Fiscal Deficits and Inflation: An Empirical Analysis from South Africa

Ahmed Oluwatobi ADEKUNLE[1]

[1]Senior Lecturer, Department of Accounting Science, Faculty of Economics & Financial Sciences, Walter Sisulu University, South Africa & Kwara State University, Nigeria, aadekunle@wsu.ac.za

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ABSTRACT

Purpose
The importance of fiscal considerations in elucidating the primary causes of inflation has received considerable attention. A well-known macroeconomic theory states that governments with ongoing budget deficits eventually must create money to cover them, which leads to inflation. This study examines fiscal deficits and inflation, using an empirical analysis from South Africa.

Methodology
The data from 1986 to 2021 was collected from the World Development Indicator (WDI, 2021). The ARDL econometric technique was used to test the nexus among the variables.

Findings
The study's findings show that the long-term fiscal deficit coefficient is positive and statistically significant. The long-term results support the expected sign that the budget deficit directly impacts inflation in South Africa. The coefficient (0.78) indicates that a percentage increase in the budget deficit will cause inflation in South Africa to rise by roughly 0.78%.

Conclusion
It is recommended that the government use less inflationary sources, such as the non-banking technique, to finance fiscal deficits during economic downturns. The study also suggests keeping the fiscal deficit at a manageable level to keep inflation under control in South Africa, which will lead to growth and lower inflation.

Corresponding author's email address: aadekunle@wsu.ac.za

1. Introduction

Since it is widely acknowledged that developing nations have less effective tax collection, political uncertainty, and restricted access to external sources of debt (Alesina et al., 1991; Catão & Terrones, 2003; Cukierman et al., 1992), these factors reduce the comparative cost of seigniorage and raise reliance on the inflation tax. Consequently, the fiscal view of inflation has been given major focus in the case of emerging nations. Empirical studies on developing economies by De Haan and Zelhorst (1990), Metin (1998), and Domac and Yucel (2005) contend that there is a substantial correlation between budget deficits and inflation in nations with high rates of inflation.

Development has been a key variable due to its effect on the economic system. Growth refers to the extent to which the production of goods and services has increased over a particular period, most commonly a year, as noted by the International Monetary Fund (IMF, 2018). To determine the rate of inflation, the cost of an identical market basket today is compared to the cost of an identical basket in the previous year or a base year. Totonchi (2011) asserted that the causes of inflation have likely led to one of the most significant macroeconomic debates in the field of economics. Inflation has been explained through several theories, including demand-pull, cost-push, monetary, and, more recently, structural theories. John Maynard Keynes and his colleagues emphasized that the primary driver of demand-pull inflation is an increase in aggregate demand. The debates surrounding these theories vary mainly due to differing traditional perspectives on the appropriate measures to reduce inflation, as well as distinctions between developed and underdeveloped economies.

Friedman (1968) led the monetarists in emphasizing the significance of the money supply in relation to inflationary pressures. They argue that inflation is consistently and universally a monetary phenomenon resulting from a faster increase in the money supply than in output. To explore inflation in South America, particularly in Chile, Sunkel (1958) formalized the structuralist theory of inflation. According to Totonchi (2011), inflation in less developed nations often stems from efforts to achieve economic growth.

Nonetheless, each nation's economic circumstances are unique, and the factors influencing inflation continue to evolve and grow more complex. According to the theoretical and empirical literature, the causes of inflation are multifaceted, time-sensitive, and shaped by a nation's level of development (Acquah-Sam, 2017). Sargent et al. (1981) were the first to formalize the effect of monetary financing of budget deficits on inflation. Since then, fiscal considerations have received significant attention in explaining the primary causes of inflation. A widely accepted macroeconomic theory posits that governments with persistent budget deficits eventually resort to creating money to finance these deficits, leading to inflation.

Fiscal imbalances remain a critical component of most inflation models, even though this theory acknowledges the importance of additional mechanisms through which inflation can arise and persist. In the literature on developing nations, the fiscal view of inflation is particularly prevalent. It has long been recognized that political instability, ineffective tax collection, and limited access to external borrowing generally reduce the overall cost of seigniorage and increase reliance on inflationary taxation (Alesina et al., 1991; Cukierman et al., 1992). Empirical evidence indicates a long-term relationship between inflation and budget deficits (Ahmad et al., 2019; Kaur, 2019; Nguyen, 2015).

