International Journal of Contemporary Issues in Social Sciences
Volume 3, Issue 2, 2024 ISSN(P):2959-3808 | 2959-2461

THE IMPACT OF DEBT ON ECONOMIC GROWTH: A COMPARATIVE ANALYSIS OF LOW, MIDDLE AND HIGH INCOME COUNTRIES

Basit Ali[1], Waqas Ahmed[*2], Maria Siddique[3], Qamar Ud Din[4], Javeria Hameed[5]

[1,2,5]Government Post Graduate College Mansehra, KPK;
[3]Government Girls Degree College Oghi Mansehra, KPK;
[4]Hazara University Mansehra, KPK

[1]basitali16632@gmail.com; [*2]**malik.waqas9390@gmail.com**; [3]Sweet_maria92@yahoo.com;
[4]uddinq62@gmail.com; [5]javeriahameed111@gmail.com

Corresponding Author: *

Received: 05 May, 2024 **Revised:** 05 June, 2024 **Accepted:** 17 June, 2024 **Published:** 30 June, 2024

ABSTRACT

This study investigates the impact of debt on economic growth in 21 countries comprising from low income, middle income and high income countries by using annual panel data of 23 years from the period of 2000 to 2022. Result of fixed effect model for complete sample shows that the debt has a negative significant impact on economic growth. Results also show the negative significant effect of trade openness on economic growth. Real interest rate and saving have positive and significant impact on economic growth. These results suggest some important policy implications for governments in the sample countries.

Key words: Public debt, economic growth, fixed effect model.

1. INTRODUCTION

When a country is unable to meet its financial needs through domestic financing, then this country turns to finance them by external financing and external debt is the major source of external financing and sometimes it can be meant of financing for capital formation. According to According to Adepoju et al. (2007), the vicious cycle of low productivity, low income, and low savings frequently characterizes developing nations as having limited internal capital accumulation. As a result, in order to close the resource gap locally, foreign assistance and funding are sought for technical, managerial, and financial assistance.

When funds are optimally utilized then External debt does not automatically transform into debt burden because in an optimal condition, the marginal return on investment is equal or greater than the cost of borrowing the funds.

The twin gap theory provides the only justification for choosing external financing: it guarantees sustained development as opposed to relying solely on domestic borrowing. According to the hypothesis, savings determine investment, and in developing nations, domestic savings are insufficient to guarantee the investment required for economic growth. Therefore, the foreign goods and services are fully filling the void. However, the relationship between domestic savings and foreign capital, investment, and economic growth determines the need for outside funding. A country can borrow the fund from abroad up to the point where the rate of return from the borrowed funds is greater than the cost of borrowing. Trade openness has a negative significant effect on economic growth (Keho, 2017). Similarly, the studies of Shafik and Jalali, (1991), Jelilov, (2016) investigate that real interest rate has positive effect on economic growth. Jagadeesh, (2015), Chandioet al, (2015), Sajid and Sarfaraz, (2008) found positive impact of saving on economic growth.

A sustainable amount of debt (internal and external) is determined by a number of measures. These indicators, which essentially take the shape of ratios, can be used as gauges of a nation's solvency since they take into account the debt load of the nation at a given point in time relative to its capacity to produce

the necessary income to pay back the remaining amount of borrowed money. These metrics include the debt to GDP ratio, the government debt to current fiscal revenue ratio, the foreign debt to exports ratio, the proportion of foreign debt to total debt, and the short-term debt to total debt. They also contain debt management ability elements.

There are some indicators that only focus on the short-term liquidity requirements of the borrowing country with respect to its debt obligations and can be useful as pre-cautionary signaling system for problem arising from debt service and alongside they also focus the impact of the short term trade-offs arising from past borrowing decisions. The debt service to GDP ratio, the government debt service to current fiscal revenue ratio, and the foreign debt service to exports ratio are a few examples of these liquidity monitoring metrics.

In addition to these, there are other indicators that demonstrate how, given the existing debt stock and average interest rate, the debt burden will change over time. The ratio of the average interest rate on outstanding debt to the nominal GDP growth rate is known as the dynamic debt management ratio.

Contribution of our study to the existing research is that, no comparative study of low income, middle income and high income countries is found in case of the impact of public debt on economic growth. To fill this gap this study, examine the impact of public debt on the economic growth during 2000 to 2022 of the panel of 21 low income, middle income and high income countries, specifically the country specific effects of debt on economic growth. We suppose that characteristics of these countries are almost equal.

