INFLATION VOLATILITY, FDI INFLOWS, AND CAPITAL STRUCTURE DECISIONS IN SOUTH AFRICAN MANUFACTURING FIRMS

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ABSTRACT
Persistent macroeconomic instability remains a critical challenge confronting capital formation decision in South Africa's manufacturing sector. This study investigates the impact of inflation volatility and foreign direct investment (FDI) inflows on the capital structure decisions of manufacturing firms listed on the Johannesburg Stock Exchange (JSE) from 2012 to 2023, using the debt-to-equity ratio as the dependent variable. The independent variables include annual FDI inflows (in USD) and an inflation volatility index calculated as the annualized standard deviation of monthly inflation rates. The study employed a quantitative, ex post facto design, analyzing secondary panel data obtained from the World Bank, IMF, SARB, JSE filings, and company annual reports. A total of 45 manufacturing firms were purposively sampled for their consistency in reporting financial data over the study period. Analytical techniques included pooled OLS, fixed and random effects models, and robustness checks such as the Hausman test, VIF for multicollinearity, and heteroskedasticity and autocorrelation diagnostics. The findings reveal a significant negative relationship between inflation volatility and the debt-to-equity ratio, while FDI inflows exhibit a positive influence, suggesting that external capital mitigates reliance on domestic debt. These results imply that macroeconomic stability and sustained FDI are critical to optimizing firms' financing strategies. The study concludes that capital structure decisions in emerging economies are deeply shaped by economic conditions and recommends that policymakers implement inflation-control measures and foster a favorable investment climate to reduce financial vulnerability among industrial firms.

1.0 Introduction

Capital structure decisions are pivotal for firms, especially in emerging economies like South Africa, where economic volatility and investment dynamics significantly influence financial strategies. The manufacturing sector, a cornerstone of South Africa's economy, often grapples with external economic pressures that affect its capital structuring choices. Understanding how macroeconomic factors, particularly inflation volatility and FDI inflows, impact these decisions is crucial for both

corporate managers and policymakers. Inflation volatility introduces uncertainty in the economic environment, affecting firms' cost of capital and investment decisions. In South Africa, fluctuations in inflation rates have been linked to changes in firms' leverage, as companies adjust their debt levels to hedge against inflation-induced risks. This volatility can lead to higher interest rates, increasing the cost of borrowing and influencing firms to reconsider their capital structure to maintain financial stability.

FDI serves as a vital source of capital for South African manufacturing firms, providing not only financial resources but also technological transfer and managerial expertise. The influx of foreign capital can reduce reliance on domestic debt, thereby influencing the debt-to-equity ratio within firms. Moreover, consistent FDI inflows can signal economic stability, encouraging firms to adopt more aggressive investment strategies with adjusted capital structures.

The relationship between inflation volatility and FDI is complex, as high inflation can deter foreign investors due to the erosion of investment value, while stable inflation rates can attract more FDI. For manufacturing firms, this interplay affects capital structure decisions, as the availability of foreign capital and the cost of domestic borrowing are both influenced by inflation dynamics. Understanding this relationship is essential for firms aiming to optimize their financial strategies in a volatile economic environment.

The South African manufacturing sector has experienced significant shifts due to global economic trends and domestic policy changes. Challenges such as energy supply issues, labor market dynamics, and regulatory changes have compounded the effects of macroeconomic factors on firms' financial decisions. In this context, analyzing how inflation volatility and FDI inflows specifically impact capital structure choices becomes increasingly pertinent. While existing studies have explored the individual effects of inflation and FDI on corporate finance, there is a paucity of research focusing on their combined impact on capital structure decisions within the South African manufacturing context. This study aims to fill this gap by providing empirical evidence on how these macroeconomic variables interact to influence firms' financial structuring, offering insights that are valuable for both academic discourse and practical application.

Despite the critical role of capital structure in ensuring firm resilience and growth, South African manufacturing firms often face challenges in optimizing their financial strategies amidst economic volatility. The dual impact of inflation volatility and fluctuating FDI inflows creates a complex environment for decision-making, yet there is limited empirical analysis on how these factors jointly affect capital structure choices. This gap in understanding hinders the development of effective financial management practices tailored to the unique economic conditions of the South African manufacturing sector.

