DETERMINANTS OF FIRM LOCATION CHOICE IN LARGE CITIES IN INDIA: A BINARY LOGIT MODEL ANALYSIS

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Abstract

The present paper tries to investigate the economic determinants of firm location choice in the metropolitan/large cities in India by considering firm those are using FDI (i.e., more than 10 percent of foreign investment) in 2012-13. For the analysis binary Logit model is used in this paper by condidering firm level data from Capital Line database, Prowess database provided by CMIE (Centre for Monitoring Indian Economy) and Ace Equity plus database. The empirical estimations show that total value of output, capital, and exports have a negative effect on firm location choice in the large cities. On the other hand, total value of working capital, operating profits, age of the firm, fixed assets, material cost, and sales of a firm have a positive effect on firm location choice in the large cities in India. However, the effect of percentage of FDI and total value of imports are statistically insignificant on the firm's location choice. Finally, the paper discusses several policies in terms of location choice of firms in the large cities such as higher level of infrastructure investment, etc. for higher and sustainable industry lead urban development in India.

Keywords:Location choice, firm location, Metropolitan cities, India.

1. INTRODUCTION

In the recent decades India has emerged as one of the fastest growing economy in the world. Since 1991, the regulatory environment in the context of foreign direct investment has been consistently eased for making India as one of the investment friendly nations in the world. In fact the "Make in India" program launched by the newly elected government of India in September 2014 is one among the several governmental initiatives aimed at making India more investor-friendly. The main goal of this program is to encourage national and multi-national companies to manufacture their products in India. This means that this policy has further eased the regulatory environment in order to attract Foreign Direct Investment (FDI) in India. As per the data provided by World Development Indicator, FDI flows to India increased from US$ 28 billion in 2013 to US$ 44 billion in 2015 which is indeed a 57% increase.

On the other hand, FDI (net inflows as % of GDP) in India was 2.1 % in 2015 whereas for China it was 2.3%. Make in India program mainly focuses on twenty-five sectors (e.g., Automobiles, Construction, Pharmaceuticals, etc) of the economy by allowing 100% FDI in most of these sectors.[1] This has resulted in improved ranking in the World Bank's ease of doing business index where India is ranked 130th out of 189 countries as of 2016 whereas it was ranked 134th in the 2015 index. Moreover, out of 17 cities, World Bank's Doing Business in India Index in 2009 ranked Ludhiana in the first position and Kolkata in the last position followed by New Delhi at 6th and Mumbai at 10th as the easiest cities to do business in India. India's ranking among the world's 10 largest manufacturing countries has also improved by three places to sixth position in 2015.[2]

In sum, 'Make in India' program will help India to become a global manufacturing hub by increasing the contribution of the manufacturing sector to 25% of the GDP by the year 2025 from its current 16%. Among the different initiatives, promotion of foreign direct investment is one of the major one. Manufacturing sector is crucial for development of the economy by providing higher employment opportunities. As per the Annual Survey of Industries (ASI) data, the number of persons working in manufacturing sector has increased from an average 7.95 million in 1981-91 to an average 8.98 million during 1991-2001, 13.4 million in 2011-12, but decreased marginally to 12.95 million in 2012-13.[3] However, manufacturing sector accounts for a small share in total employment. The latest data from 68th round of National Sample Survey (NSS) indicates a revival in employment growth in manufacturing from 11% in 2009-10 to 12.6% in 2011-12. On the other hand, NSS data also shows that employment in manufacturing sector increased marginally from 44 million in 1999-2000 to 48.54 million in 2009-10 but lowered to less than 55.77 million in 2004-05. Most importantly, India Labour and Employment Report (IHD, 2014) indicates that employment in organized public manufacturing sector decreased from 18.52 lakh in 1991 to 10.16 lakh in 2011, i.e. a decrease of about 45%. On the other hand, employment in organized private sector increased from 44.8 lakh in 1991 to 53.97 lakh in 2011, i.e. an increase of over 20%.

Above discussion clearly shows that there is a significant rise in volatility in manufacturing sector in India from the perspective of employment, growth rate and its contribution to national GDP. Therefore, industrial unrest poses a challenge for industrial peace as it is detrimental to the growth of the manufacturing sector. IHD (2014) clearly highlighted that the manufacturing sector which has significant linkage effects with other sectors has not registered high growth rate of employment due to low growth of output and other institutional bottlenecks.

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[1] More details about the 'Make in India' program can be found in the following web link:
http://www.makeinindia.com/home
[2] According to 'The Yearbook' a report by United Nations Industrial Development Organization (UNIDO).
[3] http://mospi.nic.in/mospi_new/upload/SYB2016/CH-32-LABOUR-EMPLOYMENT/ch32.pdf

Now the question arises how we can improve the manufacturing growth in India. It is obvious that new FDI will help to set up new firms in India. In this context, the present papers tries to find out what determines the locational choice of firms in the metropolitan areas or cities in India.[4] It is important to note that the successful execution of 'Make in India' mission will rejuvenate the manufacturing sector not only by establishing new industries but also providing higher level of employment through lowering institutional bottlenecks. Therefore, the main aim of this paper is to see what factor/s actually contributes to location choice of firms in the large Indian cities.

