Foreign Investment in Indian Industrial Firms and Its Impact on Firm Performance

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Abstract

There is a strong belief that foreign direct investment in industrial firms in developing countries has a positive productivity enhancing effect on the domestic firms. The objective of the present paper is to assess the impact of FDI in Indian manufacturing firms on their performance. The analysis is carried out using a panel data-set (unbalanced panel) on 775 manufacturing companies in India for the period 2000-01 to 2011-12. Growth, profitability and export intensity are considered as performance indicators for the analysis. The estimates obtained by using difference-in-difference estimator coupled with propensity score matching do not show a significant effect of FDI on growth and export performance. However, there is some evidence, though not strong, that FDI tends to raise profitability of Indian manufacturing firms after two or three years which is probably a manifestation of the productivity enhancing effect of FDI.

1. Introduction

1.1 There is a strong belief that foreign direct investment in industrial firms in developing countries has a positive productivity enhancing effect on the local firms receiving the investment. The reason for expecting such an impact primarily lies in the transfer of technological knowledge, management practices, etc. associated with foreign investment as well as the local firms getting increasingly more acquainted with global players and hence developing new business connections with them. There are empirical studies that have found evidence of such positive productivity enhancing effects of foreign direct investment. Arnold and Javorcik (2009), for instance, have found a significant positive effect of foreign investment on productivity of industrial plants in Indonesia.

1.2 Foreign direct investment (FDI) may not only enhance the productivity of firms in which the investment takes place, but it may also have a positive indirect effect on the productivity of other local firms belonging to the same industry and on the productivity of local firms in vertically connected industries (as supplier of inputs or users of the products). This is known in the literature as the spillover effects of FDI. There is a huge literature on the spillover effects of FDI including studies undertaken in the context of developing countries. A number of studies on the spillover effects of FDI has been carried out for Indian manufacturing firms and several of them, though not all, have found evidence of positive spillover effects (see, for instance, Siddharthan and Lal, 2004; Behera *et al*., 2012a, 2012b; and Mondol and Pant, 2014). This aspect is not discussed any further in this paper because the focus here is on the direct effect of FDI on performance indicators of the firms receiving the investment.

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1.3 Besides productivity, the impact of FDI on other performance indicators of firms has been studied empirically. These include wages and growth. A couple of studies have examined the impact of FDI on wages. Lipsey and Sjoholm (2004), for instance, have investigated this issue for Indonesia. They find that foreign-owned establishments in Indonesia pay a higher wage to their workers than domestically owned establishments, and the difference in wages is mostly attributable to ownership rather than plant characteristics. The impact of FDI on growth performance of firms has been studied by Petkova (2013) in the context of Indian manufacturing. She has found a significant positive effect of FDI on growth performance of firms.

1.4 Confining attention now only to the studies that have been undertaken on the impact of FDI of Indian manufacturing firms, a majority of the studies have tried to assess the spillover effects. But, an assessment of the direct effect of FDI on the performance of the firm receiving the investment has also been done as, for instance, in the study of Petkova (2013) mentioned above. The effect of FDI or foreign ownership on productivity of industrial firms in India has been examined by Goldar *et al*. (2004), Banga (2004) and Mishra (2011), among others. The effect of FDI on export performance has been examined by Banga (2006) and Ghosh and Roy (2013), among others. The effect of FDI on technological choices and technological efforts made by firms has been studied by Kathuria (2008) and Ghosh and Roy (2014).

1.5 The object of this paper is to assess the impact of FDI in Indian manufacturing firms on their performance. The analysis is carried out using a panel data-set (unbalanced panel) on manufacturing companies in India covering the period 2000-01 to 2011-12. Three performance indicators are considered for the analysis: growth, profitability and export intensity. The empirical approach adopted in this study, which is explained later in Section 2, is essentially similar to that in Petkova's study on the impact of FDI on Indian manufacturing firms. There are, however, certain differences. One important difference is that the period covered in this paper is more recent than that covered by Petkova. In the study of Petkova, the period considered is 2000-01 to 2008-09, whereas the period covered in this study is 2000-01 to 2011-12. Thus, a longer and more recent period is covered in this study.

1.6 The rest of the paper is organized as follows. Section 2 discusses the data and methodology utilized for the analysis. A preliminary analysis of the firm-level data is presented in Section 3. A more rigorous econometric analysis of the effect of FDI on firm performance is presented in Section 4. Finally, the key findings are summarized and some concluding remarks are made in Section 5.

2. Data and Methodology

2.1 This study makes use of the *Ace Equity* data-base. The period covered is 2000-01 to 2011-12. Data on 775 manufacturing companies are used for the study. It should be pointed out here that *Ace Equity* covers a much larger number of manufacturing companies. However, for the analysis presented here, detailed data are required on the pattern of equity holding in different years, particularly the holding of the foreign promoters, if any. Since such data are not available for many manufacturing firms in the *Ace Equity* data-base, these firms had to be excluded from the analysis.

2.2 To explain next the empirical strategy, the focus is on the change in ownership, from domestic to foreign, taking place in a firm. To make an assessment of the impact of the ownership change on the firm performance, the difference-in-difference (DID) estimator is used. Thus, the average change in a performance indicator of the acquired firms is compared with the average change in the performance indicator in respect of the firms that remain in domestic hands.

2.3 Let the change of ownership, from domestic to foreign, occurring in a particular year T, be called an event taking place in time T, and the firms that experience the event be called treated firms (i.e. the firms that get treated in that year). Also, let the firms that remain in domestic hands and do not experience the event be called control group firms. Thus, to judge the effect of foreign acquisition, the average change in a performance indicator (say logarithm of real sales) between years T and T-1 for treated firms could be compared with that for control groups firms. This is termed as the average treatment effect on the treated (ATT).

