

**Investigating The Drivers of Escalating External Debt in High Debt Distressed Nations
using Appropriate Econometric Techniques**

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ABSTRACT

This study examines the escalating foreign debt in ten highly debt distressed countries namely Egypt, Ghana, Ethiopia, Lebanon, Pakistan, Kenya, Sri Lanka, Tunisia, Ukraine and Zambia over the 1990 to 2022 by obtaining data from the World Bank's WDI database. Initially applying a pooled OLS model, the study encounters issues like cross-sectional dependence and heteroscedasticity, leading to the use of quantile regression, Kao co-integration and Fully Modified OLS regressions for more robust results. Findings indicate that rising debt is driven by high debt servicing costs and growing imports. To mitigate this, the study recommends restructuring debt, banning unnecessary imports and improving economic growth, international reserves, foreign investment, domestic savings and development spending while addressing governance and infrastructure challenges.

Keywords: External debt, External debt Servicing, quantile regression, Debt distress countries

JEL Classification: B22, B27, C33, F34

INTRODUCTION

Foreign debt refers to the amount of money that domestic citizens, resident companies, organizations and government agencies owe to foreign creditors, necessitating repayment with interest over time. While effectively utilized foreign debt can serve as an essential tool for economic growth and development by enabling structural reforms and fostering progress, mismanagement can lead to a vicious cycle of debt accumulation—often referred to as "debt overhang" (Krugman, 1988). Theoretical frameworks suggest that borrowed funds, when allocated to productive development activities, can enhance output, income and savings, leading to increased exports and foreign exchange earnings. However, empirical evidence frequently indicates that achieving this virtuous cycle is challenging (Abdelaziz et al., 2019; Azolibe, 2021).

The global public debt reached a record high of USD 92 trillion in 2022, with developing nations accounting for over 30% of this total. In recent years, public debt in these countries has grown at a significantly higher rate than in advanced economies, primarily driven by a rising need for development financing. This trend has been exacerbated by multifaceted challenges such as the COVID-19 pandemic, climate change and a lack of sufficient alternative funding sources (UNCTAD, 2024). Among the most affected are ten developing economies, including Egypt, Ghana, Lebanon, Ukraine and Pakistan, which have faced severe debt distress due to escalating interest rates, increasing investor risk aversion and mounting external debt service obligations, as described by the International Monetary Fund (IMF) and the World Bank (Reuters, 2023).

The growing public debt burden poses significant challenges for these nations. Rising borrowing costs, currency devaluations and limited access to capital constrain their abilities to address crises, invest in development and enhance living standards. Governments often face the difficult choice of prioritizing debt servicing over essential expenditures such as healthcare and education, ultimately adversely affecting their populations. For instance, in many developing nations, interest payments exceed combined budgets for education and healthcare, impacting approximately millions of people (Reuters, 2023). Additionally, public debt levels in emerging economies have surged from 35% of GDP in 2010 to 60% in 2021, with external public debt escalating from 19% to 29% of GDP during the same period. This trend has strained countries' abilities to generate sufficient export revenue to meet their debt obligations, leading to a rise in the public debt-to-exports ratio from 71% in 2010 to 112% in 2021 (World Bank, 2023).

The increasing reliance on private creditors further complicates the sustainability of debt, as commercial borrowing carries higher interest rates than concessional financing. Currently, private creditors account for 62% of external public debt in emerging economies, increasing the complexity of debt restructuring and raising financial uncertainty (UNCTAD, 2024). Developing nations face disproportionately high borrowing costs, with African countries paying interest rates as much as eight times higher than in advanced economies such as Germany. Such high costs impede necessary investments and hinder debt repayment, perpetuating a cycle of debt distress and underdevelopment. The rising incidence of sovereign defaults in countries such as Sri Lanka, Lebanon and Argentina underscores the urgent need for effective strategies to address escalating foreign debt.

Despite various policy measures implemented, a comprehensive understanding of the drivers of debt distress and the formulation of actionable solutions remain critical. Previous research has identified key variables contributing to the burden of external debt, notably focusing on gaps in savings-investment, export-import and government revenue-expenditure (Bacha, 1990; Ahmad et al., 2013; Bilquees, 2003; Cheema, 2004). Contrarily, some studies emphasize that non-development expenditures, particularly defense spending, serve as primary catalysts for increased external borrowing (Shahbaz et al., 2016; Okwoche & Nikolaidou, 2024; Anfofum et al., 2014). Nevertheless, the impacts of external debt servicing and growing imports on external debt, especially in highly distressed countries, have been largely overlooked.

Given these contextual factors, this study aims to address the following research question: **What are the key drivers of escalating external debt in highly indebted nations?** The objectives of this research include identifying the principal determinants of external debt across ten highly debt distressed countries and empirically assessing the relationships between debt servicing costs, growing imports, economic growth, international reserves, foreign investment, domestic savings and government expenditures.

This study makes several noteworthy contributions to the literature and holds significant relevance for both academia and policymakers. Methodologically, it addresses key econometric challenges such as cross-sectional dependence and heteroscedasticity by employing appropriate techniques, including quantile regression, Kao co-integration and Fully Modified OLS regression, thereby ensuring more reliable and nuanced results. The research integrates macroeconomic variables into a cohesive analytical framework to assess their collective impact on growing external debt .

From an empirical standpoint, the study provides a long-term perspective through the analysis of data spanning thirty years from 1990 to 2022 across ten countries. The findings are directly relevant to policymakers in heavily indebted nations, offering actionable strategies such as debt restructuring, banning unnecessary imports and enhancing governance, infrastructure and economic fundamentals tailored to the unique challenges of distressed economies. Furthermore, the focus on addressing cascading debt contributes to global discussions on financial stability and sustainable development while promoting economic resilience. From an academic perspective, the use of advanced econometric techniques enriches the literature on debt sustainability and sets a methodological benchmark for future

research in this domain. Additionally, the study emphasizes aligning debt management strategies with broader developmental goals, such as governance improvements and economic growth, to ensure long-term benefits for vulnerable economies.

The remaining research is organized as follows: Section 2 of the paper covers the theoretical and empirical reviews, while Section 3 addresses the methodology, data sources and econometric models, along with pertinent robustness and diagnostic checks. Sections 4 and 5 discuss policy implications and recommendations and present the results and their implications, respectively

REVIEW OF LITERATURE

Theoretical Review/Framework

The exploration of external debt is grounded in two prominent theoretical frameworks. The first, rooted in Neo-liberalism, emphasizes the demand side of external debt and loan servicing. This theory advocates for the minimization of barriers to the flow of capital, labor, goods, services, and exchange rate markets. Under this paradigm, countries, particularly those in the developing world, face heightened pressures on their foreign exchange reserves and exchange rates due to trade deficits, heavy imports and capital flight. As a consequence of these liberalization policies, countries are often compelled to resort to external borrowing and deploy their labor abroad to manage foreign exchange pressures (Harvey, 2005; Stiglitz, 2002). Such a dynamic is illustrated in Figure 1.