Adom et al. (2015) found an insignificant impact of fiscal deficits on inflation, while Dadson (2015) reported a positive and significant effect (at the 10% level of significance) of fiscal deficits on inflation over the long run. Dadson also confirmed a unidirectional causality running from fiscal deficits to inflation in Ghana. However, the results indicated an insignificant effect (with an estimated coefficient of 0.0031) of fiscal deficits financed through the central bank on inflation during the study period. This was attributed to the omission of broad money supply and government expenditure—two critical factors influencing inflation—in Dadson's study.

Meanwhile, research conducted in Ghana has demonstrated that the money supply significantly reduces inflation in both the short and long term (Adjei, 2018; Adu et al., 2011). Furthermore, according to the Quantity Theory of Money (QTM) and the equation of exchange, an increase in the money stock will eventually lead to a proportional rise in the price level. Empirical evidence from various countries and monetary systems has demonstrated a long-term correlation between inflation and broad money growth (Benati, 2005; Kaur, 2019; King, 2002; Nguyen, 2015).

According to neoclassical economists, under the assumption of full employment, an increase in government spending through intervention could lead to significant inflationary effects (Olayungbo, 2013). Strong inflationary pressures can also result from excessive monetary growth caused by national debt from financial institutions used to finance unfavorable budget balances (Ahmad et al., 2019). Additionally, literature has established that government spending influences inflation (Georgantopoulos et al., 2010).

This study seeks to investigate the effect of fiscal deficits on inflation in South Africa while accounting for broad money supply and government spending. Employing a more rigorous methodology and broadening the scope, the study specifically aims to examine the relationship between South African inflation and budget deficits, the direction of causality between the two, and the impact of fiscal deficit shocks on inflation.

2. Literature Review

Inflation is a monetary phenomenon, as Friedman (1956) illustrated, but Leeper (1991) and Sims (1994) proposed the Fiscal Theory of the Price Level (FTPL), which views inflation as a fiscal event. The FTPL suggests that government deficits should be manageable and that the intertemporal budget constraint of public authorities must be balanced. It links the price level to the interaction between fiscal and monetary policy, emphasizing that the relative strength of these authorities plays a critical role in the inflationary impact of deficits. Nandi (2019) reaffirms that inflation is often more of a fiscal issue, dependent on public expectations regarding fiscal policy and fiscal deficits.

The FTPL has been analytically validated in various nations, albeit with differing degrees of success (Adekunle, 2024). Research on less developed nations has demonstrated a positive correlation between inflation and budget imbalance. For instance, Jalil et al. (2014) found a causal relationship between inflation and fiscal deficits in Pakistan. Similarly, Zimbabwe's persistent fiscal imbalance, financed by seigniorage, has resulted in inflation due to excessive current and non-development government spending (Nguyen, 2015). In Nigeria, the central bank's lack of independence in decision-making has led to significant inflationary impacts caused by fiscal deficits (Bajo-Rubio et al., 2009). Fiscal dominance has also been observed in the Italian economy, with evidence of a positive correlation between fiscal deficits and inflation (Adekunle et al., 2024; Komulainen et al.,

2002). However, Tekin-Koru and Erdal (2003) did not find conclusive evidence of a potential correlation between the budget deficit and inflation in the Turkish economy. A panel data analysis of select SAARC countries also dismissed the FTPL (Nawaz et al., 2012). While fixed and random effects models showed no significant evidence, a pooled least squares method revealed a negative and significant impact of fiscal deficits on pricing. Sahan and Bektasoglu (2010) tested this relationship in European nations, finding a long-term cointegration link between inflation and deficits, but no standardized association.

Recent studies suggest that in emerging nations with a history of high inflation, fiscal deficits and inflation are closely linked. Conversely, in nations with moderate inflation, fiscal deficits impact long-term inflation, but this effect diminishes in developed countries with low, single-digit inflation. The weaker link in industrialized nations can be attributed to greater credibility and autonomy in monetary policy. Developing nations, on the other hand, often have weak institutions and rely on inflationary deficit-financing methods. As a result, the relationship between inflation and budget planning is dynamic, non-linear, and diverse (Catao et al., 2005). The choice of fiscal deficit metric is crucial when assessing its impact on inflation. The fiscal deficit consists of two components: one that contributes to inflation and another that does not. According to the literature, government spending on investments is more sustainable in the long run, whereas spending on consumption exacerbates the fiscal deficit over time (Tiwari et al., 2012; Bekun et al., 2023; Adekunle, 2024).

