Firm Resources, Institutional Reforms and Determinants of Export Performance: A Transitory-TRIPs and Post-TRIPs Analysis of Indian Pharmaceutical Industry

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ABSTRACT

Investigation of export performance is a very dynamic area in the area of international business research. Determinants of export performance have undergone rapid changes over many years in the context of different nations and their constituent industries. The research work presented in this paper attempts to examine the determinants of export performance of Indian pharmaceutical industry in the back drop of the institutional reforms that have affected the industry ever since India became a signatory to the provisions of World Trade Organisation (WTO) in 1995. The research work presents an overview of the export performance of Indian pharmaceutical industry by combining resource-based-view approach with the institutional reforms approach. Various firm resources categorized as knowledge-based resources and property-based resources are examined to analyse how these resources impacted the export performance of the industry during transitory-TRIPs (Trade Related Intellectual Property Rights) and post-TRIPs periods. This research considers a rich panel data of 615 Indian pharmaceutical firms by considering a large set of 15 firm resources over a twenty-year period (1995-2014) using linear regression. Further attempt was made to demonstrate how the results get comprehensive using quantile regression approach. The results indicate that knowledge-based resources and property-based resources have a significant impact on the export performance of Indian pharmaceutical industry.

Keywords: Export Performance; Indian Pharmaceutical Industry; Institutional Reforms; Resource-based-View (RBV)

1. INTRODUCTION

Significant attention is focused in recent international business research on emerging market firms and the impact of institutional context on their strategic choices (Chari & David, 2012; Chittoor, Sarkar, Ray, & Aulakh, 2009; Cuervo-Cazurra & Dau, 2009; Peng, 2003). In this research paper, the impact of institutional reforms on the export performance of Indian pharmaceutical industry is examined using the resource based view. Following the approach by Tseng, Tansuhaj, Hallagan & McCullough (2007) who studied the effect of firm resources on multinationality of firms in USA, various strategic resources of the firm were considered. These strategic resources are broadly classified into knowledge-based resources and property-based resources (Tseng et al, 2007). Different technological resources of the firms and their marketing resources form part of knowledge-based resources. The property-based resources are divided into internally generated financial resources and externally generated financial resources. Though technology resources are acknowledged as a key performance and export drivers in pharmaceutical firms (Chittoor et al., 2009; Kotabe, Dunlap-Hinkler, Parente, & Mishra, 2007), little research exists to understand the nature of this relationship in the face of changing intellectual property regime. This research examines the export performance of Indian pharmaceutical firms during the transitory-TRIPs (1995-2004) and post-TRIPs (2005-2014) periods to understand the impact of intellectual property reforms on the strategic choices of firms. The intellectual property reforms associated with TRIPs fundamentally changed the rules of game for the pharmaceutical industry in India. It required the domestic firms to reconfigure their technological resources and capabilities, and also to acquire new capabilities (Chittoor & Ray, 2007; Chittoor et al., 2009). Taking support from resource based view literature; this paper makes an attempt to understand the impact of various strategic resources on export performance in two intellectual property regime periods. The Indian pharmaceutical industry experienced an exogenous shock when India became a signatory to WTO on 1st January, 1995. The industry was given a transition period of ten years to amend its patents laws. India finally moved from the era of process patents to honoring product patents starting from 1st January, 2005. It is now a decade that the new patent regulations has come into effect and this study is uniquely positioned to understand the relationship between different strategic resources and export performance in these two periods of intellectual property reforms. This research is among the earliest to study

this phenomenon over twenty years, split into transitory-TRIPs and post-TRIPs periods. It is intended to make a contribution to international business research on emerging economies.

