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The External Debt and Economic Growth Conundrum: Evidence from 81 Countries

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Considering the rising external debt across countries, empirical research over the past twenty years of the twenty-first century has focused on the relationship between debt and growth. This study investigates the linear and nonlinear impact of external debt on economic growth for 81 highly indebted countries divided into three distinct groups based on the percentage of external debt (i.e., 50th, 75th, and 75th+ percentiles) during the last decade for the period of 2008-2023. The panel data random effects model was employed to test the relationship. Data from WDI is used for the estimation of the models. The results show a highly significant and negative linear as well as nonlinear relationship across all three groups and the overall sample. The study also found that the impact of external debt gets stronger with an increase in the percentage from 50 to 75. The study concludes that external debt is a significant negative determinant of economic growth for an overall sample of 81 countries, as well as a distinct group of countries. The study recommends revenue mobilization and efficient debt management for the sample group of countries .
Keywords: external debt, nonlinear relationship, GDP growth, panel data

The rising level of external debt and government debt has become a major problem for most of the economies around the world. External financing has primarily been a primary source of stabilization and investment in developing economies. However, recent trends show that developed economies also accumulate external debt due to high stabilizing costs arising from shocks such as the global financial crisis of 2008, or the European sovereign debt crisis of 2008 (Mohsin, Ullah, Iqbal, Iqbal, & Taghizadeh-Hesary, 2021; Law, Ng, Kutan, & Law, 2021). As a result, the higher debt accumulation impedes economic growth in both developing and developed economies. A pressing concern in developed economies is the issue of debt, which raises significant implications for less developed nations in terms of fiscal sustainability. Numerous developing countries heavily depend on advanced economies for external funding, comprising loans, grants, and foreign direct investment. Advanced economies facing growing public debt and potential fiscal troubles may have a considerable impact on the availability and affordability of external funding for developing countries. Developed nations facing economic difficulties like rising inflation, interest rate increases, or financial turmoil can result in stricter global credit terms, thereby elevating the expense of borrowing for emerging economies (Khan, Qadeer, & Ghafoor, 2017). This, consequently, could weaken the capacity of developing nations to fund essential infrastructure, development initiatives, and social welfare schemes.

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In this context, the government's central role in developing countries becomes increasingly vital. Ensuring long-term economic stability requires governments to prioritize fiscal sustainability, effectively manage debt levels, and reduce reliance on foreign borrowing. Implementing prudent fiscal policies, increasing domestic revenue collection, and optimizing public expenditure can help governments mitigate their exposure to external financial disturbances. Fostering economic resilience through diversification and attracting long-term foreign investment can help mitigate external debt challenges, which affect the economies of developed countries (Law, Ng, Kutan, & Law, 2021; Ali, Khalid, & Subhan, 2014). The primary reasons for borrowing or external financing in the literature are, firstly, to fill the investment gap, i.e., the difference between the investment and domestic savings to finance the investment projects in the economy, and secondly, to fill the current account deficit. However, over a longer period, the increased borrowing overburdens the economy, resulting in the diversion of resources to service the debt. This leads to a decrease in the resources to finance the development spending in the economy, thus impacting economic growth adversely (Abdullahi, Aliero, & Abdullahi, 2013; Senadza, Fiagbe, & Quartey, 2017).

From a financial standpoint, using external debt effectively can result in profitable outcomes and help stimulate the economy. Borrowed funds that are efficiently directed towards sectors like infrastructure development, education, healthcare, and technology can boost economic activity, increase productivity, and yield lasting advantages (Ajmair & Hussain, 2020). A key consideration in this scenario is keeping the cost of borrowing below the returns generated by investments funded through debt. Under these circumstances, the earnings from these investments can both compensate for the expense of debt repayment and produce additional profits that strengthen economic expansion (Akram, 2011; Mahmoud, 2015). This outcome hinges on prudent debt management and the efficient allocation of available resources. Inefficient use of borrowed funds for non-income-generating activities can result in wasted resources, heightened debt levels, and ultimately impede economic development, highlighting the importance of prudent fiscal and investment decision-making.

