

Assessing the Financial Resilience of Selected Indian Pharmaceuticals amidst the Complexities of COVID-19 Pandemic and Lockdowns: A Du-Pont Analysis Perspective

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Abstract

This paper conducts a comprehensive analysis of the financial performance of five prominent Indian pharmaceutical and drug companies, each boasting net sales exceeding one billion Indian Rupees for the year 2022. The primary aim of this study is to ascertain the return on equity (ROE) of these selected companies utilizing the DuPont model. This analysis spans multiple time frames, encompassing the periods before, during, and after the disruptive influence of the COVID-19 pandemic and subsequent lockdowns. Additionally, an ANOVA analysis has been employed to rigorously assess whether statistically significant differences exist among the selected companies. This research endeavours to shed light on the financial resilience and adaptability of these pharmaceutical enterprises in the face of unprecedented challenges. A comprehensive ranking in the end provide a succinct overview of the competitive landscape within the pharmaceutical industry, highlighting leader's position and the closely contested performance of other key players.

Keywords *Pharmaceuticals & Drugs Companies, Financial Performance, Return on Equity, DuPont Analysis.*

INTRODUCTION

With more than 7 million confirmed deaths as of December, 2024, and new variants continuously emerging, this global health crisis not only took its toll on healthcare but also sent shockwaves that reverberated through economies, causing a significant slowdown.

The pandemic had multifaceted implications for India as well, contributing to its economic deceleration. Various economic sectors, including domestic demand and exports, experienced sharp declines. However, amidst these challenges, certain sectors demonstrated resilience, and one such notable exception was the pharmaceutical sector, particularly in India. Although the pharmaceutical industry faced disruptions in supply chains and the import of active pharmaceutical ingredients from China, it also encountered opportunities spurred by the pandemic.

In light of these dynamics, we embarked on a comprehensive meta-research endeavour to investigate the effects of the COVID-19 pandemic. To analyze the data concerning the return on equity (ROE) of selected pharmaceutical companies from the pre-COVID to the post-COVID period, we employed the DuPont model. Before delving into the mechanics and utility of the DuPont model, it is pertinent to explore its origins.

The DuPont model, developed in the early 1900s, was originally crafted for assessing the profitability of businesses. Its creator, F. Donaldson Brown, was an electrical engineer working in the Treasury Department of the E. I. Du Pont Corporation in Wilmington, Delaware. Brown was tasked with managing the finances of a company in which Du Pont held a 23 percent stake—General Motors. During this period, Brown observed that the product of two frequently computed ratios, net profit margin and total asset turnover, equated to return on assets (ROA).

Subsequently, the DuPont model underwent two significant modifications. The first modification shifted the focus from return on assets (ROA) to return on equity (ROE) by incorporating 'leverage' as a third area of attention, accounting for debt. The second and latest modification of the DuPont model involves a combination of five ratios to determine ROE, making DuPont analysis the preferred method for estimating a firm's market value.

Hence, there exist two variants of the DuPont model: the original three-step model and an extended five-step model. The original model elucidates what drives a company's ROE, whether it's an improvement in profitability through efficient asset utilization or by leveraging additional debt. However, the introduction of excessive leverage can eventually erode profit margins, underscoring the necessity for a more nuanced approach. This led to the development of the extended five-step DuPont Model, which delves deeper into net profit margin to assess the impact of increased borrowing costs associated with leverage. It also considers interest expenses in relation to a company's tax burden, as most companies benefit from tax deductions on interest expenses.

To summarize, the extended five-step DuPont Model dissects ROE into the following components:

1. Operating Profit Efficiency = Earnings Before Interest and Tax ÷ Gross Sales
2. Asset Turnover Ratio = Gross Sales ÷ Total Assets
3. Financial Leverage Ratio, or Equity Multiplier = Total Assets ÷ Shareholders' Equity
4. Interest Burden Ratio = Earnings Before Tax ÷ Earnings Before Interest and Tax
5. Tax Burden Ratio = Net Profit ÷ Earnings Before Tax

When these five ratios are multiplied together, they yield the return on shareholders' equity, indicating how much profit is generated with investors' capital. In our study, we apply this extended five-step DuPont model to analyze the data of selected pharmaceutical companies with net sales exceeding Rs. 10,000 crore."

LITERATURE REVIEWS

- Carl B. McGowan's 2012 analysis employs the DuPont system to calculate ROE based on net profit margin, total asset turnover, and equity multiplier. Focusing on Monarch Bank from 2003 to 2010, it reveals that the majority of Monarch Bank's investment-weighted return on assets stems from its return on loans, indicating the significant role of its loan portfolio in profitability.
- Cristina's 2013 article employs the DuPont method to compare the annual financial statements of five listed pharmaceutical companies, aiming to ascertain if profitability on employed capital impacts share tradable value. The study suggests that other factors beyond ROE may influence share value, urging investors to consider a range of financial metrics.
- Hada Teodor's 2014 study investigates the financial performance of 64 companies listed on BSE using the DuPont analysis. It also employs Pearson's correlation coefficient to explore factors influencing the DuPont model's profitability ranking. This approach offers a holistic view of companies' financial performance to assist informed investment decisions.
- Vasile Burja's 2014 paper aims to identify factors affecting the effectiveness of the DuPont analysis in the furniture industry. It calculates ROE using DuPont analysis for 13 years and employs the Pearson correlation coefficient to examine relationships between turnover and ROE indicators, shedding light on factors influencing profitability in large furniture companies.
- Ramesh's work in 2015 highlights the limitations of the traditional ROE calculation, which solely divides net income by shareholders' equity. To address this limitation, the DuPont model was introduced, breaking ROE into three components: profit margin, asset turnover, and financial leverage. This model provides a more comprehensive understanding of a company's profitability sources and asset efficiency.
- Prof. Laxman B. Doiphode's 2016 paper highlights that companies with high profit margins but low asset turnovers tend to adopt a differentiation strategy, while those with low profit margins but high asset turnovers lean toward cost leadership. The study demonstrates that differentiation strategy companies often outperform their counterparts, emphasizing the reliability of the DuPont Model for performance assessment.
- In Rooplata's study from 2016, the primary aim is to demonstrate that, in many cases, the most profitable companies are not necessarily the most attractive to investors. This is attributed to the breakdown of Return on Equity (ROE) into Return on Assets (ROA), Return on Sales (ROS), Total Assets Turnover (TAT), and Equity Multiplier (EM). These components offer an analytical framework for understanding the factors

influencing financial profitability, represented by ROE. ROA is calculated as Net Income / Total Assets, while ROS is calculated as Operating Profit / Net Sales. TAT is derived from Total Assets / Net Sales, and EM is calculated as Total Assets / Shareholder's Equity. These metrics allow investors to gain insights into a company's financial performance, aiding investment decisions.

