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Determinants of Fiscal Deficit in Sub-Saharan Africa (1994-2023)

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Abstract

The economic consequences of budget deficits are a key topic in current empirical research. There is less emphasis given to the different potential causes of fiscal deficits. Furthermore, empirical literature presents contradictory findings. It is against this background that this study was carried out to establish the determinants of fiscal deficit in 40 Sub-Saharan African (SSA) countries from 1994 to 2023. Explanatory variables are real gross domestic product, per capita income, external debt service, real effective exchange rate and broad money. Annual secondary data for the key variables were sourced from the World Bank and IMF databases. Fixed Effect model and Prais-Winsten Regression with Panel-Corrected Standard Errors were used for estimation. Both real gross domestic product and per capita income negatively and statistically related with fiscal deficit while broad money had a positive statistically significant relationship. Real effective exchange rate had negative but insignificant effect while external debt service was positive and insignificant. The study recommends SSA countries need to upscale on ways of promoting economic growth so that they will be able to gain more revenue to fund public demands without relying on loans. Additionally, SSA central banks and governments should work together to coordinate monetary growth with fiscal goals.

Keywords: *Fiscal deficit, External debt service, Real gross domestic product, Sub-Saharan Africa.*

1.0 Introduction

The literature on the effects of fiscal deficits on macroeconomic parameters has grown over time as a result of emerging fiscal sustainability concerns (Lin and Chu, 2013; Nimani, 2013; Nguyen, 2015). According to empirical literature, implications of fiscal deficit depend largely on the reasons for its existence. Positive and negative impacts prevail, however the drawbacks exceed the benefits in the long term due to the accompanying economic damage. Keynesian economists Stiglitz (2010) and Krugman (2012) argue that if the deficit is triggered by countercyclical fiscal policies, it will promote private investment, reduce unemployment, and encourage businesses to thrive regardless of tough economic times. The sub-Saharan Africa

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(SSA) region continues to face substantial and chronic budget deficits despite the rich resources it is endowed with. The region recorded an average growth of 3.76 % from the year 2000 to 2023, with a maximum of 6.7% in 2004 and an annual contraction of -3.24 % in 2020. The per capita income on the other hand experienced a steady growth during the same period, averaging at US\$3723.885. As at end of 2023, the number of middle-income countries had reached 26. Most of these countries rely on expenditure cuts to reduce fiscal deficits.

Low tax performance is one reason behind low domestic resource mobilization. Skewed development patterns are evident resulting to growth inequalities between SSA sub-regions. Non-resource-rich countries especially in East and West Africa have more dynamic and resilient economies than the resource-abundant ones, due to faster diversification (World Bank, 2018; Ross and Werker, 2024). Prior intentions of external debts are to provide additional funds to the domestic savings in order to promote sustainable growth and development of a country. The challenge currently is that SSA countries for example Zambia, Burundi, Angola, Central African Republic and Mozambique are borrowing just to fulfill current consumption with zero long term investments that yield returns. A report by International Monetary Fund (2023) indicates that the interest on public loan in SSA drained 4.6 percent of government revenues (excluding grants) at the end of 2012 to 10.4 percent at the end of 2022. Ratio of government income (excluding grants) spent on interest payments increased in 34 SSA nations, with 13 countries experiencing increases of more than 10 percentage points. Excessive loans put pressure on debt financing costs thereby threatening the financial steadiness in SSA region. The real effective exchange rate (REER) dictates a nation's foreign competitiveness and overall economic performance. The persistent misalignment of a country's currency rate may make the country's fiscal deficit even more severe. IMF (2023) confirms significant depreciations associated with inflation was experienced in during coronavirus period in SSA non-pegged. As a result, the debts stock especially the external one, surged by an average of 10%. The rise in debt stock was most significant in non-pegged regimes due to the fact that 66% of their debt is denominated in US dollars and 99% is denominated in Eurobonds, whereas in pegged regimes it is only 50% and 45% respectively (IMF, 2023).