In the recent decades, urbanization in India has increased at very fast pace. The unique feature of India's urbanization is that a major chunk of urban population is concentrated mainly in class I cities (those with population 1 lakh and more) which accounted for about 70% of the total urban population in 2011; this has led to 'Top heavy' urbanization in India. Presently, 31% of India's population lives in urban area and their contribution account for over 63% of India's GDP. It is expected that by 2020, the contribution to GDP by urban sector in India will increase to 70- 75 %. The number of cities and towns in India has increased over time, i.e. from 1915 in 1901 to 7935 in 2011. Most importantly, number of class I cities increased from 24 in 1901 to 468 in 2011. The choice of urban locations for analysis is for the following reasons: First, urban centres provide a higher demand for manufactured goods than rural areas. Secondly, urban areas provide higher level infrastructure such as road, water, electricity, etc. which are essential to set up new industries. Finally, large cities (or agglomerations) have higher productivity, wages, and capital per worker (i.e., higher economies of agglomeration), and therefore, greater efficiency benefits (Duraton, 2008; World Bank, 2004). In addition, large cities   provide the benefits of sharing (e.g. local infrastructure), matching (e.g. employers and employees), and learning (e.g. new technologies) (Duraton & Puga 2004). As the new industries will be using a higher percentage share of FDI, then obviously they would choose a location where they can have higher level of basic facilities as well as demand, which will ensure a higher level of profit for them. It is therefore fair to assume that large agglomerations will be the first choice of entrepreneurs for setting up manufacturing industries. Therefore, it is important to know which factors actually contribute to location choice by firm in the large cities in India.

The rest of the paper is organized as follows. The second section provides a brief review of literature. Sections 3 and 4 describe data base and the empirical framework for estimation of determinants. Results of estimations and discussion are made in sections 4 and 5, respectively. The last section presents the conclusion and policy implications.

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4 In the rest of the paper we use large cities as synonymous to metropolitan cities or large agglomerations.

2. REVIEW OF LITERATURE

Among the theoretical literature, Lösch (1940) developed a general location theory (i.e., central place theory) by considering full general equilibrium of all locations and prices and argues that firms locate in such a way as to maximize profits. Krugman (1995) extended the central place explanation by considering market size, agglomeration and localization economies which actually determine the firm location choice. In addition to such market-based factors, Markusen (1999) added that policy related factors such as favoritism towards certain regions can also explain the location of industry. New Economic Geography (NEG) pioneered by Krugman (1991) explained that there is an inherent advantage for firms or industries in locating in the large agglomerations as it provides a greater number of consumers with higher real wage (as consumers locate close to their suppliers which reduces transportation cost) and higher demand. Further, firm enjoys economics of scale by reducing fixed cost when they locate in the large agglomerations.   It is beneficial for both consumers and firms to locate close to one another as increasing returns occur at the city level (Fujita, 2007). NEG models also predict that size of agglomeration (measured in terms of population) also depends on trade openness of a country because when a country trades less with rest of the world, the domestic transaction becomes more important and these transactions can, in general, be conducted more cheaply over shorter distances. This process is reversed when a country trades with the rest of the world (Krugman and Elizondo, 1996). In other words, when a country is less trade- liberalized,naturally, firms will produce output for the domestic consumers and will locate close to large agglomerations but when the country becomes more trade liberalized, some of the firms which produce output for the international market will move away from the large agglomerations, and will locate in the hinterland or small towns to reap the advantage of low cost production derived from low land rent, wages etc. This result is empirically validated by Brülhart and Sbergami (2009) and Ades & Glaeser (1995). In the context of India, Sridhar (2005) argued that infrastructure is an important determinant of firm location in the growth centres of India. Without proper infrastructure (power, telecom, roads and banking), many firms (even some representing local entrepreneurship) would not have located in the growth centers. Rajaraman et al. (1999) found that abundance of power was an important factor attracting investment into major Indian states during the eighties. Mani et al. (1996) also estimated that power availability (rather than its price) reliable infrastructure and factors of production played a significant role in firm location decisions across major Indian states. Tulasidhar and Rao's (1986) analysis of a large number of medium- and large-scale industries in an Indian state indicate that the sales tax incentive, whichever way designed, was not the appropriate instrument to raise the level of investment or spread industries to backward areas.World Bank (2002) examined the investment climate and the bottlenecks that deter private investment and productivity growth in India, based upon the World Bank's Firm Analysis and Competitiveness Surveys

