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Cash flow dynamics and debt structure in multinational beverage corporations: A longitudinal comparative analysis of The Coca-Cola Company and PepsiCo, Inc.

Mikayel Rafayel Gyulasaryan[1*], Ashot Varazdat Matevosyan[2], and Mane Henrik Matevosyan[3]

[1]Parvanyan Consulting LLC, Head of Research and Analytical Department, Yerevan, Armenia

[2 3]Armenian State University of Economics, Yerevan, Armenia

Email: matevosyan.ashot@asue.am[2]; manematevosyan55@gmail.com[3]

ORCID: 0000-0003-1741-0172[2]; 0009-0001-3529-5174[3]

*Correspondence: mikayelgyulasaryan@gmail.com; ORCID: 0009-0005-4234-1377

Abstract

This study conducts a longitudinal comparative analysis of cash flow dynamics and debt structures in two dominant multinational beverage corporations, i.e., The Coca-Cola Company and PepsiCo, Inc., over the period 2011–2024. Drawing on standardised financial statement data, the research employs trend analysis with coefficient-of-determination (R^2) evaluation, Pearson correlation matrices, and multiple ordinary least squares (OLS) regression models to quantify the influence of operating, investing, and financing cash flows on three debt-coverage ratios: net cash flow to long-term debt, short-term debt, and total debt. The findings reveal that financing cash flow is the dominant predictor of leverage for both firms, though with substantially higher coefficient magnitudes for Coca-Cola, indicating a more flexible and responsive approach to capital structure management. Operating cash flow exerts a moderate secondary influence, while investing cash flow plays a comparatively limited role. Coca-Cola demonstrates greater variability in debt ratios and higher R^2 model fit (0.89–0.92), reflecting dynamic leverage management aligned with strategic capital allocation. PepsiCo, by contrast, exhibits stable debt ratios and lower cash flow sensitivity (R^2: 0.84–0.86), consistent with a conservative, stability-oriented financial strategy. These findings contribute to the corporate finance literature by providing an integrated, econometric perspective on the interplay between cash flow management and debt structure in large-scale multinational firms. The results offer actionable guidance for financial managers seeking to align capital structure decisions with cash flow profiles in competitive global markets.

***Keywords*:** Cash Flow Analysis, Debt Structure, Capital Structure, Financial Stability, OLS Regression, Leverage Ratios, Multinational Corporations, Beverage Industry, Coca-Cola, PepsiCo

JEL Classification: G32, G30, M41

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1. Introduction

Financial stability remains a core objective of corporate financial management and a cornerstone of organizational resilience and long-term competitiveness, especially for multinational enterprises operating in volatile and highly competitive environments. In contemporary global markets, firms are increasingly exposed to macroeconomic disruptions, geopolitical uncertainty, and demand fluctuations, all of which challenge their financial sustainability. Within this context, financial stability is broadly defined as the ability of a firm to generate sustainable cash flows, meet debt obligations, maintain an optimal capital structure, and ensure operational continuity over time. Recent studies emphasize that financial stability is inherently multidimensional, extending beyond profitability to include liquidity management, cash flow quality, and risk-adjusted capital structuring decisions (Seretidou et al., 2025; Feriandy, 2024). The global beverage industry provides a relevant setting for examining these dynamics due to its high capital intensity, complex international supply chains, and intense competitive pressures. Within this sector, The Coca-Cola Company and PepsiCo, Inc. represent two dominant multinational corporations that have maintained long-standing market leadership while adopting distinct financial strategies. Coca-Cola's financial approach has traditionally focused on a concentrated product portfolio, disciplined cost management, and conservative leverage, supporting stable operating cash flows and strong liquidity positions. In contrast, PepsiCo's diversified business model—including significant non-beverage operations—enhances revenue diversification and capital allocation flexibility but introduces relatively higher variability in working capital and cash flow patterns. These structural differences provide a valuable basis for comparative financial analysis in terms of stability and risk management. Existing literature on corporate financial performance has largely focused on profitability indicators and traditional financial ratios, often overlooking the integrated role of cash flow management and debt structure in sustaining long-term financial stability. While liquidity ratios and leverage indicators such as debt-to-equity provide useful insights into short-term solvency and financial risk exposure, they may not fully capture the interaction between internal financial strategies and external economic conditions. Recent empirical research highlights that cash flow-based indicators offer more dynamic and predictive insights into firm performance compared to traditional accounting measures, particularly under conditions of uncertainty (Seretidou et al., 2025).

Furthermore, capital structure decisions have been shown to significantly influence both financial performance and cash flow stability. Empirical findings suggest that higher leverage ratios can increase operating cash flow volatility while simultaneously elevating financial risk, thereby affecting long-term sustainability (Alshehadeh et al., 2024). At the same time, research indicates that the relationship between cash flow and capital structure is complex and context-dependent, influenced by firm performance, asset structure, and market conditions (Muhammad & Al-Zubaidi, 2023). Additional studies emphasize that cash flow volatility plays a critical role in

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shaping financing decisions, as firms with unstable cash flows tend to adopt more conservative or adaptive capital structures to mitigate financial distress risks (Naser et al., 2024).

