

Firm Size and Performance with special reference to Multinational Pharmaceutical Firms

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Abstract

The study analyses firm size and its impact on the performance of the firm. The objective of the study is to analyze the relationship between firm size represented by net sales and firm performance with reference to capital intensity, export intensity, profit intensity, research and development intensity, total forex earnings and total imports. Also it studies whether the size of the firm have an edge over their performance. Data for the study was collected from CMIE Prowess Database for the period of 10 years from 2007-2016. The statistical tools namely correlation, regression and Granger causality were used for the study. The results confirm that only total forex earnings, profit intensity, total imports and export intensity had an impact on the performance of the sample multinational firms during the study period.

Keywords: Foreign Subsidiary, Pharmaceutical Industry, Size, Firm Performance, Correlation, Regression and Granger Causality.

Introduction

A multinational corporation owns and manages business in six or more countries. Indian pharma industry is mainly operated and controlled by overriding foreign companies having subsidiaries in India due to availability of economical labor in India at low cost. Governments regulate their operations in various ways, including removing barriers to entry, restrictions on market concentration, and restrictions on vertical integration. Governments may also indulge in monitoring operators' pricing and production practices or providing incentives for applicable conduct. There are a number of challenges that are faced when designing an effective performance measurement system. Measures need to be chosen to support the attainment of specific performance or conduct identified by the organization's leaders to achieve managerial goals. Thus, clearly defined goals/objectives and strategies are required for appropriate measures to support their attainment. Correspondingly the fundamental processes, drivers of performance, and the major competencies required by employees need to be identified before effective performance measurement can be achieved. The study analyses the performance of the sample firms using research and development intensity to check whether R&D activities which amount to innovation, leads to greater profitability of firms. Profit intensity to detect whether firm's performance can be measured by its profit rates, share of forex earnings which is the proportion of earnings attributed to foreign exchange earnings, capital intensity is used to measure the performance as it indicates the total

capital incurred by the firm in its operation and finally the study considers export and imports to estimate their level of operations in international activities.

Review of Literature

Beamish, Paul W. Karavis, Lambros et al (1999) examined the impact of organizational factors on the export performance. Furthermore, firms that structure exports around subsequent stages of internationalization achieve progressively higher overall export. Takehiko Isobe, Shige Makino and David B. Montgomery (2000) examined whether early movers and technology leaders attained superior performance in emerging economic regions. The study found that both high commitment and early entry had positive impacts on the perceived economic performance of the Joint Ventures. Anthony Goren and Paul W. Beamish (2003), through an internalization theory, suggested that the outdated concept of geographic scope should be split into two related, but more precise, elements of international asset dispersion and country environment diversity. Subsequently, affiliation between economic performance and international asset distribution is positive, but that country environment diversity is negatively associated with performance, with a positive interaction between them. Saradindu Bhaduri & Amit S. Ray (2004) analysed how Technological Capability augments export competitiveness of Less Developed Countries enterprises by introducing quantifiable concepts of technological capability and estimating econometric models of firm-level export performance for two R&D-intensive industries in India, Pharmaceuticals and Electronics/Electricals. Andrew B. Bernard and J. Bradford Jensen (2007) examined the effects of firm structure on the closure of manufacturing plants. Multi-plant firms and those owned by multinationals are less likely to exit. However, the superior survival chances are due to the characteristics of the plants rather than the nature of the firms. Aspasia Vlachvei and Ourania Notta (2008) examined the impact of firm level variables on the growth of firms operating in Greece. The paper analyzed empirically the factors affecting the growth of Greek firms. The results of the study show that the relationship between growth, size and the age of firms is very sensitive with respect to the methods of estimation and growth and size definitions. Natasha I.E. and Yanthi R.I. Hutagaol (2009) examined the relationship between R&D with firm's operation and market performance. The findings of the study indicate that all sample firms have reported their R&D activities accordingly to the realistic accounting standard. However, the hypothesis testing results shows that there is no relationship between R&D and firm's operation and market performance. Chandan Sharma (2012) examined the effect of research and development (R&D) activities on firms' performance for the Indian pharmaceutical industry. The study found that the performance of foreign firms operating in the industry is more sensitive toward R&D than the local

firms and propose further encouragement and incentives for doing in-house innovative activities in the Indian pharmaceutical industry. Rehana Kouser, Tahira Bano et al, (2012) provided an profound description of the inter-relationship between firm size, growth, and profitability of non-financial companies listed at Karachi stock exchange. The study revealed that profitability had strong positive relationship with the growth of the firm; however size has less significant and negative impact on the profitability. Chitra Singla and Rejie George (2013) explored the nature of the relationship between a firm's internationalization and performance. The study found that business group affiliation and firm age positively moderate the I-P relationships, which signifies deeper institutional, resource-based, and legitimizing effects. The results indicate the need for better mid-range conceiving to forge a more robust understanding of the role various organizational characteristics play in influencing the I-P relationship.