(FACS). The study found that while China and India are both low-inflation countries, interest expenses account for a higher share of costs for Indian firms (12.3 per cent, relative to 5.9 per cent for Chinese firms). Meanwhile, freight as a percentage of traffic units is a mere 5 per cent in India compared to 79 per cent in China, highlighting the much poorer utilization of freight infrastructure in India. Chakravorty et al. (2005) used the disaggregated industry location and size data from Mumbai, Kolkata, and Chennai, to analyze eight industrial sectors. The empirical results suggest that general urbanization economies are more important than localization economies for firm's location decisions. Lall et al. (2004) found that access to market through improvements in inter-regional infrastructure is an important determinant of firm level productivity, whereas benefits of locating in dense urban areas do not offset associated costs. Lall and Mengistae's (2005a) result showed that both the local business environment and agglomeration economies significantly influence business location choices across Indian cities. A plant-level study by Lall and Mengistae (2005b) in India's major industrial centers showed large productivity gaps across cities due to differences in agglomeration economies, degree of labor regulation, severity of power shortages, and market access. Lall et al. (2003) found that generalized urbanization economies (manifested in local economic diversity) provide agglomeration externalities that lead to industrial clustering in metropolitan and other urban areas in India. Chakravorty's (2003) findings provide evidence both of inter-regional divergence and intra-regional convergence, and suggest that concentrated decentralization is the appropriate framework for understanding industrial location in post-reform India. Lall and Chakravorty (2005) examined the contribution of economic geography factors to the cost structure of firms in eight industry sectors and showed that local industrial diversity is an important factor with significant and substantial cost-reducing effects. Sridhar and Wan (2010) using large data sets—Investment Climate Surveys (ICS)—of firms surveyed by the World Bank investigated the determinants of firm location choice in cities by considering China, India, and Brazil. The study used Multinomial econometrics models by considering different independent variables, such as dummy variable pertaining to firms established in the post reform period, Firm's private ownership, dummy variable for capital city, proximity to inputs, firm size, dummy variable for exporter firm etc. They found that in the Indian context, more labour-intensive firms tend to refrain from locating in medium-sized cities relative to smaller cities. Indian firms find capital cities attractive. Exporting firms prefer larger cities because the product value chain is better integrated in larger than in smaller cities. The labour regulation indicator has a significant and negative impact on the odds of a firm locating in a large city in India. Firm efficiency has a significant positive impact on the log odds of a firm locating in the large cities of India.In regard to FDI's contribution to locational choice of firms in the city of Mexico, Jordaan (2012) using conditional Logit and nested Logit model found that the level of regional demand enhances the probability of a region beingselected by new FDI firms, as do the regional level of schooling and labor quality. The regional level of wages impacts this probability. Further, the regional presence of

agglomerations of manufacturing firms and distributors both increase the probability of a region being selected. Regional agglomerations of Mexican manufacturing firms and foreign-owned distributors have the largest positive effect. In the context of India, Mukim and Nunnenkamp (2012) employed a discrete choice model and Poission regression model to analyze the location choices of foreign investors at Indian district level by taking a sample of about 19,500 foreign investment projects approved in 447 districts from 1991 to 2005. They found that foreign investors strongly prefer locations where other foreign investors are present. They are also attracted to industrially diverse locations and those with better infrastructure. Chakrabarti et al. (2012) examined the effect of infrastructure in 2001 on cumulative FDI flows into Indian districts during 2002-07. Using panel regressions that include state fixed effects, they employed a two-pronged identification strategy. First, they tested by netting out average (and maximum) FDI inflows into surrounding districts. Second, they exploited variation among different sectors within a district depending upon the sector's propensity to attract FDI. Finally, they found that FDI inflows remain insensitive to changes in infrastructure till a threshold is reached; thereafter, FDI inflows increase steeply with an increase in infrastructure.A theoretical explanation for the finding the present study that a threshold level of public infrastructure isrequired to attract FDI, is offered by Haaland and Wooton (1999) and Kellenberg (2007).

A study by Morris (2004), in the context of regional determinants of foreign direct investments in India, and the case of Gujarat in particular, argued that for all investments (other than those strictly confined to locations due to their requirements of either natural resources or the need to be very close to markets) it is the regions with metropolitan cities, that have the advantage in 'headquartering' the country operations of MNCs in India, and therefore attract the bulk of FDI. The above literature survey clearly indicates that firm-level studies and city-level data regarding firm locations are sparse in India. The few such studies include, Byrnes et al. (1999) pertaining to USA, Sridhar (2006) for India and China and Sridhar and Wan (2010) for India, China and Brazil. However, it is important to note that firm level data on the locational choice is important for assessing investment climate or highlighting crucial aspects of city-level governance and policies, which can thwart or promote their ability as engines of economic growth in India. This calls for the modeling on firm location in urban areas in India. This paper constitutes a small addition to the literature on determinants of industrial location in India and examines why industry locates or refrains from locating in large urban areas by using invaluable firm level financial data. Uniqueness of this exercise is the use of the firm level financial data to find out the determinants of firm location choice in India. The determinants of location choice of firms are very important to formulate policy prescriptions for urban based industrial policy.