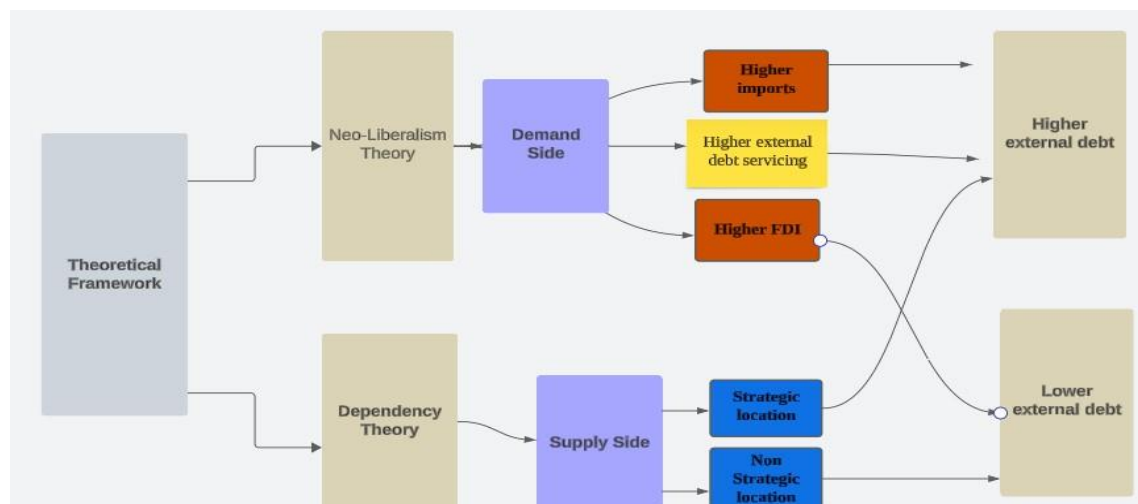


Figure 1: Theoretical Framework

Conversely, Dependency Theory offers a supply-side perspective, analyzing the motivations behind external lending to strategically important nations, particularly in geopolitical and geo-economic contexts. This framework explains why wealthier nations continue to extend credit to developing countries despite their deteriorating creditworthiness. Proponents of this theory argue that more affluent countries purposefully entrap less developed nations in external debt to further their own national interests (Ikejiaku, 2008; Dos Santos, 1970). This argument posits that political leaders in developing nations often prioritize the interests of richer nations for personal gain, leading to corrupt practices that facilitate capital flight. Consequently, resources from heavily indebted countries are siphoned off to wealthier nations, exacerbating their debt burdens as shown in figure 1.

Empirical Review

A review of previous research reveals a variety of factors contributing to the burden of external debt and highlights variables that can mitigate external borrowing. An early study by Bacha (1990) identified three primary gaps—saving-investment, export-import and government revenue expenditure—as significant contributors to foreign borrowing. Subsequent studies by Ahmad et al. (2013), Bilquees (2003) and Cheema (2004) reinforce this finding, examining these gaps using diverse econometric techniques across different time periods.

In contrast, Shahbaz et al. (2016), along with Okwoche and Nikolaidou (2024) and Anfofum et al. (2014), contend that non-development expenditures, notably military and defense spending, act as primary catalysts for external borrowing in developing nations. This divergence in perspectives underscores the multifaceted nature of external debt determinants, emphasizing the need to consider both developmental and non-developmental expenditures.

Further complicating the discourse, Brafu-Insaadoo (2019) illustrates that interest rate disparities between developing and developed countries, alongside financial deepening and economic growth, contribute positively to external borrowing. Conversely, trade openness and certain debt relief initiatives have been shown to alleviate the external debt burden, particularly within the Ghanaian context.

At the same time, Al-Fawwaz et al. (2016) emphasize that terms of trade and trade volume significantly influence foreign loan accumulation in Jordan, while GDP growth mitigates foreign borrowing levels. This highlights the need for tailored strategies that consider local contexts when addressing external debt dynamics.

In examining Malaysia's experience, Pyeman (2016) utilized Granger causality and multivariate regression models to understand the determinants of foreign loans and revealed that GDP and foreign direct investment (FDI) exhibit a significant negative impact on external debt, while exports exert a positive influence. This finding provides an intriguing contrast to prevailing theories that typically posit an inverse relationship between exports and foreign borrowing. Here, it is suggested that external borrowing may be channeled into developing export-oriented sectors, enhancing national creditworthiness.

Moreover, Azolibe (2021) identified poor governance and corruption as critical drivers of external debt accumulation in heavily indebted nations. He established a significant relationship between foreign loans, corruption, unemployment and foreign aid, while emphasizing the detrimental influences of GDP and international reserves.

Alesina and Weder (2002) further corroborated this narrative, suggesting that corrupt governments attract more foreign aid, driven by geopolitical considerations rather than institutional performance. This finding indicates that the rationale behind foreign aid distribution is often rooted in historical relationships and strategic interests of donor nations.

Conversely, Abdullahi et al. (2015) observed a negative association between exchange rate, interest rate and budget deficit with foreign debt, despite the prevailing emphasis on the positive correlation between external debt and fiscal deficits. Their analysis utilized the ARDL model to investigate the primary factors influencing Nigeria's foreign debt from 1980 to 2013, underscoring the need for cautious borrowing practices.

Furthermore, Mijiyawa (2022) assessed the determinants of foreign loans in heavily indebted poor countries (HIPC) after the implementation of debt relief initiatives. His findings indicated that the nominal exchange rate, GDP growth rate and remittances negatively affect external debt accumulation. Post-reform, the study noted that governance indices emerged as a positively influential factor.

In a related study, Mijiyawa and Oloufade (2022) analyzed 50 low- and middle-income countries between 1970 and 2017 using the system generalized method of moments (GMM). Their research highlighted a positive contribution of remittances to external debt and a negative impact of international reserves. These outcomes indicate a potential "Dutch disease" effect of remittances within the context of external borrowing.

Currently, the existing literature indicates a significant knowledge gap regarding the specific impacts of imports and external debt servicing on the external debt dynamics in countries experiencing severe debt distress. As such, the primary aim of this study is to close this gap by investigating the factors contributing to the rapid increase of external debt in highly indebted nations despite substantial debt servicing payments..

However, Demikha, L., Shaharuddin, A., & Edris, M. M. A. M. (2021) are of the view that the 19th century was marked by significant events that influenced the geopolitical and economic landscapes of Europe and the Ottoman Empire, including the Industrial Revolution, economic crises and the Crimean War. By 1870, the Ottoman Empire declared bankruptcy, a move that sent shock-waves through international markets and prompted European powers to impose stricter conditions for access to foreign capital. Their study examines the determinants of external debt using economic data from 1881 to 1913. Employing the ARDL econometric approach, the findings indicate a negative relationship between economic growth and external debt, while government expenditure shows a positive association with the accumulation of external debt.