- The study conducted by R Deepak in 2018 discovered that when a firm uses very high levels of debt, it can have a negative impact on the Return on Equity (ROE). This is because it can lead to a decrease in revenues as more money is spent servicing the debt. In order to create a positive impact on the ROE, the firm should aim to increase its Return on Assets (ROA). This is because if the ROA exceeds the cost of debt, it can create a positive impact on the ROE.

IMPORTANCE OF THE STUDY

1. **Enhanced Stakeholder Insight:** Implementing this approach will provide valuable insights to the company's stakeholders, allowing them to gain a deeper understanding of the return on equity. This means they will have a clearer picture of how effectively the company is utilizing its shareholders' equity to generate profits and returns.
2. **Empowering Investors:** This initiative will empower investors by offering them a comprehensive tool to monitor the company's performance over time. It serves as a valuable resource for them to make informed decisions and take necessary actions based on the data and trends they observe. Investors can use this information to assess the company's financial health and identify areas where improvements or adjustments may be required.
3. **Informed Investment Decisions:** For investors seeking opportunities in the market, this tool can be a game-changer. By analysing our research and utilizing the insights derived from it, investors can confidently make investment decisions. They can identify and choose to invest in companies that exhibit the best performance based on the provided data, ultimately aiming for the highest possible return on their investments. This not only reduces investment risk but also maximizes the potential for returns.

OBJECTIVES OF THE STUDY

1. To conduct a comparative analysis of financial performance of pharmaceutical companies spanning a 5-year timeline, comparing their performance from the pre-COVID to the post-COVID period.
2. To analyze the performance of selected pharmaceutical companies operating in India using the 5-step DuPont analysis/model.
3. To identify the best-performing pharmaceutical companies among the five selected companies based on their net sales figures surpassing the INR one billion.

HYPOTHESIS TESTING

Since the objective of this study is to do a comparative analysis of financial performance of pharmaceutical companies, therefore, the following testable hypotheses in the form of Null Hypotheses H₀ versus the Alternative one H₁ are taken.

1. Hypothesis H₀: There is no significant difference in the average Return on Equity, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average Return on Equity, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
2. Hypothesis H₀: There is no significant difference in the average PBIT Efficiency, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average PBIT Efficiency, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
3. Hypothesis H₀: There is no significant difference in the average Interest Burden, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average Interest Burden, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
4. Hypothesis H₀: There is no significant difference in the average Tax Burden, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average Tax Burden, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
5. Hypothesis H₀: There is no significant difference in the average Asset Turnover Ratio, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average Asset Turnover Ratio, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
6. Hypothesis H₀: There is no significant difference in the average Equity Multiplier/Leverage, analyzed individually for the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.
Hypothesis H₁: There is no significant difference in the average Equity Multiplier/Leverage, analyzed among the five selected pharmaceutical companies, between 2018-2019 and 2021-2022.

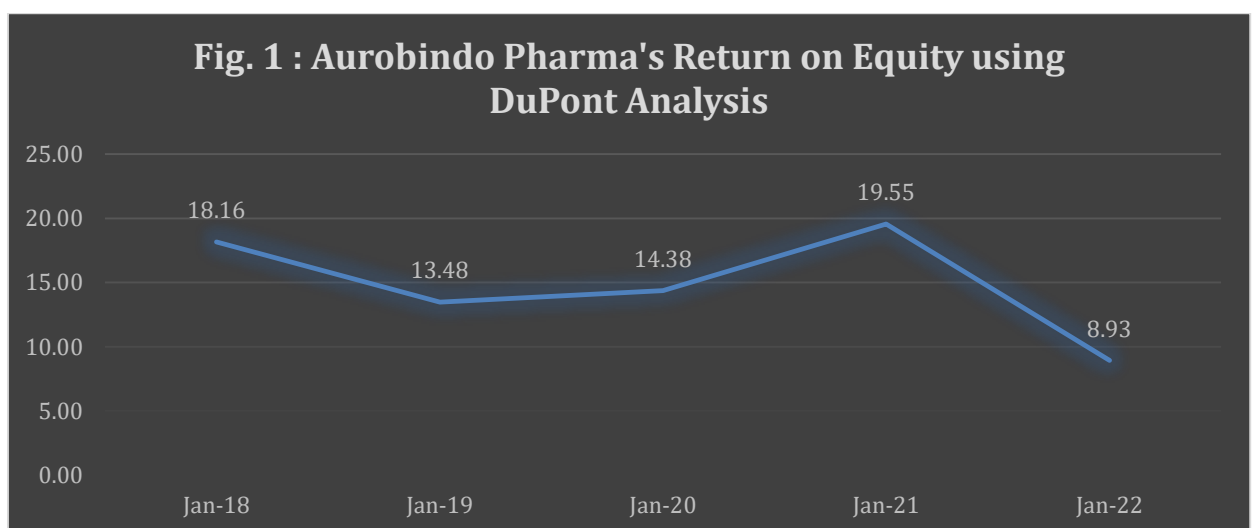
RESEARCH METHODOLOGY

To test the research hypothesis, this study utilized secondary data from the top five publicly listed pharmaceutical companies with net sales exceeding one billion Indian Rupees. The study spanned a ten-year period, from 2018-19 to 2021-2022, and sourced its secondary data from annual financial statements. The data underwent collection, editing, coding, and was then organized in Excel before being imported into SPSS version 16.0 for analysis. Descriptive statistics, including mean, standard deviation, frequency, and percentages, were employed. The investigation into the impact on Return on Equity and the assessment of comparative performance were both conducted using the 5-step DuPont analysis/model. Additionally, an ANOVA analysis has been employed to rigorously assess whether statistically significant differences exist among the means of the ROE figures for the selected companies. This research model holds significance for potential investors in making informed investment decisions and serves as a valuable resource for banks and other corporate organizations in the formulation of policies.

