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## Dynamics of Use of IMF Debt: Evidence from IMF Members Countries



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**Abstract:** This research scrutinize dynamics of use of IMF credit on the growth performance of the ten most heavily indebted countries of the world. The study employs a panel of ten countries during the period 1990-2022. Multiple tests, including LLC, IPS, Maddala-WU, and Fisher Augmented DF, reveals mixed order of integrations. Additionally, the panel co-integration tests by Pedroni, Kao, and Westerlund indicate existence of steady state equilibrium between growth performance and use of IMF loans taken by the sampled countries. The empirical results indicate that the use of IMF credit significantly and adversely affects the economic growth of these ten highly indebted countries. Moreover, the study identifies detrimental effects stemming from government expenditure, debt servicing, and inflation on economic growth. The study proposes that governments should implement austerity measures, search for alternative debt sources and control on imports and ensure proper utilization of IMF credit to save foreign reserves.

**Key Words:** Heavily Indebted Countries, ARDL, Use of IMF, Panel Co-integration, Crowding out

### JEL Classification:

### Introduction

When domestic resources are not sufficient to fund essential development projects, poor countries often take on external debt as a source of financing (Al-Fadhat & Nadhir, 2019; Toktosunova et al., 2021). This can be used to finance critical development projects, including infrastructure, healthcare, education, and economic development (Senadza et al., 2017). However, if this debt is not managed properly, it can lead to a range of negative consequences (Bangura et al., 2021; Clements et al., 2021). Stated

differently, if managed properly, external debt can provide critical financing for development projects and can contribute to economic growth (Mohsin et al., 2021; Sandow et al., 2022; Duodu & Baidoo, 2022).

Neoclassical economists perceives external borrowing as a rational choice to secure investment capital, potentially accelerating economic growth by financing projects that domestic savings alone cannot cover. In contrast, the endogenous growth theory argues that increasing public debt adversely affects future generations by lowering the growth rate, while reducing it

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hurts the current generation, illustrating a Pareto optimal dilemma. Dependency theorist's view external debt as a form of economic exploitation, perpetuating underdevelopment by diverting resources from domestic investments. Keynesian school of thoughts recognizes the short-term benefits of external debt in stimulating economic growth through increased aggregate demand, but warns of potential long-term issues such as inflation, balance of payments crises, and debt sustainability. The structuralists underscores the role of domestic structural factors like income inequality, market structure, and political instability in shaping the consequences of external debt, positing that it can exacerbate existing structural problems and debt problems. Traditional view contends that external debt hampers economic growth by draining a country's resources and eroding foreign creditors' confidence. Debt overhang theory highlights how high external debt levels can deter foreign investment, creating a cycle of low investment and increased debt, ultimately hindering economic growth. Debt neutrality theory hold that growth depends on domestic policies and institutions. Conversely, debt-led growth theory proposes that external debt can spur short-term economic growth by financing essential projects, yet excessive external debt poses a risk of financial instability and crisis, as observed in many developing countries during the 1980s and 1990s.

How debt affect growth performance, is extremely debatable area between economists and policy makers. One view is that a certain amount of debt can be beneficial for an economy, as it can be used to finance infrastructure, education, research and development, and other activities that can lead to increased productivity and economic growth. The golden rule states that a country should use debt to finance projects that will result in a higher return on investment than the interest rate charged on the debt. According to Barro (1990), expected rate of return on borrowed funds determine whether a debt is optimal level and thereby use the funds for investment projects. Similarly, Aghion and Bolton (1997) suggest when the borrowed

amount is growth enhancing activities such innovation and development of new product, it would positively affect economic growth performance of borrowing countries. Literature indicate that external indebtedness can have a positive effect on economic development in developing countries, provided that the borrowed funds are invested in productive activities. The results of these studies indicate that countries with high external indebtedness, but which invest the borrowed funds into productive activities, tend to have higher rates of economic growth.

Economists, policy makers and researchers have not reached to any particular relationship between borrowed funds and growth performance of indebted countries because of the diversity of underlying features of indebted countries. Krugman (1988) argued that fund raised through borrowing reduced investment, lower investor confidence, decreased government spending, heightened financial risk which unfavorable effects on balance of payments of borrower countries. Easterly (2001) state that debts effects are not uniform for all countries rather vary with countries institutions and policies, although specific forms of borrowing like foreign direct investment can be advantageous. The impact of use of IMF loans vary depending on the level of debt institutional structure, types of economy and level of already availed debt facilities (Chowdhury & Mavrotas, 2006; Wang et al., 2021). Gómez-Puig et al., (2022) explored the relationship across advanced and emerging economies, confirming a negative association, particularly in emerging economies, and a weaker relationship when external debt was in domestic currency rather than foreign currency. The same type of relationship is found in the study of Reinhart and Rogoff (2010) covering 44 countries and sample period 1800-2008. Similarly Asteriou et al., (2021), finds countries with weak institutions and low level of human capital experience negative effects of use of borrowed funds on their growth performance. In additions to low level of human capital, corruption is also one of the problems of institutionally weak developing countries. Literature shows that borrowed funds have

negative effects on economic performance of corrupt countries (Dey & Tareque, 2020; Maken, 2021; Manasseh et al; 2022). IMF funds can provide countries with access to much-needed capital for investment, infrastructure development, and other economic activities. This, in turn, can stimulate economic growth and development, leading to increased employment, higher incomes, and improved standards of living. However, excessive use of IMF can lead to a range of negative consequences, including higher interest payments, reduced government spending on essential public goods and services, and increased risk of default. These factors can all impede economic growth and development, leading to increased poverty and hardship for ordinary citizens.

Judicial and proper utilizations of resources especially funds borrowed from external sources such as IMF, World Bank and other organizations might bring prosperity and improvement in growth performance of countries in countries with quality institutions (Acar et al., 2023; Asante et al., 2023; Giri et al., 2023; Kumar & Batra, 2023; Mtar & Belazreg, 2023; Öncel et al., 2023). Besides, loans, countries are receive Grants, aid and concessional loans to supports countries in time of suffereings such Covid-19. Literature highlight possittve impact of such types of loans and grants on economic performance of economies (Asongu et al., 2018; Vreeland, 2020; Yoon & Mah, 2020).

The contributions of the present work are manifold. This paper contributes to literature in several way. First, top ten (10) indebted countries of International Monetary Fund (IMF) are selected as panel and examined the how growth performance of such countries changed with use of IMF loan. Second, the sample consists of heterogonous countries with diverse economic, institutional, and social structure. This paper is also different from the past studies in the sense that it examined the impact of loan provided by IMF on economic growth of selected countries. Timing of the study is significant, as most of the countries of the world have been facing challenges related to their reserves and

external borrowing and they are entering into the IMF program. The literature on the relationship between external debt and economic growth suggests that the relationship is complex and may depend on many factors. Therefore, this study provides valuable insights into the specific debt dynamics. Furthermore, the study would inform decision-making in the fiscal management of the panel countries. By examining whether IMF debt has short-run or long-run effects on economic growth, policymakers could better understand the implications of such borrowing for their economic prospects.