Similarly, Mahara, T. S. (2021) investigated the macroeconomic determinants of external debt in Nepal, focusing on budget deficits, per capita GDP, terms of trade, trade openness, foreign aid, and real effective exchange rates. Using the ARDL cointegration approach, the results reveal that fiscal deficits and trade openness significantly increase external debt, while foreign aid helps reduce it in both the short and long run. The error correction term indicates a 37% annual adjustment toward equilibrium. The study concludes that effective foreign trade policies, demand management, a progressive tax system and efficient resource utilization are critical to curbing debt accumulation and avoiding a debt trap.

While, Zahra, A., Nasir, N., Rahman, S. U., & Idress, S. (2023) analyzed the impact of exchange rates, fiscal deficits, foreign direct investment and economic growth on external debt in Pakistan, using time series data from 1973 to 2021. Employing the autoregressive distributed lag (ARDL) model, the research investigates the co-integration and relationships among the variables. The findings indicate a positive and significant long-term association between exchange rates, fiscal deficits, foreign direct investment, economic growth and external debt. In the short term, however, the real effective exchange rate and fiscal deficits exhibit a negative relationship with external debt, while economic growth maintains a positive link. Policymakers are advised to consider that an increase in the exchange rate, which devalues the domestic currency, can enhance foreign exchange reserves used for debt repayment.

Likewise, Awan, R. U., Anjum, A., & Rahim, S. (2014) investigated the macroeconomic factors influencing external debt in Pakistan using annual data from 1976 to 2010. The analysis employs the ARDL model to identify long-term relationships and the Error Correction Model (ECM) for short-term dynamics. The findings reveal that fiscal deficits, nominal exchange rates and trade openness significantly contribute to Pakistan's external debt burden. Although foreign aid is positively associated with external debt, its impact is statistically insignificant. Conversely, terms of trade show a negative but statistically insignificant relationship with external debt.

Similarly, Dawood, M., Baidoo, S. T., & Shah, S. M. R. (2021) also examined the factors influencing external debt in 32 developing and transitioning Asian economies from 1995 to 2019. The analysis employs the generalized method of moments (GMM) to address potential endogeneity issues. The findings indicate that economic growth and investment contribute to reducing external debt in both the short and long term, while exchange rates, trade and government expenditure lead to an increase in

external debt. Diagnostic tests confirm the robustness and reliability of the results. Based on the empirical evidence, the study offers policy recommendations to help policymakers design strategies to mitigate external debt in the selected economies.

Whereas, Bittencourt, M. (2015) examined the key drivers of government and external debt in South American democracies from 1970 to 2007 using dynamic panel time-series analysis. The findings highlight that economic growth significantly reduces debt ratios in the region. However, other factors, such as inflation, inequality and executive constraints, show inconsistent or insignificant effects. The results emphasize the importance of fostering economic activity and prosperity to manage and stabilize debt ratios effectively.

However, Danish, M. H., Jamshaid, F., & Shahzadi, S. (2022) believe that external debt is a pressing issue for many developing and underdeveloped nations, driven by factors such as current account and budget deficits, low savings and investment and unfavorable balance of payments. This study investigates the determinants of external debt in four South Asian countries—Bangladesh, India, Pakistan and Sri Lanka—over the period 1984–2019. The findings reveal that budget deficits, negative balance of payments, currency devaluation and corruption are the primary contributors to rising external debt in these nations. To mitigate this issue, the study recommends promoting exports through subsidies and bonus voucher schemes, implementing fair taxation policies, reducing import taxes on manufacturing machinery and encouraging foreign direct investment (FDI).

Adane, O., Mulugeta, W., & Melaku, T. (2018) examined the determinants of external debt in Ethiopia, a heavily indebted poor country (HIPC) with a history of rising external debt levels. External debt refers to the amount a country owes to foreign entities, with or without interest payments. In developing countries like Ethiopia, financing budget deficits through external borrowing is a significant burden due to low economic growth and debt overhang issues. Using time series data from 1981 to 2016 and analyzing it with the ARDL model, the study finds evidence of a long-term relationship among the variables, as confirmed by the bound test.

In the short run, the ECM regression identifies inflation, the primary budget deficit and the exchange rate as significant determinants of external debt, with inflation showing a negative relationship and the other two a positive one. Domestic savings and resource balance are statistically insignificant in the short term. Over the long run, inflation, the primary budget deficit (as a percentage of GDP), domestic savings (as a percentage of GDP) and resource balance (as a percentage of GDP) are significant factors. The primary budget deficit and domestic savings positively impact external debt accumulation, while inflation and resource balance have a negative effect. Although the exchange rate is negatively related to external debt, it is statistically insignificant.

As a policy recommendation, the Ethiopian government should prioritize equity financing, such as foreign direct investment (FDI) and portfolio investment, reduce the budget deficit, enhance investment efficiency and maintain a stable exchange rate to address external debt challenges effectively.

Conversely, Harsono, E., Kusumawati, A., & Nirwana, N. (2023) are of the view that Managing external debt is a critical challenge for developing nations, requiring governments to identify key factors influencing debt levels and adopt effective strategies. Their study explores the determinants of external debt and examines policies for its management by analyzing the inflation rate, exchange rate, interest rate, trade openness and institutional quality. Using data from 52 samples across five ASEAN developing countries from 2008 to 2019, the research employs moderated regression analysis to assess the interaction between institutional quality and macroeconomic indicators on external debt.

The findings reveal that the inflation rate, interest rate and institutional quality negatively impact external debt, whereas the exchange rate and trade openness positively influence it. However, institutional quality does not moderate the relationship between the inflation rate, exchange rate, and interest rate with

external debt. It only moderates the link between trade openness and external debt. These results underscore the importance of improving institutional quality and considering macroeconomic factors in formulating policies to effectively manage external debt in ASEAN developing countries.

However, Saxena, S., & Shanker, I. (2020) explored the theoretical underpinnings and empirical analysis of the macroeconomic factors influencing external debt in India from 1990-91 to 2016-17. Using an Ordinary Least Squares (OLS) model, the research identifies key variables that significantly impact India's gross external debt. These include the gross fiscal deficit, net domestic savings, net domestic capital formation, exports, imports, real effective exchange rate, foreign exchange reserves, net terms of trade, consumer price index, debt service ratio, net foreign direct investment, gross domestic product and real interest rates (LIBOR). Collectively, these variables account for 62% of the systematic variations in India's external debt, providing valuable insights for policymakers to address debt management effectively.