ANALYSIS & INTERPRETATION

Table 1: Aurobindo Pharma's DuPont Analysis

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average
EBIT Efficiency	0.27	0.18	0.20	0.27	0.15	0.21
Interest Burden	0.85	0.89	0.91	0.99	0.99	0.93
Tax Burden	0.77	0.78	0.79	0.74	0.89	0.79
Assets Turnover Ratio	0.76	0.77	0.79	0.80	0.60	0.74
Leverage/ Equity Multiplier	1.37	1.40	1.29	1.25	1.11	1.28
Return on Equity using DuPont Analysis	18.16	13.48	14.38	19.55	8.93	14.9

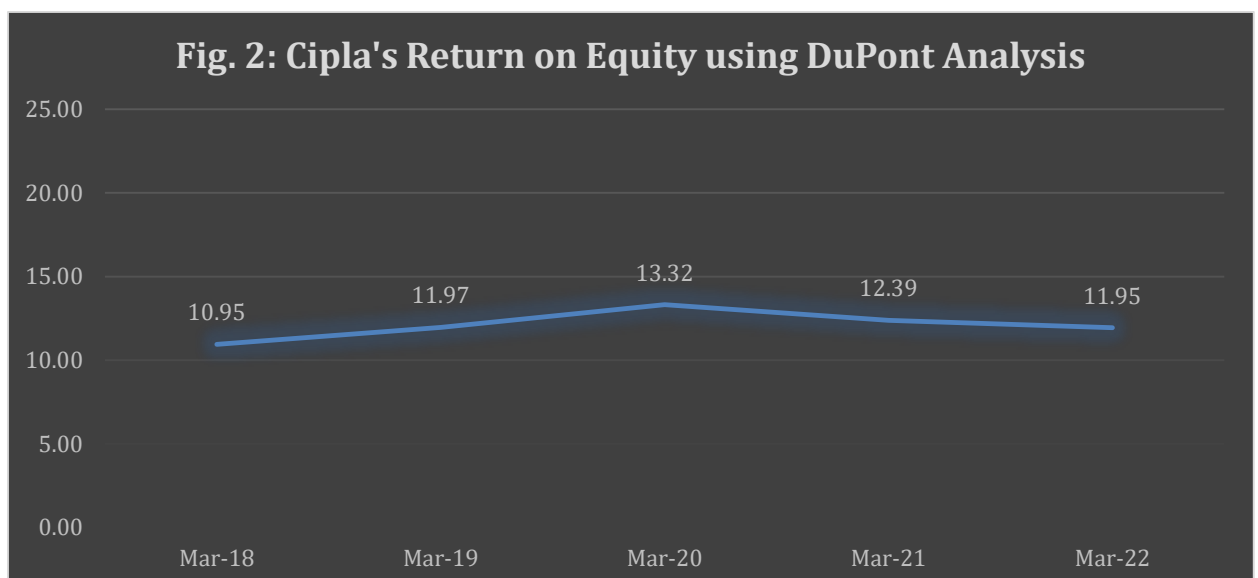


- Aurobindo Pharma's EBIT Efficiency improved significantly from Mar-19 to Mar-20, contributing to higher ROE in the COVID year.
- Interest Burden remained stable.
- Tax Burden fluctuated, with a notable decrease from Mar-20 to Mar-21.
- Assets Turnover Ratio increased up to Mar-20 but dropped sharply in Mar-22, impacting ROE.
- Leverage/Equity Multiplier decreased gradually over the years, reducing financial risk.
- ROE using DuPont Analysis increased from Mar-19 to Mar-20 but declined in Mar-21 and further in Mar-22.

The drop in Asset Turnover in Mar-22 is a key factor in the declining ROE. Aurobindo Pharma may need to enhance asset utilization to improve ROE in the future.

Table 2: Cipla's DuPont Analysis

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average
EBIT Efficiency	0.18	0.20	0.24	0.24	0.27	0.23
Interest Burden	0.99	0.99	0.99	0.99	0.99	0.99
Tax Burden	0.78	0.76	0.78	0.74	0.76	0.76
Assets Turnover Ratio	0.80	0.78	0.73	0.70	0.58	0.72
Leverage/ Equity Multiplier	1.01	1.00	1.00	1.00	1.00	1.00
Return on Equity using DuPont Analysis	10.95	11.97	13.32	12.39	11.95	12.12