1.1 Fiscal Deficit and External Debt Service Trends in SSA

The SSA region attained more fiscal deficits compared to surpluses (including grants) beginning the year 2000 all through to 2023. Figure 1 show how fiscal deficit has evolved in SSA since the year 2000 in relation to external debt service.

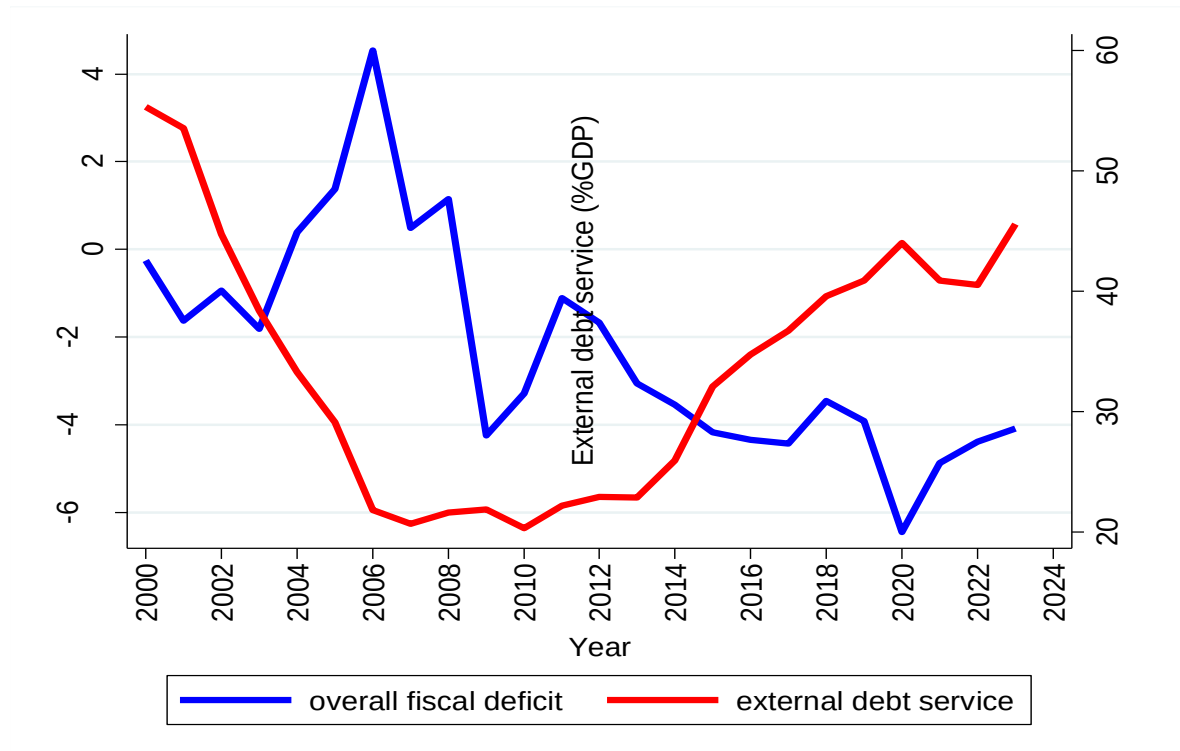


Figure 1: Fiscal Deficit versus External Debt Service for SSA from 2000 to 2023 as a Percentage of GDP

Note: Derived from WEO October 2024 database. A positive value is surplus; negative is deficit

According to Figure 1, SSA region attained an average fiscal balance of -2.16 percent of GDP. Fiscal surpluses were observed between the year 2004 and 2008, through an average peak of 4.53 percent in 2006. This was as a result of a number of factors: One reason is the upsurge of the oil revenue caused by rising oil prices. In 2006 for example, oil-exporting countries recorded a fiscal surplus of 10.42 percent of GDP. Additionally, better macroeconomic policies reduced inflation by half from an average of about 16.1 percent in 2000 to 7.4 percent in 2006, with oil- exporting countries recording remarkable improvements. Another factor is the decline in external debt stock from 55.72 percent of GDP in 2000 to 21.89 percent in 2008 due to the HIPC and MDRI debt relief initiatives. There was further influence of reduced regional conflicts, and improvements in both terms of trade and foreign direct investment (FDI) (IMF, 2008).