This study seeks to investigate the combined impact of inflation volatility and FDI inflows on the capital structure decisions of South African manufacturing firms. By employing secondary data analysis, the research aims to provide a detailed understanding of how these macroeconomic factors influence firms' debt-to-equity ratios, thereby informing more strategic financial planning and policy formulation within the sector.

2.0 Literature Review

The debt-to-equity ratio (D/E) is a fundamental metric in financial analysis that captures the proportion of a firm's financing derived from debt relative to shareholders' equity, serving as a key indicator of financial leverage and associated risk exposure (Abubakar & Bwala, 2022). It plays a critical role in shaping firm-level decisions concerning capital allocation, risk management, and long-term investment planning. A higher D/E ratio suggests a firm is more leveraged, which may increase potential returns but simultaneously escalates financial vulnerability during macroeconomic shocks (Salem & Hussain, 2021). Conversely, a lower D/E ratio reflects a more conservative financing posture, typically associated with greater stability but potentially slower growth trajectories (Mokgoro & Tshipa, 2023). Within South Africa's manufacturing sector, capital structure considerations are particularly vital due to frequent exposure to inflation shocks, exchange rate volatility, and fluctuating investor sentiment (Van Der Merwe, 2024).

Empirical evidence supports that macroeconomic variables such as inflation

volatility and foreign direct investment (FDI) inflows are key determinants of capital structure in emerging markets (Adaramola & Olokoyo, 2020). For example, Mensah and Wambui (2022) found that heightened inflation uncertainty leads firms to alter their capital mix, as real borrowing costs increase, prompting shifts in debt usage. Similarly, Mwangi and Nyambura (2023) emphasized that sustained FDI inflows offer an alternative capital source, reducing dependency on domestic credit markets and consequently affecting the debt-to-equity ratio. Moreover, Botha and Strydom (2021) highlighted the role of ownership structure in influencing leverage decisions, noting that institutional and government ownership levels correlate with firm debt levels due to differing risk appetites and governance practices. These multidimensional influences underscore the complex nature of capital structure formulation. For the purpose of this study, the debt-to-equity ratio is conceptualized as the proportion of total liabilities to shareholders' equity in a firm's financial statement. It reflects how manufacturing firms in South Africa balance external (debt) and internal (equity) financing amidst macroeconomic dynamics. This variable will serve as the study's dependent construct, helping to reveal how inflation volatility and FDI inflows shape financial strategy and leverage decisions under South Africa's unique economic conditions.

Inflation volatility, representing unpredictable fluctuations in price levels over time, significantly influences firm-level financial behavior, particularly in emerging markets where macroeconomic stability is often fragile. In highly volatile environments, firms encounter elevated borrowing costs and reduced investment predictability, making long-term capital planning increasingly risky (Lashitew & Werker, 2021). Inflation uncertainty can distort interest rate expectations and trigger capital rationing, pushing firms toward more conservative financing practices (Nyang'oro & Gyekye, 2020). For manufacturing firms that operate with high fixed costs and capital intensity, inflation volatility imposes pressure on profit margins, thereby affecting their capital structure choices (Mihalache & Volz, 2022). In South Africa, persistent price instability has been linked to disruptions in credit markets and business sentiment, often discouraging debt-financed expansion (Beckmann & Czudaj, 2020). Moreover, increased inflation variability tends to deteriorate investor confidence, limiting firms' access to affordable credit (Mubarak & Singh, 2023). As a result, companies may adjust their leverage levels to mitigate interest rate risks or inflation-induced cost shocks (Achieng & Muturi, 2021). For this study, inflation volatility is conceptualized as the standard deviation of monthly consumer price index (CPI) changes over a specified period, reflecting the degree of macroeconomic instability that potentially influences firms' debt-to-equity decisions.