2.4 To make a valid comparison so as to isolate the treatment effect, the difference-in-difference (DID) estimator is combined with propensity score matching. This makes it possible to compare treated firms with non-treated firms having similar characteristics.[2] The central idea underlying the technique of propensity score matching is that there are a number of time varying and time invariant characteristics that could make a control group firm a suitable match for a treated firm. Since a large number of variables would be difficult to compare across firms to find suitable matches, an index may be formed on the basis of the relevant variables which may then be used for finding suitable matches. This index, known as propensity score, is formed by estimating a logit or a probit model which gives for each firm the probability of getting treated at time T.

2.5 When using panel data for the analysis, the year in which the event occurs and the industry affiliation of the treated are important pieces of information to be used for finding suitable matches for the treated firms. Arnold and Javorcik (2009) in their study have used a technique that ensures that for each acquired/treated firm, the match from the control group are assigned from the same year and same industry group/sector. In this study, the same technique has been applied.[3]

2.6 Following Arnold and Javorcik (2009), the standard error of ATT is computed by using bootstrapping procedure. While Arnold and Javorcik have considered two-digit level industrial disaggregation for finding matches for treated firms, the same procedure could not applied here because the number of treated firms is relatively smaller. Instead of considering individual two-digit industries separately, four broad groups have been formed: (a) food, tobacco, textiles, leather and other agriculture based industries, (b) chemicals, rubber, plastics, and non-metallic mineral products, (c) metals and metal products, and (d) machinery, transport equipment and other miscellaneous industries. Matching has been done by considering the year of treatment and the broad industry groups (out of the above four) to which the treated firm belongs.

[2] In a way, this creates a counterfactual. Thus, the observed change in a performance indicator in respect of a treated firm is compared with what the change would have been if the firm did not get the treatment, i.e. the firm had remained in domestic hands.

[3] We are thankful to Jens Matthias Arnold for sharing the programming codes to be used in STATA.

2.7 One important methodological issue is what threshold of foreign equity holding should be used to define a foreign firm or foreign acquisition. In studies undertaken on Indian manufacturing firms, the cut-off level has commonly been taken as 10 percent (see, for instance, Sasidharan and Ramanathan, 2007; Behera *et al*., 2012a, 2012b; and Mondol and Pant, 2014). Indeed, Petkova in her study (2013) of mentioned above has also used 10 percent foreign equity level for defining foreign acquisition. Arnold and Javorick (2009), by contrast, have used the cut-off level of 20 percent. One interesting empirical question this arises here is that defining foreign acquisition or treatment at 10 percent foreign equity may yield different results than the alternate option of defining foreign acquisition or treatment at 20 percent foreign equity. This issue has not been investigated in this paper and left for future research. For the analysis undertaken in this paper, the threshold level of foreign equity participation has been taken as 10 percent.

3. Trends in FDI and Preliminary Analysis of the Firm-level Data

This section is divided into two sub-sections. Section 3.1 gives a macro view of FDI inflows and discusses the trends in FDI in India in the 2000s and later. Section 3.2 presents a preliminary analysis of firm-level data relating to foreign (equity) investment in Indian industrial firms, covering the period 2000-01 to 2011-12.

Since the main object of the paper is to assess the impact of foreign investment in Indian manufacturing firms on certain performance indicators of those firms, covering the period 2000-01 to 2011-12, a brief discussion on the trends in FDI inflows in India in this period would obviously be useful, as a background to the analysis presented later. The preliminary analysis of the firm-level data serves the same purpose, providing an indication of the magnitude of foreign equity investment in Indian industrial firms and its distribution across industry groups and over time.

3.1 *Trends in FDI*

3.1.1 Table 1 presents data on India's FDI inflows in the years 2000-01 to 2012-13, showing inter-temporal changes in aggregate FDI inflows as well as foreign equity inflows. The table is based on DIPP (Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India) data on India's FDI inflows. It is interesting to observe from the table that there was a sharp increase in FDI inflows in 2006-07 over the previous year, and another large increase in 2007-08. The increase in aggregate FDI inflows between 2005-06 and 2006-07 was by about 150 percent, and that in equity investment was by about 125 percent. Between 2006-07 and 2008-09, aggregate FDI inflows increased by about 84 percent and foreign equity inflows increased by about 150 percent. There is no clear trend in FDI inflows in the period after 2008-09. The inflows in 2010-11 were lower than those in 2008-09. However, there was a smart recovery the next year, i.e. 2011-12. In the year 2012-13, FDI inflows came down significantly from the levels reached in 2011-12 with the results that the FDI inflows in 2012-13 were lower than those in 2008-09.

3.1.2 It is important to note that the average annual FDI inflows of India in the period after 2005-06 were substantially higher than those during the period 2000-01 to 2005-06. This is true both for aggregate FDI inflows and foreign equity inflows. In the case of equity

inflows, for instance, the average inflow during the period 2000-01 to 2005-06 were about US$ 3.4 billion while that during the period 2006-07 to 2012-13 were about US$ 24.7 billion, i.e. more than seven times the figure for the first half of the 2000s.

