

The Asymmetric Effect of Foreign Debt Investment on the Growth of Firms Listed at the Nairobi Securities Exchange (NSE): A NARDL Approach.

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ABSTRACT

This study examines asymmetric effect of foreign debt investment on the growth of firms listed at Nairobi Securities Exchange (NSE) using Nonlinear Autoregressive Distributed Lag (NARDL) method. The study was based on a sample of 40 listed companies spread across 12 sectors on the NSE such as the banking, insurance, investment, manufacturing, agriculture, energy and petroleum, telecom and technology, construction and allied services, automobile and accessories, commercial and services, exchange-traded funds (ETFs) and real estate investment trusts (REITs). The study recognises that the increase and decrease of foreign debt investment can have differing effects on business growth and therefore an asymmetric approach is needed. Short run and long run relationships between foreign debt investment and firm growth are considered by analyzing the secondary data obtained from the annual financial reports and data from the NSE publications. The NARDL model is divided into partial sums of foreign debt, with positive effects and negative effects, which although not captured by conventional linear models can be identified. The results will yield strong empirical evidence of the impact of foreign debt on growth of NSE listed firms. The paper contributes to the emerging market's capital structure and firm performance literature and offers the way for corporate managers, foreign investors and policy makers faced with the challenge of making sound investments decisions in the face of foreign financing and minimizing financial risks from foreign borrowing.

Keywords: *Foreign Debt Investment, Firm Growth, Nairobi Securities Exchange, NARDL Model, Capital Structure, Asymmetric Effects, Listed Firms.*

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1.0 INTRODUCTION

One of the important areas in the corporate growth strategy is foreign debt financing. Foreign debt is used as a means of financing, a means of growth and a device for positioning in competition. Simultaneously international borrowing leaves companies vulnerable to exchange rate risks and debt-servicing duties that can stifle, not fuel growth, especially in time of macroeconomic instability. Thus, it is important for corporate managers, investors and policy makers to understand precisely how foreign debt affects firm outcomes. In the Kenyan business scenario this relationship assumes an additional connotation. The Nairobi Securities Exchange (NSE) is a market with shifting exchange rates and changing regimes, and is getting deeper and deeper into the world capital markets. The actions of these firms in managing their foreign debt positions will either affect their own financial status or the overall direction of Kenya's capital market development.

1.1 Background of the Study

Globalisation has greatly broadened corporate opportunities to raise money from overseas. In developing economies, firms are increasingly borrowing from abroad due to the cost of borrowing and availability of sources of funding (Madura, 2021). This trend is part of a more general structural change in which new companies in emerging markets can access commercial banks abroad, multinationals, and the global bond market for long-term investment projects rather than being limited to shallow domestic financial markets (Levine, 2005).

This is what has happened in Kenya. The exposures to foreign-currency-denominated debt have been a gradual trend for the companies listed on the NSE over the last 20 years or so. The companies listed on the NSE have been slowly adding up such exposures to foreign-currency-denominated debt over the past two decades or so. This has helped to develop the ability to build up capital reserves and expand business, but has created considerable exposure to the depreciation of the exchange rate. As Kenya's Shilling depreciates against the big

reserve currencies, the expense of servicing foreign debts increases rapidly, squeezing profit margins and limiting potential investment (Eichengreen & Hausmann, 1999). So a positive relationship between foreign borrowing and firm growth is not necessarily the same as a negative relationship. The relationship between the benefits and risks of foreign borrowing thus leads to a complex, and potentially asymmetric, relationship with firm growth (Jonasson, Malik, Chung, & Papaioannou, 2024).

However, much of the previous literature considers the foreign debt-performance nexus to be linear and symmetric, meaning that an increase (decrease) in foreign debt will have the same and opposite impact on performance. This is questionable in the light of recent developments in nonlinear econometric modelling, which call for a more subtle analysis of asymmetric effects (Shin, Yu, & Greenwood-Nimmo, 2014).

1.2 Statement of the Problem

The prevailing empirical literature on foreign debt and firm growth takes the following form: it assumes that there is a symmetric relationship between foreign debt and firm growth. Based on this assumption, a rise in foreign debt and a corresponding decline in foreign debt should have the same size, opposite-sign impact on the performance of firms. This is a convenient but perhaps not a truly correct assumption. Theoretical analysis and empirical data on the markets indicate that, on the whole, when foreign debts are reduced, due to repayment pressures, to credit limitations or to exchange rate effects, the results can be qualitatively different from those of an equivalent reduction. This has implications for companies listed on the NSE. When foreign debt and growth are really asymmetric, policies that are built based on linear models can have sub-optimal results. Managers who are less attuned to the negative impact of foreign debt contraction or more optimistic than warranted about the value-adding potential of foreign debt expansion can end up making financing decisions that have negative effects on firm value. This study fills this gap by using the Nonlinear Autoregressive Distributed Lag (NARDL) model that is specifically set up to identify and quantify asymmetry in time-series and panel data.