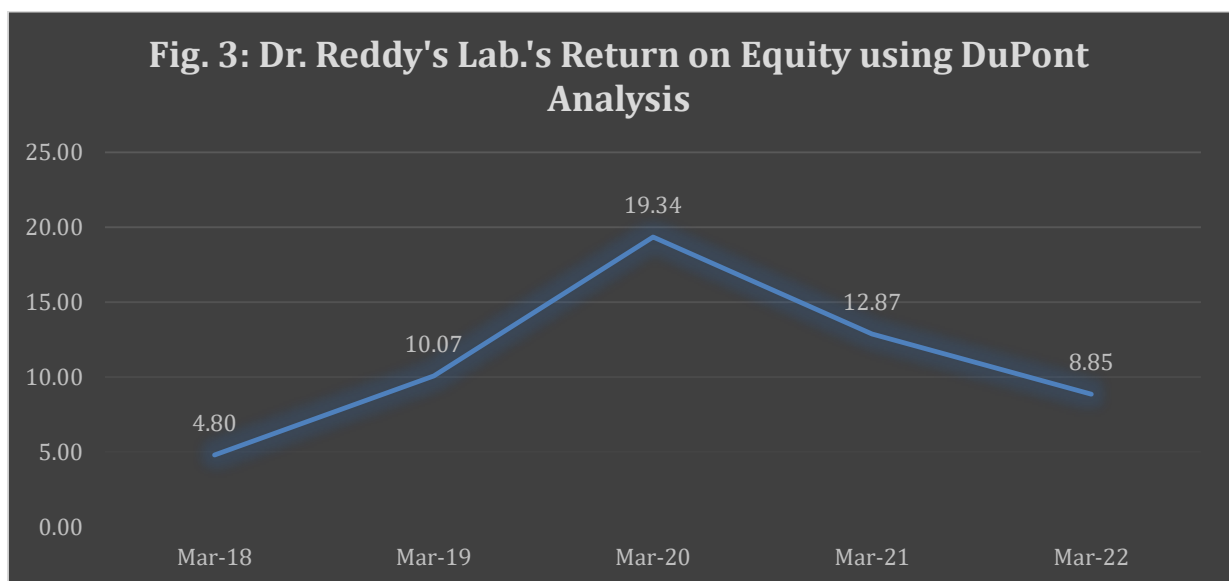
Cipla's DuPont Analysis for the years Mar-18 to Mar-22:

- Cipla's EBIT Efficiency steadily improved from Mar-18 to Mar-22, indicating increasing profitability.
- Interest Burden remained constant throughout these years, with no impact on ROE.
- Tax Burden fluctuated but didn't show a consistent trend.
- Assets Turnover Ratio declined, indicating a decrease in the efficiency of asset utilization.
- Leverage/Equity Multiplier remained constant at 1.00, signifying a consistent financial structure.
- ROE using DuPont Analysis increased from Mar-18 to Mar-20, indicating better overall performance. However, it declined slightly in the subsequent years.

Cipla experienced an increase in ROE due to improved EBIT Efficiency and a stable Leverage/Equity Multiplier from Mar-18 to Mar-20. However, the decline in Asset Turnover Ratio from Mar-18 to Mar-22 negatively impacted ROE. The company may need to focus on improving asset utilization to maintain or increase ROE in the future.

Table 3 : Dr. Reddy's Lab.'s DuPont Analysis

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average
EBIT Efficiency	0.08	0.17	0.24	0.23	0.16	0.18
Interest Burden	0.92	0.97	0.98	0.98	0.98	0.97
Tax Burden	0.81	0.75	1.06	0.72	0.73	0.81
Assets Turnover Ratio	0.65	0.78	0.73	0.73	0.70	0.72
Leverage/ Equity Multiplier	1.22	1.07	1.07	1.07	1.12	1.11
Return on Equity using DuPont Analysis	4.80	10.07	19.34	12.87	8.85	11.19



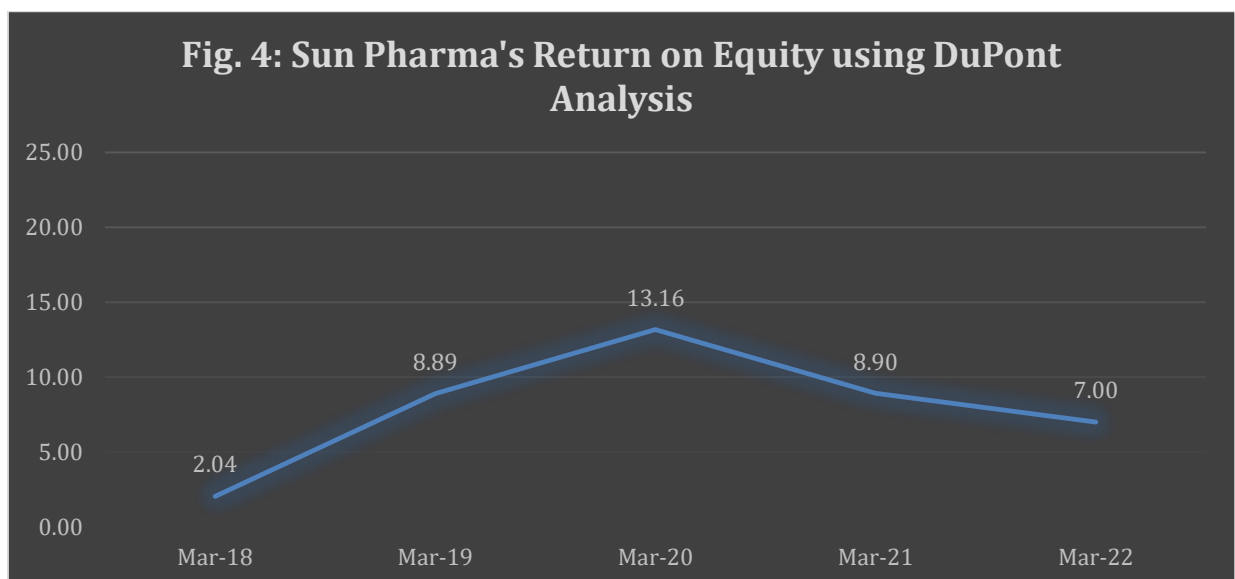
Dr. Reddy's Lab's DuPont Analysis for the years Mar-18 to Mar-22:

- Dr. Reddy's Lab's EBIT Efficiency improved from Mar-18 to Mar-20 but decreased in the subsequent years.
- Interest Burden remained relatively stable, with no significant change.
- Tax Burden exhibited significant variability, with a notable increase in Mar-20, impacting the company's net income.
- Assets Turnover Ratio fluctuated over the years but remained somewhat consistent.
- Leverage/Equity Multiplier showed a mild increase in Mar-22.
- ROE using DuPont Analysis increased significantly from Mar-18 to Mar-20, reflecting improved EBIT Efficiency, favourable tax situations in Mar-20, and consistent leverage.
- However, ROE declined in Mar-21 and further in Mar-22 due to decreased EBIT Efficiency.