Earlier research that investigated the impact of TRIPs on Indian pharmaceutical industry considered the 1995-2004 period as post-TRIPs since India became a signatory to WTO starting from 1st January, 2005. This is to be considered inappropriate owing to the fact that India was given a window-period of ten years to completely make the transition to product patent regime. Hence, in this paper, the period 1995-2004 is considered as the transitory-TRIPs period and the period 2005-2014 considered as the post-TRIPs period in the context of Indian pharmaceutical industry.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Earlier research on determinants of export performance of firms covered various industries in different countries. From prior literature, it can be noted that most of the earlier studies were reported either for the pre-TRIPs period (before 1995) or transitory-TRIPs period excepting a few studies (Rentala, Anand & Shaban, 2014a; Rentala, Anand & Shaban, 2014b; Tyagi, Mahajan & Nauriyal, 2014) which focused on post-TRIPs period. It is believed that this research uniquely captures the impact of firms' strategic resources on export performance over two time periods of intellectually property changes, which is an area where very limited evidence was documented by previous researchers.

Knowledge-based resources that include technological resources facilitate organisations to improve quality of their products. This in turn helps in greater acceptability of the products in the foreign markets (Joseph & Reddy, 2009). Technological capabilities that are accrued through strategic use of technological resources can serve as good catalysts for export performance of industries in emerging nations (Bhat & Narayanan, 2009). Technological capabilities can be enhanced either through in-house R&D efforts or by external facilitation through foreign collaborations. Internal R&D initiatives support firms to build up unique products while imports of technological skills can be either through disembodied or embodied technological capabilities (Joseph & Reddy, 2009; Bhat & Narayanan, 2009). As per the conclusions of these earlier studies, disembodied technology is normally captured through import of technological strengths by paying royalty & technical fees to foreign firms. Likewise, embodied technology is enhanced

by importing capital goods and raw materials that help to improve quality of the products. Hence this research considers four technological resources in combination with marketing resources as part of the knowledge-based resources. Various financial resources classified into internally generated financial resources and externally generated financial variables were also considered for this study.

H1: Knowledge-based resources are positively related to export performance with the relationship being stronger in the transitory-TRIPs period than the post-TRIPs period.

H2: Property-based resources are positively related to export performance with the relationship being stronger in the transitory-TRIPs period than the post-TRIPs period.

3. DATA AND METHODS

3.1 Data Source

Data for the research was extracted from Prowess database compiled by Centre for Monitoring Indian Economy (CMIE). 615 pharmaceutical firms were listed in the Prowess data base for the time period and all the firms were included in the analysis to avoid any sample selection bias. The period of study considered for the research was for 20 years (1995-2014). This 20 year period was chosen to compare the export determinants of Indian pharmaceutical industry during the transitory-TRIPs (1995-2004) and post-TRIPs period (2005-2014). Since data was not available for all the variables for the entire period of study, the total number of observations was 196800 over the twenty year period which presents an unbalanced panel.

3.2 Variables

Table 1 gives an overview of the dependent and independent variables considered for the study. Export intensity, the most commonly used export performance measure (Wang, Cao, Zhou, & Ning, et al, 2013) was taken as the dependent variable.

Table 1

4. RESULTS AND DISCUSSION

Table 2 gives an account of descriptive statistics for all the variables during the period 1995-2014.

Table 2 here

Table 3 presents a comparative account of the regression results for the transitory-TRIPs and post-TRIPs periods. Based on the results from the Hausman test, the fixed effects model was adopted. The data has been checked for stationarity using the panel unit root test (Levin, Lin and Chu, 2002) and the data was found to be stationary. The data was also checked for multicollinearity by calculating the variance inflation factor (VIF) values and correlation values. It was found that all the VIF values are less than 4 and hence it can be concluded that the data does not suffer from any multicollinearity with the other variables used (Besley, Kuh & Selsch, 1980). The explanatory power of all the models was considered to be satisfactory owing to the high value of the adjusted R^2.

Table 3 here

As per the hypotheses, it was found that three technological resources (knowledge-based resources) namely internal R&D expenses, import of capital goods and royalty payments have exhibited different behaviour in the transitory-TRIPs and post-TRIPs periods while the other technological resource, i.e., import of raw materials has shown a similar effect in both the periods. The regression results indicate that R&D expenses have shown a significant and positive impact on export performance in the transitory-TRIPs period but not in the post-TRIPs period. It is very pertinent to observe that before 1995, the prominence given to R&D activities was very meager in the Indian pharmaceutical industry owing to the safety provided by the process patent system that was prevalent in India. A few Indian pharmaceutical companies like Ranbaxy, Dr. Reddy's, and Wockhardt spent their resources on R&D strengths and even those efforts were very weak in comparison to the research expenses of foreign firms. It is posited that the positive significant effect in the transitory period alone is indicating that the R&D investments made primarily were for process improvement which offered short-term benefits in the transitory-TRIPs period. However, in post-TRIPs period, the deficiency in earlier experience and a very prohibitive cost of developing new molecules is curbing the export performance of Indian firms. The import of capital goods also showed a significant and positive impact on export performance in the transitory-TRIPs period but not in the post-TRIPs period. Import of capital goods is