## Literature Review

Classical growth theories emphasized the role of division of labor, specialization, and free markets in promoting economic growth. Smith (1776) argued that through specialization and efficient resource allocation, nations could increase productivity and overall wealth. Thomas Malthus, in his work "An Essay on the Principle of Population", introduced a pessimistic theory of growth and argued that population growth would inevitably outpace the growth of food production, leading to recurring cycles of population checks that would keep population growth in check and prevent sustained economic growth. Building on Malthus's work, David Ricardo introduced the concept of diminishing returns to land. In his theory, as population increases and more land is cultivated, diminishing returns set in, making it increasingly difficult to sustain high levels of economic growth. Ricardo's theory highlighted the importance of technological progress to counteract the negative effects of diminishing returns. John Stuart Mill emphasized on capital formation, increase in stock of capital and technological progress. Mill's theory introduced the concept of "stationary state," where a society could reach a point of steady-state growth due to diminishing returns, unless technological progress continued to provide new avenues for growth. Although not purely growth theories, utopian socialists like Robert Owen and Charles Fourier envisioned ideal societies

where economic growth was coupled with social harmony and equitable distribution of resources. They focused on reforming social and economic structures to create more just and prosperous societies.

Neoclassical growth theories shifted the focus of growth analysis from macroeconomic aggregates to microeconomic foundations. The Solow growth model explains long-term economic growth and capital accumulation within an economy. It posits that in the short run, increasing investments and capital accumulation can lead to economic growth, but eventually, diminishing returns set in as capital accumulates. Thus, sustained economic growth can only be achieved through technological progress, which is treated as an exogenous factor in the original model. Paul Romer's endogenous growth theory challenged the assumption of exogenous technological and argued that technological progress is not just a random external factor but can be influenced by deliberate investments in research and development, education, and innovation. In the endogenous growth model, sustained investment in human capital and knowledge leads to continuous economic growth without the diminishing returns predicted by the Solow model. Schumpeterian believed that innovation is the primary engine of economic growth. He argued that entrepreneurs, driven by a desire for profit, introduce new products, services, production methods, and business models into the market. These innovations disrupt the existing equilibrium and create economic opportunities. According to theory of creative destruction, as new firms and technologies emerge, older industries and firms that cannot keep up with the pace of innovation gradually decline or disappear. This process is seen as essential for long-term economic progress. According to him, entrepreneur are motivated by entrepreneurial profit as a reward for taking risks and introducing new ideas and technologies. He believed that these profits, while temporary due to competition and imitation, are crucial for stimulating further innovation and economic growth. He further argued that monopolies can provide firms with the

resources and incentives needed to invest in research and development, fostering further technological progress. This monopolist can be successful in introducing in products if the economy has well-functioning financial system, supportive legal framework, and institutions promoting research and development.

Countries borrow from foreign creditors to finance investment and development projects. When a country's domestic savings rate is insufficient to meet its investment needs, external borrowing can provide the necessary funds to finance development projects, such as infrastructure, education, and health care (Khan & Haque, 1985). By financing these projects, external borrowing can stimulate economic growth by creating jobs, increasing productivity, and improving the country's economic infrastructure. External borrowing can provide the funds necessary to finance development projects (Ubok-Udom, 1979), it can also create a burden of debt repayment that diverts resources away from social spending and public services, potentially slowing economic growth (Fosu, 2010). Additionally, if the borrowed funds are not used effectively or if the debt burden becomes too large, it can lead to debt crises and economic instability.

During periods of economic recession or depression, significant levels of debt accumulated during previous periods of prosperity can discourage investment and spending (Krugmen, 1988) and so the anticipation of potential default or bankruptcy due to the burden of existing debt deters individuals, companies, and governments from engaging in productive economic activities. This, in turn, can lead to a prolonged economic downturn, as the economy remains trapped in a cycle of low growth and high debt, making it difficult to achieve a sustainable recovery. Moreover, when a government borrows heavily from financial markets to finance its expenditures, it competes with businesses and individuals for the available pool of loanable funds and drive the interest rate high which discourage private investors to invest in risky and heavy

investment projects. This rise in interest rates reduced access to affordable credit can discourage private investment and spending, potentially offsetting the positive effects of government spending. In the absence of the option to default on government debt, the initial debt levels do not influence the dynamics of fiscal competition. However, this neutral scenario changes when the possibility of a default is introduced. In cases where default is feasible, a government constrained by potential default optimally responds by reducing investments in durable public infrastructure. This reduction in infrastructure spending subsequently drives a more assertive approach to setting taxes (Janeba & Todtenhaupt, 2018).

Moss and Chiang (2003) as well as Soydan and Bedir (2015) argued that when a nation grapples with a substantial debt burden, the necessity for foreign exchange inflows intensifies to meet debt obligations, leading to currency devaluation on the international stage. Consequently, exports, capital influx, and reserves all dwindle, culminating in formidable challenges for debt repayment. This situation prompts a heightened need for additional external debt to meet previous obligations, exacerbating liquidity constraints and impeding economic growth. The ensuing macroeconomic instability triggers reduced exports, diminished capital inflow, and insufficient reserves, exacerbating the difficulties of debt repayment and detrimentally impacting economic growth. Countries often resort to import substitutions and devaluations of currency which might result in reduction in growth performance (Taylor, 1983; Serieux and Yiagadeseen, 2001).

Kononenko (2015) employed both vector autoregressive (VAR) methodology and vector error correction (VEC) methodology to investigate how IMF lending affected the Ukrainian economy from 1991 to 2010. The comprehensive empirical analysis revealed a short-term detrimental effect of IMF lending on economic growth in Ukraine. Nonetheless, these results underscore that IMF lending could establish a foundation for lasting economic growth in Ukraine, despite the initial

short-term downturn. In another time study, debt services is found to have insignificant negative impact on economic growth in long run (Alrefai, 2015).

Ajayi and Ndikumana(2014) examined the impact of capital flight on economic growth 31 African countries during 1980-2010. The Authors assumed that government with sound macroeconomic policies face fewer capital flight using Harrod-Domer framework. The study finds that capital flight has significant negative affect on economic growth of petroleum exporting countries. In another study, Ndikumana(2016) employed case study approach, found that external borrowing cause capital flight highlighting under invoicing as a main channel of capital flight. The study further found that political instability is main deriver of capital flight in African countries.

Countries has no option without resorting to debt when domestic resources are short of demand for resources. In such situations, economists are investigating about the limit of the debt to GDP which is conducive to growth. Fofana N'Zue (2020) identified short term threshold to be 45% while 42.52% as debt threshold for short run and conclude that out of the debt limit, economic progress is negatively affected by external debt. In another panel study of BRIC countries, Azretbergenova (2022) using Westerlund(2007) co-integration test and Fully Modified Ordinary Least Square(FMOLS) estimator, found 61.3 % of GDP as threshold level beyond which debt negatively affect economic growth.

Studies shows that because of mismanagement, external debt are found missing the target of raising the standard of living of the masses. So Public sector management is considered one of the important factor in determining potential impact of debt on economic growth. In an study Sandow et al.(2022), owing the difference in quality of public sector management, African countries debt impact vary across countries with quality institution, debt is found to have positive impact on economic growth. Another study found that

bidirectional causality exist between economic growth and external debt using panel of 18 Asian countries for the period 1995-2019 and Pooled Mean Group method. The study emphasized on the debt management and investment in productive sector. Both the theoretical and empirical studies also discussed the level of debt ratio which is conducive for growth. In empirical work, it is found that the ratio varies among countries depending on their fiscal imbalances and specific targets (Evan, 2022).

