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Sacrifice Ratio And Macroeconomic Variables For Selected West African Countries: Panel Data Analysis

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ABSTRACT
The intent of this paper is to examine the effect of some macroeconomic variables on sacrifice ratio in selected West African Countries. Inflationary pressures manifesting in continuously rising price level is a major issue of concern to policy makers.. The study adopts the panel data analysis and investigates the effect of some macroeconomic variables on sacrifice ratio in 9 West African Countries. The empirical results obtained revealed that trade openness and inflation contribute negatively to sacrifice ratio while GDP and unemployment contribute positively to the dependent variable. The study concludes by suggesting among other options that there is need for policy makers to be cautious in considering the trade- offs among macroeconomic objectives in their policy decisions so as to achieve macroeconomic stability in the region.
Keywords: Sacrifice Ratio, Macroeconomic Variables, Openness, Disinflation Policy

INTRODUCTION

The macroeconomic goals of most countries include the achievement of high economic growth, price stability, high levels of employment and balance of payment equilibrium. From these objectives, most countries give priority to higher economic growth and price stability because of their influence on other macroeconomic variables. Studies have shown that price stability promotes economic growth; this suggests that a high level of inflation is capable of undermining practical efforts at actualizing economic growth and other macroeconomic objectives. Hence, inflation policy is an important macroeconomic policy of any monetary authority (Morar, 2011 in Odu and Anih 2018). Inflation is often considered a nuisance. This is because, by increasing the prices of local products, it is likely to encourage imports and restrict exports. Thus, in order to address the situation, countries often establish a disinflation policy that improves the competitiveness and therefore job creation.

Most policy makers, however, argue that they should not permit zero level of inflation in the economy since the cost of disinflation (sacrifice ratio) are thought to be high.(Billi and Khan (2008).Though some evidence suggest that lower level inflation stimulates high economic growth, the overall weight of evidence so far clearly proved that high inflation is harmful to growth Mubarak(2005). Consequently, policy makers should aim at a low level of inflation that maximizes the general economic wellbeing. But how low should inflation be in developing nations like West African Sub-region? Should the target inflation be 5% or 10%? How much inflation impedes economic growth in West African countries?

Consequently, Khan and Senhadji, (2001) produced the threshold rate for all types of economy in a cross country panel data framework. The researchers arrived at a threshold level range of 11 - 12% for developing countries. Indisputably, the major yardstick to measure the real costs of disinflation is the

sacrifice ratio. A large sacrifice ratio entails high loss of real GDP for a decrease in inflation (disinflation). A low sacrifice ratio means a small loss of output for disinflation (Coffinet, et al, 2007; Cechetti and RIch, 2001; Mazumder, 2012 in Amaduche et al 2019).

These inflation reductions impose cost to the economy in terms of output loss. Several studies (Belke and Boing, 2014, Dramani and Thiam, 2012; Daniels and VanHoose, 2004; Cecchetti and Rich, 2001; Munoz - Torres et al, 2004 in Amaduche et al 2019) have clearly shown that the sacrifice ratio differs considerably among countries, yet this is uncertain for Nigeria. As further enunciated by Daniels and Van Hoose (2004) and Dramani and Thiam (2012) in Amuche et al, 2019, the size of sacrifice ratio can be reduced without a corresponding increase in the level of inflation.

The focus here is on the output cost of stabilizing inflation. Inflation volatility would bring about movement in real output if not fully anticipated. Monetary easing may create economic expansions but might also bring about an increases in inflation; conversely, economic downturns are simply associated with decrease in the level of inflation (Hutchison and Walsh, 1998 in Johnson et al 2020). The desirability of inflation reduction policies are based on the sacrifice ratio.(Permanent and Tavera, 2007 in Johnson et al 2020). In sub-Saharan Africa, disinflationary policies have relatively been successful in stabilizing prices and jettisoning the periods of high level of inflation. However, concerns may arise due to the real output and unemployment cost of disinflation. The sustain relatively high unemployment levels in most West African nations require revisiting the relationship between unemployment, inflation, output.

