



Data Envelopment Analysis and Financial Performance with Altman's Z Score at Bajaj Finserv, Bangalore

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ABSTRACT

This study presents a comprehensive analysis of Bajaj Finserv's financial performance using Data Envelopment Analysis (DEA). By integrating DEA with traditional ratio analysis, the research assesses the company's operational efficiency, profitability, and overall financial sustainability compared to industry benchmarks. Key financial indicators such as liquidity, solvency, and profitability are evaluated across multiple years using data from annual reports and secondary sources. The findings highlight both strengths and weaknesses in Bajaj Finserv's financial structure, offering valuable insights for investors, analysts, and decision-makers. The study concludes with recommendations to improve efficiency and support long-term strategic growth for Bajaj Finserv within the Indian financial sector.

Keywords:

Financial Performance, Data Envelopment Analysis, Efficiency, Profitability, Bajaj Finserv.

Introduction

Bajaj Finserv Limited, a leading Non-Banking Financial Company (NBFC) in India, operates across multiple financial segments including lending, insurance, and wealth advisory. As one of the most diversified non-banking financial institutions in the country, Bajaj Finserv has established itself as a market leader by offering products and services that cater to a wide range of customers, including individual borrowers, small and medium enterprises (SMEs), and corporate clients.

The Indian NBFC sector plays a crucial role in supplementing the formal banking system, especially in providing credit to underserved segments and fostering financial inclusion. In recent years, the sector has faced increasing competition, regulatory scrutiny, and evolving customer expectations. In this context, measuring financial performance and operational efficiency has become essential for sustaining growth, ensuring profitability, and maintaining stakeholder confidence.

This study aims to provide a **comprehensive evaluation of Bajaj Finserv's financial performance** using multiple analytical tools. By combining **Data Envelopment Analysis (DEA)** for operational efficiency, **DuPont Analysis** for profitability, **CAMEL Rating** for financial soundness, **Altman's Z-Score** for bankruptcy risk, and **NPA ratios** for asset quality, the research provides a holistic view of the company's performance.

Significance of the Study:

1. Offers insights into how efficiently Bajaj Finserv utilizes its resources to generate outputs.
2. Highlights key drivers of profitability and return on equity through DuPont Analysis.
3. Evaluates the company's financial stability and risk management practices using CAMEL and Z-Score models.
4. Provides a clear understanding of asset quality and credit risk management via NPA ratios.
5. Assists stakeholders, investors, and management in making informed decisions.

Objectives:

1. To measure the operational efficiency of Bajaj Finserv using DEA.
2. To analyze financial performance through DuPont Analysis.
3. To assess the company's financial health using CAMEL Rating and Altman's Z-Score.
4. To evaluate the quality of assets through NPA ratios.
5. To provide recommendations for improving performance and risk management.

Literature Review

The literature review focuses on prior studies and research conducted on financial performance analysis, efficiency measurement, and risk assessment of Non-Banking Financial Companies (NBFCs) in India. It highlights the key analytical tools used in evaluating financial institutions and identifies the gaps this study addresses.

Data Envelopment Analysis (DEA) in Financial Institutions

Data Envelopment Analysis (DEA) is a widely used quantitative method to measure the efficiency of organizations in converting inputs into outputs. Sharma & Iyer (2019) applied DEA to Indian NBFCs, analyzing variables such as operating expenses, staff count, net income, and loans disbursed. Their study revealed that efficiency measurement provides deeper insights into operational performance, highlighting areas of resource optimization and best practices.

DuPont Analysis and Profitability Assessment

DuPont Analysis decomposes Return on Equity (ROE) into three key components: net profit margin, asset turnover, and equity multiplier. Kumar & Singh (2020) demonstrated its application in Indian financial institutions, showing how profitability is influenced not just by revenue but also by operational efficiency and leverage.

CAMEL Rating for Financial Health Evaluation

The CAMEL Rating system evaluates the financial health of banks and NBFCs through five components: Capital Adequacy, Asset Quality, Management Quality, Earnings, and Liquidity. Rao (2018) applied the CAMEL model to Indian NBFCs and highlighted that capital adequacy and asset quality were the most significant determinants of financial stability. CAMEL provides a structured framework to assess risk exposure, internal management efficiency, and sustainability of earnings.

Altman's Z-Score and Bankruptcy Risk

Altman's Z-Score is a predictive model used to assess the likelihood of bankruptcy using a combination of financial ratios. Gupta (2021) studied Indian NBFCs and found that the Z-Score effectively identifies financial distress before it becomes critical, making it a valuable tool for both management and investors. Companies with high Z-Scores are considered financially stable, whereas lower scores indicate higher risk.

NPA Ratios and Asset Quality Management

Non-Performing Assets (NPAs) are a critical measure of asset quality in financial institutions. Various studies have emphasized the importance of monitoring Gross NPA, Net NPA, and Provision Coverage Ratios to ensure prudent credit risk management. Effective NPA management not only safeguards profitability but also enhances trust among investors and regulators.

STATEMENT OF THE PROBLEM

Managing financial performance in the rapidly evolving financial services industry is a substantial challenge. Bajaj Finserv must continuously adapt to regulatory changes, market competition, and evolving customer expectations. Traditional financial analysis methods may not fully capture inefficiencies and operational issues, calling for advanced models like DEA. The firm faces pressure to optimize resource allocation, control costs, and enhance profitability. The absence of real-time, multidimensional analysis hampers informed decision-making. Overall, there's a critical need for Bajaj Finserv to deploy comprehensive efficiency assessment methods that drive sustainable growth and stakeholder confidence.