Fiscal balance started deteriorating in 2009 due to the global oil crises, where SSA oil exporting countries revenue fell drastically as a result of more than 70 percent fall in oil prices. The region was also adversely affected by the 2007-2010 financial crises, characterized by both inflationary and recessionary pressure emanating from overseas. From 2013 to 2023, only deficits are experienced, averaging at 4.23 percent of GDP with as high as -6.48 percent in 2020. The shares of external debt also built up from 22.99 percent of GDP to 44.53 percent respectively. High deficits are observed during the COVID-19 period (2020-2022) due to the countercyclical fiscal policy. For the three pandemic years, debt service averaged at 41.93 percent, the highest so far recorded. Lockdown measures in more than ten SSA countries led to increased unemployment, poverty and inequality as estimated 45 million full time jobs were lost in the second quarter of 2020 (United Nations, 2021).

1.2 Problem Statement

Prior to the year 2000, fiscal deficit levels on average were quite low in SSA region hence they posed less threat to economy. In the early and mid-2000, the impact of debt relief initiatives enabled the region to achieve surpluses in their balances. However, the continuous deterioration of fiscal balances from the year 2009 onwards to 2023 at an annual average of 3.79 percent of GDP is one of the main reasons behind the escalating loans and debt distress in the region. Due to the effect of debt overhang, a number of countries in SSA including Chad, Zambia, Ghana, and Ethiopia had to compel to apply for debt relief, restructuring and suspension programme for prudent debt management. Debt service jeopardizes the fulfillment of objectives of the United Nations 2030 Agenda as well as African Union (AU) Agenda 2063 for inclusive and sustainable development in the region. The problem of persistence of fiscal deficit across SSA has not yet been resolved.

1.3 Research Objective

To establish the determinants of fiscal deficit in Sub-Saharan Africa.

2.0 Literature Review

This study was based on Keynesian theory and found backing from debt-overhang theory. One single theory could not be sufficient in outlining the potential determinants of fiscal deficit therefore the other theory was incorporated to provide detailed understanding. Keynesian theory was developed by Keynes (1936) during the 1930s Great Depression. Government had a significant role through the fiscal and monetary policy of directly injecting money into the economy so as to increase output and employment. The theory focuses on the economy in the short run especially during economic downturn whereby government has to pursue expansionary fiscal policies for real wage stabilization. This could be done through infrastructure projects to create jobs and boost income of individuals. Fiscal deficit cyclically induced is perceived to have positive impact on GDP since it will promote private investment rather than crowding it out. This move was adopted by SSA government during 2007-2009 recession as well as COVID - 19 seasons. A higher GDP growth will lead to higher tax revenue thus reducing the level of fiscal deficit. This theory is relevant to this study since it explains fiscal deficit as an outcome of countercyclical fiscal policies during recessions. These measures are to ensure increased money supply and economic growth. Government can borrow money to increase capital to finance fiscal deficit but only during unemployment times.

The idea of debt-overhang was first discussed by Myers (1977) at corporate level. Later on, authors such as Krugman (1988) extended the analogy to country level. Debt overhang signifies a debt burden that is sufficiently large such that lenders are not fully aware that the debtors will pay the full amount (Krugman, 1988). This implies that the expected present value of potential future resource transfers is less than its debt. Lenders of a country face a trade-off between financing and forgiving a debt overhang. The debt suffers a high risk of defaulting given that the current debt servicing agreements becomes hard to meet. A country can apply to debt renegotiations and restructure. Myers (1977) establishes that debt overhang can cause underinvestment and reduced corporate investment efficiency, especially on debts that hold short maturity. Investors will fear to invest in a country that accumulates high external debt. The theory is much relevant to this study since it explain that high levels of debt in an economy leads to low investment and economic growth, increases debt servicing obligations which then worsens the fiscal deficit.