In most West African countries, however, inflation though decreased from the hyper levels, remains relatively high and persistent as cost push factors, trade stocks and exchange rate fluctuations continue to create significant inflationary pressures. Levels of unemployment are relatively high while there is worry over the institutional quality, policy credibility and transmission channels of monetary policy. Disinflationary policies are necessary in West African countries but not at a great expense of employment and real output growth as the twin developmental challenge of poverty and inequality persistently scourge the sub region. Evaluation of the concept of sacrifice ratio is critical to monetary policy and economic growth in West African countries. However, in the long-term, there exist a significant output gains from stabilized prices. This may suggest that economic policy should prioritize price stability as the long-term output gains are also translated into reduction in unemployment with potential welfare improving implication.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This section reviews the literature on the concept of sacrifice ratio, empirical reviews and some related theories.

Concept of Sacrifice Ratio

Mankiw (2010) defines the sacrifice ratio as the number of points of a year's real GDP which must be forgone to reduce inflation by 1% point. According to Serju (2009), sacrifice ratio calculates the quantity of output that is lost for any percentage point reduction in the inflation rate. It measures how changes in the level of inflation affect economic production. It gauges the cost of production lost per 1% decrease in inflation. Ceccheti and rich (2001) in their work defined the sacrifice ratio as the cumulative loss in output, measured as a percentage of one year's GDP resulting from a one – percentage – point permanent reduction in inflation. A similar definition is giving by Dornbuseh et al. (2008) and Abel et al. (2008. According to them, the sacrifice ratio is the percentage of output lost for each one point decrease in the level of inflation.

The sacrifice ratio is an extension from the Phillips curve or its analysis, which states that a negative relationship exists between unemployment and inflation in the absence of a supply shock. The sacrifice ratio shows the level of unemployment an economy has to face to reduce inflation. Phillips curve establishes the negative relationship between inflation and unemployment. Thus unemployment relates to output because high unemployment connotes low output and vice versa.

The sacrifice ratio, therefore, informs policy makers about the amount of employment and output to be lost in disinflation.. A typical estimate of the sacrifice ratio for the United States in Okun (1982) and cited

in Mankiw (2010) is about 5%. A sacrifice ratio of 5% implies that 5% of annual GDP must be forgone to reduce inflation by 1%. In terms of unemployment gap, Okun's law can be used to estimate by how much unemployment will have to rise if inflation is to fall by 1%. According to Okun's law, 1% change in unemployment results in a 2% change in GDP. Therefore using the aforementioned example, reducing inflation by 1% will increase unemployment by 2.5% (Mankiw, 2010).

2.2 Determinants Or Factors Affecting The Sacrifice Ratio

In general, all variables/factors influencing the sacrifice ratio are classified in four groups of structural, traditional, institutional, political and external factors. They are hereunder considered.

Table 1 Factors Influencing the sacrifice ratio

Structural factors	Nominal wage rigidly, openness and capital mobility.
Traditional factors	Initial inflation and speed of disinflation
Institutional factors	Central bank independence and inflation targeting
External and political factors	Economic growth, relation of trade, political factors and structural reforms

Source: Elmira Bashiri (2015) international academic journal of economics

1. Structural factors: Openness and globalization will affect the sacrifice ratio depending on the degree of openness, influence of the sacrifice ratio affect prices in the economy. If an economy has a high degree of openness, changes of the sacrifice ratio will be redundant impact on domestic prices.
2. Traditional factors: Here, the initial inflation and speed of reduced inflation are important traditional factors influencing the sacrifice ratio. The first cause of initial inflation or inflation in the beginning of the period is adjusted for inflation because the average inflation rate will be influenced by the degree of nominal rigidity and high levels of inflation stickiness reduce prices.

Therefore, by adjusting wages and prices, the Philips curve and the sacrifice ratio are steep and smaller respectively. So, there should be an inverse relationship between sacrifice ratio and early inflation (Ball, Mankiw and Romer, 1988).

