African Journal of Economics and Sustainable Development
ISSN: 2689-5080
Volume 5, Issue 1, 2022 (pp. 75-82)
www.abjournals.org

LONG-RUN AND SHORT-RUN RELATIONSHIP BETWEEN BUDGET DEFICITS AND INFLATION RATE IN NIGERIA

Muideen A. Isiaka[1], Lukuman O. Lamidi[2], Rasaki O. Kareem[1] and Precious F. Oladotun[1]

[1]Department of Economics and Actuarial Sciences, Crescent University Abeokuta

[2]Federal College of Animal Health and Production Technology, Moor Plantation, Apata, Ibadan, Oyo State, Nigeria.

Cite this article:

Isiaka M.A., Lamidi L.O., Kareem R.O., Oladotun P.F. (2022), Long-Run and Short-Run Relationship between Budget Deficits and Inflation Rate in Nigeria. African Journal of Economics and Sustainable Development 5(1), 75-82. DOI: 10.52589/AJESD-R4V56ZPL.

Manuscript History

Received: 19 Oct 2021

Accepted: 9 Nov 2021

Published: 17 March 2022

ABSTRACT: *This study examines the dynamic relationship between budget deficit (BD) and inflation rate (INF) in Nigeria using secondary data extracted from the CBN statistical bulletin. Control variables included are real gross domestic product (RGDP), real interest rate (INTR), exchange rate (EXCHR) and private investment (INV). After obtaining a mixture of I(0) and I(1) variables from the unit root test, the study conducted a co-integration test using the ARDL approach. The results indicate that only RGDP and INTR have significant relationship with INF in the long-run. Budget deficit has no significant influence on inflation both in the long-run and in the short-run. This study concludes that budget deficit cannot be criticized based on its ability to induce inflation and recommends that inflation impact should be given low wait in evaluating budget deficit decisions.*

JEL Classification: H62, E62, E31

KEYWORDS: Budget Deficit, Inflation, ARDL, Short-Run, Long-Run.

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

African Journal of Economics and Sustainable Development
ISSN: 2689-5080
Volume 5, Issue 1, 2022 (pp. 75-82)

www.abjournals.org

INTRODUCTION

The persistent government budget deficits and government debt have become a significant concern in developed and developing countries (Awe & Shina, 2012). The inflation rate has been increasing with its damaging effect on the economy by increase in the price of consumer goods and services (Awe & Shina, 2012). When there is a budget deficit, the government finds ways to finance the deficit by borrowing from commercial and merchant banks or the non-banking public and through short-term bonds, monetary instruments and external borrowings (Isenmila & Okolie, 2008). Isenmila and Okolie maintain further that using deficit financing to pursue fiscal policies often leads to increased danger in an economy. Inflation remains one of the significant economic variables that can distort economic activities in developed and less developed countries (Adenuga, Bello, & Ejumedia, 2010). Generally, low and stable inflation has become the core mandate for most central banks globally for the apparent reason that inflation has costs on the economy (Mordi, 2009).

LITERATURE REVIEW

In studying how a budget deficit affects inflation in Sri Lanka by Tharaka and Ichidashi (2012), the Vector Autoregressive Regression (VAR) model was employed and it was suggested that budget and inflation have a positive relationship same time bi-directional causality structure exists. Khumalo (2013) studied budget deficits-inflation nexus for South Africa, using VAR with quarterly data for 1980–2012. The findings suggest a direction of causation and a long-run relationship between budget deficit and inflation in South Africa. Budget deficit contributes positively to inflation in South Africa. Oladipo and Akinbobola (2011) investigated the nature and direction of causality between fiscal deficit and inflation in Nigeria. Employing Granger causality pairwise test, their result showed that there was no causal influence from inflation to budget deficits; instead, there was a causal influence from budget deficit to inflation in Nigeria. Their result also added that the budget deficit affects inflation directly and indirectly through fluctuations in the exchange rate in Nigeria. Using the causality approach, Anayochukwu (2012) examined the relationship between fiscal deficits and inflation in Nigeria, covering 1970–2009. The Autoregressive Distributed Lag (ARDL) model and the Granger causality confirmed a significant negative relationship between growth in fiscal deficit and inflation, but fiscal deficit causes inflation. He recommended that one way to achieve inflationary control is to aim at policies that will reduce the fiscal deficit in Nigeria.