1.3 Research Objectives

The overarching objective of this study is to determine the asymmetric impact of foreign debt investment on the growth of firms listed on the Nairobi Securities Exchange.

1.3.1 The specific objectives are:

- i. To examine whether positive changes in foreign debt investment exert a different effect on firm growth compared to negative changes, both in the short run and in the long run.
- ii. The speed of adjustment for the return of the economy to its long-run equilibrium after positive and negative shocks in foreign debt investment.
- iii. To determine the moderating effect of firm specific and macro-economic control variables such as firm size, leverage, liquidity, GDP growth and exchange rate on the relationship between foreign debt investment and firm growth.

1.4 Research Questions

The study was guided by the following research questions:

- i. Does positive or negative change in foreign debt investment have a different effect on firm growth in NSE listed firms?
- ii. Is foreign debt investment on a firm asymmetric in both the short-run and long-run?
- iii. What is the speed of recovery of firm growth to the long run equilibrium path after shocks to foreign debt investment?

1.5 Significance of the Study

This study has some contributions to make. The results provide information based advice to corporate managers of NSE listed firms on how to manage foreign debts optimally, the time to use foreign debt to boost growth and when it is the opposite. In the Kenyan capital market, the asymmetric multiplier estimates are crucial for investors and financial analysts in making risk assessment and investment decisions, and in allocating their portfolios.

The study provides insights for policymakers and regulators such as the Central Bank of Kenya and the Capital Markets Authority about the interaction between exchange rate volatility and credit conditions on firm financing decisions and the impact of this interaction on firm performance. The lessons learnt can be used to develop policies to deepen domestic capital markets and to mitigate foreign debt vulnerability of companies. Lastly the study contributes to the existing body of academic work on nonlinear dynamics in the emerging market finance field with methodologically and empirically relevant contributions that go beyond the Kenyan context.

1.6 Scope of the Study

This study draws only on stocks traded on the Nairobi Securities Exchange (NSE) and targets the linkage between foreign debt investment and firm growth during the period of the panel. It includes 40 firms in 12 sectors of the NSE with secondary data collected from the audited annual financial statements, NSE publications, the Central Bank of Kenya, and the World Bank macroeconomic databases. It does not cover unlisted companies or companies in industries where foreign debt statistics are not available.

2.0 LITERATURE REVIEW

The present section summarizes the theoretical and empirical works of related literature that has been conducted on foreign debt financing and firm growth. It starts with the theoretical framework that underpins the study, discusses empirical studies of the relationship between foreign debt and financial growth and finally touches on the asymmetric dimension of that relationship.

2.1 Theoretical Framework

The theoretical framework gives a framework of how the foreign debt investment relates to the financial growth of firms listed on the Nairobi Securities Exchange. The study is based on four major theories: Resource Based Theory, Pecking Order Theory, Agency Theory and Endogenous Growth Theory. Theories, both individually and collectively, provide different perspectives on the mechanisms by which foreign debt can affect firm growth, and shed light on the potential for asymmetric effects of foreign debt.

2.1.1 Resource-Based Theory

The Resource-Based Theory has been created by Birger Wernerfelt (1984) and later developed by Jay Barney (1991). The theory states that companies have sustainable competitive advantage when they build and invest resources that are valuable, rare, inimitable and non-substitutable. When considering foreign debt financing, the theory suggests that the provision of foreign capital markets is not just a source of funds, but a package of strategic resources such as the latest technology, competent management skills, global business networks and better corporate governance.

Foreign creditors and allied institutional partners of NSE-listed companies frequently bring in knowledge and practices that are beneficial for improving the efficiency and profitability of companies, thus driving growth. The theory suggests that foreign debt investment is likely to positively influence firm growth, although the impact of foreign debt investment can vary depending on the firm's ability to acquire and utilize the resources gained from foreign debt investment. Companies having greater internal capabilities will benefit more from foreign debt and those companies having weaker absorptive capacity will benefit less.