3. DATABASE

A major part of the data is collected from Capital line, an online database provided by Capital Market Ltd in India. The database provides firm level financial information of more than 13,000 companies. The study has also used Prowess database provided by CMIE (Centre for Monitoring Indian Economy) and Ace Equity plus Database. Sectoral data is sourced from the Website of Department of Industrial policy and Promotion (DIPP) and a monthly newsletter issued by DIPP known as SIA newsletter. Capital line database has been used to collect the data related to balance sheet, profit and loss account and financial statements of the different companies included in the sample.The data was collected for 193 firms from 8 different sectors whose financial measures are available in 2012-13. Table 1 below shows the sector -wise distribution of the sample firms. The categorization of industry sectors in the present study is driven by the pattern of classification of sectors done by Reserve Bank of India (RBI). However, there are certain related sub- sectors of industries, and they are added in the sectors to obtain sufficient number of firms for the sample. The firms which have been selected in the study period have received FDI of 10 percent or more; such studies are selected to analyze the effect of FDI on firm location choice in India. A total of 6500 firms were checked from different industries related to manufacturing sector, which include 500 firms that were chosen for having received FDI of 10 percent or more. But, due to unavailability of data on different variables like exports, imports, capital etc. or firm merger or takeover etc., only 193 firms ultimately remained in the sample. The location of the firm is the registered head office of the firm provided by the firm in Capital line data base maintained by CMIE.

Table 1 - Industry Distribution of Firms

Industry/Sector	Frequency of firms	% of frequency
Metal and Non metal, Steel and Iron	20	10.36
Engineering - power generation	24	12.44
Electronics and electrical appliances/equipments	24	12.44
Food and dairy products - coffee, tea, vanaspati, distilleries, sugar, fast moving consumer goods (FMCG)	24	12.44
Automobiles and auto ancillaries	30	15.54
Chemicals & allied products-	24	12.44
Pharmaceuticals and biotechnology	22	11.40
Textiles	25	12.95
Total	193	100

Source: Authors'

As shown in Table 1, eight different industries are considered for the study. The shares of frequencies of the firms in these 8 industries are almost equal ranging from 20 (i.e., metal and non metal, steel and iron) to 30 (i.e., automobiles and auto ancillaries). The large cities with the 10 lakh or more population, i.e., metropolitan cities in India are considered for the study as large cities have greater efficiency than small cities. Therefore, a firm has two options: either to locate in the large cities or to locate in small

cities/towns with populations less than 10 lakhs. The study sample consists of 150 (or 78%) firms are located in 27 large cities and 43 (or 22%) firms are located in 39 small cities/towns with populations less than 10 lakh. Out of 27 large cities the highest number of firms are located in Mumbai (i.e., 43) followed by New Delhi (16), Kolkata (14), Chennai (12), Pune (11) and Bangalore (10). On the other hand, among the small cities/towns, the highest number of firms are located in Gurgaon (4) followed by Anand (2) and in other small cities/towns are having one firm each.

4. EMPIRICAL FRAMEWORK FOR ESTIMATION OF DETERMINANTS

The principal concern of this paper is to investigate whether or not firms choose large cities over small cities/towns and the reasons thereof. This problem can be quantified by dummy endogenous variables and hence the determinants of firm location choice may be estimated using a binary logit model.[5]The general framework for estimation of the model is as follows.

$$ln\left[\frac{\rho_{ij}}{1-\rho_{ij}}\right] = \alpha_j + \beta_{1j}.X_{1i} + \beta_{2j}.X_{2i} + \ldots\ldots\ldots + \beta_{kj}.X_{ki} + \varepsilon_i \{i = 1,2,3,\ldots\ldots,193\} \ (1)$$

Where ln is the base of natural logarithms; $\rho_{ij}$is the probability (defined by the standard cumulative logistic probability distribution function) of firm location choice of the jth firm in the large cities; $(1-\rho_{ij})$ is the probability of the jth firm not locating in the large cities or agglomerations;$(X_{1i}\ldots X_{ki})$ is the independent variables for jth firm; ε is the random disturbance term; and $\{\alpha_j, \beta_{1j},\ldots\ldots\beta_{kj}\}$ is the intercept and slope parameters to be estimated. The model in equation (1) is inherently non-linear and estimated by the technique of non-linear maximum likelihood estimation.

Next, let the estimated model in equation (1) be equal to the equation below. The asterisk (*) indicates the estimated value of the probability and parameters in equation (1). Then,

$$\rho_{ij}^* = \frac{\ln(z_{ij}^*)}{\{1+\ln(z_{ij}^*)\}} \ (2)$$

where Z_{ij}* is the estimated logit and is equal to:

$$ln\left[\frac{\rho_{ij}^*}{1-\rho_{ij}^*}\right] = [\alpha_j^* + \beta_{1j}^*.X_{1i} + \beta_{2j}^*.X_{2i} + \ldots\ldots\ldots + \beta_{kj}^*.X_{ki}]$$

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[5] A presentation on statistical assumptions and construction of logit model is available in Chapter 17 of Green (2011).

