



Assessing the effect of financial leverage on earnings per share in India's pharmaceutical sector

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Abstract

This study examines the impact of financial leverage on Earnings Per Share (EPS) within India's pharmaceutical sector. Financial leverage, which involves the use of debt to finance company operations, can influence a firm's profitability and risk profile. By analyzing financial data from selected pharmaceutical companies over a specified period, this research investigates the relationship between leverage ratios and EPS, highlighting how debt utilization affects shareholder returns. The findings provide insights for investors and management regarding optimal capital structure decisions in the dynamic pharmaceutical industry of India.

Keywords: Financial leverage, earnings per share, pharmaceutical sector, India, capital structure, debt financing, profitability, shareholder value

Introduction

Background and Context

The pharmaceutical sector is one of the most vital industries globally, serving a fundamental role in healthcare by developing, producing, and marketing drugs and medical products. In India, the pharmaceutical industry has emerged as a significant contributor to the economy, combining robust domestic demand with a strong presence in global generics markets. The industry is characterized by intense research and development activities, complex regulatory requirements, and significant capital needs.

Financial management plays a critical role. The optimal capital structure — the right mix of debt and equity financing. Financial leverage, which refers to the use of borrowed funds (debt) in the capital structure, is a central aspect of this decision-making process. Leveraging debt can amplify returns to shareholders but also increases the firm's financial risk.

Earnings Per Share (EPS) is a crucial performance indicator representing the portion of a company's profit allocated to each outstanding share of common stock. It is widely used by investors to gauge a company's profitability and financial health. Changes in financial leverage directly influence EPS due to interest obligations and the effect of debt on the firm's net income and equity base.

Importance of Financial Leverage

In practice, moderate financial leverage can increase shareholder value by providing tax shields and disciplining management. For pharmaceutical firms, which often require substantial capital for research, development, and regulatory approvals, debt can be a viable source of funds. Yet, excessive debt can lead to financial distress, affecting operational efficiency and investor confidence.

Pharmaceutical Sector in India: A Special Case

India's pharmaceutical industry is among the largest in the world, both in volume and value. It is characterized by a mix of multinational corporations, large domestic companies, and a burgeoning number of small and medium-sized enterprises. The sector is driven by several factors, including:

- Growing domestic demand for affordable healthcare and medicines.
- Strong export performance, particularly in generic drugs.
- Continuous innovation and patent challenges.
- Stringent government regulations and price controls.

The capital-intensive nature of pharmaceutical operations requires companies to manage their financing prudently. Given the sector's exposure to both operational risks (e.g., patent cliffs, R&D failures) and financial risks (due to leverage), understanding how financial leverage impacts EPS is critical for sustainable growth.

Financial Leverage and Earnings Per Share: Theoretical Framework

Financial leverage affects EPS primarily through two channels: the interest expense related to debt and the number of shares outstanding. When a company uses debt financing, it incurs fixed interest costs, which reduce net income available to shareholders. However, because debt does not dilute ownership, the earnings are divided among fewer shareholders compared to issuing new equity.

Conversely, if the firm's operating income is insufficient to cover interest payments, financial leverage can magnify losses, reducing EPS and increasing bankruptcy risk. Thus, the impact of financial leverage on EPS depends on the firm's profitability, cost of debt, and the prevailing economic environment.

Prior Research and Gaps

Several studies have explored the relationship between financial leverage and firm performance, including EPS, in various industries and countries. While many support the positive impact of moderate leverage on profitability, others highlight the risks of excessive debt.

In the context of the Indian pharmaceutical sector, research is relatively limited. The unique industry dynamics, regulatory framework, and economic conditions in India warrant a focused investigation into how financial leverage influences EPS. This study aims to fill this gap by providing empirical evidence and insights tailored to this sector.

- Analyzing the leverage levels across selected pharmaceutical companies.
- Examining the correlation between leverage ratios and EPS.
- Understanding how debt impacts shareholder returns and company profitability.
- Providing recommendations for optimal capital structure decisions.

Significance of the Study

The findings of this study will benefit multiple stakeholders:

- Investors and shareholders can better evaluate the risk-return profile of pharmaceutical companies.
- Corporate managers and financial analysts can make informed financing decisions to balance growth and risk.
- Policymakers and regulators can understand industry financing trends to support sustainable development.
- Academics and researchers gain insights into the Indian pharmaceutical sector's financial dynamics.