Dr. Reddy's Lab experienced a period of improved ROE, mainly driven by better EBIT Efficiency and favourable tax conditions in Mar-20. The subsequent drop in EBIT Efficiency contributed to the decline in ROE in Mar-21 and Mar-22. The company may need to focus on maintaining its profitability and efficient use of earnings to sustain or improve ROE in the future.

Table 4: Sun Pharma's DuPont Analysis

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average
EBIT Efficiency	0.10	0.24	0.29	0.20	0.16	0.20
Interest Burden	0.53	0.78	0.89	0.90	0.85	0.79
Tax Burden	1.06	1.05	0.99	0.99	0.81	0.98
Assets Turnover Ratio	0.27	0.36	0.42	0.41	0.53	0.40
Leverage/ Equity Multiplier	1.30	1.26	1.24	1.26	1.20	1.25
Return on Equity using DuPont Analysis	2.04	8.89	13.16	8.90	7.00	8.00



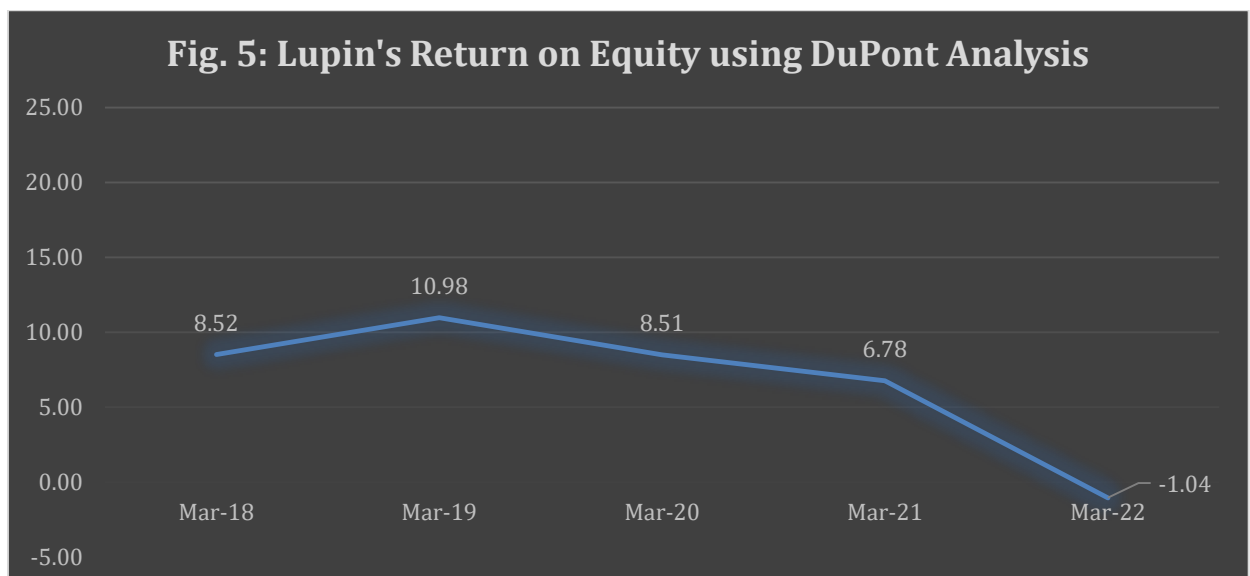
Sun Pharma's DuPont Analysis for the years Mar-18 to Mar-22:

- Sun Pharma's EBIT Efficiency showed an increase from Mar-18 to Mar-20, indicating improved profitability during this period. However, it decreased in Mar-21 and Mar-22.
- Interest Burden increased steadily over the years, reflecting a rising impact of interest expenses on net income.
- Tax Burden experienced some fluctuations but remained relatively stable, except for a drop in Mar-22.
- Assets Turnover Ratio showed an increasing trend from Mar-18 to Mar-22, indicating improved efficiency in asset utilization.
- Leverage/Equity Multiplier decreased slightly, which can reduce financial risk.
- ROE using DuPont Analysis increased significantly from Mar-18 to Mar-20, mainly due to improved EBIT Efficiency and a consistent Leverage/Equity Multiplier. However, it declined in Mar-21 and Mar-22, primarily due to a drop in EBIT Efficiency and an increase in the Interest Burden.

Sun Pharma experienced a period of improved ROE driven by better EBIT Efficiency and consistent financial leverage. The decline in EBIT Efficiency and the increasing interest impact contributed to the drop in ROE in Mar-21 and Mar-22. The company may need to address these factors to maintain or improve ROE in the future.

Table 5: Lupin's DuPont Analysis

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average
EBIT Efficiency	0.18	0.24	0.17	0.15	-0.01	0.15
Interest Burden	0.98	0.99	0.97	0.98	1.83	1.15
Tax Burden	0.75	0.70	0.82	0.77	1.17	0.84
Assets Turnover Ratio	0.64	0.66	0.63	0.59	0.62	0.63
Leverage/ Equity Multiplier	1.00	1.00	1.00	1.02	1.04	1.01
Return on Equity using DuPont Analysis	8.52	10.98	8.51	6.78	-1.04	6.75



Lupin's DuPont Analysis for the years Mar-18 to Mar-22:

- Lupin's EBIT Efficiency improved from Mar-18 to Mar-19, but then it declined in subsequent years, reaching a negative value in Mar-22.
- Interest Burden remained relatively stable during these years, with a significant increase in Mar-22, which can impact net income.
- Tax Burden fluctuated, with a noticeable increase in Mar-22, further affecting net income.
- Assets Turnover Ratio experienced a gradual decline, suggesting reduced efficiency in asset utilization.
- Leverage/Equity Multiplier increased slightly over the years, indicating a slight increase in financial leverage.
- ROE using DuPont Analysis increased from Mar-18 to Mar-19 due to improved EBIT Efficiency. However, it declined in the following years, with a substantial drop in Mar-22. The significant decrease in EBIT Efficiency, the increase in Interest Burden, and the negative Tax Burden contributed to the negative ROE in Mar-22.