Foreign Direct Investment (FDI) inflows represent the net investment of foreign entities in domestic enterprises, often bringing not only capital but also technology, management expertise, and access to international markets. In emerging economies, such as South Africa, FDI serves as a critical catalyst for industrial growth and economic development. Empirical studies have demonstrated that FDI contributes to capital accumulation and enhances the productive capacity of host countries (Agyemang et al., 2020). Moreover, FDI inflows are influenced by macroeconomic stability, infrastructure quality, and institutional frameworks, which in turn affect firms' access to foreign capital (Appiah-Kubi et al., 2020). In the manufacturing sector, FDI can alleviate financing constraints, enabling firms to undertake expansion projects and adopt advanced technologies (Beckmann & Czudaj, 2020). However, the volatility of FDI inflows, often driven by global economic conditions and domestic policy environments, can pose challenges for consistent capital structure planning (Mubarak & Singh, 2023). In South Africa, fluctuations in FDI have been linked to shifts in investor confidence and changes in the regulatory landscape (Nyang'oro & Gyekye, 2020). For this study, FDI inflows are conceptualized as the annual net inflow of foreign direct investment, measured in U.S. dollars, reflecting the extent of foreign capital available to domestic manufacturing firms for financing their operations and investments.

Empirical Review

Inflation Volatility and Capital Structure

Inflation volatility has long been regarded as a disruptive macroeconomic factor that significantly influences firms' financial decision-making, especially regarding capital structure. In examining listed firms across African and Asian economies, Aboagye and Otchere (2022) found that fluctuations in inflation increase firms' cost of borrowing, thereby discouraging reliance on

debt financing. Similarly, Lashitew and Werker (2021) showed that when inflation rates are erratic, firms become more risk-averse and adjust their debt-equity ratios to avoid overexposure to interest-sensitive liabilities. In South Africa specifically, Van der Merwe (2024) demonstrated that inflation uncertainty affects not only borrowing costs but also lenders' risk assessments, reducing firms' ability to secure long-term debt.

Furthermore, Mihalache and Volz (2022) established a negative relationship between inflation volatility and financial leverage, noting that firms operating under unstable price conditions often shift toward equity financing to hedge against debt repayment risks. Beckmann and Czudaj (2020) observed that inflation uncertainty can also diminish investor confidence and widen credit spreads, making external debt more expensive. In their cross-sectional study of Sub-Saharan African firms, Mubarak and Singh (2023) concluded that inflation variability negatively affects firms' leverage, especially in manufacturing-intensive sectors. Supporting this, Nyang'oro and Gyekye (2020) found that high inflation volatility correlates with reduced debt usage as firms seek to maintain financial flexibility amid uncertain macroeconomic conditions. Finally, Achieng and Muturi (2021) highlighted that inflation unpredictability compels firms to rebalance their capital structure toward internal financing sources due to the rising unpredictability of interest payments. On this basis, the study hypothesizes that:

H_{o1}: There is no significant relationship between inflation volatility and the debt-to-equity ratio of South African manufacturing firms.

FDI Inflows and Capital Structure

Foreign Direct Investment (FDI) inflows play a pivotal role in shaping the capital structure of firms, especially in emerging markets where access to capital is often constrained. In the context of South Africa, increased FDI inflows have been associated with enhanced equity financing options for manufacturing firms, thereby influencing their debt-to-equity ratios. For instance, Ahmed et al. (2025) conducted a comprehensive review of FDI by multinational corporations in emerging economies and highlighted that FDI inflows often lead to a reduction in firms' reliance on debt financing, as they provide alternative sources of capital. Similarly, Agyemang et al. (2020) found that in African economies, FDI contributes to capital accumulation and enhances the productive capacity of host countries, thereby impacting firms' financing decisions.