Knowledge Gap and Study Contribution

This research aims to address the aforementioned gap by providing a clearer understanding of the nuanced factors especially external debt servicing and imports driving external debt accumulation in heavily indebted countries. By integrating insights from both theoretical and empirical domains, this study seeks to offer a comprehensive analytical framework that captures the complexity of external debt dynamics in the context of global economic challenges. Through this investigation, we hope to inform policy decisions that enhance debt sustainability and economic development strategies in severely indebted nations.

Methodology

Data, variables and the econometric model

This study utilizes panel data from ten countries classified as highly debt distressed by the World Bank and the International Monetary Fund (IMF), covering the period from 1991 to 2022. The data is sourced from the World Development Indicators (WDI) database of the World Bank. The details of variables, their description and notation are given in table 1.

To investigate the effects of external debt servicing and other macroeconomic factors on total external debt, a systematic approach featuring multiple econometric techniques is employed. We begin by estimating Equation 1 using the Pooled Ordinary Least Squares (OLS) method:

$$TED_{it} = \alpha + \beta_1 EDS_{it} + \beta_2 IMPG_{it} + \beta_3 GDPG_{it} + \beta_4 FDIG_{it} + \beta_5 RESX_{it} + \beta_6 GFCC_{it} + \beta_7 GDSG_{it} + \epsilon_{it} \quad (1)$$

Table 1 Variables, Notation, Description and Sources

Variable	Notation	Description	Source
External Debt	TED	Total external debt to GDP ratio used as a dependent variable	WDI
External Debt Service	EDS	External Debt Servicing to GDP ratio	WDI
Imports	IMPG	Imports to GDP ratio	WDI
Economic Growth	GDPG	Real GDP growth rate	WDI
Foreign Direct Investment	FDIG	Foreign direct investment to GDP ratio	WDI
Foreign Reserves	RESX	Foreign reserves to export ratio	WDI
Government Consumption	GFCG	Government Final Consumption to GDP ratio	WDI
Domestic Savings	GDSG	Gross domestic saving to GDP ratio	WDI

In this equation, (TED_{it}) represents the total external debt, (EDS_{it}) denotes external debt servicing and other control variables including imports (IMPG), GDP growth rate (GDPG), foreign direct investment (FDIG), foreign reserves to export ratio (RESX), government final consumption (GFCG) and gross domestic savings (GDSG), all expressed as ratios relative to GDP. The error term, (ϵ_{it}) , captures unobservable factors.

While pooled OLS provides a foundational analysis, potential limitations such as violations of normality, autocorrelation, heteroscedasticity and cross-sectional dependence necessitate more robust methods to ensure the reliability of the results. Consequently, Equation 2 will be analyzed using quantile regression

$$\text{Quant}(TED_{it} | EDS_{it}) = EDS_{it}' \beta_{\theta} \quad (2)$$

In Equation 1 and Equation 2 TED is total external debt, EDS is external debt servicing, Z is the vector of control variables such as imports (IMPG), GDP growth rate (GDPG), foreign direct investment (FDIG), foreign reserves to export ratio (RESX), government final consumption (GFCG) and gross domestic savings (GDSG) all factored by GDP.

$Quant(TED_{it}|EDS_{it})$ is the θ th conditional quantile of external debt to GDP ratio given external debt servicing to GDP ratio in i^{th} country and t^{th} year, where $0 < \theta < 1$.

The subscripts i and t stand for years and country, respectively. The intercept is denoted by α , the (β) is the coefficient of the variable of interest which is external debt servicing here and the vector of coefficients of control variables is denoted by θ' . The error terms " u_{it} " in the pooled OLS model are associated with zero mean, constant variance and covariance. The log of the data is not taken because all of the variable data is already in ratio form.

Using quantile regression allows for a more comprehensive analysis by examining how the relationship between external debt servicing and total external debt varies across different quantiles of the distribution. Unlike traditional OLS, which estimates an average effect, quantile regression can reveal how factors influencing external debt may have differential effects at the lower and upper ends of the debt spectrum. This is particularly important in the context of heavily indebted nations, where different segments of the economy may react differently to changes in debt servicing costs.

After establishing the preliminary relationships through quantile regression, we will further ensure robustness in our model through the Kao co-integration test. This test is used to ascertain whether a long-term equilibrium relationship exists among the variables in the model.

The Kao co-integration test is appropriate for panel data analysis as it accounts for potential non-stationarity in the variables and identifies long-term relationships amidst complex interdependencies. By confirming co-integration, we can confidently perform further analyses of long-run relationships and causal inference among the specified variables.

Finally, we will utilize the Fully Modified OLS (FMOLS) method for estimating the long-run parameters of the model: FMOLS is particularly well-suited for dealing with the issues of endogeneity and serial correlation that often arise in time series data. This method produces consistent and efficient estimates by incorporating corrections for both the serial correlation of the errors and potential endogeneity of the regressors. By applying FMOLS, we enhance the accuracy of our estimates, ensuring a more reliable assessment of the impact of external debt servicing and other economic factors on total external debt.

In the equations described, external debt servicing is anticipated to positively correlate with total external debt, as increased servicing obligations may compel countries to increase borrowing to fulfill their foreign payment commitments. According to empirical literature, GDP growth is expected to exhibit an inverse relationship with foreign loans, while foreign direct investment (FDI) is also predicted to show an inverse connection by reducing the need for external funding. Conversely, higher import levels necessitate foreign currency, leading to potential increases in external borrowing.

Foreign reserves may exhibit both positive and negative impacts on external debt, depending on their use—whether as collateral for loans or for precautionary purposes. Gross domestic savings are expected to have a negative correlation with foreign loans, indicating that higher domestic savings should reduce the demand for external borrowing. Government final consumption expenditures, financed through either domestic resources or foreign savings, have dual effects depending on their nature. The methodological approach adopted in this research is designed not only to provide insights into the dynamics of external debt but also to address theoretical and empirical gaps identified in the literature on highly indebted nations.

RESULTS

Results of Pooled OLS

The findings from the pooled OLS regression model, presented in Table 1, reveal several significant relationships between external debt and various macroeconomic indicators. Consistent with theoretical expectations, the total amount of external debt servicing and the ratio of imports to GDP exert a positive and statistically significant impact on the foreign debt-to-GDP ratio in the ten heavily indebted nations. This result underscores the notion that as these countries face increased servicing obligations and higher import levels, their reliance on external borrowing intensifies, further compounding their debt burdens.

Conversely, our analysis indicates that GDP growth rate, government final consumption-to-GDP ratio, foreign direct investment (FDI) to GDP ratio and the foreign reserves-to-export ratio negatively and significantly affect the external debt-to-GDP ratio. This aligns with theoretical predictions that suggest strong economic growth can reduce the need for external borrowing, as higher domestic output may alleviate financial pressures. The negative coefficient associated with the foreign reserves variable suggests that these nations utilize their reserves as a buffer against external debt, applying them for self-insurance or precautionary measures—a strategy that, while providing short-term relief, could limit their capacity to invest in growth-enhancing projects.

