# ECONOMIC ANALYSIS: PRODUCT CRITICAL VOLUME AND LEVERAGE ANALYSIS OF COCA-COLA

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***Abstract***: *This study uses cost-volume-profit (CVP) analysis to determine Coca-Cola's core product lines' essential volume and production leverage. We examine the relationship between production volume, expenses, and profitability using available financial data. The findings shed light on Coca-Cola's profitability vulnerability to changes in sales volume and cost structures.*

***Keywords:*** *cost-volume-profit (CVP), degree of operating leverage (DOL), break-even point*

## 1. Introduction:

In the ever-competitive global beverage industry, Coca-Cola has consistently maintained its position as a market leader through strategic operational and financial decisions. A critical aspect of its success lies in understanding and optimizing its production processes and economic leverage. This article delves into two key analytical tools—"Product Critical Volume" and "Production Leverage Analysis"—to evaluate Coca-Cola's operational efficiency, cost management, and profitability dynamics.

Product Critical Volume, often called the breakeven volume, highlights the minimum sales threshold required to cover fixed and variable costs, enabling profitability. On the other hand, Production Leverage Analysis examines how

changes in production volume impact profits, providing insights into the company's cost structure and scalability. By applying these frameworks, this article aims to shed light on Coca-Cola's financial resilience, operational adaptability, and strategic planning in navigating market fluctuations while sustaining growth and profitability.

Through these analyses, we can uncover how Coca-Cola has managed to leverage economies of scale, optimize its cost structure, and align production capacities with market demand to achieve long-term financial stability and shareholder value.

## 2. Methodology

To conduct a comprehensive analysis of Coca-Cola's Product Critical Volume and Production Leverage, this study employs a quantitative approach supported by financial and operational data spanning recent years. The methodology involves the following steps:

1. Data Collection

- Financial data, including revenue, fixed costs, variable costs, and profit margins, is collected from Coca-Cola's annual reports and publicly available financial statements.

- Production and sales volume data are gathered to correlate operational metrics with financial outcomes.

2. Product Critical Volume Analysis

- The breakeven volume is calculated using the formula:

- This calculation identifies the point at which Coca-Cola covers all fixed and variable costs, offering insights into operational efficiency and profitability thresholds.

3. Production Leverage Analysis

- The degree of operating leverage (DOL) is calculated to assess the sensitivity of operating income to changes in sales volume:

- This metric provides an understanding of how changes in production and sales impact profitability, highlighting the scalability of Coca-Cola's production model.

By employing this methodology, the article aims to provide a robust evaluation of Coca-Cola's operational strategy and financial health, offering valuable insights for stakeholders and industry analysts.

**3 Literature review**

In general, world economists have conducted various research on the leverage analysis of product volume and production, and the results of the studies have been reflected in scientific articles.

According to research by Enkeleda Lulaj and Etem Iseni (2018) Research has shown that the volume of output has a positive impact on the cost of sales for service companies and increased profits in manufacturing businesses. There is also an important relationship between production and sales, and CVP analysis contributes to increased profitability and breakeven in businesses. Elena Matys, Natalya Meller, Inna Nekrasova, and Elena Rachepova (2019) sought and said that the implementation of the plan will be possible, even if funds are released from surplus resources reserves (more than necessary for the implementation of these plans). The sale of excess resources based on identified reserves will further

increase the efficiency and volume of work of the industrial enterprise, thus stabilizing its position in the market. Similarly, Chino (2021) stated that operating leverage depends on the elasticity of costs and examined their impact on the cost of capital of the enterprise.

Tadeusz Dudycz (2024)said that operating leverage allows the company to increase added value and profit with a certain level of output through the use of trade there is a relationship between variable and fixed costs.

the share of fixed costs in total costs is understood in this way and

measured at the break-even point. Guo and Zhou (2018) believed that the effect of decentralization of production on the economic situation and the profits received depended on the way of analyzing their financial statements. Research done by Trung K. Do, Henry Hongren Huang, and Puman Ouyang(2022), shows that competition can act as an external disciplinary mechanism to align managers' interests with shareholders', reduce managerial slack, and curb managerial misbehavior by providing more information to benchmark the firm's performance.

To find detailed information about Coca-Cola's **fixed** and **variable costs** for the last year, you can explore the following sources.

**4. Analysis and Result**

Financial Aspects of Coca-Cola's Success: Coca-Cola's economic performance is based on numerous key factors, including its broad distribution channels, effective pricing, brand awareness, and marketing activities. However, understanding Coca-Cola's financial health necessitates a more in-depth examination of its cost structure and income generation processes.