Oladipo and Akinbobola (2011) analysed the causal relationship between budget deficit and inflation and found a unidirectional causality from budget deficit to inflation in Nigeria. They noted also that in addition to the direct relationship, there is indirect relationship through exchange rate fluctuation. This is similar to the finding of Sebulime and Edward (2019) in Uganda.

In Iran, Zonuzi et al. (2011) found a significant positive relationship between budget deficit and inflation. For 13 developing Asian countries, Habibullah et al. (2011) found evidence that the budget deficit is inflationary. In Sri Lanka, Ekanayake (2012) confirmed the positive relationship. The author measured the budget deficit as a percentage of narrow money.

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

African Journal of Economics and Sustainable Development

ISSN: 2689-5080

Volume 5, Issue 1, 2022 (pp. 75-82)

www.abjournals.org

There are studies that find a negative relationship between budget deficit and inflation. For example, Ozurumba (2012) used a causality test and ARDL model to establish a negative relationship between fiscal deficit growth rate and inflation.

However, Dockery, Ezeabasili, and Herbert (2012) concluded that there is no significant relationship between budget deficit and inflation in Nigeria. This was also confirmed for data between 1960 and 2006 in Ezeabasili, Mojekwu, and Herbert (2012). Oseni (2015) concluded that discretionary fiscal policy has only a short-run impact on inflation volatility with negligible long-run influence.

It can be concluded from the literature review that the relationship between budget deficits and inflation has yielded conflicting results. Although the direction of the causation is generally accepted from deficits to inflation, empirical evidence on this unidirectional causation is inconclusive. While some studies provide results to support the idea that budget deficits cause inflation, others reported otherwise. And the results also depend on whether the analysis is in the short-run or long-run. The current study examines the short-run and long-run relationship between budget deficit and inflation in Nigeria.

METHODOLOGY

The functional form of the model adopted for this study is expressed below:

$$INF_t = f(BD_t, RGDP_t, INTR_t, EXCHR_t, INV_t) \quad \text{(1)}$$

where INFt is the inflation rate, BDt is the government budget deficit, RGDPt is the real gross domestic product, INTRt is the real interest rate, EXCHRt is the exchange rate, INVt is private investment, t = time (1981–2019).

Expressing model (1) in its econometric linear form,

$$INF_t = \alpha_0 + \alpha_1 BD_t + \alpha_2 GRGDP_t + \alpha_3 INTR_t + \alpha_4 EXCHR_t + \alpha_5 INV_t + \varepsilon_t \quad \text{(2)}$$

where α_0 is the intercept parameter; α_1, α_2, α_3, α_4, α_5 are the partial slope parameters; and ε_t is the stochastic error. The expected sign of the parameters are $\alpha_0 > 0, \alpha_1 > 0, \alpha_2 < 0, \alpha_3 > 0, \alpha_4 > 0, \alpha_5 < 0$.

The ARDL cointegration model is specified as follows:

$$\Delta INF_t = \alpha_0 + \alpha_1 INF_{t-1} + \alpha_2 BD_{t-1} + \alpha_3 GRGDP_{t-1} + \alpha_4 INTR_{t-1} + \alpha_5 EXCHR_{t-1} + \alpha_6 INV_{t-1}$$
$$+ \sum_{i=1}^{p} \phi_i \Delta INF_{t-1} + \sum_{j=0}^{q1} \phi_j \Delta BD_{t-j} + \sum_{k=0}^{q2} \gamma_k \Delta GRGDP_{t-k} + \sum_{l=0}^{q3} \beta_l \Delta INTR_{t-l} + \sum_{m=0}^{q4} \alpha_m \Delta EXCHR_{t-m}$$
$$\sum_{n=0}^{q5} \delta_n \Delta INV_{t-n} + \varepsilon_t \quad \text{(3)}$$

Article DOI: 10.52589/AJESD-R4V56ZPL

DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

The variables are measured as follows:

INF is annual inflation rate in percentage

BD is the annual federal government budget deficit in billion Naira.

RGDP is the real gross domestic product in billion Naira.

INTR is the annual deposit rate in percentage.

EXCHR is annual Naira per US dollar official cross exchange rate (₦/$)

INV is annual gross fixed capital formation in billion Naira.

All variables were extracted from the Central Bank of Nigeria Statistical Bulletin (2019).