3.1.3 Sector-wise breakup of FDI inflows is presented in Table 2. It is evident from the table that a substantial portion of the FDI inflows during the period April 2000 to March 2012 went to the services sector. The share of manufacturing in the total inflows of FDI in India in this period appears to be below the 50 percent mark. A careful analysis of the industry-wise division of FDI inflow undertaken by Chalapati Rao *et al.* (2014) brings out that the share of manufacturing in aggregate FDI inflows in India in the period 2000 to 2012 was about 30 percent, and it was relatively higher at about 40 percent in the more recent period, 2010-2012. The implication is that the huge increase in foreign equity inflows that took place in the second half of the 2000s was not confined to services, electricity and construction. Rather, a sizeable part of these equity inflows went to manufacturing firms. This point obviously has relevance for the analysis carried out later in this paper.

3.1.4 A more detailed industry-wise break up of FDI inflows into manufacturing during the period 2000 to 2012 is depicted in Figure 1. This is based on the estimates provided in the study of Chalapati Rao and associates (2014) mentioned earlier. It is evident from the figure that Drugs and Pharmaceuticals, Chemicals (other than fertilizers), Automobiles and Metallurgical industries dominate the FDI inflows into manufacturing. The combined share of these four industries during the period 2000 to 2012 was about 59 percent. Other industries that were important destinations of FDI inflows include Electrical equipment, Cement and gypsum products, Industrial machinery, Miscellaneous mechanical and engineering industries and Food processing, each accounting for about three percent of the inflow or a higher proportion.

3.1.5 Some observations on the nature of the foreign investors and the nature of foreign investment made in Indian manufacturing would be in order here. These observations are based on the analysis of this aspect undertaken by Chalapati Rao *et al.* (2014).

3.1.6 In the study of Chalapati Rao *et al.* (2014), a distinction has been made between 'realistic FDI" and other FDI inflows. Realistic FDI is defined as those investments where the foreign investor or its parent is engaged in manufacturing. The remaining part of the investments (about one quarter of the aggregate FDI inflows into manufacturing) is dominated by private equity, venture capital, hedge funds and sovereign wealth funds. Within the realistic FDI, a relatively large part appears to be accounted for by greenfield investment (see Figure 2). This is followed by acquisition of existing shares. Combining all realistic FDI in manufacturing where shares of a company are acquired or additional foreign equity inflows take place in an already acquired company, the total comes about 40 percent of the aggregate FDI inflows into Indian manufacturing. This is important to note because the empirical analysis presented later in the paper is essentially about this type of investment.

3.2 *Analysis of Firm Level Data*

3.2.1 As mentioned above, this study on the impact of FDI on firm performance in Indian manufacturing is based on firm level data for 775 manufacturing firms taken from *Ace*

Equity database covering the period 2000-01 to 2011-12. To study how foreign equity participation has changed over time, two threshold levels of foreign equity participation are considered, namely (a) foreign promoters' equity holding of 10 percent or more, and (b) foreign promoters' equity holding of 25 percent or more.

3.2.2 Table 3 shows the total number of manufacturing firms in the sample in various years during 2000-01 to 2011-12, and among them, the firms (in number and percentage) which meet the above mentioned two threshold levels of foreign equity participation in different years.

3.2.3 There are about 500 to 700 firms in the sample each year. In about 42 to 48 percent of the firms in different years, foreign equity participation is 10 percent or more, and in about 29 to 36 percent of the firms in different years, foreign equity participation is 25 percent or more. The sample seems to be somewhat biased towards the firms with foreign equity participation, as many firms with no foreign equity participation probably get excluded from the sample because certain importance pieces of information, particularly details on pattern of equity holdings, are missing.

3.2.4 The comparison between firms belonging to low technology industries and those belonging to medium and high technology industries shown in the table reveals that foreign equity participation is relatively lower in low technology industries. This is true whether one considers the threshold of 10 percent foreign equity holding or 25 percent foreign equity holding.

3.2.5 It is interesting to note from Table 3 that even though there was a huge increase in the foreign equity inflows in Indian manufacturing in the period after the mid-2000s (as indicated by Table 1), there was no clear upward trend in the proportion of firms that cross the specified threshold levels of foreign equity participation. This pattern is found for the proportion of firms with foreign equity participation of 10 percent or more, and the same holds true for the proportion of firms with foreign equity participation of 25 percent or more. These findings are obviously surprising given that there was a huge increase in foreign equity inflow in the second half of the 2000s as observed in Table 1 above. A closer examination of the data reveals that in 150 cases, the foreign equity participation in the firms has increased from a level below 10 percent to a level of 10 percent or more during the period under study, i.e. 2000-01 to 2011-12 (see Table 4). On the other hand, the reverse change i.e. the extent of foreign equity participation decreasing from a level of 10 percent or more to a level below 10 percent has occurred in 157 cases. Similarly, it is found that in 90 cases, the level of foreign equity participation has increased from a level below 25 percent to a level of 25 percent or more (see Table 4). The reverse change has occurred in 101 cases. It is evident from the examination of the data that while there has been considerable inflow of foreign investment in Indian manufacturing firms (companies), this has not led to any general increase in the share of foreign promoters in equity holding in the Indian industrial firms (companies). While the share of foreign promoters in equity has increased in a number of cases to the threshold levels or beyond, there has been a decrease to a level below threshold in an equally large number or a greater number of cases.

3.2.6 The opposing trends of rising foreign equity share in some firms and falling foreign equity share in some other firms seems to have, by and large, neutralized each other. Hence,

there has been no clear upward trend or downward trend in the overall share of foreign promoters in equity of Indian manufacturing companies. This may be seen from Figure 3 which shows the average foreign equity holding in the 775 sample companies considered for the study.

