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THE EFFECT OF EXTERNAL DEBT SERVICE ON EDUCATION ACCESS IN KENYA

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Abstract

This study examines the effect of external debt service on access to primary education in Kenya using annual data from 1970 to 2023. The analysis applies the Autoregressive Distributed Lag (ARDL) model to estimate both the short-run and long-run relationships between primary school enrollment, external debt service, external debt stock, government expenditure on education, and economic growth. The findings reveal a stable long-run relationship among the variables. External debt service has a negative and statistically significant effect on primary school enrollment, suggesting that rising debt repayment obligations reduce fiscal space for education. In contrast, external debt stock shows a positive relationship with enrollment, indicating that external borrowing can support education access when allocated productively. Government expenditure on education has a positive but insignificant effect, while economic growth is negatively associated with enrollment. The results suggest that sustainable debt management and more efficient public spending are essential for protecting education access and long-term human capital development in Kenya.

Keywords: ARDL Model, Education Access, External Debt, Fiscal Displacement, Human Capital.

INTRODUCTION

Kenya has experienced a substantial increase in external borrowing over the past two decades as the government has sought to finance infrastructure development, budget deficits, and long-term economic transformation. While external borrowing can provide resources for development, rising debt service obligations have raised concerns about their effect on public investment in essential social sectors. Among these sectors, education remains particularly important because access to primary schooling forms the foundation of long-term human capital development and inclusive growth. Public debt is the cumulative borrowing by governments to finance fiscal deficits when expenditures exceed revenues. For developing economies, external borrowing has long been viewed as an important tool for financing development projects and closing savings and foreign exchange gaps (Chenery & Strout, 1966). External debt involves obligations to foreign creditors, including multilateral institutions such as the World Bank and the International Monetary Fund, bilateral partners, and commercial lenders. While external borrowing can support economic development when managed prudently, debt accumulation beyond sustainable thresholds may generate adverse macroeconomic effects. Particularly as rising debt service obligations constrain fiscal space for public investment.

External debt service refers to the regular payments of principal and interest that governments must make to meet their obligations to foreign creditors (T. F. I. & Richard, 2015). When these obligations rise significantly, they may reduce the fiscal space available for social sector spending. Persistent fiscal deficits and growing debt burdens may weaken macroeconomic stability and constrain public investment in essential services (Reinhart & Rogoff, 2010). Kenya has experienced a substantial increase in external debt over the past decade. This expansion has been driven by large infrastructure projects, widening fiscal deficits, and exchange rate depreciation (Mose et al., 2024). While external borrowing is commonly justified as a tool for development financing (Baba, 2020), increasing debt service obligations raise concerns that debt repayment may crowd out public investment in key social sectors.

Education is one of the sectors most prone to fiscal pressures arising from debt obligations. Investment in education is widely recognised as a basic foundation for human capital development and long-term economic growth. However, when governments face rising debt servicing costs, they may reallocate resources away from discretionary expenditures, including education spending (Engefu et al., 2024; Miningou, 2023). Evidence from developing countries suggests that high debt servicing burdens frequently lead to reductions in social sector expenditure. In Sub-

Saharan Africa, rising external debt service has been associated with declining public investment in education and health (Mbewe, 2024; Shabbir & Yasin, 2015). Reduced funding for education can weaken school infrastructure, limit teacher recruitment, and constrain access to learning materials, ultimately affecting education outcomes. In Kenya, the pressure of debt repayment has grown rapidly. External debt service rose from approximately USD 1.5 billion in 2012 to nearly USD 4 billion in 2019. At the same time, government expenditure on education as a share of GDP declined from over 5% to about 3.96% in 2023. These trends suggest that rising debt obligations may be constraining fiscal resources available for education. Primary school enrollment is a key indicator of educational access and human capital development. Although Kenya has achieved substantial progress in expanding primary education, particularly following the introduction of free primary education in 2003, enrollment trends remain sensitive to fiscal conditions and public spending priorities.

