have led to diversification of exports of Indian manufacturing both directly as well as indirectly. However, Japanese FDI do not have any significant impact on export intensity.

Table 4: Spillover effects from Japanese FDI, U.S. FDI and aggregate FDI on export-intensity of domestic firms: Dependent variable is export-intensity of domestic firms in the Non-Traditional Export Sector: Tobit Model Estimates

	Coefficient	t-statistic	Coefficient	t-statistic
CONSTANT	-0.31***	-10.11	-0.34***	-10.75
SIZE _F	0.05***	2.56	0.05***	2.68
KI _F	0.03	0.51	0.03	0.52
R&D _F	0.06***	2.29	0.06***	2.33
IMPCAP _F	0.02***	6.52	0.02***	6.50
IMPSPS _F	1.42***	8.63	1.40***	8.47
ROY _F	0.69*	1.84	0.63*	1.77
ERP	-0.04	-0.33	0.04	0.02
SIZE	-0.01***	-4.33	-0.01***	-4.72
CR4	0.01	0.01	-0.03	-0.31
R&D	0.76***	2.67	0.91***	2.81
EXPINT	0.24***	3.78	0.25***	4.06
SKILL	0.03	0.45	0.04	0.72
USEQ	0.21*	1.69	-	-
JEQ	0.06	0.33	-	-
FE	-	-	0.23***	3.39
DT2	-0.06	-0.54	-0.07	-0.62
DT3	-0.02**	-1.97	-0.02***	-2.15
DT4	-0.02***	-2.03	-0.03***	-2.33
DT5	-0.28	-0.7	-0.09	-7.32
DT6	-0.28***	-17.94	-0.02***	-18.15
IND1	-0.05***	-2.69	-0.04***	-2.06
IND2	0.01	0.9	0.03*	1.79
IND3	-0.05***	-2.44	-0.03*	-1.66
IND4	0.25***	6.48	0.25***	6.64
IND5	-0.03	-1.52	-0.02	-0.89
IND6	0.03	0.02	0.01	0.97
IND7	-0.01	-0.81	0.02	0.14
IND8	0.01	0.93	0.02	1.20
IND9	0.01	0.76	0.02	1.24
ADJ.R SQUARED		0.27	0.27	
LOG LIKELIHOOD	-3082.92		-3078.53	
NO.OF OBSERVATIONS		8688	8688	

- Notes: 1. Tobit Model Estimates are presented
2. Period of the analysis is 1994-95 to 1999-2000
3. DT2 -DT6 refers to Time Dummies.
4. IND2-IND9 refers to Industry Dummies.
5. *indicates significant at 10%** indicates significant at 5%*** indicates significant at 1%.
6. For notations refer to Table of Definitions.

VI Conclusion

Since the beginning of the decade of 1990s, the Indian government has adopted various structural reform measures and has made several changes in the regulatory framework to attract foreign direct investment in India. However, in spite of the various incentives, the country has not been able to attract FDI in the export-oriented areas. This has led to the belief that FDI has not played any significant role in export-promotion of India. However, the main finding of the study is that FDI has to some extent led to diversification of India's exports. The study also brings out the significance of the source-country dimension of the FDI in influencing exports.

The study undertakes both industry-level as well as firm-level analyses for the period 1994-1995 to 1999-2000. The industry-level analysis uses the panel data for 74 disaggregated manufacturing industries. The analysis is carried out separately for traditional and non-traditional export sectors. The results show that FDI has a significant effect on the export-intensity of industries in the non-traditional export sector and therefore has, to some extent, led to diversification in India's exports. The impact of FDI on exports, however, differs with respect to the source-country of FDI. U.S. FDI is seen to have a positive and significant effect on export-intensity of industries in the non-traditional export sector, while Japanese FDI do not have any significant impact. In the traditional export sector, and taking aggregate manufacturing sector we find that FDI has no impact on the export-intensity of the industry. At the firm level, the spillover effects of Japanese FDI, U.S. FDI and aggregate FDI are estimated in the non-traditional export sector using a panel data for 1,448 domestic firms. The analysis shows that U.S. firms

have larger spill effects on the exports of the domestic firms as compared to Japanese firms. Lower intra-firm trade and higher integration within the domestic firms by U.S. firms as compared to Japanese firms seem to be probable reasons for the differential spillover effects from the two sources. The study thus highlights the importance of taking into account the heterogeneity of FDI and export diversifying impact of FDI while analysing the impact of FDI on exports of developing country.

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Appendix

Table A.1. Inter-Industry Distribution of Percentage Shares of Foreign, Japanese and U.S. equity invested in the Indian Manufacturing Sector: (Average Equity invested in the period 1995-96 to 1999-2000).

