

Efficiency and Performance of Top Indian Pharmaceutical Firms: A Comparative Analysis

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Abstract

The Indian pharmaceutical industry has made significant strides in the past five decades and is an important contributor to the provision of quality healthcare services in any economy. This paper studies the efficiency of selected top ten pharmaceutical companies by applying Data Envelopment Analysis (DEA). The inputs used in the study are assets, salaries, and wages. The outputs used are Return on Asset, and Net Profits. The study found Divis Laboratories and Sun Pharma to be most efficient under CRS and Sun Pharma was found to be most efficient under VRS models during 2019 - 2023. Seven pharmaceutical companies were working under Increasing returns to scale, two were working under constant returns to scale and one was performing under decreasing returns to scale. Return on assets, Net Profit margin and Return on Capital Employed Ratio were used to study financial performance of the pharmaceutical companies. Abbot India had the highest return on assets (17.948%). Divis Labs had the highest Net Profit Margin (27.76%). Mankind Pharma led in Return on Capital Employed (27.524%), This result further adds to the result provided by DEA. Companies found to be efficient by DEA were found to have high performance standards. Also, through the regression analysis the impact of variables Return on Capital Employed (ROCE) and Net profits margin (NPM) on Return on Asset (ROA) was studied. Returns on Assets (ROA) are 93.6% dependent on Net profits margin and Return on Capital Employed. There is significant (p-value = 0.000) relationship between Return on Asset (ROA), Net profits margin (NPM) and Return on Capital Employed (ROCE).

Keywords: Pharmaceutical companies, Efficiency, Performance, Returns to scale, Data Envelopment Analysis (DEA), Regression Analysis.

Introduction

The Indian pharmaceutical industry is considered to be one of the most dynamic and vibrant industries for its prominence in the developing world. It has over the years established itself as the largest producer and exporter of generic drugs across the globe. India's pharmaceutical industry has been ranked third in pharmaceutical production by volume after evolving over time into a thriving industry which is growing at CAGR of 9.43% over the last 9 years. India has the largest number of medicine manufacturing units which are compliant with US Food and Drug Administration (USFDA) and has 500 API producers, thus holding onto 8% of world's API market.

The volume is tremendously huge as it supplies over 50% of global demand for various vaccines, 40% for generic demand and 25% for all medicines in UK. The market size of Indian pharma industry is expected to reach around US\$65 billion by 2024 and US\$ 130 billion by the 2030 come around.

Over time, the Indian pharmaceutical business has seen changes in its landscape. Indian companies are now more technically advanced, adept at reverse engineering, and have developed novel methods for producing drugs. It has also changed over time to become more competitive and diversified, emphasizing small, gradual formulation changes rather than sacrificing quality in order to endure as a low-cost generic substitute alone.

There has been an increase in investment in pharmaceuticals industry as 100% FDI has been allowed under Greenfield pharmaceuticals projects¹.

With a total financial outlay of US\$ 60.9 million (Rs. 500 crore), the Ministry's "Strengthening of Pharmaceutical Industry (SPI)" program provides the necessary support to MSMEs and established pharma clusters around the nation to increase their sustainability, productivity, and quality. As of March 2025, the government wants to raise the total number of Pradhan Mantri Bhartiya Jan Aushadhi Kendras to 10,500. PMBJP's product line includes 240

¹ FDI Policy, Government of India

surgical equipment and 1,451 medications. The National Medical Devices Policy, 2023 was approved by the Union Cabinet on April 26, 2023. This policy is anticipated to support the expansion of the medical device industry in order to achieve the public health goals of affordability, quality, innovation, and accessibility².

Literature Review

Bhasa (2006) empirically examined the performance of 103 firms of various categories for the period 1995-2001 and found evidences of strong relationship between ownership structure and firm performance. It also reported that foreign-controlled firms had registered better performance as compared to their Indian counterparts. Sheela and Karthikeyan (2012) measured the financial performance of the Pharmaceutical Industry taking top three companies like Cipla, Dr. Reddy's Laboratories, Ranbaxy for the period 2003-2012. Mahajan et al. (2013) in their analysis of the efficiency and productivity of pharmaceutical sectors studied the input-output slack. They found out that out of 50 firms, 9 firms were overall technically efficient, 19 were purely technically efficient and the remaining were inefficient. They revealed that on average a firm can reduce their inputs by 14.2 percent without affecting their output levels. The research also revealed that Private Indian and Private Foreign were more efficient in comparison to group-owned firms. Mahdi Abdulkareem (2020) looked at cost of capital as well as other financial levers. The investigation showed that the cost of financing for pharmaceutical companies did not differ significantly from one another. Conversely, though, there was a noteworthy variation in the levels of combined leverage among the pharmaceutical businesses that were chosen. According to the survey, Sun Pharma did pretty satisfactorily during the study period, while Lupin underperformed.

