

# Monetary policy channels, sectoral outputs and sustainable growth in the ECOWAS region: a rigorous analysis and implications for policy

Monetary  
policy channels  
in the ECOWAS  
region

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Received 1 June 2022  
Revised 6 June 2022  
Accepted 6 June 2022

## Abstract

**Purpose** – The market-based monetary policy framework has been favoured by Economic Community of West African States (ECOWAS) economies. Hence, this study aims to investigate the effect of monetary policy channels on the sectoral value added and sustainable economic growth in ECOWAS. Data from the World Bank and International Monetary Fund over 2013–2019 were sourced for thirteen member countries. ECOWAS is found to have very high inflation level, interest and exchange rates.

**Design/methodology/approach** – The study adopted the Driscoll–Kraay fixed-effects ordinary least squares regression (OLS) estimator.

**Findings** – The findings revealed that while the effect of monetary policy channels on the agricultural sector value added is largely heterogeneous and significantly in-elastic, the one on the industrial and services sectors are overwhelmingly homogeneous and negative, but insignificant for the services sector. Moreover, the effect of monetary policy channels on sustainable economic growth is also homogeneously asymmetric, with imminent stagflation, while the interactive effects of monetary policy channels are heterogeneous on sustainable economic growth and economic sectors. Therefore, an inflation targeting monetary policy stance is generally recommended with prioritised exchange rate stabilisation amid sufficient fiscal space.

**Originality/value** – This is amongst the first studies to investigate monetary policy channels, sectoral outputs and sustainable growth in the ECOWAS region with a rigorous analysis and found implications for policy.

**Keywords** ECOWAS, Monetary policy channels, Economic growth

**Paper type** Research paper

## 1. Introduction

Economic Community of West African States (ECOWAS) consists of 15-member countries, with a mandate to promote economic integration across all areas in the constituting countries. These countries include Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, the Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal and Togo. ECOWAS is saddled with the responsibility to foster collective self-sufficiency for its member states by means of economic integration. To achieve this, there are four criteria used to measure convergence of the constituting economies which are inflation rate, interest rate, exchange rate stability and sustainability of the fiscal position (Raji, 2013). The implementation of monetary policy by the Central Banks usually has a bearing on the

## JEL Classification — E0, O4

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*Economia*  
Vol. 23 No. 1, 2022  
pp. 105-122  
Emerald Publishing Limited  
e-ISSN: 2358-2820  
p-ISSN: 1517-7580  
DOI 10.1108/ECON-06-2022-0048

interest rate especially for inflation targeting. For example, a monetary policy decision that cuts the interest rate, lowers the cost of borrowing, resulting in higher investment activity and the purchase of consumer durables. The expectation that economic activity will strengthen may also prompt banks to ease lending policy, which in turn enables businesses and households to boost spending. Also, in a low interest rate regime, stocks become more attractive to buy, raising households' financial assets. This may also contribute to higher consumer spending and make companies' investment projects more attractive. Low interest rates also tend to cause currency to depreciate because the demand for domestic goods rises when imported goods become more expensive. The combination of these factors raises output and employment as well as investment and consumer spending. In Nigeria, [Ikechukwu \(2015\)](#) using a vector autoregressive method and quarterly data from the Central Bank of Nigeria (CBN), found a negative and insignificant relationship between interest rate and the agricultural, building and construction sector outputs, while a positive relationship was found with other sectors and credit allocation to the private sector. Thus, the author concluded that given the fact that sectoral growth is insensitive to changes in interest rate, monetary policy is largely ineffective in influencing sector growth in Nigeria.

