

Does Financing Constraints Matter for Outward Foreign Direct Investment Decision? Evidence from India

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Abstract

Even though the firm internationalization through exports or foreign direct investment (FDI) has increased in recent years, there is only limited evidence on the effect of financing constraints on firm's outward orientation. This study examines the role of financing constraints in explaining the outward FDI decisions using a unique firm level panel data on Indian manufacturing firms during the period 2007–2014. We consider the role of both internal finance and external finance in firm decisions on outward FDI and employ instrumental variable probit model and random effects probit models to examine the role of financing constraints in outward FDI decisions of firms. The findings suggest that financing constraints, productivity and exporting have significant impact on the outward FDI decision. Further, using count data models, we examine the role of financing constraints in determining the more complex strategy of firms regarding number of affiliates abroad. The study shows that firms with higher cash flow and liquidity are more likely to have more number of foreign affiliates.

Key words: Financing constraints, outward FDI, total factor productivity

JEL Classifications: F14, F21, F23

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Introduction

The firm's internationalization decision through exports or foreign direct investment (FDI) has attracted the attention of the literature on international trade very recently. The theoretical models, which explain the process of internationalization, focus on the heterogeneity of the firms in terms of productivity (Melitz 2003; Helpman et al. 2004; Yeaple 2008). Productivity is highlighted as the determining factor related to the decision to enter foreign markets either through exports or FDI. These models highlight that exporting or FDI involves sunk costs and fixed costs. Those firms, which are above threshold level of productivity engage in exporting or FDI since those highly productive firms can only meet these fixed costs. Some of the recent theoretical models extent this argument and emphasize the role of financing constraints as a barrier to serve foreign markets (Chaney 2013; Manova 2013; Muuls 2015). These models incorporate the role of financing constraints in the well-known firm heterogeneity models framework following Melitz (2003).

The empirical literature on internationalization of firms mainly paid attention to the exporting behavior and FDI with emphasis on productivity (Wagner 2006; Heads and Ries 2003). Beyond, productivity, the role of financing constraints in explaining internationalization process through exporting is well recognized. A large number of studies examine the effect of financing constraints on exports (Wagner 2014²). In the internationalization literature, what is less known is the impact of financing constraints on outward FDI. The problem of financing constraints assumes greater significance in setting up affiliates abroad than exporting since firms face bigger barrier in the form of huge upfront fixed costs (Helpman et al. 2004). Buch *et al.* (2014) extended the theoretical models of internationalization strategies to the case of outward FDI in the presence of financing constraints. Therefore, the main objective of the present study is to examine the role of financing factors in determining the outward FDI based on the experience of Indian firms.

Outward FDI from the emerging economies like India is increasingly becoming an important component of the world's investment flows. India provides an ideal testing ground to undertake the present study. Figure 1 shows the recent trends in the outflows

² See Wagner (2014) for a detailed review of literature on exporting and financing constraints

of FDI from India. India's outward FDI stock registered a quantum jump during last one decade, from a negligible amount of \$ 25 million during the early nineties to \$241 billion in 2013. The momentum of these investment outflows picked up during the second half of the 2000s. One can attribute this increasing trend of outward FDI by the Indian firms to the market oriented reforms undertaken during the early nineties. Indian policy makers have recognized the importance of these investments and have undertaken several measures by easing the stringent regulatory rules regarding overseas investments³. The share of India in the total outward FDI from Asia recorded a significant increase from 0.4 per cent to 4.3 per cent over the period of 2001 to 2011 (EXIM bank report on Outward FDI from India, 2014). The bulk of the outward FDI flows originate from the manufacturing sector. The manufacturing sector contributes 32 percent of the total outward FDI from India in 2011-12 (EXIM Bank 2014).

The contribution of the present study is three fold. *First*, the empirical studies on India's experience with outward FDI focus on the determinants. The role of financing constraints is overlooked by the existing studies. We add to the nascent literature by exploring not only the productivity effects but incorporating the effect of financing constraints based on the experience of an emerging economy, India. *Second*, unlike previous studies, our study uses a novel firm level data set of outward FDI from India which allows us to comprehensively analyze the role of financing factors in determining the outward FDI. We combine data for the years 2007-2014 from the PROWESS firm level database with outward FDI data provided by the Reserve Bank of India (RBI). Moreover, we have the information related to the number of affiliates owned by these firms which enables us to understand the complex strategy of these firms. *Third*, we explore the role of financing constraints in determining the number of affiliates.

Results of the present study show that consistent with the theoretical predictions, financing constraints have a significant effect on the firm's decision to invest abroad and owning foreign affiliates. Even though internal funds of the firm matter for outward FDI decisions, the link between external finance and outward FDI is found to be weaker. Further, we find that productivity and exporting have significant impact on the outward FDI decision. We observe that the mitigating effect of productivity in compensating for firm's financing

³ Reserve Bank of India relaxed the guidelines for investment overseas by raising the annual overseas investment ceiling for Indians to US\$ 125,000 from US\$ 75,000 to establish joint ventures (JV) and wholly owned subsidiaries.

constraints holds and implies that high productivity helps firms to compensate for financing constraints.

The remainder of the paper is organized as follows: section 2 includes a brief description of the theoretical and empirical literature. Section 3 explains the data and descriptive statistics. Section 4 provides the methodology and empirical model. The findings are discussed in section 5. Final section concludes the study.

2. Theoretical Underpinnings and Literature Review

The standard industrial organization approach considers FDI arising out of the product and technology market imperfections (Hymer 1976; Rugman 1981). Recent theoretical models attribute the decision of a domestic firm to export or undertake FDI to the productivity effects (Melitz 2003; Helpman et al. 2004). According to these models, the presence of fixed costs of foreign market entry makes more productive firms to export, while the most productive firms engage in FDI. Following these set of models, numerous studies investigated the findings of the Helpman et al. (2004) theoretical predictions. Yeaple (2009) provide strong empirical evidence of Helpman et al (2004) based on the US FDI experience. Similar findings were reported by Kimura and Kiyota (2004); Girma et al (2005); Wagner (2006); Lee (2010) for Japan, U.K., Germany and Korea respectively.

As mentioned above, productivity alone is not the deciding factor in its decision to serve the foreign market. Some of the recent models extent the Melitz (2003) model to incorporate financing factors in explaining the decision to undertake FDI and export (Chaney 2005; Buch et al 2014). However, the attention of the empirical studies on internationalization process of the firms and financing constraints are confined to the export decision. The inclusion of outward FDI to the financing constraints empirical literature is very recent. Buch *et al.* (2014) develop a theoretical model along the lines of firm heterogeneity models that shows FDI being more vulnerable to the financing constraints than exports. Firms undertaking FDI use internal funds for the international investments than using external finance. Firms rely more on internal funds since banks or other creditors may be unwilling to lend due to the information asymmetry, uncertainty and riskiness of such investments in foreign market. Buch et al (2014) provide empirical support based on the experience of German firms. In a similar vein, Everett (2014) using

the Irish firm level data show that financing constraints act as a barrier to the foreign market entry.