The remaining paper is organized as follows. Section 2 provides literature review, Section 3 presents model, data and methodology, section 4 present empirical results. Finally, section 5 present conclusion and policy recommendation.

2. Literature Review

Results of some studies showed that External debt have not much impact on economic growth on negative side. One of the evident studies is done by Were (2001), who examined the effect of external debt on economic development in Kenya. Using basic correlational analysis on the time-series data for the period 1975-1995, he concluded that external debt accumulation have no adverse impact on economics growth but has some crowding out effects on private investments in Kenya. Abbas and Christensen (2007) similarly investigated the importance of domestic debt markets in economic growth but were unable to make substantial conclusions regarding the influence of debt on the growth of the economy. Their study for 93 nations using data from 1975 to 2004, found that domestic debt markets plays a crucial role in promoting economic development in emerging countries..

Another evident study about the crowding out impact of debt is done by Shabbir (2004) when he tries to find out the relationship between external debt and growth of the economy. Author took the data of 24 developing countries over the period of 1976-2003 and the results of the study suggested that higher level of external debt stock leads to crowding out, but it had adverse effect on the economy.

Opposite results of negative impact of debt on economic growth are shown by the study of Asteriou et al. (2021) studied the impact of public debt on short- and long-term economic growth in a panel of chosen Asian nations between 1980 and 2012. The findings show that an increase in governmental debt has a detrimental long- and short-term impact on economic growth. Similalry, Safdari and Mehrizi (2011) when they analyzed the impact of external debt, public and private investments including imports on the GDP in case of Iran. Vector autoregressive model (VAR) was employed for the data of 1974 to 2007 and they concluded that external debt has negative impact on GDP. Similar sort of results are characterized by the study of Ayadi and Ayadi (2008), in which they stated the negative impact of external debt for the Nigerian and south African economies. They proposed that adverse impact of external debt is more in Nigeria then south Asia, external debt boost the economy at some point after which its contribution is negative for the Nigerian economy.

Moreover, the causal relationship between public and private external debt and economic growth was examined by Zhang, Dawood, and Al-Asfour (2020) in 18 particular Asian emerging and transition states from 1995 to 2019. The findings of PMG and CS-ARDL demonstrate that external debt and economic growth are causally related in both the short- and long-term. The paired Granger test for causality demonstrated a two-way causal connection between economic expansion, total external debt, public external debt, and private external debt. The findings first demonstrated the presence of a short- and long-term causal relationship between external debt and

economic growth, as well as a bidirectional relationship between external debt and economic growth.

Similarly, another study shows that External debt has no positive contribution towards the per capita income and growth rate of Pakistan as stated by Anwar and Rais (2012) so it should be avoided. They used time series data from 1972 to 2010 and analyzed it by simple OLS technique. They suggested that outstanding debt exceeded the GDP of Pakistan thus per capita income is lower than the per citizen indebtedness. Foreign debt adversely influence the economic growth conformed by the study of Choong et al (2010). This study examines the effect of different type of debt during the sample period of 1970 to 2006 for Malaysia by using co-integration technique. Results revealed that all type of debt negatively affect the economy and decline in economic growth make it difficult to re pay the debt. To explore the impact of external debt on the growth of low income countries Gohar et al (2008) used the panel data of 36 low income countries. They used least square multiple regression method on panel data of 1990 to 2008 and concluded that debt is quite adverse for the low income countries so they should take step to erase it to grow well. They should go for the option of FDI but not as much that their overcrowding hurt the economy.

Similarly, to assess the link between growth, productivity and debt Afonso et al (2012) used the panel of 155 countries for the period of 1970 to 2008. They find negative relation of the debt ratio for the whole sample of their data base. Alike this study, another work is done by Schclarek (2004) examines the relationship of debt and economic growth for the panel of 59 developing and 24 industrial countries for the time period of 1970 to 2002.by estimating both linear and nonlinear relationship between the debt and economic growth, study conclude that debt have significantly negative impact on the growth of developing countries but lower external debt is associated with higher growth rate. For industrial countries external debt is not necessarily associated with the lower GDP growth rate. Same results were finding by study of Panizza and Presbitero (2012) by using the instrumental variable approach to find out the casual effect of debt on economic growth for the sample of 17 OECD countries. Their results are consistent with the previous research that debt and economic growth have negative relationship.