The previous studies analysed the performance of multinational companies and its subsidiaries mainly based on its research and development activities. It was found that the research relating to the performance of multinational firms' subsidiaries was not carried out. Thus the present study aims to fill the research gap.

Statement of The Problem

Multinational firms are often affected by investing whole of their resources in the foreign market without proper understanding of the operations. The subsidiaries meet challenges in maintaining or achieving competitiveness and profitability. An industrialized firm has to respond to a range of challenges, that include quick improvements in technology, reduction in employment and productivity, globalization of markets, and environment requirements. The present research study focuses on the analysis of performance of the firms belonging to the pharmaceutical industry based on their size.

Objectives of The Study

- To analyze the relationship between the size and the performance of the multinational pharmaceutical firms during the study period.
- To analyze the impact of the size on the performance of the multinational pharmaceutical firms during the study period.
- To analyse the casual relationship between the size and the performance of the multinational pharmaceutical firms during the study period.

Hypothesis of The Study

H01: There is no significant relationship between the size and the performance of the multinational pharmaceutical firms during the study period.

H02: There is no significant impact of the size on the performance of the multinational pharmaceutical firms during the study period.

H03: There is no casual relationship between the size and the performance of the multinational pharmaceutical firms during the study period.

Methodology of The Study

• Selection of the Sample Size

The constituents of the BSE S&P Index is considered for sample selection. The Index constitutes 500 companies. Out of these 456 companies are multinational. Among these 456 companies, the pharmaceutical firms are chosen as sample, which amounts to 35 firms. Among these 35 companies, data was available only for 28 companies. Thus the sample companies are Abbott India Ltd., Ajanta Pharma Ltd., Astrazeneca Pharma India Ltd., Aurobindo Pharma Ltd., Cadila Healthcare Ltd., Cipla Ltd., Dishman Pharmaceuticals & Chemicals Ltd., Divi'S Laboratories Ltd., Dr.Reddy'S Laboratories Ltd., F D C Ltd., Glaxosmithkline Pharmaceuticals Ltd., Glenmark Pharmaceuticals Ltd., Indoco Remedies Ltd., Ipca Laboratories Ltd., J B Chemicals & Pharmaceuticals Ltd., Jubilant Life Sciences Ltd., Lupin Ltd., Marksans Pharma Ltd., Natco Pharma Ltd., Novartis India Ltd., Pfizer Ltd., Sanofi India Ltd., Strides Shasun Ltd., Sun Pharmaceutical Inds. Ltd., Suven Life Sciences Ltd., Torrent Pharmaceuticals Ltd., Unichem Laboratories Ltd. and Wockhardt Ltd.

• Period of the Study

The study covers the period of 10 years from 2007 to 2016.

• Source and Collection of the Data

The secondary data relating to the study was collected from the CMIE "PROWESS" Database.

Limitations of The Study

This study suffers from the following limitations.

- All the limitations of secondary data are also applicable to this study.
- The study considered only the pharmaceutical Industry.
- The periods of study covers data only for 10 years.
- All the constraint of the tools are also applicable to this study.

Analysis And Interpretation

Computation of the Variables

The study considers size as the dependent variable which is the natural log of Net Sales. The independent variables are: Capital Intensity, Export Intensity, Profit intensity and R&D Intensity. Capital Intensity is calculated as Capital of a firm by Net Sales, Export Intensity is defined as Total Exports by Net Sales. Profit Intensity is Retained Profits of firms by Net Sales. R&D intensity is Expenses on R&D by Net Sales and Total Forex Earnings which refers to the Total value of earnings from foreign exchange transactions.

TABLE: 1 RESULTS OF DESCRIPTIVE STATISTICS OF THE SAMPLE FIRMS DURING THE STUDY PERIOD

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
CI	0.444919	0.36011	1.11944	4.101054	7.262386
EI	429.6221	266.2073	-0.168931	2.02484	1.242603
PI	1.571104	1.025081	-0.504302	6.511798	15.57501
RDI	0.425144	0.508466	2.544267	8.546955	66.10554
SIZE	9.424608	0.937975	0.010394	2.210941	0.726887
TFE	109019.1	133950.3	1.550019	4.40029	13.49955
TI	33059.68	39967.24	1.910707	6.20707	29.03659

Source: Data collected from Prowess Database and computed using E-views 7.0
CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity, TFE=Total Forex Earnings, TI=Total Imports