The studies on financing constraints and firm decisions in the context of India focus mainly on capital investment, research and development (R&D) and exports. The role of financing constraints in physical capital investment such as Athey and Laumas (1994); Ghosh (2006); Bhaduri (2005) and Bhattacharya (2008) have found that the financing constraints particularly in terms of internal funds play a major role in determining the firm investment decisions. Some of the studies focusing on the role of financing constraints in Research and Development (R&D) investment decisions also have found significant effect of financing constraints (Sasidharan et al., 2015). Recently some the empirical studies have extended this framework to explain the export decisions of Indian firms. Aggarwal (2002) found that the liberalization and growth of multinational enterprises is a major factor in improving export performance of Indian manufacturing. Lancheros and Demirel (2012) examined the role of credit constraints in the export behaviour of Indian service firms and found that the financing factors have no major impact rather the non-financing variables such as size and total factor productivity found to be significant. In a recent study, Nagaraj (2014) analyzed the role of financing constraints in export participation decisions of manufacturing firms in India and found that financing constraints affect the probability of firm exports.

Previous research on outward FDI by Indian firms has largely been descriptive in nature (Nayyar 2008). Ramamurti (2012) describes the extent to which the theories on internationalization of firms through FDI developed in the context of developed economies are applicable in the context of emerging economies like India. The study argues that even though the behaviour of emerging economies OFDI is not very different compared to developed economies, there are differences in terms of ownership advantages etc. Among the set of studies, some studies focus on the push factors of outward FDI using firm level data (Kumar 2007; Pradhan 2004). Another set of studies concentrate on the locational choices of the Indian outward FDI and motivational factors using the Gravity model (Hattari & Rajan 2010; Nunnenkamp *et al.* 2012). An exception is the firm level studies such as Goldar (2013) and Thomas and Narayanan (2013) that investigated the relationship between outward FDI and productivity. However, they overlooked the role of financing factors. In this study, we address the issue of financing constraints on the probability of undertaking outward FDI by Indian non-financial firms.

3. Data Sources

To carry out the empirical analysis, we combine two different data sources. *First*, financing information are obtained from the PROWESS database provided by the Center for Monitoring Indian Economy. PROWESS database is based on the financing information from the annual reports and balance sheets of over 27000 companies belonging to utilities, manufacturing and services. The database contains both listed and unlisted firms. This database was previously employed by many firm level studies for analyzing the financing constraints related to fixed investments and R&D (Ghosh, 2006; Sasidharan *et al.* 2015). *Second*, outward investments data is obtained from the Reserve Bank of India (RBI) dataset on outward investments. This data contains information about the investments made by around 3600 Indian firms. The coverage of the database includes manufacturing, services and utilities. Further, the data provides information on the FDI destinations, number and the nature of affiliates, i.e., joint venture (JV) vs wholly owned subsidiary (WOS). We matched the RBI data with the PROWESS data on the financing characteristics and other major firm specific characteristics. The matching exercise yielded a subset of 329 outward FDI firms.

For the empirical analysis, we restrict our sample to the manufacturing firms. We use an unbalanced panel data covering the period 2007-2014⁴. The sample is selected based on the following criteria. *First*, we include only those firms with positive sales and fixed assets. *Second*, firms reporting with negative cash flow are excluded from the sample. The reasoning for excluding is following the argument that the firms with negative cashflow are the financially distressed firms (Sasidharan et al., 2014). The flow variables such as sales are deflated with the corresponding industry WPI obtained from Central Statistical Organization (CSO). To remove the effect of the outliers, variables are winsorized at the upper and lower 0.5 percentiles. In order to account for the possible simultaneity issues, we lag the explanatory variables by one year. Therefore the data used in the empirical analysis include only the sample period from 2008-2014.

We provide the industry- wise distribution of average outward FDI during the period 2007-2014 in the Table 1. The table shows that firms belonging to machinery and electrical

⁴ RBI provides outward FDI information at the firm level data from 2007 onwards. The absence of information prior to 2007 restricts our study period from 2007- 2014.

equipment (38.98%) dominate followed by transport equipment industry (28.59%), chemicals and chemical products (19.01%). The industry wise distribution of the firms in the sample is reported in the appendix (I). The table in appendix (II) reports the list of the preferred destinations of outward FDI by firms during the study period. A preliminary analysis of the data on destinations shows that bulk of the outward FDI is directed towards the developed markets. The highest share of OFDI during this period is mainly to Europe (27.7%) followed by United States (13%). The nature of ownership reveals that Indian firms prefer to enter the foreign market by setting up wholly owned subsidiary in the host country.

4. Methodology

For the present study, we adopt an empirical strategy following Buch *et al* (2014). The dependent variable in our model is binary, i.e., decision to have outward investment taking the value '1' indicating firm has a foreign affiliate at the end of the each time period and '0' otherwise. Further, we undertake another empirical exercise to test the complex strategy of the firm to have multiple affiliates by including the number of affiliates as a count variable. This variable is used as another proxy to determine the outward investment decision of the sample firms. Measurement of financing constraints is a complex issue. To measure the financing constraints, we rely on the standard approach by resorting to the cash-flow indicator⁵ as a proxy. The expected sign of this variable is positive. The sensitivity of firm investment to cash flow is interpreted as the evidence of financing constraints. Firms with higher availability of internal finance find it easy to meet the investment costs even if they does not have access to external finance. In addition, we use two commonly used measures in the financing constraints literature namely, *debt ratio* and *liquidity*. It is argued that firms, which are heavily indebted, will have very little collateral to offer which acts as a constraint on their expansion abroad. We measure debt ratio as the debt to total assets. Liquidity ratio defined as current assets minus current liabilities scaled by total assets. We expect a positive effect of liquidity on the probability of firm investing abroad. The availability of higher liquidity enables firms to meet the fixed costs. Further, following Manova (2015) and Duanmu (2015) to account for the role of external finance, we include two measures viz, capital expenditure not financed by cashflow and access to

⁵ The cashflow variable is the widely used proxy in literature on firm financing constraints (Fazzari et al., 1998; Bond and Meghir, 1994). There is some skepticism associate with the use of cashflow as the proper measure of financing constraints since it captures the future investment opportunity and is non-monotonic in nature as pointed out by Kaplan and Zingales (1997).

finance - defined as a ratio of long term bank credit to total assets. In order to account for the role of fixed costs, we include asset tangibility measured as the ratio of fixed assets to the total book-value of assets (*fixed costs*) in the model on determinants of number of foreign affiliates. Higher fixed costs involved in establishing affiliate abroad are expected to have a negative impact on the number of affiliates owned by investing firms. Further, higher fixed costs is a proxy for the amount of collateral or tangibility. Therefore, we control for the fixed costs using fixed assets as a ratio of total assets of firm (Buch et al, 2014).

We include firm specific control variables like size, age, total factor productivity, exports, and business group affiliation that influence the outward investment decision. *Size* is measured as the as ratio of firms total assets to the industry median value. Size of the firm is considered as one of the major firm specific factor effecting firm level decisions. It accounts for scale effects (Krugman, 1984) and larger firms always have advantage of lower average costs, better information and easy access to funds. Exports are regarded as one of the means of serving the foreign market. Since exporting entails ample learning opportunities about the international markets, it act as a stimulant to the FDI. Therefore, we include export status as a control and take the value '1' if it exports and '0' otherwise. Total factor productivity (TFP) is regarded an important determinant of the outward FDI (Helpman *et al* 2004). Since the measurement of TFP using OLS do not provide consistent estimates due to the problem of simultaneity, care should be taken while including this variable in the empirical estimation. The two alternative methods to overcome this issue are: Levinsohn and Petrin (2003) and Olley and Pakes (1996) procedure⁶. For the purpose of the present study, we estimate TFP using Levinsohn and Petrin (2004) procedure. We measure productivity as the ratio of firm TFP to mean industry TFP. Regarding the nature of the ownership, it is found that business group affiliates have access to the internal capital market of the group network and do not suffer from financing constraints. We control for the group association by assigning '1' for group affiliates and '0' otherwise. Regarding the effect of the age of the firm and the decision to invest abroad, the previous findings are inconclusive. Some studies report that older firms are more likely to undertake FDI

⁶ One of the major issue in estimating production function is the correlation between unobservable productivity shocks and level of inputs. Levinsohn-Petrin (L-P) method follows a Cobb-Douglas production function accounting for three factors; labour, capital and intermediate goods and assumes intermediate goods as the proxy for the unobservable productivity shocks. In Olley-Pakes method, Investment is used as a proxy for the same. Since there are large number of firms with zero investments, it cannot be used as a proxy to account for these shocks. L-P method is widely used in literature for estimating TFP (Head and Ries, 2003; Lancheros and Demirel, 2012)

(Blomstrom and Lipsey 1991), however, some others obtain mixed results (Asiedu and Esfahani 2001). We measure Age as the number of years since the incorporation.