Akram (2011) confirms a negative link between external debt and GDP per capita in Pakistan. He evaluated the effects of public debt on growth from 1972 to 2009 using the Autoregressive Distributed Lag (ARDL) approach. The results also revealed that domestic debt has no meaningful link with per capita GDP, but investment has a positive and substantial association. Beyond a certain level, debt negatively affects the economy and this result is confirmed by Cecchetti et al (2011), when they tried to examine the real effects of debt used the sample of 18 OECD countries for the period of 1980 to 2010 by employing the simple regression technique. By using annual data of 1960 to 2007, Haider et.al (2012) investigates the debt overhang hypothesis in Pakistan. They tried to examine the dynamic behavior of GDP, employed labor force, investment and debt service. They find out negative impact of debt on productivity of labor and investment which adversely affect the GDP ultimately. Long run relationship between economic growth and debt servicing imply that future increase in output will drain away in a form of debt payment to the lender country. In short foreign creditor will gain more from the increase in productivity then domestic labor and producer.

To provide the empirical evidence on impact of high initial debt on subsequent growth of the economy Kumar et al (2010) used the panel of advance and emerging market economies over the period of 1970-2007. Authors employed the variety of econometric techniques and results suggest inverse relation between initial debt and subsequent growth. Adverse impact of it is reflected in slow down the productivity of labor due to reduced investments and slower growth of capital stock. Mojekwu et al (2011) examine the impact of external debt management on the macroeconomic variables in Nigerian economy. Their time period of analyses is from 1980 to 2004 and they used ordinary least square (OLS) technique to analyze the data. Study concluded that debt reduction would enhance the growth of the Nigerian economy. Similarly, Checherita and Rother (2010) analyze the influence of government debt on per capita GDP growth rates in twelve Eurozone nations. They discovered a nonlinear relationship between debt and GDP growth rate during a 40-year period beginning in 1970 and ending in 2009, and they recommended debt reduction to enhance long-term growth.

Islam (1992) investigates this topic in the context of Bangladesh, utilizing time series data from 1972 to 1988. His findings indicate a slight positive correlation between debt and growth, whereas local resources appear to have a greater influence than foreign resources. In a similar setting, Mbaku (1993) investigates the link between foreign debt and growth in Cameroon, and the conclusions are consistent with Islam's (1992) findings.

Babu et al. (2014) used the Johansen-cointegration test to explore the link between foreign debt and economic development in the East African Community from 1970 to 2010. The findings revealed a detrimental impact of foreign debt on economic expansion in the East African Community. Ahmad et al. (2015) used an auto regressive distributed lagged model to investigate the influence of external debt on Iraqi economic development from 1980 to 2014. The results depicted the negative effect of external debt on economic growth in the short run as well in the long run. Same result is found by Daud (2015) investigated the relationship between government debt and economic growth for Malaysia and found that when debt is at lower level, there is no benefit for the Malaysian economy. But when government debt exceeds a certain level then Malaysian economy experiences a positive effect. Swamy (2015) investigated the dynamic analysis of government debt and economic growth over the time span of 1960 to 2009 for panel of 122 countries by grouping the sample countries into 5 debt regimes according to ratio of average debt to GDP. Results revealed negative relationship between economic growth and debt; and also there exist a long term effect of debt on economic growth which based on debt regimes, inflation, consumption expenditures, FDI and trade openness. Anning et.al (2016) studied the relationship between government debt (external and domestic both) on economic growth in case of Ghana and found negative relationship between both types of debts and economic growth for Ghana. They recommended increasing taxation for revenue generation rather than depending on borrowing and debt servicing.