Despite a substantial amount of research investigating the link between external debt and economic expansion, results remain unclear. Research indicates that the debt burden and the displacement of investment (Krugman, 1988; Reinhart & Rogoff, 2010) may have a detrimental effect, whereas other studies claim that judicious use of external loans can foster economic growth (Pattillo, Poirson, & Ricci, 2004). Previous studies frequently center on either developed or developing nations individually, overlook a comprehensive cross-country examination, or neglect the complexities of the debt-growth dynamic. Many studies base their findings on outdated data and fail to consider the influence of institutional factors in this context. This study closes these gaps by using a panel dataset of 81 countries, incorporating current economic data, and applying advanced econometric methods to capture potential nonlinearities and heterogeneities across various income groups. This approach offers a more detailed comprehension of the relationship between external debt and economic growth, and it helps guide policy choices on responsible debt management strategies.

Thus, considering previous research and current studies, the research questions of this study are as follows:

- What is the relationship between external debt and economic growth across 81 sample countries?

- How do different percentages of external debt to GDP (i.e., 50, 75, and above 75) impact economic growth across the group of sample countries?

Unlike previous studies, this study explores the relationship both the linear and non-linear association between economic growth and external debt by categorizing indebted countries into three major categories according to the percentage of external debt to the GDP i.e., i) countries having external debt percentage to GDP less than or equal to 50%, ii) countries having debt greater than 50% and less than 75%, iii) and countries having debt greater than 75%. A sample of a total of 81 countries is included in the study, and data ranging from 2008 to 2023 is used to analyze the relationship. The study offers a unique exploration of the complex relationship between debt and GDP by investigating the impact of external debt on GDP growth at different percentage levels. Moreover, the use of robust panel data modeling increases the reliability and efficiency of the study findings.

This study comprises six sections, with the first providing an introduction and the second section offering a theoretical background and literature review. The third section focuses on data and methodology, while the fourth explains the variables used in the study. The fifth section presents the discussion and results, and the sixth and final section concludes with policy recommendations.

Theoretical Background and Literature

For more than 5 decades, the relationship between debt and economic growth has been a major area of interest in economics, drawing considerable scrutiny from academics since the early 1990s. A plethora of studies have investigated the intricate link between debt and economic growth, and this connection is multifaceted and influenced by specific conditions. A huge burden of debt can hinder investment and development by decreasing government finances, resulting in increased debt repayment, in turn decreasing spending on key public services like education, healthcare, and infrastructure development, which are key factors for growth. Governments trying to balance the debt and growth nexus is a major topic that needs to be extensively discussed.

Concerning the New-Keynesian view on debt overhang and the role of institutions, Krugman (1988) noted in the late 1980s that debt overhang arises when a nation's expected income's present value falls short of its total debt. Furthermore, Keynesian models emphasize the significance of government in facilitating economic growth, proposing that if there is a shortfall between savings and investments, public debt can bridge this gap. On the contrary, the limited government intervention notion by Classical economists argues to keep the economy free and alert the government about the repercussions of excessive debt accumulation over time. Additionally, they highlighted crowding-out effects as a reason to be wary of high levels of external indebtedness (Abduvaliev & Bustillo, 2024).

Many studies associate external debt as a positive determinant of economic growth. Earlier studies, such as Cline (1995), associated debt with a positive impact on economic growth, only if the cost of borrowing is less than the marginal productivity of the debt. It argues that if the marginal cost of debt is higher than the marginal productivity of debt, it impacts economic growth adversely. Similarly, Amoateng & Amoako-Adu (1996) explored the causation between growth and debt for 35 African countries from 1960 to 1990 and found a positive unidirectional causal relationship running from debt to economic growth. The study indicates that the short-run positive

relationship can be beneficial for the African countries; however, excessive debt levels may impact economic growth adversely over the long run.

