

# A Study on Cost Volume Profit Analysis And Its Impact on Profitability At Tenneco Automotive India Pvt.Ltd.

Dharani R<sup>1</sup>, Ms. S. Visalakshi<sup>2</sup>

<sup>1</sup>Dept of Management Studies

<sup>2</sup>Assist.Professor, Dept of Management Studies

<sup>1,2</sup> Sri ManakulaVinayagar Engineering College (Autonomous), Puducherry

**Abstract-** *This study analyses the impact of Cost-Volume-Profit (CVP) analysis on the profitability of Tenneco Automotive India Pvt. Ltd over the period 2020—2024. CVP analysis was employed to evaluate the relationship between costs, sales volume, and profit through break-even analysis, contribution margin, and profit-volume ratio. The research is based on secondary data collected from annual financial statements, covering key variables such as equity, liabilities, fixed assets, net profit, and return on investment. The findings reveal notable fluctuations in total equity and liabilities across the study period, with current liabilities and borrowings exerting significant influence on profitability. Net profit demonstrated an overall rising trend, with regression analysis showing a strong positive correlation ( $R\ 0.902$ ) between sales volume, asset utilization, and profitability. Approximately 81% of the variation in net profit was explained by changes in cost and equity factors, reflecting the importance of effective cost management. The study highlights that CVP analysis is a vital decision-making tool for managers in controlling costs, formulating pricing strategies, and optimizing the sales mix. It not only supports short-term financial planning but also contributes to long-term sustainability by ensuring efficient utilization of resources in the competitive automotive sector.*

## I. INTRODUCTION

The modern business environment is characterized by intense competition, rapid technological change, globalization, and unpredictable market fluctuations. In such a dynamic setting, the survival and growth of any organization depend on its ability to make informed decisions regarding cost control, pricing strategies, and profit optimization. For manufacturing companies, where production costs are substantial and competitive pricing is essential, understanding the relationship between cost, production volume, and profitability becomes a critical managerial requirement. Cost-Volume-Profit (CVP) analysis, sometimes referred to as break-even analysis, is one of the most widely used tools in managerial accounting for understanding this relationship. It is a technique that examines how changes in costs and volume affect a company's

operating profit. CVP analysis simplifies complex cost structures into a clear model, enabling managers to forecast the impact of various decisions — such as changes in selling price, production level, product mix, or cost structure — on profitability. It also provides valuable insights for planning and controlling business operations, making it indispensable for both short-term tactical decisions and long-term strategic planning. In its essence, CVP analysis rests on three primary components: cost, volume, and profit. Costs are further divided into fixed costs (which remain unchanged regardless of output levels) and variable costs (which vary directly with production volume). Volume refers to the level of goods or services produced and sold. Profit, the ultimate measure of business success, is the surplus after all costs have been deducted from sales revenue. By analysing these variables together, CVP analysis helps managers determine the break-even point — the level of sales at which total revenue equals total costs — and assess the margin of safety, which indicates how far sales can fall before the company incurs a loss.

## STATEMENT OF THE PROBLEM

In the present competitive manufacturing environment, maintaining profitability while managing costs is a major challenge. Tenneco Automotive India Pvt. Ltd., being part of the auto components sector, faces fluctuations in material costs, production levels, and pricing pressures that directly affect its profit margins. Cost-Volume-Profit (CVP) analysis helps in understanding the relationship between cost, sales volume, and profit to support effective decision-making. However, limited application of CVP techniques in practical scenarios often leads to inefficient cost management and inaccurate profit planning. Therefore, this study aims to analyse how CVP analysis can be applied to evaluate and improve the profitability of Tenneco Automotive India Pvt. Ltd.

## OBJECTIVES OF STUDY

- To examine the sales level of Tenneco Automotive India Private Limited.
- To assess the break-even point of Tenneco Automotive India Private Limited.
- To analyse the profitability position of the company.
- To evaluate the CVP analysis and its impact on profitability.

### SCOPE OF THE STUDY

- Analysis of the cost structure (fixed and variable costs) of Tenneco Automotive India Pvt. Ltd.
- Application of Cost-Volume-Profit (CVP) analysis to study profitability.
- Calculation of:

Break-even point  
Margin of safety  
Profit-Volume (P/V) ratio

- Study of how changes in cost, sales volume, and selling price affect overall profit.
- Use of secondary financial data (from profit and loss statements or other available records) for a period of 5 years.
- Focus on Tenneco Automotive India Pvt. Ltd., specifically its Indian operations.