Structure of the Paper

Following this introduction, the paper will present a comprehensive literature review, detailing theoretical perspectives and empirical findings on financial leverage and EPS. The methodology section will explain data collection and analysis techniques. Subsequently, the results and discussion will provide an empirical assessment of leverage and EPS in the Indian pharmaceutical industry. Finally, the paper concludes with key findings, implications, and recommendations.

Methods

Research Design

This study adopts a quantitative research approach to investigate the impact of the Indian pharmaceutical sector. A correlational design is employed to examine the strength and direction of the relationship between leverage and EPS. Secondary financial data of selected pharmaceutical companies listed on the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are used for empirical analysis.

Sample Selection

The sample consists of pharmaceutical firms listed on Indian stock exchanges with consistent financial data availability for a period of 10 years (2014–2023). The selection criteria include:

- Firms with complete annual financial statements available over the period.
- Companies actively engaged in pharmaceutical manufacturing and related activities.
- Exclusion of firms undergoing mergers, acquisitions, or major restructuring during the study period to maintain data consistency.

After applying these filters, 25 pharmaceutical companies were shortlisted, representing large, mid, and small-cap firms to ensure sector-wide representation.

Data Collection

Data were sourced from publicly accessible databases including:

- Company annual reports and financial statements.

- Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) official websites.
- Financial databases such as CMIE Prowess and Capitaline.

Key financial variables collected include:

- Total debt (short-term + long-term borrowings).
- Shareholders' equity.
- Net income.
- Number of outstanding shares.
- Earnings Per Share (EPS).
- Operating income and interest expenses.

Variables and Measurements

- **Financial Leverage:** Measured using the Debt-to-Equity Ratio (D/E), calculated as Total Debt divided by Shareholders' Equity. This ratio indicates the proportion of debt financing relative to equity.
- **Earnings Per Share (EPS):** Calculated as Net Income attributable to common shareholders divided by the weighted average number of common shares outstanding during the period.
- **Control Variables:** To isolate the effect of financial leverage on EPS, other factors such as firm size (measured by total assets), profitability (measured by Return on Assets, ROA), and growth opportunities (measured by Market-to-Book ratio) are included in the analysis.

Analytical Framework

The study employs panel data regression analysis to examine the impact of financial leverage on EPS over time across multiple companies. Panel data analysis is suitable as it accounts for both cross-sectional (between firms) and time-series (over years) variations, enhancing result reliability.

Two primary models are used

1. **Fixed Effects Model:** Controls for time-invariant unobserved heterogeneity between firms.
2. **Random Effects Model:** Assumes that individual effects are uncorrelated with independent variables.

The Hausman test is conducted to choose between fixed and random effects. Diagnostic tests such as multicollinearity (Variance Inflation Factor), heteroscedasticity (Breusch-Pagan test), and autocorrelation (Durbin-Watson statistic) are also performed to validate the model assumptions.

The basic regression model is specified as:

$$EPS_{it} = \alpha + \beta_1(D/E)_{it} + \beta_2Size_{it} + \beta_3ROA_{it} + \beta_4MB_{it} + \epsilon_{it}$$

$$EPS_{it} = \alpha + \beta_1(D/E)_{it} + \beta_2Size_{it} + \beta_3ROA_{it} + \beta_4MB_{it} + \epsilon_{it}$$

Where:

- EPS_{it} = Earnings Per Share of firm i at time t
- $(D/E)_{it}$ = Debt-to-Equity ratio of firm i at time t
- $Size_{it}$ = Firm size (log of total assets)
- ROA_{it} = Return on Assets
- MB_{it} = Market-to-Book ratio
- ϵ_{it} = Error term

Data Analysis Tools

Data processing and statistical analysis are conducted using software such as:

- Microsoft Excel for data cleaning and organization.
- STATA and SPSS for panel data regression, diagnostics, and robustness checks.
- EViews for additional econometric tests and model validation.

Results

Descriptive Statistics

The descriptive statistics provide an overview of the financial characteristics of the sampled pharmaceutical firms over the 10-year period:

- The average Debt-to-Equity ratio across firms is 0.65, indicating moderate use of debt in capital structures.
- Mean EPS stands at INR 15.40, with significant variability reflecting differences in firm size, profitability, and leverage.
- Return on Assets averages 8.5%, with some firms reporting negative returns in years with operational challenges.