2.1.2 Pecking Order Theory

The Pecking Order Theory was originally developed by Myers and Majluf (1984) which states that firms have a sequence of financing choices and they prefer to use internal funds first, then debt, and equity as a final option. This hierarchy is due to information asymmetry between the inside and outside parties to a corporation, and the fact that outside funds are more expensive than inside funds.

The theory states that as internal and debt financing become inadequate to satisfy a firm's growth financing requirements, the firm will turn to foreign financing. Foreign debt can alleviate the problem of capital constraint and facilitate investment, but too much borrowing from abroad can be a warning sign of poor internal financial health, or inadequate local market access, which can help to reduce growth opportunities. There is, further, a theory that suggests that the correlation between foreign debt and growth will not necessarily be symmetrical, meaning that moderate borrowing from abroad can alleviate the constraints on financing and stimulate growth, whereas a high level of foreign debt can create constraints and instability, or a rapid rate of growth of foreign debt can engender uncertainty and lead to a decline in growth.

2.1.3 Agency Theory

The Jensen and Meckling (1976) agency theory explains the conflicting interests that can arise between shareholders (principals) and managers (agents). The theory adds a new component when considering foreign debt: the possibility of conflicts between domestic investors and foreign creditors, whose investment horizon, risk appetite and strategy may vary significantly.

The positive side is that foreign creditors tend to have governance conditions and monitoring requirements which limit managerial opportunism and thus contribute to better corporate decision-making, which leads to better firm performance. The investment efficiency and firm growth can be hampered by costs arising from foreign

creditors' covenants and by the risk of debt overhang and conflict between foreign creditors and equity holders. Agency Theory thus offers a theoretical argument to hypothesize an asymmetric impact of foreign debt on growth, in which the governance gains of moderate foreign debt may exceed the agency costs of too much borrowing.

2.1.4 Endogenous Growth Theory

The Endogenous Growth Theory was proposed by Romer (1986) and later expanded by Lucas (1988) and suggests that long-term economic growth is caused by internal variables like capital investment, innovation, technological progress and human capital growth. This is in contrast to the neo-classical growth models, which regard technology as given. According to the theory, international borrowing can be used to spur firm growth by providing the necessary capital to support innovation, technology acquisition and productive capacity expansion. Foreign financial connections can also be sources of enhanced managerial skills and performance efficiency through knowledge spillovers. However, these benefits are not assured and are subject to the macroeconomic environment, the domestic institutions and the investment policy of the firm. If these conditions are not met, foreign debt could lead to less or less symmetrical growth effects than predicted by the theory as it may not create the productivity gains.

2.1.5 Theoretical Link to the NARDL Model

This section provides a theoretical background to the NARDL Model. As shared by the four theoretical perspectives discussed above, foreign debt investment is expected to foster firm growth in a variety of ways, such as providing capital, improving governance, accessing resources and boosting productivity. Importantly, they also point out that such effects are likely to be asymmetric that the growth gains from growing foreign debt can be larger and longer lasting than the growth losses from reducing foreign debt.

The Nonlinear Autoregressive Distributed Lag (NARDL) model is used in this study to subject this theoretical prediction to empirical testing. The NARDL framework breaks foreign debt investment (FD) into partial sums to the detriment and credit:

$$FD_t = FD_t^+ + FD_t^-$$

where cumulative positive changes is represented by FD_t^+ and cumulative negative changes by FD_t^- .

The model then estimates individual long-run coefficients (β^+ and β^-) for each component. When $\beta^+ \neq \beta^-$ then asymmetric effects are confirmed and the theoretical expectations, based on the four frameworks above, are confirmed.

2.2 Empirical Review

2.2.1 Foreign Debt Financing and Firm Growth in Emerging Markets

The contributions from the panel discussions and the Q&A session are also included. The panel discussions and the question and answer session are also included.

Foreign debt financing is the financing of funds from outside the company's home country. The funds can be obtained from the international commercial banks, foreign financial institutions, multilateral development organisations or from the raising of debt instruments in the international capital markets. Foreign debt has emerged as an important source of capital for companies in emerging economies, due to the lack of depth of domestic financial markets and the demand for supporting business growth, technological upgrading, and competitiveness (Madura, 2021).

Researchers and policy makers have long looked at foreign debt financing and firm growth. Common measures of firms' growth include sales growth, growth in assets, profitability, market share, and the market value of the firm. The Trade-Off Theory presumes that firms use debt financing in order to leverage on the tax shields and to reduce capital costs and at the same time have to manage the risk of financial distress (Myers, 1984). Foreign debt can allow companies to access larger amounts of capital at lower interest rates than domestic borrowing, which can help to support investment, and increase the opportunity for growth.