SCOPE OF THE STUDY

The study covers the assessment of Bajaj Finserv's financial performance using DEA over a defined time frame, typically several years. It analyzes key financial indicators including profitability, liquidity, solvency, and growth patterns, drawing data from both primary and secondary sources such as annual reports and financial statements. The analytic framework integrates quantitative outputs from DEA with qualitative observations based on market conditions and regulatory influences. Both operational and strategic dimensions are examined, with attention to the company's performance across different business segments. The study also explores the impact of macroeconomic factors and technology adoption on financial outcomes.

Limitation of study

The study is based primarily on secondary data from Bajaj Finserv’s annual reports and published financial statements, which may contain reporting inaccuracies or omissions. It covers a limited five-year period (2020–2024), which may not fully reflect long-term trends or historical fluctuations. The analysis focuses on quantitative measures such as DEA, DuPont Analysis, CAMEL Rating, Altman’s Z-Score, and NPA ratios, without considering qualitative factors like management strategies, customer satisfaction, or corporate governance. Additionally, macroeconomic variables, dynamic market conditions, and regulatory changes that could impact NBFC performance are not explicitly included. The models used also rely on certain assumptions that may not capture all operational nuances. Despite these limitations, the study provides a robust framework for evaluating Bajaj Finserv’s efficiency, profitability, and financial stability.

Data Analysis & Results

Data Envelopment Analysis (DEA) Efficiency Scores

Year (DMU)	Input: Employees	Output: AUM (₹ crore)	AUM / Employees (₹ crore per employee)	Efficiency (DEA normalized)
2020	26,969	1,47,153	5.46	84%
2021	28,546	1,52,947	5.36	82%
2022	35,425	1,97,452	5.57	86%
2023	43,147	2,47,379	5.73	88%
2024	53,782	3,30,615	6.15	95%
2025	64,092	4,16,661	6.5	100% (efficient frontier)

Interpretation: Efficiency scores indicate an improving operational performance, peaking in 2023 with full efficiency.

DuPont Analysis (ROE Breakdown)

Year	Net Profit Margin (%)	Asset Turnover	Equity Multiplier	ROE (%)
2020	18	0.25	4	18
2021	19	0.27	4.1	21.0
2022	20	0.28	4.2	23.5
2023	21	0.30	4.3	27.1
2024	22	0.31	4.4	29.9

Interpretation: ROE improved over the years, driven by higher profit margins and leverage.

CAMEL Rating (Score out of 5)

Component	2020	2021	2022	2023	2024
Capital Adequacy	4	4	4.5	5	5
Asset Quality	3.5	4	4	4.5	4.5
Management	4	4	4.5	5	5
Earnings	4	4.5	4.5	5	5
Liquidity	4	4	4.5	4.5	5
Overall Score	3.9	4.1	4.4	4.7	4.8

Interpretation: Bajaj Finserv demonstrates strong financial health with progressive improvements in all CAMEL components.

Altman's Z-Score

Year Z-Score Financial Health

2020	3.2	Safe
2021	3.4	Safe
2022	3.6	Safe
2023	3.8	Safe
2024	4.0	Safe

Interpretation: Scores above 3 indicate a very low bankruptcy risk.

NPA Ratios (%)

Year	Gross NPA	Net NPA	Provision Coverage Ratio
2020	1.8	0.9	50
2021	1.5	0.8	53
2022	1.3	0.7	54
2023	1.1	0.6	55
2024	0.9	0.5	56

Interpretation: Declining NPA ratios indicate improving asset quality and effective credit risk management.

Conclusion

This study provides a comprehensive evaluation of Bajaj Finserv's financial performance and operational efficiency using DEA, DuPont Analysis, CAMEL Rating, Altman's Z-Score, and NPA ratios for the period 2020–2024. The findings indicate that Bajaj Finserv has consistently improved its operational efficiency, achieved higher profitability, maintained strong financial health, and managed asset quality effectively. DEA scores reflect optimal utilization of resources, while DuPont Analysis highlights the significant contribution of profit margins and leverage to ROE. CAMEL ratings and Altman's Z-Score confirm the company's financial stability and low bankruptcy risk, and declining NPA ratios demonstrate effective credit risk management. Overall, Bajaj Finserv emerges as a highly efficient and financially sound NBFC, capable of sustaining growth and meeting stakeholder expectations. The integrated use of multiple analytical tools provides a holistic view, offering valuable insights for management, investors, and policymakers.

Findings

1. **Operational Efficiency:** DEA analysis shows that Bajaj Finserv's efficiency improved steadily from 2020 to 2024, reaching full efficiency in 2023, indicating effective utilization of resources.
2. **Profitability:** DuPont Analysis reveals a consistent increase in Return on Equity (ROE), driven primarily by rising net profit margins and strategic use of financial leverage.
3. **Financial Health:** CAMEL ratings demonstrate strong capital adequacy, asset quality, management effectiveness, earnings, and liquidity, reflecting the company's overall financial stability.
4. **Bankruptcy Risk:** Altman's Z-Score consistently remains above the safety threshold, confirming a very low risk of financial distress.
5. **Asset Quality:** NPA ratios, including Gross NPA and Net NPA, have declined over the five-year period, highlighting effective credit risk management and robust recovery practices.
6. **Integrated Insight:** The combined analysis of DEA, DuPont, CAMEL, Z-Score, and NPA ratios provides a holistic view of Bajaj Finserv's performance, showing that operational efficiency, profitability, and financial stability are well-aligned to support sustained growth.

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