3. Institutional Factors: These include Central Bank Independence and inflation targeting. Cost of reducing inflation and inflation (Sacrifice ratio) could be related to the clarity of monetary policy. Clarity will result to lower inflation, and moreover, output costs of disinflation negatively correlate with the degree of clarity of monetary policy. Central bank independence has a negative effect on the stability of inflation and rapid decrease of inflation leads to lower costs of adjusted for inflation. This means that central bank independence has an inverse relationship with the sacrifice ratio through affecting speed of disinflation. The second institutional factor is targeting inflation. It is a framework for monetary policy, it is determined by a public announcement of the official (or target range) during one or more time horizon for inflation rate as well as by explicit declarations that low and stable inflation is a major goal of long-term monetary policy.
4. External and Political factors: The factors here include economic growth, relation of trade, political factors and structural reforms. Studies in Latin America considers the impact of external factors such as the growth of trade partners and relationship of trade on the ratio of deduction. Stability and volatility of terms of trade have negative effect on the ratio of sacrifice. These economies have greater flexibility and faster economic growth of partners which tends to reduce cost of inflation. Political factors may also play a role in the course of adjustment for inflation. In other words, elections and the newly elected government may have appropriate credit conditions in certain short period and the specific time frame can be appropriate to begin reducing inflation and causes the cost of adjustment for inflation to reduce. Other factors influencing the sacrifice ratio are structural reforms, including protection of national markets, facilitating market operations and reducing government intervention in economic activities.

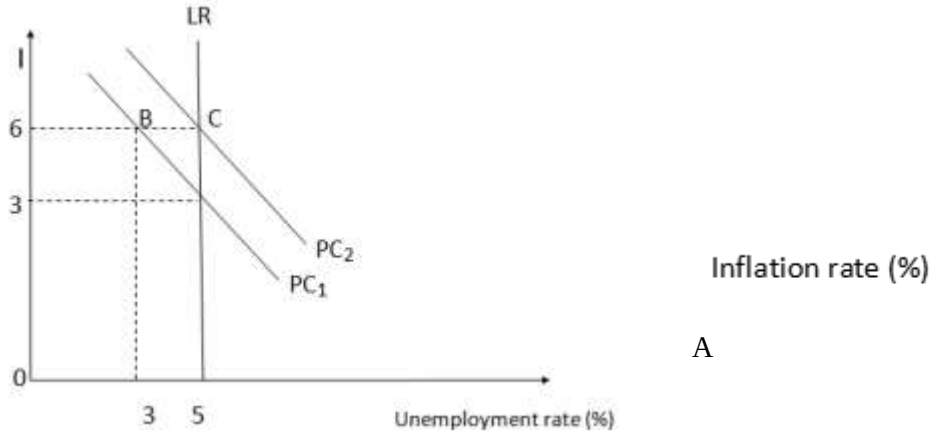
2.3 Theories Of Sacrifice Ratio

The modern Philip's curve and Okun's law provide the theoretical foundation for the notion of sacrifice ratio. The theories are briefly reviewed.

The Modern Philip's Curve

The relationship between inflation and unemployment has been discussed by different scholars at different times. One of these studies is the modern Phillips curve propounded by Friedman and Phelps in 1970. The modern Phillips curve is a generally used structural model of inflation dynamics (Gali et al..2005). They examined a situation of trade – off between inflation and unemployment as transitory and occurs only in the short run while in the long run, the Phillips curve is vertical at the natural rate of unemployment also known as NAIRU (Non Accelerating Inflation Rate of Unemployment) (Colander, 2006). Friedman was able to explain that the Phillips curve is vertical in the long run and may have an inverse slope in the short run and why the short run might adjust using the concept of policy surprises.

Figure 1: The Modern Phillips Curve



When the economy is at point A on the long run Phillips curve LR, it means that the economy is at equilibrium at the prevailing inflation rate of 3% and natural rate of unemployment of 5%. If the policy makers desire to bring about a reduction in the level of unemployment through the increase in aggregate demand, this policy would move the economy from point A to point B on the short run Phillips curve PC1. At point B, the inflation rate has increased to 6%, while the unemployment rate fell to 3% (colander, 2006).

