

## A STUDY ON COST OF CAPITAL ESTIMATION IN MANUFACTURING FIRMS AT BHARAT FORGE

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**ABSTRACT:** The cost of capital significantly influences a business's investment decisions, expansion strategies, and financial planning processes. Manufacturing businesses can enhance their financial strategy and boost the value of their shares by knowing the true cost of capital. This is because capital expenditures on equipment, software, and general company operations can add up quickly for manufacturers. A prominent player in India's automotive and industrial manufacturing industries, Bharat Forge is the focus of this article, which analyzes the company's use of debt and equity financing. It examines the process of calculating the WACC, the cost of debt, and the cost of equity by considering market circumstances, benchmarks, and business risks. This case study analyses Bharat Forge's market performance and financial statements to draw conclusions about the company's risk management, funding source selection, and return on investment (ROI) strategies for sustaining growth over the long term. Finding the correct cost of capital is more than simply a technical exercise, as the data demonstrate. It's a strategic tool that manufacturing organizations can use to stay competitive in an uncertain economic environment and come up with good ideas.

**Keywords:** Cost of capital, manufacturing firms, financial performance, capital structure, investment decisions.

### 1. INTRODUCTION

The cost of capital is the least amount of money that a company must generate in order to justify investing. Keep in mind the concept of the "hurdle rate," the threshold beyond which the potential payoff justifies the risk. A company must earn enough to pay its operating expenses before it can turn a profit. The capital structure, which includes the ratio of debt to equity, significantly affects the overall cost of capital. Debt and equity are two ways in which a business might raise funds. Debt is more important to some companies than equity, and vice versa; many companies utilize a combination of the two. The key is to strike a balance between increasing the company's cash on hand and decreasing the cost of borrowing money. This idea is crucial for all businesses, but especially those in the industrial sector. Businesses make large, long-term investments because they depend heavily on operating capital, technology, and tools. Accurately estimating the cost of capital allows them to determine the value-adding potential of new projects, growth, or enhancements. It also aids in maintaining an appropriate ratio of debt to equity capital, which lowers their risk profile while allowing them to expand. The real-world equivalent of this calculation is the WACC, or weighted average cost of capital, which includes the expenses of retained profits, loans, and equity. However, this figure is subject to change based on factors such as interest rates, investor



expectations, and the specific risks faced by each organization. In order to increase shareholder confidence, make better decisions, and make better use of resources, manufacturing companies need constantly monitor these developments. When there is a lot of rivalry, the cost of cash plays a significant role in determining the profitability, long-term success, and strategic decisions. Not everything is a cash indicator.

## 2. LITERATURE SURVEY

Sule, D. F., & Moloi, T. (2025): This research examines the relationship between the performance of investments for publicly listed Nigerian companies and two factors: segment transparency and capital costs. The study utilized secondary data collected from 85 different organizations between 2015 and 2022. It employed statistical tools for both descriptive and inferential purposes. The results demonstrate that investments are less efficient when the cost of capital is high, but they are more efficient when there is segment openness. The study found that if Nigerian companies were more transparent about their various business areas and spent less on capital, their investments would be more lucrative. If Nigerian companies want to boost investor confidence, cut capital expenses, and improve the return on investment (ROI), the authors recommend including more segment information in annual reports.

Ogunade, O. A. (2025): The impact of capital structure on the profitability of publicly traded Nigerian industrial enterprises is the focus of this study. Profitability metrics like return on equity (ROE) and return on assets (ROA) are examined in relation to varying levels of debt. Financial performance is positively affected by short-term debt ratios and negatively affected by long-term debt ratios, according to the data. The study concludes that for optimal performance, a corporation need a top-notch capital framework. The optimal capital structure, according to experts, allows companies to maximize return on investment while minimizing risk, thereby increasing the value of their shares.

Rosita, H., & Nuryaman, N. (2025): The purpose of this study is to analyze the capital structure and profitability of consumer products businesses listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023. The variables under consideration include company size, business risk, and the non-debt tax shield (NDTS). The study's multiple regression analysis reveals that capital structure is positively affected by company size and business risk, and negatively affected by NDTS. The research proves that these considerations are critical for making capital structure decisions and understanding how those choices influence profitability. According to the research, these factors should be considered by businesses when they construct their capital structure for maximum profit.