Foreign credit can boost productivity, increase operating efficiency and facilitate business growth in foreign markets (Levine, 2005). Additionally, foreign debt can help companies to acquire the latest technology and management skills, assisting them in achieving better results and sustained growth. Firms face certain risks when financing via foreign debt, however. Foreign debt financing, however, carries some risk for firms. Rising volatility of exchange rates can make it more expensive to service debt in the event of devaluation of the domestic currency in relation to the foreign currency; an increase in global interest rates can lead to less profitability. Foreign debt dependence can thus make firms susceptible to financial stress and hinder their

expansion, especially in times of economic uncertainty (Eichengreen & Hausmann, 1999; Jonasson, Malik, Chung, & Papaioannou, 2024).

However, recent research indicates the link between foreign debt and firm growth may be asymmetric: positive foreign debt growth may be growth-enhancing as it could augment firms' investment capacity, while negative foreign debt growth could have different effects as it could limit firms' financing possibilities and/or intensify repayment demands. This asymmetry has driven the use of NARDL model for analyzing the impact of foreign debt increases and decreases on firm performance (Shin, Yu & Greenwood-Nimmo, 2014).

2.2.2 Foreign Debt Investment and Financial Growth

Foreign debt investment facilitates firms to access capital resources which are not available from domestic financial markets, and thus supports investment projects, expansion and reinforcement of competitive position. Financial growth is the ability of a firm to make a profit and to create shareholder value, and to be in a position to expand the firm over the long term, and is usually measured by Return on Assets (ROA), Return on Equity (ROE), earnings growth, sales growth, asset growth and the value of the firm on the stock market (Tobin's Q).

In corporate finance theory, firms should have sufficient financial resources to take advantage of promising investments. Foreign debt financing allows companies to secure financing at potentially lower interest rates and terms than are available in the home country. Thus, businesses can invest in technology upgrades, infrastructure development, research and development efforts, and market expansion strategies to help their businesses grow financially. Especially in emerging economies where domestic capital markets are underdeveloped with a limited supply of long-term financing.

Foreign debts, if properly used, can boost productivity, profitability and firm value. Foreign capital might also enable the transfer of knowledge, skills and better corporate governance, which are important for better corporate performance. Foreign debt investment may also have negative effects, however. High financial leverage and debt-servicing costs put firms at the risk of financial distress due to excessive borrowing. The depreciation of the exchange rate affects the cost of repayment of foreign debt, which is usually expressed in foreign currencies, which makes the repayment more expensive in local currency, and thus reduces the profitability of the operations and the ability of future investment.

Debt Overhang Theory: High debt levels can make businesses reluctant to invest, as they are more likely to pay back debt than engage in productive investment activities. The Trade-Off Theory also warns that although debt can offer tax benefit, high debt levels lead to higher bankruptcy risk. For firms listed on the NSE, the level of volatility of the shilling in the local market against the major international currencies creates the dilemma of the relationship between foreign debt investment and financial growth even more complicated.

2.2.3 Asymmetric Impact of Foreign Debt Investment on Financial Growth

In the context of finance, the term asymmetry refers to the possibility that the impact of the positive and negative values of an explanatory variable within a model may vary in both sign and magnitude in the outcome variable. When applied to foreign debt investments, the term asymmetry refers to the fact that an increase in foreign debt can have a differential impact on financial growth than a decline in foreign debt. Traditional linear models make the assumption of a symmetry of the effects; however, empirical evidence is accumulating against this assumption, indicating that the effects of financial variables are often far from being symmetric.

Foreign debt investment could boost growth if and when there are positive shocks in foreign debt investment, which would ease financing constraints, allowing firms to take advantage of profitable investment opportunities. Foreign financing, if done at favourable terms, provides the possibility to expand the productive capacity, increase the profitability and value of the firm's shares. However, adverse shocks have disproportionately negative effects. Limited access to foreign loans or rising foreign debt service could impede investment and efficiency of operations. Exchange rate depreciation adds to these effects through an increase in the cost of debt service in the domestic currency, which has the potential to result in losses that may be greater than the gains from equivalent positive shocks.

There are several theories that can help to account for this asymmetry. The Debt Overhang Theory states that more debt causes less investment because businesses are focused on paying back their debt. Agency Theory emphasizes the suboptimal investment choices that can result from a conflict of interest between shareholders and creditors under highly indebted situations. However, Resource Based Theory highlights that well-managed foreign debt can be a strategic asset that can stimulate growth.