INDUSTRY	Foreign direct investment	Foreign direct investment from U.S.	Foreign direct investment from Japan
Air-conditioners	0.55	2.47	0.63
Auto Ancillaries	9.84	6.47	18.14
Auto-LCV/HCV	13.33	3.77	12.75
Auto-M Cycle/Mop	1.68	0	9.12
Bearings	2.8	5.1	0
Chemicals-organic	6.35	10.63	0.07
Chemicals-inorganic	1.65	6.06	3.6
Cigarettes	2.71	1.82	0
Compres/Dril Eqp	1.23	5.6	0
Computer-SW-	1.84	4.18	0.4
Cycles & Access.	0.04	0	3.03
Domestic Appliances	3.36	1.45	2.52
Dry Cells	0.05	0.73	1.54
Dyes & Pigments	0.15	0.33	0.92
Electric Equip	3.01	2.68	4.19
Electrod-Graphi	0.09	0	1.09
Electronic-Comp.	5.75	8.72	4.1
Electronic-Cons.	8.91	2.19	18.62
Engineering	3.56	4.75	2.84
Engines	1.53	3.53	0
Food-Processing	4.33	3.28	0
Glass & Gl. Products	2.6	0	9.02
Packaging	1.94	3.22	0.09
Personal Care	2.04	4.07	0
Pharm-Ind-Formul	0.03	1.15	0.09
Pharm-others	2.3	8.68	0
Text-Cott. Blend	0.55	0	1.2
Text-Manmade	1.11	0	1.57
Tyres	0.9	2.4	0.05
Others	15.77	6.72	4.42
TOTAL	100	100	100

Source: *Capitaline 2000*

Table A.2: India's Share (%) in World Exports by Commodity Divisions

Traditional Export Sector	1985	1990	1995	1997	1998
Tea	26.2	22.1	14.5	18.5	16.4
Iron ore and concentrates	7.8	7.6	6.2	4.9	4.6
Metalliferous ores and metal scrap	2.4	2.1	1.5	1.3	1.4
Dyeing, tanning and colouring materials	0.8	1.2	1.1	1.4	1.3
Medicinal and Pharmaceutical Products	0.8	1.2	1	1.1	1
Leather and Leather Manufactures	8.3	6.3	3.3	2.8	2.9
Textile Yarn, Fabrics and made-up articles	2.1	2.1	2.9	3.3	3.3
Pearls, precious and semi-precious stones	9.6	9.8	11.8	10.6	10.7
Articles of Apparel and clothing accessories	2.3	2.3	2.6	2.3	2.3
Vegetables and fruits	1.4	0.8	1	1.1	1
Tobacco and manufactures	1.8	0.8	0.5	0.9	1
Non Traditional Export Sector					
Manufactures of Metals	0.4	0.5	0.6	0.6	0.6
Machinery and Instruments	0.1	0.1	0.1	0.1	0.1
Transport Equipments	0	0	0	0.1	0.1
Iron and Steel	0.1	0.3	0.7	0.9	0.8
Electrical Goods	0	0	0.1	0.1	0.1
Road Vehicles	0.1	0.1	0.2	0.2	0.1
cereals and cereal preparations	0.6	0.6	2.7	1.5	1.6
organic chemicals	0.1	0.3	0.7	0.9	0.9
inorganic chemicals	0.1	0.2	0.3	0.4	0.4
Essential oils, and perfume materials, soaps etc	0.7	0.1	0.5	0.5	0.4
plastic materials, artificial resins, cellulose & others	0	0	0.1	0.1	0.1
Chemical materials and products	0.2	0.2	0.4	0.6	0.6
office machinery and ADP equipment	0.1	0.1	0.1	0.1	0.1
Total Exports	0.5	0.5	0.6	0.6	0.6

Note: The industries whose average share in the world exports in 1985 and 1990 is more than 1% are taken to be industries in the traditional export sector. Source: Economic Survey (2000-2001).

Table A.3: Mean Values of Export-Intensity, Foreign firms, Japanese firms and U.S. firms in the Traditional and Non-Traditional Export Sectors

Export Intensity	All Industries	Traditional Export Sector	Non-Traditional Export Sector
All Firms	0.11 (0.14)	0.20 (0.11)	0.07 (0.09)
Foreign firms	0.07 (0.11)	0.04 (0.11)	0.08 (0.04)
Japanese firms	0.008 (0.03)	0.001 (0.03)	0.009 (0.01)
U.S. firms	0.03 (0.05)	0.003 (0.01)	0.04 (0.06)
No. of Industries	74	52	22

Note: Figures in the parenthesis are the standard deviations