Yin, Z. (2025): This study examines the relationship between green supply chain management (GSCM) practices and the cost of equity capital for Chinese A-share companies using their data. The research proves that GSCM measures can influence equity capital expenditures. The nature of the corporation and its operations, however, may determine the magnitude of this effect. The findings demonstrate that GSCM initiatives have the potential to improve operational efficiency and the company's reputation. Although there may be some increases in expenditures, this can result in long-term financial gains. Companies who wish to limit their capital expenditure may find GSCM to be a helpful tool, according to the research.

Gormsen, N. J., & Huber, K. (2025): The disparity between the amount that firms estimate the cost of borrowing money to be and the amount that the market actually determines is the focus of this study. Based on their analysis of manually gathered data, the authors concluded that businesses with a pessimistic view of capital costs are more likely to underinvest in their initiatives, resulting in higher returns. This demonstrates how long-term capital allocation is significantly impacted by how corporations perceive it. Although there are some correlations between the two, managers' perceptions of costs may not reflect reality due to large discrepancies. This research demonstrates the need of considering alternative viewpoints when making financial and investment plans for companies. Finding the optimal allocation of capital requires aligning the perspectives of those within and outside of a company, as demonstrated by the results. There are consequences for both customers and company executives in this regard. The research contributes to the existing body of knowledge by providing concrete instances of how perceived costs influence monetary decisions made by businesses.

Barakzai, A. (2025): This research examines the financial impacts of capital structure changes made by Turkish food, textile, and metal product manufacturers from 2011 to 2020. Finding the optimal debt-to-equity ratio to increase corporate value while controlling risk and return is the primary objective of the study. The results demonstrate that a company's long-term performance and efficiency are significantly affected by its financial decisions. According to the research, in establishing a capital structure, it is critical to consider monetary objectives, the company's environment, and industry changes. It elucidates the impact of various debt levels on the capacity to generate income and expand.

Hail, L. (2024): Since businesses have a vested interest in their own stock of capital, calculating the cost of capital is a challenging task; this essay delves into the issues that arise when attempting to do so. Research into the user cost of capital takes a look at how input choices are altered by companies. U.S. Compustat data reveals that investment in physical capital as a percentage of production has remained constant over the past half-century, despite an increase in economic profits from 4% to 8% of sales. Investments in intangible capital have also increased over this time frame, according to the statistics. According to the data, businesses have maintained their capital expenditure levels despite rising profits. They may have gotten better at allocating their funds or cut costs in other areas to achieve this. This research contributes to the existing literature by providing a method for calculating the cost of capital and its relationship to profit sharing.

Mensah, L. (2025): The research team behind this project hopes to learn more about the relationship between capital structure and the expansion of IFRS-compliant businesses. By weighing the benefits and drawbacks of debt and financial stress, the study examines the trade-off concept. The study examines 92 non-financial firms that were traded on the Frankfurt Stock Exchange from 1994 to 2021 using a two-step Generalized technique of Moments (GMM) technique. The results highlight the significance of capital structure decisions to a company's success, particularly in light of the fact that IFRS facilitates comparison and understanding of financials. In order to motivate action, the research highlights the significance of aligning the company's financial structure with its strategic



objectives. The impact of accounting standards on decision-making and financial performance of businesses is also demonstrated.

### 3. THEORETICAL FRAMEWORK

A corporation needs to earn at least the cost of capital in order to maintain its market value and satisfy its shareholders. The cost of capital must be carefully considered by manufacturing enterprises due to the high expenditure on raw materials, tools, and technology. Having reliable evaluations makes it much easier to make informed decisions regarding development, change, and the launch of new initiatives. For the purpose of determining if an investment strategy's potential return justifies the dangers it poses, it can also serve as a benchmark.

The cost of capital is calculated by industrial enterprises using both loan and stock financing. Since interest can be deductible, it is common practice to estimate debt costs using adjusted bond or loan interest rates that take tax consequences into consideration. The beta coefficient of the company, the risk-free rate, and the market risk premium are the three variables that make up the Capital Asset Pricing Model (CAPM). Firm volatility relative to market volatility is shown by the beta coefficient. The Weighted Average Cost of Capital (WACC) is a measure of the overall cost to a company of raising capital. It is calculated by averaging all of the individual components.