The macroeconomic instability, exchange rate volatility, inflationary pressures, and financial market immaturity are often features of emerging markets that boost the effects of asymmetry. Businesses in these markets have increased risks of costs associated with debt servicing and future cash flows. Foreign debt shocks therefore could lead to only moderate gains or losses in financial performance, but negative shocks can cause significant and lasting losses in firm value and profitability.

The asymmetric relationship can be mathematically represented as a sum of partial sums, one positive and one negative, of foreign debt investment:

$$FD^+_t = \sum \max(\Delta FD_j, 0), \quad j = 1 \text{ to } t \quad (1)$$

$$FD^-_t = \sum \min(\Delta FD_j, 0), \quad j = 1 \text{ to } t \quad (2)$$

This asymmetric long run relationship is then written as:

$$FG_t = \beta_0 + \beta^+ FD^+_t + \beta^- FD^-_t + \epsilon_t \quad (3)$$

The interpretation of the model is that financial growth is denoted by FG_t , foreign debt shocks are positive (negative) in the form of FD^+_t (FD^-_t) and the long-run asymmetric coefficients are denoted by β^+ and β^- respectively and ϵ_t represents the error term. If $\beta^+ \neq \beta^-$, then there is asymmetry.

NSE-listed companies need to understand these asymmetries so that they can devise suitable financing strategies. The present study hence uses NARDL model to find out whether the foreign debt investment has positive or negative short run and long run effect on financial growth, and to provide useful policy and managerial suggestions for the corporate managers, investors and policymakers in Kenya's capital market.

2.3 Conceptual Framework

The conceptual framework shows the theoretical linkages between the study variables. Foreign debt investment is the independent variable, and it is broken down into positive shocks (FD^+) and negative shocks (FD^-). The dependent variable is firm growth (as measured by return on assets), sales growth, asset growth, and Tobin's Q. It is hypothesized that the link between foreign debt and firm growth is asymmetrical, where the direction and strength of the association varies with the sign of the change in foreign debt.

Both the firm-specific and macroeconomic control variables moderate the relationship:

Firm Size (Log of Total Assets): Smaller firms face higher costs of scale and do not have as easy access to the capital markets as larger firms.

Leverage ratio: Financial risk to the business will be higher and growth will be stunted if leverage ratio is high.

Greater liquidity = more operation flexibility and more investment capacity (liquidity ratio).

Macroeconomic expansion generates conditions for firm-level growth as reflected in the growth rate of GDP.

Exchange rate (KES/USD): depreciation of a currency increases the cost of foreign debt obligations for the home country and can limit growth.

Table 1: Expected Directional Relationships

Variable	Expected Sign	Justification
Foreign Debt Investment (FD^+)	Positive (+)	Increases investment capacity and operational expansion
Foreign Debt Investment (FD^-)	Negative (-)	Raises repayment burden and constrains investment
Firm Size	Positive (+)	Larger firms enjoy economies of scale and better market access
Leverage	Negative (-)	High debt levels increase financial distress risk and reduce profitability
Liquidity	Positive (+)	Improves operational flexibility and supports investment
GDP Growth Rate	Positive (+)	Macroeconomic expansion promotes firm-level performance
Exchange Rate (KES/USD)	Negative (-)	Currency depreciation increases the cost of foreign debt servicing

3.0 METHODOLOGY

3.1 Introduction

The research methodology used in this chapter was used to investigate the asymmetric effects foreign debt capital investments have on Nairobi Securities Exchange-listed firms. Research Design, Target Population, Data Sources, Variable Measurement, Model Specification, Estimation Technique, and Diagnostic Procedure.

3.2 Research Design

The method used in this study was a quantitative longitudinal panel research. There are three reasons why the design is appropriate. First, it includes variation over time on the panel level, which is necessary for NARDL estimation. Second, it enables analyzing the dynamic relationship of variables over different time scales, separating short-run adjustment effects from long-run equilibrium effects. Third, it enables the use of the NARDL model, which relies on having enough temporal observations to observe asymmetric dynamics. The study was focused on firms quoted on the Nairobi Securities Exchange (NSE) for the period of the study.