Thus, equation (2) gives the estimated probability of the location choice of the jth firm, given the different independent variables. In this model, we have 11 independent variables. Table 2 lists all the independent variables along with their measurements used to investigate the location choice of firm in the large cities in India.

TABLE 2 - VARIABLE DESCRIPTIONS

Independent variables	Variable definitions and measurement
Age	The number of years since the firm has come into existence. For example if the firm was started in 1980 and study period is 2013. The age is 2013-1980= 33 years.
Capital	The amount of expenditure incurred on the purchase of capital like machinery in a year.
Output	The total amount or value of revenue from the different outputs in the form products which a firm receives.
Export	The revenue earnings in forex.
Working capital	Current assets - current liabilities.
Fixed asset	The total amount spent on the purchase of fixed assets like buildings etc by a firm.
Operating profit	Operating profit is the profit earned from a firm's normal core business operations. This value does not include any profit earned from the firm's investments, such as earnings from firms in which the company has partial interest, as before deductions of applicable interest and taxes owed are made. Operating profit is calculated using the following formula: Operating Profit = Operating Revenue – Cost of Goods Sold (COGS) - Operating Expenses - Depreciation and Amortization
Material cost	Total amount of expenditure done in order to purchase raw material and other inputs used in the firm.
Imports	The revenue expenses in forex:
Sales	Here we have taken Gross sales. **Sales revenues** usually refer to the sum of money owed or paid by the company for sales of goods and services. It includes return, depreciation etc.
FDI	FDI is normally described as active role of a foreign investor in the risk capital of an existing or a new undertaking and also having a say in the management. The most common form of FDI flow is through participation in risk capital of the host country's joint stock companies (as per OECD IMF recommendations). As per IMF OECD definition, FDI is considered as foreign investment of 10 percent or more in the shareholding pattern of the company. The foreign investment include oversees body (government nongovernment), off shore investment etc. Most importantly, percentage share of capital is used to measure the FDI in our case.

Source: Authors' compilation

5. RESULTS OF ESTIMATION

Table 3 details the means, standard deviations, minimum, maximum, and coefficient of variation (CV) values for the variables used for the regression analysis. Most importantly, the CV aims to describe the dispersion of the variables in a way that does not depend on the variable's measurement unit. The higher values of CV for total amount capital value, total value of fixed assets, total value of working capital, value of operating profits, indicate the greater dispersion in these variables. On the other hand, age of the firm, percentage of FDI, total value of sales show the lower dispersion in these variables. Most importantly, the dummy variable of firm's location choice indicates that if the firm is located in large cities (pollution 10lakh or more) then the value is one and if the firm is not located in large cities, the value of the dummy variable is zero. In our sample 78 percent of firms are located in large cities in India.

TABLE3 - DESCRIPTIVE STATISTICS

Variables	Mean	Standard Deviations	Minimum	Maximum	Coefficient of variations
Location	0.78	0.42	0	1	53.7
Age (in yeras)	41.87	22.75	13	150	54.3
Output (in Rs crores)	2889.64	7346.74	-34.5	48295.22	254.2
Capital (in Rs crores)	2428.62	7641.86	-119.9	84844.87	314.7
Exports (in Rs crores)	457.23	1176.32	0	8829.17	257.3
Working capital (WC) (Rs crores)	715.10	2193.07	-2691.5	23126.9	306.7
Fixed assets (FA) (in Rs crores)	2880.84	9223.71	-106.27	89534.09	320.2
Operating profit (OP) (in Rs crores)	450.99	1365.41	-48.16	11353.75	302.8
Material cost(MC) (in Rs crores)	1674.34	4609.57	0	32535.40	275.3
Imports (in Rs crores	625.24	1612.27	0	11558.34	257.9
Sales (in Rs crores)	3022.37	7616.39	0	50328.95	252.0
Percentage of FDI (FDI)	44.18	24.80	10	94.45	56.1

Note: The calculation is based on 193 observations.
Source: Authors'

Table 4 shows the raw correlation coefficient. The values of the correlation coefficients (r^2) show that the firm location choice is positively associated with age of the firm (i.e., r^2 is 0.25), percentage of FDI (i.e., r^2 is 0.08), operating profits (i.e., r^2 is 0.09), total sales value (i.e., r^2 is 0.06). On the other hand, firm location choice is negatively associated with total value (i.e., r^2 is - 0.09) and imports value (i.e., r^2 is - 0.01).