Lupin's declining ROE is primarily driven by the sharp decrease in EBIT Efficiency, the significant increase in Interest Burden, and a negative Tax Burden in Mar-22. The company may need to address these factors to restore profitability and ROE in the future.

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	18.16	13.48	14.38	19.55	8.93	14.90	5
Cipla	10.95	11.97	13.32	12.39	11.95	12.11	4
Dr. Reddy's Lab	4.80	10.07	19.34	12.87	8.85	11.19	3
Sun Pharma	2.04	8.89	13.16	8.90	7.00	8.00	2
Lupin	8.52	10.98	8.51	6.78	-1.04	6.75	1

Based on the scores provided for Return on Equity, we can interpret the overall ranking of pharmaceutical companies as follows:

- Aurobindo Pharma: Aurobindo Pharma has the highest average ROE among the selected companies, with a score of 14.90%. This indicates that Aurobindo Pharma generated the highest return on its shareholders' equity during the period.
- Cipla: Cipla follows Aurobindo Pharma with an average ROE of 12.11%, demonstrating a strong performance in generating returns for its shareholders.
- Dr. Reddy's Lab: Dr. Reddy's Lab ranks third with an average ROE of 11.19%, indicating a relatively strong performance in utilizing its equity to generate profits.

- Sun Pharma: Sun Pharma has an average ROE of 8.00%, suggesting a moderate performance in generating returns for its shareholders.
- Lupin: Lupin has the lowest average ROE among the selected companies, with a score of 6.75%. This indicates relatively lower profitability and efficiency in utilizing its equity to generate returns compared to other companies.

Table 7 : ANOVA: Single Factor Test for Hypothesis 1

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	213.5946	4	53.39866	3.147592	0.036841	2.866081
Within Groups	339.2985	20	16.96493			
Total	552.8932	24				

Interpretation: The p-value (0.036840974) is less than the typical significance level of 0.05. Therefore, we have enough evidence to reject the null hypothesis. This suggests that there are statistically significant differences in Return on Equity (ROE) scores among the pharmaceutical companies using DuPont Analysis.

Table 8 : PBIT Efficiency of the Selected Companies

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	0.27	0.18	0.20	0.27	0.15	0.21	3
Cipla	0.18	0.20	0.24	0.24	0.27	0.23	4
Dr. Reddy's Lab	0.08	0.17	0.24	0.23	0.16	0.17	2
Sun Pharma	0.53	0.78	0.89	0.90	0.85	0.79	5
Lupin	0.18	0.24	0.17	0.15	-0.01	0.15	1

Based on the scores provided for PBIT Efficiency, we can interpret the overall ranking of pharmaceutical companies as follows:

- Sun Pharma: With an average PBIT Efficiency score of 0.79, Sun Pharma ranks highest among the pharmaceutical companies listed. This indicates that Sun Pharma has generally exhibited better profitability before interest and taxes compared to the other companies over the period under consideration.

- Cipla: Following closely behind Sun Pharma is Cipla, with an average PBIT Efficiency score of 0.23. Cipla's performance is the second-best among the listed companies, showcasing consistent profitability before interest and taxes over the years.
- Aurobindo Pharma: Aurobindo Pharma holds the third position with an average PBIT Efficiency score of 0.21. While its score is lower than Sun Pharma and Cipla, it still demonstrates decent profitability before interest and taxes.
- Dr. Reddy's Lab: Dr. Reddy's Lab comes next with an average PBIT Efficiency score of 0.17. Although it lags behind the top three companies, it still manages to maintain a reasonable level of profitability before interest and taxes.
- Lupin: Lupin trails behind the other companies with an average PBIT Efficiency score of 0.15. It has the lowest score among the listed companies, indicating comparatively lower profitability before interest and taxes over the years.

Overall, Sun Pharma emerges as the top performer in terms of PBIT Efficiency, followed by Cipla, Aurobindo Pharma, Dr. Reddy's Lab, and Lupin. This ranking suggests the relative performance of these pharmaceutical companies in terms of profitability before interest and taxes, with Sun Pharma being the most profitable and Lupin being the least profitable among them.

Table 9: ANOVA: Single Factor Test for Hypothesis 2

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.448071	4	0.362018	44.90261	1.02E-09	2.866081
Within Groups	0.161246	20	0.008062			
Total	1.609317	24				

Interpretation: The low p-value (1.01949E-09) indicates that there are significant differences between the groups' means. Therefore, we reject the null hypothesis and conclude that there is a statistically significant difference in at least one pair of group means.

Table 10 : Interest Burden of Selected Companies

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	0.85	0.89	0.91	0.99	0.99	0.93	2
Cipla	0.99	0.99	0.99	0.99	0.99	0.99	4
Dr. Reddy's Lab	0.92	0.97	0.98	0.98	0.98	0.97	3
Sun Pharma	0.53	0.78	0.89	0.90	0.85	0.79	1
Lupin	0.98	0.99	0.97	0.98	1.83	1.15	5

Based on the scores provided for Interest Burden, we can interpret the overall ranking of pharmaceutical companies as follows:

- Sun Pharma: Sun Pharma has the lowest average Interest Burden score of 0.79, indicating that it has had the lowest dependency on interest payments relative to its earnings compared to the other companies. However, this score has been increasing over the years, suggesting a potential trend of increasing interest burden.
- Aurobindo Pharma: Aurobindo Pharma has an average Interest Burden score of 0.93, which is the second lowest among the listed companies. This indicates a relatively low dependency on interest payments compared to its earnings.
- Dr. Reddy's Lab: Dr. Reddy's Lab follows with an average Interest Burden score of 0.97, showing a slightly higher dependency on interest payments compared to Aurobindo Pharma.
- Cipla: Cipla has the same average Interest Burden score as Dr. Reddy's Lab, standing at 0.99. This suggests that Cipla, like Dr. Reddy's Lab, has a relatively higher dependency on interest payments compared to Aurobindo Pharma and Sun Pharma.
- Lupin: Lupin stands out with the highest average Interest Burden score of 1.15 among the listed companies. This indicates a comparatively higher dependency on interest payments relative to its earnings. Notably, Lupin's score for the year Mar-22 seems unusually high compared to previous years, possibly indicating a significant change in its financial situation.