### Theoretical Framework

In developing countries, external loans are sought to address fiscal gaps and promote capital formation. External sources, like foreign loans, aid, and investments, become vital due to underdeveloped local markets. This present section layout the theoretical underpinning between economic growth and IMF loans. Theoretical models of Harrod (1939) and Domar(1956) shows different types of gaps such as saving and investment gap, foreign exchange gap (Trade gap) and fiscal constraint gap and countries often meet the gap by resorting to borrowing. The literature shows countries fill the various gaps through external borrowing.

From national income identity

$$C_t + S_t + T_t + =Y_t =+ C_t + I_t + G_t + (X_t - M_t).....(1)$$

Rearranging equation (1), we have

$$(S_t - I_t) = (G_t - T_t) + (X_t - M_t).....(2)$$

Where denote  $(S_t - I_t)$  saving gap  $(G_t - T_t)$  represent budget deficit and  $(X_t - M_t)$  indicate trade deficit of country. If the equation eq(2) hold, then the country fiscal deficit would be zero that is

$$Fiscal\ Deficit = (S_t - I_t) - (G_t - T_t) - (X_t - M_t).....(3)$$

From identity (3), it is a country's fiscal deficit would be financed from excess of saving, excess revenue, and excess of export earnings. In long run, a country reach to steady where saving gap is zero but in short run the saving gap can be positive or negative. If a country is facing any of the three or any combination of

the three gaps, it resort to borrowing. Domestic saving in developing countries often are not sufficient to the needed investment projects and therefore borrow from external institutions including IMF. Countries also need to finance excessive import bills as export revenue fall short of import payments. Such countries either export in smaller volumes or the products are not competitive. In situation, when government expenditure exceeds its revenue take loans to finance the fiscal deficit. If fiscal deficit is due to saving gap, then the amount of borrowing is equal to the deficit. That is

$$S_t - I_t = d_t + (1+r)d_{t-1}.....(4)$$

Where  $(d_t)$  denoted current level, while  $(d_{t-1})$  indicate the level of previous debt and  $(r)$  is the interest rate.  $(d_t + (1+r)d_{t-1})$  is the total external debt payment including the principal amount of previous debt and interest payment. Similarly in case of other gaps, the amount of borrowing would be equal to that gap.

As the borrowing country must pay the debt servicing (interest payment) to the debtor country which reduce the future saving of the country and hence investment which negative affect the future output of the country. Thus, higher debt would negatively affect country future growth. In the same line of reasoning, borrowing country would either reduce future expenditure or would increase taxes to pay principal amount and interest payment to debtor countries which would also reduce economic growth the country. The large debt burden also raised investors' concern regarding the paying capacity of the country which negatively affect investors' confidence that put pressures on country exchange rate.

### Model Specification

As discussed in theoretical framework, countries with fiscal deficit resort to borrowing from IMF which are expected to negatively affect economic growth either directly or through its impact on macroeconomic economic variables. However, there are studies which highlight

that use of IMF loans positively affect economic performance of indebted countries as the internal rate return from the financed projects are higher than the interest payments. From both theoretical studies and empirical, it is clear that debt affect economic performance of a country. The functional relation between growth performance and IMF loan is expressed as under

$$GDPGR_{i,t} = f(GE_{i,t}, GFCF_{i,t}, ED_{i,t}, DS_{i,t}, ER_{i,t}, INF_{i,t}, IMP_{i,t}, PS_{i,t}, \dots) \dots (5)$$

Where “i” represents country and “t” denote year.

$GDPGR_{i,t}$  = GDP growth (annual %)

$GE_{i,t}$  =General government final consumption expenditure (% of GDP)

$GFCF_{i,t}$  =Gross Fixed Capital Formation (as % GDP)

$ED_{i,t}$  =External debt stocks (% of GNI)

$DS_{i,t}$  =Total debt service (% of GNI)

$ER_{i,t}$  =Official exchange rate (LCU per US\$, period average)

$INF_{i,t}$  =Inflation, consumer prices (annual %)

$IMP_{i,t}$  =Imports of goods and services (% of GDP)

## Data and Methodology

This study selected a panel of top 10 IMF indebted countries of the world from different continents having diverse economic, political, and social structure thus constitute a panel of heterogonous countries (List of countries is given in Appendix-I). These countries include Argentina, Egypt, Ukraine, Pakistan, Ecuador, Colombia, Angola, South Africa, Nigeria and Kenya. The secondary data is collected from World Bank indicator for the period 1990-2022, forming a strongly balanced and heterogeneous panel dataset.

The dependent variable is economic growth, represented by the natural logarithm of the annual Growth rate of gross domestic product (as % of GDP) and external debt denote the use of IMF credit outstanding of the

top ten indebted countries throughout the present study. Annexure-I provides an overview of the variables, their notations, descriptions, units of measurement, and the sources of data collection. To estimate the impact of use of IMF loan on economic growth of selected panel countries, this study estimates the following econometric model based on the theoretical framework. The linear form of the model of the study is expressed as (variables are expressed in logarithmic form) and taking into account control variables (“ $Z_t$ ”) of the model.

$$GDPGR_{i,t} = \beta_0 + \beta_1 GE_{i,t} + \beta_2 GFCF_{i,t} + \beta_3 ED_{i,t} + \beta_4 DS_{i,t} + \beta_5 ER_{i,t} + \beta_6 INF_{i,t} + \beta_7 IMP_{i,t} + \beta_8 PS_{i,t} + \phi Z_{i,t} + \varepsilon_{i,t} \dots \dots \dots (6)$$

(“ $\varepsilon_{i,t}$ ”) independently and identically distributed random variable with means zero and variance one. In more compact form, we can express equation (6) in matrix form as, we can express the

$$GDPGR_{i,t} = \alpha + \mu_i + X'_{i,t} \beta + Z'_{i,t} \phi + \varepsilon_{i,t} \dots \dots \dots (7)$$

Here ( $\alpha$ ) is common intercept and ( $\mu_i$ ) is country fixed effect. (“ $X_{i,t}$ ”) represents all the potential independent variables while represent control variables.

