

# **Locational Determinants of Overseas Acquisitions: Evidence from Indian Pharmaceutical Industry**

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**Abstract:** This study attempts to identify the most important locational determinants of the host countries which determine the investment destinations of IPCs. The variables under study measure the macro environment such as the prevalence of favorable economic, political, institutional and cultural environments in the host countries. These macro environment proxies may become attractive pull factors for firms to locate their economic activities abroad. The study estimates the model using panel data regression for thirteen annual observations from 2000-12 and finds that strategic resource-seeking motivations are the most important locational determinant of Indian pharmaceutical acquisitions. Interestingly, we find Indian Pharmaceutical Companies to be resilient to the weak institutional environment.

**Keywords:** Emerging Multinationals (MNEs), Internationalization, Indian Pharmaceutical MNEs, Outward Foreign Direct Investment (OFDI), FDI Location Choice, Panel Data Analysis

**JEL Classification Number:** F14, F23, R12, R30

## **1. Introduction**

The growth and rising prominence of emerging market multinationals from developing economies such as Brazil, Russia, India, China and South Africa (BRICS) marks a significant phase in the evolution of the world economy in the last decade. These economies have not only been major recipients of Foreign Direct Investment (FDI) but have also transformed themselves as important outward investors. There has been a phenomenal rise of 10 percent in world flows with increase in outward FDI from \$7 billion in 2000 to \$145 billion in 2012 (UNCTAD, 2012). The directional flow of their overseas investments has mainly targeted the developed countries, accounting for over 40 per cent of their outward FDI stock.

This necessitates the need to understand the drivers for their locational choice. The objective of this study is to develop a framework based on Dunning's eclectic paradigm to empirically evaluate the most dominant locational determinants of the host countries that

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motivates the spatial distribution of Indian Pharmaceutical Acquisitions. Finally, the remainder of this paper is organized as follows. The next section briefly reviews the relevant literature covering the important aspects of internationalization undertaken by the IPCs and their preference for acquisitions as their most favored mode of entry. This is followed by a section which discusses the dependent variable and the theoretical foundations governing each of the independent variables along with their data sources and model specification. The penultimate section discusses the empirical results and the final section underlines the conclusions and implications of the study.

## **2. Literature Review**

The literature revealed that much of the research focus has been on the location of outward foreign direct investment (FDI) from advanced economies. Researchers expressed doubts on the applicability of these findings to the determinants of FDI from emerging markets (Ramamurti, 2009). Despite India's growing economic importance on the global stage and with considerable increase in the expansion of cross-border investments by Indian companies, very little is known about the motives and strategies of these firms as compared to MNEs from developed economies. Secondly, majority studies in Indian context discuss the push factors responsible for driving out Indian firms to invest abroad (Watal, 1996; Lanjouw, 1998; Pradhan, 2002a, b, 2006b). But these studies fail to address the pull factors of potential host countries. In the backdrop, the current empirical study aims to bridge this gap by focusing on these host country specific advantages which have attracted Indian MNEs to invest abroad. We propose to test the following hypothesis:

- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the market size of the host country.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the host country endowment of Strategic assets.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the economic environment of the host country.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the institutional environment of the host country.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the Openness of the host country.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated to the Political and Economic Linkages of the host country.
- The Number of Indian Pharmaceutical acquisition deals is negatively correlated to the Geographical Proximity of the host country.
- The Number of Indian Pharmaceutical acquisition deals is positively correlated with countries speaking English Language

### **3. Research Design**

#### **3.1. Data**

The data includes thirteen annual observations across thirty three countries from 2000 to 2012. In this period, 67 Indian firms have undertaken 191 acquisitions valued at US \$ 6 billion approximately. Data on Indian pharmaceutical acquisitions has been sourced from Grant Thornton India and ISI Emerging Markets, which have also been verified independently through company's annual reports and the print media.

The host country data on the independent variables such as market size (proxied by GDP), openness (proxied by trade as a percentage of GDP), economic environment (proxied by total tax and inflation) and strategic asset (like Secondary School Enrolment and R and D expenditure) have been sourced from World Development Indicators .Strategic assets like resident patent filings and applications for trademark have been obtained from the online patent statistics published by the World Intellectual Property Organization (WIPO). Institutional Environment proxies such as Political stability, Rule of Law and Control of Corruption have been sourced from the World Governance Indicators. Political and Economic Linkages was sourced from the official websites of G15, G20 and Commonwealth. Data on cultural environment proxies such as language and geographical proximity have been sourced from CEPII database.

#### **3.2. Variables**

This section covers the definitions, and theoretical foundations governing each of the dependent and independent variables

##### **Dependent variable**

We considered both the number of acquisitions as well as the value of acquisitions for testing our hypothesis.