Overall, Cipla, Dr. Reddy's Lab, and Lupin appear to have a higher dependency on interest payments compared to Aurobindo Pharma and Sun Pharma. Sun Pharma has consistently maintained the lowest dependency on interest payments over the years. Lupin's significantly higher score in the year Mar-22 compared to previous years warrants further investigation, as it could indicate a notable change in its financial circumstances or reporting.

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.338817	4	0.084704	2.426143	0.081694	2.866081
Within Groups	0.698262	20	0.034913			
Total	1.037079	24				

Interpretation: The p-value (0.081694) is greater than the typical significance level of 0.05. Therefore, we do not have enough evidence to reject the null hypothesis. This suggests that there are no statistically significant differences in interest burden among the pharmaceutical companies.

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	0.77	0.78	0.79	0.74	0.89	0.80	2
Cipla	0.78	0.76	0.78	0.74	0.76	0.76	1
Dr. Reddy's Lab	0.81	0.75	1.06	0.72	0.73	0.81	3
Sun Pharma	1.06	1.05	0.99	0.99	0.81	0.98	5
Lupin	0.75	0.70	0.82	0.77	1.17	0.84	4

Based on the scores provided for Interest Burden, we can interpret the overall ranking of pharmaceutical companies as follows:

- Cipla: Cipla has the lowest Tax Burden score among the selected companies, indicating that it pays the least proportion of its earnings in taxes compared to the other companies. This suggests that Cipla may benefit from favorable tax rates or effective tax planning strategies.
- Aurobindo Pharma: Aurobindo Pharma follows closely behind Cipla with the second-lowest Tax Burden score. While its tax burden is slightly higher than Cipla, it still demonstrates efficient tax management compared to the other companies.
- Dr. Reddy's Lab: Dr. Reddy's Lab ranks third in terms of Tax Burden. Although its tax burden is slightly higher than Aurobindo Pharma's, it still maintains relatively efficient tax management compared to higher-ranked companies.
- Lupin: Lupin holds the fourth position with a higher Tax Burden score compared to the top three companies. This indicates that Lupin pays a higher proportion of its earnings in taxes, potentially due to various factors such as tax regulations or business operations.
- Sun Pharma: Sun Pharma has the highest Tax Burden score among the selected companies, indicating that it pays the highest proportion of its earnings in taxes. This suggests that Sun Pharma may face higher tax rates or have less tax-efficient strategies compared to the other companies.

Overall, companies with lower Tax Burden scores tend to have more tax-efficient operations, whereas those with higher scores may face greater tax liabilities

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.141434	4	0.035359	2.562174	0.070067	2.866081
Within Groups	0.276004	20	0.0138			
Total	0.417438	24				

Interpretation: The p-value (0.070067159) is greater than the typical significance level of 0.05. Therefore, we do not have enough evidence to reject the null hypothesis. This suggests that there are no statistically significant differences in tax burdens among the pharmaceutical companies.

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	0.76	0.77	0.79	0.80	0.60	0.74	5
Cipla	0.80	0.78	0.73	0.70	0.58	0.72	3
Dr. Reddy's Lab	0.65	0.78	0.73	0.73	0.70	0.72	4
Sun Pharma	0.27	0.36	0.42	0.41	0.53	0.40	1
Lupin	0.64	0.66	0.63	0.59	0.62	0.63	2

Based on the scores provided for Assets Turnover Ratio, we can interpret the overall ranking of pharmaceutical companies as follows:

- Sun Pharma: Sun Pharma has the highest Assets Turnover Ratio with an average score of 0.40. This indicates that Sun Pharma generates more revenue relative to its total assets compared to other companies.
- Lupin: Lupin follows Sun Pharma with an average score of 0.63. It demonstrates a relatively efficient utilization of assets to generate revenue.
- Cipla: Cipla ranks third with an average score of 0.72, indicating its assets' turnover efficiency falls between Sun Pharma and Lupin.
- Dr. Reddy's Lab: Dr. Reddy's Lab also has an average score of 0.72, sharing the same score with Cipla but might be placed lower due to other tie-breaking considerations.
- Aurobindo Pharma: Aurobindo Pharma has the lowest Assets Turnover Ratio among the selected companies, with an average score of 0.74.

Overall, Lupin and Cipla also exhibit efficient asset turnover, albeit to a lesser extent than Sun Pharma. Dr. Reddy's Lab and Aurobindo Pharma have relatively lower asset turnover ratios compared to the others, suggesting that they may have room for improvement in utilizing their assets more effectively to generate revenue.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.410988	4	0.102747	19.60538	1.08E-06	2.866081
Within Groups	0.104815	20	0.005241			
Total	0.515803	24				

Interpretation: The extremely low p-value (approximately 0) indicates that the observed differences in asset turnover ratios among the pharmaceutical companies are not due to random chance. Therefore, we reject the null hypothesis and conclude that there are statistically significant differences in asset turnover ratios among the pharmaceutical companies.

Financial Ratios	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Average	Score
Aurobindo Pharma	1.37	1.40	1.29	1.25	1.11	1.28	5
Cipla	1.01	1.00	1.00	1.00	1.00	1.00	1
Dr. Reddy's Lab	1.22	1.07	1.07	1.07	1.12	1.11	3
Sun Pharma	1.30	1.26	1.24	1.26	1.20	1.25	4
Lupin	1.00	1.00	1.00	1.02	1.04	1.01	2

Based on the scores provided for Leverage/Equity Multiplier, we can interpret the overall ranking of pharmaceutical companies as follows:

- Cipla: Cipla has the lowest Leverage/Equity Multiplier with an average score of 1.00, indicating the lowest degree of financial leverage among the selected companies. This suggests that Cipla has a conservative capital structure with a relatively lower level of debt financing.
- Lupin: Lupin follows with an average score of 1.01, indicating a slightly higher Leverage/Equity Multiplier compared to Cipla but still relatively low.
- Dr. Reddy's Lab: Dr. Reddy's Lab has an average score of 1.11, indicating a moderate level of financial leverage.
- Sun Pharma: Sun Pharma has an average score of 1.25, indicating a higher level of financial leverage compared to the previous companies.
- Aurobindo Pharma: Aurobindo Pharma has the highest Leverage/Equity Multiplier among the selected companies, with an average score of 1.28, suggesting the highest degree of financial leverage.