The paper employee LLC, IPS, MW, ADF tests to check properties of variables of the study. Panel Co-integrating techniques are applied to know whether steady equilibrium exist among the variables, considering both cross-sectional and time-series dimensions. These tests extend traditional co-integration analysis to the panel data context, accounting for potential cross-sectional dependence and individual heterogeneity. Panel co-integration analysis is valuable for understanding the underlying dynamics among variables across entities over time. After the checking stationarity and cointegrating relationship among variables, panel dynamic techniques developed by Pesaran et al., (1999) is employed. As the variables are integrated of mixed order, the study ARDL method which is the most appropriate. The results of huasman test indicate that PMG perform better then MG and therefore PMG is employed to know the impact of IMF loans on growth performance of the panel countries. The general form of pooled mean group

$$GDPGR_{it} = \sum_{j=1}^p \delta_{i,j} GDPGR_{i,t-j} + \sum_{j=1}^q \beta_{i,j} x_{i,t-j} + \mu_t + \varepsilon_{it} \dots \dots \dots (8)$$

The error correction model (ECM) can be derived from eq(8) as below

$$\Delta GDPGR_{it} = \sum_{j=1}^{p-1} \delta_{i,j} \Delta GDPGR_{i,t-j} + \sum_{j=0}^{q-1} \beta_{i,j} \Delta x_{i,t-j} + \lambda_i (GDPGR_{it-1} - \beta_{i,j}' x_{i,t-j} + \mu_t + \varepsilon_{it} \dots \dots (9)$$

For convergence to hold, the coefficient of error correction term  $\lambda_i$ , which is called speed of adjustment parameter, must be negative. In this case the variables carry long run relationship.

### Results and Discussion

Correlation matrix represents pairwise correlations between six variables: GDP Growth Rate, External Debt, Debt Servicing, Imports, Government Expenditure, and Inflation in panel of top ten indebted countries of IMF having heterogeneous socio-economic structure. The correlation results given in Table No.1 shows that Correlation coefficients of GDP Growth Rate (1) and External Debt (2) is -0.158, which indicates a weak negative correlation. This suggests that there might be a slight tendency for higher external debt to be

associated with slightly lower GDP growth rate, but the relationship is not very strong. Similarly, the correlation coefficient of GDP Growth Rate (1) and Debt Servicing (3): indicate a weak negative correlation suggesting small tendency for higher debt servicing to be associated with slightly lower GDP growth rate, but again, the relationship is not substantial. The interesting relation is indicated by the correlation coefficient of Use of IMF Credit and Government Expenditure, which is 0.098, indicating a moderate positive correlation. This suggests that top ten indebted countries spend most of credit provide by IMF by government on their final consumption rather than on development projects. Similarly, the positive correlation coefficient of Debt servicing and external debt which is 0.576 shows that debt servicing increases with increase in external debt and the additional debt is mostly spend on repaying debt services by the indebted countries. Government expenditure is a fundamental component of fiscal policy, which involves how a government raises and spends money. Developing countries often resort to external borrowing to fund various government expenditures, such as infrastructure projects, social programs, and public services. Borrowing can provide immediate funds to support development initiatives that might otherwise be beyond the government's fiscal capacity.

**Table1**

*Pairwise correlation*

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) GDP Growth Rate	1.000					
(2) External Debt	-0.158	1.000				
(3) Debt Servicing	-0.090	0.576	1.000			
(4) Imports	0.043	-0.105	0.361	1.000		
(5) Govt Exp	-0.236	0.562	0.236	-0.200	1.000	
(6) inflation	-0.237	-0.008	-0.081	-0.030	0.122	1.000

Source: Author Own Calculation using Stata 17

### Panel Unit Root Tests Results

To proceed with estimation, various unit root tests are used to know the properties of the

data and their results are reported in Table No.2. Debt to GDP is stationary at level as is clear from the table. Similarly, the results of LLC, IPS and Fisher types tests indicate that

GDP Growth rate (as % annual) is stationary at level at 5% at most. Table No.2 shows that debt servicing (as % of GDP), exchange rate and government final consumption expenditure have unit root at level and become stationary at first difference.

### Co-integration Test Results

Panel cointegration tests are used to know whether long run relation exist among variables of the study. These tests are particularly useful when studying the interactions between multiple cross-sectional units over time. The present study employe Pedroni, Kao, and Westerlund to examine cross-sectional dependence and individual-specific heterogeneity, which are common characteristics of panel data. The results given in Table N0.3 indicate that variables of the study are integrated.

Pedroni test uses various versions in order to know the presence of cointegration. Modified variance ratio statistic which is 6.4745 having p-value 0.0000 indicate highly significant evidence of cointegration among the variables of the study. However, the Modified Phillips–Perron suggest weak evidence of cointegration while Phillips–Perron statistic with -6.0580, and the p-value 0.0000 shows strong evidence of cointegration. The Augmented Dickey–Fuller: The statistic is -4.4011, and the p-value is 0.0000. The p-value of Augmented Dickey–Fuller statistic also indicate strong evidence of cointegration. The results of the all the unit root tests indicate the existence of equilibrium relation among the variables. Variance ratio test statistic with the value of statistic which is -2.1728, and the p-value 0.0149 shows existence of steady state relationship.

**Table 2**

*Panel unit root tests result*

Tests Variables	Levin, Lin & Chu 1st		Im, Pesaran and Shin W-stat		ADF - Fisher Chi-square		Conclusion
	Level (Stat/P-Value)	Difference (Stat/P-Value)	Level (Stat/P-Value)	1st Difference (Stat/P-Value)	Level(Stat/P-Value)	1st Difference (Stat/P-Value)	
GDP Growth Rate	-2.5835 0.0049	-8.3045 0.0000	-6.3011 0.0000	-11.6296 0.0000	9.6528 0.0000	57.6468 0.0000	I(0)
External Debt (% of GDP)	-3.11036 (0.0009)	-11.1191 (0.0000)	-1.41553 (0.0785)	-7.35201 (0.0000)	33.7594 (0.0278)	146.693 (0.0000)	I(0)
Debt Servicing	-0.7870 0.2156	-7.1636 0.0000	-2.5860 0.0049	-11.5627 0.0000	0.2649 0.3955	57.7322 0.0000	I(1)
Exchange Rate	-0.4261 0.3350	15.8757 0.0000	3.0778 0.9990	-5.5134 0.0000	-1.0361 0.8499	15.8757 0.0000	I(1)
Imports	0.2072 0.5821	-13.3125 0.0000	-2.9194 0.0018	-9.5409 0.0000	1.4163 0.0783	31.3248 0.0000	I(1)
Govt Expenditure	-1.2097 0.1132	-9.3744 0.0000	-1.4949 0.0675	-9.0971 0.0000	-0.6329 0.7366	25.6844 0.0000	I(1)
Inflation	-4.7501 0.0000	-6.7425 0.0000	-4.6550 0.0000	-8.7234 0.0000	15.6510 0.0000	33.9745 0.0000	I(0)

*Source: Author own calculations*

In net shell, results of Pedroni, Kao, and Westerlund tests consistently indicate the presence of cointegration among the GDP growth rate, external debt, Debt servicing, Government final expenditure, Imports, exchange rate and inflation of the panel

countries implies a stable long-term relationship among the variables despite short-term fluctuations. The highly significant p-values in most cases provide strong evidence of cointegrating relationship.