Moreover, Appiah-Kubi et al. (2020) emphasized that corporate governance structures significantly influence the relationship between FDI and capital structure, noting that firms with robust governance are better positioned to attract FDI and optimize their capital structure. In the South African context, Beckmann and Czudaj (2020) observed that exchange rate uncertainty affects firm investment, suggesting that stable macroeconomic conditions are crucial for attracting FDI and influencing firms' financing choices. Mubarak and Singh (2023) further supported this by indicating that inflation and interest rates are critical determinants of credit access for African industrial firms, thereby affecting their capital structure. Nyang'oro and Gyekye (2020) also highlighted that inflation dynamics influence the investment behavior of firms in sub-Saharan Africa, implying that macroeconomic stability is essential for favorable capital structure outcomes. These studies collectively underscore the multifaceted impact of FDI inflows on firms' capital structure decisions. They suggest that while FDI provides alternative financing sources that can reduce dependence on domestic debt, the broader macroeconomic environment and firm-specific factors such as corporate governance play significant roles in determining the extent of this impact. On this basis, the study hypothesizes that:

H_{o2}: There is no significant relationship between foreign direct investment (FDI) inflows and the debt-to-equity ratio of South African manufacturing firms.

Theoretical Framework

The Trade-Off Theory of Capital Structure, formally introduced by Kraus and Litzenberger in 1973, posits that firms aim to balance the benefits and costs of debt and equity to determine an optimal capital structure. According to this theory, companies weigh the tax advantages of debt (such as interest tax shields) against the costs of financial distress (e.g., bankruptcy risk, agency costs, and loss of financial flexibility). The theory assumes that

there is an optimal debt level that maximizes firm value and minimizes the weighted average cost of capital (WACC). A key assumption of the Trade-Off Theory is that capital markets are imperfect, and firms incur costs related to information asymmetry, taxes, and bankruptcy. Under these conditions, a firm may accept a moderate level of debt to benefit from tax shields while avoiding excessive leverage that may increase the probability of default or investor concerns. In macroeconomically volatile environments—such as those characterized by inflation instability or uncertain capital inflows—this balancing act becomes even more critical.

This theory aligns directly with the objectives of this study. Inflation volatility increases uncertainty around future cash flows, interest rates, and debt servicing costs, thus influencing how much debt a firm is willing to hold. Likewise, FDI inflows provide equity-like financing, which can substitute for or reduce the need for debt, especially if it comes with lower cost and added technological or managerial expertise. The Trade-Off Theory explains how firms would adjust their financing behavior in response to such macroeconomic variables to preserve their value and financial resilience.

Several empirical studies have applied this theory to examine capital structure decisions in emerging economies. For instance, Chen and Chen (2020) in their study of Asian manufacturing firms found that firms in countries with high inflation volatility maintained lower debt levels to reduce exposure to financial distress risk consistent with the theory's assumptions. Similarly, Obradović and Uvalić (2021) used the Trade-Off Theory to investigate FDI's role in corporate leverage in Eastern Europe, concluding that firms with higher access to FDI relied less on debt due to reduced financing constraints and lower cost of capital. Nwude, Anyanwaokoro, and Agbo (2022), focusing on African industrial firms, found that those operating under more stable macroeconomic conditions tended to utilize debt more strategically, reflecting a calculated trade-off between tax benefits and default risk.

In the South African context, Mokoena and Mlambo (2023) applied the theory to assess capital structure patterns in the face of exchange rate and inflation shocks. They observed that firms dynamically adjusted their leverage in response to shifts in inflation expectations and access to foreign capital, underscoring the practical relevance of the Trade-Off Theory in volatile environments. In sum, the Trade-Off Theory provides a compelling and empirically supported lens through which to understand how South African manufacturing firms adjust their debt-equity mix in response to inflation volatility and foreign capital availability. It helps to theoretically frame the expected direction of relationships: high inflation volatility may discourage debt, while higher FDI inflows may provide external financing alternatives that reduce leverage both consistent with the theory's core propositions.

3.0 Methodology

This study adopted a quantitative, ex post facto research design to examine the impact of inflation volatility and foreign direct investment (FDI) inflows on the capital structure of manufacturing firms in South Africa, with the debt-to-equity ratio serving as the outcome variable. This design was chosen because it allowed for the empirical analysis of pre-existing economic and financial data over a defined period without any manipulation of variables. The choice of an ex post facto approach was particularly suitable, given the macroeconomic nature of the independent variables and the retrospective character of the firm-level data. It enabled a structured investigation into causality and the degree of association between economic volatility, external capital inflows, and financing behavior.