RESULTS AND DISCUSSION

Unit Root Test

The next step involved conducting a unit root test for all the variables to determine their stationarity level, which is a necessary condition for understanding the long-run behaviour of variables. In carrying out this test, the Augmented Dickey-Fuller (ADF) test was applied. The ADF test was considered because it takes into consideration the fact that the error term may be correlated. If a time series is found to be nonstationary, it could be differenced to the first or second difference to make it stationary. The rule of thumb is that if the absolute value of ADF test statistic is greater than McKinnon critical value at 5%, the null hypothesis is rejected, which implies that the variable is stationary.

Table 1 reveals that only INF was stationary at level. It implies that the null hypothesis of unit root was rejected and it was concluded that the variable has no unit root. The result also implies that the variable was integrated of order zero. On the contrary, RGDP, BD, INV, EXCHR and INTR were not stationary at level. The ADF test was estimated on their first difference to make the variables stationary. As shown in the First Difference results, the ADF test statistics were greater than the critical value at a 5% critical level in absolute terms. Therefore, the null hypothesis of the unit root was rejected, and it was concluded that the variables were stationary at first difference. The result also implies that these variables were integrated of order one.

Table 1: Unit Root Test

	Level with Constant				First Difference with Constant				
Variable	Lag	ADF Test	5% Critical Value	Decision	Lag	ADF Test	5% Critical Value	Decision	Order of Integration
INF	1	-4.336	-3.537	S					1(0)
RGDP	1	-3.297	-3.533	NS	1	-7.551	-3.537	S	I(1)
BD	1	2.238	-3.533	NS	1	-4.305	-3.537	S	I(1)
INV	1	-1.532	-3.533	NS	1	-6.754	-3.537	S	I(1)
EXCHR	1	-2.078	-3.537	NS	1	-4.510	-3.537	S	I(1)
INTR	1	-3.032	-3.533	NS	1	-7.664	-3.537	S	I(1)
NS - nonsignificant at a 5% significance level; S is significant at a 5% significance level									

Source: Authors' computation (2021)

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

African Journal of Economics and Sustainable Development
ISSN: 2689-5080
Volume 5, Issue 1, 2022 (pp. 75-82)

www.abjournals.org

Cointegration Test

Since the result of the unit root test revealed different orders of integration of the variables under study, the bounds test approach to cointegration was used as it can estimate variables both at level and at first difference (Pesaran et al., 2001). Ouattara (2004) maintained that, for models with a mix of I(0) and I(1) variables, the bounds test approach is appropriate. The rule of thumb is that the *F*-statistics should be greater than the upper and lower bounds at 10% and 5% critical levels.

Table 2 reveals that the *F*-statistics was greater than the upper bound critical values. This implies that there was cointegration among the variables. The result confirmed the existence of a cointegrated relationship among the variables.

Table 2: ARDL Cointegration Results

F- Value	**K**	**Critical Values Bounds**		
		Sig. Level	**Upper**	**Lower**
4.934	5	10% 5%	3.700 4.399	2.508 2.980

Source: Authors' computation (2021)

Long-Run Relationship

Table 3 shows that in the long-run, the coefficient of BD is 0.011, which is statistically insignificant at 5% critical level. The result implies that a one billion Naira increase in BD would increase INF by about 0.01% when all other variables are held constant. The coefficient of RGDP is -3.31, which is statistically significant at 5% critical level. The result implies that a one billion Naira increase in RGDP would decrease INF by about 3.31% when all other variables are held constant.

Table 3: Long-Run Effect of Budget Deficit on Inflation

Regressors	Coefficient	Std. Error	*t*-statistics	*p*-value
BD	0.011	0.009	1.187	0.245
RGDP	-3.314	1.397	-2.373	0.025
INTR	2.909	0.931	3.125	0.004
EXCHR	0.116	0.113	1.026	0.314
INV	0.00005	0.0001	0.5222	0.606
Constant	-7.441	13.611	-0.547	0.598
R-squared = 0.568 Adjusted R-squared = 0.448 *F*-statistics = 4.758 Prob (*F*-statistics) =0.001		Normality = 2.397[0.122] Heteroscedasticity = 2.824[0.093] Durbin-Watson = 2.019		
Dependent Variable-INF Model Structure: ARDL (1, 0, 0, 1, 1, 0)				

Source: Authors' computation (2021)

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

The coefficient of INTR is 2.909, which is statistically significant at 5% critical level. The result implies that a one percent increase in INT would increase INF by about 2.91% when all other variables are held constant. The coefficient of EXCHR is 0.116, which is statistically insignificant at 5% critical level. The result implies that a unit increase in ₦/$ would increase INF by about 0.12% when all other variables are held constant. The coefficient of INV is almost zero and not statistically insignificant at 5% critical level.