Table 3

*Panel Integration Tests Results*

<b>Pedroni test for cointegration</b>	<b>Statistic</b>	<b>P-Value</b>
Modified variance ratio	6.4745	0.0000
Modified Phillips–Perron	-0.7928	0.2139
Phillips–Perron	-6.0580	0.0000
Augmented Dickey–Fuller	-4.4011	0.0000
<b>Kao test for Cointegration</b>	<b>Statistic</b>	<b>p-value</b>
Modified Dickey–Fuller	-16.2441	0.0000
Dickey–Fuller	-9.3727	0.0000
Augmented Dickey–Fuller	-2.3766	0.0087
Unadjusted modified Dickey–Fuller	-16.7946	0.0000
Unadjusted Dickey–Fuller	-9.4099	0.0000
<b>Westerlund test for cointegration</b>	<b>Statistic</b>	<b>p-value</b>
Variance ratio	-2.1728	0.0149

**Pooled Mean Group ARDL Results**

The results of unit root tests indicate that variables are of mixed order which implies that panel Autoregressive distributed lag mode is appropriate method of estimation. The panel cointegration test results given in Table 4 shows that long run relationship between GDP Growth rate, external debt, Debt Servicing, Exchange rate, inflation, final government expenditure and imports exists. The study further employed mean both MG and PMG estimation technique and used Hausman test to decide which test perform better. The result of huasman indicate that PMG method is appropriate in the present case. Table 4 shows that IMF loans has significant negative effects on economic growth at lag (1) in both short run and long run in case of top ten IMF indebted countries. The results are in line with theoretical and empirical study's findings. This may be due to the reason that increase in IMF loan reduces role of fiscal policy and hence growth dampen (Shabbir, 2013). Studies also shows that IMF could influence countries through its involvement through its conditionality's and through its advice to the policy makers. The present study shows that use of IMF credit has significant negative effects which justify IMF interference in economic affairs of indebted countries which confirms confusions of earlier studies (Barro & Lee, 2005).

Countries with deficient domestic resources also borrow from IMF to finance their imports bill. The significant positive affect of imports implies that the selected countries spend their borrowed money on financing imports of capital goods. The finding of current study is in line with literature which shows that excessive reliance on debt to finance imports of capital good lead to increases economic growth as the imported goods have imbedded technology (Schneider, 2005; Zheng et al., 2022; Zou et al., 1999). Moreover, this also led to diffusion of technology and hence growth. However, the impact of imported capital goods has insignificant positive impact in short run (Asunka et al., 2022; Liu & Guo, 2019).

The long run estimates reported in table No. 4 shows that in long run, Government consumption expenditures negatively affect economic growth of selected top ten indebted countries of the world. This implies that the selected indebted countries spend the borrowed money on recurrent expenditure rather than spending the investment projects for which the loans are taken. Moreover, it also implies that countries are not abide by the IMF conditional of restructuring their economies to specified stabilization policies. The results are in line with finding of previous studies. The short run estimated also shows significant negative affect on economic growth which is

due to the reason that government divert resource from investment pool to finance current expenditures and thus crowding out affects exist and thus adding to existing studies (Ghali, 2003; Ghourchian & Yilmazkuday, 2020).

In short run, a moderate level of inflation can stimulate economic growth. This is because it encourages spending and investment as people and businesses anticipate rising prices. It can lead to increased consumer spending, borrowing, and investment, all of which contribute to higher

economic activity. When inflation becomes too high and unpredictable, it can have detrimental effects on the economy. High and unstable inflation erodes purchasing power, reduces savings' value, distorts economic decision-making, and creates uncertainty. Businesses might struggle to plan, and consumers may limit their spending due to concerns about the eroding value of money. The result of the current study shows that inflation has significant positive effects on economic growth in short run and have negative significant affects in long run which lend support theoretical and empirical studies.

**Table 4**

*Panel ARDL Long Run Pooled Mean Group Estimate*

	VARIABLES	Coefficients
<b>Long Run</b>		
	L.IMF Credit	-0.175*** (0.0312)
	L. Debt Servicing	-0.320*** (0.0781)
	Imports (% of GDP)	1.986*** (0.487)
	L2. Imports (% of GDP)	-1.664*** (0.399)
	L. Govt Expenditure (% of GDP)	-1.884*** (0.362)
	Inflation	-0.196*** (0.0725)
	L2. Inflation	0.0692 (0.0590)
	L. Exchange Rate	-0.108* (0.0632)
<b>Short Run</b>		
	Error Correction Term	-0.968*** (0.232)
	D.IMF Credit	-0.417*** (0.118)
	D. Debt Servicing	-0.347** (0.135)
	D. Imports (% of GDP)	0.295 (1.773)
	D. Govt Expenditure (% of GDP)	-3.139 (2.026)
	D. Inflation	0.157* (0.0949)
	D. Exchange Rate	1.778 (2.626)

VARIABLES	Coefficients
Constant	9.643*** (2.539)
Observations	210

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Exchange rates are determined by the supply and demand of currencies in foreign exchange market. Loan granted by IMF would increase foreign exchange reserves in short run and so growth is positively affected in short run. But in long run, the country must repay principal amount of external debt along with debt servicing which would seem to be drain on foreign exchange reserves. Thus, in long run exchange rate would have negative while it has positive affect on economic growth. The empirical results supports the theoretical and empirical findings of the previous studies and thus contribute to literature. The results reported in table 4 shows that exchange rate has positive insignificant effects on economic growth of selected panel countries in short run while it has negative significant effect on economic growth in long run which support the theory exchange rate (Rodrik, 2009; Do, 2019; Wong, 2013).

## Conclusions and Recommendations

This study investigated impact of loans granted by IMF to top ten indebted countries including Argentina, Egypt, Ukraine, Pakistan, Ecuador, Colombia, Angola, South Africa, Nigeria and Kenya, on their economic performance. The objective to the study is to know whether the loan provided by IMF to the countries to implement essential structural reforms, address fiscal imbalances, enhance governance, and stimulate economic diversification are achieved. For this purpose, the paper employed secondary data on use of IMF credit (Current \$), Debt Servicing (% of GDP), official Exchange rate(local currency per \$), Imports of goods and services(% of GDP), Inflation, consumer price (Annual %), and Government consumption expenditures from world Bank database. Correlation analysis shows that GDP Growth Rate and IMF credit are negatively correlated while positive

relation exist between high Inflation and use of IMF assistance. The study use panel data approached, checked the stationarity of the data using LLC test, PS test and WU(MW) tests and variables are found integrated of different orders which recommended that use of panel ARDL. The study also checked whether cointegrating relationships exist using panel cointegration test such as Pedroni, Kao and Westerlund Panel Cointegration tests. The highly significant p-values in most cases provide strong evidence of cointegration.

Hausman test is used to know which estimation technique is suitable and PMG is recommended as a suitable in the present case. The study finds that use of IMF credit negatively affect growth performance of the indebted countries in both short and long run confirming the predictions of previous theoretical and empirical study's (Janeba & Todtenhaupt, 2018; Kasidi & Said, 2013). This may be due to the reason that increase in debt stock make fiscal policy ineffective (Shabbir, 2013) which justify the interference of IMF in the economic affairs of indebted countries, thereby confirming the findings of earlier studies (Barro & Lee, 2005; Dreher, 2006; Przeworski & Vreeland, 2000).

Positive effect of Imports implies that the selected countries spend their borrowed money on financing imports of capital goods. The finding of current study is in line with Literature which shows that excessive reliance on debt to finance imports of capital good lead to increases economic growth as the imported goods have imbedded technology (Schneider, 2005; Zheng et al., 2022; Zou et al., 1999). Moreover, this also led to diffusion of technology and hence growth. However, the impact of imported capital goods has positive insignificant (Asunka et al., 2022; Liu & Guo, 2019). Inflation is found to have significant positive effects on economic growth in short

run while its affects are negative significant in steady state which lend support theoretical and empirical studies (Akinsola & Odhiambo, [2017](#); Atigala et al., [2022](#); Bakare et al., [2015](#)).