TABLE 4 - SIMPLE CORRECTION COEFFICIENTS

Variables	Location	Age	Output	Capital	Exports	WC	FA	OP	MC	Imports	Sales	FDI
Location	1.00											
Age	0.25	1										
Output	0.05	0.13	1									
Capital	0.02	0.16	0.74	1								
Exports	-0.09	-0.03	0.66	0.48	1							
WC	0.05	0.13	0.75	0.64	0.33	1						
FA	0.03	0.14	0.78	0.97	0.49	0.64	1					
OP	0.09	0.19	0.90	0.88	0.47	0.81	0.90	1				
MC	0.06	0.06	0.94	0.57	0.71	0.63	0.60	0.74	1			
Imports	-0.01	0.02	0.83	0.70	0.82	0.53	0.74	0.69	0.79	1		
Sales	0.06	0.14	0.99	0.77	0.65	0.75	0.80	0.92	0.93	0.82	1	
FDI	0.08	0.15	-0.06	-0.12	-0.05	-0.05	-0.13	-0.09	-0.07	-0.07	-0.07	1

Note: Description of notations is as given in Table 3.
Source: Authors'

Table 5 presents the estimation results of three models by considering all the 193 firms. All results are presented by the estimated intercept and slope coefficients and their standard errors. In addition,

goodness of fit for the entire model is presented by the log-likelihood test statistic and chi-square test. The test showed significant results for all models. Estimated coefficients of all the variables are statistically significant, except the coefficient of the percentage of FDI and imports values. Among the independent variables, age of the firms, value of output, value of capital, value of exports, value of working capital, value of fixed assets, value of operating profits, value of material costs, and value of sales indicated significant influence on firm location choice in large cities. For expositional purposes, all results are interpreted according to statistically significant coefficients.

TABLE 5 - BINARY LOGIT MODEL ESTIMATES OF LOCATIONAL CHOICE OF FIRMS IN LARGE CITIES IN INDIA

Independent Variables	Model 1	Model 2	Model 3
Age	0.039***		0.036***
	(0.013)		(0.012)
Output	-0.102**	0.0153*	
	(0.059)	(0.009)	
Capital	-0.108**	-0.003	
	(0.051)	(0.005)	
Exports	-0.106*	-0.059**	-0.065**
	(0.043)	(0.026)	(0.031)
Working capitals	0.001*		0.057
	(0.001)		(0.215)
Operating profits	0.002*		
	(0.001)		
Fixed asset	0.079*		
	(0.041)		
Material costs	0.063*		
	(0.033)		
Imports	-0.017		
	(0.562)		
Sales	0.459		0.143*
	(0.663)		(0.081)
Percentage of FDI	0.003	0.007	0.002
	(0.008)	(0.007)	(0.008)
Intercept	-0.286	0.931**	-0.184
	(0.534)	(0.36)	(0.492)
No. of observation	193	193	193
-2 Log likelihood	-84.69	-98.15	-91.72
Chi-square	35.35***	8.45*	21.31***
Estimated probability	0.876	0.795	0.828

Source: Estimated by using equations (1) and (2). Figures in the parentheses are standard errors. ***, **, or * indicates that the t-statistic is significant at 1, 5, or 10 percent level.
Notes: For model 1 -3, dependent variable is whether firm located large or small city (1 if located in large cities, 0 otherwise).

The estimated coefficient of age variable is positive and statistically significant in Model 1 and 3. This means that other things being the same, the odds are in favor of the firms locating in the large cities than the small cities in India. This result is consistent with the known fact that large cities provide greater

efficiency than the small cities. This also indicates that old firms largely prefer to locate in the large cities in India than in smaller ones. Interestingly, the value of total output is negative in Model1 but it is positive in Model 2. On the other hand, total value of capital also has a negative effect. This means that, other thing being equal, firms with higher level of output and capital (i.e., large firm) have a lower probability to locate in the large cities than in the small cities. In particular, a 1 percent increase in total value of output (or capital) lead to decline of 0.10 (or 0.11) in the logarithm of the odds that the firm will choose to locate in the large cities. This indicates that large firms (in terms of total value of capital and output) mainly prefer to locate in the small cities than large cities. The estimated coefficient of total value of exports is negative in Model 1-3. The value of the coefficient in Model1 shows that a 1 percent increase in the total value of firm's export leads to a decline of 0.11 in the logarithm of the odds that the firm will choose to locate in a large city. The estimated coefficients of total value of working capital and total value of fixed assets -variables are positive in model 1. This means that, other things being equal, firms with higher value of working capital and fixed assets have a higher probability to locate in the large cities than small cities in India. The impact of total value of operating profits and material costs is positive. The result implies that a 1 percent increase in the total value of operating profits (or materials cost) leads to an increase of 0.002 (or 0.063) in the logarithm of the odds that the firm will choose to locate in the large cities. Finally, the estimated coefficient of total sales value is positive and statistically significant. This means that, other things being equal, higher value of firm's sales have a higher probability of locating a firm in the large city than a small city. However, the study could not find any statistically significant effect of percentage of FDI used by the firms and total value of imports on the location choice of the firm in the large/small cities in India.

Using equation (2), the probability of location choice of firm in the large cities was calculated and is presented in the last row of Table 5. The estimated probability is relatively higher for models 1, 2 and 3. Notably, it is the lowest for model 2 and the highest for model 1.