Table (2) provides the definition of major variables, the measurement and descriptive statistics. Column 6 provide the results of the equality of mean difference between the outward FDI and domestic firms in terms of major financing indicators, productivity, size, age using a two tail t-test. The t-test for difference in the mean values of these characteristics between outward FDI and domestic firms indicates that differences are statistically significant. We observe that on an average, outward FDI firms are larger in terms of size, have higher cash flow, maintain higher liquidity. We plot the major firm level variables to show the difference between the outward FDI and domestic firms. Figure 2(a), (b) and (c) confirms the hypothesis that the OFDI firms are larger, have higher cash flow and higher liquidity compared to their counterparts. Figure 2(d) shows that in the case of TFP, the corresponding figures are overlapping. Further, figure 2 (e) shows that there is no significant difference between two groups in terms of asset tangibility, which is the proxy for fixed costs. From the figure 2(d), it is evident that some of the productive firms are not involving in outward FDI. They majorly focus on the domestic market and do not prefer internationalization. Based on this exercise, the heterogeneity of outward FDI and non-FDI firms with regard to financing status is evident, but there seem to be no clear difference in the case of asset tangibility and TFP.

Econometric Specification

We estimate the following specification using the random effects and instrumental variable probit⁷ regression.

$$\Pr (OFDI_{i,t}) = \beta_0 + \beta_1 Z_{i,t-1} + \theta X_{i,t-1} + S_t + \varepsilon_{i,t} \quad (1)$$

where i is the firm, j and t denote the industry and year respectively. To account for the endogeneity and simultaneity of the explanatory variables, we use lagged values of the time varying explanatory variables. The dependent variable is $OFDI_{i,t}$ denoting whether firm i is has undertaken outward direct investment or not. $OFDI_{i,t}$ is defined as binary variable

⁷ ivprobit model is used since the endogenous regressors included are continuous variables and the dependent variable is of binary nature.

taking value ‘1’ if firms have reported outward FDI and ‘0’ otherwise. $Z_{i,t-1}$ is the vector of financing constraint variables. Financing constraints are proxied by $CashFlow_{i,t}$ and $Liquidity_{i,t}$. We also include debt ratio as additional financing indicator. $X_{i,t-1}$ is a vector of firm specific control variables like ownership, productivity, size, exports, age, fixed costs. S_t is time dummies which accounts for the macroeconomic factors.

The endogeneity of financing constraints is a major issue in empirical models examining firm level decisions. The endogeneity arises in this case due to the possibility that the firm internationalization can enhance financing status of firms through access to international financing markets or through export receipts (Buch et al., 2014). In order to control for the endogeneity problem, we use an instrumental variable probit model. The method involves two steps: (i) estimating the potential quality of instruments using OLS regression and (ii) estimation of instrumental variable probit model (*inprobit*) using the instruments. The financing constraints of firm’s competitors are independent of investment decisions of specific firm. Thus, we control for the endogeneity issue by using financing constraints of competitors of particular firm as instruments (Buch et al., 2014). The instrument variables are defined as the mean industry cash flow and mean industry liquidity where we exclude the values of these measures specific to the firm from the mean values. In all those cases where we include instruments, we exclude the industry dummies since the instruments are constructed at industry level.

Determinants of Number of foreign affiliates

We extend our first set of analysis to examine the factors which determine the number of foreign affiliates. The decision on investing abroad as well as the number of foreign affiliates also varies across firms. We using count data models analyze the factors which determines the number of foreign affiliates. Count variables are characterized by excessive zeros, but are non-negative values. The count models allow to control for excess zeros in the data. The basic count model is the poisson model which is based on equi-dispersion assumption⁸. Since the assumption of equi-dispersion rarely holds, Negative binomial model is often used as an alternative, which is based on over dispersion. We employ both the models to examine the factors determining the number of foreign affiliates. Our

⁸ Equi-dispersion assumption implies equality of mean and variance.

dependent variable is a count variable (number of foreign affiliates by firm)⁹. The firms differ in their number of foreign affiliates. Therefore, in the second set of analysis, we try to explore the factors which drive the differences across firms. We report the results of both poisson and negative binomial models.

Initial conditions problem exists in the context of firm decisions such as exports, number of foreign affiliates etc. Initial conditions bring in the persistence nature of firm decisions on these variables and determine the future values (Lemmon et al., 2008). Unlike the previous studies (Buch et al 2014, Everett 2014), we control for the effect of initial conditions by dropping the initial year count of number of foreign affiliates in the count model.

5. Results and Discussion:

The following section discuss the findings of the models on the probability of firm investing abroad and the model on the factors determining the number of affiliates of each investing firm. The results confirm our hypothesis that financing constraints matters for the probability of firm investing abroad.

Table (3) reports the estimates of the first stage regressions using OLS. Column (1) and (2) reports the model with cash flow and liquidity as the dependent variables respectively. The results show that all major variables are significant. The major interest variable, sector mean of cash flow and sector mean debt ratio found to be positively correlated to the firm's financing condition which confirms the endogeneity problem.

Table (4) reports the results of model on relationship between internal finance and probability of firm investing abroad using the instrumental variable probit model (*inprobit*). The dependent variable is the binary variable defined as '1' if firm invests and '0' otherwise. Column (1) reports the estimates using cash flow as the major indicator of financing constraints. Column (2) reports the estimates of liquidity as the major financing indicator. As expected, the financing constraints (internal finance) measured by cash flow and liquidity have the expected sign and significant. We control for the effect of the major financing measures by including an additional measure, debt ratio, defined as the total debt to total assets ratio. Debt ratio fails to have a significant impact on the OFDI decisions.

⁹ In the present case, number of foreign affiliates ranges from a minimum of one and maximum of 11.

We include size, age, productivity, export status and ownership group association as additional explanatory variables. Size of the firms is expected to have a positive impact on the firm's investment. In the presence of financing constraints, the size of the firm is found to have a negative impact on the probability of firm investing abroad¹⁰. Productivity of the firms is found to have a significant effect on the firms outward FDI decision. Our results are consistent with other studies which report significant effect of TFP on outward FDI (Duanmu, 2015). This implies that most productive firms tend to invest more overseas compared to less productive firms. Firm age is found to have a negative effect, which implies that the young firms tend to invest in comparison with their counterparts. The export status of the firms which is defined as binary variable taking value '1' if firm is an exporter in period t and '0' otherwise. Export status of the firms has a significant impact on the probability of firm investing abroad. Firms which are exposed to international markets through exports are more likely to invest abroad. The coefficient of the variable business group affiliation is negative and significant. Even though a bit surprising, slightly unexpected result may be due to the fact that firms affiliated to business groups prefer to focus predominantly on domestic markets. Perhaps this results is due to the fact that family owned and business group affiliated firms find the institutional context in home country optimal and that of overseas as detrimental. This is mainly due to risk involved, unwillingness towards dilution of ownership and lack of strategic relationships with foreign investors (Bhaumik et al., 2010).