Overall, Companies with lower Leverage/Equity Multiplier scores, such as Cipla and Lupin, generally have a more conservative capital structure with lower levels of debt relative to equity. Companies with higher Leverage/Equity Multiplier scores, such as Aurobindo Pharma and Sun Pharma, have a higher proportion of debt in their capital structure relative to equity, indicating a higher degree of financial leverage. Dr. Reddy's Lab falls in between, exhibiting a moderate level of financial leverage compared to the other companies.

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.339246	4	0.084811	22.08916	4.2E-07	2.866081
Within Groups	0.07679	20	0.00384			
Total	0.416036	24				

Interpretation: The extremely low p-value (approximately 0) indicates that the observed differences in Leverage/Equity Multiplier scores among the pharmaceutical companies are not due to random chance. Therefore, we reject the null hypothesis and conclude that there are statistically significant differences in Leverage/Equity Multiplier scores among the pharmaceutical companies.

FINDINGS

From the analysis of the DuPont Analysis for the five pharmaceutical companies (Aurobindo Pharma, Cipla, Dr. Reddy's Lab, Sun Pharma, and Lupin) over the years from Mar-18 to Mar-22, we can draw the following findings:

1. Earnings Before Interest and Taxes (EBIT) Efficiency: EBIT Efficiency plays a crucial role in ROE. The companies that improved their EBIT Efficiency during the analysis period generally experienced an increase in ROE. However, those with declining EBIT Efficiency saw a drop in ROE. It's an essential factor in profitability.
2. Interest Burden: While Interest Burden remained relatively stable for most companies, Sun Pharma saw a steady increase. A significant increase in interest burden can negatively impact ROE, as it reduces net income.
3. Tax Burden: Tax Burden fluctuated for most companies, but significant changes in tax burden, whether positive or negative, had an impact on net income and, consequently, ROE.
4. Assets Turnover Ratio: A decreasing trend in the Assets Turnover Ratio was observed for several companies. A drop in asset turnover can lower ROE, as it indicates less efficient use of assets to generate revenue.
5. Leverage/Equity Multiplier: Most companies maintained consistent leverage/equity multipliers, with Sun Pharma slightly increasing it. A stable leverage/equity multiplier can reduce financial risk and stabilize ROE.
6. Return on Equity (ROE): ROE varied significantly among the companies, with some experiencing significant increases, while others faced declines. Improvements in ROE were often associated with better EBIT Efficiency and tax situations, while declines were often linked to deteriorating EBIT Efficiency and increased interest burden.

In summary, the findings highlight the importance of EBIT Efficiency in driving ROE, as well as the impact of tax, interest expenses, and asset turnover. Companies that can maintain or improve EBIT Efficiency, control interest costs, and manage their tax situations tend to achieve better ROE. Additionally, prudent management of assets and financial leverage plays a role in maintaining consistent or improving ROE. The specific factors affecting each company's ROE should be carefully analyzed to develop strategies for enhancing performance in the pharmaceutical industry.

CONCLUSION

In conclusion, the DuPont Analysis of five prominent pharmaceutical companies (Aurobindo Pharma, Cipla, Dr. Reddy's Lab, Sun Pharma, and Lupin) over the years from Mar-18 to Mar-22 provides valuable insights into the factors influencing their Return on Equity (ROE). Several key takeaways emerge from this analysis:

1. **EBIT Efficiency Matters:** EBIT Efficiency, the ability to convert Earnings Before Interest and Taxes (EBIT) into net income, is a crucial driver of ROE. Companies that improved their EBIT Efficiency generally experienced higher ROE, while those with declining EBIT Efficiency saw a decrease in ROE. This highlights the importance of profitability in ROE performance.
2. **Interest Burden and Tax Burden:** Changes in interest and tax burdens can significantly impact net income and, consequently, ROE. Companies need to manage interest expenses and tax situations effectively to maintain or improve their ROE.
3. **Asset Utilization:** The Assets Turnover Ratio, which reflects how efficiently a company uses its assets to generate revenue, showed a mixed trend. A declining asset turnover can negatively impact ROE by indicating less efficient asset utilization.
4. **Leverage/Equity Multiplier:** Most companies maintained relatively stable leverage/equity multipliers, contributing to consistent or slightly improved ROE. Managing financial leverage is essential to reduce financial risk and stabilize ROE.
5. **ROE Fluctuations:** ROE varied significantly among the companies, with some experiencing substantial increases and others facing declines. Factors like EBIT Efficiency, tax, and interest burdens played a significant role in these fluctuations.

The findings underscore the importance of financial efficiency, profitability, and prudent financial management for maintaining or enhancing ROE in the pharmaceutical industry. Companies that can optimize their EBIT Efficiency, control interest expenses, manage their tax situations, and efficiently utilize their assets tend to achieve better and more stable ROE. In an ever-evolving and competitive industry, it is vital for pharmaceutical companies to continually assess these key factors to sustain and improve their financial performance and shareholder value.

	Score	Rank
Aurobindo Pharma	22	1
Dr. Reddy's Lab	18	2
Sun Pharma	18	2
Cipla	17	4
Lupin	15	5

Aurobindo Pharma claimed the top spot with a score of 22, showcasing superior performance among the selected pharmaceutical companies, while Dr. Reddy's Lab and Sun Pharma tied for the second position with scores of 18 each. Cipla followed closely behind in the fourth position with a score of 17, while Lupin ranked fifth with a score of 15. These rankings provide a succinct overview of the competitive landscape within the pharmaceutical industry, highlighting Aurobindo Pharma's leading position and the closely contested performance of other key players.

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