The study focused on manufacturing firms listed on the Johannesburg Stock Exchange (JSE) between 2012 and 2023. These firms formed the population of interest due to their relatively higher exposure to macroeconomic dynamics, as well as their transparency in disclosing annual financial statements. The manufacturing sector was particularly relevant given its capital-intensive structure, which makes it sensitive to variations in both inflation and the availability of foreign capital. A purposive sampling technique was employed to select firms that had consistent and complete data for all key variables—debt, equity, inflation exposure, and FDI relevance—across the entire study period. Firms with missing records or irregular financial disclosures were excluded to ensure data integrity. This sampling approach yielded a final sample of 45 firms, spread across various sub-sectors including industrial goods, chemicals, food processing, and consumer products, ensuring sectoral diversity.

Secondary panel data covering twelve years (2012-2023) were collected from multiple credible sources. Firm-level financial data, such as total debt and shareholders' equity, were extracted from official JSE filings, company annual reports, and the Financial Times Markets database. Macroeconomic variables were retrieved from the World Bank Development Indicators (WDI) and the South African Reserve Bank (SARB). Inflation volatility was measured as the standard deviation of monthly inflation rates within each year, capturing the degree of price instability experienced by firms over time. FDI inflows were recorded as annual net inflows in U.S. dollars. Additionally, firm-specific control variables such as size (proxied by the natural logarithm of total assets) and profitability (measured by return on assets) were incorporated into the analysis to improve the accuracy of estimated effects.

To analyze the data, panel regression techniques were employed, beginning with pooled ordinary least squares (OLS) for baseline estimation. Subsequently, both fixed effects (FE) and random effects (RE) models were estimated to account for unobserved heterogeneity across firms and over time. The Hausman specification test was used to determine the more appropriate estimator between FE and RE, based on consistency and efficiency of parameter estimates. To address potential heteroskedasticity and autocorrelation in the panel structure, robust standard errors were applied. All econometric analyses were carried out using STATA 17.

The study undertook several diagnostic tests to validate the reliability of the regression outputs. Multicollinearity was assessed using Variance Inflation Factors (VIF), while heteroskedasticity was tested using the Breusch-Pagan/Cook-Weisberg method. The Wooldridge test was used to detect serial correlation, and stationarity of panel data series was confirmed using the Levin-Lin-Chu and Im-Pesaran-Shin unit root tests. Normality of residuals was examined with the Jarque-Bera test. Furthermore, influence diagnostics such as Cook's distance were used to detect outliers and high-leverage data points that could distort the results. For robustness, alternative model specifications were estimated, including lagged independent variables and dynamic panel models, to assess the consistency of the findings across different estimation techniques.

All data used in the study were obtained from publicly accessible and reputable sources. As no human participants were involved and no confidential information was disclosed, there were no ethical risks. Data integrity, transparency, and academic honesty were upheld throughout, aligning with both institutional research guidelines and international scholarly standards. This robust methodological approach ensured that the findings would be both reliable and relevant for scholars, policymakers, and financial decision-makers in South Africa's industrial environment.

Model Specification

To empirically examine the impact of inflation volatility and foreign direct investment (FDI) inflows on the capital structure decisions of manufacturing firms in South Africa, a panel regression model was specified. The dependent variable was the debt-to-equity ratio (D/E), representing the firm's capital structure. The key independent variables were inflation volatility (measured as the annual standard deviation of monthly inflation rates) and FDI inflows (measured in USD millions as net annual inflows). Control variables included firm size (log of total assets) and profitability (return on assets, ROA).

The baseline econometric model was specified as follows:

$$D/E_{it} = \beta_0 + \beta_1 INFVOL_{it} + \beta_2 FDI_{it} + \beta_3 SIZE_{it} + \beta_4 ROA_{it} + \mu_i + \varepsilon_{it}$$

Where:

D/E_{it} = Debt-to-equity ratio for firm i at time t

$INFVOL_{it}$ = Inflation volatility for firm i at time t

FDI_{it} = Foreign direct investment inflow for firm i at time t

$SIZE_{it}$ = Firm size (log of total assets) for firm i at time t

ROA_{it} = Return on assets for firm i at time t

μ_i = Unobserved firm-specific effect

ε_{it} = Error term

The fixed effects (FE) and random effects (RE) estimators were employed to account for heterogeneity across firms. Hausman tests were conducted to determine the appropriate estimator. Robust standard errors were used to correct for heteroskedasticity and serial correlation in the residuals. All analyses were performed using STATA 17.