Despite the growing literature on public debt and development outcomes, few studies have investigated the direct relationship between external debt service and access to education in Kenya. Most existing research focuses on macroeconomic indicators such as economic growth or aggregate education expenditure, leaving a gap in understanding how debt servicing pressures influence education access at the primary level. This study addresses this gap by examining the impact of external debt service on primary school enrollment in Kenya using a time-series econometric approach. Specifically, the study investigates both the short-run and long-run dynamics between external debt service and enrollment using the ARDL model.

LITERATURE REVIEW

Theoretical Literature

Fiscal Displacement Effect

Government spending decisions in developing economies are often made under binding fiscal constraints. Due to limited public resources, governments must allocate available revenue across competing sectors such as infrastructure, health, security, and education. Within this budget framework, debt service obligations differ from most other expenditures because they are largely non-discretionary. Principal and interest payments to external creditors must be honored to preserve creditworthiness and maintain access to international financial markets. By contrast, expenditure on education, although socially important, is often treated as a relatively adjustable component of the public budget in the short run. During periods of fiscal stress, governments may postpone school construction, delay teacher recruitment, reduce the availability of learning materials, or slow the expansion of education programs to meet debt repayment commitments. As a result, rising debt service can indirectly reduce access to education by compressing the fiscal space available for social sector spending. Following Fosu (2007), social welfare can be represented as a function of expenditure allocated to education and other public spending:

$$U = U(E, O)$$

where

E represents expenditure on education and O represents other government expenditures.

This welfare maximisation is subject to a government budget constraint:

$$E + O = R$$

where total available resources are defined as:

$$R = T + N + A - D$$

where:

T = tax revenue
N = non-tax revenue
A = external aid
D = debt service obligations

An increase in external debt service reduces total available fiscal resources. Unless revenue rises proportionately, the government must reduce expenditure in other areas. Since education spending can be adjusted more easily than debt repayment in the short run, higher debt service may displace resources away from education and weaken school access over time.

2.2 Empirical Literature Review

A growing body of literature has investigated how external debt service affects the social sector in developing countries. Debt servicing represents a binding fiscal commitment that governments must meet regardless of other spending priorities. In low-income economies where public revenues are already limited, rising debt

repayment obligations often compete directly with funding for basic services. When larger portions of the national budget are devoted to servicing external debt, fewer resources remain available for essential education inputs such as classrooms, teacher recruitment, instructional materials, and school feeding programs. Over time, these fiscal pressures can weaken the ability of governments to sustain or expand access to primary education. Evidence from Sub-Saharan Africa broadly supports this relationship between debt servicing and education outcomes. High external debt service crowds out social-sector spending, reducing access to education and health services across developing economies (Shabbir and Yasin 2015). Similarly, Miningou (2023) reports that rising debt servicing obligations are associated with lower school participation rates in highly indebted African countries. However, the empirical evidence is not entirely uniform. Ekaette et al. (2019) identify a significant relationship between external debt and education financing in Nigeria, yet they find that external debt service itself does not significantly influence government education spending. These mixed findings suggest that while debt servicing can create fiscal pressure, its effect on education outcomes may vary depending on country-specific fiscal structures, policy priorities, and institutional capacity.

Beyond direct effects on educational access, a substantial strand of literature focuses on how external debt service reshapes government expenditure patterns, particularly spending on education. From a public finance perspective, debt service is largely non-discretionary: governments must honor repayment commitments before allocating resources to development sectors. As a result, rising debt service obligations can displace discretionary expenditures, including education spending. Empirical studies support this argument. Fosu (2007) demonstrates that higher debt servicing significantly reduces government expenditure on education across Sub-Saharan Africa, confirming the presence of fiscal displacement. Similarly, Mbewe (2024) finds that increasing debt service payments crowd out education spending in low-income countries, while Shabbir & Yasin (2015) show that debt burdens systematically reduce social sector investment, weakening human capital development over time.