Exchange rate has also positive insignificant effects on economic growth of selected panel countries in short run while it has negative significant effect on economic growth in long run which support the theoretical and empirical studies (Rodrik, [2009](#); Do, [2019](#); Wong, [2013](#)). The depreciation of domestic currency lead to increase in imports bills, debt stock and the general price which lead to have negative affect on investment and consumer spending leading to decrease in economic growth.

The study conclude that use of IMF credit by the top ten indebted countries has negative significant effects on their growth performance in both the short run and long run. Moreover, literature also highlights that one of the reasons for the negative impact of use of IMF credit is the involvement of IMF in countries own economic policies. Therefore, it is recommended that.

- Government expenditure should reduce its expenditure by taking austerity measures.
- Only most essential imports such import of capital goods may allowed while consumer goods imports should be discouraged to save foreign reserves.

- The indebted countries should try to increase their foreign reserves by encouraging exports and reducing imports through increase domestic production.
- Maintaining a stable exchange rate can prevent sudden fluctuations in exchange rates and would control increase exchange rate induced debt servicing.

### Limitation of the Study

The study finds that use of IMF credit has significant negative affect on economic growth performance of the selected indebted countries in the short run and long run. It do not guide us what are the better alternative sources of borrowing for the indebted countries.

### Future Area of Research

Indebted countries can borrow loans from different international financial institutions. Future studies can be undertaken by comparing the impact of loan provide by those institutions. Moreover, research can also examine whether short term debts or long-term debts are beneficial for economic growth. Also, separate studies can be undertaken to examine the effect of domestic and external debt on economic growth.

## References

- Acar, S., Altıntaş, N., & Haziyeve, V. (2023). The effect of financial development and economic growth on ecological footprint in Azerbaijan: an ARDL bound test approach with structural breaks. *Environmental and Ecological Statistics*, 30(1), 41–59. <https://doi.org/10.1007/s10651-022-00551-6>
- Aghion, P., & Bolton, P. (1997). A Theory of Trickle-Down Growth and Development. *Review of Economic Studies*, 64(2). <https://doi.org/10.2307/2971707>
- Akinsola, F., & Odhiambo, N. M. (2017). Inflation and Economic Growth: a Review of The International Literature. *Comparative Economic Research*, 20(3), 41–56. <https://doi.org/10.1515/cer-2017-0019>
- Al-Fadhat, F., & Nadhir, M. R. (2019). Foreign Investment and the Political Economy of Indonesian Capital Market in 2015-2016. *Humanities and Social Sciences Reviews*, 7(6). <https://doi.org/10.18510/hssr.2019.7659>
- Al-Refai, M. F. (2015). Debt and Economic Growth in Developing Countries: Jordan as a Case Study. *International Journal of Economics and Finance*, 7(3). <https://doi.org/10.5539/ijef.v7n3p134>
- Asante, G. N., Takyi, P. O., & Mensah, G. (2023). The impact of financial development on economic growth in sub-Saharan Africa. Does institutional quality matter? *Development Studies Research*, 10(1). <https://doi.org/10.1080/21665095.2022.2156904>
- Asongu, S., Akpan, U. S., & Isihak, S. R. (2018). Determinants of foreign direct investment in fast-growing economies: evidence from the BRICS and MINT countries. *Financial Innovation*, 4(1). <https://doi.org/10.1186/s40854-018-0114-0>
- Asteriou, D., Pilbeam, K., & Pratiwi, C. E. (2021). Public debt and economic growth: panel data evidence for Asian countries. *Journal of Economics and Finance*, 45(2). <https://doi.org/10.1007/s12197-020-09515-7>
- Asunka, B. A., Ma, Z., Li, M., Amowine, N., Anaba, O. A., Xie, H., & Hu, W. (2022). Analysis of the causal effects of imports and foreign direct investments on indigenous innovation in developing countries. *International Journal of Emerging Markets*, 17(5). <https://doi.org/10.1108/IJOEM-08-2019-0609>
- Atigala, P., Maduwanthi, T., Gunathilake, V., Sathsarani, S., & Jayathilaka, R. (2022). Driving the pulse of the economy or the dilution effect: Inflation impacting economic growth. *PLoS ONE*, 17(8 August). <https://doi.org/10.1371/journal.pone.0273379>
- Bakare, H., Kareem, R., & Oyelekan, B. (2015). Effects of Inflation rate on Economic Growth in Negeria (1986-2014). *Developing Country Studies*, 5(8). <https://www.iiste.org/Journals/index.php/DCS/article/view/21800>
- Bangura, S. A. F., Kitabire, D., & Powell, R. (2021). External Debt Management in Low-Income Countries. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1445725>
- Barro, R. J. (1990). Government Spending in a Simple Model of Endogeneous Growth. *Journal of Political Economy*, 98(5, Part 2). <https://doi.org/10.1086/261726>
- Barro, R. J., & Lee, J. W. (2005). IMF programs: Who is chosen and what are the effects? *Journal of Monetary Economics*, 52(7). <https://doi.org/10.1016/j.jmoneco.2005.04.003>
- Chowdhury, A., & Mavrotas, G. (2006). FDI and growth: What causes what? *World Economy*, 29(1). <https://doi.org/10.1111/j.1467-9701.2006.00755.x>
- Clements, B., Bhattacharya, R., & Nguyen, T. Q. (2021). External Debt, Public Investment, and Growth in Low-Income Countries. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.880959>