Lau, Alba, and Liew (2022) indicate that rapid economic growth in developing and emerging economies results in a substantial increase in investment demand, driven by efforts to improve infrastructure, boost industrial capacity, and fulfill the growing aspirations of their populations. Countries facing a significant increase in investment needs frequently find themselves short of domestic resources, prompting them to obtain external funding from international financial bodies, foreign governments, and private loan providers. Borrowing is a critical source of finance that is pivotal to fund large-scale development projects to promote economic growth and enhance living conditions. The short-run gains from the influx of external financing cannot be neglected, as it provides governments and private businesses with the necessary finance to make investments, such as transportation systems, energy networks, and communication networks, which are crucial for facilitating economic activities. External financing supports technological progress, increases efficiency, and generates job openings, thereby producing a short-term surge in GDP growth and economic advancement. The study also cautioned that external borrowing can have long-term economic implications. The country's debt burden escalates as external debt grows, resulting in increased financial commitments that can put pressure on the government's budget and force the diversion of funds away from essential areas like education, healthcare, and social services. In addition to other issues, excessive external debt risks expose the economy to vulnerabilities, such as exchange rate fluctuations, varying interest rates, and global economic disturbances. Borrowing can worsen the debt problem, especially when it's not matched by rising economic output and higher income.

Pattillo and Antonio (2011) in their study explored the relationship between foreign debt and growth in 93 developing countries, emphasizing the varying impacts on economic growth at different levels of debt. The study concluded that in countries with a larger amount of indebtedness, doubling the debt accumulation impacts the GDP growth negatively, decreasing it by half a percentage point roughly. This implies that a huge accumulation of debt hinders economic growth and impacts the economy adversely both in the short run and the long run. The study argues that although debt acts as a significant alternative to financing the government, higher debt levels result in higher repayments, which in turn decrease the funds to invest in the fundamental sectors such as industry, infrastructure, and services. This lower investment in these sectors eventually impedes economic growth. The study also found that the negative effects of debt begin when the debt levels jump to around 35 to 40 percent of GDP; thus, based on the results study recommends prudent debt management policies, and policies directed at optimal use of borrowed funds.

Chen and Quang (2014) argue that as the debt burden increases, the government tends to increase taxes on the private sector. This leads to an adverse impact on private investment in the economy, thus resulting in a crowding-out effect. As a result, the economy is impacted adversely. Égert (2015) found that the negative relationship between debt and economic growth tends to begin already at lower debt levels, approximately 20 to 60 percent. Thus, a threshold value is estimated for the OECD countries, that is, the debt percentage should be kept below 20% for debt not to be a negative determinant. Makun (2021) argues that developing nations are highly dependent on external financing, such as remittances, foreign investment, financial aid, and external borrowing, due to lower revenue from government and domestic sources. A total

diversion of these resources towards growth-led policies might be beneficial for long-term economic growth; however, such diversion can lead to the deterioration of other sectors, such as environmental policies.

Ismael, Mahmod, and Khorsheed (2024) delve into the complex interplay between external debt and economic expansion in emerging economies, employing a quantitative research approach. Data was collected in three chosen developing countries via an online survey, resulting in 189 responses from important stakeholders. The study employed various methods such as t-tests, Chi-square tests, VIF, partial least squares regression (PLS), and principal component analysis (PCS) to assess the relationship. The study found that a lower amount of debt borrowed from external sources influences economic growth positively, however, a higher amount can be detrimental to economic growth. Furthermore, the study emphasizes the readiness of governments with high debt for an external shock. It argues that governments with high debt are susceptible to external shocks, which might lead to an adverse impact on the economy. Therefore, governments need to be cautious and ready for any contingent event. Based on the findings, the study recommends efficient debt management, with a policy readiness for any external shocks.