Inflation is not determined solely by fiscal deficits. Other factors influencing inflation include food and energy prices, exchange rates, globalization, and economic growth rates. For instance, Hanif (2012) noted that food inflation in Pakistan is both unpredictable and disproportionately impactful on the poor. Coppin (1993) found that tourism, interest rates, and imported inflation are key determinants of inflation in Barbados. In Brazil, inflation rises with increasing exchange rate devaluation and falls as output growth increases (Durevall, 1998). Political instability also affects inflationary policies, with its impact being more significant in developing nations and those with high inflation (Bekun et al., 2023). Trade openness is another factor associated with inflation control. Romer (1993) suggested that globalization and inflation are negatively correlated. However, Zakariya (2010) found that trade openness, in addition to fiscal and monetary policies, contributes to inflation in Pakistan. Samimi et al. (2012) empirically demonstrated that a higher degree of trade openness, as measured in Zakariya's study, is positively correlated with inflation. This indicates that greater trade openness leads to higher inflation under certain circumstances.

Pakistan's economy has faced inflation driven by its massive and unsustainable fiscal deficits. Previous research on Pakistan aligns with these findings (Nguyen, 2015). Given the persistent fiscal deficits and rising inflation in Pakistan, further research is warranted to provide new insights.

3. Methodology

From 1986 to 2021, the study utilized annual data for all the variables under investigation. The explanatory variables included the fiscal deficit (FISD), government consumption expenditure (GCE), broad money supply (BmS), and exchange rate (ExC), while the dependent variable was inflation. The World Development Indicators (WDI) database of the World Bank served as the source for data on the fiscal deficit, exchange rate, and broad money supply.

To determine the integration order and identify the long-term relationship among the variables, the study employed the autoregressive distributed lag (ARDL) bounds testing approach, as proposed by Pesaran et al. (2001). This method offers several advantages over earlier cointegration techniques. For instance, it can be applied to small sample sizes and datasets with mixed integration orders (i.e., variables integrated of order I(0) or I(1)). Furthermore, issues related to endogeneity can be addressed by selecting appropriate lags within the model structure. The ARDL bounds testing method was estimated using an unrestricted error correction model (UECM).

$$Inf = f(FisD, GcE, BmS, ExC) \quad 1$$

$$Inf = \emptyset_1 + \emptyset_2 FisD + \emptyset_3 GcE + \emptyset_4 BmS + \emptyset_4 ExC + \mu \quad 2$$

$$\Delta Inf = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta Inf_{.t-n} + \sum_{m=1}^{J} . \emptyset_{1m} \Delta FisD_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta GcE_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta BmS_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta ExC_{.t-n} + \partial_1 Gdp_{t-1} + \partial_2 FisD_{t-1} + \partial_3 GcE_{t-1} + \partial_4 BmS_{t-1} + \partial_5 ExC_{t-1} + \mu \quad 3$$

$$\Delta Inf = \emptyset_0 + \sum_{m=1}^{J} . \emptyset_{1m} \Delta Inf_{.t-n} + \sum_{m=1}^{J} . \emptyset_{1m} \Delta FisD_{.t-n} + \sum_{m=0}^{J} . \emptyset_{2m} \Delta GcE_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta BmS_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta ExC_{.t-n} + \partial_1 Inf_{t-1} + \partial_2 FisD_{t-1} + \partial_3 GcE_{t-1} + \partial_4 BmS_{t-1} + \partial_5 ExC_{t-1} + \in ECT_{t-1} + \in_t \quad 4$$

According to the ECM, the error correction term accurately captures the short-term dynamics of the adjustment process that leads to the long-term equilibrium. The ECM coefficient represented by ξ, represents the pace at which the long-term equilibrium is being reached. It should be negative and smaller than one; a bigger magnitude indicates a faster corrective process. To track changes in causal linkages over time, we also employed the time-varying exogeneity causality test. This strategy works better than other approaches for two reasons. It does this by first removing the requirement to run a unit root test to verify the variable's stationarity. Second, there is no need for cointegration between the variables.