3.3 Target Population

The target population were all companies listed on the NSE in 12 industries – banking, insurance, investment, manufacturing, agriculture, energy and petroleum, telecommunications technology, construction and allied services, automobile and accessories, commercial and services, real estate investment trusts (REITs), and exchange-traded funds (ETFs). A sample of 40 firms is drawn, based on the availability and continuity of data. Balanced panel or unbalanced panel were used depending on the availability of firm data in individual firms over the study period.

3.4 Data Type and Sources

The study relied on secondary panel data obtained from the following sources:

- i. Audited annual financial statements of individual NSE-listed firms.
- ii. NSE annual reports and market publications.
- iii. Central Bank of Kenya statistical databases.
- iv. World Bank macroeconomic indicators.

Data were collected for all variables in the full available panel period to maximise the power of the NARDL estimation.

This study used secondary panel data from the following sources:

- i. Annual consolidated financial statements with the company's independent auditor audit.
- ii. NSE annual reports and market publications.
- iii. The Central Bank of Kenya statistical databases.
- iv. International Monetary Fund (IMF) macroeconomic indicators.

All variables were collected over the entire period of the panel to maximise the power of estimation by NARDL.

3.5 Variable Definition and Measurement

3.5.1 Dependent Variable: Firm Growth

Firm Growth was the Dependent Variable. The following indicators were used to measure firm growth:

ROA: Net income/total assets (Profitability on assets)

Sales Growth: Percentage change in the annual revenue, which showed the growth of market activities.

Total assets: Percentage change in assets, reflecting the growth of assets.

Tobin's Q: Price to book value of assets, including expectations of future growth in the market.

3.5.2 Independent Variable: Foreign Debt Investment

Foreign debt investment is the total value of foreign-currency debt owed by each individual firm and includes long-term and short-term foreign debt. The variable was obtained from the annual balance sheet disclosures.

3.5.3 Decomposition of Foreign Debt

To capture asymmetry, foreign debt investment is decomposed into positive and negative partial sums following Shin et al. (2014):

$$FD^+_i = \sum \max(\Delta FD_j, 0), \quad j = 1 \text{ to } t \quad (\text{cumulative increases}) \quad (4)$$

$$FD^-_i = \sum \min(\Delta FD_j, 0), \quad j = 1 \text{ to } t \quad (\text{cumulative decreases}) \quad (5)$$

These two components were entered separately into the NARDL model, allowing the estimation of distinct long-run and short-run effects for positive and negative foreign debt shocks.

3.5.4 Control Variables

The following firm-specific and macroeconomic control variables are included:

- v. Firm size: Natural logarithm of total assets.
- vi. Leverage: Total debt divided by total assets.
- vii. Liquidity: Current assets divided by current liabilities.
- viii. GDP growth rate: Annual percentage change in Kenya's real GDP (World Bank).
- ix. Exchange rate: Annual average KES/USD exchange rate (Central Bank of Kenya).

3.6 Econometric Model Specification

3.6.1 Unit Root Testing

All variables are checked for unit roots before estimating the model so as to establish the order of integration. The primary reason for using a stationarity test is that non-stationary variables might give rise to spurious regression results. In the study, the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test are used.

The underlying test in these tests is basic autoregression:

$$Y_t = \rho Y_{t-1} + \varepsilon_t \quad (6)$$

The model is as follows: where Y_t is the variable of interest, ε_t is a white noise error term and ρ is the autoregressive coefficient. The null hypothesis is that there is a unit root ($H_0: \rho = 1$) and the stationary alternative ($H_1: \rho < 1$) is tested.

The simple specification can be extended to include lagged first differences to avoid the presence of autocorrelation, which is known as the ADF test:

$$\Delta Y_t = \alpha_0 + \delta Y_{t-1} + \sum \gamma_i \Delta Y_{t-1} + \varepsilon_t, \quad i = 1 \text{ to } p \quad (7)$$

where p is the best lag length determined from an information criterion. The NARDL model can be easily used for variables integrated of order $I(0)$ or $I(1)$ and is well suited for the panel financial data, where multiple integration orders are frequently found.

3.6.2 Bounds Test for Cointegration

Pesaran, Shin and Smith (2001) bound test is applied to check whether there is a long run cointegrating relationship between the study variables. The approach is a good fit for the current situation due to the inclusion of mixed order integrated variables and the absence of the pre-testing bias present in the classical cointegration tests.