6. DISCUSSIONS

This paper has brings to light various important and interesting results than previous studies on the topic (Sridhar and wan, 2010, etc). The mixed effect of total output value and negative effect of capital amount (which is used to buy machinery) indicates that the large firms tend to refrain from locating in the large cities in India. This is because of the likely higher costs of doing business such as costs on real estate, skills attrition, etc. This result is in line with findings of Sridhar (2006). Age of the firm which is measured by year of establishment has a significant effect on the firm location choice in the large cities in India. The result indicates that though the old firm would have preferred to locate in the large

cities, it may not be case for the new firms, i.e., new firms are locating in the small cities in India as small cities have lower rent, lower wage rate etc.

The total value of exports has a negative effect of firm location choice in the large cities in India. In other words, major exporting firms prefer small cities than large cities in India. This result supports the NEG model (Krugman and Elizondo, 1996) and the empirical findings of Brülhart and Sbergami (2009) and Ades & Glaeser (1995). It indicates that India's trade liberalization has transformed the firm location choice. Domestic firms which produce output for the domestic consumer prefer to locate in the large cities in order to reduce transport cost and also proximity to inputs. On the other hand, firms that produce output to meet foreign demand (export) prefer to locate in the small cities or hinterlands or small towns to reap the advantage of low cost production through the low land rent, wages etc.

On the other hand, volume of working capital is dependent on nature of business of a firm. This is the capital of the firm used in its day-to-day trading operations, calculated as the current assets minus the current liabilities. In other words, the current assets represent anything of value that is highly liquid. Working capital also gives investors an idea of the company's underlying operational efficiency. If a company's current assets do not exceed its current liabilities, then it may run into trouble of paying back creditors in the short term. The worst-case scenario is bankruptcy. This indicates that the amount of working capital always involves risk. Therefore, to minimize the risk, firm with higher working capital choose to locate in the large cities, or it may be the case that investors choose the firms which are located in the large cities for higher investment which in turn increases the higher working capital of the firm.

On the other hand, the total value of operating profit of a firm has a significant effect on the firm's location choice in large cities in India. The operating profit may reflect the company's financial situation more positively than that reflected by net profits. While positive operating profit may express the overall profit potential of a business, it does not guarantee that the business is not experiencing losses. Investment decision of an investor depends on operating profits as well the risks involved. Therefore, much alike the working capital, the amount of operating profits of a firm has a positive impact on firm location choice in the large cities in India.

The estimated results show that higher the costs incurred on fixed assets by a firm, higher the propensity to locate in the large cities in India. This result supports the theoretical argument of NEG models, which predicts that firms choose to locate in the large cities as they can enjoy higher economies of scale by sharing the fixed cost (Krugman, 1991). The results clearly support the hypothesis that firms that invest more money on fixed costs prefer to locate in the large cities in order to reap the economies of scale.

Krugman (1991) explained that there is an advantage for firms or industries in locating in the large agglomerations as it provides a greater number of consumers with higher real wage (as consumers locate close to their suppliers which reduces transportation cost) and higher demand., Further, a firm enjoys economies of scale by reducing fixed cost through locating in the large agglomerations. This way, both consumers and firms stand to gain by being close to one another and increases returns on investment at the city level (Fujita, 2007). However, Lall et al. (2004) found that access to market through improvements in inter-regional infrastructure is an important determinant of firm level productivity, whereas benefits of locating in dense urban areas do not offset associated costs. Tripathi (2014) in his analysis of firm level data in 2004-05 from Annual Survey of Industries found that urban firms in Indian industry operate under decreasing returns to scale, i.e, urbanization is associated with negative external economies of scale that do not enhance productivity and do not drive urban growth and development. This indicates that though a firm may choose to locate in the large cities to reap advantage of low fixed costs, they may still face lower productivity due to other costs and also lack of suitable business acumen/ environment.

Higher material costs and sales values of firm have positive effect on location choice of firms in the large cities in India. This indicates that if a firm paying higher amount of money to buy raw materials, it tends to choose large cities for location. Firms that locate in the large cities incur higher cost in buying raw materials, but higher sales values could still persuade a firm to locate in the large cities, or it will be the case that due to higher demand in the large cities the firms locating in the large cities reap higher sales values.

Most importantly, the study found that the total value of imports and percentage share of capital of FDI have no statistically significant effect on the firm location choice in the large cities in India. This is a very important finding, and supports the empirical findings of Chakrabarti et al. (2012). They found that there is indeed a positive relationship between physical infrastructure and FDI inflows; the relationship is essentially non-linear with a "threshold level" of infrastructure after which the positive effect becomes significant. The findings of this paper also support their argument that Indian cities face a severe lack of adequate infrastructure. Therefore, it is clear that the small increase in infrastructure cannot yield a proportional rise in FDI inflows and promote location of multinational corporations in towns/cities. It is important to note here that the Report on Indian Urban Infrastructure and Services (GOI, 2011) estimated that Rs. 39.2 lakh crore at 2009-10 prices is required over the next 20-year period to reach the level of infrastructure needed to attract FDI inflows and sway the choice of firm location. Of this, the outlay on urban roads accounts for Rs 17.3 lakh crore (or 44 per cent). Therefore, this paper argues that strong governmental policy measures are essential for higher infrastructure investment which would

help to cross the infrastructure threshold necessary to attract FDI and corresponding location of foreign enterprises.