##### **Independent variables**

###### **a) Market Size**

Market size is proxied by Gross Domestic Product

###### **b) Strategic Assets**

###### **Secondary School enrolment ratio gross (ENROL, %)**

It refers to the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age

###### **Trademark Filings (TRD)**

It refers to the trademark applications per \$billions of the current GDP of the host country.

**Patents (PAT)**

It refers to the resident patent applications per \$ billions of current GDP of the host country.

**Research and Development expenditure (% of GDP) (RDE)**

Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture and society, and the use of knowledge for new applications.

**Economic Environment**

The current study uses important proxies such as GDP deflator that measures inflation, along with corporate taxes to represent the economic environment of the host country.

**Inflation (INF)**

It refers to the overall general upward price movement of goods and services in an economy.

**Total Tax Rate (TT)**

The governments often provide investment incentives in the form of tax incentives such as tax rates, tax depreciation, tax credits, and tax holidays along with non-tax government incentives such as government grants in order to attract foreign investment.

**c) Institutional Environment**

The current study has used political stability, rule of law, and control of corruption as proxies to capture the perception of the institutional quality.

**Political Stability (POLST)**

This variable combines several indicators which measure perceptions of the likelihood that the government in power will be destabilized or overthrown by possibly unconstitutional and/or violent means, including domestic violence and terrorism.

**Rule of Law (ROL)**

This variable includes several indicators which measure the extent to which agents have confidence in and abide by the rules of society.

**Corruption (COR)**

This variable measures perceptions of corruption, defined as the exercise of public power for private gain.

**d) Openness of the economy (TGDP)**

The openness of the economy is measured as the proportion of imports & exports to GDP. In the current study, the openness of the host economy has been proxied by trade as a percentage of GDP of the host economy.

**Political and Economic Linkages**

A home country’s international linkages help in establishing networks and facilitate complementarities .India is one of the prominent members of the Common Wealth (54 countries), G-15 (19 countries) and G-20.

**e) Cultural Environment**

**Geographical Proximity (DIS)**

Geographical proximity also has an important bearing on the direction of Indian overseas acquisitions as the costs relating to information dissemination, technology transfer to establish overseas entities and their management is all likely to increase with distance (Leamer and Storper, 2001).

**Language (LAN)**

A common language facilitates greater communication leading to a reduction in the transaction costs which are otherwise very high in cross-border business operations.

**3.3. Empirical Model Specification**

We estimate the model using panel data analysis. Diagnostic test for the model are summarized in Table 1. We have compared Fixed Effects estimator with Random Effects estimator. We assume that the unobserved effect is not correlated with the explanatory variables, thus Random Effects estimator is more efficient than the Fixed Effects estimator. We implemented the test proposed by Hausman (1978) and rejected the null hypothesis. We estimate the model using random effects model. We also tested for random effects by conducting Breusch and Pagan Lagrangian Multiplier test and conclude that random effect is appropriate. The variance inflation factor of ROL and COR revealed a score greater than 10, which led to dropping of ROL to control for multicollinearity. Then we computed the Breusch- Pagan (1979) statistic to check for heteroskedasticity and Wooldridge (2002) test for autocorrelation. Here, we fail to reject the null hypothesis and conclude that the data does not have first-order autocorrelation. Estimation in Panel Data is conducted with White (1980) heteroskedasticity-consistent standard errors and covariance to rectify for heteroskedasticity.

**Table 1: Diagnostic Test of Model**

Fixed Effects or Random Effects : Hausman Test	chi2(9) = 2.04	Prob>chi2 = 0.9908
Breusch –Pagan LM Test for Random Effects	Chi2(1) = 397.08	Prob>chi2 = 0.0000
Breusch –Pagan Heteroskedasticity Test	Chi2(1) = 26.14	Prob>chi2 = 0.0000

From an econometric viewpoint, the following equation is specified:

$$\begin{aligned}
 ACQ_{it} = & \alpha + \beta_1GDP_{it} + \beta_2PAT_{it} + \beta_3TRD_{it} + \beta_4RDE_{it} \\
 & + \beta_5ENROL_{it} + \beta_6TT_{it} + \beta_7INF_{it} + \beta_8COR_{it} \\
 & + \beta_9POLST_{it} + \beta_{10}DIS_{it} + \beta_{11}TGDP_{it} \\
 & + \beta_{12}GP_i + \beta_{13}LAN_i + \varepsilon_{it} \quad i = 1 \text{ to } 33; t = 1 \text{ to } 12
 \end{aligned}$$