Empirically, a number of studies have been carried out on drivers of fiscal deficit. Bangura *et al.* (2016) studied macroeconomic determinants of fiscal deficit in Sierra Leone using time series data from the period 1980 to 2014 using Vector error correction model (VECM) and

variance decomposition techniques. Results showed that real GDP, interest rate and exchange rate had a long-run negative impact on budget deficit. Alam *et al.* (2022) used VECM and Granger Causality test to study the impact of macroeconomic variables on the budget deficit in Bangladesh from 1980 to 2018. The test revealed that GDP had negative both long-run and short-run relationship with budget deficit while money supply and real effective exchange rate exhibited a positive long-run relationship.

Similarly, Kasongo (2023) investigated factors influencing fiscal deficit in South Africa from 1975 to 2021 using Bayesian vector autoregressive estimation research design with Minestor prior. Findings confirmed positive significant impacts of government debt on fiscal deficit; negative significant impacts of economic growth, money supply and interest rate on fiscal deficit. Dalyop (2017) on the other hand examined determinants of fiscal deficit in conflict affected 37 states in Africa from 1980 to 2013. Findings indicated that higher economic growth rate in the preceding year prompt the government to increase expenditure in the current year leading to higher fiscal deficit. By using two-stage least squares (2SLS) method, Diokno (2007) assessed the economic and fiscal policy determinants of public deficits in Philippines for the period 1981-2005. The influence of Interest payment on loan was found insignificant in explaining national government account balancen(NGAB). Abanikanda *et al.* (2023) examined economic, political and institutional drivers of fiscal deficit on twenty three (23) sub-Saharan African countries. They carried out panel spatial consistent correlation, dynamic fixed effect autoregressive distributed lag and generalized feasible OLS estimation techniques. Results indicated per capita income having a significant positive influence in the short-run but a negative effect in the long-run. Corruption control had weaker statistical evidence.

In a similar study, Arif and Hussain (2018) examined the economic political and institutional determinants of budget deficit instability in South Asia and ASEAN countries from 1984 to 2016 using unbalanced panel. Fixed effect and random effect results positively related per capita GDP with fiscal deficit. Mawejje and Odhiambo (2022) conducted a causality analysis on determinants of fiscal policy in East African Community (EAC) from 1980 to 2017 using balanced panel dataset. Multivariate panel granger causality analysis and impulse response functions were carried out. No short run causality was evident between fiscal deficit and debt service. Debt service had a small insignificant impact on budget balance. Arif and Arif (2023) analysed the institutional approach to budget deficit by examined factor affecting budget deficit in 66 countries ranging 1996 to 2020. FE, RE, pooled mean group (PMG), and mean group (MG) estimates indicated GDP per capita had a positive significant effect on budget deficit in the long-run. Al-Sawaie *et al.* (2025) analyzed the relationship between the budget deficit and macroeconomics variables in Jordan from 2008 to 2023 employing ARDL model on quarterly data. Findings indicated high GDP reduces budget deficit, increase in money supply increases budget deficit while real exchange rate was insignificant.

Additionally, Kalim and Hassan (2013) examined what lies behind fiscal deficit in Pakistan spanning from 1976 to 2010. Methods included ARDL bounds testing, FMOLS, ECM and Granger causality test. Total debt service and broad money showed a both short-run and long-run positive significance relationship with fiscal deficit. Mokaya *et al.* (2024) examined economic growth, external debt and corruption nexus in SSA countries. 46 countries having unbalanced data were analyzed using FE panel method from 1998 to 2021. Finding showed positive relationship between external debt and economic growth. Considering the reviewed studies above it is evident that GDP growth level, per capita income, real exchange rate, money supply and debt service are important in explaining fiscal deficits across regions. However, empirical results provide mixed, conflicting results, different methodologies and also conclusions. This research was therefore conducted to expand on empirical literature. The

specific determinants were selected because both empirical analysis and theoretical examination regards them relevant to the study.

3.0 Research Methodology

This study utilized historical research design. The design allowed using annual secondary data (past data) on the key variables under study. Secondary data was employed given that it is less costly, allows comparison, checks and explain trends of variables hence giving room for predictions (Melissa, 2014). Forty (40) Sub-Saharan Africa countries were studied from 1994 to 2023. The countries were chosen based on data availability. SSA was the core of this research since the region continues to encounter economic slowdown, notably in the HIPC, and one of the possibilities of that is the persistence of fiscal deficits and debt.