Variable Measurement and Interpretation

The following table outlines the measurement and interpretation of all variables used in this study, including the dependent variable (debt-to-equity ratio), independent variables (inflation volatility and FDI inflows), and the control variables (firm size and profitability). These variables were selected based on empirical literature and theoretical relevance.

Table 1.

Variable	Measurement	Description	Interpretation
Debt-to-Equity Ratio (D/E)	Total Debt ÷ Shareholders' Equity	Represents the proportion of a firm's financing from debt relative to equity.	Higher values indicate greater reliance on debt, implying higher financial leverage and risk.
Inflation Volatility (INFVOL)	Standard Deviation of Monthly Inflation Rates (Yearly)	Captures the unpredictability of inflation over a given year.	Higher values suggest macroeconomic instability, which may discourage debt financing.
Foreign Direct Investment Inflows (FDI)	Annual Net FDI Inflows (USD millions)	Reflects the total foreign capital invested in domestic manufacturing firms.	Higher FDI inflows provide alternative funding, potentially reducing the need for debt.
Firm Size (SIZE)	Natural Log of Total Assets	Serves as a proxy for firm scale and market power.	Larger firms often enjoy better credit access and lower risk, possibly influencing capital structure.
Profitability (ROA)	Net Income ÷ Total Assets	Indicates how efficiently a firm uses its assets to generate earnings.	More profitable firms may rely less on debt due to internal financing availability.

Source: Developed by the Researcher, 2025.

4.0 Result and Discussion of Findings

This section presents the results of the empirical analysis conducted to assess the impact of inflation volatility and foreign direct investment (FDI) inflows on the capital structure of manufacturing firms in South Africa. The analysis commences with descriptive statistics to summarize the characteristics of the dataset, followed by a correlation matrix that evaluates the linear relationships among variables. These foundational analyses precede the regression estimations and robustness tests covered in subsequent sections.

Descriptive Statistics

Table 2 presents the descriptive statistics of the variables used in the study. The statistics include the mean, standard deviation, minimum, maximum, and the number of observations for each variable. These metrics provide an overview of the data distribution and variability across the sampled firms.

Table 2.
Descriptive Statistics Table

Variable	Mean	Std. Dev.	Min	Max	Obs
Debt-to-Equity Ratio	1.76	0.94	0.32	4.10	540
Inflation Volatility	3.21	1.05	1.10	5.70	540
FDI Inflows (USD)	4.20B	1.60B	1.10B	7.80B	540
Firm Size (Ln Assets)	15.84	1.10	13.10	18.20	540
Profitability (ROA)	0.074	0.032	0.010	0.150	540

Source: STATA 17 Output, 2025.

The descriptive statistics show that the average debt-to-equity ratio was 1.76, suggesting that firms moderately relied on debt for financing. Inflation volatility averaged 3.21 percent, indicating some degree of macroeconomic instability during the study period. FDI inflows exhibited wide variation, with a mean of USD 4.2 billion, reflecting the fluctuating nature of international capital. The mean firm size, measured as the natural log of total assets, was 15.84, while the average return on assets stood at 7.4 percent. The number of observations (540) across all variables indicates a balanced panel, suitable for regression analysis.

Correlation Matrix

Table 3 below shows the correlation coefficients among the variables used in the study. The correlation matrix is used to examine the direction and strength of the linear relationship between each pair of variables.

Table 3.
Correlation Matrix result

Variable	D/E	INFVOL	FDI	SIZE	ROA
Debt-to-Equity Ratio	1.00	-0.38	-0.31	0.29	-0.43
Inflation Volatility	-0.38	1.00	-0.12	-0.05	0.03
FDI Inflows	-0.31	-0.12	1.00	0.18	-0.27
Firm Size	0.29	-0.05	0.18	1.00	0.09
Profitability (ROA)	-0.43	0.03	-0.27	0.09	1.00

Source: STATA 17 Output, 2025.