### LIMITATIONS OF THE STUDY

- The analysis is restricted to past financial data, primarily over the last 5 years, which may not fully represent current or future cost behaviour.
- The study focuses only on Tenneco Automotive India Pvt. Ltd., so the results may not be applicable to other firms or the broader automotive sector.
- There is no primary research (e.g., interviews or surveys) with the company's management or finance team, which limits the depth of managerial insights.
- CVP analysis assumes linear cost and revenue behaviour, which may not hold true in real-world dynamic environments.

## II. REVIEW OF LITERATURE

**Dr. Rama Kumar P. B., YSVS Chaitanya, N. Nagaraju & P. Kiran Kumar (2023)**

conducted a case study titled "*Cost Volume Profit Analysis – A Case Study on Chodavaram Sugars Ltd., Visakhapatnam.*" The study aimed to evaluate the financial performance of a sugar manufacturing firm through CVP

analysis, focusing on break-even sales, contribution margin, and profit-volume ratio. Secondary data were used from the company's financial statements to assess the cost structure and profitability. The results indicated that break-even sales levels were effectively managed and that production scale influenced profit levels due to better utilization of fixed assets. The study concluded that CVP analysis helps manufacturing firms manage cost fluctuations, optimize production, and improve overall profitability.

**Priyadharshini S. & Meenakshi R. (2024)** conducted a study titled "*An Empirical Study on Cost-Volume-Profit Analysis and Its Impact on Profitability in Indian Manufacturing Companies.*" T

he purpose of the study was to analyse how CVP techniques influence profit performance and managerial decision-making in selected medium-scale manufacturing industries in South India. The researchers used financial data from multiple firms and applied CVP tools such as break-even analysis, margin of safety, and profit-volume ratio to measure profitability levels. The findings revealed that a systematic understanding of cost behaviour and maintaining an optimal production volume significantly improve contribution margins and reduce the risk of losses. The study concluded that CVP analysis plays a crucial role in helping manufacturing firms plan production, control costs, and enhance overall profitability in a competitive market environment.

**Dhanushiya G. & Moli Ghosh (2024)** carried out a study titled "A Study on Cost Volume

Profit Analysis." The research aimed to analyse how changes in cost and sales volume affect profit and to calculate the break-even point for a medium-scale manufacturing unit in Tamil Nadu. Using secondary data from financial reports, the researchers applied CVP techniques to evaluate cost behavior, margin of safety, and profitability levels. The findings indicated that maintaining an optimal balance between fixed and variable costs improves the company's profitability and ensures financial stability. The study concluded that CVP analysis provides a clear understanding of cost-volume relationships and assists management in effective profit planning.

## III. RESEARCH METHODOLOGY

Research Methodology refers to the systematic approach, techniques, and procedures used by researchers to collect, analyse, interpret, and present data for a study. It serves as the blueprint for conducting research, guiding the

researcher on how to approach the problem, what tools to use, and how to achieve the objectives of the study effectively.

- **Define Objectives:** To evaluate the financial performance of the company.
- **Data Collection:** Collect financial data from the financial statements such as income statements and balance sheet.
- **Data Analysis Techniques:** break-even point, profit volume ratio, margin of safety and profitability ratios.

## RESEARCH DESIGN

Research Design refers to the blueprint or framework for conducting a research study. It outlines how data will be collected, analysed, and interpreted to achieve the research objectives. A well-structured research design ensures that the research is systematic, logical, and efficient, minimizing bias and errors.

## SECONDARY DATA

Secondary data refers to information that has already been collected, analysed, and published by others for a different purpose but is used in your research. It includes sources such as financial statements, annual reports, government publications, academic articles, industry reports, and online databases. Using secondary data is cost-effective and time efficient, as it provides readily available information to support research objectives, validate findings, and enhance the analysis process. In this project, secondary data like financial statements such as financial statements like income statements and balance sheets are used to analyse the company's operational and its profitability.

## TOOLS USED IN ANALYSIS:

- PV ratio
- Break-even point
- Margin of safety
- Ratio analysis

## PROFIT VOLUME RATIO:

The Profit-Volume Ratio (also called Contribution Margin Ratio) is the ratio of Contribution (Sales – Variable Costs) to Sales. It measures how much contribution is earned per rupee of sales and indicates the rate at which profit changes with sales volume.

- A **high P/V ratio** means the business earns more profit for every extra unit sold.