In the long run, when workers realize that their real wages have reduced, they go into negotiations to bid up their wages, adjusting their expectations of inflation from 3% to 6%. This leads to an increase in wages which raises firms' cost of production thereby reducing their profit. Firms in turn reduce output and employment to maintain their profit level which finally increases the unemployment rate. This is shown in figure 2.2 by movement from point B on short run Phillips curve PC1 to point C on the short run Phillips curve PC2. If the aggregate demand is maintained at the current level, the economy will be stabilized at 6% level of inflation and unemployment will fall back to the 5% natural rate of unemployment since it is the result of both workers expectation of inflation and the actual inflation. Hence, in the long run, inflation and unemployment have undergone all the necessary adjustments resulting in a vertical Phillips curve at the natural rate of unemployment (colander, 2006).

According to Mankiw (2010), the modern Phillips curve can be deduced as a result of its dependence on, expected inflation, cyclical unemployment (deviation of unemployment from its natural rate) and supply shocks. It is given as follow:

$\pi\pi$ = $E^{\pi\pi}$ – B(u-u^n)+ v……..(2.4)

Where, $\pi\pi$ = inflation

$E^{\pi\pi}$ = Expected inflation

B = parameter measuring the response of inflation to cyclical unemployment

V = supply shock.

Equation (2.4) connotes that changes in expected inflation ($\Delta E^{\pi\pi}$), cyclical unemployment and supply shocks will affect inflation.

One main features of the trade- off between the rate of inflation and unemployment is its short- run relevance. For essentially the same sample countries , Pham and Sala (2019) showed that the short impact of fiscal shocks generates different responses in output and unemployment, leading to large immediate trade- offs.

2.4 Okun's Law

This is a theory developed by Arthur Melvin Okun to explain the connectedness between unemployment and output losses, in other words, the relationship between deficient unemployment and output gap. The law stated by Okun was in two versions, the difference version, and the gap version.

The gap version as specified by Abel and Bernanke (2005), is expressed as follows:

Y-Y/Y=C(U-Ù)----------(2.5)

Where; Y= Potential GDP,

Y = Actual GDP, Ù = Natural rate of unemployment, U = Actual unemployment rate. C is a factor relating changes in unemployment to changes in output, which has been 2% and 3% since 1955. This measure is rarely used in practice due to the difficulty in computing Y and Ù, which can only be estimated.

The difference version is expressed as follows:

$\Delta Y / Y = K – c\Delta U$ ----------(2.6)

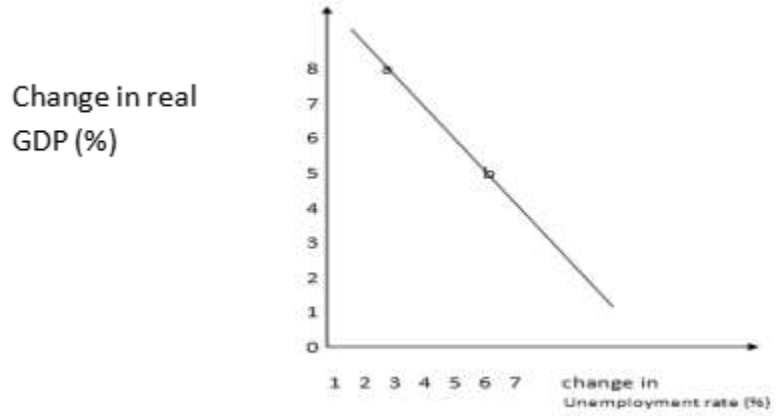
ΔY = Change in actual output from a year to the next, ΔU = Change in unemployment from one year to the next, K = average annual growth rate of full employment output. Currently in the U.S.A, K = 3% and C = 2%

The original Okun's law states that a 3% rise in output corresponds to a one (1%) decrease in the level of unemployment, a 0.5% rise in labour force participation, a 0.5% increase in hour worked per worker and a 1% rise in output per hours worked (labour productivity) (Odu, 2014).