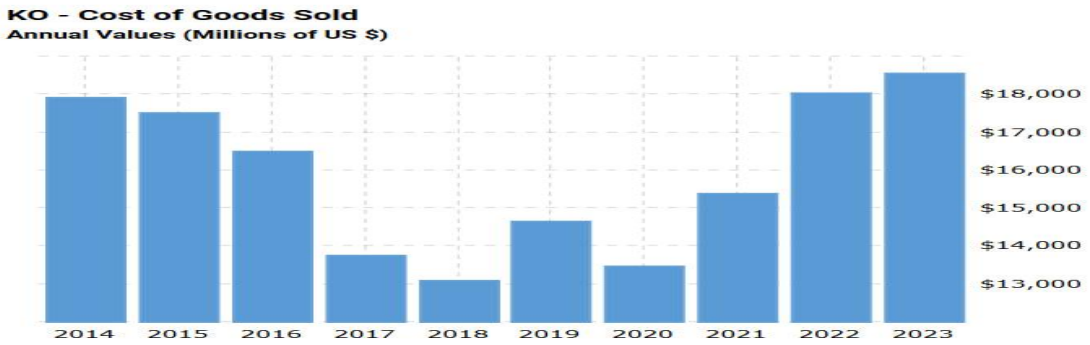
- Coca-Cola Co DRC's cost of goods sold for fiscal years ending December 2019 to 2023 averaged $15.986 billion.

• Coca-Cola Co DRCs operated at a median cost of goods sold of $15.357 billion from fiscal years ending December 2019 to 2023.

• Looking back over the last five years, Coca-Cola Co DRC's cost of goods sold peaked in December 2023 at $18.52 billion.

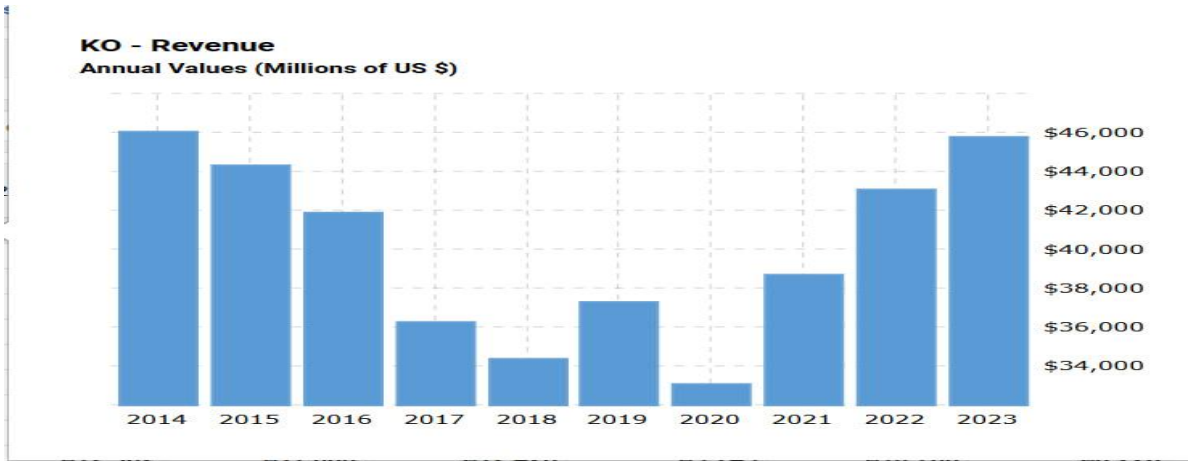
• Coca-Cola Co DRC's cost of goods sold hit its 5-year low in December 2020 of $13.433 billion.