#### COST OF CAPITAL FORMULA

A look at the cost of capital reveals the predicted return on investment for all capital sources. There are two main sources of funding for a company:

**Equity Capital Providers** → Stockholders who own ordinary and preferential shares

**Debt Capital Providers** → In the market, you can find institutional investors, senior lenders like banks, and specialty financiers like mezzanine funds.

It is expected that the money, whether it is borrowed or donated outright, will receive a decent return that corresponds to the risk involved.

The weighted average cost of capital (WACC) is a rate of return that indicates the risk and profitability of a business when all sources of capital are given the appropriate weight.

The WACC can be calculated using the following procedure.

$$\text{Cost of Capital (WACC)} = [k_d \times (D \div (D + E))] + [k_e \times (E \div (D + E))]$$

Approaches to Determination:

- The following equation can be rewritten as:  $WACC = \text{Cost of Debt After Tax } (k_d) / D / (D + E) = \text{Cost of Equity}$ .
- Divide the total of debt and equity by the sum of the two, and you get the equity weight in percentage terms.

### 4. COST OF CAPITAL CALCULATIONS

#### Step 1. Calculate Cost of Debt (kd)

The most crucial factor in determining a company's weighted average cost of capital (WACC) is the cost of debt (kd). To recoup the expenses of arranging for and transferring loan funds to a specific borrower, debt holders require a minimum return known as the cost

of debt (kd). If a business takes out a loan today, its cost of debt will be equal to the effective interest rate it will pay on its long-term debt. Lenders are willing to take on a certain level of risk when lending money to a borrower if the cost of debt is low enough. Debt costs are simpler to calculate than equity costs due to the widespread availability of market interest rates on various debt instruments such as loans, bonds, and other current debt instruments through Bloomberg and other third-party data platforms. If you don't have access to Bloomberg's or other sources' market-based yield, you can manually calculate the pre-tax cost of debt by dividing a company's total debt by its yearly interest costs. The effective interest rate, or the cost of debt before taxes, can be calculated using the following approach.

$$\text{Pre-Tax Cost of Debt} = \text{Annual Interest Expense} \div \text{Total Debt Balance}$$

Given that interest paid on debt is eligible for tax deductions, one must employ the following technique to convert the pre-tax cost of debt to the post-tax rate.

$$\text{After-Tax Cost of Debt} = \text{Pre-Tax Cost of Debt} \times (1 - \text{Tax Rate})$$

A adjustment to the cost of debt equal to  $(1 - \text{Tax Rate})$  must be made in order to account for interest, which is deductible. Contrarily, this adjustment is unnecessary for the cost of equity. As shown in the revenue statement, the interest "tax shield" reduces the pre-tax profit of a corporation.

The yield to maturity (YTM) is a useful metric for determining the pre-tax cost of a company's long-term indebtedness, such as corporate bonds, assuming such bonds are rated "investment grade" by rating agencies such as S&P Global, Fitch, and Moody's.

Lenders assign a higher credit rating to investment-grade debt due to the lower credit risk and failure likelihood that they anticipate.

In most cases, when the debt is selling at par, rather than a premium or discount, its book value is a decent indication of its market worth.

Loan default and credit risk are both impacted by interest rate changes; conversely, a decline in interest rates has the opposite effect.

## Step 2. Calculate Cost of Equity (ke)

The cost of equity (ke) is the minimal rate of return that common stock buyers desire; it indicates the riskiness and reward potential of an investment. The cost of equity is the expected return on a security that fairly compensates the investor for the risk associated with purchasing common shares in a corporation. When trying to determine the ke, practitioners primarily rely on the capital asset pricing model (CAPM). An investment's predicted return is dependent on its sensitivity to systematic risk, the non-distributable component of risk, according to the capital asset pricing model (CAPM). The return on a security, also called the "cost of equity," can be calculated by multiplying the risk-free rate (rf) by the product of a security's beta and the equity risk premium (ERP).

$$\text{Cost of Equity (ke)} = \text{Risk-Free Rate (rf)} + \beta (\text{Equity Risk Premium})$$