- Rodrik, D. (2009). The real exchange rate and economic growth. *Brookings Papers on Economic Activity*, 2008(2), 365–412. <https://doi.org/10.1353/eca.0.0020>
- Dey, S. R., & Tareque, M. (2020). External debt and growth: role of stable macroeconomic policies. *Journal of Economics, Finance and Administrative Science*, 25(50). <https://doi.org/10.1108/JEFAS-05-2019-0069>
- Do, T. M. H. (2019). Real exchange rate and economic growth: An empirical assessment for Vietnam. *Asian Economic and Financial Review*, 9(6). <https://doi.org/10.18488/journal.aefr.2019.9.6.680.690>
- Dreher, A. (2006). IMF and economic growth: The effects of programs, loans, and compliance with conditionality. *World Development*, 34(5 SPEC. ISS.). <https://doi.org/10.1016/j.worlddev.2005.11.002>
- Duodu, E., & Baidoo, S. T. (2022). The impact of capital inflows on economic growth of Ghana: Does quality of institutions matter? *Journal of Public Affairs*, 22(1). <https://doi.org/10.1002/pa.2384>
- Fosu, A. K. (2010). The external debt-servicing constraint and public-expenditure composition in sub-saharan Africa. *African Development Review*, 22(3). <https://doi.org/10.1111/j.1467-8268.2010.00252.x>
- Ghali, K. (2003). Government Spending, Budget Financing, and Economic Growth: The Tunisian Experience. *The Journal of Developing Areas*, 36(2).
- Ghourchian, S., & Yilmazkuday, H. (2020). Government consumption, government debt and economic growth. *Review of Development Economics*, 24(2). <https://doi.org/10.1111/rode.12661>
- Giri, A. K., Mohapatra, G., & Debata, B. (2023). Technological development, financial development, and economic growth in India: Is there a non-linear and asymmetric relationship? *Journal of Economic and Administrative Sciences*, 39(1). <https://doi.org/10.1108/jeas-03-2021-0060>
- Gómez-Puig, M., Sosvilla-Rivero, S., & Martiñez-Zarzoso, I. (2022). On the heterogeneous link between public debt and economic growth. *Journal of International Financial Markets, Institutions and Money*, 77, 101528. <https://doi.org/10.1016/j.intfin.2022.101528>
- Harrod, R. F. (1939). An Essay in Dynamic Theory. *The Economic Journal*, 49(193). <https://doi.org/10.2307/2225181>
- Janeba, E., & Todtenhaupt, M. (2018). Fiscal competition and public debt. *Journal of Public Economics*, 168, 47–61. <https://doi.org/10.1016/j.jpubeco.2018.10.001>
- Kao, C. (1999). Spurious regression and residual-based tests for co-integration in panel data. *Journal of Econometrics*, 90(1). [https://doi.org/10.1016/S0304-4076\(98\)00023-2](https://doi.org/10.1016/S0304-4076(98)00023-2)
- Kasidi, F., & Said, A. M. (2013). Impact of external debt on economic growth: a case study of Tanzania. *Advances in Management & Applied Economics*, 3(4).
- Khan, M. S., & Haque, N. U. (1985). Foreign borrowing and capital flight: A formal analysis. Staff Papers - *International Monetary Fund*, 32(4).
- Kononenko, R. (2015, September 5). *IMF Lending and Economic Growth: An Empirical analysis of Ukraine*. arXiv.org. <https://arxiv.org/abs/1509.01741v1>
- Krugman, P. (1988). Financing vs. forgiving a debt overhang. *Journal of Development Economics*, 29(3). [https://doi.org/10.1016/0304-3878\(88\)90044-2](https://doi.org/10.1016/0304-3878(88)90044-2)
- Kumar, G., & Batra, S. (2023). Interrelationship Between Human Development, Financial Development and Economic Growth: Empirical Evidences from Indian Economy. *Indian Journal of Human Development*, 17(1), 60–81. <https://doi.org/10.1177/09737030221146022>
- Liu, C., & Guo, Q. (2019). Technology spillover effect in China: The spatiotemporal evolution and its drivers. *Sustainability (Switzerland)*, 11(6). <https://doi.org/10.3390/su11061694>

- Frost, M. (2022). Thomas Malthus, Essay on The Principle of Population. In *Routledge eBooks* (pp. 501–503). <https://doi.org/10.4324/9780429355653-83>
- Manasseh, C. O., Abada, F. C., Okiche, E. L., Okanya, O., Nwakoby, I. C., Offu, P., Ogbuagu, A. R., Okafor, C. O., Obidike, P. C., & Nwonye, N. G. (2022). External debt and economic growth in Sub-Saharan Africa: Does governance matter? *PLoS ONE*, 17(3) March). <https://doi.org/10.1371/journal.pone.0264082>
- Mohsin, M., Ullah, H., Iqbal, N., Iqbal, W., & Taghizadeh-Hesary, F. (2021). How external debt led to economic growth in South Asia: A policy perspective analysis from quantile regression. *Economic Analysis and Policy*, 72. <https://doi.org/10.1016/j.eap.2021.09.012>
- Mtar, K., & Belazreg, W. (2023). On the nexus of innovation, trade openness, financial development and economic growth in European countries: New perspective from a GMM panel VAR approach. *International Journal of Finance and Economics*, 28(1). <https://doi.org/10.1002/ijfe.2449>
- Öncel, A., Saidmurodov, S., & Kutlar, A. (2023). Financial development, export and economic growth: Panel data evidence from Commonwealth of Independent States. *Journal of International Trade and Economic Development*. <https://doi.org/10.1080/09638199.2022.2164045>
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61(SUPPL.). <https://doi.org/10.1111/1468-0084.61.s1.14>
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, 94(446). <https://doi.org/10.1080/01621459.1999.10474156>
- Przeworski, A., & Vreeland, J. R. (2000). The effect of IMF programs on economic growth. *Journal of Development Economics*, 62(2). [https://doi.org/10.1016/S0304-3878\(00\)00090-0](https://doi.org/10.1016/S0304-3878(00)00090-0)
- Sandow, J. N., Oteng-Abayie, E. F., & Duodu, E. (2022). External debt and economic growth in Sub-Saharan Africa: does heterogeneity in the quality of public sector management make a difference? *Heliyon*, 8(9), e10627. <https://doi.org/10.1016/J.HELIYON.2022.E10627>
- Schneider, P. H. (2005). International Trade, Economic Growth and Intellectual Property Rights: A Panel Data study of Developed and Developing Countries. *Journal of Development Economics*, 78(2). <https://doi.org/10.1016/j.jdeveco.2004.09.001>
- Senadza, B., Fiagbe, A. K., & Quartey, P. (2017). The effect of External Debt on Economic Growth in sub-saharan Africa. *International Journal of Business and Economic Sciences Applied Research*, 11(1).
- Shabbir, S. (2013). SBP Working Paper Series, Does External Debt Affect Economic Growth: Evidence from Developing Countries. *SBP Working Paper Series*, 63.
- Smith, A., & Rogers, J. E. T. (1776). An Inquiry into the Nature and Causes of the Wealth of Nations. In *Oxford University Press eBooks*. <https://doi.org/10.1093/oseo/instance.00043218>
- Toktosunova, C., Sharsheeva, N., Abdukadyrova, G., Rasulova, N., & Esenamanova, S. (2021). Problems of the growth of the external public debt of the Kyrgyz republic. *Estudios de Economía Aplicada*, 39(5). <https://doi.org/10.25115/eea.v39i5.5245>
- Ubok-Udom, E. U. (1979). Development through debt: Rationalizing the costs of external borrowing. *Inter economics*, 14(4). <https://doi.org/10.1007/BF02924273>

- Vreeland, J. R. (2020). What is the IMF? *International Monetary Fund (IMF)*. <https://doi.org/10.4324/9780203962787-12>
- Wang, R., Xue, Y., & Zheng, W. (2021). Does High External Debt Predict Lower Economic Growth? Role of Sovereign Spreads and Institutional Quality. *Economic Modelling*, 103. <https://doi.org/10.1016/j.econmod.2021.105591>
- Westerlund, J. (2007). Testing for Error Correction in Panel Data. *Oxford Bulletin of Economics and Statistics*, 69(6). <https://doi.org/10.1111/j.1468-0084.2007.00477.x>
- Wong, H. T. (2013). Real exchange rate misalignment and economic growth in Malaysia. *Journal of Economic Studies*, 40(3). <https://doi.org/10.1108/01443581311283934>
- Yoon, S. C., & Mah, J. S. (2020). Aid Inflows and Economic Growth: Grants and Loans in the Case Of Kenya\*. *Journal of Economic Development*, 45(4).
- Zheng, X., Yu, H., & Yang, L. (2022). Technology imports, independent innovation, and China's green economic efficiency: an analysis based on spatial and mediating effect. *Environmental Science and Pollution Research*, 29(24). <https://doi.org/10.1007/s11356-021-17499-y>
- Zou, X. Z. H. (1999). Foreign technology imports and economic growth in developing countries. In *World Bank policy research working paper*. <https://doi.org/10.1596/1813-9450-1412>