3.2.7 It may be mentioned in passing that in the study of Petkova (2013) on Indian manufacturing firms for the period 2000-01 to 2008-09, she identified 66 cases of foreign investment in Indian manufacturing, i.e. the cases in which foreign equity holding crossed the threshold limit of 10 percent. Also, she found 46 cases of disinvestment, i.e. the cases in which foreign equity holding came down from a level of 10 percent or above to a level below 10 percent. These findings are broadly consistent with the findings of this study. According to the assessment made by Petkova, the largest number of cases of foreign direct investment took place in 2006. This matches the pattern observed in Table 4. According to Petkova, this sharp increase in the number of cases of foreign investment in 2006 may have a lot to do with Clause 49 of the listing agreement for all Indian publically traded companies which became effective from January 1, 2006. This clause ensures greater transparency in various ways and thus encouraged foreign investment. It mandates 50 percent independent directors or one-third if the chairperson of the board is a non-executive director. Other requirements imposed include independent audit committee and disclosure of information on subsidiary companies.

3.2.8 Table 5 shows the distribution of sample firms according to two-digit industries to which they belong. A further sub-division of firms has been made according to the level of technology. Firms have been divided into two groups in terms of technology used: low, and medium and high. Out of the 775 firms covered in the study, 124 belong to chemicals and chemical products (medium technology firms), 66 belong to textiles (low technology firms), 55 firms belong to pharmaceuticals and 50 firms belong to computers, electronics and optical products (high technology firms). The following industries account for the dominant portion of the cases of foreign direct investment: textiles, chemicals and pharmaceuticals, non-metallic mineral products, basic metals, computer and electronics, and non-electrical machinery.

3.2.9 Before concluding this section, it should be pointed out that there are several cases in which a firm experiences a decline in foreign equity participation percentage below the threshold and an increase back to the threshold. An examination of the data reveals that out of the 150 cases of firms which experienced an increase in foreign equity participation from a level below 10 percent to a level of 10 percent or more, there are 11 cases which had experienced a reverse change within the previous three/four years. Similarly, out of the 90 cases, in which the increase in foreign equity participation percentage was from a level below 25 percent to a level of 25 percent or more, there are 8 cases where the reverse change had taken place in the previous three/four years.

4. Results of Econometric Analysis

4.1 *Differences between domestic and foreign firms*

4.1.1 To analyze differences in certain important firm characteristics between domestic and foreign firms, t-test for equality of means has been applied. Table 6 makes a comparison

of the mean values between domestic and foreign firms in respect of certain variables representing important firm characteristics. The table reports t-statistic for the test of equality of means. A comparison is made between the observations (firm by year) in which the foreign equity proportion is less than 10 percent (regarded as domestic firm) and the observations in which the relevant proportion is 10 percent or more (regarded as foreign firm).[4] It should be noted that categorization is not done by firm but by observation.[5] Thus, some firms are treated as a domestic firm in some observations and as a foreign firm in others. This occurs in those cases where a significant change takes place over time in the foreign equity holding proportion in the firm making foreign equity share cross over the 10% threshold in some year during the period under study. Therefore, these firms change from being a domestic firm to a foreign firm (or from a foreign to a domestic firm).

4.1.2 The comparison of means shown in Table 6 indicates that the foreign firms are bigger in size than domestic firms. Expenditure on royalty and technical fees in foreign exchange is relatively higher for foreign firms than domestic firms, which implies that the foreign firms are more technology oriented than domestic firms. Also, it may be inferred from the table that foreign firms have relatively higher intensity of imports of materials, stores and spares, and capital goods. On the other hand, foreign firms do not have higher export intensity than domestic firms. Rather, the opposite seems to be true. Another interesting finding is that the foreign firms have greater liquidity and are less leveraged. Indeed, there is a marked difference in the debt-equity ratio between the foreign and domestic firms; it is relatively lower in foreign firms.

4.1.3 The comparison of means presented in Table 6 has been followed-up by a discriminant analysis. The results of this analysis indicate that the two most important factors that distinguish between domestic firms and foreign firms are: (a) debt-equity ratio and (b) whether the firm belongs to a business house. The results indicate that a foreign firm is more likely to be a firm belonging to a business house than an independent private firm. Also, the debt-equity ratio in a foreign firm is likely to be lower than that in a domestic firm. Other important factors distinguishing between domestic and foreign firms are size of the firm, technology import intensity, import intensity and export intensity. In the case of the last factor, there is an inverse relationship, i.e. foreign firms are expected to have lower export intensity.

4.2 Probit Model for Explaining Foreign Investment

4.2.1 As mentioned earlier, a Probit model has been estimated to obtain the propensity scores to be used for matching. The estimates of the Probit model are presented in Table 7. The model explains the transition of firms from being domestically owned to foreign owned.

4.2.2 Since the model explains the transition of domestic firm to foreign firm, it is estimated from those observations in which the one-year lagged value of foreign equity proportion is

[4] In most cases, the variables representing firm characteristics have been winsorized at 2.5 percent level to take care of extreme variation in the values of the variables. This applies also to variables used for the estimation of the Probit model presented later.

[5] There are over 3500 observations for domestic firms and over 3000 observations for foreign firms, summing over observations for different years.

less than 10 percent. It should be noted further that the explanatory variables in the model are lagged by one year (to take care of possible simultaneity bias), except in the case of dummy variables such as membership of business house. The model includes year dummies and two-digit industry dummies. These dummy variables are intended to capture the inter-industry differences and incorporate the influence of time factor, for example, the effect of clause 49 that came into effect in 2006 (mentioned earlier).

