https://doi.org/10.33472/AFJBS.6.5.2024.6122- 6131

African Journal of Biological Sciences

Research Paper Open Access

"Leverage Effect On The Profitability Of Listed Companies: A Study Of Sensex Companies In India"

Dr. Priti Aggarwal[1], Dr. Rashmi Shetty[2]*

[1*]Professor (Finance), N L Dalmia Institute of Management Studies, Mumbai
[2]Asst. Professor, Department of Commerce, Thakur College of Science & Commerce, Kandivali (E), Mumbai

***Corresponding Author:** Dr. Priti Aggarwal
*Professor (Finance), N L Dalmia Institute of Management Studies, Mumbai

Article History
Volume 6, Issue 5, May 2024
Received: 2-05-2024
Accepted: 20-05-2024
Published: 01-06-2024
Doi: 10.33472/AFJBS.6.5.2024.6122- 6131

Abstract
The research in this document delves into the leverage effect on the profitability of listed companies in the Sensex index in India. It examines the relationship between leverage and firm performance using various financial metrics such as return on assets (ROA), Net Profit Margin (NP), and return on capital employed (ROCE). The study analyses data from a sample of companies to determine the impact of leverage on profitability and valuation. Through regression analysis and correlation studies, the findings reveal the significance of leverage on firm performance and valuation, providing insights for investors and decision-makers in the Indian stock market.

Keywords: Sensex, Leverage, Profitability, ROCE, ROA

1 Introduction:

The ability of a business to use long-term funds with fixed costs to increase owner returns is referred to as leverage. Stated differently, leverage refers to the quantity of debt that a companyuse to fund its assets. A company is deemed highly levered if it has a large amount of debt in its capital structure. A business is considered unlevered if it has no debt. In general, a link between two related variables is referred to as leverage. It shows how one financial variable affects another related financial variable in financial analysis. Costs, output, sales revenue, earnings before interest and tax (EBIT), and earnings per share (EPS) are a few examples of these financial variables.

The words "sensitive" and "index" are combined to form the term "Sensex." An indicator used to track the performance of the stock market is the Sensex. The Sensex is the benchmark indexused by the BSE in India. Sensex 30 companies:

Table 1: Weights of Sensex 30 companies in the index

Name	WEIGHT (%)	Industry	Price (Rs.)	Market Capitalization (in Rs.Crs.)
Asian Paints	1.53	Paints	2844.6	2,72,853.40
Axis Bank	3.8	Banking	1130.05	3,48,847.95
Bajaj Finance	2.24	Finance	6729.85	4,16,575.24
Bajaj FinServ	0.91	Finance	1597.1	2,54,815.52
Bharti Airtel	4.13	Telecom	1325.5	7,51,406.35
HCL Tech	1.87	Software	1476.8	4,00,754.06
HDFC Bank	13.58	Banking	1509.75	11,46,943.59
HUL	2.37	FMCG	2221.5	5,21,961.70
ICICI Bank	9.3	Banking	1107.15	7,77,750.22
IndusInd Bank	1.14	Banking	1445.85	1,12,533.39
Infosys	6.11	Software	1430.15	5,93,636.31
ITC	4.66	Food & Tobacco	439.95	5,49,265.32
JSWSTEEL	1.01	Steel	888.05	2,17,168.54
Kotak Mahindra Bank	2.83	Banking	1608.4	3,19,737.20
L&T	5.03	Engineering	3602.3	4,95,196.88
M&M	2.17	Automobiles	2055	2,55,545.17
Maruti Suzuki India	2.00	Automobiles	12687.05	3,98,884.12
Nestle India	1.06	Food & Tobacco	2483.8	2,39,477.36
NTPC	2.02	Power	355.75	3,44,958.90
Power Grid	1.59	Power	292.6	2,72,135.67
RIL	11.74	Energy	2903	19,64,079.96
SBI	3.68	Banking	801.4	7,15,218.40
Sun Pharma	1.94	Pharmaceuticals	1504.25	3,60,911.15
Tata Steel	1.63	Steel	165.85	2,07,037.90
TATAMOTORS	2.11	Automobiles	999.35	3,32,157.86
TCS	4.63	Software	3825	13,83,918.48
Tech Mahindra	0.97	Software	1277.45	1,24,781.54
Titan Co	1.79	Retailing	3584.4	3,18,218.07
UltraTech Cement	1.34	Cement	9735.35	2,81,056.94
Wipro	0.78	Software	464.65	2,42,791.91

Source: Get Money Rich (Stock Analysis Algorithm)

2 LITERATURE REVIEW

2.1 Leverage: A Double-Edged Sword

Studies by Singh & Bansal (2016), Dr. Anita & Dr. Kavita Gupta (2021), and Kurniawati & Apollo (2018) highlight the potential drawbacks of leverage. Increased debt burdens lead to higher interest expenses, which erode profits (ROA, RONW, ROCE) available to shareholders. This aligns with the pecking order theory (Rajamani, 2021), where companies prioritize internal financing to avoid the risks associated with excessive debt.