Table (7) reports the results of model on probability of firm investing abroad with two external finance measures defined as the capital expenditure not financed by cashflow as a ratio to total assets (Manova, 2015) and long term bank credit to total assets (Duanmu, 2015) which is a proxy for firm's access to finance. We expect a positive effect of two measures which implies the fact that higher the access to external funds, higher is the probability that firm will invest abroad. We retain all other explanatory variables in the first model except the internal finance measures. Following Duanmu (2015), we examine the role of external finance in determining the probability of firm investing abroad using random effects probit model¹¹. Column (1) and column (2) reports the estimates of the model using two alternative measures of external finance dependence using random effects probit model. The results using both the measures suggest that the external finance does

¹⁰ Buch et al (2014) argue that this result further depends on the instrumentation strategy.

¹¹ We resort to random effects probit model rather than IV probit since the estimation using external finance measures does not involve the endogeneity issue.

not play any role in determining the OFDI decisions of the firms. Rather, the findings confirm the hypothesis that firm's foreign investment decisions rely more on the availability of internal funds such as cashflow and liquidity. This result highlights the fact that those firms which are not constrained by internal funds have higher probability of making investment abroad. Other control variables size, TFP, exports are found to be consistent with the previous specifications.

Mitigating effects of productivity

Table (4) also reports the results of interaction term between financing constraints and productivity. The objective of including these variables is to examine whether the higher productivity help the firms to compensate for undertaking FDI. We control for the mitigating effect of productivity by including an interaction term of the financing indicators with productivity. A significant negative impact of the variable implies that higher productivity helps to compensate the firm financing constraints. We expect a negative significant impact of the interaction term in our model. Column 3 and 4 reports the results of the empirical model controlling for mitigating effect of productivity. Column 1 reports the estimates using cash flow as the interaction term while column 2 reports the estimates of model using liquidity as the measure of internal funds. The negative and significant impact of interaction terms indicates that higher productivity helps firms to compensate for the financing constraints.

Small versus Large Firms

In the next step, we proceed to find out whether financing constraints affect small and large firms differently. We estimate the basic model using a sub-sample classified based on the mean value of size. We employ IV probit model to examine the role of financing constraints in determining the probability of firm outward FDI across size groups. We define a firm as small if the mean value of size (by year) is lower than or equal to the sample mean value or large otherwise. We expect a higher role of financing constraints in the case of larger firms since larger firms have a higher probability of making foreign investment compared to small firms given higher productivity. Table (5) reports the results of model on the probability of firm investing abroad across firm size classification. Column (1) and (2) reports the coefficients for the small firms using cash flow and liquidity measures. The results show that in the context of small firms, the financing constraints does not play significant role in determining the foreign investment decision. It provides support for our

hypothesis that the large firms tend to invest more in relation to small firms. This result follows from the theoretical predictions that the productive and larger firms are able to meet the fixed costs and is more likely to invest abroad (Helpman et al., 2004). Small firms which are less productive does not find outward FDI a viable option. Therefore, financing constraints do not have significant effect. The results are consistent with the existing studies such as Kimura and Kiyota (2006) and Lee (2010). Column (2) and (4) reports the results for firms categorized as large firms. Unlike small firms, we find significant role of financing constraints in large firm's decision to invest abroad. The other firm specific variables such as age, productivity and business group affiliation have the expected sign with varying level of significance across small and large firms.

II. Determinants of Number of Foreign Affiliates

Table (6) reports the estimates of the analysis on the role of financing constraints on number of foreign affiliates using count data models. Column (1) and column (2) reports the results of poisson and negative binomial models using cash flow measure. Column (3) and (4) reports the results of poisson and negative binomial models using liquidity. The basic model is the poisson model based on equi-dispersion assumption. The negative binomial model allows for the case of over dispersion and unobserved heterogeneity (Hilbe, 2014). The dependent variable; count of number of foreign affiliates is modeled as function of major financing constraint indicators and other firm-specific characteristics. We introduce an additional control variable, fixed costs which is found to have a significant impact on the number of foreign affiliates by various studies (Buch et al., 2014; Duanmu, 2015). It is considered as a proxy for fixed costs. The financing constraints are found to have a significant impact on the number of foreign affiliates. The coefficient of the cash flow suggests that higher the availability of cashflow, higher the probability that the firm will have many foreign affiliates. Similarly higher liquidity is associated with more number of foreign affiliates.

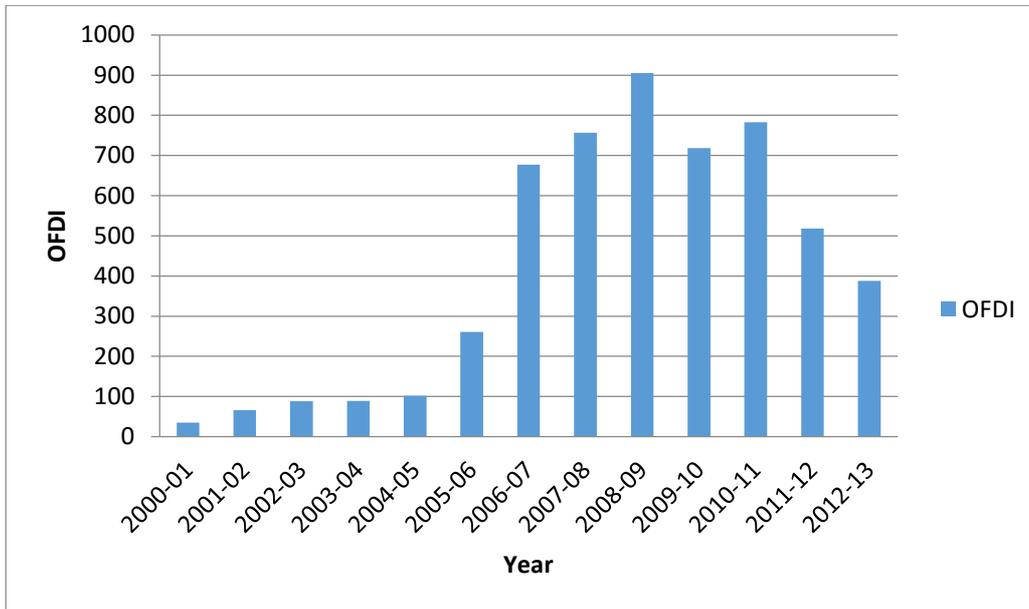
The asset tangibility measure which is the proxy for the amount of fixed costs is found to have the expected negative sign. This finding shows that the fixed costs involved in foreign investment and setting up affiliates reduces the number of foreign affiliates that an investing firm will own. Further, the importance of fixed costs points out the importance of the financing strength in firm's decision to invest and determining the number of foreign affiliates owned by investing firms.