The current version of the law which has been adjusted to fit the current economic situations and employment trends states that; for every 2% that GDP falls relative to potential GDP, the level of unemployment rises by one percentage point (Samuelson and Nordhaus, 2001).

Frank and Bernanke (2001), state the law as follows; each extra percentage point of mass unemployment is linked to about a 2% point rise in the output gap, measured in relation to potential output. This entails that if output losses and unemployment were originally at 1% and 2% respectively, a rise in unemployment from 1% to 2% , will lead to an increase in output losses from 2% to 4%. This is due to a fall in output results fewer workers needed by firms, so no new workers are employed and current works are laid off.

Figure 2: Okun's Law Illustrated



According to Okun's law, for cyclical unemployment to be constant, actual GDP has to increase at the same pace as potential GDP and for cyclical unemployment to fall, actual GDP must rise faster than potential GDP.
Mankiw (2010) gave the mathematical formula for Okun's law as:
Percentage change in real GDP =3%- 2 x change in unemployment rate….. (2.7)

2.5 Empirical Literature

Mazumder (2012) calculated the sacrifice ratio for all nations of the world (OECD and non-OECD), using a sample of 189 countries with data covering 1969-2009, also exploring the determinants of the sacrifice ratio. He adopted the Ball (1994) methodology in his study. His findings suggest that the speed of disinflation is the major determinants of sacrifice ratio value but having insignificant effect on non OECD countries disinflation cost. Greater central bank independence and openness are responsible for lower ratios in non-OECD episode.
Zhange (2001) carried out an empirical study on sacrifice ratios with hysteresis (long lived effects) for G-7 (group-7) countries, in which he used quarterly data spanning. Q1-1960 –Q4-1999 on some newly developed methods of calculating the sacrifice ratio. He also used the Hadrick – Prescott (HP) filter to estimate the potential output. Zhang (2001) cited in odu and Anih (2018) concluded that ratios with long lived effects have larger values than ratios that do not account for long lived effects. Zhang also stated that the ball (1994) method has a larger downward bias for countries with long lived effects.
Kabundi, (2016) cited in Adebisi and Moses (2019) estimated the sacrifice ratio for the south African economy using quarterly data of annual inflation and unemployment rate from 1994 Q4-2014 Q4. He used the time varying Phillips curve. The result showed that the average sacrifice ratio for South Africa is 1.5, also shows that the time varying sacrifice ratio depends on the slope of the Philips curve and the inflation persistence. Bashiri and Amirkhiz (2015) examined sacrifice ratio and disinflation cost for selected OPEC countries. Panel data evidence for the period 1990-2013. Applying panel cointegation and dynamic ordinary least square (DOLS) methods, results showed that there are positive relationship between inflation change with sacrifice ratio and negative relationship between initial inflation and openness with sacrifice ratio. Meaning that cost of disinflation reduce up to 8% by increasing in openness and this value for inflation rate changes, causes 11% sacrifice ratio change. Belke and Boing (2014) applying a structural vector autoregressive technique, found that most countries have sacrifice ratios of between 1 and 2 percent of real GDP for a reduction in inflation of one percentage point. In some cases, these estimates deliver negative sacrifice ratios. Daniel and VanHoose (2013) studied the relationship between exchange rate pass- through, openness and the sacrifice ratio. The authors found that greater pass

through increases the sacrifice ratio, that there was significant interaction among pass through and openness, and once the extent of pass through was taken into account alongside other factors that affected the sacrifice ratio , such as central bank independence, openness exerts an empirically ambiguous effect on the sacrifice ratio.

Dramani and Thiam (2012) calculated the sacrifice ratio for countries in West African Economic and Monetary Union (WAEMU). Their findings showed that sustained decline of 1% inflation rate inherent in a monetary shock leads to a cumulative decline of 1.3% growth rate in Senegal, and 0.06% in Benin

Kinful (2007) applied all the three known methods within the economic literature to estimate the size of the sacrifice ratio for Ghana. It was found that the estimated sacrifice ratios indicated that in Ghana, a permanent 1% drop in inflation results in an output loss within the range of 0.001 to 5.1%. The author concluded from the study that if a disinflation process persists and policies are consistent and credible, the economy may eventually adjust to the new monetary policy regime and output and employment losses may only be transitory.