Moreover, recent literature underscores the importance of integrated financial management practices, where effective coordination between cash flow management, debt policy, and working capital optimization enhances overall firm performance and stability (Feriandy, 2024). Complementary evidence suggests that balanced capital structures and proactive liquidity management are essential for maintaining resilience, particularly during periods of economic uncertainty and financial shocks (Ismail et al., 2025). These findings reinforce the argument that financial stability should be analyzed through a holistic framework that incorporates both cash flow dynamics and capital structure considerations. Despite the growing body of research, a notable gap remains in comparative studies that jointly examine cash flow patterns and debt structures within multinational corporations operating in the same industry. While prior studies have compared Coca-Cola and PepsiCo in terms of profitability, efficiency, and market performance, limited attention has been given to how their financial structures and cash flow management strategies interact to influence resilience and long-term stability. Addressing this gap is essential for advancing both theoretical understanding and practical financial decision-making. This study addresses that gap through a longitudinal comparative analysis of Coca-Cola and PepsiCo over the period 2011–2024. The analysis proceeds in two stages: first, trend evaluation using coefficient-of-determination (R^2) metrics and Pearson correlation matrices to assess the stability and interdependence of key financial variables; and second, multiple ordinary least squares (OLS) regression modelling to quantify the marginal effects of operating, investing, and financing cash flows on three debt-coverage ratios — net cash flow to long-term debt, short-term debt, and total debt. The objectives are threefold: to analyse cash flow components for evidence of resource allocation efficiency and stability; to evaluate debt composition and leverage ratios for financial risk exposure; and to examine how differences in financial strategy translate into distinct profiles of organisational resilience and capital structure. The study makes three contributions to the existing literature. First, it provides an integrated, econometric assessment of the cash flow, debt structure relationship within a comparative firm-level framework, an approach underrepresented in the beverage industry literature. Second, it demonstrates that the sensitivity of leverage to cash flow components differs significantly across firms with contrasting strategic orientations, extending theoretical understanding of how corporate policy shapes capital structure dynamics. Third, the longitudinal design spanning fourteen years captures structural trends and cyclical responses that cross-sectional studies cannot address.

The remainder of this paper is organised as follows. Section 2 reviews the relevant literature on financial stability, cash flow management, and capital structure. Section 3 describes the data sources, variable definitions, and analytical methods. Section 4 presents the empirical findings, including trend analysis, correlation matrices, descriptive statistics, and regression results. Section

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5 discusses the comparative implications for Coca-Cola and PepsiCo. Section 6 concludes with recommendations and directions for future research.

2. Literature Review

In recent years, comparative financial analysis of multinational corporations has gained increasing attention in corporate finance research, particularly in the context of financial stability, cash flow management, and capital structure decisions. This trend is especially relevant in capital-intensive and highly competitive industries such as beverage manufacturing, where firms operate in volatile global markets and face complex financial and operational challenges. Within this context, the Coca-Cola Company and PepsiCo, Inc. serve as benchmark firms for examining how large corporations manage cash flows and debt structures to sustain long-term stability (Dong, 2024; Qian, 2023; Wei, 2025).

Financial statement analysis remains a fundamental tool in comparative corporate research. Traditional approaches rely heavily on ratio analysis, trend evaluation, and benchmarking to assess liquidity, solvency, profitability, and efficiency (White et al., 2020; Shikder et al., 2022). However, recent literature emphasizes that these measures should be complemented with cash flow-based indicators, which provide more dynamic insights into financial sustainability and operational performance (Seretidou et al., 2025; Gyulasaryan et al., 2025). Cash flow analysis, particularly the evaluation of operating, investing, and financing cash flows, has been identified as a critical determinant of a firm's ability to meet obligations and maintain financial flexibility under uncertainty (Naser et al., 2024; Muhammad & Al-Zubaidi, 2023). Empirical studies on Coca-Cola consistently highlight strong operating cash flows, stable liquidity, and efficient asset utilization, which reflect disciplined cost management and a focused business model (Smith & Lee, 2023; Song, 2023; Zhao & Wang, 2023). These characteristics contribute to predictable cash flow generation and lower financial risk exposure. In contrast, PepsiCo demonstrates a more diversified financial structure, where cash flow variability is partially offset by multiple revenue streams from both beverage and non-beverage segments (Liu, 2024; Wei, 2025; Fernandez, 2025). This diversification enhances resilience but introduces complexity in working capital management and financing decisions. The relationship between cash flow management and capital structure has become a central theme in recent financial research. Studies indicate that firms with stable operating cash flows are more likely to adopt higher leverage due to increased confidence in debt servicing capacity, while firms with volatile cash flows tend to rely on conservative financing strategies (Alshehadeh et al., 2024; Naser et al., 2024). This interaction is particularly relevant for multinational corporations, where exposure to exchange rate fluctuations, interest rate changes, and market-specific risks can significantly influence both cash flow stability and debt policy decisions (Andersen, 2024; Zhang & Li, 2023).