6. Conclusions:

The study is an attempt to examine the role of financing constraints in determining the outward FDI decisions of Indian manufacturing firms during the period of 2007- 2014. The empirical findings confirm that the firm financing constraints matters for firms outward FDI decision. The findings suggest that firms which are smaller, with less cashflow, less liquidity, less productivity and high fixed costs are less likely to invest abroad. The findings suggest that the mitigating effect of productivity is valid in the case of outward FDI. We observe that higher productivity helps firms to compensate for the financing constraints. The second set of analysis of the model on probability of firm outward FDI using external finance dependence measures do not provide any significant effect. The findings confirm the importance of internal funds in firm investment decisions.

The study also finds that the financing constraints matters not only for the probability of firm foreign investment, but also plays a significant role in determining the number of foreign affiliates of firms investing abroad. Using count models, the study shows that firms with higher cash flow and liquidity are more likely to have more number of foreign affiliates. Another major finding is that the productivity which was considered as the major factor in determining firm internationalization is found to be only a necessary rather than a sufficient condition in the context of firm OFDI decisions when firms are financially constrained. One of the major implication of the findings is that the export orientation of firms is a major factor in determining the firm foreign investment decisions. This finding suggests for the need of policies, which improves the firm export orientation which can further enhance the internationalization through outward FDI. The results also provide evidence that improving the access to finance will help firms from emerging markets in getting rid of entry barriers to foreign markets.

Figure 1. Outward FDI from India: Recent Trends



Source: RBI Data on OFDI

Table (1): Distribution of Outward FDI by Industry group over the period 2007-2014

| Industry Group | Amount (US\$ Million) | Percentage (%) |
|---|--------------------------|-------------------|
| Basic metals, Alloys and Metal products | 845.73 | 2.85 |
| Beverage and Tobacco Products | 103.54 | 0.35 |
| Chemical and Chemical products | 5647.33 | 19.01 |
| Leather and Leather products | 15.22 | 0.05 |
| Machinery and Electrical Equipment | 11576.61 | 38.98 |
| Miscellaneous manufacturing | 329.96 | 1.11 |
| Non- metallic mineral products | 911.85 | 3.07 |
| Pharmaceuticals and related products | 3503.78 | 11.80 |
| Rubber and Plastic products | 298.182 | 1.00 |
| Textiles | 394.563 | 1.33 |
| Transport Equipment and parts | 6024.91 | 20.29 |
| Wood and wood products | 49.57 | 0.17 |

Source: RBI data on Outward FDI

Table (2): Descriptive Statistics

| Variables | Definition | Observations | Mean (Median) | FDI firms | Non- FDI firms | P value |
|---------------------------------------|--|--------------|------------------|------------------|----------------------|---------|
| OFDI Decision | =1 if firm has OFDI =0 otherwise | 5645 | 0.058 | - | - | - |
| Cashflow | Log of cashflow | 5645 | 2.731 (2.590) | 4.276 (4.439) | 2.635 (2.494) | 0.000 |
| Liquidity | Current assets- current liabilities/total assets | 5645 | 3.692 (3.594) | 5.037 (5.102) | 3.609 (3.519) | 0.000 |
| Debt Ratio/Collateral | Borrowings/Total assets | 5645 | 0.309 (0.301) | 0.293 (0.315) | 0.310 (0.300) | 0.195 |
| Capital Expenditure | Capital Expenditure not financed by cashflow/ total assets | 4137 | 0.015 (0.001) | 0.028 (0.014) | 0.014 (0.003) | 0.0029 |
| Access to finance | Long-term bank credit / total assets | 4137 | 0.114 (0.079) | 0.115 (0.074) | 0.1144 (0.078) | 0.951 |
| Asset Tangibility | Gross Fixed Assets/ total assets | 5645 | 0.631 (0.586) | 0.499 (0.491) | 0.639 (0.597) | 0.000 |
| Size | Log of Total Assets/ Median Industry log of total assets | 5645 | 1.041 (1.023) | 1.317 (1.318) | 1.024 (1.002) | 0.000 |
| Age | Number of years since incorporation | 5645 | 35.42 (29) | 35.158 (29) | 41.78 (35) | 0.201 |
| Total Factor Productivity (TFP) | Log of TFP/Mean Industry TFP | 5645 | 0.982 (0.725) | 1.025 (0.912) | 0.978 (0.711) | 0.442 |
| Export status | =1 if firm has exporter =0 otherwise | 5645 | 0.825 | 0.960 | 0.816 | 0.000 |
| Business Group Association | =1 if firm is associated with a group =0 otherwise | 5645 | 0.386 | 0.465 | 0.381 | 0.0025 |

TFP is estimated using Levinsohn and Petrin (2003) method. The method involves estimating TFP using a Cobb-Douglas form of production including capital stock, labour and energy as inputs and is measured as a ratio of firm TFP to its mean industry TFP. We measure capital stock using widely used Perpetual Inventory method. Since the prowest database does not include information on labour, we calculated the same using Annual Survey of Industries (ASI) data. Labour is constructed using data on average wage rate from ASI and salaries and wages information from Prowest database (i.e., Average wage rate=total emoluments/total persons engaged; Number of labour=salaries and wages/Average wage rate). Power and fuel expenses is used as a proxy for energy expenses. We used revenue method since the value added information is not available

Figure 2(a)

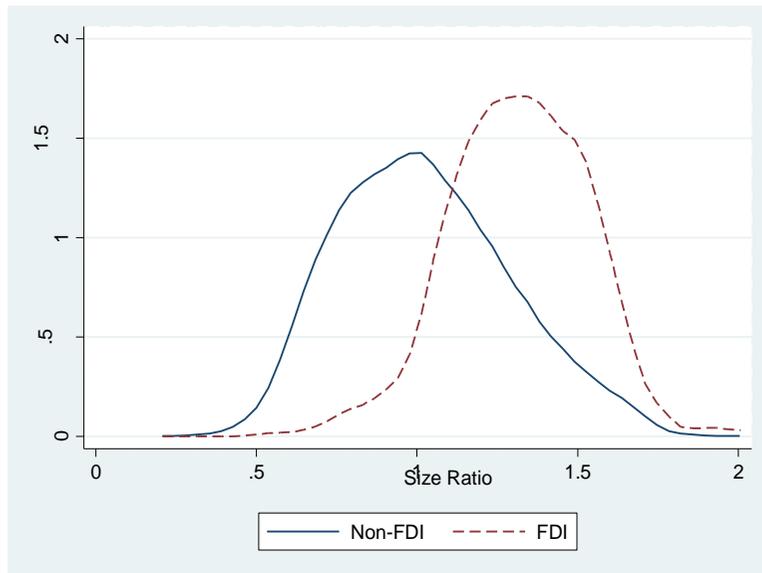


Figure 2 (b)

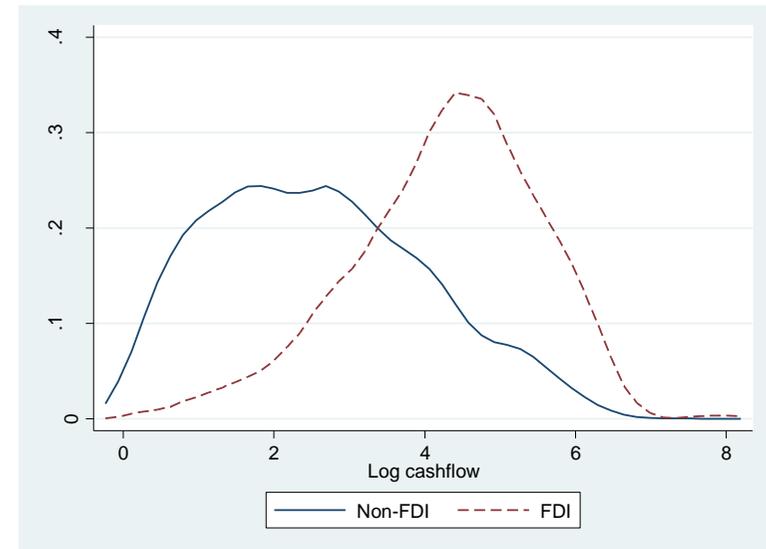


Figure 2(c)