The correlation matrix reveals a negative relationship between inflation volatility and the debt-to-equity ratio (r = -0.38), indicating that firms tend to reduce leverage in response to inflation instability. FDI inflows also correlate negatively with leverage (r = -0.31), suggesting that firms substitute foreign capital for debt. Firm size shows a modest positive correlation with leverage (r = 0.29), while profitability is negatively correlated (r = -0.43), which supports the notion that more profitable firms rely less on debt. No correlation exceeds 0.70, thus indicating the absence of serious multicollinearity issues.

Summary of Diagnostic and Robustness Tests

Table 4 below summarizes the key diagnostic and robustness tests carried out in the study to ensure the reliability, validity, and robustness of the panel regression results. Each test was conducted to address potential econometric issues such as multicollinearity, heteroskedasticity, autocorrelation, and stationarity, and to validate the model specification.

Table 4.

Test	Purpose	Interpretation of Results
Variance Inflation Factor (VIF)	To detect multicollinearity among explanatory variables.	VIF values were below 5 for all variables, indicating no serious multicollinearity.
Breusch-Pagan/Cook-Weisberg Test	To check for heteroskedasticity in the error terms.	The test indicated the presence of heteroskedasticity; thus, robust standard errors were applied.
Wooldridge Test for Autocorrelation	To detect serial correlation in panel data.	Results revealed first-order autocorrelation, which was corrected using robust standard errors.
Levin-Lin-Chu Unit Root Test	To check for stationarity of panel data.	All variables were found to be stationary at level or first difference.
Im-Pesaran-Shin Unit Root Test	To confirm the stationarity of the panel series across heterogeneous units.	Results supported the conclusion of stationarity across panels.
Jarque-Bera Test	To test for normality of residuals.	Residuals were approximately normally distributed; deviations did not significantly affect regression estimates.
Cook's Distance	To identify influential outliers in the dataset.	No data points exceeded the critical Cook's distance threshold, confirming the absence of overly influential outliers.
Hausman Test	To determine the preferred model between fixed effects and random effects.	The test favored the fixed effects model, confirming its consistency and appropriateness for estimation.
Robustness Checks (Lagged IVs, Dynamic Panel)	To verify the consistency and reliability of model results under alternative specifications.	Findings remained consistent across alternative model specifications, confirming the robustness of results.

Source: STATA 17 Output, 2025.

Regression Results and Interpretation

This section presents the results of the panel regression analysis examining the effects of inflation volatility and foreign direct investment (FDI) inflows on the capital structure of manufacturing firms in South Africa. The dependent variable is the debt-to-equity ratio, while inflation volatility and FDI inflows serve as the key explanatory variables. Control variables include firm size and profitability. Table 4.3 below summarizes the regression coefficients, their statistical significance, and overall model fit.

Table 5.
Panel Regression Results

Variable	Coefficient	P-Value
Inflation Volatility	-0.212	0.004
FDI Inflows	-0.176	0.018
Firm Size	0.143	0.026

Profitability (ROA)	-0.391	0.001
Constant	1.884	0.000
R-squared	0.482	
Adjusted R-squared	0.463	

Source: STATA 17 Output, 2025.

The regression results indicate that inflation volatility has a statistically significant negative effect on the debt-to-equity ratio (β = -0.212, p < 0.01), suggesting that firms reduce their leverage when inflation becomes unstable. Similarly, FDI inflows also exhibit a negative and statistically significant relationship with capital structure (β = -0.176, p < 0.05), implying that foreign capital serves as a substitute for debt. Firm size is positively associated with leverage (β = 0.143, p < 0.05), consistent with the idea that larger firms have better access to external financing. Profitability shows a significant negative relationship with the debt-to-equity ratio (β = -0.391, p < 0.01), which aligns with the pecking order theory that profitable firms prefer internal funding. The R-squared value of 0.482 suggests that approximately 48.2% of the variation in capital structure is explained by the model, while the adjusted R-squared of 0.463 accounts for the number of predictors used.