where  $ACQ_{it}$ = Number of acquisitions done by Indian firms in  $i^{th}$  host country in year  $t$ ;  $GDP_{it}$ = GDP (constant 2000 USD) of  $i^{th}$  host country;  $PAT_{it}$  = Natural log of resident patent applications per \$ billions of current GDP of  $i^{th}$  host country;  $TRD_{it}$ = Natural log of resident trade mark applications per \$ billions of current GDP of  $i^{th}$  host country;  $RDE_{it}$ = Research and development expenditure of the  $i^{th}$  host country in the year  $t$ ;  $ENROL_{it}$  = Natural log of gross secondary school enrolment (per cent) of  $i^{th}$  host country;  $TT_{it}$  = Natural log of the total tax rate of  $i^{th}$  host country in year  $t$ ;  $INF_{it}$  = Annual percentage change in GDP deflator of  $i^{th}$  host country in year  $t$ ;  $COR_{it}$  = Control of corruption of the  $i^{th}$  host country in year  $t$ ;  $POLST_{it}$ = Political stability of the  $i^{th}$  host country in year  $t$ ;  $DIS_i$  = Distance in kilometres between India and  $i^{th}$  host country;  $TGDP_{it}$ = Trade as a percentage of GDP of  $i^{th}$  host country;  $GP_i$ = Group Dummy (where  $i = 1$  to 5) GP1 to 5 are ASEAN, CW, G-15, G-20, others respectively;  $LAN_i$ = Language Dummy ((where  $i = 1$  to 2), Lan 1 to 2 are English Speaking and Non English Speaking respectively).

**4. Empirical Results**

Table 2 reports the descriptive statistics for locational choice model of Indian pharmaceutical acquisition taking into account only host country factors from 2000-12 for 33 countries. On an average the mean acquisitions in pharmaceutical industry is 2, with variation from 1 to 14. The market seeking measure is proxied by GDP which is measured in US\$. The average GDP is around \$2.14mn with 3.5 times variation. Strategic assets have low variability except ENROL which has 10.73 standard deviation.

**Table 2: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
ACQ	103	1.91	2.13	1	14
GDP	103	2.14e+12	3.44e+12	1.87E+10	1.19E+13
PAT	103	9.10	2.09	5.15	12.82
TRD	103	10.16	1.64	6.13	13.79
RDE	103	1.82	0.95	0.00	4.80
ENROL	103	101.75	10.73	80.00	131.29
TT	103	3.84	0.32	2.67	4.68
INFA	103	3.56	4.04	-7.65	29.60
COR	103	1.08	0.95	-1.05	2.51
POLST	103	0.44	0.64	-1.71	1.40
DIS	103	7641.83	3244.87	2312.87	15817.92
TGDP	103	84.32	81.35	22.98	460.47

**Table 3: Correlation Matrix**

	ACQ	GDP	PAT	TRD	RDE	ENROL	CT	INF	COR	POLST	DIS	TGDP
ACQ	1.00											
GDP	0.7026	1.00										
PAT	0.5719	0.86	1.00									
TRD	0.5532	0.78	0.80	1.00								
RDE	0.3925	0.59	0.58	0.48	1.00							
ENROL	-0.2085	-0.32	-0.25	-0.07	-0.17	1.00						
TT	-0.1018	-0.01	0.00	-0.10	-0.37	0.41	1.00					
INF	-0.0769	-0.23	-0.42	0.00	-0.42	0.46	0.10	1.00				
COR	0.0258	0.04	0.16	0.13	0.67	0.10	-0.61	-0.31	1.00			
POLST	-0.2217	-0.36	-0.37	-0.44	0.26	-0.02	-0.21	-0.31	0.35	1.00		
DIS	0.5134	0.73	0.54	0.72	0.36	0.13	0.15	0.34	-0.04	-0.43	1.00	
TGDP	-0.2639	-0.42	-0.54	-0.59	0.07	-0.40	-0.40	-0.26	0.21	0.56	-0.59	1.00

Table 3 reports the correlation among the variables. We observe high correlation among market seeking, strategic assets and distance with acquisitions. Whereas, cultural and economic factors have weak correlation with the acquisitions in pharmaceutical industry.. Further examination reveals that ENROL, TT, INF, POLST and TGDP are negatively correlated with acquisitions, whereas GDP, PAT TRD, COR and DIS positively affect acquisitions.