4. Results and Discussions

4.1. Bound Testing

Since the computed F-statistic value exceeds the upper bound (II) value of 5.32 when the variables are integrated of order I(0) and I(1), the F-statistic presented in Table 2 confirms the existence of a long-term relationship between inflation, fiscal deficits, and other exogenous variables. The rejection of the null hypothesis of no cointegration among the variables further supports the presence of a long-term relationship between inflation and

the exogenous variables. Following the empirical confirmation of cointegration, the study proceeded to estimate the ARDL model.

Table.2.ARDL Bound Testing

Test Statistic	Value	k
F-statistic	5.321203	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's own elaboration

4.2. ARDL Long-run Estimation

The long-term relationship between the variables was estimated using the ARDL framework based on the results of the cointegration analysis, with the findings presented in Table 2. The long-term fiscal deficit coefficient is positive and statistically significant at the 4% level, supporting the hypothesis that the budget deficit has a direct impact on inflation in South Africa. Consistent with previous research, the coefficient (0.78) suggests that a 1% increase in the budget deficit will result in an approximately 0.78% rise in South Africa's inflation rate (Adekunle, 2024; Ahmad et al., 2019; Dadson, 2015; Kaur, 2019; Obeng et al., 2024).

Inflation and the broad money supply exhibit a positive and statistically significant relationship, confirming the predicted sign over the long term. Table 3 further corroborates the hypothesis that the exchange rate and inflation have a negative relationship. Although the exchange rate coefficient in the inflation model is negative, it is not statistically significant. This finding aligns with Bekun et al. (2023), who reported an inverse relationship between inflation and the exchange rate in the South African economy. Similar conclusions have been drawn by Ahiakpor (2014) and Bawumia et al. (2003).

These results suggest that currency devaluation contributes to higher inflation in South Africa. Additionally, there is a positive and statistically significant relationship between inflation and government spending. A 1% increase in government spending corresponds to an approximate 0.67% rise in inflation, as evidenced by a coefficient of 0.67. This finding is consistent with the empirical evidence provided by Magazzino (2011), who identified a long-term positive relationship between these variables in the case of France.

Table.3.Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FISD	0.789287	1.671854	0.472103	0.0453
GCE	0.673121	1.132117	0.594568	0.0532
EXR	-0.567232	0.399687	-1.419192	0.1813
BRS	1.396298	0.994255	-1.404367	0.0156
C	-31.653083	30.003101	-1.054994	0.3122

Source: Author's own elaboration

4.3. ARDL Short-run Output

The results presented in Table 4 confirm the cointegration of government spending, broad money supply, the exchange rate, and the fiscal deficit. At a 3% significance level, the error correction term lagged by one period (ECM-1) has a negative and statistically significant coefficient. The coefficient of the error correction term, at -0.94 in absolute terms, indicates that more than 94% of the annual adjustment of the long-term inflation rate deviation is corrected from the short run to the long run. This suggests that approximately 94% of the inflationary disequilibrium from the previous year is resolved within the current year. The magnitude of the error correction term highlights a rapid pace of adjustment over time following a shock.

The short-term results reveal that the fiscal deficit is statistically significant at the 2% level and has a negative coefficient. This aligns with Ekanayake's (2012) findings, which identified an inverse relationship between inflation and the fiscal deficit. Specifically, the first lag of the fiscal deficit and inflation exhibits a negative relationship, with a coefficient of -0.43 at the 2% significance level. The results suggest that a 1% reduction (or increase) in the fiscal deficit from the previous year would lead to an approximate 2.0% decrease (or increase) in inflation.

The broad money supply demonstrates a weak but statistically significant negative relationship with inflation at the 3% significance level. Similar findings have been reported in prior studies, such as those by Kaur (2019) and Nguyen (2015), which also identified a negative impact of broad money supply on inflation. However, Ofori-Frimpong (2017) investigated the relationship between inflation and Ghana's money supply and found a positive association. In the short run, the relationship between GDP and inflation appears to be mildly negative, albeit statistically insignificant. The results indicate a weak but temporary inverse relationship between government spending and inflation, consistent with findings in prior literature.