7. CONCLUSIONS AND POLICY IMPLICATIONS

The present paper investigates the relevant economic determinants of firm location choice in the large cities (with population 10lakh and more) in India. Of the total 193 firms considered in this study, 150 (or 78%) are located in 27 large cities and rest 43 (or 22%) in 39 small cities/towns with populations less than 10 lakh. Out of total 6500 firms, the study has chosen for analysis 193 firms that have received FDI of 10 percent or more as   full data set on other important variables such as, exports, imports, capital etc of these firms are available (for analysis) for the period 2012-13. These193 firm belongs to 8 different industry groups such as metal and non metal, steel and iron; engineering - power generation; electronics and electrical appliances/equipments; food and dairy products - coffee, tea, vanaspati, distilleries, sugar, FMCG; Automobiles and auto ancillaries; Chemicals & allied products; Pharmaceuticals and biotechnology; and Textiles.

The main findings from the estimation of binary logit can be summarized as follows. First, age (i.e., the year of establishment) of the manufacturing firm has a significant positive effect on firm location choice in the large cities in India. Second, large firms in terms of higher level of output and capital have a lower probability to locate in the large cities. Third, firms having higher export share of the output choose not to locate in the large cities in India. Fourth, firms having higher level of working capital and operating profits prefer to locate in the large cities than in the small cities to avoid risk. Fifth, firms that have higher level of fixed assets, material cost and higher sales values generally locate in the large cities. Finally, the study could not found any statistically significant effect of percentage of FDI in capital and total imports values on firm location choice in the large cities in India.

The findings carry several policy implications. First, the insignificant impact of the FDI percentage in capital on the location choice of firms clearly indicates that Indian cities largely lack the adequate infrastructure. Therefore, investment in urban infrastructure is essential to create favorable condition for the location of firms in large cities in India. Recently, the Government of India has launched several urban development policies and programmes to streamline urban infrastructure and service delivery systems, as a part of which Rs 98,000 crore (US$ 15,329.26 million) has been allocated to build 100 smart cities in India. It is hoped that this policy will be helpful in persuading foreign firm to locate in the large cities of India. Locating foreign firms in the large cities or agglomerations will have higher spillover benefits than locating them in –smaller cities/towns. Therefore, large Indian cities need to be improved in such a way that these cities/towns become the natural destination of FDI. Further, the highest

positive spillover effects that foreign firms can generate will be realized if they are located in the large cities than in smaller scale agglomerations in small cities/towns.

Second, to attract higher level of FDI at the firm level, in addition to make regulatory policies more flexible, government also needs to means to reduce production costs either by providing substantial subsidies or tax benefits to multinational enterprises (MNEs) or through the provision of public inputs such as infrastructure.

Third, government has to clearly distinguish the firms that produce goods for domestic markets from those produce goods for the international market. The results of empirical analysis conducted under this study as also theoretical reasoning indicate that it is always better to support the domestic firms to locate closer to large cities and to support exporting firms to locate away from the large cities or in the hinterland. This way, domestic firms can reduce production cost by reducing transport cost and exporting firm can reduce production cost by benefitting from the lower wage rate and lower land rent etc. in smaller towns/ hinterlands. In order to make this proposition practical, government needs to make sure that exporting firms can avail facilities such as connectivity with the port, supply of electricity etc in the small town or in the hinterland where the firms choose to locate.

Fourth, firms which are large in terms of amount of capital (i.e., machinery cost) and value of output need to locate in the small towns so that they can avail the benefits of lower wage rate, land rent etc in the smaller cities/towns and maximize profit. An additional bonus of this scheme would be reduction of pollution levels in the large cities. However, large firms with have higher level of working capital and operating profits can locate in the large cities to avoid risk of lower margin of profits as large cities provides higher level of consumer demand than in small cities.

The national licensing policy 1977 which mandates that new medium or large scale industries can't be set up in the standard urban areas of the metropolitan cities in India deters the exploitation of economies of scale of large agglomeration/cities. However, manifestly eco friendly firms should be allowed to locate in large cities so that they can enjoy increasing returns to scale and returns on investment.

Finally, it is hoped that the findings of the paper will be helpful to promote urban-led industrial revolution and to transform Indian cities as the engines of growth. In this case, it is important to note that countries like England, Belgium, Germany, France, United States and Japan owe their present developed status to their early start on the industrialization front. Even after 69 years of Independence, India is yet to realize the benefits of   low- cost urban-based industrial revolution. So, it is high time that the country took all necessary steps to promote urban-based and industry-led economic growth in India.

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