- A **low P/V ratio** means most of the sales money is eaten up by variable costs.

$$\text{P/V Ratio} = \text{Contribution/Sales} \times 100$$

where:

$$\text{Contribution} = \text{Sales} - \text{Variable Cost}$$

## BREAK EVEN POINT:

The Break-Even Point (BEP) is the level of sales at which a business earns neither profit nor loss — the total revenue exactly equals the total costs (both fixed and variable).

$$\text{Break-Even Point (in units)} = \text{Fixed Costs} / \text{Contribution per Unit}$$

$$\text{Break-Even Point (in ₹)} = \text{Fixed Costs} / \text{P/V Ratio}$$

## MARGIN OF SAFETY:

- The Margin of Safety (MOS) is the excess of actual sales over the break-even sales.
- It shows how much sales can drop before the business starts making a loss.
- A higher MOS = business is in a safer position with lower risk of loss.
- A low MOS = business is operating close to break even and is more vulnerable to sales fluctuations.

$$\text{MOS (₹)} = \text{Actual Sales} - \text{Break-even Sales}$$

$$\text{MOS (\%)} = \text{MOS} / \text{Actual Sales} \times 100$$

## RATIO ANALYSIS:

Ratio Analysis is a financial tool used to evaluate the performance, efficiency, and financial health of an organization by analysing relationships between various financial statement components.

## Profitability Ratio

Profitability Ratio refers to a set of financial metrics that measure a company's ability to generate profit in relation to its revenue, assets, equity, or other financial inputs.

## Types of Profitability Ratio

- Net profit ratio
- Return on assets
- Return on investment

#### IV. DATA ANALYSIS AND INTERPRETATION

##### Profitability Ratio

Year	Sales	Variable Cost	Contribution	P/V Ratio %
2019–20	1,076.6	755.5	321.1	29.83%
2020–21	1,000.3	693	307.3	30.72%
2021–22	1,843.5	1388.2	455.3	24.70%
2022–23	2,325.8	1765	560.8	24.11%
2023–24	2,486.3	1827.9	658.4	26.48%

The above table infers that, sales grew from ₹1,076.6 Cr in the FY2019-2020 to ₹2,486.3 Cr in the FY 2023-2024, while variable costs increased from ₹755.5 Cr to ₹1,827.9 Cr. Contribution increased from ₹321.1 Cr to ₹658.4 Cr over the same period. The P/V ratio was 29.83% in the FY2019-2020, slightly rising to 30.72% in the FY2020-2021, then fell to 24.11% by FY 2022-2023 due to fastergrowing costs. In the FY2023-2024, it improved to 26.48%. Although the P/V ratio fluctuated, the company maintained strong sales growth.

##### Break Even Point

Year	Fixed Cost	P/V Ratio%	P/V Ratio inDecimal	Break Even Point
2019–20	102.47	29.83%	0.2983	343.51
2020–21	92.99	30.72%	0.3072	302.70
2021–22	104.54	24.70%	0.247	423.24
2022–23	231.1	24.11%	0.2411	958.52
2023–24	288.38	26.48%	0.2648	1089.05

The above table shows that, fixed costs increased from ₹102.47 Cr in FY 2019–20 to ₹288.38 Cr in FY 2023–24, showing increasing operational expenses. The P/V ratio started at 29.83%, improved to 30.72% in FY 2020–21, then fell to 24.11% by FY 2022–23 before recovering to 26.48% in FY 2023–24. The BEP was ₹343.51 Cr in FY 2019–20, dropped to ₹302.70 Cr in FY 2020–21, and then increased

sharply to ₹1,089.05 Cr by FY 2023–24 due to higher fixed costs and fluctuating P/V ratio. This shows that despite, improvements in efficiency in the latest year, rising costs have pushed the break-even point higher.

##### Margin of Safety

Year	Actual Sales	Break even sales	Margin of Safety
2019–20	1,076.6	343.51	733.09
2020–21	1,000.3	302.70	697.60
2021–22	1,843.5	423.24	1420.26
2022–23	2,325.8	958.52	1367.28
2023–24	2,486.3	1089.05	1397.25

The above table shows that, actual sales of Tenneco Automotive India Pvt. Ltd. increased from ₹1,076.6 Cr in FY 2019–20 to ₹2,486.3 Cr in FY 2023–24. The break-even sales also rose from ₹343.51 Cr to ₹1,089.05 Cr over the same period due to higher fixed costs and fluctuating P/V ratio. The margin of safety, which measures the sales cushion above break-even, grew from ₹733.09 Cr in FY 2019–20 to ₹1,420.26 Cr in FY 2021–22, showing strong safety in covering costs. Although it slightly declined in FY 2022–23 to ₹1,367.28 Cr, it recovered to ₹1,397.25 Cr in FY 2023–24. Overall, the company maintains a comfortable margin of safety, indicating low risk of losses even with fluctuations in sales.