In Kenya, education access has historically been shaped by a combination of political priorities, economic conditions, and major policy reforms. The introduction of Free Primary Education (FPE) in 2003 dramatically expanded school enrollment, illustrating the powerful role of public financing in improving access to basic education (Ombado, 2006). Sustaining these gains has become increasingly difficult amid growing fiscal pressures, including rising external debt obligations. Wafula & Njaramba (2024) report that foreign debt servicing adversely affects literacy outcomes in Kenya in the long run. Suggesting that rising debt repayment pressures may constrain fiscal space for education spending. Similar patterns appear across other African countries, where debt service pressures limit government spending on education and reduce investment in human development (Brendan Edeminam & Nuri Aras, 2022; Mbewe, 2024). Despite these insights, Kenya-specific empirical evidence remains limited, particularly studies that examine education access directly using indicators such as primary school enrollment. Most existing work mostly focuses either on economic growth or broader educational outcomes, such as literacy rates. This study addresses that gap by investigating how external debt service, alongside education expenditure, influences primary school enrollment in Kenya using a time-series econometric framework.

METHOD

This study adopts a quantitative approach, employing a time-series econometric model to examine the effect of external debt service on Education access in Kenya. This study utilises an Autoregressive Distributed Lag (ARDL) model, as it effectively captures both the short-run dynamics and long-run equilibrium relationships between variables. To examine the effect of external debt service on primary school enrollment in Kenya, this study uses annual time-series data covering the period from 1970 to 2023. The study relies on secondary data obtained from the World Bank database. Data for primary school enrollment, external debt service, external debt stock, government expenditure on education, and gross domestic product (GDP) are collected from the World Development Indicators (WDI) of the World Bank. These data sources provide consistent and reliable macroeconomic indicators widely used in empirical economic research.

Table 3.1: Description of Variables

Variable	Symbol	Measurement	Source
Education Enrollment	ENR	Gross enrollment ratio (%)	World Bank
External Debt Servicing	EDS	External debt service (% of GNI)	World Bank
External Debt	ED	Total external debt stock (% of GNI)	World Bank
Government Expenditure on Education	GEE	Government expenditure on education (% of GDP)	World Bank
Economic Growth	GDP	Gross Domestic Product growth rate (%)	World Bank

Estimation Technique

The study employs the Autoregressive Distributed Lag (ARDL) approach developed by Pesaran et al. (2001) to estimate the relationship among the variables. The ARDL model has several advantages that make it particularly suitable for this analysis. First, the ARDL framework allows the estimation of both short-run and long-run relationships between variables within a single econometric model. This is important because the effects of debt servicing on education access may differ between immediate fiscal adjustments and long-term structural dynamics. Second, the ARDL approach can be applied when the variables included in the model are integrated at different orders, provided that none of the variables is integrated of order two or higher. Macroeconomic time-series data often exhibit mixed integration properties, making the ARDL approach particularly useful in empirical macroeconomic studies. Third, the ARDL model performs well even with relatively small sample sizes, which is often the case in country-specific time-series analyses.

Econometric Model Specification: ARDL Model

Following the fiscal displacement theory, this study specifies the primary school enrollment rate as a function of external debt service, external debt stock, government expenditure on education, and overall economic activity. The theoretical functional relationship is expressed as:

$ENR_t = f(DS_t, DebtStock_t, EDEXPE_t, GDP_t)$

Where;

ENR_t : Primary school enrollment rate at time t

DS_t: External Debt Service at time t

$DebtStock_t$: External Debt stock at time t

$EDEXPE_t$: Government Expenditure on Education at time t

GDP_t: Gross Domestic Product (Economic Growth) at time t

t: Time period

The theoretical relationship is translated into an estimable linear econometric model as follows:

$$ENR_t = \beta_0 + \beta_1 DS_t + \beta_2 DebtStock_t + \beta_3 EDEXPE_t + \beta_4 GDP_t + \varepsilon_t$$

β_0: Intercept

β_1, β_2, β_3, and β_4: Parameters to be estimated

ε_t Error term that captures other factors influencing enrollment.