More recently, Ngalawa (2020), using the difference Generalized method of moments (GMM), estimated the inflation expectation- augmented Phillips curve for the period 2000Q3- 2015Q1. The shape of the Phillips curve was found to be concave and asymmetric. The simulation results reveal that a negative shock to aggregate demand reduces output and inflation, while the same magnitude of positive demand shock results in a smaller rise in inflation and a substantial rise in output.

Edeme et al (2018) in Nuru et al(2021) analyzed the impact of inflation reduction on output and unemployment for the Nigerian economy for the period 1970- 2015 by adopting the instrumental variables Generalized method of moment(IVGMM). Their findings indicate that inflation inertia is negatively and significantly related to the actual rate of inflation in Nigeria. It was also revealed that the amount of real GDP that must be given up annually to reduce inflation is 5.1%, while it was 53.6% in 1982. Moreover, in the same year, 26.6% of cyclical unemployment occurred and the highest percentage of GDP was sacrificed in 1990 and the lowest in 2007.

Sanusi (2015) Set out to estimate the inclusive growth cost of disinflation to Nigeria for a study period spanning Q1-1960- Q2 2015 and to determine the influence of central Bank independence on the sacrifice ratio . He employed two approaches to estimate the sacrifice ratio viz; a variant of the Ball (1994) approach and the Phillips curve approach. From his findings, he concludes that disinflation is costless post – Central Bank independence and that the inclusive growth sacrifice ratio are very small and nearly non- existent. His results however, indicate output costs ranging from -0.16 – 0.46, with negative values in the same recent episodes.

Abu (2019) examined the Phillips curve hypothesis (inflation and unemployment trade- off) and its stability in Nigeria from 1980- 2016.Using the ARDL bounds testing approach. Other estimation techniques including the fully modified ordinary least square(FMOLS), Dynamic ordinary least square(DOLS), static ordinary least square , and canonical cointegrating regression(CCR) were employed to ascertain the consistency and robustness of the result that were generated using the ARDL bounds testing method. The results of the cointegration test revealed the existence of long – run relationship between inflation and unemployment. The result of autoregressive distributive lag (ARDL) bounds testing ,fully modified ordinary least square, dynamic ordinary least square, static OLS and CCR estimations indicate that there is a trade- off relationship between the variables, and higher unemployment leads to lower inflation in the long- run. The plot of cumulative sum of squares of recursive residuals (CUSUMQ) confirm the stability of the long – run parameters. The results of causality test using the standard Granger causality test and the Toda and Yamamoto approach demonstrate that there is unidirectional causality from inflation to unemployment.

2.6 Theoretical framework

The theories that underpin this study are modern Phillips curve propounded by Friedman and Phelps (1970), and Okun's law (1982) on inflation, unemployment and output. They examined a situation of trade- off among some macroeconomic objectives.

However, among these theories examined, the researcher is of the view that the Phillips curve theory embraces other theories; hence he adopts it in the empirical analysis of this study. The choice of the Phillips curve theory is informed from a policy point of view which reveal that there exist a trade – off between inflation and unemployment. The researcher agrees with Phillips curve theorists which relate to the policy of central bank and how it guarded their initiative to control inflation in order to achieve price stability. This is because nations give priority to price stability due to its influence on other macroeconomic variables. These theories are evidences of how sacrifice ratio theories are replete with models of how some macroeconomic variables are critical in influencing sacrifice ratio.

3. METHODOLOGY

This section covers the model that expresses the relationship among some macroeconomic variables on sacrifice ratio in selected West African Countries.

3.1 Sources and nature of Data

The data used for this study were entirely secondary. The data from these countries are collected from World Bank database, United Nations Conference on Trade And Development (UNCTAD) data statistics, CBN Statistical Bulletin of countries concern and World Investment Reports (2020). The study used thirteen years data (2010- 2022) from 9 African Countries.