3.1 Justification of Variables and Data Sources

The data for fiscal deficit and real GDP growth was obtained from World Economic Outlook (WEO) which is a database published by the IMF. Broad money, external debt service, real effective exchange rate and GDP per capita datasets were sourced from World Bank's World Development Indicator (WDI). Unbalanced panel data was used. The sources are publicly accessible and from internationally recognized institutions therefore the data was credible and reliable to produce sound results. Broad money and external debt service were expected to relate positively with fiscal deficit while real gross domestic product, per capita income and real exchange rates were expected to have negative relationship.

3.2 Empirical Model

Since the study employed a panel analysis approach, the empirical model was specified as 3.1

$$FD_{it} = \beta_0 + \beta_1 GDPPC_{it} + \beta_2 DES_{it} + \beta_3 RGDP_{it} + \beta_4 REER_{it} + \beta_5 BM_{it} + \varepsilon_{it} \quad \dots\dots\dots 3.1$$

Equation 3.1 is meant to achieve objective (i) of this study. In the model 3.1, natural logs were introduced and estimated as 3.2. This helped to transform data to the same scale and also eliminate heteroskedasticity.

$$\ln FD_{it} = \beta_0 + \beta_1 \ln GDPPC_{it} + \beta_2 \ln DES_{it} + \beta_3 \ln RGDP_{it} + \beta_4 \ln REER_{it} + \beta_5 \ln BM_{it} + \varepsilon_{it} \quad \dots\dots\dots 3.2$$

For $i = 1, 2, \dots, N$; $t = 1, 2, \dots, T$

In this case, FD is fiscal deficit; RGDP represent real gross domestic product; GDPPC means gross domestic product per capita; DES is external debt service; REER represent real effective exchange rate; BM is broad money; ε_{it} is the error term at specific entity i and time t respectively; β_0 is slope intercepts; $\beta_1, \dots, \beta_8$ are parameters to be estimated and $\ln$ means natural logs.

4.0 Results

The results are presented in sections.

4.1 Panel Unit Root Test

The Pesaran (2007) Cross-sectionally Augmented Dickey-Fuller (CADF) test was performed to test stationarity of the variables at both level and first difference. The advantage of the test is that it could be performed on series that had some missing observations and also takes care of cross-sectional dependence. The CADF unit root results are presented in Table 1.

Table 1: Results for Cross-sectionally Augmented Dickey-Fuller (CADF) Unit Root Test

Variable	CADF		Order of Integration
	At Level	1 st Difference	
lnFB	-4.061**	-	I(0)
lnRGDP	-4.709**	-	I(0)
lnDES	-3.401**	-	I(0)
lnGDPPC	-1.512	-4.371**	I(1)
lnREER	-2.737**	-	I(0)
lnBM	-2.838**	-	I(0)

**significant at 5%, *significant at 10%

Table 1 shows mixed stationarity. Natural log of fiscal balance, real GDP growth, external debt service, real effective exchange rate and broad money had stationarity of I(0) at 5% significance in level form. However, natural logs of per capita income became stationary at first difference.

4.2 Cointegration Test

This study utilized the Durbin-Hausman panel cointegration test proposed by Westerlund (2008). It is a Fisher-type approach that accounts for cross-sectional dependence and works on unbalanced dataset. The Durbin-Hausman group statistic was 13.062 with a p-value of 0.0000 while the Durbin-Hausman panel statistic was 2.697 having a p-value of 0.0278. Given in both cases the p-values for the statistics were less than 5% significance level, the null hypothesis of no cointegration was rejected and therefore there exists long-run stable relationship among the variables.

4.3 Hausman Test

Panel data analysis can be done using fixed effect or random effect model. In order to determine the appropriate estimation technique, Hausman (1978) test is normally used. The results are presented in Table 2.