The normality test results reveal that the test statistics value is 2.397 with a probability value of 0.122, which is not significant at a 5% significance level. Therefore, the null hypothesis is accepted, and it is concluded that the residual of the model is normally distributed.

Heteroscedasticity is used to describe the situation when the variance of the residuals of a model is not constant. The result reveals that the test statistics value is 2.824 with a probability value of 0.093, which is not significant at a 5% significance level. Therefore, the null hypothesis is accepted, and it is concluded that the residual is homoscedastic. The Durbin-Watson statistics is 2.019 which indicates that there is no serial correlation in the model.

Short-Run Relationship

Table 4.6 shows the result of the VECM. The VECM must lie between 0 and 1 and is expected to be negative. The coefficient of the VECM for model 14 had negative coefficients and significant *p*-values. Therefore, the error correction term in the long-run would move back to equilibrium. The adjustment speed is 0.688, which implies that in the short-run, given any initial shock with a speed of adjustment of about 69%, the error term would converge to equilibrium.

Table 4: Short-Run Effect of Budget Deficit on Inflation

Regressors	Coefficient	Std. Error	*t*-statistics	*p*-value
dBD	0.007	0.006	1.291	0.206
dRGDP	-0.727	0.704	-1.033	0.310
dINTR	0.788	0.683	1.154	0.257
dEXCHR	0.080	0.071	1.123	0.270
dINV	0.0005	0.001	0.521	0.606
ecm(-1)	-0.688	0.160	-4.299	0.001
R-squared = 0.501 Adjusted R-squared = 0.364 Durbin-Watson = 2.019		*F*-statistics = 4.862 Prob (*F*-statistics) =0.001		
Dependent Variable-INF Model Structure: ARDL (1, 0, 0, 1, 1, 0)				

Source: Authors' computation (2021)

Also, the results show that in the short-run, the coefficient of BD is 0.007, which is statistically insignificant at 5% critical level. The sign of the coefficient conformed to a priori expectation. The coefficient of RGDP is -0.727, which is statistically insignificant at 5% critical level. The coefficient of INT is 0.788, which is statistically insignificant at 5% critical level. The coefficient of EXCHR is 0.080, which is statistically insignificant at 5% critical level. The coefficient of INV is 0.0005, which is statistically insignificant at 5% critical level. While none

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

of the long-run variables have no significant impact on inflation in the short run, the error correction term of -0.688 is statistically significant at 1% significance level. The negative value of the ECM indicates tendencies towards long-run equilibrium from short-run disequilibrium. It suggests that long-run equilibrium can be restored within two years after a short run shock.

The R-squared value is 0.501. The value of the *F*-statistic is 4.862 with probability of 0.001 which is significant at 5% critical level. The Durbin-Watson statistic is 2.019 which indicates that there was no serial correlation in the model.

CONCLUSION

This study examined the impact of budget deficit on inflation rate in both short-run and long-run. The results indicate that the budget deficit has no significant impact on inflation rate both in the short-run and in the long-run. The major long-run determinants of inflation rate are the real GDP and interest rate. While real GDP has a negative impact on inflation rate, interest rate has a positive impact on inflation rate.

The finding implies that an increase in government deficit spending does not impact inflation in Nigeria. The result implies that other factors like increase in fuel price, government economic policies, devaluation of currency, supply shocks arising from the implementation of the border protection policy, among others might be the major drivers of inflation. The finding supports that of Egwaikhide (1996), Osakwe (1983), and Inam (2014). On the contrary, the result was inconsistent with the findings of Oseni (2015), Sebulime and Edward (2019), and Chukwu, Otiwu, and Okere (2020).

This study concludes that the budget deficit cannot be criticized based on its ability to induce inflation and recommends that inflation impact should be given low wait in evaluating budget deficit decisions.

REFERENCES

Adenuga, I. A., Bello, H. T., & Ejumedia, P. E. (2010). Is inflation a purely monetary phenomenon? Empirical investigation from Nigeria (1970-2009). *European Scientific Journal, 8*(17), 236-247

Anayochukwu, O. B. (2012). The relationship between fiscal deficits and inflation: The causality approach. *International Journal of Scientific & Technology Research, 1*(8), 6-12.

Awe, A. A., & Shina, O. S. (2012). The nexus between budget deficit and inflationary in the Nigeria economy (1980-2009). *Research Journal of Finance as Accounting, 3*(10), 78-92.