4.2.3 The Probit model estimate indicates that the probability of transition of a domestic firm to a foreign firm is positively related to the rate of investment and negatively related to cash flow situation in the firm. Thus, an important reason for foreign equity inflow in a firm may be the financial requirements of the firm. The coefficient of the debt-equity variable in the model is negative, which is consistent with the pattern observed in Section 4.1. The coefficient is not strictly statistically significant, but the t-ratio is high enough to infer justifiably that high leverage discourages foreign direct investment in a manufacturing firm in India.

4.2.4 It appears from the model results that foreign equity participation is more likely to take place in new firms than in old firms. Also, firms belonging to business houses are more likely to attract foreign direct investment than firms not belonging to business houses.

4.3 Estimates of the Impact of Foreign Direct Investment

4.3.1 Three indicators of performance are considered for assessing the impact of foreign direct investment on the performance of manufacturing firms. These are: (a) growth in real sales measured by changes in logarithm of real sales,[6] (b) change in profitability measured by the ratio of profit before tax and exceptional items to gross sales, and (c) change in export intensity measured by the ratio of value of export to gross sales. The estimates of ATT (average treatment effect on the treated) obtained by the matching procedure of Arnold and Javorick (2009) are reported in Table 8.[7]

4.3.2 It is seen from Table 8 that none of the estimates of ATT for sales growth and change in export intensity are statistically significant. Also, the estimates are erratic. The estimate of ATT for sales growth is negative for years 0 and 1 and turns positive for later years. The estimate of ATT for export intensity is negative for years 0, 1 and 2 and turns positive for year 3. All these estimates of ATT for change in export intensity are rather low. Thus, it is difficult to judge whether foreign direct investment will have a positive or a negative effect on growth and export performance. Based on the results obtained, one may conclude that the estimates of ATT do provide any clear indication of a significant effect of foreign equity inflow in a firm on its growth or export performance.

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[6] Sales have been deflated by the wholesale price index of manufactured products.

[7] The estimates make use of PSMATCH2 run on STATA 12 along with MATCHCAT procedure developed by Arnold. While making matches, the firms that turned from foreign owned to domestically owned in one year and then turned again to foreign owned in the next year have been excluded. Also, while finding a match for a particular treated firm, the year of treatment is considered and the foreign equity proportion in other firms in that year is considered. Among the other firms, those in which foreign equity proportion is more than (or equal to) 10 percent in the year of treatment and also in the previous year are not considered as a possible control.

4.3.3 It should be noted that the results obtained here in respect of the impact of FDI on growth performance of Indian manufacturing firms are at variance with the findings of Petkova (2013) who has found a significant positive effect of FDI on growth of firms. One possible reason why the findings of this study differs from that of Petkova is that the period covered in this study includes the years of recent global economic crisis, which are not included in Petkova's study.

4.3.4 In the case of profit rate, the estimates of ATT are statistically insignificant for years 0, 1 and 2, and statistically significant for year 3. The estimates of ATT for years 2 and 3 are relatively large in numerical magnitude. The estimate for year 2 is greater than the standard error, and the estimate for year 3 is well above the standard error (see Figure 4 for a graphic presentation of changes in profitability among treated and control group firms). This is suggestive of a positive effect of FDI on profitability of manufacturing firms.

4.3.5 To examine further the effect of FDI on profitability, an alternate estimate of ATT has been made in which matching has been done simply on the basis of propensity scores without paying any attention to the timing of the treatment and industry affiliation of the treated firms. The results of this analysis are reported in Table 9. In this case, the estimates of ATT are statistically insignificant for all four years. However, the estimated ATT is positive in numerical value for all four years, and the estimate for year 3 is relatively big in numerical magnitude and greater than the standard error. Indeed, the t-ratio is only marginally less than the tabulated value for 10 percent level of statistical significance. Thus, considering the results reported in Tables 8 and 9, it may be inferred that there are indications of a positive effect of foreign direct investment on profitability of manufacturing companies by the third year.

5. Conclusion

5.1 The effect of foreign direct investment in Indian manufacturing firms on their performance has been studied in this paper using data on 775 manufacturing companies for the period 2000-01 to 2011-12. Three indicators of performance are considered for the analysis: growth, profitability and export intensity.

5.2 An interesting finding of the study is that while there was a huge increase in FDI inflows particularly foreign equity inflows from the mid-2000s, the foreign equity share in Indian manufacturing companies has not increased much. A close examination of the data revealed that while the foreign equity share increased beyond the 10 percent threshold in about 150 firms out of 775 firms studied, in another 157 firms, foreign equity share declined from a level of 10 percent or more to a level below 10 percent. Similarly, in 90 cases, the foreign equity share increased beyond the threshold level of 25 percent, and in another 101 cases, the reverse change took place.

5.3 Analysis of firm level data reveals that some of the most important factors that determine foreign direct investment in Indian manufacturing firms are: (a) debt-equity ratio, (b) whether the firm belongs to a business house, and (c) import orientation of the firms. Also, it appears that one important cause for foreign investment taking place in a firm may be connected with the financial requirements of the firm; a firm engaged in large investment

activity and not having sufficient resources of its own is more likely to go for foreign equity inflow. Thus, the underlying basis for the foreign investment decision in this case is more financial than strategic.

5.4 The main focus of the study is on the assessment of the impact of FDI on firm performance. The estimates obtained by using difference-in-difference estimator coupled with propensity score matching did not show a significant effect of FDI on growth and export performance. However, there is some evidence, though not strong, that FDI tends to raise profitability of Indian manufacturing firms after two or three years. This is probably a manifestation of the productivity enhancing effect of FDI. In this sense, the findings of this study are in agreement with the findings of the study of Arnold and Javorcik (2009) undertaken of manufacturing plants of Indonesia.