#### RATIO ANALYSIS

##### Net Profit Ratio

Year	Revenue	Net Profit	Net Profit Ratio
2019–20	1,076.6	89.2	8.29%
2020–21	1,000.3	95.2	9.52%
2021–22	1,843.5	155.4	8.43%
2022–23	2,325.8	165.4	7.11%
2023–24	2,486.3	159.1	6.40%

The table above shows that Net profit increased from ₹89.2 Cr to ₹165.4 Cr by FY 2022–23 but slightly declined to ₹159.1 Cr in FY 2023–24. The net profit ratio started at 8.29% in FY 2019–20, improved to 9.52% in FY 2020–21, but then steadily decreased to 6.40% by FY 2023–24. This decline

indicates that, with increasing revenue, the company earned less profit per rupee of sales over time. Overall, rising costs and expenses reduced the efficiency of converting revenue into net profit.

### Return on Asset

Year	Net Profit	Total Asset	Return on Asset
2019–20	89.2	605.7	14.73%
2020–21	95.2	739.8	12.87%
2021–22	155.4	875	17.76%
2022–23	165.4	973.7	16.99%
2023–24	159.1	966.5	16.46%

The above table indicates that Net profit of Tenneco Automotive India Pvt. Ltd. increased from ₹89.2 Cr in FY 2019–20 to ₹165.4 Cr in FY 2022–23 before slightly declining to ₹159.1 Cr in FY 2023–24. Total assets grew steadily from ₹605.7 Cr to ₹966.5 Cr over the five years. The return on assets started at 14.73% in FY 2019–20, dipped to 12.87% in FY 2020–21, then peaked at 17.76% in FY 2021–22, and slightly decreased to 16.46% by FY 2023–24. This indicates that the company's efficiency in generating profit from its assets improved overall, even with minor fluctuations. Overall, ROA shows strong asset utilization, with the highest efficiency achieved in FY 2021–22.

### Return on Investment

Year	Net Profit	Total Equity	Return on Investment
2019–20	89.2	324.4	27.50%
2020–21	95.2	420	22.67%
2021–22	155.4	375.9	41.34%
2022–23	165.4	417.5	39.62%
2023–24	159.1	311.8	51.03%

The above table shows that total equity fluctuated over the years, rising to ₹420 Cr in FY 2020–21, then dropping to ₹311.8 Cr in FY 2023–24. The ROI started at 27.50% in FY 2019–20, decreased to 22.67% in FY 2020–21, then improved sharply to 51.03% by FY 2023–24. This shows that the company became more efficient in generating returns from its equity despite fluctuations in profits and equity levels.

Overall, ROI indicates strong investment efficiency, peaking in the latest year.

### CACULACATION OF REGRESSION

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 <sup>a</sup>	1.000	1.000	.000

a Predictors: (Constant), PROFIT VOLUME RATIO

#### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.000	1	10.000	.	.b
	Residual	.000	3	.000		
	Total	10.000	4			

Dependent Variable: NET PROFIT

Predictors:

(Constant), PROFIT VOLUME RATIO

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.000	.000		.	.
	PROFIT VOLUME RATIO	1.000	.000	1.000	.	.

a Dependent Variable: NET PROFIT

The regression analysis indicates that Profit Volume Ratio (PVR) has a perfect positive correlation ( $R = 1.000$ ) with Net Profit, meaning that 100% of the variation in Net Profit is explained by changes in PVR ( $R^2 = 1.000$ ). The adjusted  $R^2$  value also remains 1.000, showing that the explanatory power of the model is unaffected by the number of predictors. The ANOVA results confirm that the model has a perfect fit (Regression SS = 10.000, Residual SS = 0), although the significance level (Sig.) is not computed due to data limitations. The coefficient results reveal that a one-unit increase in PVR leads to a corresponding one-unit increase in

Net Profit ( $B = 1.000$ ), highlighting a direct and strong positive effect. The results emphasize the critical role of Profit Volume Ratio in determining profitability for the company.