Table 2: Results for Hausman (1978) Test

-Coefficients-	(b) fix	(B) random	(b-B) Difference	Sqrt (diag(V _b -V _B)) S.E.
lnRGDP	0.480549	0.4783084	0.0022405	0.0163391
lnDES	-0.03968	-0.0235176	-0.0161624	0.0100174
lnGDPPC	0.0314357	0.0799479	-0.0485121	0.0344226
lnREER	0.0239819	0.0799479	-.0125338	0.0137809
lnBM	-0.1740335	-0.1915603	0.0175268	0.0249853
chi2 (5) = 17.64			Prob>chi2 =	0.0034000

The result for the test from Table 2 shows a p-value of 0.0000 which is less than 5% significance level. The null hypothesis of preferred model is random was rejected. Therefore the fixed effect model was utilized in analyzing the determinants of fiscal deficit in SSA from 1994 to 2023.

4.4 Regression Results

Beck and Karts (1995) recommends Prais-Winsten Regression with Panel-Corrected Standard Errors (PCSE) estimators when there are violation of ordinary least squares (OLS) assumptions. This is because the aforementioned problems make the standard errors of the FE model to have biasness. The PSCE results in Table 3 are when the autocorrelation was assumed to be panel-specific AR (1), with errors that are panel-level heteroskedastic and correlated across panels.

Table 3: Fixed Effect and PCSE Regression Results

Model Dep. Variable	FE lnFB Robust SE	PCSE lnFB PSAR(1)
lnRGDP	0.481*** (2.929)	0.373*** (4.420)
lnDES	-0.0397** (-2.190)	-0.00846 (-1.085)
lnGDPPC	0.0314 (0.399)	0.0840*** (3.685)
lnBM	-0.174** (-2.432)	-0.189*** (-6.443)
lnREER	0.0240 (0.402)	0.0867 (1.518)
Constant	1.724** (2.188)	0.924* (1.909)
Observations	1,104	1,104
R-squared	0.083	0.848
Number of c_id	40	40
chi2/F	5.995	67.72
Prob > chi2/F	0.0003	0.0000

*** 1% significant, ** 5% significant and * 10% significant level with t and z-statistics in parentheses respectively

PCSE was used as the final estimation model. The coefficient of determination is 0.848 with a Chi-square probability of less than 5%. This implies that 84.8% of the variations in fiscal deficit are explained by the explanatory variables included in the model. Table 3 also shows that as the economy improves the level of fiscal deficit reduces. A 1% increase in real GDP growth results into 0.373% reduction in fiscal deficit, significant at 1% level. This finding is consistent with the Keynesian Theory that advocates for counter-cyclical government spending involving expansionary policy during recession and discretionary in booms. The results are also similar to those of Bangura *et al.* (2016), Kasongo (2023) and Alam *et al.* (2022) but conflicts those of Dalyop (2017).

Additionally, from the regression results, as per capita income increases by 1%, the level of fiscal deficit declines by 0.084%. The effect was statistically significant at 1% level. Generally in relation to the study period, as income levels in SSA improve, the tax base broadens enabling the government to collect more tax which increases the revenue. In the same way Abanikanda *et al.* (2023) finds per capita income to be negatively relating with fiscal deficit in the long-run, even though in the short-run it was worsening it. The results however do not conform to Arif and Hussain (2018); Arif and Arif (2023) who denote that fiscal deficit positively associate with real per capita income.

Broad money supply estimated coefficient was -0.189 and highly significant at 1% level. The relationship is negative indicating the worsening effect on fiscal balance. This means that 1% increase in broad money supply would lead to 0.189% increase in fiscal deficit. The theoretical expectations were that when broad money increases, the level of fiscal deficit would also increase. When money supply is increased by central bank, it creates inflation that reduces the real value of the tax revenue. Inflation also makes the local currency weak making government to import at high prices thus worsening fiscal balance. The results are consistent with the findings of Al-Sawaie *et al.* (2025) and Kalim and Hassan (2013).