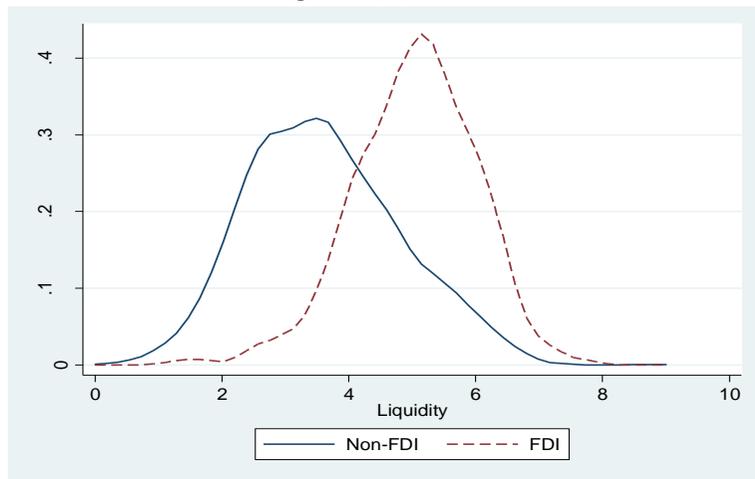


Figure 2(d)

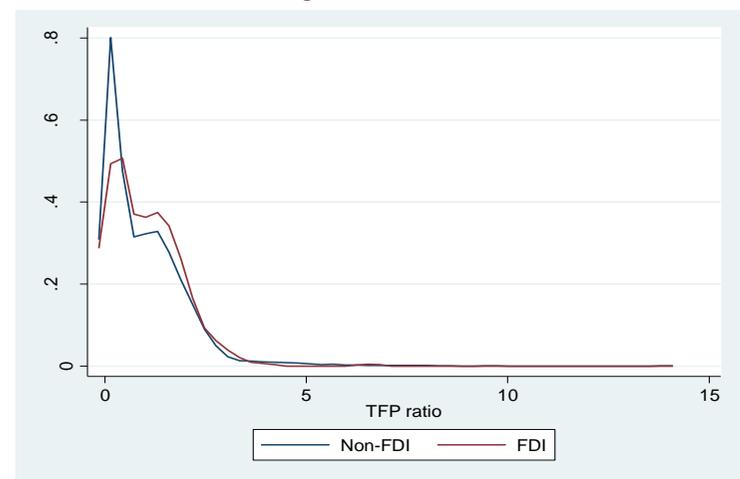


Figure 2(e)

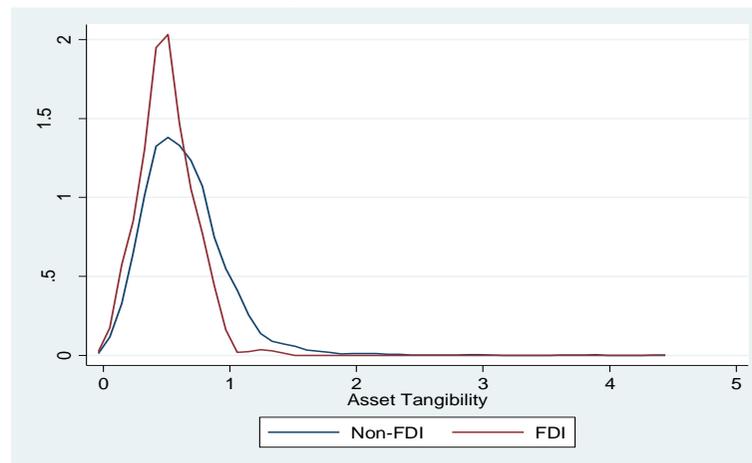


Table (3) First Stage Regressions

| VARIABLES | (1) | (2) |
|-------------------------|-------------------------------|-------------------------------|
| | Dependent variable: Cash flow | Dependent variable: Liquidity |
| Size t-1 | 4.451*** (0.0379) | 4.240*** (0.0237) |
| TFP t-1 | 0.0144* (0.00757) | 0.0255*** (0.00484) |
| Debt ratio t-1 | -0.00523 (0.149) | -0.0873*** (0.0294) |
| Age | 0.0426** (0.0206) | 0.0463*** (0.0119) |
| Exporter | 0.0533** (0.0246) | 0.0235 (0.0170) |
| Business Group | 0.0482** (0.0199) | -0.0829*** (0.0124) |
| Mean industry cashflow | 1.091*** (0.0495) | 0.271*** (0.0346) |
| Mean industry liquidity | -0.0233 (0.0685) | 0.770*** (0.0518) |
| Time Dummies | YES | YES |
| Observations | 5,645 | 5,645 |
| R ² | 0.786 | 0.887 |

Note: This table reports the results of regressions testing for the potential quality of instruments of financing constraint measures; cashflow and liquidity. Cashflow is measured as the sum of profit after tax and depreciation and liquidity is defined as current assets minus current liabilities to total assets. We use mean cashflow and liquidity are the industry means excluding the specific firm as the respective instruments. Cashflow, size, age and TFP are measured in logs. Exporter is a dummy for export status. Standard errors are reported in the parentheses. ***, **, * denotes Significance at the level of 1, 5, and 10 % respectively.

Table (4) Internal Finance and OFDI Decisions

| VARIABLES | (1) | (2) | (3) | (4) |
|------------------------|-----------------------|---------------------|-----------------------|-----------------------|
| Cashflow t-1 | 0.758*** (0.111) | | 0.896*** (0.129) | |
| Liquidity t-1 | | 0.890*** (0.141) | | 0.966*** (0.159) |
| Size t-1 | -1.198** (0.531) | -1.523** (0.629) | -1.354** (0.539) | -1.579** (0.640) |
| Age | -0.156** (0.0776) | -0.142* (0.0787) | -0.141* (0.0767) | -0.136* (0.0785) |
| TFP t-1 | 0.0613* (0.0322) | 0.0545* (0.0320) | 0.331*** (0.0740) | 0.278*** (0.107) |
| Exporter | 0.477*** (0.143) | 0.449*** (0.157) | 0.471*** (0.140) | 0.451*** (0.156) |
| Business Group | -0.319*** (0.0985) | -0.177* (0.105) | -0.308*** (0.0968) | -0.172 (0.105) |
| Debt ratio t-1 | 0.0180 (0.208) | -0.209 (0.213) | 0.0335 (0.206) | -0.208 (0.213) |
| (Cashflow *TFP) t-1 | | | -0.123*** (0.0301) | |
| (Liquidity* TFP) t-1 | | | | -0.0689** (0.0305) |
| Time Dummies | YES | YES | YES | YES |
| Wald Chi ² | 343.59 | 303.63 | 373.73 | 306.81 |
| Prob> Chi ² | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Observations | 5,645 | 5,645 | 5,645 | 5,645 |

This table reports the results of instrumental variable regressions where the dependent variable is 0/1 dummy variable of firm having outward FDI . The major financing indicators cashflow and liquidity is instrumented using industry level mean cashflow and liquidity. Cashflow, size, age and TFP are measured in logs. Exporter is a dummy for export status. Standard errors are reported in the parentheses. ***, **, * denotes Significant at the level of 1, 5, and 10 % respectively.