In addition, many studies such as Haussmann et al, (2007), Dao, (2014), Keho, (2017), Musila and Yiheyis, (2015), Polatet al, (2015), Ulasan, (2015), Vlastou, (2010), Lawal et al, (2016), Were, (2015), Huchet-Bourdon et al, (2018) found that trade openness has a negative significant effect on economic growth. Similarly, the studies of Shafik and Jalali, (1991), Jelilov, (2016) investigate that real interest rate has positive effect on economic growth. Turan and Gjergji, (2014), Jagadeesh, (2015), Chandioet al, (2015), Sajid and Sarfaraz, (2008) found positive impact of saving on economic growth. Mousa and Shawawreh (2017) examined the influence of debt on economic growth in Jordan using data from 2000 to 2015 and the OLS technique. The empirical findings of study revealed that public debt (specifically external debt) have negative relation with economic growth. Gómez-Puig and Sosvilla (2017) empirically studied the impact of debt on economic growth for the short and long run for countries of Euro area. They applied ARDL method and find diversified pattern for different countries of Euro area where in short run debt have positive effect on economic growth and in long run there is negative relationship between economic growth and public debt. Jacobo and Jalile (2017) examined the impact of government debt on GDP in Latin American [1]countries for 50 year time period and find nonlinear relationship between debt and economic growth. Whereas in short run positive impact of debt on economic growth has found and if the debt crosses the specific threshold level then it has adverse effect on economic growth. In summary, above studies show that public debt has negative impact on economic growth.

3. Data and Methodological Framework

The study is proposed to use 23 years annual panel data from the period 2000 to 2022[2] of 21 countries, equally belonging to Low, Middle and High income countries. The data of all variables taken from World Bank's reliable source World Development Indicators. We have been used log form of variables GDP, public debt and trade openness for robust and meaningful result. The list of all used countries is presented in table 1.

[1]Nicaragua, Uruguay, Bolivia, Panama, Colombia, Venezuela, Honduras, Dominican Republic, Costa Rica, Mexico, Argentina, Paraguay, Brazil, Peru, and Chile

[2]Although, we wish to use longer period data, as for some of our incorporated variables, the data were only available between 2000 to 2022.

Table 1: Present list of 21 countries included

Country	Income Level
Australia	High income
Austria	High income
Crotia	High income
Italy	High income
Lithuania	High income
Poland	High income
Sweden	High income
Pakistan	Middle income
Azerbaijan	Middle income
Egypt	Middle income
Romania	Middle income
South Africa	Middle income
Turkey	Middle income
Brazil	Middle income
Bangladesh	Low income
Tajikistan	Low income
Cambodia	Low income
Republic of Korea	Low income
Niger	Low income
Tanzania	Low income
Myanmar	Low income

Source: Author's construction

3.1 Model specification

This study has used the model based the empirical research work of (Henri, 2018). Henri, (2018) conducted a research to examine the impact of public debt on economic growth of panel of six CMAC countries using OLS, Fixed and Random effect models. Therefore, this study used fixed and random effect models to determine the impact of public debt on economic growth; a comparative study of 21 countries i.e lower income, middle income and high income countries for the period of 2000 to 2022. The following regression model is formulated:

$$Y = f(DEBT, TOP, RINTR, GSAV) \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$Log\ Y_{it} = \beta_o + \beta_1 ldebt_{it} + \beta_2 logtop_{it} + \beta_3 Rintr_{it} + \beta_4 Gsav_{it} + \mu_{it} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

In the above model i show the number of countries in the panel and t shows the number of observations over time. Y represents economic growth, that measured by GDP per capita constant 2010 US$, debt is the central government debt to % of GDP, top is the trade openness as measured by sum of export and import divide by GDP, Rintr is a Real interest rate (%) as measured by lending interest rate adjusted for inflation as measured by the GDP deflator, Gsav is a Gross savings (% of GDP) as measured by gross national income less total consumption, plus net transfers.

4. Estimation Technique

Various kinds of approaches are used in panel analysis. These approaches contain Pooled Ordinary Least Square (POLS), Fixed Effects model (FE) and Random Effects model (RE). Previous research indicates that fixed effect approach is superior due to unobservable time effects and unobservable country effects are captured in it (Balgati, 2001).

This study uses a fixed effect, assuming that influencing factors within the cross-section may affect the results, and this phenomenon needs to be managed. For this reason, it was assumed that there is no correlation between the error term of the entity and the variable in the fixed effect. Total effect of independent variables can easily be estimate because fixed effect eradicates those factors which are time invariant. Another assumption of fixed effect model is that those properties which are time invariant belong to specific cross sections and these features must not be mixed or correlated with other cross section's characteristics. Each entity has a different constant and error term which investigates cross section's specific features and these cannot be mixed with other cross sections.

In case, if there exist correlation between error terms, then fixed effect is no more accurate because result will be biased and incorrect. In such case, random effect is suitable for estimation. This is the main rationale for using Hausman test (Torres-Reyna, 2007).