Table.4.Short-run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFL(-1))	-0.353626	0.237756	-1.487346	0.1627
D(FISD)	-0.432915	0.302183	-1.432627	0.0275
D(FISD(-1))	0.661791	0.556139	1.189974	0.2571
D(FISD(-2))	-0.540145	0.307065	-1.759059	0.1040
D(GCE)	-0.094522	0.161083	-0.586786	0.5682
D(GCE(-1))	0.119765	0.124246	0.963942	0.3541
D(GCE(-2))	0.161257	0.149278	1.080249	0.3013
D(GCE(-3))	0.409507	0.145752	2.809612	0.0158
D(EXR)	0.168000	0.071316	2.355734	0.0363
D(EXR(-1))	0.287238	0.071722	4.004870	0.0017
D(EXR(-2))	0.155972	0.045312	3.442203	0.0049
D(BRS)	0.016139	0.070001	0.230557	0.8215
D(BRS(-1))	0.112620	0.077559	1.452049	0.1721
D(BRS(-2))	-0.204171	0.087953	-2.321356	0.0387
CointEq(-1)	-0.944439	0.193514	-4.880468	0.0305

Source: Author's own elaboration

4.4. Stability Test

The statistical properties of the model were evaluated using various diagnostic tests to ensure the regression results were reliable and free from issues such as heteroscedasticity and serial correlation. The results of the normality test indicate that the model is normally distributed, with skewness ranging from -0.4 to 0.5 and a kurtosis value of 2.57, which suggests a distribution slightly above the positive kurtosis threshold of 2. Additionally, the Jarque-Bera test yielded a coefficient of 0.52 (P ≈ 0.05), confirming that the data follows a normal distribution. The detailed results are shown in Figure 1.

At the 5% significance level, we fail to reject the null hypothesis, which suggests that there is no serial correlation, no misspecification of the model, and that the residuals are normally distributed and homoscedastic. Finally, the stability of both the long-run and short-run coefficients was examined using the Cumulative Sum of Squares (CUSUM SQ) tests, developed by Brown et al. (1975). The stability tests, based on the CUSUM and CUSUM SQ methodologies, consistently indicated the absence of any structural breaks.