External debt service had negative relationship with fiscal balance meaning it worsens the fiscal balance by increasing fiscal deficit and reducing surplus. The coefficient was -0.00846 implying 1% increase in the cost of servicing external debt leads to 0.00846% increase in fiscal deficit. This results were however not statistically significant. Krugman (1988) in relation to debt overhang theory elaborates that when the country's debt reaches very high levels, the expected future debt service requirements discourages investment both foreign and domestic. There is high risk on defaulting on the loan therefore the affected countries have to renegotiate with lenders, seeking for rescheduling, restructuring or suspension of the debt. By doing this the debt overhang burden is reduced, creating more fiscal space and restore the confidence of investors. The findings of this research are supported by those of Diokno (2007) who also finds debt service insignificant. Mawejje and Odhiambo (2022) found that debt service had small but insignificant impact on fiscal deficit. Being insignificant could possibly mean that debt service using recent values may not have an immediate impact on revenues and expenditures. Rather, lagged values of the variable could carry significant impact on fiscal deficit. External debt service could also be having low variability across the panels and time periods.

On the other hand a 1% increase in real effective exchange rate would lead to 0.0867% decrease in fiscal deficit. This supports the expectation of the study that real effective exchange rate improves the fiscal balance. The 0.0867% increase on the level of fiscal deficit was conversely not found statistically significant at the standard levels of significance. The results of this study concurred with those of Diokno (2007) who found real effective exchange rate insignificant in describing fiscal deficit in the country, suggesting reason being the offsetting effects of the peso depreciation on revenues and expenditures. Fiscal deficit is influenced by an array of factors structural, political, economic or institutional that vary depending on the set up of each country. There also lies a possibility that real effective exchange rate could be impacting fiscal deficit in the long-run.

4.5 Post-Diagnostic Tests

These include test for cross-sectional dependence, serial correlation and test for heteroskedasticity. The tests were run on the fixed effect model with robust standard errors and results tabled in Table 4.

Table 4: Post-Diagnostic Tests

Test	Statistic	P-value
Modified Wald Test (Heteroskedasticity)	Chi2 (40) = 10740.82	0.0000
Pesaran (2004) CD Test (Cross-sectional dependence)	9.515	0.0000
Wooldridge (2002) test (Autocorrelation)	F (1, 39) = 26.279	0.0000

The results in Table 4 shows Pesaran (2004) test of cross sectional independence as 9.515 with P-value of 0.0000. Since the P –value is less than 5% significance level; the null hypothesis of

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no cross-sectional dependence in panel was rejected implying that there was cross-sectional dependence. Woodridge (2002) test for autocorrelation results showed F (1, 39) statistic as 26.279 and p-value of 0.0000. With a p-value less than 0.05, then the null hypothesis of no first-order autocorrelation was rejected implying that serial correlation was present in the fixed effect results. Modified Wald test for group-wise heteroskedasticity results indicated χ^2 (40) = 10740.82 and p-value of 0.0000. Since p-value is less than 0.05 the null hypothesis of Homoskedasticity was rejected concluding that the fixed effect estimators were affected by heteroskedasticity. Heteroskedasticity was corrected using PCSE estimation method.

5.0 Conclusion

The study concludes that the level of economic growth, per capita income and broad money supply are significant in determining fiscal deficit in sub-Saharan Africa. The positive and significant impact of real GDP growth on fiscal balance indicate that as the economy expands, many people get jobs, income of individuals increase, government is able to expand the tax base thereby getting more tax revenue from income tax and corporate taxes. When expenditures remain low, the outcome will be a reduced fiscal deficit. The negative and statistically significant impact of broad money supply on fiscal balance implies that as the central bank increase the volume of money in the economy, it creates inflationary pressures, reducing the real value of revenues, discourages savings and increases interest rate in the future. Increase in money supply therefore increases the fiscal deficits of SSA economies.

6.0 Recommendations

The study recommends that each SSA country government should implement measures that promote economic growth as this will generate more revenue and enable them fund public needs without reliance on loans. Additionally, Sub-Saharan central banks and governments should work together to coordinate monetary growth with fiscal goals. For instance, limiting the monetary financing of deficits can prevent inflationary spending pressures that worsen fiscal balances, as this assures that increases in broad money are related to productive investment instead.

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