Fixed effect method takes into account heterogeneous characteristics of cross sections. However, in this method it is assumed that the mean of these characteristics over time for individual entity is clear and can be separated from the actual.

The equation for fixed effect model is:

$$logY_{it} = \beta_i X_{it} + \alpha_i + \mu_{i,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where

i= entity and**t** = time

Y = GDP per capita (dependent variable)

α_i= (i= 1……n) is the unobserved country specific factors which effect economic growth (n entity specific intercept)

X_{it}= is a vector of explanatory variables ($ldebt_{i,t}$, $logtop_{i,t}$, $Rintr_{i,t}$, $Gsav_{i,t}$)

β_i= is the coefficient vector for the explanatory variables

μ_i, = is the error term

As for as fixed effect model is concerned, intercept allowed difference among units which is due to the reason that each unit consists of some special characteristics of its own. Fixed effect model is appropriate in such situations where there may be correlation between individual specific intercept and one or more independent variables. Since fixed effect model has disadvantage, as if there are a large cross-sectional unit, there is loss of degree of freedom.

5. Diagnostic tests

To decide, whether fixed effect or random effect model is appropriate for that two types of tests are applied. The one is Hausman test and the other is Redundant test.

5.1. Redundant Fixed Effect Test

To confirm further whether fixed effect model is actually the best model, redundancy test conducting to check whether pooled or fixed effect model is best. Null and alternative hypothesis are given below:

- H_o: Pooled model is preferable.
- H_1: Fixed effect model is preferable.

When null hypothesis is rejected, fixed effect model is appropriate and if null hypothesis accepted, pooled model is best.

5.2. The Hausman test

To compare the results of fixed effect and random effect models, Hausman test is used. This test basically tests whether the unique errors (μ_i) are correlated with the explanatory variables or not. Following are the null and alternative hypothesis:

- H_o: random effect model is best.
- H_1: fixed effect model is best.

Rejection of null hypothesis means that fixed effect model is accurate and if null hypothesis is not rejected it means that random effect is appropriate (Sudrajat, 2008).

In summary, results of both diagnostic tests show that no correlated random effect and redundancy fixed effects. So, results from fixed effect model are used.

6. Results and Discussion

To investigate the link between public debt and economic development in high, middle, and low-income nations from 2000 to 2022 using fixed-effect model.

6.1 Descriptive statistics

A descriptive statistic reveals the essential qualities of data utilized in study design. Table 2 indicates the average value of lgdp is 8.51 while standard deviation which shows the dispersion from mean is 1.63. The mean value of ldebt is 3.03 whereas SD is 2.12. The average value of lop is 8.51 while SD 4.48. The mean value of R_intrest is 7.04 whereas SD is 9.15. Lastly, the mean value of SAV is 19.97 where as standard deviation is 8.80. The Skewness values of all variables lie in the range of normal distribution[3].

Table 2: Present descriptive statistics of all variables

	LGDP	LDEBT	LOP	R_INTRST	SAV
Mean	8.512651	3.034953	16.12152	7.040258	19.97196
Median	8.932196	3.212500	16.88041	5.343309	18.90082
Maximum	10.94152	11.87365	26.42399	48.34020	52.87676
Minimum	5.775017	0.000000	-3.620192	-20.32374	1.039287
Std. Dev.	1.631599	2.125668	4.482231	9.155341	8.806200
Skewness	-0.156515	0.643185	-2.015321	2.162257	0.616161
Kurtosis	1.671047	3.539632	10.42338	10.28910	4.195304
Jarque-Bera	27.72854	28.94599	1061.371	1068.506	43.84213
Probability	0.000001	0.000001	0.000000	0.000000	0.000000
Sum	3039.016	1083.478	5755.382	2513.372	7129.991
Sum Sq. Dev.	947.7135	1608.573	7152.179	29840.02	27607.50

Source: Author's estimation

[3]The skewness coefficient for normal distributed variable are respectively 0 and 3 (Gujrati 5th Edition)

6.2 Correlation matrix

Correlation matrix of all variables used in this study is shown in table 3. The values of correlation between variables depicts that no multicollinearity problem exist among the variables used in our study.