The model is then transformed into a natural logarithmic form.

$$lnENR_t = \beta_0 + \beta_1 lnDS_t + \beta_2 lnEDEXPE_t + \beta_3 lnEDEXPE_t + \beta_4 lnGDP_t + \varepsilon_t$$

Where;
ln: Natural logarithm
$lnENR_t$: Natural log of primary school enrollment rate
$lnDS_t$: Natural log of external Debt Service
$lnEDEXPE_t$: Natural log of external Debt Stock
$lnEDEXPE_t$: Natural log of government expenditure on education
$lnGDP_t$: Natural log of Gross Domestic Product
β_0: Constant term
β_1- β_4: Long-run elasticities
ε_t: Error term
The ARDL model is re-parameterised into an error-correction form to capture both the short-run dynamics and the speed of adjustment towards the long run.

$$\Delta ENR_t = \alpha_0 \sum_{i=1}^{p} \alpha_i \Delta ENR_{t-1} + \sum_{j=0}^{q} \beta_j \Delta DS_{t-J} + \sum_{k=0}^{q} Y_k \Delta ControlVariables_{t-k} + \lambda ECM_{t-1} + \varepsilon_t$$

Where:
Δ: denotes first differences
ENR_t: Overall level of participation in primary education.
DS: Debt service
Control variables: set of control variables (GDP, Debt Stock, and Government Expenditure on Education)
α_0: Constant term
α, β, γ: Parameters to be estimated
ε_t: Error term, assumed to be normally distributed with zero mean and constant variance.
ECM_{t-1}: Captures the speed at which enrollment adjusts back to equilibrium after a shock.
λ: Measures the speed of adjustment. It is expected to be negative and statistically significant.
ε_t: Error term.

Estimation Procedure and Model Validation

The ARDL model process is carried out through a series of well-defined steps. First, a unit root test is conducted to assess the stationarity of the variables. In this study, the Phillips–Perron (PP) test is employed for this purpose. Next, the ARDL Bounds cointegration test is applied to determine whether a long-run relationship exists among external debt service, enrollment, and the other explanatory variables. Once cointegration is established, the analysis proceeds to estimate both the long-run relationships and the short-run dynamics using the ARDL Error Correction Model (ECM). This step enables a clearer understanding of how variables adjust over time toward equilibrium. To ensure the reliability and robustness of the results, several diagnostic tests are also performed. These include tests for heteroskedasticity, autocorrelation using the Breusch–Godfrey test, and stability of the model coefficients through the CUSUM and CUSUMSQ tests. This structured approach strengthens the validity of the ARDL model and ensures that both the short-term adjustments and long-term relationships are accurately captured.

RESULTS AND DISCUSSION

ARDL Diagnostic Test Results

Table 1. Phillips–Perron Unit Root Test Results

Variable	p-value	Order of Integration	Decision
LNENR	0.000	I(1)	Stationary
LNDS	0.000	I(1)	Stationary
LNDSTOCK	0.0038	I(1)	Stationary
LNEDEXP	0.000	I(1)	Stationary
LNGDP	0.0034	I(0)	Stationary

The Phillips–Perron unit root test was conducted to determine the order of integration of the variables before estimating the ARDL model. The results indicate that the variables are integrated at mixed orders. Specifically, LNGDP is stationary at level, indicating an I(0) process, while LNENR, LNDS, LNDSTOCK, and LNEDEXP become stationary after first differencing, indicating that they are integrated of order one, I(1). Since none of the variables is integrated of order two, the ARDL approach is appropriate for estimating both the short-run and long-run relationships among the variables.

Table 2. ARDL Bounds Test for Cointegration

Test Statistic	Value	5% I(0)	5% I(1)
F-statistic	4.3163	2.8600	4.01

The F-statistic exceeds the 5% upper bound, confirming cointegration among the variables.

The ARDL bounds test confirms the existence of a long-run relationship among primary school enrollment, external debt service, debt stock, education expenditure, and GDP. This justifies estimating both long-run coefficients and short-run dynamics using an error correction model.

Table 3. Error Correction Term (Speed of Adjustment)

Variable	Coefficient	Std. Error	t-Statistic	p-value
CointEq(-1)	-0.3083***	0.0632	-4.878	0

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

The error correction term is negative and statistically significant (−0.3083, $p < 0.01$), confirming the presence of a stable long-run equilibrium. The magnitude implies that approximately 30.8% of short-run disequilibrium is corrected annually, indicating a moderate speed of adjustment toward equilibrium.