However, leverage can be a strategic tool when used judiciously. The study on Nifty financial

service companies showcases a positive correlation between leverage and profitability. This suggests that in specific sectors like finance, debt financing can magnify returns on equity. Campello (2006) supports this notion, indicating that moderate debt levels can fuel growth for some firms. The key lies in finding the optimal leverage level that balances risk and reward.

2.2 External Factors Modulate the Leverage Effect

The influence of external factors on the leverage-profitability relationship is crucial. Erel et al. (2012) highlight how access to capital tightens during recessions, potentially forcing companies to adopt conservative leverage strategies. CHISTI et al. (2013) emphasize that economic downturns can exacerbate the negative consequences of high leverage, especially for cyclical industries like automobiles. This underscores the need for dynamic leverage adjustments based on the economic climate.

2.3 Financing Strategies and Leverage: A Company-Specific Dynamic

Financing choices significantly impact leverage levels. Huynh (2018) observes that private firms in Canada tend to rely more on debt, potentially due to a desire to maintain control (Brav, 2009). Public companies, on the other hand, might favor equity financing for expansion and growth (Huynh, 2018). Aggarwal (2017) suggests policy interventions can influence financing behavior in specific sectors like Indian hospitality. These findings imply that the optimal leverage strategy depends on company type and ownership structure.

2.4 Recapitalization and Leverage: A Complex Relationship

Bunyaninu's (2021) study on recapitalized banks in India demonstrates that leverage can negatively impact profitability even after financial interventions. This suggests a complex interplay between leverage and turnaround strategies. Further research could explore how companies can optimize their capital structure during and after financial distress.

2.5. Leverage and Stock Returns: Investor Perception Matters

Nianty's (2022) study on food and beverage companies reveals a potential link between lowerdebt-to-equity ratios and improved stock returns. This aligns with the profitability findings, implying that investors might favor companies with a more balanced capital structure. This highlights the importance of considering investor sentiment when determining optimal leverage levels.

3 RESEARCH METHODLOGY

3.1 Research methodology:

Since various research approaches exist, such as qualitative, quantitative, fundamental, and others, the most suitable methodology for this paper was determined to be quantitative research methodology, aligning with the research topic

3.2 Quantitative Research methodology:

Unlike qualitative research that focuses on words and experiences, quantitative research divesinto the world of numbers. It involves gathering and analyzing measurable data to uncover patterns, predict future trends, and test cause-and-effect relationships. This numerical approach allows researchers to draw broader conclusions applicable to larger groups.

There are various quantitative research methods which can used under this research methodology including Descriptive, correlation and experimental research. Where both correlational and

experimental research methods can be employed to formally test hypotheses or predictions using statistical analyses. The findings can be generalized to larger populations depending on the sampling technique employed.

3.3 Understanding the variables:

This study uses Leverage that is Debt to Equity Ratio where the Debt-to-Equity Ratio equals to the Total Debt/ Total Equity as an independent variable. The profitability ratios including Net profit margin [Net profit margin = (Net profit/ Revenue) * 100], Return on Capital Employed (ROCE = EBIT/ Capital Employed), Return on Assets (ROA = EBIT/ Total Assets), and Earning Per Share (EPS = Net Profit/ Number of Outstanding equity shares) are used as dependent variables.

3.4 Objectives of the research:

- Investigating the influence of leverage on a company's profitability.
- To examine the relationship between the debt-equity ratio and a firm's profitability of 24 selected listed companies from Sensex.

3.5 Formation of Null Hypothesis as per the research objectives

H1: There is no significant relationship between the debt equity ratio and the net profit margin of the company.
H2: There is no effect of the debt-to-equity ratio on the return on capital employed of the company.
H3: There is no effect of the debt-to-equity ratio on the return on assets of the company.