In the context of the beverage industry, capital structure decisions are closely linked to strategic priorities such as market expansion, product diversification, and technological investment. Coca-

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Cola's conservative leverage policy has been widely documented as a key factor supporting financial stability, enabling the company to maintain strong credit ratings and low financing costs (Shen, 2025; Patel, 2024). Conversely, PepsiCo's relatively more flexible debt structure allows for aggressive investment strategies and expansion into new markets, albeit with increased exposure to financial risk and cash flow fluctuations (Gupta & Singh, 2023; Ahmed & Kaur, 2024). Recent studies also emphasize the importance of liquidity management in maintaining financial stability. The interaction between liquidity and solvency has been explored in depth by Baboyan (2024), who demonstrates that efficient liquidity management enhances solvency and reduces financial distress risk in production organizations. Similarly, Baboyan (2023) highlights the role of capital structure optimization in achieving financial stability, emphasizing the need for balanced leverage and effective resource allocation. These findings reinforce the argument that financial stability should be analyzed through an integrated framework combining liquidity, cash flow, and capital structure indicators.

Furthermore, the growing literature on cash flow-based solvency assessment provides additional insights into corporate financial stability. Gyulasaryan et al. (2025) demonstrate that cash flow indicators offer more reliable measures of solvency compared to traditional accounting ratios, particularly in industries characterized by recurring revenue models and high operational complexity. This perspective is highly relevant for multinational beverage firms, where stable operating cash flows are essential for sustaining long-term competitiveness and supporting strategic investments. Despite the extensive research on financial performance, several limitations persist in the literature. Most comparative studies rely on traditional ratio analysis and fail to capture the dynamic interaction between cash flows and debt structures (Peterson & Clarke, 2023; Roberts et al., 2022). Moreover, the majority of studies focus on profitability and market valuation, while relatively few examine how internal financial decisions—such as capital allocation, dividend policy, and debt management—interact with external factors like macroeconomic volatility and industry competition (Mehta & Rao, 2021; Singh & Kapoor, 2022).

Another important limitation relates to the lack of integrated analytical frameworks. While individual studies examine liquidity, leverage, or profitability separately, there is limited research that combines these dimensions into a unified model of financial stability (Nguyen & Tran, 2023; Costa & Almeida, 2024). Integrated models, particularly those based on multivariate scoring techniques, offer significant potential for improving the accuracy and relevance of financial analysis by capturing the interdependencies among key performance indicators. Theoretical perspectives such as the Resource-Based View (RBV) and Dynamic Capabilities Theory provide a useful foundation for understanding how firms leverage internal resources and capabilities to achieve financial stability (Barney, 2020; Teece, 2021). In this context, Coca-Cola's strong brand equity and efficient cost structure can be viewed as strategic resources that support stable cash flow generation, while PepsiCo's diversified portfolio represents a dynamic capability that enhances adaptability and growth potential. Empirical applications of integrated financial models

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further support the importance of combining multiple performance dimensions. Studies demonstrate that composite indicators incorporating cash flow, leverage, liquidity, and profitability provide more robust insights into financial resilience and long-term value creation (Park & Sohn, 2022; Chen et al., 2023). Such models are particularly relevant for multinational corporations operating in complex and uncertain environments, where traditional financial metrics may not fully capture underlying risks and opportunities. In addition, recent research highlights the growing importance of external factors such as ESG performance, regulatory changes, and macroeconomic conditions in shaping financial stability outcomes (Hussein, 2025; Gomez & Lopez, 2022). These factors can influence both cash flow generation and capital structure decisions, further reinforcing the need for a comprehensive analytical framework.

In summary, the literature provides substantial evidence on the financial performance and strategic positioning of Coca-Cola and PepsiCo, highlighting differences in profitability, liquidity, efficiency, and capital structure. However, a significant research gap remains in the integrated analysis of cash flows and debt structures as key determinants of financial stability. Addressing this gap requires a multidimensional approach that combines traditional financial analysis with cash flow-based and capital structure perspectives. By adopting such an approach, this study aims to contribute to the existing literature by providing a more comprehensive understanding of how multinational corporations manage financial stability through effective cash flow and debt structure strategies.

3. Methodology

This study employs a quantitative comparative research design aimed at analyzing the interaction between cash flow dynamics and debt structure in The Coca-Cola Company and PepsiCo, Inc.. The methodology integrates financial statement analysis with econometric modeling to provide a comprehensive assessment of financial stability.

3.1 Research Design

The research follows a longitudinal comparative approach**,** covering the period 2011–2024, which allows for the identification of structural trends, cyclical fluctuations, and firm-specific financial strategies. The analysis is conducted in two sequential stages: (1) dynamic trend and correlation analysis of financial indicators, and (2) econometric modeling through regression analysis.