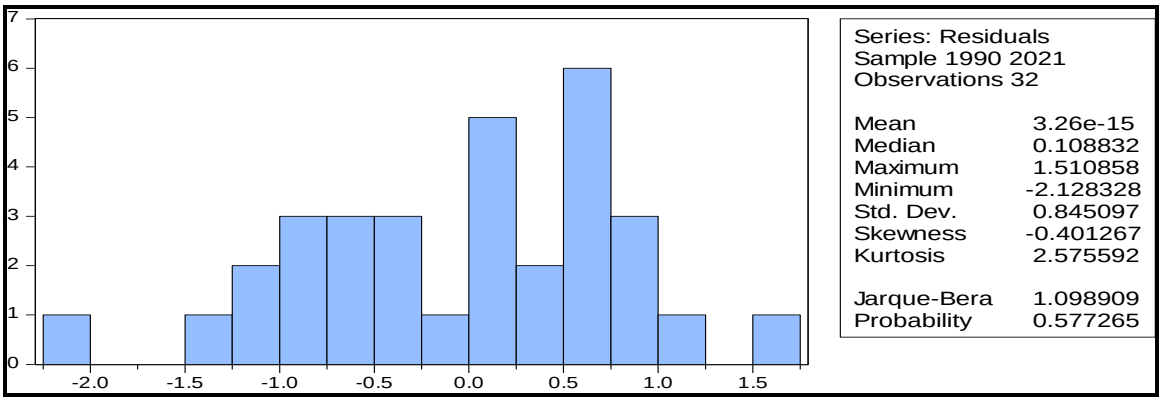

Figure.1.Normality Test
Source: Author's own elaboration

Table.5.Breusch-Godfrey Serial Correlation LM Test

F-sta	1.895414	Prob. F(2,10)	0.2005
Obs*R-sq	8.796173	Prob. Chi-Sq(2)	0.0123

Source: Author's own elaboration

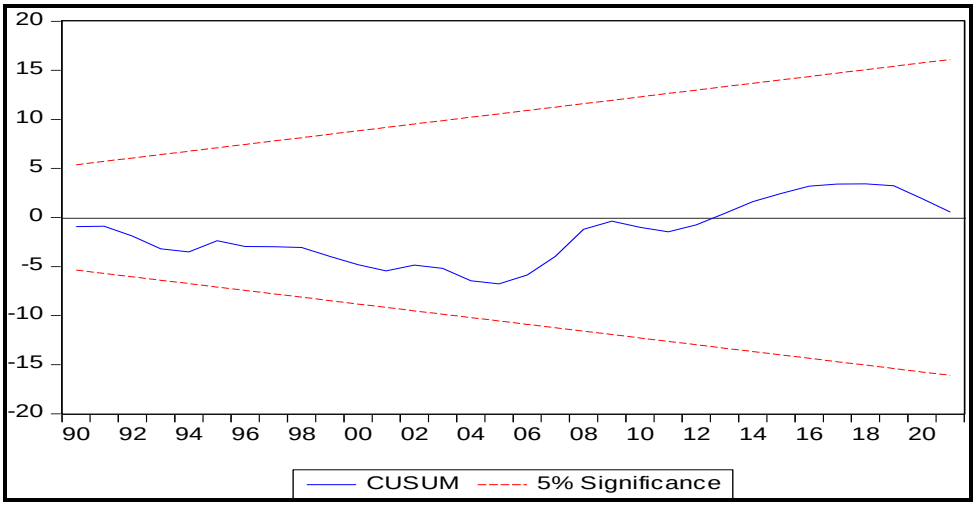

Figure.2.Cusum Sum
Source: Author's own elaboration

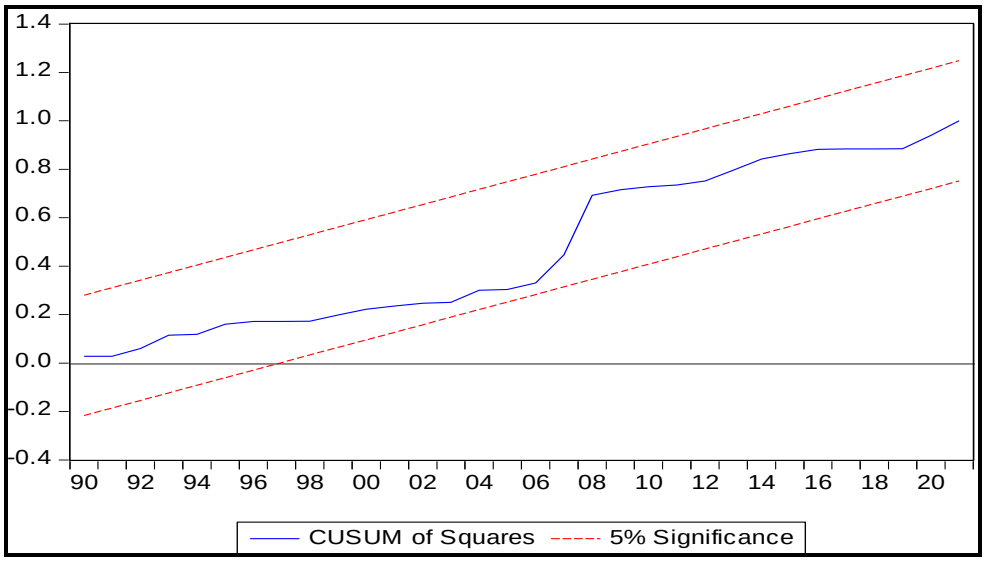

Figure.3.Cusum of Squares
Source: Author's own elaboration

5. Conclusion

The primary objective of this study is to investigate the impact of fiscal deficits on inflation in South Africa between 1986 and 2021. The findings indicate that, in the long term, fiscal deficits have a direct and lasting effect on the inflation rate. Furthermore, consistent with many empirical studies reviewed, the broad money supply (BmS) exhibits a positive correlation with inflation in both the short and long term. Although BmS demonstrates a significant correlation with inflation, its short-term significance was not as pronounced.

The study recommends that the government seek less inflationary sources, such as non-banking methods, to finance fiscal deficits during periods of economic stress. To keep inflation under control, the report also suggests maintaining fiscal deficits at manageable levels, which would foster economic growth while helping to curb inflation. Additionally, the Reserve Bank of South Africa should be encouraged to continue financing the deficit primarily through external sources and non-banking methods, such as issuing bonds in international financial markets. While non-banking borrowing has an indirect effect on future domestic debt usage, it has minimal impact on inflation.

Author Contributions

Ahmed Adekunle carried out the conceptualization, formal analysis, revised, results estimation, tabulation of data, and response to reviewers' comments

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Conflicts of Interest

No conflict of interest

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