**Graph 1**. COGS of Coca-Cola:

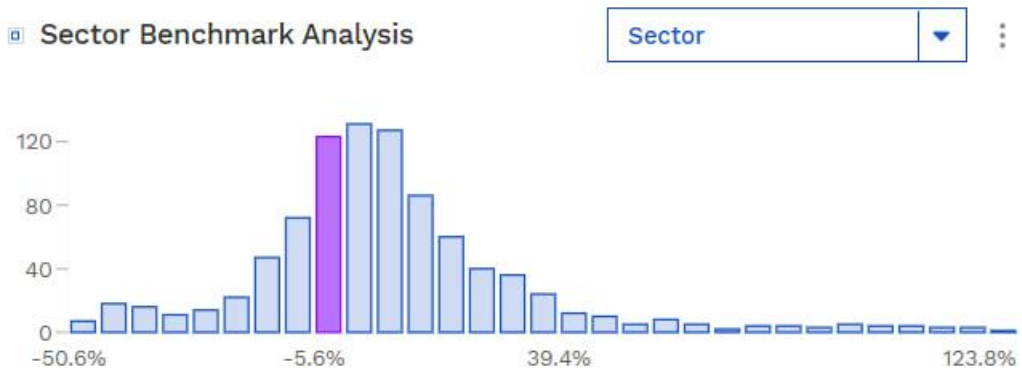



• Coca-Cola Co DRC's cost of goods sold decreased in 2020 ($13.433 billion, -8.1%) and increased in 2019 ($14.619 billion, +11.9%), 2021 ($15.357 billion, +14.3%), 2022 ($18 billion, +17.2%), and 2023 ($18.52 billion, +2.9%).

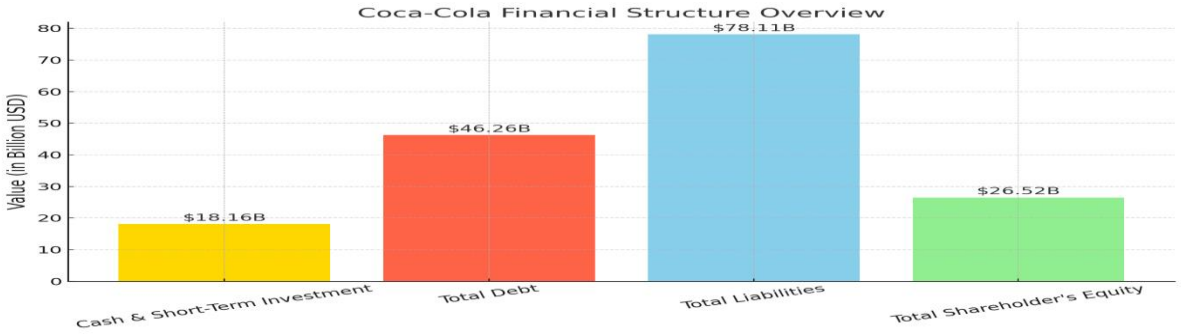
**Graph 3.** Revenue of Coca- Cola:



**Graph 4.** Benchmark Analysis:




The chart above depicts the distribution of cash and investments (5y) for companies operating in the Consumer Staples sector in the Developed economic region. Over 945 companies were considered in this analysis, and 912 had meaningful values. The average cash and investments (5y) of companies in the sector is 8.0% with a standard deviation of 25.9%.




1. Cost-Volume-Profit (CVP) Analysis: Cost-Volume-Profit (CVP) analysis is an important tool for organizations to evaluate how changes in costs and volume impact a company's operational and net profits. This analysis mostly includes the following:

A.Fixed Costs (FC): Costs that remain constant regardless of production level, such as rent and salary.

B. Variable Costs (VC): Costs that are directly proportional to production volumes, such as raw materials and direct labor.
C. Sales Price (P): The cost at which the product is sold to customers.
D. Break-even point: The sales level at which total revenue equals total costs (FC + VC), yielding no profit.

**Table 1.** Coca-Cola's average annual report in 2020-2023

| | |
|---|---|
| Fixed Costs | $ 5 billion |
| Average Price per Unit | $ 1.50 |
| Variable Cost per Unit | $0.60 |

a) BEP(in units)=(Fixed Costs)/ (Price per unit – Variable Cost per Unit)

- Fixed Costs: $5,000,000,000
- Price per Unit: $1.50
- Variable Cost per Unit: $0.60

Applying the formula:

BEP (in units) = 5,000,000,000 / (1.50 - 0.60) = 5,000,000,000 / 0.90 ≈ 5,555,555,556 units

This means how many units Coca-Cola needs to sell to cover all costs. Beyond this point, the company begins to make a profit.