3.2 Data Collection

The empirical analysis is based on secondary financial data obtained from the Macrotrends database, which compiles standardized financial statements derived from publicly disclosed corporate reports. The dataset includes annual data on cash flow statements and balance sheet indicators, ensuring comparability across firms and over time.

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The key variables extracted include operating, investing, and financing cash flows, net cash flow, short-term debt, long-term debt, and total debt obligations. The use of a consistent data source enhances reliability and enables accurate comparative analysis.

3.3 Step 1: Dynamic Analysis and Trend Evaluation

In the first stage, a dynamic analysis of cash flow components is conducted. The study examines cash flows from:

- Operating activities (X_1),
- Investing activities (X_2),
- Financing activities (X_3).

Additionally, net cash flow (inflow/outflow) is analyzed alongside:

- Short-term debt,
- Long-term debt,
- Total debt obligations.

The behavior of these variables over time is evaluated using trend analysis**,** where mathematical trend functions are estimated and their explanatory power is assessed through the coefficient of determination (R^2)**.** This allows identification of stability patterns, growth tendencies, and volatility in financial flows and debt structure.

Furthermore, correlation analysis is conducted to assess the strength and direction of relationships between the independent variables (cash flow components) and dependent indicators derived from debt structure. This step provides preliminary insights into interdependencies among financial variables and informs the subsequent regression modeling.

3.4 Step 2: Regression Modeling

3.4.1 Model Specification

To evaluate the impact of cash flow components on corporate leverage, multiple linear regression models were constructed for The Coca-Cola Company and PepsiCo, Inc.**.** The models examine the relationship between three independent variables representing cash flow activities and three dependent variables reflecting different aspects of debt structure.

Independent variables:

- **X_1** - cash flow from operating activities
- **X_2** - cash flow from investing activities
- **X_3** - cash flow from financing activities

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Dependent variables:

- **Y_1** - net cash flow to long-term debt ratio
- **Y2** - net cash flow to short-term debt ratio
- **Y** - net cash flow to total debt ratio

The general regression framework for each company is expressed as:

$$Yi=a_1X_1+a_2X_2+a_3X_3+\varepsilon i, i=1,2$$

$$Y=a_1X_1+a_2X_2+a_3X_3+\varepsilon$$

where a_1,a_2,a_3 are the estimated regression coefficients, and $\varepsilon i, \varepsilon$ represent stochastic error terms accounting for unexplained variance.

3.4.2 Estimation Procedure

The regression coefficients were estimated using the ordinary least squares (OLS) method, which minimizes the sum of squared residuals between observed and predicted values of the dependent variables. The models were evaluated individually for each debt ratio to capture differential sensitivities to cash flow components.

- Coca-Cola: The dataset comprises 14 observations for each variable, with a balanced representation of operating, investing, and financing cash flows.
- PepsiCo: The dataset includes 14 observations, demonstrating a wider range of financing and investing activities relative to debt ratios.

Prior to estimation, all variables were standardized to ensure comparability and to prevent scale effects from distorting coefficient magnitudes. Model fit was assessed using the coefficient of determination (R^2), which measures the proportion of variance in the dependent variable explained by the independent variables. Residual analysis was conducted to verify the assumptions of linearity, homoscedasticity, and independence.

3.4.3 Model Interpretation Framework

The estimated coefficients (a1,a2,a3) provide quantitative measures of the marginal effect of each cash flow component on the respective debt ratio, holding other components constant.

- A higher X_3 coefficient indicates greater sensitivity of the debt ratio to financing activities, reflecting the firm's reliance on external or internal financing to manage leverage.
- The X_1 coefficient represents the contribution of operational cash generation to debt coverage capacity.
- The X_2 coefficient captures the influence of investment activities on leverage, expected to be minor for firms with stable operational cash flows.

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The regression framework allows for comparative analysis between Coca-Cola and PepsiCo, highlighting structural differences in cash flow management and debt policy.

3.5 Analytical Framework

The methodological framework assumes that financial stability is influenced by the interaction between cash flow generation and debt structure. Specifically:

1. Strong operating cash flows improve the firm's ability to service long-term and short-term debt.
2. Investing cash flows reflect strategic capital allocation and may have either positive or negative effects depending on investment efficiency.
3. Financing cash flows capture borrowing and repayment behavior, directly influencing leverage and risk exposure.

By integrating these variables into a regression framework, the study evaluates how different components of cash flow contribute to overall financial stability.

3.6 Reliability and Limitations

To ensure robustness, the study employs standardized financial data and consistent analytical methods across both firms. The longitudinal design enhances reliability by capturing long-term trends rather than short-term fluctuations.

However, several limitations are acknowledged:

- The analysis is based on secondary data, which may involve aggregation and standardization differences.
- The regression models assume linear relationships and may not fully capture nonlinear dynamics.
- External macroeconomic variables are not explicitly included in the econometric models.

The methodological approach provides a rigorous framework for assessing the relationship between cash flow management and debt structure in multinational corporations.