Gopalakrishnan et al. (2016) based on financial performance analysis using ratios, revealed that the overall financial health of the pharmaceutical industry in India was in a healthy zone. Five pharma companies-- Divis Laboratories Ltd., Aurobindo Pharma Ltd., Cipla Ltd., Dr. Reddy's Laboratories Ltd. and Cadila Healthcare Ltd.—were in the healthy zone. But three pharma companies--Piramal Enterprises Ltd., Sun Pharma Industries Ltd. and Glenmark

² National Medical Device Policy 2023, Government of India

Pharmaceuticals Ltd.—were in a bankruptcy zone for the financial years 2012-16. Adding to the above analysis, Panigrahi et al. (2019) revealed that net profit ratio of pharmaceutical companies was significantly affected by gross profit ratio, operating ratio, return on equity capital, and earnings per share. In the time period of 2011-16, the selected companies had a satisfactory performance despite a few up and downs during the period. The study also highlighted that for the companies to increase their level of performance, they would need to invest more in capitals and increase their sales.

In another study by Sharma (2020) the financial data of top 6 Indian pharma for the years 2015-2016 and 2019-2020 companies was taken to measure the financial performance. The study revealed that Aurobindo Pharma has the highest average return on equity with low variance and it thus has a higher growth than other sample units. All factors combined, excluding interest load, have a major effect on ROE. Even if Sun pharma's trend was rising, its early years saw negative returns. All sample units showed a variable ROE trend overall, with the exception of Sun pharma, indicating a need for performance enhancement. The study offered ideas for improving the performance of the chosen sample units as well as recommendations for additional research.

Objectives of the study

The following are the objectives of the study:

1. To compare the efficiency of the selected pharmaceutical companies.
2. To find the relationship between financial ratios of selected pharmaceutical companies.
3. To study the performance of selected pharmaceutical companies on the basis of financial ratios.

The following hypothesis were constructed for second objective of the study:

H₀: There is an insignificant relationship between Returns on Assets (ROA), Net Profit Margin (NPM) and Return on Capital Employed (ROCE).

Research Design

Population

For the same a sample size of 10 companies has been taken up, that includes Sun Pharma, Cipla, Divis Labs, Dr Reddy's Labs, Mankind Pharma, Torrent Pharma, Zydus Life, Lupin, Aurobindo

Pharma, Abbot India. These companies have been selected on the basis of their market share.

The period of study

The company’s 5 years (2019-2023) worth of financial performance was analyzed.

Variables

For the purpose of analyzing the efficiency of the company, inputs like assets, salaries, and wages have been studied. In relation, a study of outputs like Return on Asset, and Net Profits have been undertaken. For studying performance, the Net profit margin, Return on Asset and Return on Capital Employed ratios have been analyzed. For this purpose, Ratio Analysis and Data Envelopment Analysis (DEA) was used.

Results & Analysis

The Data Envelopment Analysis DEA was undertaken by taking inputs and outputs.

Table 1: Measurement of Efficiency and Returns to Scale of Selected Pharmaceutical Companies						
Companies	CRS Score	Benchmarks	VRS Score	Benchmarks	NIRS Score	Returns to Scale
Sun Pharma	1.00	7	1.00	6	1.00	CRS
Divis Lab	1.00	7	1.00	5	1.00	CRS
Mankind Pharma	0.60	1 (0.20) 2 (0.48)	0.77	1 (0.25) 2 (0.32) 10 (0.43)	0.603	IRS
Zydus Life	0.20	1 (0.87)	0.25	1 (1.00)	0.218	IRS
Aurobindo Pharma	0.49	1 (0.03) 2 (0.96)	0.50	1 (0.03) 2 (0.95) 10 (0.03)	0.493	IRS
Cipla	0.59	1 (0.16) 2 (1.16)	1.00	1	1.00	DRS

Dr. Reddy's labs	0.50	1 (0.23) (0.94)	2	0.72	1 (0.19) 2 (0.25) 6 (0.56)	0.717	IRS
Torrent Pharma	0.53	1 (0.12) (0.49)	2	0.72	1 (0.16) 2 (0.31) 10 (0.5)	0.534	IRS
Lupin	0.22	1 (0.06) (0.35)	2	0.39	1 (0.11) 2 (0.09) 10 (0.80)	0.217	IRS
Abbot India	0.41	2 (0.27)		1.00	4	0.406	IRS

Constant returns to scale occur when increasing the scale of resource utilization or production proportionally results in a proportional increase in output. This showcases an efficient use of resources and there is no inefficiency or unused inputs existing. The resource utilization of Sun Pharma and Divis labs is efficiently balanced and optimized.