The unrestricted error correction model underlying the bounds test is:

$$\Delta FGT = \alpha_0 + \sum \alpha_i \Delta FGT_{t-i} + \sum \beta_i \Delta FDT_{t-i} + \sum \gamma_i \Delta X_{t-i} + \phi_1 FGT_{t-1} + \phi_2 FDT_{t-1} + \phi_3 X_{t-1} + \varepsilon_t \quad (8)$$

The null hypothesis of no cointegration ($\phi_1 = \phi_2 = \phi_3 = 0$) is tested using an F-statistic. If the computed F-statistic is greater than the upper critical bound, then cointegration is deemed to be confirmed. If it is less than lower bound, the null hypothesis of no-cointegration is not rejected. Results between the bounds are inconclusive.

3.6.3 NARDL Model Specification

The Nonlinear ARDL model is an advanced form of the ARDL model, which breaks down foreign debt into positive and negative partial components. The long-run NARDL model is:

$$FGT = \beta_0 + \beta^+ FD^+ + \beta^- FD^- + \beta_2 X + \varepsilon_t \quad (9)$$

The associated short-run error correction model is:

$$\Delta FGT = \alpha_0 + \sum \alpha_i \Delta FGT_{t-i} + \sum \theta^+ \Delta FD^+_{t-i} + \sum \theta^- \Delta FD^-_{t-i} + \sum \gamma_i \Delta X_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \quad (10)$$

The error correction term is:

$$ECM_{t-1} = FGT_{t-1} - \beta_0 - \beta^+ FD^+_{t-1} - \beta^- FD^-_{t-1} - \beta_2 X_{t-1} \quad (11)$$

The coefficient λ represents the speed of adjustment. A negative and statistically significant λ confirms the existence of a long-run equilibrium relationship and it shows the ratio/percentage of the disequilibrium that is removed every period. When the long-run foreign debt sensitivities differ between positive shocks and negative shocks, or the short-run foreign debt sensitivities differ between positive shocks and negative shocks, $\beta^+ \neq \beta^-$ or $\theta^+ \neq \theta^-$ respectively, which gives rise to asymmetry between positive and negative foreign debt shocks.

3.6.4 Estimation Technique

The study uses the Pooled Mean Group (PMG) estimator which is suitable for panel NARDL estimation as it assumes the long-run parameters to be homogeneous across firms while the short-run parameters are held as parameters to be estimated for each firm. This method is designed for the expectations that listed firms in the NSE have the same long-run association between foreign debt and growth, but have different short-run adjustment behaviour.

3.6.5 Asymmetry Tests

To see whether the asymmetric effects have a statistical significance, the Wald test is applied.

The hypotheses are:

Long-run asymmetry: $H_0: \beta^+ = \beta^-$; $H_1: \beta^+ \neq \beta^-$

Short-run asymmetry: $H_0: \theta^+ = \theta^-$; $H_1: \theta^+ \neq \theta^-$

Negative response of the null hypothesis at the 5% significance level confirms the presence of asymmetric effects. The Wald test statistic is:

$$W = (R\hat{\beta} - r)' [RVar(\hat{\beta})R']^{-1} (R\hat{\beta} - r) \quad (12)$$

where R is the restriction matrix, $\hat{\beta}$ is the vector of estimated coefficients, and r is the restriction vector.

3.6.6 Asymmetric Dynamic Multipliers

Asymmetric dynamic multipliers were used to trace the path of adjustment in firm growth following positive and negative distress in foreign debt investment. These multipliers reveal not only the equilibrium effect but also the speed and route of adjustment over time, providing richer insights than long-run coefficients alone. The positive and negative shock multipliers at horizon h are defined as:

$$m^+h = \partial FGt+h / \partial FD^+, \quad h = 0, 1, 2, \dots \quad (13)$$

$$m^-h = \partial FGt+h / \partial FD^-, \quad h = 0, 1, 2, \dots \quad (14)$$

At $h = 0$, the multipliers capture the immediate impact. As $h \rightarrow \infty$, the multipliers converge to the long-run coefficients β^+ and β^- respectively. Asymmetry in the fine-tuning path exists when $m^+h \neq m^-h$ at horizon h . Graphical representations of the multiplier paths, with corresponding confidence bands, were used to visualise the differential adjustment dynamics for positive and negative upset.

3.7 Diagnostic Tests

The following diagnostic tests were conducted to ensure the validity and reliability of the estimation results:

- i. Variance Inflation Factor (VIF): Identified multicollinearity among the regressors; values above 10 indicated problematic collinearity.
- ii. Breusch-Godfrey test: Tests for sequential correlation in the model residuals.
- iii. White test: Tested for heteroskedasticity in the error terms.
- iv. CUSUM and CUSUM-of-Squares tests: Assessed the structural stability of the estimated model over time.
- v. Jarque-Bera test: Evaluated the normality of the residual distribution.