Here, the risk-free rate (rf) is typically the yield on the 10-year U.S. Treasury bill. The "full faith and credit" of the United States government is believed to provide a guarantee of safety for the 10-year Treasury note. The ability to print more money to pay off debts is available to the United States government in the very improbable case that it goes bankrupt. In corporate

finance, beta is a measure of a security's exposure to market systematic risk. It achieves this by tracking the performance of individual companies' share prices relative to the S&P 500 over time. This means that, everything else being equal, a higher beta will cause stock prices to rise and a lower beta will cause stock prices to decrease. Investing in a security's likelihood is influenced by two factors:

**Unsystematic Risk** → Unsystematic risk, sometimes known as "company-specific risk," can be mitigated with a diversified portfolio. Beta estimations do not incorporate unsystematic risk because diversification can lessen it.

**Systematic Risk** → Contrarily, diversification in and of itself cannot mitigate systematic risk or the price volatility of an asset. Systemic risk, sometimes known as "market risk," cannot be hedged for this reason.

**Equity Risk Premium (ERP)** → One assumes a greater degree of risk when investing in the stock market as opposed to risk-free government bonds. One term for this additional danger is the equity risk premium (ERP), which is also known as the "market risk premium." Stockholders require a minimum rate of return that is equal to the return on a risk-free asset plus a premium for taking on extra risk, according to the Capital Asset Pricing Model (CAPM). The additional risk can be calculated by multiplying the security's beta with the equity risk premium (ERP) of the entire stock market. Subtract the risk-free rate, which is typically the yield on the 10-year Treasury note, from the predicted market return. The result is the equity risk premium, or ERP.

$$\text{Equity Risk Premium (ERP)} = \text{Expected Market Return (rm)} - \text{Risk-Free Rate (rf)}$$

In the past, the equity risk premium (ERP) in the United States has fluctuated between 4.0 and 6.0 percent.

### Step 3. Determine Capital Weights (%)

Once the costs of the debt ( $k_d$ ) and equity ( $k_e$ ) components have been determined, the final step is to determine the capital weights for each kind of capital.

Capital weight, expressed as a percentage, reveals the relative importance of various forms of funding within the capital structure. Instead than using book values to represent fair value, accounting should use market prices of stock and debt. This facilitates the determination of the relative contributions of debt and equity to total capitalization. Follow this procedure to determine the equity and debt capital weights. Determine the percentage of debt by dividing  $D$  by the sum of  $D$  and  $E$ . The formula for capital gains expressed as a percentage is  $E$  divided by the sum of  $D$  and  $E$ .  $E$  stands for Market Capitalization, sometimes spelled "Market Cap," and MVE, which stands for Market Value of Equity. Full capitalization, which is the sum of  $D$  and  $E$ , is equivalent to total capitalization. Current Market Value of Debt (also known as Book Value of Debt) If you know the book value of the debt, you may get a good idea of its market worth. However, the market value of equity can be easily calculated by multiplying the most recent stock price of the company by the total number of outstanding diluted shares. The market value of debt, in contrast to the market value of shares, is relatively stable relative to its book value barring exceptional situations.

WACC %	Company Count
≤ 5.1	60
2	35
2.6	40
3.2	45
3.8	55
4.4	57
5	75

## 5. ANALYSIS AND DISCUSSION

### CALCULATION OF COST OF EQUITY FOR BHARATFORGE

A company's cost of equity is the sum it must pay out to owners as compensation for the risk they incur when purchasing the company's shares. The Capital Asset Pricing Model (CAPM) incorporates the risk-free rate, the beta value of the company, and the equity risk premium (ERP). Compared to a risk-free investment, this method factors in both the general market risk and the risk associated with stock investments. Below you can see the procedure that was utilized to determine BHARATFORGE's cost of equity.