Another transmission channel of monetary policy is the exchange rate, which affects the stance of economic outlook. Studies have revealed the asymmetric effect of exchange rate on the economies of the West African Monetary Zone (WAMZ) ([Raji, 2013](#); [Idris, Hassan, & Muhammed, 2016](#)). They include the Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone. [Adebayo and Harold \(2016\)](#) using monthly data for the period, found that variations in the exchange rate have the largest impact on industrial output in Brazil, Russia, India, China and South Africa (BRICS) countries. Further results revealed that the inflation rate significantly increases industrial outputs, peaking after a short period of time (about 11 months). Also, interest rate shocks have a marginal effect on exchange rates, while money supply makes a relatively larger contribution to exchange rate fluctuations. The prime objective of monetary policy for sustainable growth is the maintenance of price stability. In effect, monetary policymakers use the monetary policy tools especially the interest rate to effectively stabilise price in the medium to long term. Sustainable long-term growth is associated with lower price levels. In other words, high inflation is damaging to long-run economic performance and welfare. Monetary policy has far reaching impact on financing conditions in the economy, not just the costs, but also the availability of credit, banks' willingness to assume specific risks, etc. It also influences expectations about the future direction of economic activities and inflation, thus affecting the prices of goods, asset prices, exchange rates as well as consumption and investment.

Therefore, the objective of this paper is to empirically investigate the effect of monetary policy channels in terms of money supply, interest rate and exchange rate, while controlling for inflation, on the sectoral outputs and sustainable economic growth in ECOWAS. Furthermore, the second objective is to examine the effect of the interactions amongst interest rate, exchange rate and inflation with money supply on the sectoral outputs and economic performance. Informed by data availability, the data used span over 2013–2019, with 13 ECOWAS countries (i.e.  $N > T$ ) except for Guinea and Liberia. Given the scope, these objectives are achieved using the cross-sectional dependence consistent Driscoll–Kraay (DK) estimator ([Driscoll & Kraay, 1998](#)) which is also robust to heteroscedasticity and autocorrelations. More on the data issues are discussed in [Section 4](#). To moderate the monetary policy transmissions, the interaction variables used include interest rate and money supply, exchange rate and money supply, and inflation and money supply. Controlling for these interactions is warranted due to different monetary policy targets by the constituting member countries in ECOWAS. The rest of the paper is structured as follows: [Section 2](#) provides a brief overview of the evolution of monetary policy in ECOWAS; [Section 3](#) discusses the literature review; [Section 4](#) deals on data issues and methods; [Section 5](#) presents and discusses the results, while concluding remarks are discussed in [Section 6](#).

## 2. Evolution of monetary policy in ECOWAS

In West Africa, monetary policy has been significantly modified since the 1975 reforms. This was accompanied by further positive changes in 1993 and 1996. These improvements make extensive use of money market-based mechanisms (i.e. the use of indirect monetary instruments). These modifications comprised rediscount rate, a discount rate and a money market interest rate. The rediscount rate variations are determined by the money market rates (Siri, 2012). In Nigeria, the objective of monetary policy has been to attain internal and external balance of payments. The techniques or instruments to achieve this objective have evolved through the two major phases in the pursuit of monetary policy before and after 1986. While the first phase placed emphasis on direct monetary controls, the second relies on market mechanisms (CBN, 2018). For Ghana, in 2007, the Bank of Ghana officially adopted an Inflation Targeting (IT) framework underpinned with a flexible exchange rate regime. To achieve this, the Central Bank has established institutional, accountability and operational structures to support the implementation of the IT framework (Bank of Ghana – BoG, 2021).

In the new monetary policy era, a flexible exchange rate regime was instituted in Nigeria and Ghana in 1986, with the introduction of a foreign exchange market. Furthermore, the setting of the bank rates (minimum and maximum) was removed in Nigeria in 1987, while Ghana abandoned the control of banking rates in February, 1988. In 1990, banks were obligated to provide the agricultural sector with loans. From the 1990s, the CBN adopted the minimum discount rate as an instrument for currency and credit management. The introduction of different maturity bills and the treasury bills by the Central Banks in Ghana was founded upon the review of a set of instruments. To control bank liquidity, the Central Bank used open market operations and treasury bills to fund government budget. Since the mid-80s, two distinct periods can be categorically identified for the CBN and BoG interest rates. In Nigeria, from 1980 to 1993, and from 1980 to 1997 in Ghana, which marked the first periods respectively, interest rates were regularly raised by the respective central banks. In the second period, both central banks engaged in a series of gradual rate reductions causing reductions in Nigeria's minimum rediscount rate from 26% in 1993 to 7% in 2007. Similarly, the BoG discount rate decreased from 45% to 18.5% in the same year.