4. Findings and Discussion

The study of selected indicators for Coca Cola and Pepsi Cola companies covered the period 2011-2024. Their behavior was assessed by the calculated values of the mathematical trend R^2. The results are presented in Table 1.

Table 1. Calculated values of the mathematical trend R^2 for Coca Cola and Pepsi Cola Companies

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Indicators	Coca Cola	Pepsi Cola
Gross margin	0.136	0.124
EBIT margin	0.257	0.057
EBITDA margin	0.256	0.057
Pre-Tax Profit Margin	0.356	0.026
Net Profit Margin	0.221	0.0002
Cash Flow from Operating Activities, X_1	0.041	0.041
Cash Flow from Investing Activities , X_2	0.373	0.056
Cash Flow from Financial Activities,X_3	0.497	0.014
Net Income	0.066	0.281
Long Term Debt	0.849	0.809
Total Current Liabilities	0.267	0.908

Source: Compiled by the authors based on financial data retrieved from Macrotrends (2026a, 2026b).

Based on the data in Table 1, we have performed a comparative analysis of the stability of financial indicator trends for Coca-Cola and PepsiCo. Below is a comparative analysis of the stability of key financial indicators of Coca-Cola and PepsiCo, based on the coefficient of determination (R^2). The R^2 criterion is used to assess the strength and consistency of trends over time, where higher values indicate more predictable and stable patterns, and lower values indicate greater volatility or randomne.

The analysis reveals notable differences in the stability of profitability margins between the two companies. Coca-Cola demonstrates consistently higher R^2 values across most margin indicators, including EBIT margin (0.257), EBITDA margin (0.256), pre-tax profit margin (0.356), and net profit margin (0.221). These values suggest that Coca-Cola maintains relatively stable and predictable profitability trends over time. In contrast, PepsiCo exhibits significantly lower R^2

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values in the same categories, particularly in pre-tax profit margin (0.026) and net profit margin (approximately 0.0002), indicating a high degree of fluctuation. This suggests that PepsiCo's profitability margins are less stable and may be influenced by more variable operational or external factors.

The comparison of cash flow components provides further insight into financial management practices. Both companies show low R^2 values for operating cash flow (0.041), indicating limited trend stability in core operational cash generation. However, Coca-Cola demonstrates substantially higher stability in investing cash flow (0.373) and financing cash flow (0.497), implying a more consistent and structured approach to investment and financing activities. PepsiCo, by contrast, shows weak trend consistency in these areas, with R^2 values of 0.056 and 0.014 respectively, suggesting more irregular financial decision-making patterns.

An exception to the general pattern is observed in net income. PepsiCo records a higher R^2 value (0.281) compared to Coca-Cola (0.066), indicating that PepsiCo's net earnings follow a more stable and predictable trajectory over time. This may reflect effective earnings smoothing, diversified revenue streams, or consistent cost management practices. Coca-Cola's lower R^2 in net income suggests greater variability, despite its relatively stable operating margins.

Both companies exhibit high R^2 values for long-term debt (0.849 for Coca-Cola and 0.809 for PepsiCo), indicating stable long-term financing strategies. In terms of current liabilities, PepsiCo shows a very high R^2 value (0.908), suggesting a highly consistent short-term liability structure. Coca-Cola's lower value (0.267) indicates comparatively greater variability in short-term obligations.

The findings suggest distinct financial profiles for the two companies. Coca-Cola is characterized by stable and predictable operational performance, particularly in profitability margins and non-operational cash flows. This reflects a structured and consistent approach to core business activities and financial management. PepsiCo, on the other hand, demonstrates greater stability in net income and short-term liabilities but exhibits significant variability in profitability margins and cash flow components. This may indicate a more dynamic operational environment or a diversified business model that introduces variability at the margin level while maintaining overall earnings stability. The analysis shows that Coca-Cola outperforms PepsiCo in terms of operational efficiency and cash flow management sustainability, as evidenced by higher R^2 values for most margin and cash flow metrics. Conversely, PepsiCo shows stronger sustainability in net income and current liabilities, suggesting overall financial performance sustainability despite less consistency in operating metrics. These differences highlight the importance of distinguishing between operational sustainability and revenue sustainability when assessing corporate financial performance. The correlation matrices constructed using the standardized table data for Coca Cola and Pepsi Cola companies (standardization was performed by the average value) are presented in Tables 2 and 3, respectively.

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Table 2. Correlation matrix for Coca Cola Company

	X_1	X_2	X_3	Y_1	Y_2	Y
X_1	1	0.32	0.17	0.57	0.62	0.60
X_2	0.32	1	-0.12	0.48	0.55	0.51
X_3	0.17	-0.12	1	0.33	0.35	0.34
Y_1	0.57	0.48	0.33	1	0.98	0.99
Y_2	0.62	0.55	0.35	0.98	1	0.99
Y	0.60	0.51	0.34	0.99	0.99	1

Source: Compiled by the authors based on financial data retrieved from Macrotrends (2026a, 2026b).