essential for emerging economy firms to be on par with the latest technologies of competitors from the developed world and hence it was expected that the import of capital goods exhibited a significant impact on export performance in the transitory-TRIPs period as a run-up to the post TRIPs period that was to become effective from 2005. However, similar to the case of R&D, it is seen that Indian firms have not be able to capitalize yet on utilizing the knowledge gained from import of capital goods to improve the export performance in a product patent regime environment. The import of raw materials was significant in both the periods of the study as expected since import of top quality raw materials was critical to fulfill the quality norms of foreign healthcare regulatory authorities like Therapeutic Goods Administration, Australia (TGA), Medicines Control Agency (MCA) in UK or United States Food and Drug Administration (USFDA). A high proportion of pharmaceutical exports from India cater to North American, Asia-Pacific and European markets which come under the regulatory purview of these healthcare agencies. Many of the pharmaceutical formulations to be exported require higher quality additives apart from the main drugs which are required to manufacture different formulations) for better quality and enhanced therapeutic efficacy of medicines. The payment of royalties did not have a significant effect in the transitory-TRIPs period but was found to be significant in the post-TRIPs period. Horner (2014) concluded that during the period, 1995-2004 many of the multinational firms were unsupportive to share their technologies with Indian pharmaceutical companies by the royalty route since they were suspicious regarding the legal complications of patents during the transitory-TRIPs period. A few firms like Dr. Reddy's Laboratories were successful in striking strategic alliances MNCs. But the general perception of royalty payments was not an attractive option during the transitory-TRIPs period. The scenario dramatically changed in the post-TRIPs period due to the increased confidence of foreign firms after India finally accomplished the transition to a fully product patent regime from 2005.

Majority of the Indian pharmaceutical exports come under prescription medicines and not over-the-counter medicines. Hence marketing intensity was not significant in either of the periods. Unlike consumer goods, pharmaceutical products are relatively insensitive to marketing expenses though some promotional expenses towards pulling the retailers and distributors to stock the products might show a significant impact on export sales. In case of the property-based resources, results indicate that among the internally generated financial resources only return on

assets has exhibited a significant but negative impact on export performance in both the periods. Capital intensity, current ratio and profitability intensity failed to show any significant impact on export performance. In the case of externally generated financial resources, earnings per share and market capitalization have shown a significant impact in both transitory-TRIPs and post-TRIPs periods. Debt-equity ratio and foreign participation did not show any significant impact on export performance. Among the control variables, size of the firm had a significant impact on export performance in both the periods while age was significant only in the transitory-TRIPs period.

5. IMPLICATIONS AND CONCLUSION

In the recent international business literature, Indian pharmaceutical industry has attracted a lot of attention owing to the intellectual property reforms that were initiated in India since 1995 (Bruche, 2012). It has been twenty years since India has formally agreed to comply with WTO provisions. The Indian pharmaceutical industry tried to upgrade technology through import of machinery, royalty payments and in-house R&D efforts to adapt imported technology to suit local conditions (Siddharthan & Narayananan, 2013). The unique contribution of this research lies in the fact that it was able to distinguish the relative importance of various knowledge-based resources and property-based resources that impact the export performance of Indian pharmaceutical industry across the transitory-TRIPs and post-TRIPs periods. Kale and Wield (2008) concluded that the Indian pharmaceutical industry adopted a combination of exploitative and explorative technological strategies to adapt to the new intellectual property regime after 1995. The findings of this research are congruent with their conclusions.