Table 1 shows the results of descriptive statistics for the pharmaceutical industry during the study period. The mean value was positive for all the variables such as Capital Intensity, Export Intensity, Profit Intensity, Research and Development Intensity, Size, Total Forex Earnings and Total Imports for all the sample firms during the study period. Total Forex Earnings recorded the highest mean value 109019.1 and Research and Development Intensity recorded the lowest mean value 0.425144. The volatilities (Standard Deviation) exhibited high volatility except Capital Intensity, Research and Development Intensity and

Size exhibited low volatility. The skewness was positive and skewed towards right except for Export Intensity and Profit Intensity which was negatively skewed and moved towards left. The Kurtosis value was greater than the normal distribution value 3 and it indicates leptokurtic distribution except for the variable Export Intensity and Size which was less than 3 and indicates platykurtic distribution. The Jarque-Bera was greater than 5 which indicates normality of distribution except for Export Intensity and Size it was less than 5 which indicates non normality of the distribution.

TABLE 2: RESULTS OF CORRELATION ANALYSIS OF THE MULTINATIONAL PHARMACEUTICAL FIRMS DURING THE STUDY PERIOD

		PI	TFE	TI	EI	CI	RDI
Size	Pearson Correlation	0.282	.796**	.780**	0.070	0.120	-0.312
	Sig. (2-tailed)	0.146	0.000	0.000	0.724	0.544	0.106

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Source: Data collected from Prowess Database and computed using SPSS 16.0

CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity,TFE=Total Forex Earnings, TI=Total Imports

Table 2 shows the results of the correlation analysis of the sample firms during the study period. The variable Size witnessed significant 'p' value with Total Forex Earnings and Total Imports which reveals 79.6% and 78% relationship between the variables. The impact of intermediate inputs on performance is sector-specific and cannot be generalized. Higher Imports reflects greater ability to import by exporting firms. In case of the pharmaceutical sector, raw

materials are essentially the basic chemicals for the production which in turn acts as raw material for formulations and they lead to increase in the Total Forex Earnings. Hence the null hypothesis Ho1: "There is no significant relationship between the Size and the Performance of the Multinational Pharmaceutical Firms during the Study Period" is rejected.

TABLE 3: MODEL SUMMARY OF REGRESSION RESULT FOR THE SAMPLE FIRMS DURING THE STUDY PERIOD

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.912	0.832	0.784	0.436	1.968

a. Predictors: (Constant), RDI, TFE, PI, CI, EI, TI

b. Dependent Variable: Size

Source: Data collected from Prowess Database and computed using SPSS 16.0

CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity,TFE=Total Forex Earnings, TI=Total Imports

Table 3 shows the results of model fitness for the Size and Performance of the Sample firms with Size as dependent and Research and Development Intensity, Total Forex Earnings, Profit Intensity, Capital Intensity, Export Intensity and Total Imports as independent variables. It is noted that 91.2% of relationship was noticed between Size and

Research and Development Intensity, Total Forex Earnings, Profit Intensity, Capital Intensity, Export Intensity, and Total Imports as independent variables. Further only 83.2% of variation in Size was explained jointly by the other independent variables. However the R square value is high which indicates the model is good.

TABLE 4: ANOVA RESULTS OF THE SAMPLE FIRMS DURING THE STUDY PERIOD

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	19.764	6	3.294	17.335	0.00
1 Residual	3.990	21	0.190		
Total	23.754	27			

a. Predictors: (Constant), RDI, TFE, PI, CI, EI, TI

b. Dependent Variable: Size

Source: Data collected from Prowess Database and computed using SPSS 16.0

CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity,TFE=Total Forex Earnings, TI=Total Imports

The results of Analysis of Variance for the Size and Performance of the Sample firms with Size as Dependent and Research and Development Intensity, Total Forex Earnings, Profit Intensity, Capital Intensity, Export Intensity and Total Imports as independent variables are presented in

Table 4. The F statistic value was found to be 17.335. The 'p' value was 0.00 which is lesser than 0.05 at 5% level. Hence the Ho2: "There is no significant impact of Size on the Performance of the Multinational Pharmaceutical Firms during the Study Period" is rejected.

TABLE 5: CO-EFFICIENT RESULT FOR THE SAMPLE FIRMS DURING THE STUDY PERIOD

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8.873	0.239		37.134	0.000
PI	0.244	0.095	0.267	2.564	0.018
TFE	0.000	0.000	0.794	3.520	0.002

1	TI	0.000	0.000	0.253	1.246	0.226
	EI	-0.001	0.000	-0.424	-3.592	0.002
	CI	-0.183	0.310	-0.070	-0.591	0.561
	RDI	0.206	0.212	0.112	0.973	0.341

a. Dependent Variable: Size

Source: Data collected from Prowess Database and computed using SPSS 16.0

CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity,TFE=Total Forex Earnings, TI=Total Imports