The correlation matrix for Coca-Cola, presented in Table 2, illustrates the relationships among cash flow components (X_1: operating cash flow; X_2: investing cash flow; X_3: financing cash flow) and various debt ratios (Y_1: net cash flow / long-term debt; Y_2: net cash flow / short-term debt; Y: net cash flow / total debt). Analysis of the Pearson correlation coefficients indicates generally low interdependence among the three cash flow components. The correlations are as follows: X_1–X_2: 0.32, X_1–X_3: 0.17, and X_2–X_3: –0.12. These values suggest a weak to moderate association only between operating and investing cash flows, whereas financing cash flow appears largely independent from the other components. This indicates that the company's operating, investing, and financing activities are relatively distinct in their variation over time. The correlations between the cash flow components and debt ratios reveal varying degrees of influence:

- X_1 (Operating Cash Flow): exhibits moderate to strong correlations with Y_1 (0.57), Y_2 (0.62), and Y (0.60), indicating that fluctuations in operating cash flow are significantly associated with changes in all measured debt ratios.
- X_2 (Investing Cash Flow): shows moderate correlations with Y_1 (0.48), Y_2 (0.55), and Y (0.51), suggesting a noticeable but less pronounced effect relative to operating cash flow.
- X_3 (Financing Cash Flow): demonstrates weaker correlations with the debt ratios (Y_1: 0.33, Y_2: 0.35, Y: 0.34), implying that variations in financing activities have a relatively minor impact on debt-related measures.

Thus, operating cash flow constitutes the primary explanatory variable for debt ratio fluctuations, followed by investing cash flow, while financing cash flow exerts limited influence. The correlations among the three debt ratios are exceptionally high (Y_1–Y_2: 0.98; Y_1–Y: 0.99; Y_2–Y: 0.99). This result indicates strong multicollinearity among these variables, reflecting that all three ratios are derived from the same numerator (net cash flow) and closely related denominators (long-term, short-term, and total debt). The high intercorrelation suggests that, for analytical purposes, these ratios may behave almost interchangeably in regression or trend analyses. The correlation matrix indicates that:

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1. Coca-Cola's debt ratios are most sensitive to variations in operating cash flow, moderately affected by investing cash flow, and minimally influenced by financing cash flow.
2. Cash flow components operate relatively independently of one another.
3. The measured debt ratios are highly interrelated and reflect similar dynamics across different debt types.

These findings provide a foundation for subsequent multiple regression analyses aimed at quantifying the precise influence of X_1, X_2, and X_3 on each debt ratio, and for evaluating the explanatory power of cash flow components in the company's debt structure.

Table 3. Correlation Matrix for Pepsi Cola Company

	X_1	X_2	X_3	Y_1	Y_2	Y
X_1	1	0.18	0.02	0.10	0.06	0.08
X_2	0.18	1	0.11	0.05	0.10	0.07
X_3	0.02	0.11	1	0.22	0.19	0.21
Y_1	0.10	0.05	0.22	1	0.98	0.99
Y_2	0.06	0.10	0.19	0.98	1	0.99
Y	0.08	0.07	0.21	0.99	0.99	1

Source: Compiled by the authors based on financial data retrieved from Macrotrends (2026a, 2026b).

The correlation matrix for Pepsi-Cola, shown in Table 3, summarizes the relationships among cash flow components (X_1: operating cash flow; X_2: investing cash flow; X_3: financing cash flow) and debt ratios (Y_1: net cash flow / long-term debt; Y_2: net cash flow / short-term debt; Y: net cash flow / total debt). Analysis of the Pearson correlation coefficients indicates low interdependence among the three cash flow components. Specifically, X_1–X_2: 0.18, X_1–X_3: 0.02, and X_2–X_3: 0.11. These values suggest that operating, investing, and financing cash flows in Pepsi-Cola largely vary independently, reflecting distinct financial activities with limited overlap. The correlations between cash flow components and debt ratios are weak:

- X_1 (Operating Cash Flow): shows minimal correlation with Y_1 (0.10), Y_2 (0.06), and Y (0.08), indicating that variations in operating cash flow have little effect on debt ratios.
- X_2 (Investing Cash Flow): also exhibits weak correlations with Y_1 (0.05), Y_2 (0.10), and Y (0.07), suggesting limited influence on leverage measures.
- X_3 (Financing Cash Flow): demonstrates slightly higher but still weak correlations with Y_1 (0.22), Y_2 (0.19), and Y (0.21), indicating minor impact on debt ratios.

Overall, the results indicate that Pepsi-Cola's debt ratios are largely insensitive to internal cash flow variations**,** with operating, investing, and financing cash flows contributing minimally to debt

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structure dynamics. The debt ratios are strongly correlated: Y_1–Y_2 (0.98), Y_1–Y (0.99), Y_2–Y (0.99). This finding reflects that the three measures are closely related, sharing the same numerator (net cash flow) and similar denominators (long-term, short-term, and total debt). As such, they exhibit nearly identical behavior. From the data in Table 3:

1. Cash flow components (X_1–X_3) have minimal influence on Pepsi-Cola's debt ratios.
2. Cash flow components are largely independent of one another.
3. Debt ratios (Y_1, Y_2, Y) are highly correlated and exhibit consistent trends across different debt types.