Table 3: Present Correlation matrix of all variables

	GDP	LDEBT	LOP	R_INTRST	SAV
GDP	1				
LDEBT	0.588467	1			
LOP	0.396406	0.265703	1		
R_INTREST	0.035604	-0.048157	-0.018322	1	
SAV	0.219867	0.188584	0.453133	-0.054585	1

Source: Author's estimation.

6.3 Diagnostic tests

Table 4 shows Redundant test (i.e F-statistics) and Hausman test. The p-value of F-statistics is less than 5% rejected the null hypothesis suggest that fixed effect model is appropriate than pooled model[4]. Whereas p-value of Hausman test also less than 5% suggest that fixed effect model is appropriate than random effect. So, fixed effect is selected as base for analysis of nexus between debt and economic growth.

Table 4: Present Diagnostic tests

Test name	Test effects	Statistics	p-valve	Decision
F-test	Pooled or fixed	772.262	0.000	**Fixed effect**
Hausman test	Random or fixed	10.606	0.03	**Fixed effect**

Source: Author's estimation.

6.4 Fixed effect and Random effect model for whole sample 21 countries

Table 5 shows the estimated results of fixed and random effect for whole sample of 21 countries. In both models, debt has a negative significant effect on economic growth. It is similar to the findings of Schclarek (2004), Ayadi and Ayadi (2008), Choong et al (2010), Safdari and Mehrizi (2011). But according to Hausman test, our estimations are done by the fixed effect in column (1). Since the coefficient of debt is negative significant which reveal that 1% increase in debt leads to a 0.048 % decrease in the economic growth of whole sample countries. These negative association results indicate that the majority of government debts are utilized for consumption expenditures, with just a small percentage going towards the formation of capital that is productive.

Similarly, trade openness has a negative significant effect on economic growth. This result is within the line of Haussmann et al, (2007), Dao, (2014), Keho, (2017), Musila and Yiheyis, (2015), Polatet al, (2015), Ulasan, (2015), Vlastou, (2010), Lawal et al, (2016), Were, (2015), Huchet-Bourdon et al, (2018). They found the same relationship between these two variables. This result suggest that increasing the dependency of their economy on trade without ensuring an improvement of the quality of their exports may have negative consequences in terms of growth. Trade has negative effect on growth in case, when countries have specialized in low-quality products. On the other hand real interest rate has positive significant effect on economic growth. The coefficient for the impact of real interest rate on economic growth is 0.0058, which shows that every unit increase in real interest rate raises economic growth by 0.0058. This suggests that high interest rate is being caused by declining savings as opposed to a rise in investment demand, prices of raw materials fall which resulting increases economic growth. Higher future expected profit, which would support the view that interest rate were driven by investment demand. The result of this study is similar to the studies of Shafik and Jalali, (1991), Jelilov, (2016).

Similarly, the coefficient of saving is positive and statistically significant. This outcome shows that saving has a positive effect on economic growth. This result is same to the earlier studies of Turan and

[4]Redundant test is conducted to check whether pooled model is suitable or fixed effect model.

Gjergji, (2014), Jagadeesh, (2015), Chandioet al, (2015), Sajid and Sarfaraz, (2008), they found positive impact of saving on economic growth. This conclusion implies that a high level of saving is always beneficial to a country since it accumulates capital stock and hence boosts economic growth. The R-squared score is 0.98, indicating that 98% of the variance in economic growth can be explained by changes in every independent variable.

Table 5: Fixed effect and Random effect models of economic growth for 21 countries

Dependent variable : Log of GDP per capita		
	Fixed effect	Random effect
	(1)	(2)
Independent variables		
Ldebt	-0.048***	-0.045***
	(0.0103)	(0.0103)
Lop	-0.0136**	-0.0127***
	(0.0052)	(0.0051)
R_interest	0.0058***	0.0058***
	(0.0018)	(0.0018)
Sav	0.0269***	0.026***
	(0.0028)	(0.0028)
Constant	8.3012***	8.278***
	(0.094)	(0.294)
R-squared	0.987	0.238
Durbin-Watson stat	0.226	0.199
Hausman test (prob)		19.809409 (0.0005)
Observations	441	441

Standard error are presented in parenthesis ***, ** significant at 1% and 5% levels respectively.

After determining that debt has a negative and substantial influence on economic development throughout the whole sample, we are now examining the same connection at different income levels. The Hausman test findings demonstrate that alternative hypotheses are accepted in all three models, and the fixed effect model is chosen above the random effect model.