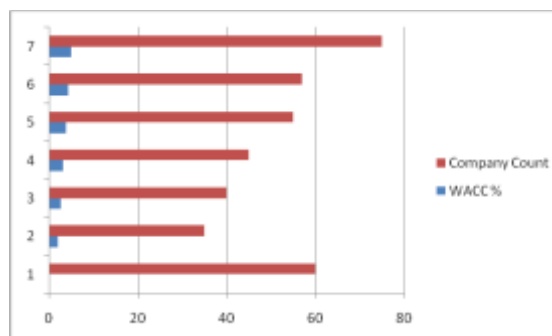
$$\text{Cost of Equity } 10.44\% = \text{Risk-Free Rate } 6.52\% + \text{Beta } 0.95 \times \text{ERP } 4.12\%$$

The WACC is a measure of the typical rate of return that a company is anticipated to provide to those who hold its securities in return for asset finance. When trying to determine a company's total value, it is among the most essential metrics utilized in financial analysis. The weighted average cost of capital (WACC) method takes into account the different capital framework ratios of debt and equity to determine their respective costs. This paper explains how to find BHARATFORGE's WACC (Weighted Average Cost of Capital).

$$\text{WACC } 10.63\% = \text{Cost of Equity } 10.44\% \times \text{Equity Weight } 97\% + \text{Cost of Debt } 17.29\% \times \text{Debt Weight } 3\%$$

### WACC CALCULATION – BHARAT FORGE (2024-25)

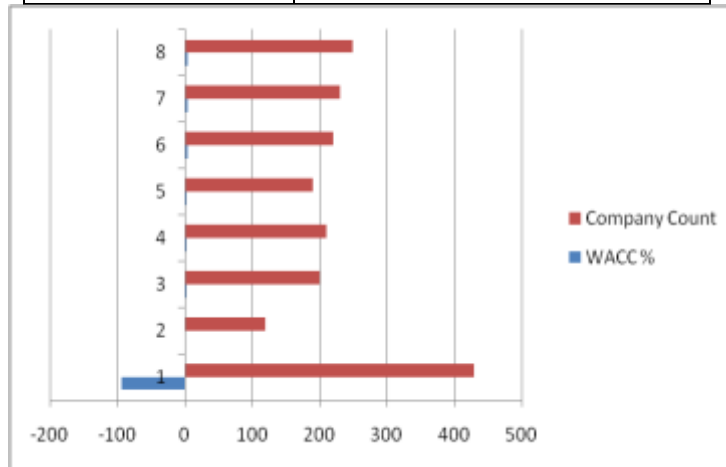
#### WACC % Industry Distribution



Presented here are the WACC % distribution charts for the Vehicles & Parts and Consumer Cyclical sectors of Bharat Forge: A red bar indicates the possible range of Bharat Forge's WACC %.

**WACC % Sector Distribution**

WACC %	Company Count
-94.1	430
1	120
2.5	200
3	210
3.5	190
4	220
4.5	230
5	250



A company should pay each security buyer the weighted average cost of capital (WACC) to fund its assets. A company's cost of capital, or WACC, is another name for it. Companies typically utilize a combination of debt and equity to finance their assets. With weights assigned to each source according to its relative importance in the study, WACC displays the average cost of various forms of financing. For each dollar that the organization lends out, we can calculate its interest expense by utilizing a weighted average.

$$WACC = E / (E + D) * \text{Cost of Equity} + D / (E + D) * \text{Cost of Debt} * (1 - \text{Tax Rate})$$

**1. Weights:**

It is common practice for a combination of loans and shares to finance a business's assets. Determining the total wealth and debt in each account is crucial. What we call a stock's "market cap" is actually its market value. Bharat Forge is worth ₹58,267.052 million in the market. Since the market value of debt is difficult to ascertain, GuruFocus relies on the book value of debt (D). We have combined the most current averages of long-term debt and capital lease obligations with short-term debt and capital lease obligations to help you better comprehend the situation. In March 2025, Bharat Forge had an average Book Value of Debt (D) of ₹74,620.0733 million over the previous year. Divide D by (E + D) to get the debt percentage in the capital structure (74,620.0733 / (582,670.520 + 74,620.0733) = 0.1135) and

divide E by (E + D) to get the equity percentage ( $582,670.520 / (582,670.520 + 74,620.0733) = 0.8865$ ).