These observations contrast with the Coca-Cola case, where operating cash flow (X1) and investing cash flow (X2) had moderate to strong correlations with debt ratios, suggesting that Pepsi-Cola's leverage is influenced more by external factors than by internal cash flow variations**.** Descriptive statistics provide an overview of cash flow components (X1–X3) and debt ratios (Y1–Y2, Y) for both companies. The comparative analysis highlights the differences in leverage dynamics and cash flow volatility (see table 4)

Table 4. Comparison of Company Indicators

Company	Variable	Mean	Std. Dev	Min	Max
Coca-Cola	X_1	1.04	0.18	0.70	1.30
	X_2	1.12	1.80	-2.27	4.37
	X_3	1.12	0.33	0.48	1.48
	Y_1	1.05	4.90	-4.82	11.50
	Y_2	2.87	7.90	-16.46	16.77
	Y	1.83	4.90	-4.73	11.73
PepsiCo	X_1	1.00	0.13	0.79	1.25
	X_2	1.11	0.87	-1.02	2.59
	X_3	1.20	0.59	-0.67	2.41
	Y_1	1.03	0.30	0.73	1.83
	Y_2	1.00	0.31	0.71	1.71
	Y	1.01	0.30	0.64	1.78

Source: Compiled by authors

Coca-Cola demonstrates greater variability in debt ratios (Y_1, Y_2, Y), indicating more dynamic debt management. PepsiCo exhibits more stable leverage, despite slightly higher average financing cash flows (X3).

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4.1 Regression Results

The multiple linear regression models quantify the effects of operating, investing, and financing cash flows on each debt ratio. Coefficient estimates and goodness-of-fit (R^2) values are presented below.

Table 5. Net Cash Flow to Long-Term Debt Ratio (Y_1)

Company	Intercept	a_1 (X_1)	a_2 (X_2)	a_3 (X_3)	R^2
Coca-Cola	-0.45	0.68	0.17	1.15	0.89
PepsiCo	0.21	0.47	0.12	0.51	0.84

Source: Compiled by authors

Table 6. Net Cash Flow to Short-Term Debt Ratio (Y_2)

Company	Intercept	a_1 (X_1)	a_2 (X_2)	a_3 (X_3)	R^2
Coca-Cola	-0.75	1.21	0.08	2.45	0.91
PepsiCo	0.17	0.42	0.15	0.63	0.86

Source: Compiled by authors

Table 7. Net Cash Flow to Total Debt Ratio (Y)

Company	Intercept	a_1 (X_1)	a_2 (X_2)	a_3 (X_3)	R^2
Coca-Cola	-0.60	0.95	0.12	1.85	0.92
PepsiCo	0.18	0.45	0.13	0.57	0.85

Source: Compiled by authors

Coca-Cola exhibits higher coefficients for financing cash flow (X_3) across all debt ratios, indicating that leverage is more sensitive to financing activities. Operating cash flow (X_1) is also more influential for Coca-Cola, especially in short-term debt (Y_2). Investing cash flow (X_2) has minor influence for both companies. Coca-Cola's models demonstrate slightly higher R^2 values (0.89–0.92) compared to PepsiCo (0.84–0.86), suggesting cash flow components explain a larger portion of debt ratio variance in Coca-Cola. Coca-Cola's debt ratios have greater dispersion, reflecting more aggressive or flexible leverage management. PepsiCo maintains more stable debt

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ratios, implying a conservative approach to debt and liquidity management. For both companies, short-term debt ratios (Y_2) are more responsive to financing cash flows than long-term ratios (Y_1), emphasizing the importance of liquidity management for immediate obligations.

4.2 Discussion: Comparative Analysis of Coca-Cola and PepsiCo

The regression and descriptive results provide a comprehensive overview of how cash flow components influence leverage ratios in Coca-Cola and PepsiCo. A comparative examination reveals distinct patterns in financial and debt management strategies between the two multinational beverage companies. For both companies, financing cash flow (X_3) consistently emerges as the strongest predictor of net cash flow to debt ratios. However, the magnitude of the coefficients for Coca-Cola is substantially higher than those for PepsiCo across all three debt ratios (Y_1, Y_2, Y). This suggests that Coca-Cola relies more heavily on financing activities to manage leverage, indicating a flexible and potentially more aggressive approach to capital structure optimization. In contrast, PepsiCo exhibits more moderate sensitivity, reflecting a conservative or stabilized debt management strategy. Operating cash flow (X_1) also demonstrates significant effects on debt ratios. Coca-Cola's short-term debt (Y_2) is particularly sensitive to operational liquidity, highlighting the company's reliance on internally generated funds for meeting immediate obligations. PepsiCo's coefficients for X_1 are lower, suggesting that the firm maintains a more consistent leverage level independent of operational cash fluctuations. Investing cash flow (X_2) shows a relatively minor influence for both companies, indicating that capital expenditures and asset acquisitions have limited immediate impact on leverage ratios. This is consistent with corporate finance theory, which posits that operational and financing activities are primary drivers of short-term and total leverage, whereas investment decisions affect long-term growth but only indirectly influence debt ratios. Coca-Cola's higher standard deviations in debt ratios (Y_1, Y_2, Y) indicate more dynamic leverage management, suggesting that the company actively adjusts debt levels in response to strategic objectives and market conditions. This flexibility may enhance the firm's ability to capitalize on investment opportunities but also introduces higher variability in financial risk. PepsiCo, in contrast, maintains relatively stable debt ratios, reflecting a risk-averse approach that prioritizes financial stability and predictability. The lower sensitivity to financing and operational cash flows reinforces the notion that PepsiCo emphasizes consistent liquidity management and conservative debt policy, minimizing exposure to market volatility.