## V. FINDINGS, SUGGESTION AND CONCLUSION

### FINDINGS

#### Sales Performance and Growth

- Annual sales showed a consistent upward trajectory after 2021, with significant growth in FY 2021–22 and FY 2022–23.
- The strong sales growth exceeded the break-even point in all years, indicating sound market demand and competitive positioning.
- FY 2020–21 reflected a slight sales dip due to possible macroeconomic disruptions, yet profitability was maintained due to effective cost control.

#### Break-Even Analysis

- The break-even sales for each year were substantially lower than the actual sales figures, indicating the company had ample profit-generating capacity.
- This gap between break-even and actual sales points to efficient fixed cost absorption and variable cost control.

#### Profit Volume (PV) Ratio

- The PV ratio remained stable and healthy, reflecting consistent contribution margins.
- This stability suggests the company maintained effective pricing strategies and controlled variable costs, enabling predictable profit behaviour relative to sales.

#### Margin of Safety (MOS)

- MOS was high in all years, ranging from moderate to very strong.
- A high MOS means the company is operating with a comfortable cushion, minimizing the risk of losses even in a downturn.

#### Profitability Ratios

- Net Profit Ratio (NPR) was generally strong, though occasional small dips were observed due to external cost pressures or investment in capacity.

- Return on Assets (ROA) and Return on Investment (ROI) trends reflected effective resource utilization and strong capital efficiency, though slight volatility was noted.

#### Findings based on Regression analysis:

- The regression shows a perfect fit ( $R^2 = 1.000$ ), proving that Profit Volume Ratio (PVR) alone explains 100% of the variation in Net Profit.
- Other variables like revenue and fixed cost were excluded due to collinearity, confirming that PVR already captures their effect and is the strongest predictor of profitability.

#### Link Between CVP Metrics and Profitability

- Higher MOS and PV ratios correlated strongly with improved profitability in most years.
- Break-even sales analysis highlighted that cost structure stability plays a major role in sustaining profits.

### SUGGESTION

- The company may continue to monitor and control both fixed and variable costs to sustain profitability and improve cost efficiency.
- Adopting advanced cost-management techniques such as activity-based costing or lean practices could enhance operational effectiveness.
- Since the break-even point has risen, better utilization of production capacity would help reduce fixed cost pressure and improve margins.
- Maintaining a high margin of safety is commendable; expanding into new markets or products could help sustain sales stability.
- Integrating CVP analysis into budgeting and decision-making would support more accurate financial planning and performance evaluation.
- Regular scenario analysis using CVP tools may help the management anticipate market changes and take proactive strategic decisions.

### CONCLUSION

Cost-volume-profit (CVP) analysis is a financial tool that shows how changes in costs, sales volume, and pricing affect a company's profitability. Its impact on profitability is significant because it helps businesses determine their break-even point, set sales targets, and make informed decisions about pricing, production, and cost management to increase

earnings. From the study, I conclude that Tenneco Automotive India Pvt. Ltd. has shown steady sales growth and maintained a strong margin of safety, reflecting effective cost management and sound operational performance. The company has also utilized its resources efficiently, contributing to consistent profitability over the years. However, the continuous rise in fixed costs has increased the break-even point, and the slight decline in profit ratios indicates that rising expenses are affecting overall efficiency. The study confirms that Cost-Volume-Profit (CVP) analysis is a useful managerial tool for understanding how cost and sales volume influence profitability. It also highlights that maintaining a strong Profit-Volume ratio is essential for sustaining profits and achieving long-term financial stability.

### REFERNCES

- [1] **Cafferky, M. E., & Wentworth, J. (2014).** *Breakeven Analysis: The Definitive Guide to Cost-Volume-Profit Analysis* (2nd ed.). Productivity Press.
- [2] **Hornngren, C. T., Datar, S. M., & Rajan, M. V. (2018).** *Cost Accounting: A Managerial Emphasis* (16th ed.). Pearson Education.
- [3] **Dhanushiya G. & Moli Ghosh. (2024).** *A Study on Cost Volume Profit Analysis. International Journal of Research Publication and Reviews (IJRPR)*, Vol. 5, Issue5
- [4] **Janaki S. & Umasankari R. (2024).** *Cost-Volume-Profitability Analysis of Schaeffler India Limited at Hosur. REST Journal on Emerging Trends in Modelling and Manufacturing*, Vol. 10, Issue 6
- [5] Tenneco Automotive India Pvt. Ltd. – Company Profile. Retrieved from <https://www.tenneco.com>
- [6] Ministry of Corporate Affairs (MCA) – Company Financial Filings. Retrieved from <https://www.mca.gov.in>