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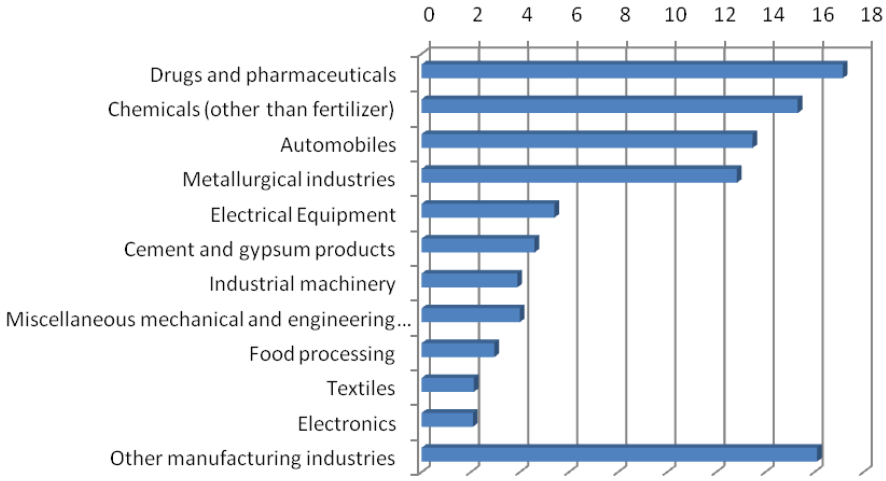
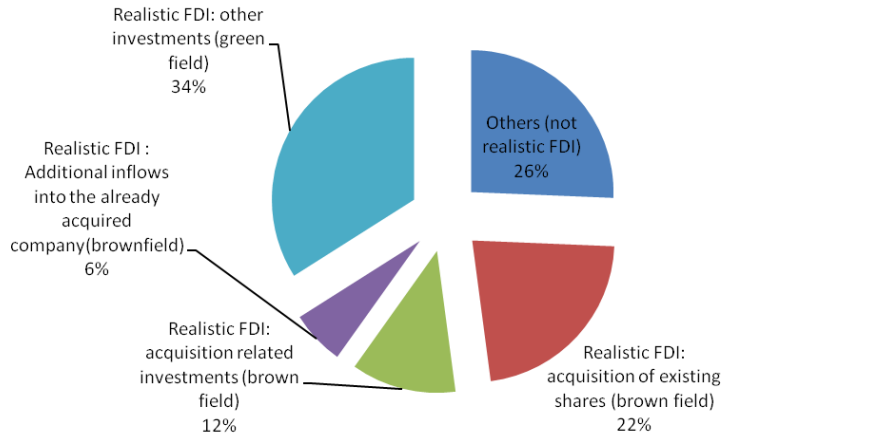
Fig. 1 : Share in FDI (%), manufacturing, during 2000-2012



Source: Prepared by Authors from FDI inflow data provided in Chalapati Rao *et al.* (2014).

Fig. 2 : FDI in Manufacturing, September 2004 to March 2013 (% share)



Source: Prepared by Authors based on estimates of category-wise FDI inflows into manufacturing made by Chalapati Rao *et al.* (2014).

Note: The sample covers only those manufacturing firms (companies) for which details of equity holding are available. Thus, many small firms in which there is no foreign equity participation get excluded as the details of equity holding are not available. The average level of foreign equity participation shown in the graph is therefore an over-estimate of foreign equity participation in all manufacturing companies in India.

Source: Authors' computation based on Ace Equity database.