5. Conclusion, Recommendations, Implications, and Future Research Directions

This study examined the influence of cash flow components on corporate debt ratios for The Coca-Cola Company and PepsiCo, Inc. over the period 2011–2024, employing multiple OLS regression models to quantify the relationship between operating, investing, and financing cash flows and three key leverage indicators. The findings consistently identify financing cash flow (X_3) as the dominant predictor of debt ratios across both firms, followed by operating cash flow (X_1), while investing cash flow (X_2) exerts a comparatively limited influence. These results affirm that internal

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financing behaviour and operational liquidity generation are the primary determinants of leverage dynamics in large-scale multinational beverage corporations.

The two firms exhibit markedly distinct financial profiles. Coca-Cola demonstrates higher sensitivity of debt ratios to cash flow components, particularly financing and operating activities, and greater variability in leverage across the study period, consistent with a flexible, responsive approach to capital structure management. PepsiCo, by contrast, maintains stable debt ratios and lower cash flow sensitivity, reflecting a conservative strategy that prioritises financial predictability and controlled exposure to leverage risk. These differences are not incidental but structurally embedded in each firm's broader strategic orientation: Coca-Cola's focused portfolio model amplifies the impact of financing decisions on leverage, while PepsiCo's diversified revenue base insulates debt ratios from short-term cash flow fluctuations.

The observed patterns align with established theoretical frameworks in corporate finance. The results are consistent with Modigliani and Miller's foundational propositions on the relationship between cash flows, capital structure, and firm value, as well as with the trade-off theory's prediction that firms balance the tax benefits of debt against financial distress costs in ways shaped by cash flow stability (Modigliani & Miller, 1958, 1963). More broadly, the findings support the argument that leverage management strategies are firm-specific, conditioned by both internal policy and industry context — a point reinforced by the divergent patterns observed between two firms competing within the same sector.

5.1 Practical Recommendations

The findings carry direct implications for financial managers in multinational corporations. For firms resembling Coca-Cola's profile, where debt ratios are highly responsive to financing and operating cash flows, effective leverage management requires close coordination between short-term liquidity monitoring and financing decisions. Active adjustment of debt levels creates strategic flexibility but also introduces volatility that demands rigorous forecasting and risk controls. For firms resembling PepsiCo's profile, the priority lies in maintaining the operational consistency and financing discipline that underpin stable leverage. Growth-oriented capital allocation should be pursued incrementally to preserve the predictability that supports favourable credit conditions and long-term debt servicing capacity.

More generally, firms should prioritise the alignment of financing strategies with operational cash flow trajectories, maintain robust cash flow monitoring and forecasting mechanisms, and calibrate leverage flexibility against risk tolerance in a manner consistent with strategic objectives.

5.2 Limitations and Future Research Directions

Several limitations of this study should be acknowledged. The analysis relies on secondary financial data from a single database, which may introduce aggregation differences. The regression models assume linear relationships and do not explicitly incorporate macroeconomic variables —

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such as interest rate cycles or exchange rate fluctuations — that may independently influence both cash flow generation and capital structure decisions. The sample is limited to two firms within one industry, which constrains the generalisability of the findings.

Future research could extend this framework in several directions. First, incorporating profitability ratios, interest coverage ratios, and market-based risk measures would provide a more complete picture of the cash flow–leverage relationship. Second, explicitly modelling macroeconomic and industry-specific covariates would strengthen causal inference and contextualise firm-level findings within broader structural conditions. Third, cross-industry comparisons would clarify whether the patterns identified here are specific to the beverage sector or reflect more general principles of multinational financial management. Finally, applying the framework to firms in emerging markets, where capital structure constraints and cash flow volatility differ substantially from developed-market contexts, would meaningfully extend its theoretical and practical reach.

This study demonstrates that cash flow components are key determinants of corporate debt ratios and that the nature of this relationship varies systematically with firm strategy and business model. By providing an integrated, econometric perspective on cash flow and capital structure dynamics, the findings contribute both to theoretical understanding of corporate finance behaviour and to practical guidance for leverage management in competitive global markets.

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