Doorasamy et al. (2024) used the VECM model along with Granger causality to test the relationship between debt and economic growth in South Africa and Nigeria. The study uses data from 1981 to 2022 to investigate the relationship. The study found a positive impact of debt on economic growth for South Africa in the short run, and no significant impact on economic growth for Nigeria. However, over the longer term, the study found a negative and significant impact on economic growth in South Africa. This implies that in the short run, the external debt might lead to short-term gains; however, over time, the accumulation of larger amounts of external debt impedes economic growth. The study also found a causal relationship between external debt and economic growth in the case of South Africa. In the case of Nigeria, the study concluded no significant relationship, underscoring that other factors such as exchange rates and FDI may have a substantial impact on economic growth. The study recommends decreasing the debt accumulation in the case of South Africa and shifting to domestic alternatives such as domestic borrowing and taxation. Moreover, the study also recommends that both countries should focus on development projects and industrial expansion to mitigate the impact of external debt and increase economic growth.

Ponceno and Indumati (2023) found a significant and negative correlation between foreign debt and economic growth in the case of India. This implies that an increase in foreign debt leads to a decrease in overall economic growth, emphasizing the negative repercussions of debt accumulation in the case of India. The study employed a cointegration test, and VECM model, and Granger causality to measure the correlation between economic growth and independent variables. The study found that, along with external debt, FDI and domestic savings are also negatively associated with economic growth in India. The study argues that if the capital inflow from external sources in the form of FDI and debt is not used efficiently, and not directed to the development projects, it eventually impacts the economy negatively both in the short run and long run. In addition, the study found a positive impact of gross capital formation on economic growth, indicating the positive spillovers of higher economic activity and capital accumulation in the economy. The report recommends that policymakers to focus on investing in the industrial sector and development projects to increase economic growth in the case of India.

The recent literature on the external debt and growth nexus by Mumba and Li (2020), Qureshi and Liaqat (2020), Tarawalie and Jalloh (2021), and Epaphra and Mesiet (2021) showed a positive relationship between external debt and economic growth in their studies across different countries and regions. On the contrary, Guei (2019), Azolibe (2022), Asafo, Matuka, and Dominic (2019), and Hoti, Shkurti, and Rehman (2022) found a negative association of external factors with economic growth.

Despite extensive analysis in current literature of the connection between debt and growth, there is still considerable disagreement regarding the effects of debt on economic expansion. The debate is divided, with some researchers believing there is a negative effect, others a positive one, and a few thinking it has no significant impact. This study re-examines the relationship between debt and economic growth, adopting a novel approach that categorizes nations into distinct groups based on their external debt percentages. This study not only illustrates the influence of different debt levels on economic growth but also offers valuable insights into the optimal level.

Method

Todaro and Stephen (2009) discussed the two-gap model in their book. The study is based on the two-gap theory proposed by them. The theory puts domestic savings at the center of economic growth in the economy. It argues that insufficient savings in the economy lead to insufficient capital for investment, which in turn leads economies to rely on the following financing.

The national income identity for the open economy is given as :

$$Y = C + I + G + NX \quad (1)$$

Where Y is the GDP, C is consumption, I is investment, G is government spending, and NX represents the net exports which can be written as exports minus imports i.e., X-M.

From the equation, the investment identity can be written as:

$$I - S = M - X \quad (2)$$

Equation two represents that in the case of inadequate savings, there is a gap between investment and saving, which then is financed by external sources equal to M-X, which is also known as the current account deficit. Thus, to cover the investment gap and current account deficit, countries borrow from external sources.

Following (Le & Phan, 2022), we employed the panel data random effects model to explore the correlation between dependent and independent variables. We estimated both the linear and non-linear impact of external debt on economic growth for each group of countries.