Table (5) : Internal Finance and OFDI Decisions: Small Vs. Large Firms

| VARIABLES | (1) Small | (2) Small | (3) Large | (4) Large |
|-----------------------|---------------------|----------------------|----------------------|----------------------|
| Cashflow t-1 | 0.374 (0.262) | | 0.723*** (0.108) | |
| Liquidity t-1 | | 0.264 (0.306) | | 0.873*** (0.136) |
| Debt ratio t-1 | -0.566 (0.482) | -0.833* (0.500) | 0.616** (0.283) | -0.136 (0.247) |
| Age | -0.0391 (0.141) | -0.0500 (0.140) | -0.184** (0.0923) | -0.219** (0.0925) |
| TFP t-1 | 0.107** (0.0460) | 0.0971** (0.0467) | 0.0790** (0.0399) | 0.0654* (0.0390) |
| Exporter | 0.444* (0.248) | 0.460 (0.294) | 0.271 (0.184) | 0.284 (0.199) |
| Business Group | -0.296 (0.211) | -0.230 (0.186) | -0.427*** (0.115) | -0.322*** (0.111) |
| Time Dummies | YES | YES | YES | YES |
| Wald Chi | 28.84 | 26.45 | 134.71 | 133.62 |
| Prob>Chi ² | 0.0042 | 0.0093 | 0.0000 | 0.0000 |
| Observations | 2,991 | 2,991 | 2,654 | 2,654 |

This table reports the results of IV probit across size groups where the dependent variable is 0/1 dummy variable of firm outward FDI status. Column (1) and (2) reports the results for small firms and column (3) and (4) reports that of large firms. Cashflow, age and TFP are measured in logs. Exporter is a dummy for export status. Standard errors are reported in the parentheses. ***, **, * denotes significant at the level of 1, 5, and 10 % respectively The mismatch of observations is due to missing information of financing indicator (cashflow) of some firms

Table (6) Internal Finance and Determinants of Number of Foreign Affiliates

| VARIABLES | (1) Poisson | (2) Negative Binomial | (3) Poisson | (4) Negative Binomial |
|-----------------------|----------------------|-----------------------------|----------------------|-----------------------------|
| Cash flow t-1 | 0.674*** (0.0678) | 0.687*** (0.0861) | | |
| Liquidity t-1 | | | 0.595*** (0.0996) | 0.770*** (0.136) |
| Debt ratio t-1 | 0.525*** (0.136) | 0.506** (0.224) | -0.250 (0.279) | -0.462 (0.372) |
| Asset tangibility t-1 | -1.506*** (0.212) | -1.679*** (0.272) | -0.785*** (0.225) | -0.941*** (0.287) |
| Size t-1 | 0.953*** (0.367) | 1.116** (0.470) | 1.558*** (0.452) | 1.292** (0.593) |
| Age | -0.174* (0.0906) | -0.189 (0.122) | -0.164* (0.0922) | -0.248* (0.129) |
| Export dummy | 0.486** (0.207) | 0.674*** (0.245) | 0.568*** (0.205) | 0.631*** (0.244) |
| TFP t-1 | 0.139*** (0.0444) | 0.141** (0.0573) | 0.128*** (0.0420) | 0.133** (0.0579) |
| Business Group | -0.571*** (0.105) | -0.546*** (0.130) | -0.557*** (0.107) | -0.504*** (0.133) |
| Time Dummies | YES | YES | YES | YES |
| Pseudo R ² | 0.212 | 0.167 | 0.193 | 0.157 |
| LR Chi ² | 708.19 | 499.50 | 645.96 | 468.97 |
| Prob>Chi ² | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Observations | 5645 | 5645 | 5645 | 5645 |

This table reports the results of count models, where the number of foreign affiliates is used as the dependent variable. Cashflow, Size, age and TFP are measured in logs. Exporter is a dummy for export status. Standard errors are reported in the parentheses. ***, **, * denotes Significant at the level of 1, 5, and 10 % respectively.

Table (7): External Finance and OFDI Decisions

| VARIABLES | (1) | (2) |
|--------------------------|---------------------|---------------------|
| Capex t-1 | -1.014 (0.741) | |
| Long term borrowings t-1 | | -0.760 (0.588) |
| Size t-1 | 4.473*** (0.509) | 3.709*** (0.428) |
| Age | -0.220 (0.190) | -0.120 (0.175) |
| TFP t-1 | 0.0720 (0.0681) | 0.0675 (0.0613) |
| Exporter | 1.075*** (0.326) | 0.485* (0.249) |
| Business Group | -0.406** (0.205) | -0.434** (0.188) |
| Time Dummies | YES | YES |
| Log Likelihood | -690.26957 | -608.2999 |
| Rho | 0.776 | 0.685 |
| Observations | 4137 | 4137 |

This table reports the results of random effects probit using external finance dependence measures capital expenditure not financed by cashflow to total assets and ; access to finance where the dependent variable is 0/1 dummy variable of firm outward FDI status. Size, age and TFP are measured in logs. Exporter is a dummy for export status. Standard errors are reported in the parentheses. ***, **, * denotes Significant at the level of 1, 5, and 10 % respectively. The mismatch of observations is due to missing information of external finance measures compared to internal finance measures.

Appendix I: Distribution of Firms by Industry

| Industry | Observations |
|---|----------------|
| Basic metals, Alloys and Metal products | 538 (9.53) |
| Beverage and Tobacco Products | 240 (4.25) |
| Chemical and Chemical products | 895 (15.85) |
| Leather and Leather products | 68 (1.20) |
| Miscellaneous manufacturing | 45 (0.80) |
| Non- metallic mineral products | 322 (5.70) |
| Pharmaceuticals and related products | 510 (9.03) |
| Rubber and Plastic products | 521 (9.23) |
| Textiles | 817 (14.47) |
| Transport Equipment and parts | 764 (13.53) |
| Wood and Wood products | 59 (1.05) |
| Machinery and Electrical Equipment | 866 (15.34) |
| Total | 5,645 |

Note: Figures in parentheses are the percentage share of each industry group.

Source: Author's calculation from PROWESS Database.