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Debt-to-Equity (D/E)	-3.12	0.98	-3.18	0.002 **
Firm Size (log Assets)	1.85	0.56	3.30	0.001 **
Return on Assets (ROA)	4.55	0.65	7.00	0.000 **
Market-to-Book (MB)	0.78	0.33	2.36	0.019 *
Constant	2.14	1.22	1.75	0.081

Significance levels: $p < 0.05$ (*), $p < 0.01$ (**)

The negative coefficient of Debt-to-Equity ratio (-3.12) confirms that higher financial leverage reduces EPS in Indian pharmaceutical firms. The result is statistically significant, suggesting that debt financing is associated with lower earnings per share, possibly due to increased interest burden and financial risk.

Firm size and profitability (ROA) positively influence EPS, consistent with theoretical expectations that larger and more profitable firms generate higher shareholder returns. The positive Market-to-Book ratio coefficient indicates that growth opportunities enhance EPS.

Robustness Checks

- Multicollinearity tests show VIF values below 3, confirming no serious collinearity issues.
- Breusch-Pagan test indicates heteroscedasticity is present; therefore, robust standard errors are used.
- Durbin-Watson statistic near 2 suggests no autocorrelation in residuals.

Subgroup Analysis

Further analysis by market capitalization segments reveals that large-cap firms show a weaker negative impact of leverage on EPS compared to mid and small-cap firms. This suggests that larger firms may manage debt more efficiently or access cheaper financing, mitigating the adverse effects on earnings.

Discussion

Interpretation of Key Findings

The primary objective of this study was to assess the impact of financial leverage on Earnings Per Share (EPS) in India's pharmaceutical sector. The analysis revealed a significant negative relationship between the Debt-to-Equity (D/E)

- The Market-to-Book ratio averages 1.7, indicating moderate investor expectations of growth.

The data reveals considerable heterogeneity in leverage and profitability across firms, necessitating panel data methods.

Correlation Analysis

Correlation coefficients show a statistically significant negative relationship between Debt-to-Equity ratio and EPS ($r = -0.42$, $p < 0.01$), suggesting that higher leverage is associated with lower earnings per share. Firm size and ROA have positive correlations with EPS ($r = 0.53$ and 0.68 respectively), indicating their positive influence on shareholder returns.

Panel Regression Results

The Hausman test indicates that the fixed effects model is appropriate ($p < 0.05$), accounting for firm-specific heterogeneity.

The fixed effects regression results are as follows:

ratio and EPS among the sampled pharmaceutical companies over the period 2014 to 2023. This finding suggests that increased financial leverage tends to diminish the earnings available to shareholders in the Indian pharmaceutical industry.

This negative association aligns with the theoretical understanding that while debt financing can provide tax benefits and enhance returns, excessive leverage imposes fixed interest obligations that reduce net income, thereby lowering EPS. Particularly in the pharmaceutical sector, where firms face high operational risks such as research and development uncertainties, regulatory hurdles, and pricing pressures, the burden of debt interest can magnify financial distress. This effect appears to outweigh the benefits of leverage, as evidenced by the negative coefficient of the D/E ratio in the regression results.

Comparison with Prior Literature

The findings resonate with previous studies in emerging markets and capital-intensive industries. For instance, research conducted by Pandey (2010) in India found that high leverage adversely affects firm profitability and shareholder value due to increased bankruptcy risk and financial distress costs. Similarly, studies on pharmaceutical firms globally, such as those by Gupta and Agarwal (2015), have highlighted that excessive debt reduces EPS, especially in firms with volatile earnings and long product development cycles.

However, the results diverge from some literature in mature markets where moderate leverage is often linked to improved profitability through tax shields and agency cost benefits (Jensen, 1986; Myers, 2001). The difference can be attributed to the Indian pharmaceutical sector's evolving

financial environment, higher interest rates, and less efficient capital markets compared to developed economies.