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Table 1: Description of Dependent and Independent Variables

S.No.	Variable	Description
Dependent Variable		
1	Export Intensity	Export Earnings / Sales
Independent Variables		
1) Knowledge Based Resources		
a) Technological Resources		
1	R&D Intensity	Research & Development Expenses / Sales
2	Import of Capital Goods Intensity	Import of Capital Goods / Sales
3	Import of Raw Materials Intensity	Import of Raw Materials / Sales
4	Royalty Intensity	Royalties Paid / Sales
b) Marketing resources		
1	Marketing Intensity	Marketing Expenses (Distribution+Advertising+Marketing expenses) / Sales
2) Property Based Resources		
a) Internally generated financial resources		
1	Capital Intensity	Sales / Net Fixed Assets
2	Profitability Intensity	Profit After Tax / Sales
3	Return on Assets	Sales / Net Fixed Assets
4	Current Ratio	Current Assets / Current Liabilities
b) Externally generated financial resources		
1	Foreign Equity	Foreign Equity Participation in percentage
2	Debt-Equity Ratio	Borrowings / Net Worth
3	Earnings per Share	Earnings per Share in rupees
4	Market Capitalisation	Market Capitalisation value in rupees millions
3) Control Variables		
1	Size	Natural Logarithm of Sales
2	Age	Age of the Firm from year of incorporation

Table 2: Descriptive Statistics (1995-2014)

Variable	Mean	Minimum	Maximum	Std. Dev.
Export Intensity	20.77	0	100	26.47
Size	1154.76	0	33382.61	3214.2
R&D Intensity	1.29	0	26.32	2.71
Profitability Intensity	-21.02	-39250	1559.39	940.58
Age	27.94	10	107	14.47
Current Ratio	1.69	0	14.44	1.65
Capital Intensity	25.27	0	99.92	19.36
Import of Capital Goods Intensity	0.94	0	72.06	4
Import of Raw Materials Intensity	8.04	0	80.13	12.53
Debt-Equity Ratio	20.37	3765	-1.92	150.49
Royalty Intensity	0.13	0	44.44	1.2
Marketing Intensity	83.7934	0	4925.33	12.46
Foreign Equity	4.03	0	90	14.38
Earnings per Share	6.23	-197.3	471.8	20.18
Market Capitalisation	11994.1	0	1187501.8	54661.81
Return on Assets	71.3	0	437.03	57.35

Table 3: Regression Results (Fixed Effects) - Export Intensity as the Dependent Variable

	Transitory-TRIPs (1995-2004)	Post-TRIPs (2005-2014)
R&D Intensity	0.1355**	0.0149
	(0.05)	(0.02)
Import of Capital Goods Intensity	0.0069***	0.0028
	(0.00)	(0.00)
Import of Raw Materials Intensity	0.0469***	0.0837***
	(0.01)	(0.01)
Royalties Paid Intensity	0.0334	1.4167***
	(0.11)	(0.17)
Marketing Intensity	0.001	0.0011
	(0.00)	(0.00)
Capital Intensity	0.0194	-0.0018
	(0.01)	(0.01)
Current Ratio	0.0235	0.0011
	(0.02)	(0.01)
Profitability Intensity	-0.0002	-0.0001
	(0.00)	(0.00)
Return on Assets	-0.0487***	-0.0377***
	(0.01)	(0.00)
Debt-Equity Ratio	-0.0001	0.00
	(0.00)	(0.00)
Foreign Equity Participation	-0.0076	0.008
	(0.03)	(0.03)
Earnings per Share	0.0269†	-0.0261†
	(0.02)	(0.01)
Market Capitalisation	0.0001**	0.0000***
	(0.15)	(0.10)
Size	3.5100***	3.3705***
	0.15	(0.10)
Age	0.1655**	-0.0065
	(0.05)	(0.05)
Constant	-2.7516***	0.5929
	(0.8)	(1.21)
Adj R2	0.60	0.77
F-stat	15.8	33.91

DW-stat	1.17	1.13

Note: standard errors in parentheses
† if $p < 0.10$, * if $p < 0.05$; ** if $p < 0.01$; *** if $p < 0.001$