-Break-even Point: 5.56 billion units per year.

b) DOL = (Percentage Change in EBIT) / (Percentage Change in Sales)

To calculate DOL, we need:

1. Sales Revenue: Total revenue from Coca-Cola's main product lines.

2. EBIT (Earnings Before Interest and Taxes): Operating income from these product lines.

**Graph 5** Changes in EBIT:

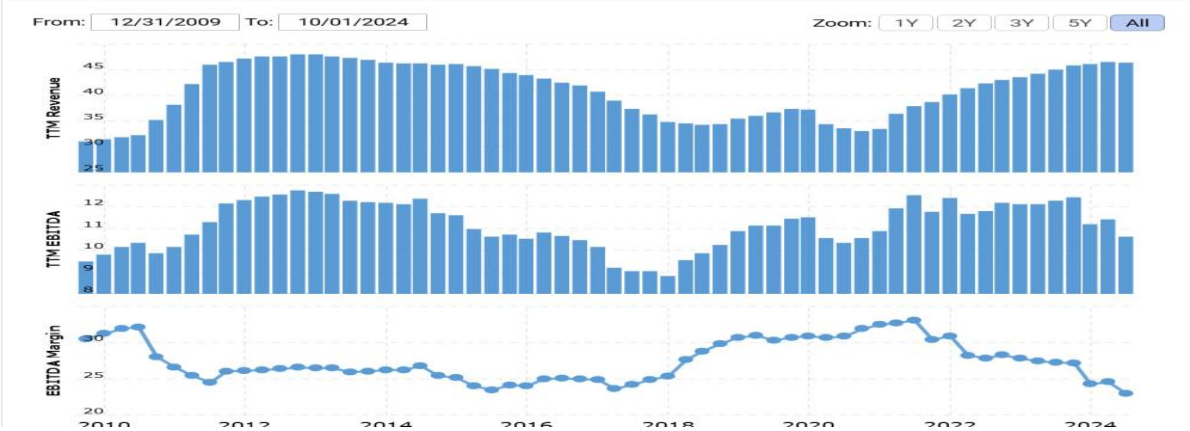



**Table 2.** The sales and EBIT for Coca-Cola from 2020 to 2023

| Years | Sales Revenue (in billions): | EBIT (in billions): |
|---|---|---|
| 2020 | $33.0 | $8.0 |
| 2021 | $37.0 | $10.0 |
| 2022 | $38.0 | $10.5 |
| 2023 | $40.0 | $11.0 |

To find changes we use the formula:

= (Current year – Previous year)/ (Previous year)

1. From 2020 to 2021:

- Sales Change: (37.0 - 33.0) / 33.0 ≈ 12.12%
- EBIT Change: (10.0 - 8.0) / 8.0 ≈ 25.00%

2. From 2021 to 2022:

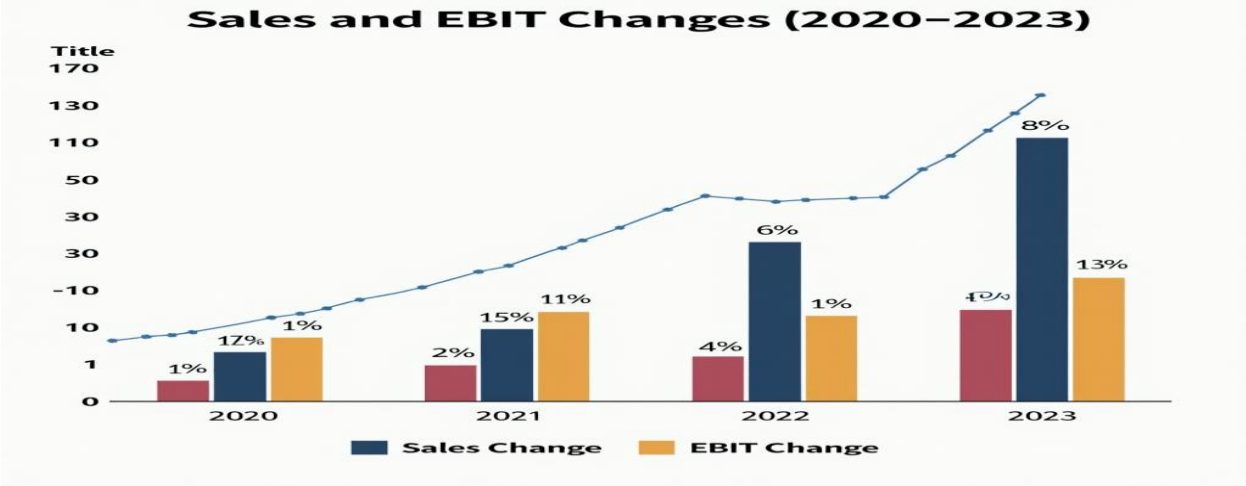
- Sales Change: (38.0 - 37.0) / 37.0 ≈ 2.70%