Similarly, the negative relationship observed between government final consumption and external debt indicates that expenditures funded through domestic savings or taxation rather than external borrowing may help mitigate reliance on foreign loans. However, it is important to note that while domestic savings exhibit a negative correlation with external borrowing, their impacts are statistically insignificant. This insignificance likely stems from the relatively low savings rates prevalent in these countries, which limits their ability to reduce external debt reliance substantially.

The overall model fit is indicated by an R-squared value of 0.743819 and an adjusted R-squared of 0.736975, suggesting that approximately 73% of the variance in external debt can be explained by the included variables. This demonstrates a strong explanatory power of the model. Furthermore, the probability value of the F-statistic, which is zero, confirms that the independent variables jointly and significantly influence the dependent variable.

However, the very low value of the Durbin-Watson statistic raises important concerns regarding potential autocorrelation within the regression residuals. Autocorrelation may suggest that the model could be misspecified or that key temporal patterns in the data have not been adequately captured. Therefore, while the pooled OLS approach provides initial insights into the relationships among these variables, it may necessitate further investigation to address issues of model specification and to validate the robustness of the results.

In summary, these findings provide valuable insights into the drivers of external debt in heavily indebted nations. The significant positive impacts of external debt servicing and imports highlight the need for careful management of external obligations, while the negative influences of growth and domestic consumption suggest pathways for reducing reliance on foreign borrowing. Future analysis using more robust econometric techniques could enhance our understanding of these dynamics over time and help formulate targeted policy responses to manage debt sustainability effectively.

Table 1: Results of pooled OLS Model

Variable	Coefficient	P-value
TEDS	3.719467*	0.0000
RESX	-0.181620*	0.0001
IMPG	0.988201*	0.000
GDPGR	-0.487040***	0.0551
GFCG	-1.998113*	0.0000
GDSG	-0.047225	0.7144
FDIG	-1.119454**	0.0183
C	36.83459	0.0000
R square	0.743819	
Ad. R sq	0.736975	
F-statitics	108.6736*	0
DW	0.591459	

***, ** & * at 10%, 5% and 1% significance level respectively.

Diagnostic tests for pooled OLS model

Before drawing definitive conclusions and formulating policy implications, it is essential to conduct thorough diagnostic checks on the pooled OLS model to validate the reliability of the regression results. Specifically, we assess the normal distribution of error terms, homoscedasticity and the presence of cross-sectional dependence. The outcomes of these diagnostic tests are summarized in Table 2.

The results of the Jarque-Bera test indicate that the probability value is less than 5%, leading us to reject the null hypothesis of normal distribution. This finding suggests that the residuals of the model deviate significantly from normality, which can raise concerns about the validity of statistical inferences drawn from the model.

Additionally, the likelihood ratio (LR) statistic from the heteroscedasticity test also reports a probability value of less than 5%. This outcome signifies that the model's residuals exhibit heteroscedasticity, meaning that the variance of the error terms is not constant across observations. The presence of heteroscedasticity can pose challenges to the efficiency of OLS estimates, potentially impacting the reliability of estimations and hypothesis testing.

Furthermore, the results from the Pesaran cross-sectional dependence test reveal a significant chi-square statistic, indicating that cross-sectional dependence exists among the countries in the sample. This suggests that residuals across countries are correlated, which may violate the independence assumption of the model and could lead to biased estimations.

Given these diagnostic results—particularly the violations of normality, homoscedasticity and the presence of cross-sectional dependence—it is essential to proceed with caution. These issues highlight the need for robust econometric techniques that can accommodate these challenges to ensure more accurate estimations and inferential statistics.

Future analyses should consider employing alternative methodologies such as quantile regression or Fully Modified OLS (FMOLS) to mitigate the effects of these diagnostic failures. Such methods will provide a more nuanced understanding of the relationships among the variables, ultimately enhancing the reliability and validity of the study's findings

Table 2: Diagnostic Test

Test	JB statistics	P-value	Statistics	P-value
Normality	467.6147	0.0000		
Pesaran CD			7.076983	0.000
Hetero			168.0377	0

Calculations by authors.

Given the diagnostic results indicating violations of normality, heteroscedasticity and cross-sectional dependence, there is considerable uncertainty surrounding the reliability of the pooled OLS model's findings. Consequently, it is advisable to employ a quantile regression model to reassess the relationships between external debt and its determinants. This approach is particularly advantageous as it utilizes median values rather than means, thereby reducing the influence of outliers and providing a more robust estimation of the parameters. By accommodating the identified econometric issues, quantile regression can deliver more reliable insights into the dynamic effects of external debt servicing and other macroeconomic variables across different levels of external debt, thereby enhancing the overall validity of the analysis.

Results of quantile Regression

The findings from the quantile regression model are displayed in Table 3. Notably, these results exhibit comparable significance levels to those obtained from the pooled OLS model; however, they demonstrate greater robustness and nuance. The analysis reveals a positive and statistically significant relationship between external debt servicing and foreign loans, aligning with theoretical expectations. Specifically, for every one percentage point increase in the external debt servicing-to-GDP ratio, the external debt-to-GDP ratio increases by approximately three percentage points.

In addition, the analysis indicates a positive and significant correlation between the GDP ratio of imports and the GDP ratio of external debt. Consistent with the theoretical framework and findings presented by Okwoche and Nikolaidou (2024), the results suggest that a one percentage point rise in the import-to-GDP ratio corresponds to an increase of about 0.978 percentage points in the external debt-to-GDP ratio.

Furthermore, the findings regarding foreign direct investment (FDI) reflect a notable negative impact on external debt, corroborating the results of Pyeman (2016). Holding all other factors constant, a median increase of one percentage point in the FDI-to-GDP ratio results in a decrease of 0.742 percentage points in the foreign debt-to-GDP ratio, indicating that higher FDI inflows can substantially alleviate external debt burdens in these economies.

The study also identifies an inverse relationship between economic growth and external borrowing, consistent with the expectations set forth by Al-Fawwaz et al. (2016), Azolibe (2021), Mijiyawa (2022) and Pyeman (2016), while contradicting findings from Brafu-Insaideo (2019). Specifically, a one percentage-point increase in the GDP growth rate leads to a decrease of 0.447 percentage points in the foreign loans-to-GDP ratio. This dynamic underscores the importance of fostering economic growth as a strategy to mitigate external debt levels.

Moreover, the external debt-to-GDP ratio is significantly influenced negatively by the foreign reserves-to-export ratio (RESX). This outcome aligns with the conclusions made by Nor et al. (2008) and Mijiyawa (2022). The negative coefficient for the RESX variable indicates that these nations commonly preserve their foreign reserves for self-insurance and precautionary measures. More specifically, for every one percentage point increase in RESX, the foreign debt-to-GDP ratio declines by 0.184 percentage points.