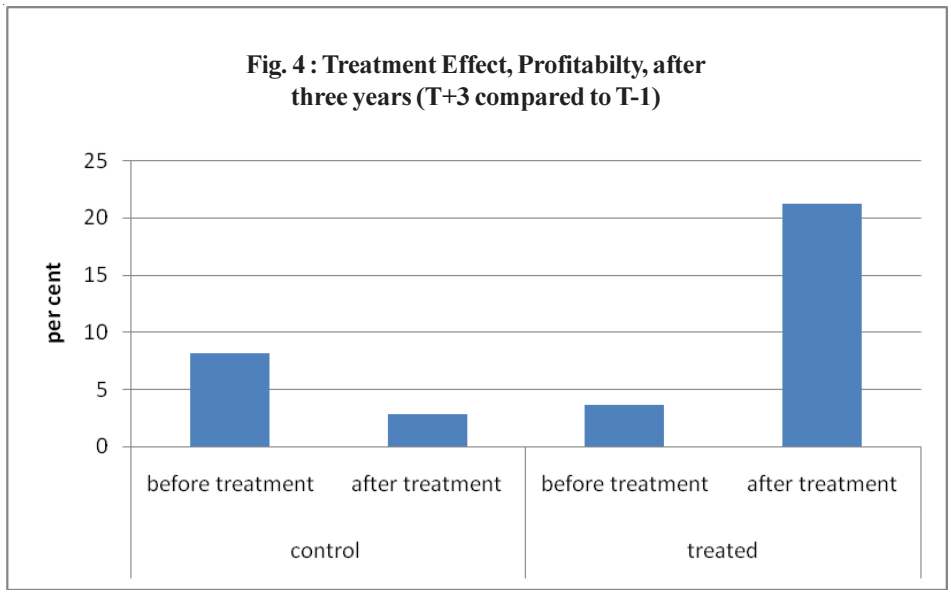


Table 1: India's FDI Inflows, 2000-01 to 2012-13

Financial Year	FDI Inflow (As per International Best Practices) (US $ Million)	% Growth over Previous Year	FDI equity inflow (US $ Million)	% Growth over Previous Year
2000-01	4029		2,463	
2001-02	6130	52	4,065	65
2002-03	5035	-18	2,705	-33
2003-04	4322	-14	2,188	-19
2004-05	6051	40	3,219	47
2005-06	8961	48	5,540	72
2006-07	22826	146	12,492	125
2007-08	34843	53	24,575	97
2008-09	41873	20	31,396	28
2009-10 (P)+	37745	-10	25,834	-18
2010-11 (P)+	34847	-8	21,383	-17
2011-12 (P)	46556	34	35,121	64
2012-13(P)+	36860	-21	22,423	-36

Source: Based on DIPP, "Fact Sheet on Foreign Direct Investment (FDI)", April2014.

"(P)" All figures are provisional; "+" Data in respect of 'Re-invested earnings' & 'Other capital' for the years 2009-10, 2010-11 and 2012-13 are estimated as average of previous two years.

Table 2: Sectors Attracting Relatively High FDI Equity Inflows, India, April 2000 to March 2012 [Amount, Rupees in crores (US$ in million)]

Ranks	*Sector*	*2009-10 (April-March)*	*2010-11 (April-March)*	*2011-12 (April-March)*	*Cumulative Inflows (April 00 - March 12)*	*% age to total Inflows (In terms of US$)*
1	SERVICES SECTOR (financial & non-financial)	19,945 (4,176)	15,053 (3,296)	24,656 (5,216)	145,764 (32,351)	19 %
2	TELECOMMUNICATIONS (radio paging, cellular mobile, basic telephone services)	12,270 (2,539)	7,542 (1,665)	9,012 (1,997)	57,078 (12,552)	7%
3	CONSTRUCTION ACTIVITIES (including roads & highways)	13,469 (2,852)	4,979 (1,103)	13,672 (2,796)	52,253 (11,433)	7%
4	COMPUTER SOFTWARE & HARDWARE	4,127 (872)	3,551 (780)	3,804 (796)	50,118 (11,205)	7%
5	HOUSING & REAL ESTATE	14,027 (2,935)	5,600 (1,227)	3,443 (731)	49,717 (11,113)	7%
6	CHEMICALS (OTHER THAN FERTILIZERS)	1,726 (366)	1,812 (398)	36,227 (7,252)	47,904 (9,844)	6%
7	DRUGS & PHARMACEUTICALS	1,006 (213)	961 (209)	14,605 (3,232)	42,868 (9,195)	5%
8	POWER	6,138 (1,272)	5,796 (1,272)	7,678 (1,652)	33,214 (7,299)	4%
9	AUTOMOBILE INDUSTRY	5,893 (1,236)	5,864 (1,299)	4,347 (923)	30,785 (6,758)	4%
10	METALLURGICAL INDUSTRIES	1,999 (420)	5,023 (1,098)	8,348 (1,786)	26,936 (6,041)	4%
	TOTAL FDI INFLOWS *	123,120 (25,834)	88,520 (19,427)	173,946 (36,504)	775,006 (170,407)	-

Source: Based on DIPP, "Fact Sheet on Foreign Direct Investment (FDI)", March 2012.

Note: (i) Cumulative Sector-wise FDI equity inflows (from April 2000 to March, 2012); (ii) FDI Sectoral data has been revalidated with that of RBI, and the comparison revealed only minor changes in the FDI figures(increase/decrease) as compared to the earlier published sectoral data.

Table 3: Foreign equity holding among firms in the sample, 2000-01 to 2011-12,by year

Year	Total number of firms in the sample	Firms in which foreign equity percentage is 10 percent or more		Firms in which foreign equity percentage is 25 percent or more		Among firms belonging to low technology industries		Among firms belonging to medium and high technology industries	
	No.	No.	Percent	No.	Percent	Percentage of firms with foreign equity>=10%	Percentage of firms with foreign equity >=25%	Percentage of firms with foreign equity >=10%	Percentage of firms with foreign equity >=25%
2000	528	248	47	189	36	37	21	49	39
2001	609	292	48	221	36	36	22	51	40
2002	638	292	46	217	34	35	21	49	38
2003	637	287	45	210	33	37	21	47	36
2004	649	287	44	202	31	36	18	46	35
2005	660	284	43	204	31	35	17	45	35
2006	690	329	48	220	32	39	19	50	35
2007	689	309	45	219	32	36	20	47	35
2008	695	311	45	223	32	33	20	48	35
2009	681	300	44	210	31	30	18	48	34
2010	653	286	44	195	30	30	19	48	33
2011	646	274	42	186	29	32	21	45	31

Source: Authors' computation based on Ace Equity data.

Table 4: Number of Sample Firms and Cases in which Foreign Equity Percentage in Firms Reached the Threshold Foreign Equity Holding Levels of 10 and 25 Percent, by year

Year	Number of firms in the sample	Cases in which foreign equity holding percentage in the firms has increased to reach the specified threshold level	
		Reached 10%+	Reached 25%+
2000-01	528	NC	NC
2001-02	609	8	6
2002-03	638	5	4
2003-04	637	10	6
2004-05	649	10	6
2005-06	660	12	10
2006-07	690	53	23
2007-08	689	8	6
2008-09	695	12	11
2009-10	681	11	5
2010-11	653	10	7
2011-12	646	11	6
Total		150	90

Source: Authors' computation based on Ace Equity data.NC= Not computed.