Appendix. II. List of Top Ten Countries: OFDI Destinations (2007-2014)

| Country | Percentage share of OFDI |
|--------------------------|---------------------------------|
| Mauritius | 36.10 |
| Singapore | 16.59 |
| China | 5.18 |
| Cyprus | 3.05 |
| Netherlands | 2.66 |
| United Arab Emirates | 2.39 |
| United States of America | 1.57 |
| Switzerland | 1.35 |
| Brazil | 1.26 |
| United Kingdom | 0.64 |

Source: RBI data on OFDI

References

- Aggarwal, A. (2002) 'Liberalization, Multinational Enterprises and Export Performance: Evidence from Indian Manufacturing', *Journal of Development Studies*, Vol.38 (3): 119-137
- Athey, M.J.and Laumas, P.S. (1994). Internal Funds and Corporate Investment in India. *Journal of Development Economics*. 45 (2): 287-303.
- Asiedu, E., and Esfahani, H. S. (2001). Ownership Structure in Foreign Direct Investment Projects. *Review of Economics and Statistics* 83 (4): 647–662.
- Bhattacharyya, S. (2008). “Determinants of Private Corporate Investment: Evidence from Indian Manufacturing Firms. *Journal of Quantitative Economics*. 6 (1&2): 151-172.
- Bhaduri, S.N. (2005). Investment, Financing constraints and Financing Liberalization: Some stylized facts from a developing economy, India. *Journal of Asian Economics*. 16 (4): 704-718.
- Bhaumik, S. K., Driffield, N and Sarmistha Pal (2010). Does Ownership Structure of Emerging-market Firms affect their Outward FDI? The case of the Indian Automotive and Pharmaceutical Sectors. Vol. 41 (3): 437-450.
- Blomstrom, M., and Lipsey, R. (1991). Firm Size and Foreign Operations of Multi-nationals. *Scandinavian Journal of Economics* 93 (1): 101–107.
- Bond, S.R., and Meghir, C. (1994). Dynamic Investment Models and the Firm's Financing Policy. *Review of Economic Studies* 61 (2): 197-222.
- Buch, C. M., Kesternich, I., Lipponer, A., & M. Schnitzer (2014). Financing Constraints and Foreign Direct Investment: Firm-level Evidence, *Review of World Economics* 150 (2): 393-420.
- Chaney, T., (2013). Liquidity Constrained Exporters, *NBER Working Paper 19170*, <http://www.nber.org/papers/w19170>
- Duanmu, J, L. (2015). External Finance and the Foreign Direct Investment Decision: Evidence from Privately Owned Enterprises in China, *International Journal of the Economics of Business* 22 (1): 23-45.
- Fazzari, S.M., Hubbard, G.R., Peterson, C.B., Blinder.A.S. and James. M.Poterba. (1988).“Financing Constraints and Corporate Investment”. *Brookings Papers on Economic Activity*. 1 (1) :141-206.
- Ghosh, S. 2010. Firm characteristics, financing composition and response to monetary policy Evidence from Indian data. *Journal of Indian Business Research*, 2 (4): 198-215.
- Girma, S., Kneller, R. & M. Pisu (2005). Exports versus FDI: An Empirical Test, *Review of World Economics*, 141(2): 855-866.

Goldar, B. (2013). *Direction of Outward FDI of Indian Manufacturing Firms: Influence of Technology and Firm Productivity*, presented at the Eighth Annual Conference of the Forum for Global Knowledge Sharing held at Indian Institute of Technology Bombay, Mumbai, India. October 25 – 27.

Ghosh, S. (2006). Did Financing Liberalization ease financing constraints? Evidence from Indian firm-level data. *Emerging Markets Review*, 7 (2): 176-190.

Hattari, R & Rajan, R. (2010) India as a Source of Capital: Focus on Outward Foreign Direct Investment, *Oxford Journal of Development Studies* 38 (4): 495-517.

Head, K and Ries, J. (2003). Heterogeneity and the FDI versus export decision of Japanese manufacturers, *Journal of the Japanese and International Economies* 17(4): 448-467.

Helpman, E., Melitz, M. J., & S. R. Yeaple (2004). Export versus FDI with Heterogeneous Firms. *American Economic Review* 94 (1): 300–316.

Hilbe, J,M (2014). *Modelling Count Data*, ed., Cambridge University Press, ISBN 978-1-107-02833-3

Hymer, S, H. (1976). *The International Operations of National Firms: A Study of Direct Foreign Investment*. MIT Press, Cambridge.

Kimura, F. and Kiyota, K. (2006). Exports, FDI, and Productivity: Dynamic Evidence from Japanese Firms, *Review of World Economics* 142(4): 695-719.

Krugman, P (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review*. Vol. 70 (5): 950-959.

Kumar, N. (2007). Emerging TNCs: Trends, Patterns and Determinants of Outward FDI by Indian Enterprises. *Transnational Corporations* 16 (1): 1-26.

Lancheros, S and Demirel, P. (2012). Does Finance play a Role in Exporting for Service Firms? Evidence from India. *World Economy* 35 (1):44-60

Lee, H. (2010), Decision to Invest Abroad: the Case of South Korean Multinationals. *Pacific Economic Review* 15(2): 281–302.

Lemmon, M, L., Roberts,M, R., and Jiame. F. Zender (2008). Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure. *Journal of Finance* 63 (4): 1575-1608.

Levinsohn, J. and Petrin, A. (2003). Estimating Production Functions Using Inputs to Control for Unobservables, *Review of Economic Studies* 70 (2): 317-342

Manova, K. (2013). Credit Constraints, Heterogeneous Firms and International Trade. *Review of Economic Studies* 80 (2): 711–744.

Manova, K (2015) Firm Exports and Multinational Activity Under Credit Constraints *Review of*

- Economics and Statistics* 97(3): 574-588.
- Melitz, M. (2003). The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71 (6): 1695–1725.
- Muuls, M. (2015). Exporters, Importers and Credit Constraints, *Journal of International Economics* 95(2): 333-343.
- Nagaraj, P. (2014). Financing Constraints and Export Participation in India. *International Economics*, <http://dx.doi.org/10.1016/j.inteco.2014.07.001>.
- Nayyar, D. (2008). The Internationalization of Firms from India: Investment, Mergers and Acquisitions. *Oxford Development Studies* 36 (1): 111-131.
- Nunnenkamp, P., Sosa Andrés, M., Vadlamannati, K., Waldkirch, A. (2012). What Drives India's Outward FDI?. *South Asian Journal of Macroeconomics and Public Finance* 1 (2): 245-279.
- Pradhan, J. P. (2004). The Determinants of Outward Foreign Direct Investment: A Firm-level Analysis of Indian Manufacturing. *Oxford Development Studies*, 32 (4): 619-639.
- Ramamurti, R. (2012). What Is Really Different About Emerging Market Multinationals?. *Global Strategy Journal*, 2 (1): 41-47.
- Rugman, A. M. (1981). Research and Development by Multinational and Domestic Firms in Canada. *Canadian Public Policy*, 7 (4): 604-616.
- Sasidharan, S., Lukose, P, J., and Surenderrao Komera. (2015). Financing constraints and investments in R&D: Evidence from Indian manufacturing firms. *Quarterly Review of Economics and Finance*, 55: 28-39.
- Thomas, R., and Narayanan, K. (2013). *Outward FDI, Firm Heterogeneity and Technological Efforts: A Study of Indian Manufacturing*, presented at the Eighth Annual Conference of the Forum for Global Knowledge Sharing held at Indian Institute of Technology Bombay, Mumbai, India. October 25 – 27.
- Wagner, J. (2006). Exports, Foreign Direct Investment, and Productivity: Evidence from German Firm-level Data, *Applied Economics Letters* 13(6): 347-349.
- Wagner, J. (2014). Credit Constraints and Exports: a Survey of Empirical Studies using Firm-level Data, *Industrial and Corporate Change* 23(6): 1477-1492
- Wang, B., Yu, M and Yiping Huang (2011) Financing Constraints on Chinese Outward Direct Investment by the Private Sector, China, in Ross Garnaut, Cai Fang and Ligang Song (eds.) *A New Model for Growth and Development*, Published by ANU E Press, The Australian National University, Australia, Chapter (16); 321-340,
- Yeaple, S. (2009). Firm Heterogeneity and the Structure of U.S. Multinational Activity: An Empirical Analysis, *Journal of International Economics* 78(2): 206-215.