## 2. Cost of Equity:

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## 3. Cost of Debt:

Divide the interest cost from the most recent year-to-date period by the average debt during the most recent one-year quarterly period, and GuruFocus will give you the reduced cost of debt. In March 2025, Bharat Forge's interest expense was ₹3945.21 million. The total amount of indebtedness recorded is ₹74,620.0733 million. When the cost of debt (74,620.0733) is divided by 3,945.21, the resulting rate is 5.2871%. Division of the most current TTM Tax Expense by the most current TTM Pre-Tax Income yields the tax rate. After that, take the TTM Tax Rate and multiply it by one minus one. The computed TTM tax rate falls somewhere in the range of 0% and 100%. In cases where the predicted rate exceeds 100%, the tax rate is fixed at 100%. If the anticipated rate is lower than 1%, the tax rate is zero percent.

The current TTM tax rate is 37.27 percent, which can be calculated by dividing 5425.50 by 14558.25.

Calculating the current Weighted Average Cost of Capital (WACC) for Bharat Forge is as follows:

$$\begin{aligned} \text{WACC} &= E / (E + D) * \text{Cost of Equity} + D / (E + D) * \text{Cost of Debt} * (1 - \text{Tax Rate}) \\ &= 0.8865 * 15.4\% + 0.1135 * 5.2871\% * (1 - 37.27\%) \\ &= 14.03\% \end{aligned}$$

All financial data is shown in US dollars, and all operational data is presented with the correct unit for each characteristic. Any value other than a %, ratio, or share is presented in millions in the sections that follow. The stock market currency of the corporation is used to define all financial deals. Bharat forg Warburg ACO CNS To what extent is Bharat Forge The message is clear: cash is expensive. The term "excess returns" is used to describe a situation in which a company's ROIC is greater than the cost of raising the necessary funds for a project. A company's value decreases as it expands if its returns are lower than its cost of capital. A growing business, on the other hand, will be worth more if its investors anticipate healthy excess returns on their capital.

**PEER COMPARISON**

**Comparative Market and Financial Performance**

Name	CMP Rs.	P/E	Mar Cap Rs.Cr.	Div Yld %	NP Qtr Rs.Cr.
Bosch	38525.1	51.22	113624.49	1.32	1115.4
Samvardh. Mothe.	106.65	33.37	112563.18	0.53	606.09
Uno Minda	1315.3	73.63	75737.48	0.17	309.03
Schaeffler India	4246.1	62.73	66368.07	0.68	296.23
Tube Investments	3151.65	94.26	60983.75	0.11	303.19
Bharat Forge	1222.65	56.99	58453.53	0.7	283.87
Endurance Tech.	2880	47.72	40510.84	0.36	226.35
Median: 123 Co.	419.9	30.18	1265.96	0.37	9.49

**Quarterly Financial & ROCE Comparison**

Name	Qtr Profit Var %	Sales Qtr Rs.Cr.	Qtr Sales Var %	ROCE %
Bosch	44.04	4789	10.93	21.11
Samvardh. Mothe.	-42.81	30212	4.66	13.66
Uno Minda	46.47	4489	17.59	18.83
Schaeffler India	16.84	2282	10.14	25.67
Tube Investments	-12.87	5309	15.97	21.83
Bharat Forge	-2.4	3909	-4.81	12.18
Endurance Tech.	11.03	3319	17.46	17.26
Median: 123 Co.	16.26	206.8	9.38	14.32

**6. CONCLUSION**

In conclusion, manufacturing organizations' capital budgets, investment decisions, and overall performance are all impacted by the cost of capital, making it an essential component of financial management. This study highlights the significance of applying rigorous methodologies such as CAPM, WACC, and ICC. It also highlights the need to consider both market-related and company-specific risk variables. The study examines all the elements that impact and vary the cost of capital across various industries by integrating data from financial managers with facts from company records, stock markets, and industry evaluations. The



findings offer valuable insights for enhancing financial strategies and making more informed decisions about capital structure, even when there are challenges such as scarce data, unpredictable markets, and model assumptions. Regular checks, a thorough sensitivity analysis, and comparisons to industry standards can all help make cost projections more accurate. In the long run, this helps businesses achieve their growth goals by coordinating their financial strategy. This study demonstrates that the manufacturing sector may enhance its long-term competitiveness, strategy planning, and risk management by utilizing a comprehensive, data-driven approach to calculate the cost of capital. It also makes it easier to deploy resources efficiently.

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