The model also reveals a significant inverse relationship between the government final consumption-to-GDP ratio (GFCG) and the foreign loans-to-GDP ratio. This indicates that if the GFCG rises by one percentage point, the foreign loans-to-GDP ratio decreases by approximately 1.33 percentage points. The negative coefficient of GFCG suggests that government expenditures in these countries are primarily financed through tax revenues or domestic savings rather than external borrowing.

In terms of gross domestic savings, the results confirm a negative relationship with the foreign loans-to-GDP ratio. This finding is consistent with theoretical expectations and aligns with the insights provided by Bacha (1990). Specifically, a one percentage point increase in gross domestic savings to GDP ratio is associated with a decrease of 0.317 percentage points in the external debt-to-GDP ratio, reflecting the critical role of domestic savings in reducing external borrowing demands.

The model fit is reinforced by the R-squared and adjusted R-squared values, which indicate that approximately 54% of the variance in the dependent variable is explained by the independent variables. This suggests a satisfactory fit of the model to the panel data. Additionally, the significant values of the sparsity statistic and the Quasi LR statistic confirm that all variables included in the model jointly and significantly impact the level of foreign loans.

In summary, the quantile regression analysis provides robust evidence regarding the complex dynamics influencing external debt in heavily indebted nations. The results not only highlight the critical role of external debt servicing and import levels in driving debt accumulation but also underscore the importance of domestic factors like GDP growth, FDI, government consumption and savings in managing external debt sustainably. These insights offer valuable implications for policymakers aiming to develop targeted strategies to alleviate the external debt burden

Table 3: quantile Regression Model' Results

Variable	Coefficient	P-value
TDSG	3.099494*	0.0000
RESX	-0.184710*	0.0000
IMPG	0.978784*	0.0000
GDPG	-0.447745***	0.0897
FDIG	-0.742835***	0.0676

GFCG	-1.338236*	0.0036
GDSG	-0.371080**	0.0184
C	32.60582*	0.0000
R square	0.527867	
Ad. R sq	0.515253	
Sparsity	30.37595*	0
Quasi-LR stat	489.1981*	0

***, ** & * exhibit 10%, 5% and 1% significance level respectively.

Calculation by authors

Quantile Process

The quantile regression analysis investigates the conditional effects of various input variables on external debt across different quantiles, specifically at the 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 and 0.9 quantiles. The results are presented in Table 4 and illustrated in Figure 2 (see Appendix).

In examining the impact of external debt servicing, we observe that the effects are relatively consistent from the 10th to the 50th quantiles. However, a notable increase is observed in the effects of total external debt servicing (EDS) from the 60th to the 90th quantiles. This trend suggests that countries experiencing a higher burden of external debt are compelled to increase their borrowing to meet servicing obligations. This phenomenon aligns with the debt overhang hypothesis, illustrating a vicious cycle where countries become trapped in escalating debt burdens as they borrow more to service existing liabilities.

Similarly, the influence of international reserves on foreign loans demonstrates a decreasing trend from the 10th to the 40th quantiles, indicating that countries with lower external debt burdens do not heavily rely on reserves as substitutes for foreign borrowing. In contrast, for countries in the higher quantiles (50th to 90th), the effects of international reserves begin to rise. This suggests that as external debt levels increase, countries become more conscious of their reserve management, proactively maintaining substantial reserves to alleviate the burden of external debt and ensure financial stability.

The analysis of the imports-to-GDP ratio reveals a consistent increase in its impact from the 10th to the 90th quantiles. This indicates that countries with higher levels of imports are increasingly reliant on external borrowing to cover import bills, which underscores the correlation between import dependency and external debt accumulation.

The effect of GDP growth rate demonstrates an interesting dynamic, initially increasing from the 10th to the 60th quantile and showing further increases at the 70th quantile. However, from the 80th quantile onward, its effect stabilizes, suggesting that as the foreign loan burden escalates, the ability of GDP growth to mitigate external borrowing diminishes significantly. This observation reinforces the notion that economic growth may become less effective in alleviating debt stress in countries with higher debt levels.

In examining the role of foreign direct investment (FDI), results indicate that the influence is statistically insignificant at the 10th to 40th and 90th quantiles, while showing significance for the 50th to 80th

quantiles. The decreasing impact of FDI throughout this range suggests that foreign investments are particularly effective in reducing foreign loans for countries with moderate debt levels, making them more attractive to investors.

Moreover, the government final consumption-to-GDP ratio (GFCG) shows statistically significant effects across all quantiles except for the 10th. Initially, GFCG impacts show a reduction but increase slightly before stabilizing. This variability suggests that the effects of government consumption on debt management are not consistent across different debt levels. In contexts of moderate external debt, government consumption expenditures appear to play a more stable and beneficial role in mitigating foreign loan burdens.

Lastly, the influence of gross domestic savings-to-GDP ratio is significant at the 30th and 40th quantiles, indicating that domestic savings have a stronger and more stable impact on reducing external debt burdens in countries facing moderate levels of debt. This finding emphasizes the importance of enhancing domestic savings as part of a broader strategy to manage external debt effectively.

In conclusion, the quantile regression analysis provides nuanced insights into how different macroeconomic factors influence external debt across varying debt burdens. The results highlight the importance of accounting for heterogeneity in the impacts of these variables, offering valuable implications for policymakers in addressing the challenges of external debt sustainability.

Slope equality and slope symmetry test

To preserve the validity and reliability of the results in quantile regression, it is crucial to make sure that the coefficients are not uniform and symmetrical over all quantiles. These tests were conducted as a result. In both tests, the Wald's chi square p-values are less than the 5% significance level. The null hypothesis that the coefficients are symmetrical and equal is thus rejected.

Robustness of the results

To ensure the robustness and reliability of our findings, the data has been re-analyzed using the Kao co-integration test and Fully Modified OLS (FMOLS). Employing these advanced econometric techniques is crucial for addressing potential issues of non-stationarity and endogeneity that can affect the validity of the results obtained from earlier models such as Pooled OLS and quantile regression.

The Kao co-integration test is particularly useful for determining whether a long-term equilibrium relationship exists among the variables in the model. This test is appropriate for panel data and provides critical insights into whether the variables move together over time, which is essential for drawing meaningful conclusions about external debt dynamics. By confirming co-integration, we can assert that the relationships established in our earlier analyses are not merely spurious but reflect genuine economic interactions.

In addition, the FMOLS estimation method offers several advantages over traditional OLS. Specifically, FMOLS provides consistent and efficient estimates in the presence of endogenous regressors and serial correlation in the error terms. This method corrects for potential biases, enhancing the accuracy of the coefficient estimates. The FMOLS approach is particularly relevant in the context of external debt and economic indicators, as these relationships are often complex and affected by various interdependencies.