3.6 Sample and data collection:

For this research, secondary data was collected, encompassing 26 companies listed on the Sensex during the Fiscal 2019 to 2024. Panel data regression was employed in this study at a predetermined significance level of 5%.

3.7 Scope of Study:

This study's objective is to look into how leverage affects a business's profitability. This research will investigate the correlation between a company's profitability and its debt-to- equity ratio for 26 Sensex listed businesses during a five-year period (2019-2024).

3.7.1 The research specifically concentrated on the following:

Companies: The Sensex lists 26 companies.Duration: 2019-2024
Independent Variable (Leverage Ratio): Debt to Equity Ratio (Total Debt / Total Equity) Dependent Variables (Profitability Ratios):

a. Net Profit Margin (Net Profit / Revenue * 100)
b. Return on Capital Employed (ROCE = EBIT / Capital Employed)
c. Return on Assets (ROA = EBIT / Total Assets)

4 DATA ANALYSIS - HYPOTHESIS TESTING

H1: There is no significant relationship between the debt equity ratio and the net profitmargin of the company."

Table 4.1: Regression Model

Linear Regression						
Model Fit Measures						
			Overall Model Test			
Model	**R**	**R^2**	**F**	**df1**	**df2**	**p**
1	0.681	0.464	19	1	22	< .001

Model Coefficients - NET PROFIT MARGIN				
Predictor	**Estimate**	**SE**	**t**	**p**
Intercept	40.76	7.029	5.8	< .001
DEBT EQUITY RATIO	3.89	0.892	4.36	< .001

Assumption Checks		
Normality Tests		
	Statistic	**p**
Shapiro-Wilk	0.863	0.104
Kolmogorov-Smirnov	0.198	0.269
Anderson-Darling	1.14	0.214
Note. Additional results provided by *more tests*		
Heteroskedasticity Tests		
	Statistic	**p**
Breusch-Pagan	0.828	0.363
Goldfeld-Quandt	2.66	0.069
Harrison-McCabe	0.268	0.086
Note. Additional results provided by *more tests*		
Durbin-Watson Test for Autocorrelation		

Autocorrelation	**DW Statistic**	**p**
0.143	2.27	0.614
Collinearity Statistics		
	VIF	**Tolerance**
DEBT EQUITY RATIO	1	1

Interpreting the Results:

1. Model Fit Measures:

- The linear regression model has an overall R^2 value of 0.464, indicating that approximately 46.4% of the variability in the net profit margin (dependent variable) can be explained by the independent variable, which is the debt equityratio.
- The F-statistic tests the overall significance of the model. With a p-value less than 0.001, the model is statistically significant, suggesting that at least one of the predictors (debt equity ratio) is related to the net profit margin.

2. Model Coefficients - NET PROFIT MARGIN:

- The intercept value is 40.76, indicating that when the debt equity ratio is zero, the estimated

net profit margin is 40.76%.

- The coefficient for the debt equity ratio is 3.89. This suggests that for each unitincrease in the debt equity ratio, the net profit margin is estimated to increase by 3.89%.

3. **Assumption Checks:**

- **Normality Tests:** The Shapiro-Wilk, Kolmogorov-Smirnov, and Anderson- Darling tests assess the normality of the residuals. None of these tests indicate a significant departure from normality, as all p-values are above the conventional threshold of 0.05.
- **Heteroskedasticity Tests:** The Breusch-Pagan, Goldfeld-Quandt, and Harrison-McCabe tests assess the assumption of homoscedasticity (constantvariance of residuals). None of these tests show significant evidence of heteroskedasticity, as all p-values are above 0.05.
- **Durbin-Watson Test for Autocorrelation:** The Durbin-Watson test examines the presence of autocorrelation in the residuals. With a Durbin-Watson statisticof 2.27 and a p-value of 0.614, there is no evidence of autocorrelation in the residuals.

4. **Collinearity Statistics:**

- The variance inflation factor (VIF) and tolerance values assess multicollinearity between predictors. A VIF of 1 and a tolerance of 1 indicate no issues with multicollinearity, suggesting that the independent variables do not exhibit excessive correlation with each other.

Conclusion: Based on the results:

There is a statistically significant positive relationship between the debt equity ratio and net profit margin. The results of the linear regression analysis provide evidence supporting this hypothesis, indicating that changes in the debt equity ratio are associated with changes in the net profit margin. This suggests that for each unit increase in the debt equity ratio, the net profit margin is estimated to increase by 3.89%.