The general model for the panel random effects model is given below:

$$y_{i,t} = \beta_0 + X'_{i,t}\beta + \mu_i + \varepsilon_{i,t} \quad (3)$$

Where $y_{i,t}$ is the dependent variable for country i at time t, β_0 is the overall intercept, $X'_{i,t}$ is the vector of the independent variable for country i at time t, β coefficient vector of independent variables, μ_i *the* Individual-specific random effect, $\varepsilon_{i,t}$ idiosyncratic error term for country i at time t.

To ensure consistency and efficiency in estimation, we assume that the individual-specific random effects μ_i are independent and identically distributed (i.i.d.) across individuals, normally distributed $\mu_i \sim (0, \sigma_\mu^2)$, not correlated with independent variables, $\mathrm{Cov}(\mu_i, X_{i,t}) = 0$.

The idiosyncratic error $\varepsilon_{i,t}$ is independently and identically distributed (i.i.d) $\varepsilon_{i,t} \sim (0, \sigma_\varepsilon^2)$, and not serially correlated $\mathrm{E}(\varepsilon_{i,t}\, \varepsilon_{j,s}) = 0$ where $i \neq j$ and $t \neq s$.

The decision to use a random effects model was motivated by both theoretical and statistical factors. Our sample encompasses 81 countries, which exhibit considerable variation in terms of institutional, geographical, and structural features. A random effects model is more suitable for accounting for cross-sectional variation due to the likelihood that many of these country-specific impacts are variable rather than consistent and are not related to the control variables. We employed the Breusch and Pagan Lagrangian multiplier test for random effects to choose between the random effects and fixed effects model, and the results show that the panel random effects model is most suitable for the given sample data.

The model for linear and nonlinear estimations can be specified as follows:

$$GDPPC_{it} = \propto_i + \beta_1 FDI_{it} + \beta_2 LNED_{it} + \beta_3 INF_{it} + \beta_4 GE_{it} + \beta_5 LNExp_{it} + \beta_6 LNOex_{it} + \varepsilon_{it} \quad (4)$$

$$GDPPC_{it} = \propto_i + \beta_1 FDI_{it} + \beta_2 (LNED_{it})^2 + \beta_3 INF_{it} + \beta_4 GE_{it} + \beta_5 LNExp_{it} + \beta_6 LNOex_{it} + \varepsilon_{it} \quad (5)$$

Where GDPPC represents the GDP per capita, FDI is foreign direct investment, LNED is the natural log of external debt, INF is inflation, GE is government expenditures as a percentage of GDP, LNExp is the natural log of Exports, LNOex natural log of the official exchange rate, Ɛ is the unobserved error, α is the group-specific constant, $\beta_{1\text{-}6}$ coefficients of the variables, and i, t represents country and time.

The control variables of the model include natural log total exports, FDI as a percentage of GDP, natural log of government expenditure, inflation, natural log of official exchange rate, and the log of external debt stocks is the main variable of interest. The details on the variables are provided below.

Equation 4 shows the linear estimation model, and Equation 5 shows the nonlinear estimation model, where the square of LNED captures the nonlinear effects of external debt on economic growth for each group of countries.

To ensure the robustness of the methodology. We chose a data sample from 2008 to 2023 (16 years). This implies that there is no need for testing cross-sectional dependence and serial correlation, which are problems in macro panels with long time series (20-30 years) (Torres-Reyna, 2007). As for heteroscedasticity in the case of the random effects model, the panel data modelling uses the GLS (generalized least squares method) method of estimation, thus it internalizes the heteroscedasticity in estimation (Bai, Choi, & Liao, 2021).

Description of Variables

Based on the existing literature following variables are used as dependent and independent variables of the study.

GDPPC (Growth of Per Capita GDP in Percentage): GDPPC represents the annual growth rate of a country's per capita GDP, which is a common measure of economic growth and prosperity. It reflects the increase in the value of goods and services produced per person in an economy. Economic growth, measured by GDPPC, is influenced by various factors such as investment, human capital, technological progress, and fiscal policies (Barro, 1991). Higher GDPPC growth is often associated with improvements in living standards and overall economic development.