3.2 Model specification

Our model is generally stated as:

$SRit = \beta 0 + \beta 1OPENit + \beta 2GDPit + \beta 3INFit+$
$\beta 4UNEMPit + Eit$

Where

SR = sacrifice ratio
INF = Inflation
GDP = Gross Domestic product
OPEN = Openness
UNEMP = Unemployment
Eit = Error term

Where the β's are the coefficients of the respective variables in the equation to be estimated, t is the time period and subscript I stand for individual country

4. ESTIMATION RESULTS AND DISCUSSION

Table 2: Panel Data Results

Variable	Model
Dependent variable (Sacrifice Ratio)	
CONSTANT	-0.594 (-1.919) **
INFL	-0.008(-1.993) **
GDP	0.0009(3.953) ***
OPEN	-807.17(-7.187) ***
UNEMP	0.0149(2.010) **
N	117
R^2	0.4688
F – statistics	7.6478 ***
Wild Test X	19.14 ***
Durbin – Watson statistics	2.15
Hausman test X	▵6.10 (0.1917)
VIF	3.3

Note: Figures in parenthesis ( ) are t -value ; ( ) represent p – value ; *** and ** represent 1 percent and 5 percent significance level

Source; Author's computation from E-views 10

5.1 Robustness Test

Table 2 present the mean variance inflation factor (VIF) result of the explanatory variables. The Robustness Test aims to ensure the reliability of the model estimates under different conditions. In this case, the Variance Inflation Factor (VIF) test is employed to assess multicollinearity among the independent variables. The mean VIF of 3.3 suggests that multicollinearity is not a significant issue in the model. This indicates that the estimated coefficients are reliable and not inflated due to correlation among the independent variables. Therefore, we can have confidence in the stability and robustness of the regression results. The Hausman test assesses whether the estimates derived from the fixed effects model are consistent and efficient compared to those from the random effects model. The null hypothesis of the Hausman test is that the coefficients estimated by the fixed effects model are consistent and efficient. In this case, the Hausman test statistic is 6.10 with a p-value of 0.1917. Since the p-value is greater than the conventional significance level of 0.05, we fail to reject the null hypothesis. This suggests that the fixed effects model is appropriate, and the estimates are consistent and efficient, further supporting the reliability of the regression results.

5.2 Econometric Analysis/Discussion

In Table 2 the negative coefficient on inflation suggests that higher inflation is associated with a lower sacrifice ratio (Dixit & Pindyck, 1994). In West African countries such as Nigeria, Ghana, and Ivory Coast, which have experienced periods of high inflation rates in the past, this finding could have significant implications. Policymakers in these countries may prioritize reducing inflation to lower the output costs of disinflationary policies, such as interest rate hikes or fiscal tightening (Klein &

Ordeshook, 1975). However, they must carefully balance this objective with the need to maintain economic stability and avoid the detrimental effects of high inflation on purchasing power and investment (Barro & Gordon, 1983).

Currently, Nigeria is experiencing inflationary pressures due to factors such as currency devaluation, supply chain disruptions, and rising food prices (Alemu & Kneller, 2020). The central bank has implemented tight monetary policies to curb inflation, but these measures may have adverse effects on economic growth and employment (Kazeem, 2021). Therefore, policymakers must carefully consider the trade-offs between inflation and other macroeconomic objectives in their policy decisions .The positive coefficient on GDP suggests that as the economy grows, policymakers may be more willing to accept short-term output costs to achieve lower inflation (Friedman, 1968). In West African countries undergoing economic development and structural transformation, such as Ghana and Senegal, this finding could be relevant.

For example, Ghana's recent economic growth has been driven by sectors such as oil and gas, mining, and agriculture (World Bank, 2021}. Policymakers in Ghana may prioritize maintaining stable inflation levels to sustain economic growth and attract foreign investment (Aryeetey et al., 2020). However, they must also address structural challenges such as unemployment and income inequality to ensure that the benefits of economic growth are widely shared among the population (Amoako-Tuffour & Koomson, 2017).