Tables 6, 7, and 8 show the estimated findings for three samples of nations with lower, middle, and higher incomes. The results show that debt has a negative and substantial influence on economic growth in all three income levels. Lower-income nations see a greater influence. As a result, low-income nations have poor incomes, suffer from severe inflation, and their economies are based on agriculture.

Similarly, trade openness has negative significant effect on economic growth of lower income countries, but has a positive significant impact is found in middle and higher income countries. Middle-income nations see the greatest impact of trade liberalization on economic growth. The results also reveal that R_interest rate has a favorable and substantial influence on economic growth across all three income levels. Lower-income nations see the greatest impact of R_interest rates on economic growth. Lastly, saving has positive and statistically significant impact on economic growth in all income level countries, but it has more effect is found in lower income countries.

Table 6: Fixed effect model of economic growth for lower income countries

Variables	Coefficients	Std.Error	t-value	p-value
Ldebt	-0.0044	0.0443	-0.2586	0.7964
Lop	-0.0168	0.0068	-2.4765	0.0148
R_interest	0.0141	0.0032	4.4684	0.0000
Sav	0.0282	0.0068	4.1071	0.0001
Constant	6.5708	0.1367	48.0658	0.0000
F-statistic (prob)	363.7315 (0.0000)			
R-squared	0.971			
Durbin-Watson stat	0.415			
Hausman test (prob)	26.6361 (0.0000)			

Source: Author's estimation.

Table 7: Fixed effect model of economic growth for middle income countries

Variables	Coefficients	Std.Error	t-value	p-value
Ldebt	-0.0115	0.0128	-0.3447	0.7310
Lop	0.8425	0.0826	10.2016	0.0000
R_interest	0.0065	0.0020	3.1857	0.0019
Sav	0.0185	0.0025	7.3895	0.0000
Constant	-6.3353	1.4238	-4.4495	0.0000
F-statistic (prob)	465.2844 (0.0000)			
R-squared	0.977			
Durbin-Watson stat	0.387			
Hausman test (prob)	18.4784 (0.0010)			

Source: Author's estimation.

Table 8: Fixed effect model of economic growth for Higher income countries

Variables	Coefficients	Std.Error	t-value	p-value
Ldebt	-0.0197	0.0075	-2.6375	0.0096
Lop	0.6953	0.0677	10.2591	0.0000
R_interest	0.0018	0.0062	0.2877	0.7741
Sav	0.0124	0.0053	2.3647	0.0198
Constant	-2.1713	1.1427	-1.9001	0.0601
F-statistic (prob)	822.7766 (0.0000)			
R-squared	0.987			
Durbin-Watson stat	0.2549			
Hausman test (prob)	18.4784 (0.0010)			

Source: Author's estimation.

7. Conclusion and Policy Recommendation

This study has investigated the relationship between debt and economic growth in 21 countries including higher income countries, middle income countries and lower income countries by using the annual panel data of 21 years from the period of 2000 to 2022. Result of fixed effect model for complete sample shows that the debt has a negative significant impact on economic growth. Results also show negative significant effect of trade openness on economic growth. On the other hand, real interest rate and saving have a positive and statistically significant impact on economic growth. Results of low, middle and high income countries indicate negative significant impact of debt on economic growth in all three income levels countries. The highest impact is found in lower income countries. Trade openness has negative significant effect on economic growth of lower income countries, but has a positive significant impact is found in middle and higher income countries. The higher impact of trade openness on economic growth is found in middle income countries. Similarly, R_interest rate and saving have a positive and statistically significant impact on economic growth in all income level countries, but both have more effect is found in lower income countries. In this way, over all this study support the prior studies that debt lead to a negative impact on economic growth.

Empirical findings of this study suggest that effective fiscal policy and wise fiscal management is required in order to prevent persistent fiscal deficit. Particularly, governments need to control recurrent expenditures for instance wages, salaries and other charges, particularly during period of transitory upward movement in government revenue. Government revenue mobilization effort should be strengthening by expanding the tax coverage to rope in the large formal sector in the sample countries. This will also limit the macroeconomic imbalances and irregular depreciation of domestic currencies will lead normally worsen debt problem in the sample countries. Similarly, efficient and effective debt management mechanisms should be implemented and adopted to keep debt level within sustainable limits.

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