FDI (Net Foreign Direct Investment as Percentage of GDP): FDI measures the investment made by foreign entities in a country's economy, often directed towards industries such as manufacturing, services, and infrastructure. FDI is considered a key driver of economic growth as it brings capital, technology, and expertise to the host country, potentially boosting productivity and creating jobs (Borensztein, Gregorio, & Lee, 1998). Higher FDI inflows are generally associated with stronger GDP growth, as it enhances the domestic economy's capacity to innovate and expand.

ED (External Debt stocks): ED represents the amount of external debt a country holds relative to its GDP. While external debt can provide much-needed capital for investment in infrastructure and development, excessive debt can constrain growth due to the burden of servicing the debt (Eichengreen & Hausmann, 1999). High external debt is often linked to lower GDPPC growth, especially when debt servicing consumes significant portions of government expenditure and reduces fiscal flexibility (Pattillo & Antonio, 2011).

INF (Consumer Price Index Annual Percentage): INF measures the annual percentage change in the consumer price index, indicating inflation levels within an economy. Inflation affects the purchasing power of consumers and can distort investment decisions. A moderate inflation rate is often associated with healthy economic growth, but high inflation typically undermines growth by creating uncertainty and reducing investment (Fischer, 1993). Controlling inflation is crucial for maintaining stable economic growth and a rising GDPPC.

GE (Government Expenditure as Percentage of GDP): GE represents the government's total spending on goods, services, and welfare programs as a percentage of GDP. Government expenditure can stimulate economic growth by funding public services, infrastructure, and social programs, which enhance human capital and productivity (Barro, 1991; Arawatari, Hori, & Mino, 2023). However, excessive government spending, especially if inefficient or overly financed by debt, can crowd out private investment and potentially hinder GDPPC growth.

Ex (Total Exports): Ex represents the value of a country's exports. Trade openness and export growth have been found to promote economic growth by expanding market opportunities, improving productivity, and facilitating technology transfer (Rodrik, 1998). A higher export-to-GDP ratio typically signals a competitive economy, contributing positively to GDPPC growth, as increased exports stimulate domestic industries and lead to higher income levels (Kulu, 2023).

Oex (Official Exchange Rate in Current Dollar Terms): Oex measures the value of a country's currency relative to the US dollar. The exchange rate influences international trade, investment flows, and inflation. A stable or favorable exchange rate can stimulate exports, attract foreign investment, and support economic growth (Edwards, 1989). A depreciation of the local currency might increase export competitiveness but could also lead to inflationary pressures, impacting overall GDPPC growth negatively (Jayathilaka, et al., 2023).

Table 1 below shows the description of the variables used in this study. The data is obtained from the World Development Indicators for 2008 to 2023. The variables of the studies are chosen following the previous studies by (Asafo, Matuka, & Dominic, 2019; Qureshi & Liaqat, 2020; bduvaliev & Bustillo, 2024)

Table 1

Description of variables

Variable	Description	Source
GDPPC	Growth of Per Capita GDP in Percentage	WDI
FDI	Net Foreign Direct Investment as a percentage of GDP	WDI
ED	External Debt Stocks (current dollar terms)	WDI
INF	Consumer Price Index Annual Percentage	WDI
GE	Government Expenditure as a Percentage of GDP	WDI
Ex	Total Exports (current dollar terms)	WDI
Oex	Official Exchange rate (current dollar terms)	WDI

Results and Discussion

Before estimation, we must ensure the stationarity of all the variables of the study. Table 2 shows the groupwise panel unit root Levin-Lin-Chu (Levin, Lin, & Chu, 2002) test results. The variables of the study are all stationary at the level, with the order of integration I equal to zero as represented by I(0), as shown in the table.