H2: There is no effect of the debt-equity ratio on the return on capital employed of thecompany

Table 4.2: Regression Model

Linear Regression						
Model Fit Measures						
			Overall Model Test			
Model	R	R^2	F	df1	df2	p
1	0.541	0.293	9.13	1	22	0.006

Model Coefficients - Return on Capital Employed (%)				
Predictor	Estimate	SE	t	p
Intercept	134.49	15.78	8.52	< .001
DEBT EQUITY RATIO	-6.23	2.06	-3.02	0.006

Assumption Checks		
Normality Tests		
	Statistic	p
Shapiro-Wilk	0.902	0.124
Kolmogorov-Smirnov	0.206	0.226
Anderson-Darling	0.86	0.123

Note. Additional results provided by *more tests*		
Heteroskedasticity Tests		
	Statistic	**p**
Breusch-Pagan	0.809	0.368
Goldfeld-Quandt	1.59	0.238
Harrison-McCabe	0.361	0.181
Note. Additional results provided by *more tests*		
Durbin-Watson Test for Autocorrelation		
Autocorrelation	**DW Statistic**	**p**
-3.25e-4	1.99	0.856
Collinearity Statistics		
	VIF	**Tolerance**
DEBT EQUITY RATIO	1	1

Interpreting the Result:
Based on the linear regression analysis conducted:

1. **Model Fit Measures:**
- R: The correlation coefficient, indicating the strength and direction of the linear relationship between the predictor and the outcome variable. In this case, it's 0.541, suggesting a moderate positive correlation.
- R^2 (Coefficient of Determination): Represents the proportion of variance in the dependent variable that is predictable from the independent variable(s). Here, it's 0.293, meaning that about 29.3% of the variance in "Return on Capital Employed" can be explained by the "DEBT EQUITY RATIO" variable.
- F-statistic: A measure of how well the regression model fits the data. It's a ratio of the explained variance to the unexplained variance. Higher values indicate a better fit. The F-statistic here is 9.13.

2. **Model Coefficients:**
- Intercept: When all predictors are zero, this is the expected value of the dependent variable. Here, it's 134.49.
- DEBT EQUITY RATIO: This coefficient (-6.23) indicates the change in the dependent variable for a one-unit change in the predictor variable "DEBT EQUITY RATIO". Since it's negative, it suggests that as the DEBT EQUITY RATIO increases, the Return on Capital Employed decreases.

3. **Assumption Checks:**
- Normality Tests: The Shapiro-Wilk, Kolmogorov-Smirnov, and Anderson-Darling tests all indicate that the residuals are normally distributed, as all p-values are greater than the conventional significance level of 0.05.
- Heteroskedasticity Tests: These tests examine if the variance of the residuals is constant across levels of the predictor variable. All p-values are above 0.05, indicating no significant evidence of heteroskedasticity.
- Durbin-Watson Test: This tests for autocorrelation, or whether there is a pattern in the residuals. The DW statistic is close to 2, indicating no significant autocorrelation.
- Collinearity Statistics: These assess multicollinearity, a situation where predictor variables are highly correlated with each other. Here, the VIF (Variance Inflation Factor) and Tolerance values

for "DEBT EQUITY RATIO" indicate no significantmulticollinearity.

Conclusion:

The model seems to fit the data reasonably well, with the Debt Equity Ratio being a significant predictor of Return on Capital Employed.

H3: There is no effect of the debt-equity ratio on the return on assets of the company.

Table 4.3: Regression Model

Linear Regression						
Model Fit Measures						
			Overall Model Test			
Model	R	R^2	F	df1	df2	p
1	0.666	0.443	17.5	1	22	< .001

Model Coefficients - Return on Asset (%)				
Predictor	Estimate	SE	t	p
Intercept	67.98	8.27	8.22	< .001
DEBT EQUITY RATIO	-4.53	1.08	-4.19	< .001

Assumption Checks		
Normality Tests		
	Statistic	p
Shapiro-Wilk	0.923	0.067
Kolmogorov-Smirnov	0.178	0.389
Anderson-Darling	0.624	0.092
Note. Additional results provided by *more tests*		
Heteroskedasticity Tests		
	Statistic	p
Breusch-Pagan	0.0389	0.844
Goldfeld-Quandt	1.47	0.278
Harrison-McCabe	0.38	0.208
Note. Additional results provided by *more tests*		
Durbin-Watson Test for Autocorrelation		
Autocorrelation	DW Statistic	p
0.0818	1.83	0.57
Collinearity Statistics		
	VIF	Tolerance
DEBT EQUITY RATIO	1	1

Interpretating the Result:

Based on the linear regression analysis conducted:

1. **Model Fit Measures:**

- R (Correlation Coefficient): 0.666 indicates a moderately strong positive correlationbetween Debt Equity Ratio and Return on Assets.
- R^2 (Coefficient of Determination): 0.443 suggests that approximately 44.3% of the variability in ROA can be explained by the Debt Equity Ratio.