Increasing returns to scale occurs when the outputs increase at a proportionally higher rate than the increase in inputs. This means that the resource utilization is highly efficient and more is getting produced at less. This is a reflection of economies of scale at play here as the utilization of resources becomes more efficient as the scale increases. Mankind Pharma, Zydus Life, Aurobindo Pharma, Dr. Reddy's, Torrent pharma, Lupin and Abbot India are achieving high level of efficiencies and utilizing resources better than their competitors. In regards to the input used, it can be stated that the companies are earning significantly high revenues in comparison to their costs and thus they have high net profits.

Decreasing returns to scale occurs when the increase in outputs is proportionally lower than the increase in inputs. This showcases that the resource utilization is less efficient as the scale increases. Here, Cipla is inefficient in its operations and is incurring higher expenses than it is generating incomes.

Return On Assets (ROA)

Return on assets was used to evaluate the profitability of a business compared to its total assets. It is evident that Abbot India, has the greatest ROA of 17.948%, indicating how well they are able to utilize their assets to their full capacity. Furthermore, it is evident that Lupin, has the lowest

ROA of any of its rivals 3.62%, indicating that they are not making the best use of their resources.

Net Profit Margin (NPM)

Divis Lab has the highest NPM of 27.762%, this represent indicates that a company is more efficient in generating profits from its revenue. Also, Lupin has the lowest NPM of 6.738%, showing that they are not able to generate profits efficiently alike its peers.

Return on Capital Employed

This financial parameter presents that Mankind Pharma has the highest return on capital 27.524%. This points towards high level of performance as the company can invest large chunks of its profits back into the business. Lupin has lowest return on capital employed 7.424%. the company would have to think before investing these profits.

Multiple regression model was used to study the relationship between Returns on Assets (ROA), Net Profit Margin (NPM) and Return on Capital Employed (ROCE) as shown in table 2, 3 and 4.

Table 2: Model Summary of Multiple Regression of ROA on NPM and NPM

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.969 ^a	0.939	0.936	1.41670

a. Predictors: (Constant), ROCE, NPM

Table 2 provides information about the overall fit of the model, and the adjusted R-squared value was found to be 0.936, which indicates the proportion of variance in the dependent variable Returns on Assets (ROA) that is explained by the independent variable(s) Net Profit Margin (NPM) and Return on Capital Employed (ROCE) by 93.6%. Hence the hypothesis (H₀) with p-value = 0.000 is rejected at 1% level of significance as shown in table 3.

Table 3: ANOVA of ROA on NPM and NPM

Model		Sum of Squares	df	Mean Square	F	p-value
1	Regression	1446.671	2	723.336	360.402	0.000 ^b
	Residual	94.330	47	2.007		
	Total	1541.002	49			

a. Dependent Variable: ROA

b. Predictors: (Constant), ROCE, NPM

Table 4 shows the coefficients of regression ($\beta_0 = 0.260$ and $\beta_1 = 0.485$) and these were found significant at 1% level of significance, which means significant relationship exists between Returns on Assets (ROA), Net Profit Margin (NPM) and Return on Capital Employed (ROCE)

Table 4: Coefficients^a of Multiple Regression of ROA on NPM and NPM

Model	Unstandardized Coefficients		Standardized Coefficients		t	p-value	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
1	(Constant)	-2.815	0.538		-5.229	0.000	-3.898	-1.732
	NPM	0.260	0.035	0.322	7.460	0.000	.190	.330
	ROCE	0.485	0.028	0.754	17.492	0.000	.430	.541

a. Dependent Variable: ROA

Interpretation & Conclusion

The study provides insights on the efficiency and performance of selected companies in the pharmaceutical industry. The Data Envelopment Analysis highlighted three distinct efficiency patterns. Sun Pharma and Divis Labs are working on constant returns to Scale, i.e. they are able to efficiently utilize their resources. While companies like Mankind Pharma, Zydus Life, Aurobindo Pharma, Dr. Reddy’s, Torrent Pharma, Lupin, and Abbot India are highly efficient and operating at economies of scale and classified under Increasing Returns to Scale. But Cipla needs to work on better utilizing its resources as it is function in Decreasing Returns to Scale.

Ratio analysis revealed that Abbot India had the highest return on assets (17.948%). This coincides with the result showcased in the DEA. Divis Labs had the highest Net Profit Margin (27.76%). This result further adds to the result provided by DEA and it shows Divis Labs is an efficient company with high performance standards. Mankind Pharma led in Return on Capital Employed (27.524%), showcasing a high level of performance and the ability to reinvest profits into the business.

There is significant relationship between dependent variable Returns on Assets (ROA) and independent variables Net Profit Margin (NPM) and Return on Capital Employed (ROCE). Further 93.6% Returns on Assets (ROA) is dependent on Net Profit Margin (NPM) and Return on Capital Employed (ROCE).

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