Table 2

Panel Unit Roots

Variable	Overall		50th Percentage		75th Percentage		75+ Percentage	
Statistics	P-value	O.I	P-value	O.I	P-value	O.I	P-value	O.I
GDPPC	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0000***	*I(0)*
FDI	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0012***	*I(0)*	0.0000***	*I(0)*
LNED	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0000***	*I(0)*
INF	0.0988*	*I(0)*	0.0124	*I(0)*	0.0566*	*I(0)*	0.0000***	*I(0)*
GE	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0684*	*I(0)*	0.0079***	*I(0)*
LNExp	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0001***	*I(0)*	0.0036***	*I(0)*
LNOEx	0.0000***	*I(0)*	0.0000***	*I(0)*	0.0541*	*I(0)*	0.0056***	*I(0)*

For our data, the Breusch and Pagan Lagrangian multiplier test for random effects shows that the panel random effects model is suitable for estimation across all the percentage-wise groups. Therefore, we proceed with the panel random effects estimation.

Tables 3 and 4 show the estimation for the linear and nonlinear panel data estimations for each group of countries.

Table 3

Estimation Results (Panel Random Effects Model)

Dep Var: GDPPC	(1) Overall	(2) 50th Percentage	(3) 75th Percentage	(4) 75+ Percentage
FDI	0.0938***	0.0930	-0.00675	0.148***
	(3.40)	(1.47)	(-0.14)	(3.58)
LNED	-0.937***	-0.894*	-2.258***	-1.808**
	(-4.18)	(-2.43)	(-3.40)	(-2.73)
Inf	-0.0139	-0.0195	0.00522	-0.107*
	(-1.80)	(-0.64)	(0.52)	(-2.11)
GE	-0.185***	-0.218***	-0.173**	-0.187*

	(-6.14)	(-4.84)	(-3.25)	(-2.32)
LNExp	2.128***	1.465***	3.279***	3.528***
	(6.71)	(3.43)	(5.17)	(3.29)
LNOEx	-0.0916	-0.129	-0.0852	0.220
	(-1.24)	(-1.19)	(-0.63)	(1.20)
_cons	1.014	3.418	2.320	-0.527
	(0.78)	(1.64)	(0.68)	(-0.12)
N	1200	630	285	270

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4
Non-Linear Estimates

Dep Var: GDPPC	**(1)**	**(2)**	**(3)**	**(4)**
	Overall	**50th Percentage**	**75th Percentage**	**75+ Percentage**
FDI	0.0938***	0.0930	-0.00675	0.148***
	(3.40)	(1.47)	(-0.14)	(3.58)
LNED2	-0.469***	-0.447*	-1.129***	-0.904**
	(-4.18)	(-2.43)	(-3.40)	(-2.73)
Inf	-0.0139	-0.0195	0.00522	-0.107*
	(-1.80)	(-0.64)	(0.52)	(-2.11)
GE	-0.185***	-0.218***	-0.173**	-0.187*
	(-6.14)	(-4.84)	(-3.25)	(-2.32)
LNExp	2.128***	1.465***	3.279***	3.528***
	(6.71)	(3.43)	(5.17)	(3.29)
LNOEx	-0.0916	-0.129	-0.0852	0.220
	(-1.24)	(-1.19)	(-0.63)	(1.20)
_cons	1.014	3.418	2.320	-0.527
	(0.78)	(1.64)	(0.68)	(-0.12)
N	1200	630	285	270

The findings from the linear model show that external debt has a significant negative impact on GDP growth across all the groups of countries, which is in line with the previous studies. The results of the overall estimation for the sample of 81 countries also show a negative and significant impact of external debt on the economy of the sample.

Unlike previous studies, our results show that as the percentage of external debt increases, i.e., from the 50th percentile to the 75th percentile, the impact of external debt also increases, as evidenced by the increased coefficient of external debt as the percentile increases from 50 to 75. This shows that the impact of debt is negative but weak when it is below the 50th percentile; however, when it exceeds the 50th percentile, the negative impact becomes stronger. For the 75th and above percentile, the impact of also highly significant and negative. This implies that external debt is a significant negative determinant of economic growth across all groups of countries.