- F-statistic: With a value of 17.5 and a very low p-value (< 0.001), the model is highly statistically significant, indicating that at least one predictor variable (Debt Equity Ratio) has a significant effect on ROA.

2. Model Coefficients:

- Intercept: The intercept of 67.98 represents the estimated ROA when the Debt Equity Ratio is zero.
- DEBT EQUITY RATIO: The coefficient of -4.53 indicates that for each unit increase in Debt Equity Ratio, ROA is expected to decrease by 4.53 percentage points. The p-value (< 0.001) suggests this coefficient is highly statistically significant.

3. Assumption Checks:

- Normality Tests: None of the normality tests show significant departures from normality assumptions, with p-values above the conventional threshold of 0.05.
- Heteroskedasticity Tests: The Breusch-Pagan test has a p-value of 0.844, indicating no evidence of heteroskedasticity.
- Durbin-Watson Test: The DW Statistic of 1.83 suggests no significant autocorrelation between residuals.
- Collinearity Statistics: The VIF of 1 for the Debt Equity Ratio indicates no issues with multicollinearity.

Overall, similar to the previous model, this one also seems to fit the data reasonably well, with the Debt Equity Ratio being a significant predictor of Return on Assets. The model's predictive power (R^2) is relatively strong, suggesting that a substantial portion of the variability in ROA can be explained by the Debt Equity Ratio.

5 CONCLUSIONS

This study investigated the impact of leverage, measured by the debt-equity ratio, on the profitability of listed companies on the Bombay Stock Exchange (BSE) Sensex. The findings reveal a complex relationship, with some evidence supporting both positive and negative effects depending on the specific profitability metric used.

Key Findings:

a. Net Profit Margin: A statistically significant positive relationship was observed. This suggests that for some Sensex companies, increased leverage might lead to higher net profit margins, potentially due to the efficient use of debt financing.
b. Return on Capital Employed (ROCE) and Return on Assets (ROA): A statistically significant negative relationship was found. This aligns with the traditional view that excessive leverage can burden companies with high interest expenses, ultimately reducing profitability ratios like ROCE and ROA.

Interpreting the Contradictions:

The seemingly contradictory findings highlight the importance of considering industry-specific dynamics and company-level factors when evaluating the leverage-profitability relationship. It's possible that certain sectors on the Sensex benefit from moderate leverage for growth and expansion, while others might be more susceptible to the negative consequences of high debt

levels.

References:

1 Singh, A. K., & Bansal, P. (2016). Impact of financial leverage on firm's performance and valuation: A panel data analysis. Indian Journal of Accounting, 48(2), 73-80.
2 Gupta, K. Influence of Capital Structure on Firm Profitability: A Study of SENSEX 30 Companies.
3 Campello, M. (2006). Debt financing: Does it boost or hurt firm performance in product markets? Journal of Financial Economics, 82(1), 135-172.
4 Brav, O. (2009). Access to capital, capital structure, and the funding of the firm. The journal of finance, 64(1), 263-308.
5 Aggarwal, D., & Padhan, P. C. (2017). Impact of capital structure on firm value: Evidence from Indian hospitality industry. Theoretical Economics Letters, 7(4), 982-1000.
6 Aggarwal, D., & Padhan, P. C. (2017). Impact of capital structure on firm value: Evidence from Indian hospitality industry. Theoretical Economics Letters, 7(4), 982-1000.
7 Rajamani, K. (2021). Debt financing and financial performance: Empirical evidence of Indian SMEs listed in BSE-SME platform. In Eurasian Economic Perspectives: Proceedings of the 29th Eurasia Business and Economics Society Conference (pp. 217-230). Springer International Publishing.
8 Data: https://getmoneyrich.com/stocks-with-high-weightage-in-sensex/
9 https://www.bseindia.com/markets/keystatics/Keystat_index.aspx
10 https://www.bseindia.com/
11 https://www.forbes.com/advisor/in/investing/what-is-sensex/