Table 5 explains the co-efficients of Size and the Performance of the Sample firms during the study period. It is to be noted from the results that the 'p' value of the variables Profit Intensity, Total Forex Earnings and Export Intensity alone was less than 0.05 among the selected variables. Profit being the important source of funding for Export initiatives of firm. Higher profit-earning firms can more easily face competitiveness in foreign markets. Export intensity reflects international competitive structure of a firm. The relationship between firm size and exports are mixed, the majority of the studies seem to emphasize a positive relationship. Other recent studies have found a positive relationship between firm size and export competitiveness. MNCs, with their primary focus on

formulation production, perform better in the export market. Firm size is generally expected to have a positive relationship to export intensity as larger firms have more resources with which enter foreign markets. A large firm will be better able to exploit such scale economies and enjoy greater efficiency in production, enabling it to export more and in turn increase its earnings. It may also be able to spread this cost over a larger volume of export, which, in turn, makes it more efficient by reducing the average cost of exporting. Hence it is clear that among the selected variables Profit Intensity, Total Forex Earnings and Export Intensity alone had its impact on the Performance of the Sample Multinational Firms during the study period.

TABLE 6: RESULTS OF GRANGER CAUSALITY TEST FOR THE SAMPLE FIRMS DURING THE STUDY PERIOD

Null Hypothesis:	F-Statistic	Prob.	Accept/Reject	Conclusion
SIZE does not Granger Cause CI	1.052	0.367	Accept	No Causation
CI does not Granger Cause SIZE	0.833	0.449	Accept	No Causation
SIZE does not Granger Cause EI	0.859	0.438	Accept	No Causation
EI does not Granger Cause SIZE	0.060	0.942	Accept	No Causation
SIZE does not Granger Cause PI	0.905	0.420	Accept	No Causation
PI does not Granger Cause SIZE	1.178	0.328	Accept	No Causation
SIZE does not Granger Cause RDI	1.043	0.370	Accept	No Causation
RDI does not Granger Cause SIZE	3.464	0.050	Accept	Unidirectional Causation
SIZE does not Granger Cause TFE	1.033	0.373	Accept	No Causation
TFE does not Granger Cause SIZE	0.371	0.694	Accept	No Causation
SIZE does not Granger Cause TI	1.291	0.296	Accept	No Causation
TI does not Granger Cause SIZE	1.179	0.327	Accept	No Causation

Source: Data collected from Prowess Database and computed using E-views 7.0

CI= Capital Intensity, EI= Export Intensity, PI=Profit Intensity, RDI = Research and Development Intensity, TFE=Total Forex Earnings, TI=Total Imports

Table 6 exhibits the results of Granger Causality for Size and Performance of the Pharmaceutical Industry Firms. The F – Statistic values revealed Unidirectional Causation between the variables Size and Research and Development Intensity. All the other variables recorded no causation with the size of the sample firms belonging to the pharmaceutical industry. Empirical studies show that large firms are more innovative. Since R&D activity involves a high level of risk that is difficult to eliminate, large firms may be more willing to take these risks as they can be diversified over a wider range of product lines. Third, the production outline in a large firm is more organized and routinized, which makes it easier for them to device a new innovation. Hence the null hypothesis Ho3: “There is no casual relationship between

the size and the performance of the multinational pharmaceutical firms during the study period.” is accepted.

Findings And Implications

The study examined the impact of the selected variables on the performance of the sample firms during the study period. The major findings of the study were: The results of correlation analysis indicate that size witnessed significant relationship with Total Forex Earnings and Total Imports. The sample firms had positive relationship with the Size and Total Imports, Total Forex Earnings and Export Intensity as they exhibited increase in Net Sales by means of increase in their Export Intensity, Total Imports and Total Forex Earnings. The regression results showed that the

model is good for all the sample firms during the study period. The variables namely Profit Intensity, Total Forex Earnings and Export Intensity had impact on the Performance of the sample firms during the study period. Granger Causality results indicate Unidirectional Causation between the variables Size and Research and Development Intensity. All the other variables recorded no causation with the size of the sample firms belonging to the Pharmaceutical Industry. Hence the study found that Export Intensity, Profit Intensity, Total Imports and Total Forex Earnings are closely related and they are the major determinants of the Size of the Sample Firms belonging to the Pharmaceutical Industry.

Suggestions Of The Study

- The sample firms should concentrate more on export activities
- The sample firms should invest in R&D activities.
- The government should provide some subsidy in enriching the R&D activities which play a major role in the case of pharmaceutical industry.

Conclusion of The Study

The study analysed the impact of size on the performance of the sample multinational firms for the period of ten years from 2007 to 2016. The study revealed that total forex earnings, export intensity and total imports of the sample firms alone had its impact on the size of the sample firms. The larger firms had an increase in the total forex earnings by means their positive impact on export intensity and increase in total imports.

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