Other variables, such as FDI, have a positive impact on economic growth across all the groups but are only significant for the overall sample and the 75th + percentile group. Inflation is insignificant for all the groups except the 75th + percentile, showing that as the debt increases, inflation also starts to impact GDP growth adversely. Government expenditure is highly significant across all the groups with a negative coefficient, showing that the increase in government spending impacts GDP growth adversely. This can be attributed to the crowding-out effects of the government spending. When government spending increases, it crowds out private investment, thus impacting the economy adversely. The net exports impact the GDP growth

significantly and positively across all the groups. This confirms the Export-Led-Growth hypothesis (ELG) (Petchko, 2018). The ELG hypothesis postulates that expanding exports is one of the key factors in promoting long-term growth (Kumar, Nargis, & Begam, 2020). The exchange rate has no significant impact on GDP growth across all the groups. Our results are consistent with (Mumba & Li, 2020; Qureshi & Liaqat, 2020; Cline, 1995; Alnaa & Matey, 2023)

Similar to the linear analysis, the results of the nonlinear analysis show that external debt has a substantial and adverse effect on GDP growth for every group of countries examined. This implies that there is a nonlinear dynamic as well as a linear relationship between external debt and economic growth. In particular, the negative correlation between external debt and economic growth gets stronger as the percentage of external debt rises, highlighting the negative effects of growing external debt levels. These findings demonstrate the negative impact of accruing external debt and show that the drag on economic performance is worsened by larger debt loads. This nonlinearity may be caused by several factors that together impair the prospects for economic growth, including higher debt servicing costs, less fiscal flexibility, and elevated investor concerns about a nation's solvency (Cahyadin & Ratwianingsih, 2020; Lin & Sosin, 2001).

Conclusion

This study offers significant findings on the connection between external debt and economic expansion in 81 countries, grouped according to their external debt-to-GDP ratios. Across all groups, a significant and persistent negative impact of external debt on economic growth was evident, according to findings based on both linear and nonlinear panel data random effects models used over 15 years spanning from 2008 to 2023. The linear model implies a proportional negative correlation between external debt and growth, showing that even modest levels of external debt can impede economic expansion. Careful management of debt accumulation is necessary to prevent negative impacts on a nation's overall production.

A nonlinear model indicates that beyond specific levels of external debt, its negative effects become more pronounced, implying that debt overhang effects occur. At moderate levels of debt, external borrowing can still support economic growth by funding productive investments, but once debt exceeds a certain threshold, its negative impacts become more noticeable. Excessive debt is thought to result in increased interest payments, diminished fiscal flexibility, and a decrease in private-sector optimism, ultimately hindering economic expansion. The existence of nonlinear effects underscores the necessity of determining optimal debt levels to prevent economic stagnation.

In addition to external debt, the study examines other factors that influence economic growth. Research evidence backs up the export-led growth theory, indicating that a substantial increase in exports can greatly enhance GDP expansion rates. Economic performance continues to rely heavily on trade, underscoring the necessity for policies that increase export competitiveness. Foreign direct investment also has a significant impact on promoting economic growth, highlighting the need for a business environment that is attractive to investors. The study also reveals that government spending has a detrimental effect on economic growth, indicating potential crowding-out effects, in which an overextended public sector could displace private investment or contribute to fiscal inefficiencies.

Based on the findings of the study, governments should prioritize implementing structural reforms that increase the efficiency of public spending and foster an environment that is conducive to exports and foreign direct investment to achieve a balanced and sustainable path for economic growth, even though external debt is an important factor to monitor. Additionally, this study suggests that governments investigate domestic financing options like revenue mobilization, expanding tax revenue bases, and domestic borrowing.

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