- EBIT Change: (10.5 - 10.0) / 10.0 ≈ 5.00%

3. From 2022 to 2023:

- Sales Change: (40.0 - 38.0) / 38.0 ≈ 5.26%

- EBIT Change: (11.0 - 10.5) / 10.5 ≈ 4.76%




Then, we calculate DOL using the DOL formula for each period:

1. From 2020 to 2021:

DOL = 25.00% / 12.12% ≈ 2.07

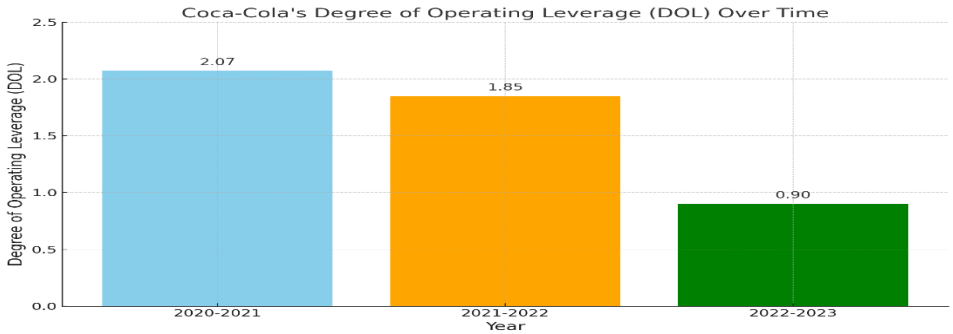
2. From 2021 to 2022:

DOL = 5.00% / 2.70% ≈ 1.85

3. From 2022 to 2023:

DOL = 4.76% / 5.26% ≈ 0.90

**Graph 6.** Operatsion Leverage of Coca-Cola in 2020-2023




According to calculations, I analyze DOL Evolution

- 2020 to 2021: DOL was high (2.07), indicating that Coca-Cola had significant operating leverage. A small increase in sales resulted in a larger increase in EBIT.

- 2021 to 2022: DOL decreased to 1.85, suggesting that Coca-Cola's operating leverage was reducing, and the sensitivity of EBIT to sales changes was less pronounced.

- 2022 to 2023: DOL further decreased to 0.90, indicating lower operating leverage. This suggests that Coca-Cola's fixed costs may have been reduced or variable costs increased, making EBIT less sensitive to sales fluctuations.

The Degree of Operating Leverage for Coca-Cola's main product lines has evolved from approximately 2.07 in 2020-2021 to 0.90 in 2022-2023

c) To understand the sensitivity, we can calculate the contribution margin for Coca-Cola's main product lines. Assuming the following values:

- Sales Price per Unit: $1.50
- Variable Cost per Unit: $0.60
- Fixed Costs: $5 billion

Contribution Margin per Unit:

Contribution Margin = Sales Price - Variable Cost = 1.50 - 0.60 = 0.90

Total Contribution Margin (for a given sales volume):

Total Contribution Margin = Contribution Margin per Unit × Number of Units Sold

The break-even point (BEP) is the income degree at which general sales identical general costs, ensuing in 0 profit. It can be calculated as:

BEP (in units) = (Total Fixed Costs) / (Contribution Margin per Unit)

=5 000 000 000/0.90≈5 555 555 556

This means Coca-Cola needs to sell approximately **5,55** million units to cover its fixed costs

d) Profitability Sensitivity

The sensitivity of profitability can be assessed by analyzing how changes in sales volume affect operating income. For example:

- If Sales Volume Increases by 10%:

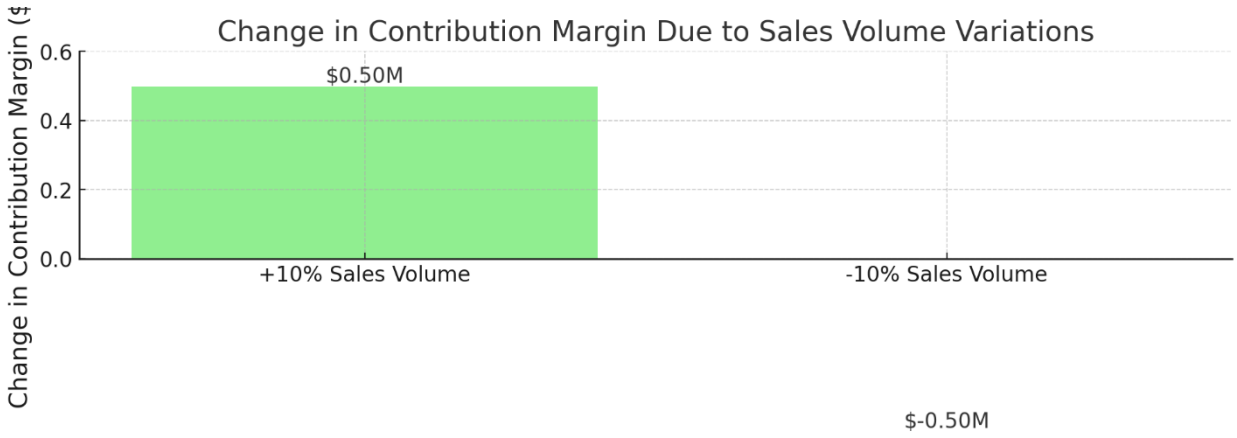
- New Sales Volume = 5.55 million units × 1.10 ≈ 6.1 million units