Table 4. Long-Run (Levels) Equation Coefficients

Variable	Coefficient	Std. Error	t-Statistic	p-value
LNDS	-0.3376**	0.1628	-2.0734	0.0448
LNEDEXP	0.3026	0.2420	1.2502	0.2187
LNDSTOCK	0.6138**	0.2494	2.4609	0.0194
LNGDP	-0.5078*	0.2548	-1.9927	0.0533

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

The long-run estimates suggest economically plausible relationships between external debt variables, macroeconomic factors, and primary school enrollment in Kenya. External debt service is negative and statistically

significant, indicating that higher debt servicing obligations may constrain resources available for education access, consistent with the Crowding-out Effect and Fiscal Displacement Effect. External debt stock, on the other hand, shows a positive and significant association with enrollment, which may reflect the role of debt-financed public investment and social spending in supporting education outcomes over time. Government expenditure on education has a positive but statistically insignificant coefficient, a result that is common in enrollment studies and may point to inefficiencies, delayed effects of spending, or institutional constraints. GDP exhibits a marginally significant negative effect on enrollment, which could be indicative of non-inclusive growth patterns or distributional issues that limit the transmission of economic growth into improved educational access. Overall, these results suggest that debt dynamics play a meaningful role in shaping education outcomes, warranting further analysis.

Table 5. Short-Run Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	p-value
LNENR(-1)	-0.3083***	0.0947	-3.2562	0.0023
LNDS	-0.1041**	0.0405	-2.5701	0.0141
LNEDEXP	0.0933	0.0814	1.1462	0.2587
LNDSTOCK	0.1892**	0.0764	2.4781	0.0176
LNGDP	-0.1566*	0.0880	-1.7785	0.0831

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

In the short run, changes in external debt service continue to exert a negative influence on enrollment, suggesting immediate fiscal pressure effects.

Discussion

The findings indicate that external debt influences education access through two distinct channels with different implications for human capital development. While external debt service hurts primary school enrollment, external debt stock shows a positive association with enrollment when borrowed resources are used productively. This distinction suggests that the social impact of public debt depends not only on the level of borrowing itself but also on the fiscal burden created by subsequent repayment obligations. The long-run results show that external debt service has a negative and statistically significant effect on primary school enrollment. This suggests that increasing debt repayment obligations reduces the fiscal capacity of the government to sustain investment in education. Because debt service constitutes a mandatory budgetary commitment, rising repayment pressures may force governments to reallocate resources away from discretionary sectors such as education. In the Kenyan context, this finding implies that debt servicing may indirectly weaken school participation by limiting expenditure on classrooms, teacher recruitment, instructional materials, and other essential educational inputs. The result is consistent with the fiscal displacement hypothesis, which argues that debt repayment can crowd out social sector expenditure in highly indebted developing economies.

This finding also supports earlier empirical evidence that debt servicing can undermine social development outcomes in low-income countries. Studies such as Fosu (2007) & Miningou (2023) demonstrate that debt servicing obligations frequently reduce public investment in education by compressing available fiscal space. The Kenyan evidence presented reinforces this argument by demonstrating that the adverse consequences of debt servicing extend beyond aggregate expenditure and may directly affect access to basic education. By contrast, external debt stock is found to have a positive and statistically significant relationship with enrollment in the long run. This result indicates that external borrowing itself is not inherently harmful. When debt is used to finance productive public investment, it can improve educational access by expanding school infrastructure, increasing educational resources, and supporting long-term development programs. In Kenya, this may reflect periods during which borrowed funds contributed to the expansion of the education system, particularly after major reforms aimed at universalising primary education in 2003. The positive coefficient, therefore, suggests that the developmental impact of debt depends less on the size of borrowing and more on how borrowed resources are allocated, consistent with the dual-gap theory of development finance (Chenery & Strout, 1966).The contrast between the debt service and debt stock coefficients points to an important policy implication. Borrowing may support education in the short to medium term, but excessive debt accumulation can eventually generate repayment burdens that reverse those gains. This pattern is consistent with debt overhang theory, which proposes that moderate borrowing may promote development, whereas

unsustainable debt can reduce future public investment by increasing fiscal pressure (Krugman, 1988; Sachs, 1990). The results, therefore, suggest that the relationship between external debt and education is conditional rather than uniformly negative. Government expenditure on education shows a positive but statistically insignificant effect on primary school enrollment. Although the coefficient carries the expected sign, the lack of significance suggests that increased spending alone may not automatically translate into improved educational access. One possible explanation is that the effectiveness of public expenditure depends not only on the amount allocated but also on the efficiency with which resources are used. Administrative inefficiencies, delays in implementation, regional disparities, and governance constraints may weaken the transmission from education spending to actual school participation. This finding implies that the quality of expenditure may be as important as its quantity in improving education outcomes.