**Annexure-I***Variables and Data Sources*

Variable Name	Definition	Source
GDP Growth Rate	GDP growth (annual %)	World Bank national accounts data, and OECD National Accounts data files.
Use of IMF Credit	Use of IMF credit (DOD, current US\$)	World Bank, International Debt Statistics.
Debt Servicing	Total debt service (% of GNI)	World Bank, International Debt Statistics.
Exchange Rate	Official exchange rate (LCU per US\$, period average)	International Monetary Fund, International Financial Statistics.
Government Expenditures	General government final consumption expenditure (% of GDP)	World Bank national accounts data, and OECD National Accounts data files.
Imports	Imports of goods and services (% of GDP)	World Bank national accounts data, and OECD National Accounts data files.

**Annexure-II***List of top 10 indebted Countries of IMF*

Members	Total IMF Credit Outstanding as of 07/31/2023	Total Repayment	Total IMF Credit Outstanding as of 08/04/2023
1 Argentina	28,262,500,000	0	28,262,500,000
2 Egypt	12,942,109,173	119,396,666	12,822,712,507
3 Ukraine	9,519,169,172	98,508,333	9,420,660,839
4 Pakistan	6,123,145,835	0	6,123,145,835
5 Ecuador	6,096,350,000	58,712,500	6,037,637,500
6 Colombia	3,750,000,000	0	3,750,000,000
7 Angola	3,153,816,667	0	3,153,816,667
8 South Africa	3,051,200,000	0	3,051,200,000
9 Nigeria	2,147,687,500	0	2,147,687,500
10 Kenya	2,058,982,100	0	2,058,982,100
11 Cote d'Ivoire	1,800,102,620	0	1,800,102,620
12 Ghana	1,689,210,500	0	1,689,210,500
13 Morocco	1,499,800,000	0	1,499,800,000
14 Jordan	1,484,680,250	0	1,484,680,250
15 Tunisia	1,375,694,070	0	1,375,694,070
16 Congo, Democratic Republic of	1,294,500,000	0	1,294,500,000
17 Costa Rica	1,194,430,000	0	1,194,430,000
18 Cameroon	1,043,280,000	0	1,043,280,000
19 Senegal	1,040,873,750	0	1,040,873,750
20 Bangladesh	1,004,499,400	0	1,004,499,400
21 Sudan	991,551,000	0	991,551,000

22	Sri Lanka	982,290,010	0	982,290,010
23	Serbia, Republic of	949,460,000	0	949,460,000
24	Uganda	902,500,000	0	902,500,000
25	Gabon	721,087,500	5,952,500	715,135,000
26	Madagascar	662,448,200	3,142,800	659,305,400
27	Tanzania	626,530,000	0	626,530,000
28	Benin	577,060,900	0	577,060,900
29	Moldova, Republic of	544,905,004	0	544,905,004
30	Chad	544,093,000	0	544,093,000
31	Ethiopia	524,550,000	37,587,500	486,962,500
32	Myanmar	516,800,000	0	516,800,000
33	Jamaica	511,840,040	0	511,840,040
34	Mozambique	480,906,664	0	480,906,664
35	Dominican Republic	477,400,000	59,675,000	417,725,000
36	Georgia	459,000,000	0	459,000,000
37	Honduras	414,668,000	0	414,668,000
38	Mali	378,237,600	0	378,237,600
39	Panama	376,800,000	0	376,800,000
40	Afghanistan, Islamic Republic of	376,146,000	450,000	375,696,000
41	Niger	369,442,500	0	369,442,500
42	Sierra Leone	362,357,800	0	362,357,800
43	Barbados	361,608,334	0	361,608,334
44	Armenia, Republic of	345,997,516	0	345,997,516
45	Guinea	338,551,500	0	338,551,500
46	Papua New Guinea	329,010,000	0	329,010,000
47	Bosnia and Herzegovina	321,884,375	0	321,884,375
48	Malawi	316,641,000	0	316,641,000
49	Nepal	292,425,000	0	292,425,000
50	Somalia	285,429,780	0	285,429,780
51	Burkina Faso	280,986,500	0	280,986,500
52	Rwanda	280,205,820	0	280,205,820
53	Zambia	279,760,000	0	279,760,000
54	Uzbekistan, Republic of	275,600,000	0	275,600,000
55	Congo, Republic of	259,200,000	0	259,200,000
56	Albania	253,168,342	0	253,168,342
57	El Salvador	251,300,000	0	251,300,000
58	Mauritania	246,284,000	0	246,284,000
59	South Sudan	246,000,000	0	246,000,000
60	Togo	240,099,000	0	240,099,000
61	Kyrgyz Republic	211,110,600	0	211,110,600
62	North Macedonia,	206,942,500	0	206,942,500

63	Republic of Central African Republic	202,766,000	0	202,766,000
64	Mongolia	196,203,239	0	196,203,239
65	Namibia	191,100,000	0	191,100,000
66	Haiti	189,089,550	0	189,089,550
67	Bahamas, The	182,400,000	0	182,400,000
68	Liberia	182,362,200	0	182,362,200
69	Tajikistan, Republic of	139,200,000	0	139,200,000
70	Nicaragua	130,000,000	0	130,000,000
71	Suriname	118,200,000	0	118,200,000
72	Burundi	105,100,000	0	105,100,000
73	Gambia, The	98,540,000	0	98,540,000
74	Seychelles	95,187,000	0	95,187,000
75	Eswatini, The Kingdom of	78,500,000	0	78,500,000
76	Equatorial Guinea	76,537,000	0	76,537,000
77	Montenegro, Republic of	60,500,000	0	60,500,000
78	Cabo Verde	50,720,000	0	50,720,000
79	Kosovo	36,137,500	0	36,137,500
80	Lesotho	35,468,000	0	35,468,000
81	Guinea-Bissau	32,898,400	0	32,898,400
82	Djibouti	31,800,000	0	31,800,000
83	Sao Tome & Principe	24,816,432	0	24,816,432
84	Grenada	23,408,000	0	23,408,000
85	St. Lucia	21,400,000	0	21,400,000
86	Maldives	21,200,000	0	21,200,000
87	Solomon Islands	21,082,291	0	21,082,291
88	St. Vincent and the Grenadines	20,494,950	0	20,494,950
89	Comoros	17,811,125	0	17,811,125
90	Samoa	16,200,000	0	16,200,000
91	Yemen, Republic of	14,625,000	0	14,625,000
92	Tonga	13,800,000	0	13,800,000
93	Dominica	13,355,000	0	13,355,000
94	Vanuatu	3,400,000	0	3,400,000
To tal		111,348,611,209	383,425,299	110,965,185,910

Source: *International Monetary Fund* accessed at <https://www.imf.org/external/np/fin/tad/balmov2.aspx?type=TOTAL>