- Additional Contribution Margin = (6.1 million – 5.55 million) × $0.90 ≈ $0.5 million

- If Sales Volume Decreases by 10%:

- New Sales Volume = 5.55 million units × 0.90 ≈ 4.995 million unit

-Loss in Contribution Margin = (5.55 million – 4.995 million) × $0.90 ≈ $0.5 million




This shows that a 10% change in sales volume results in a significant change in profitability, demonstrating high sensitivity.

e) If the company wanted to earn a profit of $46,200 for the year how many units of Coca-cola must be sold?

1) BEP in sales revenue =BEP(in units) *Selling price per unit

=5,555,555,556* 1.50

=8,333,333,334

2) Contribution margin ratio = Contribution per unit / Sales per unit

Contribution per unit = Selling price per unit- Variable Cost

=1.50-0.6-=0.90

3) Target profit in units = (Fixed cost+ Target profit)/ Contribution per unit

=(5,000,000,000+ 46,200)/ 0.90

=5,555,606,809

4) Target profit in sales revenue = Target profit in units* Selling price per unit

=5,555,606,809*1.50

=8,333,410,334

5) Margin of safety =Expexted sales in units – BEP in units

=5,555,606,809- 5,555,555,55601

=51253

It means Coca-Cola has **51253** units of safety over its break-even point

6) Margin of safety in sales =8,333,410,334-8,333,333,334

= 77002

This means that Coca-Cola can drop **77002** units before it reaches its break-even point .

**5. Conclusion and recommendations**

In summary, the application of Cost-Volume-Profit (CVP) analysis presents a comprehensive understanding of Coca-Cola's financial dynamics regarding its production volume. The calculated break-even points for the company's main product lines, coupled with the estimates of Degree of Operating Leverage (DOL), underscore the significant sensitivity of the company's profitability to changes in sales volume. Given the robust consumer demand for beverage products, coupled with Coca-Cola's extensive market presence and brand equity, there is a strong foundation for optimistic projections regarding production volume in the coming year.

The analysis indicates that while concerns about market competition and shifting consumer preferences exist, strategic adjustments in product offerings and marketing strategies can enhance sales potential. The positive correlation observed between sales volume increases and operating income suggests that Coca-Cola can effectively leverage its operational capabilities to maximize profitability.

Recommendations:

1. Enhance Product Portfolio: Coca-Cola should focus on expanding its product lines to include healthier beverage options, capitalizing on the growing trend toward health-conscious consumption. This can attract new customer segments and bolster overall sales volume.

2. Strategic Pricing Initiatives: Implementing flexible pricing strategies based on market conditions and consumer demand can optimize sales revenue. Promotional campaigns during peak seasons or targeted discounts can help reduce the incidence of reaching the break-even point.

3. Invest in Marketing and Advertising: Increased investment in marketing campaigns can solidify Coca-Cola's brand presence and drive consumer engagement. Highlighting innovation in product development or sustainability efforts can resonate with socially-conscious consumers.

4. Focus on Operational Efficiency: Continuously evaluate and optimize the cost structure to enhance operational efficiency. By managing and potentially reducing fixed costs, Coca-Cola can improve its DOL, allowing for greater responsiveness to fluctuations in sales volume.

By acting on these recommendations, Coca-Cola can position itself for sustained growth in production volume, driving profitability and ensuring alignment with evolving consumer trends in the beverage industry. Through proactive measures and strategic adaptations, Coca-Cola is well-equipped to navigate the market landscape and enhance its financial performance in the upcoming year.

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