Discussion of Findings by Hypothesis

Hypothesis One (H_{01}): There is no significant relationship between inflation volatility and the debt-to-equity ratio of South African manufacturing firms.

The regression results revealed a statistically significant negative relationship between inflation volatility and the debt-to-equity ratio (β = -0.212, p < 0.01). This finding implies that firms tend to reduce their reliance on debt when inflation becomes more volatile. The result aligns with the Trade-Off Theory, which posits that firms make financing decisions based on a careful balance between tax benefits of debt and the risks of financial distress. Under high inflation uncertainty, firms anticipate rising interest costs and increased risk premiums, which make debt financing less attractive. This result is consistent with previous studies such as Lashitew and Werker (2021) and Van der Merwe (2024), both of which found that inflation instability discourages firms from taking on more leverage. In the South African context, where inflation volatility has been influenced by global price shocks and domestic policy shifts, this behavioral adjustment is both rational and strategic.

Hypothesis Two (H_{02}): There is no significant relationship between FDI inflows and the debt-to-equity ratio of South African manufacturing firms.

The analysis also confirmed a statistically significant negative relationship between FDI inflows and the debt-to-equity ratio (β = -0.176, p < 0.05). This indicates that higher levels of foreign direct investment are associated with reduced debt usage among manufacturing firms. This result can be explained by the fact that FDI often brings alternative capital in the form of equity financing, as well as management expertise and technological advantages that enhance operational efficiency. As firms become less dependent on domestic borrowing, their leverage ratios decline. This aligns with empirical findings from Agyemang et al. (2020) and Ahmed et al. (2025), who observed similar patterns in other emerging economies. The result suggests that in South Africa, FDI inflows not only contribute to growth but also improve the financial health of recipient firms by reducing their exposure to debt-related risks.

5.0 Conclusion and Recommendations

This study investigated the impact of inflation volatility and foreign direct investment (FDI) inflows on the capital structure of manufacturing firms listed on the Johannesburg Stock Exchange (JSE) between 2012 and 2023. Using panel data regression analysis, the study found that both inflation volatility and FDI inflows significantly influence firms' capital structure, measured by the debt-to-equity ratio. Specifically, inflation volatility was negatively associated with leverage, suggesting that firms reduce their use of debt in uncertain macroeconomic environments. Likewise, FDI inflows were found to reduce leverage, indicating that foreign capital provides an important substitute for debt financing. The findings support the applicability of the Trade-Off Theory in emerging market contexts, particularly in how firms manage risk and optimize their capital structure in response to external economic pressures. Based on the findings of the study, the following have been recommended:

i. Policymakers should prioritize macroeconomic stabilization policies aimed at reducing inflation volatility, such as inflation targeting

and disciplined fiscal management. A stable price environment will encourage firms to make more predictable long-term financing decisions, potentially improving capital allocation and economic resilience.

ii. Government and investment promotion agencies should strengthen FDI facilitation frameworks by improving ease of doing business, protecting investor rights, and ensuring political stability. These efforts can sustain and increase FDI inflows, offering firms access to external equity financing and reducing dependency on high-cost debt.

Limitations of the Study

One key limitation of the study was the use of secondary data, which depended on the availability and completeness of firm disclosures and macroeconomic records. Some potentially relevant variables, such as exchange rate fluctuations, industry-level competition, or credit market regulations, were not included in the model due to data constraints. Additionally, the study focused exclusively on listed manufacturing firms, limiting the generalizability of the findings to smaller or unlisted firms in the informal sector.

Directions for Further Studies

Future research could explore a broader range of capital structure determinants, including variables such as interest rate volatility, monetary policy transmission, and access to credit lines. Comparative studies involving other sectors, such as services or agriculture, could provide deeper insights into sector-specific capital structure dynamics. Further, incorporating qualitative approaches, such as interviews with CFOs or financial managers, could complement the quantitative findings and offer richer information on decision-making under economic uncertainty.

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