Bai, J. and P. Perron (2003), Computation and analysis of multiple structural change models, *Journal of Applied Econometrics*, (18), 1–22.

Chukwu, L. C., Otiwu, K., & Okere. P. A. (2020). Impact of budget deficit on Nigeria's macroeconomic variables (1980-2012). *International Journal of Science and Management Studies (IJSMS), 3*(4), 135-150.

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL

Dockery, E., Ezeabasili, V. N., & Herbert, W. E. (2012). On the relationship between fiscal deficits and inflation: Econometric evidence for Nigeria. *Economics and Finance Review, 2*, 17-30.
Egwaikhide, F. O. (1996). The implication of Nigeria's budget deficit profile on inflation and current account. A Nigeria Experience. *Econs working Paper*. P. 5.
Ekanayake, H. J. E. (2012). The link between fiscal deficit and inflation: Do public sector wages matter? ASARC Working Paper 2012/14. Retrieved from www.asarc.com
Ezeabasili, V. N., Mojekwu, J. N., & Herbert, W. E. (2012). An empirical analysis of fiscal deficits and inflation in Nigeria. *International Business and Management, 4*(1), 105–120.
Habibullah, M. S., Cheah, C. K., & Baharom, A. H. (2011). Budget deficits and inflation in thirteen Asian developing countries. *International Journal of Business and Social Science, 2*(9), 192–204.
Inam, U. (2014). Budget deficit and inflation In Nigeria: An empirical analysis (1970-2010). *Journal of Economics and Sustainable Development, 5*(2), 26-32.
Isenmila, P., & Okolie, A. (2008). Deficit financing and its inflationary impact on developing economies: The Nigerian economy perspective. *Journal of Financial Management and Analysis, 21*(1), 58-68.
Khumalo, J. (2013). Budget deficit-inflation nexus in South Africa: VAR analysis. *Mediterranean Journal of Social Sciences, 4*(13), 415-424.
Mordi, G. G. (2009). Overview of monetary policy framework in Nigeria. *Bullion, 33*(1), 1-10.
Oladipo, S. O., & Akinbobola, T. O. (2011). Budget deficit and inflation in Nigeria: A causal relationship, *Journal of Emerging Trends in Economics and Management Sciences (JETEMS) 2*(1), 1-8.
Orji, U. O., Onyeze, C. N., & Edeh, L. (2014). Inflation dynamics and fiscal deficit in Nigeria: Examination of causal relationship. *Journal of Economics and Finance, 5*, 79-86.
Osakwe, J. O. (1983): Government expenditures, money supply and price, 1970-1980. CBN *Economic and Financial Review*, 21(2).
Oseni, I. (2015). Fiscal policy and inflation volatility in Nigeria. *The Nigerian Journal of Social and Economic Studies*, *57*(1), 1–20.
Oseni, I. (2015). Fiscal policy and inflation volatility in Nigeria. *The Nigerian Journal of Social and Economic Studies*, *57*(1), 1–20.
Ouattara,B. 2004. Modelling the long run determinants of private investment in senegal, Economics Discussion Paper Series 0413, Economics, The University of Manchester.
Ozurumba, B. A. (2012). Fiscal deficits and inflation in Nigeria: The causality approach. *International Journal of Scientific & Technology Research, 1*, 6-12.
Perron, P. (1989), The great crash, the oil-price shock, and the unit-root hypothesis", *Econometrica*, (57), 1361– 1401.
Pesaran, H., Smith, R. J., & Shin, Y. (2001). Bound testing approach to the analysis of level relationship. *Journal of Applied Econometrics, 16*(3), 289-326.
Sebulime, K., & Edward, B. (2019). Budget deficit and inflation nexus in Uganda 1980-2016: A cointegration and error correction modeling approach. *Journal of Economic Structure, 8*(3), 1-14.
Tharaka, N. D., & Ichihashi, M. (2012). How does the budget deficit affect inflation in Sri Lanka? *IDEC Discussion Paper*, Hiroshima University, Japan, pp. 1-36.
Zonuzi, J. M., Pourvaladi, M. S. H., & Faraji, N. (2011). The relationship between budget deficit and inflation in Iran. *Iranian Economic Review, 15*, 117-133.

Article DOI: 10.52589/AJESD-R4V56ZPL
DOI URL: https://doi.org/10.52589/AJESD-R4V56ZPL