Table 5: Distribution of Sample Firms — Industry Group, Level of Technology and Foreign Equity

Two Digit NIC Code	Description	Number of Firms				
		Total	Level of Technology		Cases in which the foreign equity holding percentage has increased to reach specified threshold level	
			Low	Medium & High	Reached 10%+	Reached 25%+
10	Manufacture of food products	45	45	0	5	2
11	Manufacture of beverages	10	10	0	3	2
12	Manufacture of tobacco products	2	2	0	0	0
13	Manufacture of textiles	66	66	0	17	7
14	Manufacture of wearing apparel	12	12	0	3	2
15	Manufacture of leather and related products	2	2	0	0	0
16	Manufacture of wood and products of wood and cork, except furniture; Manufacture of articles of straw and plaiting materials	2	2	0	0	0
17	Manufacture of paper and paper products	19	19	0	2	3
19	Manufacture of coke and refined petroleum products	15	0	15	3	2
20	Manufacture of chemicals and chemical products	124	0	124	24	15
21	Manufacture of pharmaceuticals, medicinal chemical and botanical products	55	0	55	14	9
22	Manufacture of rubber and plastics products	52	0	52	8	5
23	Manufacture of other non-metallic mineral products	43	0	43	10	7
24	Manufacture of basic metals	68	0	68	18	9
25	Manufacture of fabricated metal products, except machinery and equipment	15	0	15	3	1
26	Manufacture of computer, electronic and optical products	50	0	50	9	7
27	Manufacture of electrical equipment	53	0	53	4	5
28	Manufacture of machinery and equipment n.e.c.	73	0	73	15	6
29	Manufacture of motor vehicles, trailers and semi-trailers	44	0	44	7	3
30	Manufacture of other transport equipment	3	0	3	0	0
32	Other manufacturing	20	8	12	5	5
33	Repair and installation of machinery and equipment	2	0	2	0	0
	All Manufacturing Firms	775	166	609	150	90

Source: Authors' computation based on Ace Equity data.

Table 6: Difference between Domestic and Foreign Firms, Important Firm Characteristics

Variable/firm characteristics	Mean value for Domestic firms	Mean Value for Foreign firms	t-statistics (P-value)
Age (years)	27.1	30.4	8.11(0.000)
Debt-equity ratio	6.44	4.13	-12.9 (0.000)
Export intensity	0.083	0.069	-3.5 (0.000)
Size (logarithm of gross fixed assets)	3.88	4.32	9.7 (0.000)
Investment rate (ratio of investment to gross fixed assets)	0.114	0.139	4.15 (0.000)
Ratio of capital goods imports to gross fixed assets	0.007	0.010	6.47 (0.000)
Ratio of imports of materials, stores and spares to gross sales	0.044	0.059	6.51 (0.000)
Ratio of payment for royalty and technical fees in foreign exchange to gross sales	0.0002	0.0018	15.3 (0.000)
Ratio of cash and bank balance to gross sales	0.073	0.089	4.45 (0.000)
Selling and distribution expenses to gross sales ratio	0.0427	0.0426	0.09 (0.92)
Cash-flow to sales ratio	0.016	0.038	4.2 (0.000)

Source: Authors' computations.

Table 7: Estimated Probit Model: Explaining Transition from Domestic to Foreign Ownership (threshold defined as foreign equity participation of 10%)

Explanatory variable	Coefficients
Royalty and technical fee/sales	-10.948 (-0.46)
Cash flow/sales	-0.359 (-2.43)**
Debt-equity ratio	-0.010 (-1.62)
Capital goods imports/gross fixed assets	-0.099 (-0.04)
Size (logarithm of gross fixed assets)	-0.009 (-0.32)
New firm (5 years of age or younger)	0.769 (2.36)**
Old firm (over 30 years of age)	-0.198 (-1.99)**
Firms not belonging to business groups (dummy)	-0.173 (-1.77)*
Foreign equity percentage (lagged)	-0.036(-2.57)***
Export intensity (exports/sales)	-0.107 (-0.43)
Ratio of imports of materials, stores and spares to gross sales	1.033 (2.02)**
Investment rate (investment/gross fixed assets)	0.353 (2.43)**
Industry dummies	Yes
Year dummies	Yes
Constant	-1.67
Pseudo R-squared	0.108
No. of observations	3707

t-ratios in parentheses. *, **, *** statistically significant at ten, five and one percent respectively.

Source: Authors' computations.

Table 8: Difference in Difference Matching Estimates of Average Treatment Effect (increase in outcome variables in comparison to one year before the change in ownership)

Time (year)	Change in logarithm of sales (Sales growth)	Change in profit rate	Change in export intensity
0	-0.061 (0.398)	-0.106 (0.255)	-0.004 (0.005)
1	-0.029 (0.545)	0.051 (0.472)	-0.002 (0.010)
2	0.043(0.913)	0.198 (0.131)	-0.018 (0.126)
3	0.017(0.697)	0.228 (0.064)*	0.004 (0.058)

Note: Figures in parentheses are standard errors obtained by bootstrapping procedure.

* statistically significant

Source: Authors' computations

Table 9: Difference in Difference Matching Estimates of Average Treatment Effect on Profitability

Time (year)	ATT (change in profitability)	Standard Error	t-statistics
0	0.032	0.085	0.38
1	0.021	0.086	0.25
2	0.048	0.110	0.44
3	0.203	0.129	1.57

Source: Authors' computations.