The results from the Kao co-integration test and FMOLS estimation, as presented in Tables 5 and 6 in the appendix, consistently align with the findings from the Pooled OLS and quantile regression analyses. This consistency across different modeling approaches indicates that our results are robust, reliable and valid. By utilizing these additional robustness checks, we reinforce the credibility of our conclusions regarding the drivers of external debt in highly indebted nations.

POLICY IMPLICATIONS

Theoretical Implications of the Research

This research significantly enhances the understanding of external debt dynamics in highly indebted countries through the frameworks of Neoliberalism Theory and Dependency Theory. By integrating these theories, the study offers a nuanced analysis of how systemic economic factors and structural dependencies perpetuate cycles of unsustainable external debt.

The findings align with Neoliberalism Theory, which underscores the importance of fiscal discipline, trade liberalization and structural reforms in effectively managing external debt. The identification of high debt servicing costs and growing imports highlights the challenges stemming from inadequate fiscal prudence and unchecked market liberalization. These outcomes suggest that while neoliberal policies may facilitate integration into the global economy, they can also exacerbate external debt issues if governance and regulatory frameworks are insufficient to manage consumption and investment behaviors. Consequently, the research implies that addressing external debt pressures necessitates a careful balance between embracing open market principles and implementing targeted interventions designed to mitigate unsustainable economic practices.

Conversely, the findings also resonate with Dependency Theory, which posits that developing economies remain structurally dependent on external resources, thereby perpetuating cycles of debt and underdevelopment. The reliance on foreign debt to finance growing imports and essential development spending reveals the inequalities inherent in global economic relationships, placing these nations in a subordinate economic position. By applying Dependency Theory, this study elucidates how external debt can reinforce dependency by redirecting essential resources toward debt servicing, rather than promoting self-sustaining economic growth. Accordingly, the recommended policies—such as enhancing domestic savings and improving governance—align with the theory's advocacy for reducing external vulnerabilities and bolstering internal economic capabilities.

By employing both Neoliberal and Dependency perspectives, this research effectively bridges a critical gap in the theoretical discourse surrounding external debt. It illustrates that while neoliberal strategies may address certain immediate financial challenges, achieving long-term sustainability requires overcoming the structural dependencies that drive debt accumulation.

This integrative approach offers a more comprehensive framework for understanding the interactions between internal policy failures and external systemic constraints that heavily indebted countries face.

The theoretical implications derived from this research underscore the necessity for policy interventions that extend beyond traditional economic orthodoxies. The study advocates for a strategic blend of governance reforms, debt restructuring initiatives and investments in domestic capacity building to dismantle cycles of dependency while aligning with sustainable neoliberal objectives. In doing so, this research lays a foundational groundwork for further empirical and theoretical explorations into the determinants of external debt crises and their solutions within developing economies.

CONCLUSION

This study aimed to investigate the influence of external debt servicing and imports on the growth of external debt in countries classified as highly indebted by the World Bank and the International Monetary Fund (IMF). Using panel data sourced from the World Development Indicators (WDI) database for the period from 1991 to 2022, the initial analysis was conducted using pooled OLS regression. However, to account for econometric issues such as heteroscedasticity, non-normal distribution of residuals and cross-sectional dependence, quantile regression was subsequently employed. This approach enabled a more robust estimation of the relationship by utilizing median values rather than means, thus addressing

potential violations of OLS assumptions. Our diagnostic tests confirmed that the coefficients obtained from quantile regression exhibited neither equality nor symmetry.

The findings from this analysis indicate that external debt servicing and imports are significant drivers of the escalating external debt burden in the examined countries. Specifically, the results suggest that lenders frequently extend loans to cover the repayment of previous debts and to finance substantial imports of unnecessary goods. This trend highlights a systemic issue, wherein a considerable proportion of imports consists of non-essential luxury items sourced from wealthier countries, exacerbating external debt dependence.

In addition, the study identifies several avenues for potential mitigation of external debt distress, including fostering economic growth, increasing domestic savings and enhancing foreign reserves. The inflow of foreign direct investment (FDI) and government expenditures on development initiatives funded through tax revenues or domestic savings can provide viable strategies for reducing reliance on external borrowing.

While this research leans towards a dependency theory perspective, illustrating systemic vulnerabilities such as unnecessary imports and governance challenges that perpetuate economic subordination, it also incorporates aspects of neoliberal thought. The proposed solutions—particularly those emphasizing the importance of attracting foreign investment and enhancing economic growth—highlight the necessity of structural reforms in conjunction with policies designed to improve market efficiency.

Based on the outcomes of this study, it is strongly recommended that governments of highly indebted nations initiate immediate negotiations with external lenders to reschedule and restructure their external debt and its related servicing obligations. Additionally, concrete measures should be implemented to bolster non-debt-generating inflows, such as remittances, international investment, exports and official development assistance. It is equally important for governments to focus on boosting foreign exchange reserves through strategies aimed at enhancing FDI, promoting exports and stimulating domestic growth.

Furthermore, to address the underlying issues contributing to external debt accumulation, policymakers should implement regulations to restrict the importation of unnecessary luxury items, including high-end vehicles, expensive jewelry and military equipment. By adopting a comprehensive approach that combines debt management with sustainable economic development strategies, these nations can work toward achieving greater economic stability and reduced vulnerability to external shocks

LIMITATIONS OF THE STUDY

This study faces several limitations that may affect the interpretation and generalizability of the findings. First, while the data sourced from the World Bank's World Development Indicators (WDI) database offers a comprehensive overview, it may contain inaccuracies, inconsistencies, or coverage gaps for certain variables or years, potentially impacting the robustness of the results. Additionally, the focus on ten highly debt-distressed countries, while providing valuable insights, may limit the applicability of the findings to other developing or transitioning economies with differing structural and economic conditions. Methodologically, despite employing pooled OLS followed by quantile regression and other advanced techniques to address issues of cross-sectional dependence and heteroscedasticity, these methods may fail to capture complex nonlinear relationships or dynamic interactions among the variables. Furthermore, endogeneity and omitted variable biases might persist despite the application of robust econometric techniques. The study's primarily quantitative approach also limits the analysis, as it does not fully consider the institutional, political and social factors that influence external debt dynamics, such as corruption or governance quality. Lastly, the static nature of the analysis, which spans the period from 1990 to 2022, does not account for significant structural changes or global economic shocks, such as the 2008 financial crisis or the COVID-19 pandemic, which could have notably influenced the results. Addressing these limitations in future research will be critical for deepening the understanding of

external debt dynamics and informing more effective policy frameworks in developing economies.