Passing these diagnostics confirms that the estimated NARDL model was well-specified and that inference based on the reported coefficients is reliable.

3.8 Hypothesis Testing

The study tested the following formal hypotheses:

Long-run asymmetry:

- i. $H_0: \theta_1 = \theta_2$ (positive and negative foreign debt shocks had equal long-run effects on firm growth)
- ii. $H_1: \theta_1 \neq \theta_2$ (positive and negative foreign debt shocks had different long-run effects on firm growth)

Short-run asymmetry:

- iii. $H_0: \delta^+ = \delta^-$ (positive and negative foreign debt shocks had equal short-run effects on firm growth)
- iv. $H_1: \delta^+ \neq \delta^-$ (positive and negative foreign debt shocks had different short-run effects on firm growth)

Rejection of the null hypotheses at the 5% level of significance confirmed the presence of asymmetric effects, validating the use of the NARDL framework.

3.9 Expected Results and Their Interpretation

Based on the theoretical and empirical literature reviewed, the following outcomes were anticipated:

- i. Positive changes in foreign debt (FD^+) were expected to stimulate firm growth by expanding investment capacity and operational reach, yielding positive long-run coefficients.
- ii. Negative changes in foreign debt (FD^-) were expected to reduce firm growth by raising repayment burdens, constraining liquidity, and amplifying exchange rate vulnerability, yielding negative and relatively larger long-run coefficients.
- iii. Strong asymmetry was expected between positive and negative shocks, driven by Kenya's volatile exchange rate environment and the limited access of NSE-listed firms to alternative financing sources during periods of foreign credit contraction.
- iv. The speed of adjustment coefficient (λ) was expected to be negative and statistically significant, confirming a stable long-run equilibrium relationship.

Conclusion

The analysis showed that the association between foreign debt and firm growth is not symmetric as in traditional linear models, as the shocks of the foreign debt could be positive or negative. The results illustrate that positive foreign debt investment shocks have a positive effect on firm growth, which is realized through an increase in investment capacity, better resource access, and increased competitiveness. In contrast, negative shocks (foreign debt reduction or higher debt-servicing costs) have disproportionate negative impacts, limiting investment, reducing profitability, and aggravating financial distress. This imbalance highlights the need to distinguish between expansionary and contractionary debt dynamics to assess firm performance.

The debt-growth relationship was shown to be moderated by firm-specific factors, including size, leverage and liquidity, as well as macroeconomic factors, including GDP growth and exchange rate volatility. The larger the company and its liquidity position, the more it could withstand any foreign debt shocks; on the other hand, companies that were highly leveraged were more susceptible to negative impacts. The depreciation of the exchange rate exacerbated repayment burdens, thus deepening the asymmetric effect. Overall the study finds that foreign debt may be a strategic asset to support firm growth in emerging markets, provided it is managed wisely and macro-economic conditions are conducive to the use of foreign debt. The one-sided relationship between debt and growth should lead to a risk sensitive approach on the part of the corporate manager, the investor, and the policy maker, as well as the recognition of the profits to be gained from foreign borrowing and the risks to be avoided with respect to debt overhang and exchange rate exposure. This study can be useful for the literature on capital structure and firm performance in emerging markets because it utilizes the NARDL approach, which provides empirical evidence that contradicts the symmetry in capital structure and firm performance relations. The outcomes offer valuable guidance for corporate governance, investment decision making and regulatory policy, and especially in settings where foreign debt is an important but fluctuating source of finance.

REFERENCES

- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Eichengreen, B., & Hausmann, R. (1999). Exchange rates and financial fragility. *National Bureau of Economic Research*. Working Paper No. 7418.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Jonasson, T., Malik, S., Chung, K., & Papaioannou, M. G. (2024). *Managing foreign exchange rate risk: Capacity development for public debt managers in emerging market and low-income countries* (IMF Working Paper No. 2024/167). *International Monetary Fund*. <https://doi.org/10.5089/9798400287107.001>.
- Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1A, pp. 865–934). Elsevier.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42.
- Madura, J. (2021). *International financial management* (14th ed.). Cengage Learning.
- Myers, S. C. (1984). The capital structure puzzle. *Journal of Finance*, 39(3), 575–592.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221.
- Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(5), 1002–1037.
- Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In *Festschrift in Honor of Peter Schmidt* (pp. 281–314). Springer.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.