Influence of Firm Size and Profitability

The positive and significant coefficients for firm size and Return on Assets (ROA) reinforce the importance of operational efficiency and scale in enhancing shareholder returns. Larger pharmaceutical companies benefit from diversified product portfolios, stronger brand equity, and better access to capital markets, enabling them to generate higher EPS despite leverage. Profitability, captured through ROA, naturally boosts EPS as firms generate more earnings relative to assets.

The subgroup analysis indicated that large-cap firms exhibit a less pronounced negative impact of leverage on EPS compared to smaller firms. This suggests that large firms have better risk management practices and possibly enjoy lower borrowing costs, allowing them to leverage debt more effectively without severely compromising EPS.

Role of Growth Opportunities

The Market-to-Book (MB) ratio's positive impact on EPS highlights the role of growth prospects in driving shareholder returns. Pharmaceutical firms with higher market valuations relative to their book values likely have better pipelines, innovation capabilities, or market potential, contributing to improved EPS. This indicates that investors reward firms that invest wisely in growth, even if accompanied by some degree of leverage.

Sector-Specific Considerations

The pharmaceutical sector in India is unique due to several factors that influence the leverage-EPS relationship:

- **Capital Intensity and R&D Risk:** Pharmaceutical companies require substantial investment in research and development, often over extended periods before commercialization. This long gestation period means that cash flows may be volatile or negative initially, making interest payments on debt burdensome and detrimental to EPS.
- **Regulatory Environment:** The industry is subject to strict government regulations and price controls, which can limit revenue growth and profitability. This regulatory uncertainty amplifies the risks associated with financial leverage.
- **Competitive Landscape:** The sector faces intense competition from domestic and multinational firms, exerting pressure on profit margins and increasing the need for prudent financial management.
- **Access to Capital:** Indian pharmaceutical firms may have relatively higher borrowing costs compared to global peers, reflecting emerging market risks and credit conditions. This makes debt financing more expensive and risky, influencing its negative impact on EPS.

Implications for Management and Investors

The study's findings offer valuable insights for pharmaceutical firm management and investors:

- **Optimal Capital Structure:** Managers should exercise caution in leveraging debt, balancing the benefits of

financing growth and expansion against the potential negative impact on EPS and financial stability. Moderate leverage tailored to firm-specific risk profiles and cash flow patterns is advisable.

- **Focus on Profitability and Scale:** Enhancing operational efficiency and achieving economies of scale are critical for mitigating the adverse effects of leverage. Profitability improvements can cushion the impact of debt servicing costs on EPS.
- **Investor Considerations:** Investors should consider leverage levels alongside profitability and growth prospects when assessing pharmaceutical stocks. Firms with high debt and unstable earnings pose greater risks to shareholder returns.
- **Policy Recommendations:** Policymakers could facilitate better access to affordable long-term financing for pharmaceutical firms, particularly small and medium-sized enterprises (SMEs), to reduce reliance on expensive debt and foster sustainable growth.

Limitations and Areas for Future Research

While this study provides important insights, some limitations should be acknowledged:

- **Sample Size and Period:** The study focused on 25 firms over a 10-year period, which, while adequate, could be expanded for greater generalizability. Including more firms and a longer timeframe may capture broader trends.
- **Exclusion of Market Conditions:** External macroeconomic variables such as interest rate fluctuations, inflation, and economic cycles were not explicitly modeled but could influence the leverage-EPS relationship.
- **Focus on Financial Leverage:** Other aspects of capital structure, such as equity financing, hybrid instruments, or off-balance-sheet liabilities, were not examined.

Future research could explore

- The impact of leverage on other performance metrics such as Return on Equity (ROE) or market valuation.
- Comparative studies between pharmaceutical firms in India and other emerging or developed markets.
- Qualitative investigations into managerial decision-making regarding capital structure.

Conclusion

This study highlights a significant negative impact of financial leverage on Earnings Per Share (EPS) in India's pharmaceutical sector. The findings suggest that increased reliance on debt financing reduces shareholder returns, likely due to the high operational risks and interest burdens characteristic of the industry. While firm size, profitability, and growth opportunities positively influence EPS, managers must carefully balance the use of debt to optimize capital structure without jeopardizing financial stability. These insights are vital for investors, corporate managers, and policymakers aiming to support sustainable growth in this critical sector. Future research could extend this

analysis by incorporating broader macroeconomic factors and comparative international perspectives.

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