Economic growth, represented by GDP, exhibits a negative and marginally significant relationship with enrollment. This result differs from conventional expectations that higher income should improve social welfare outcomes. A possible explanation is that economic growth in Kenya may not have been sufficiently inclusive to expand educational access across all households. Growth concentrated in sectors with limited employment benefits for poorer households may fail to reduce barriers to school participation. Additionally, periods of economic expansion may coincide with rising opportunity costs of schooling if children are drawn into informal labor markets. The result suggests that macroeconomic growth alone does not guarantee improvements in human capital unless accompanied by policies that promote equitable distribution of income and access to public services. This finding is consistent with the broader argument that macroeconomic growth does not automatically lead to improvements in social sector outcomes when structural inequalities persist (Miningou, 2023).

Moreover, labour market dynamics may play a role, as economic expansion can increase demand for low-skilled labour, potentially encouraging school-age children to participate in income-generating activities rather than remain in school. These findings suggest that economic growth alone is insufficient to improve enrollment levels without complementary policies that promote equitable distribution of resources, strengthen public service delivery, and ensure that the benefits of growth reach disadvantaged groups in marginal and remote regions. The findings also emphasise the important role of institutional quality and policy effectiveness in shaping development outcomes. The insignificant effect of education expenditure and the negative relationship between GDP and enrollment suggest that macroeconomic resources alone are insufficient to improve education access without efficient allocation and equitable distribution. This implies that policy interventions should not only focus on increasing funding but also on improving governance, strengthening institutional capacity, and ensuring that resources are directed toward areas with the greatest impact on access to education.

The findings demonstrate that the relationship between public debt and education access is more nuanced than is often assumed. External debt can contribute positively to educational development when used productively, yet rising debt service obligations can simultaneously undermine those gains by constraining future public spending. This dual effect underscores the importance of sustainable debt management and efficient public expenditure in protecting long-term investments in human capital. For Kenya, the results suggest that debt policy should be evaluated not only in terms of macroeconomic sustainability but also in terms of its implications for social development and educational opportunity.

CONCLUSION

This study examined the effect of external debt on access to primary education in Kenya using annual time-series data from 1970 to 2023 within an ARDL framework. The findings show that external debt influences education access through two distinct channels. External debt service was found to have a negative and statistically significant effect on primary school enrollment, indicating that rising debt repayment obligations reduce the fiscal space available for education financing. In contrast, external debt stock exhibited a positive long-run relationship with enrollment, suggesting that external borrowing can support educational development when borrowed resources are directed toward productive public investment.

The results further show that government expenditure on education has a positive but statistically insignificant relationship with enrollment, implying that increased spending alone may not be sufficient to improve educational access. This suggests that the effectiveness of public expenditure depends not only on the amount allocated to education but also on how efficiently those resources are managed. Economic growth was also found to have a negative and marginally significant effect on enrollment, indicating that growth alone may not automatically translate into better education outcomes in the absence of inclusive development policies.

Beyond Kenya, these findings contribute to the broader debate on debt sustainability and human capital development in developing economies. Many low- and middle-income countries increasingly rely on external borrowing to finance development while simultaneously facing rising debt-servicing pressures. The Kenyan experience suggests that the developmental impact of external debt depends not only on the scale of borrowing but also on the balance between financing current development needs and preserving future fiscal capacity. This implies that debt management should be assessed not only by macroeconomic indicators such as debt-to-GDP ratios but also by its implications for long-term social investment. The study, therefore, highlights the importance of aligning debt policy with development priorities. For countries seeking to expand human capital while maintaining fiscal stability, sustainable borrowing and efficient allocation of public resources remain critical to ensuring that debt supports, rather than undermines, long-run educational progress.

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