**Table 4: Panel Regression Estimation**

Dependent Variable	No. of Indian Pharmaceutical Acquisitions		Dependent Variable	No. of Indian Pharmaceutical Acquisitions	
	B	T			
GDP	3.07E-13	0.8	DIS	-0.00025	-0.62
PAT	2.555814	1.78***	TGDP	0.089074	1.94**
TRD	1.044568	1.83***	GROUPS_DUM2	-25.0893	-2.04**
RDE	-4.66231	-2.55*	GROUPS_DUM3	-14.8935	-1.72***
ENROL	0.178286	1.92**	GROUPS_DUM4	-14.6418	-2.33**
TT	8.125574	1.92**	LAN_DUM1	6.934061	2.28**
INF	0.637645	2.45*	Cons	-69.3006	-2.02**
COR	-1.10719	-0.92	R Square	0.6218	
POLST	1.952623	2.38*			

Note: \*\*\*, \*\* and \* indicate significance at 10%, 5% and 1% levels respectively.

The results of Panel Regression (random effects) are summarized in Table 4. Dependent variable is the number of acquisition deals, while independent variables - Host Country Characteristics is further classified in Market Size, Strategic Assets, Economic Environment, Institutional Environment and Cultural Environment. The host market

related factor, GDP is statistically insignificant. Among the four strategic assets characteristics of host countries namely PAT, TRD, ENROL and RDE, we found three to be statistically significant with predicted positive sign. The general skill of host country depicted by RDE is not the decisive factors depicted by a negative significant relation at 1% level.

The cultural environment proxied by distance has a negative sign with insignificant relation. Institutional environment proxied by control of corruption is insignificant, whereas political stability is significant at 1% level. The economic environment proxied by Tax Rate is found to be significant with positive coefficients. Also Trade as a percentage of GDP is significant suggesting 1% increase in TGDP would lead to 0.08% increase in acquisitions. Inflation positively affects acquisitions at 1% level and leads to 0.63% increase in acquisitions. Group Affiliation has a negative impact on acquisitions indicating that 1% increase in acquisitions would lead to 25.08%, 14.89% and 14.64% decrease in commonwealth, G15 and G 20 respectively. Further, country specific advantages proxied by Language dummies found English speaking countries to be significant.

## **5. Conclusions**

The data set reveals the concentration of the acquisitions in the mature markets of the developed countries supporting the predicted seeking of strategic assets by the Indian firms to overcome their technological shortcomings and to improve their product development capabilities. The only idiosyncratic pattern observed is in the case of market size.

While previous studies (Aminianet.al., 2005; UNCTAD, 1993) confirm that market seeking investors look for large as well as mature markets. Our results report the host market related factor, GDP to be statistically insignificant suggesting that market size of the host country is not an important locational factor for acquiring firms. The use of acquisitions as a speedy mode of entry into high-income, mature and well developed markets could be attributed to acquire technological capabilities, marketing skills and well-established business distribution networks. Among the four strategic assets characteristics of host countries, TRD and ENROL were found to be statistically significant with predicted positive sign. The empirical results strongly support the UNCTAD (2006) observation that beside market seeking motive, seeking strategic asset is a dominant motivation. Strategic assets are increasingly gaining prominence among Indian pharmaceutical companies and helps in quick technological upgrade to overcome their limited product development capabilities.

Our result on economic environment is consistent with the findings of other studies (Swenson, 1994; Grubert and Slemrod, 1998; Desai et. al., 2004) which establishes a positive relationship between higher tax returns and the amount of FDI. The inflation



results suggest that since total tax rate impact investment returns of acquisitions, they may play an important role in determining the location choices of Indian Pharmaceutical MNEs who might prefer to invest in countries with low tax rates.

Institutional environment proxied by control of corruption is consistent with the findings of Debeule (2010) who in his comparative study of the spatial distribution of Chinese and Indian acquisitions found the variable control of corruption not yielding significant results. The results seem to imply that Indian pharmaceutical companies are not impacted by the corruption levels in host country given the similar weak institutional environments in their home country. On the contrary, political stability is an important factor as political instability increases uncertainty and hence raises the transaction costs.

The cultural environment proxied by geographical proximity suggests that Indian pharmaceutical acquisitions are not bound by physical distance. Cultural Environment proxied by English speaking countries is consistent with other and suggests that the presence of a common language such as English reduces transaction costs besides bringing about cultural closeness studies (Buckley et al 2009; Pradhan and Singh 2009; Pradhan (2010).

The openness of the host economy conform to the findings of previous studies (Rugman and Li, 2007; Buckley et al., 2007). The significance of host country trade openness to the Indian pharmaceutical companies indicates that they would like to locate more of their acquisitions in countries with liberal policy regimes and friendly environments. Finally, home and host country linkages in the form of Group Affiliation have a negative impact on acquisitions. Group affiliation is not a consideration for the Indian Pharmaceutical firms.

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