The negative coefficient on openness suggests that more open economies tend to have lower sacrifice ratios (Edwards, 1998). In West African countries such as Ivory Coast and Senegal, which have relatively open economies with significant trade and investment flows, this finding could be applicable.

For instance, Ivory Coast is a major exporter of agricultural products such as cocoa, coffee, and cashew nuts (FAO, 2020). The country's openness to international trade has facilitated economic growth and diversification. Policymakers in Ivory Coast may prioritize maintaining open trade policies to promote competitiveness and efficiency, thereby reducing the costs associated with disinflationary policies (Koopman et al., 2016).The positive coefficient on unemployment indicates that higher unemployment is associated with a higher sacrifice ratio (Okun, 1962). In West African countries with high levels of youth unemployment, such as Nigeria and Senegal, this finding could have important implications for labor market policies.

For example, Nigeria's youth unemployment rate is among the highest in the world, with over 30% of young people unemployed or underemployed (NBS, 2021). Policymakers in Nigeria may face pressure to prioritize job creation and economic growth over inflation control. However, they must also address structural issues such as skills mismatches, informal sector employment, and labor market rigidities to achieve sustainable reductions in unemployment (World Bank, 2019).

In summary, the econometric analysis provides valuable insights into the factors influencing the sacrifice ratio in selected West African countries. Policymakers in these countries must carefully consider the trade-offs among inflation, economic growth, openness, and unemployment in their policy decisions to achieve macroeconomic stability and sustainable development.

The R^2value of 0.4688 implies that over 46.8 percent variation in sacrifice ratio can be explained by the model. The Durbin-Watson statistic of 2.15, the F-statistic value of 7.6478 and the Wald test value of 19.14 (significant at 1 percent level) established the reliability of the estimated model.

6. CONCLUSION

The findings from the econometric analysis shed light on the intricate relationship between various economic factors and the sacrifice ratio in selected West African countries. Through the examination of inflation, GDP, openness, and unemployment, policymakers can gain valuable insights into the trade-offs involved in monetary policy decision-making and the implications for macroeconomic stability and growth. Inflation remains a critical concern for policymakers in West African countries, particularly those grappling with high inflation rates. The negative coefficient on inflation suggests that policymakers may be willing to tolerate higher inflation levels to mitigate the output costs associated with disinflationary policies. However, it is essential to strike a careful balance between reducing inflation and maintaining

economic stability to avoid the detrimental effects of high inflation on purchasing power, investment, and overall welfare.

Moreover, the positive coefficient on GDP highlights the role of economic growth in influencing policymakers' willingness to accept short-term output costs to achieve lower inflation. As West African countries continue to undergo economic development and structural transformation, sustaining stable inflation levels becomes imperative for sustaining economic growth and attracting foreign investment. Policymakers must prioritize policies that promote inclusive growth and address structural challenges such as unemployment and income inequality to ensure that the benefits of economic growth are widely shared among the population.

The negative coefficient on openness underscores the importance of trade openness in reducing the costs associated with disinflationary policies. More open economies tend to have lower sacrifice ratios, attributed to increased competition and efficiency. Policymakers in West African countries should prioritize maintaining open trade policies to enhance competitiveness and reduce the costs of disinflation, thereby fostering sustainable economic growth and development.

Additionally, the positive coefficient on unemployment highlights the trade-off between inflation and unemployment in monetary policy decision-making. Higher unemployment rates are associated with higher sacrifice ratios, indicating the challenges policymakers face in balancing the objectives of price stability and full employment. Addressing structural issues such as skills mismatches, informal sector employment, and labor market rigidities is crucial for achieving sustainable reductions in unemployment and promoting inclusive growth.

In conclusion, the econometric analysis provides valuable insights into the factors influencing the sacrifice ratio in selected West African countries. Policymakers must carefully consider the trade-offs between inflation, economic growth, openness, and unemployment in their policy decisions to achieve macroeconomic stability and sustainable development. By prioritizing policies that promote inclusive growth, address structural challenges, and maintain open trade policies, policymakers can mitigate the costs of disinflationary policies and foster long-term economic prosperity in West Africa.

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