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A Appendices

Figure 2: quantile Process

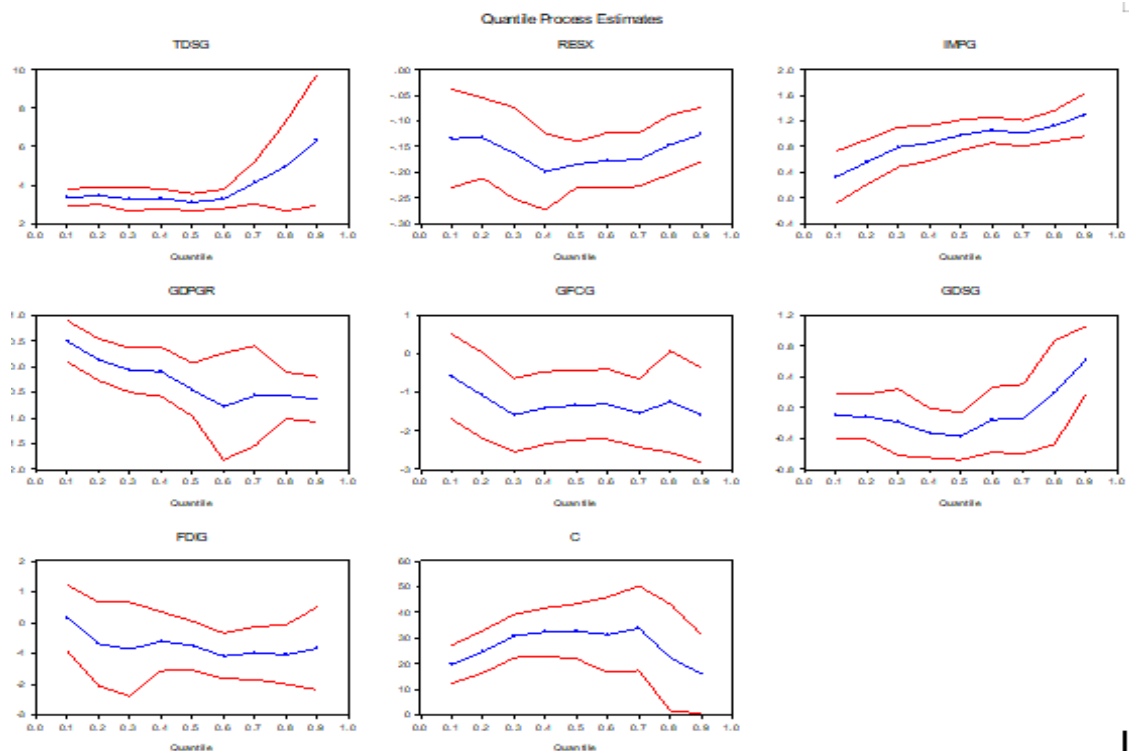


Table 4: quantile Process Results

Variable	quantile	Coefficient	P-value	Variable	quantile	Coefficient	P-value
TDSG	0.1	3.335093	0	GFCG	0.1	-0.594297	0.2918
	0.2	3.458547	0		0.2	-1.091493	0.0566
	0.3	3.255773	0		0.3	-1.590291	0.0013
	0.4	3.303423	0		0.4	-1.400555	0.004
	0.5	3.099494	0		0.5	-1.338236	0.0036
	0.6	3.276168	0		0.6	-1.310718	0.0052
	0.7	4.120248	0		0.7	-1.54208	0.0008
	0.8	4.980109	0		0.8	-1.243131	0.0662
	0.9	6.350739	0.0003		0.9	-1.595627	0.0112

RESX	0.1	-0.13435	0.0064	GDSD	0.1	-0.10468	0.4864
	0.2	-0.133353	0.0009		0.2	-0.117494	0.4378
	0.3	-0.162929	0.0004		0.3	-0.19064	0.3883
	0.4	-0.198903	0		0.4	-0.328044	0.046
	0.5	-0.18471	0		0.5	-0.37108	0.0184
	0.6	-0.176852	0		0.6	-0.154947	0.4755
	0.7	-0.175781	0		0.7	-0.147684	0.5211
	0.8	-0.146056	0		0.8	0.197104	0.5671
	0.9	-0.126019	0		0.9	0.615862	0.0067
IMPG	0.1	0.323688	0.1202	FDIG	0.1	0.151231	0.7838
	0.2	0.561454	0.0018		0.2	-0.69823	0.3151
	0.3	0.792448	0		0.3	-0.860511	0.2689
	0.4	0.854397	0		0.4	-0.606642	0.2158
	0.5	0.978784	0		0.5	-0.742835	0.0676
	0.6	1.056689	0		0.6	-1.083491	0.0047
	0.7	1.007839	0		0.7	-0.983189	0.0255
	0.8	1.124822	0		0.8	-1.035169	0.0359
	0.9	1.29978	0		0.9	-0.835693	0.2239
GDPGR	0.1	0.494216	0.0163	Constant	0.1	19.73235	0
	0.2	0.134673	0.5167		0.2	24.66994	0
	0.3	-0.066922	0.7614		0.3	30.8186	0
	0.4	-0.096847	0.6944		0.4	32.36147	0
	0.5	-0.447745	0.0897		0.5	32.60582	0
	0.6	-0.777229	0.1446		0.6	31.34601	0
	0.7	-0.569809	0.2517		0.7	33.78327	0.0001
	0.8	-0.563112	0.0154		0.8	22.44871	0.0353

Table. 5 Results of FMOLS

Dependent Variable: TED
Method: Panel Fully Modified Least Squares (FMOLS)
Date: 07/22/24 Time: 20:43
Sample (adjusted): 1992 2022
Periods included: 31
Cross-sections included: 10
Total panel (unbalanced) observations: 259
Panel method: Weighted estimation
Cointegrating equation deterministics: C
Long-run covariance estimates (Bartlett kernel, Newey-West fixed bandwidth)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TDSG	3.587109	0.045859	78.22120	0.0000
RESX	-0.255329	0.044367	-5.754916	0.0000
GDPGR	-0.174577	0.065377	-2.670319	0.0081
GFCG	-0.394251	0.036439	-10.81956	0.0000
GDSG	-0.128020	0.020776	-6.161982	0.0000
IMPG	0.985909	0.033434	29.48847	0.0000
FDIG	-2.204694	0.016627	-132.5963	0.0000
R-squared	0.809575	Mean dependent var	59.75125	
Adjusted R-squared	0.796985	S.D. dependent var	37.67780	
S.E. of regression	16.97658	Sum squared resid	69745.40	
Long-run variance	109.2945			

Table 6. Kao co-integration test

Kao test for cointegration

H0: No cointegration Number of panels = 10
Ha: All panels are cointegrated Avg. number of periods = 23,5

Cointegrating vector: Same

Panel means: Included Kernel: Bartlett
Time trend: Not included Lags: 1.60 (Newey-West)
AR parameter: Same Augmented lags: 1

	Statistic	p-value
Modified Dickey-Fuller t	-6.6526	0.0000
Dickey-Fuller t	-3.3465	0.0004
Augmented Dickey-Fuller t	-2.9627	0.0015
Unadjusted modified Dickey-Fuller t	-7.0103	0.0000
Unadjusted Dickey-Fuller t	-3.4286	0.0003