In contrast, from 1990 to 1993 the West African Economic and Monetary Union (WAEMU) was characterised by a stepwise increase in the Central Banks' interest rates for the constituting member states in response to the capital flight recorded before the devaluation of the Communauté financière africaine (CFA) Franc in January 1994. Before 1994, the WAEMU interest rates were maintained at a high level to offer a risk premium to holders of CFA assets. In 1995, monetary policy decisions were almost exclusive, with the aim to maintain CFA Franc peg to French Franc. In 1995, after the devaluation of CFA Franc, three distinct periods can be identified for the WAEMU interest rates. A series of gradual rate reductions that is consequential for the fall in the discount rate from 10% to 6.5% were recorded in the first period (December 1994 to October 1996). This period coincided with the stepwise reductions in the Bank of France short-term interest rate. From October 1996 to December 2002, the WAEMU fluctuated within a narrow range of 5.75% to 6.50% consistent with the relative stability of French interest rates, except at the end of the period. During the period, annual reports of WAEMU indicate that the Central Bank revised the reserve requirement as a monetary policy tool. The WAEMU reacted to this change in the activity by lowering interest rate again from 2003 to 2007.

## 3. Literature review

Literature works on the effects of monetary policy shocks in ECOWAS have been based on member country investigations. Such literature works that studied the impact and causality between interest rate and credit on sectoral outputs include Osinubi and Akinyele (2006), Nwosa and Saibu (2012), Ikenna (2012), Ikechukwu (2015), Tule, Egbuna, Akinboyo, Afangideh and

Oladunni (2016). Other studies focussed on the effects of monetary policy on economic growth: those of Balogun (2007), Chaudhry, Ismail, Farooq and Murtaza (2015), Raji (2013), Jelilov, Celik and Adamu (2020), Danladi and Uba (2016), Idris *et al.* (2016), and Nwoko, Ihemeje and Anumadu (2016).

In Nigeria, literature works on sectoral elasticity to credit has been inconclusive and scanty. The study by Osinubi and Akinyele (2006) pointed out that the real sector of the Nigerian economy has depended largely on the banking system for working capital with which to acquire inputs. However, increases in bank lending rates complicate the problems by raising cost of working capital which altogether slowed the productivity and performance of the sector. Ikenna's (2012) findings using an Autoregressive Distributed Lag (ARDL) model to test for the possibility of a credit crunch in the real sector, revealed that deregulation had an adverse effect on the credit allocation to real economic sectors in the long run. The study concluded that deposit money banks in Nigeria have an aversion towards lending to the real sector. Nwosa and Saibu (2012) found that the channels through which monetary policies were transmitted to various economic sectors were different in Nigeria. On the one hand, the interest rate channel was liable for the transmission of monetary policy shocks to the agriculture and manufacturing sectors whereas the exchange rate channel transmits monetary policy impulses directly to the building and construction, mining, wholesale and service sectors. Similarly, Tule *et al.* (2016) evaluated the impact of lending on the select sub-sectors (agriculture, manufacturing, real estate and construction as well as transportation and communication) of the real sectors of the economy since the inception of the CBN tightening measures and found a significant positive relationship between cash reserve ratio and credit to the agricultural and manufacturing sector, while the current lending rate has a negative relationship with the agricultural and manufacturing sectors. Other results revealed that the cash reserve ratio has an insignificant positive impact on the real estate and construction sub-sectors. Therefore, the study concluded that tight monetary policy has a significant impact on the agricultural and manufacturing sub-sectors, except for the real estate and construction where it was insignificant.

Other studies focussed their investigation on aggregate evidence of monetary policy effect on economic growth. Balogun (2007) using the optimum currency area and the impact model for monetary union and International Monetary Fund (IMF) data to test the hypothesis that independent monetary and exchange rate policies have relatively been ineffective in influencing domestic activities (especially GDP and inflation), and that when they do; they are counterproductive for ECOWAS. The results showed that monetary policy innovations have had adverse effects on the economic growth of Nigeria due to lack of political autonomy and then concluded that improvement can only take place when the member countries enter into a currency union, with the surrender of monetary and exchange rate policy to a superior body. Also, Chaudhry *et al.* (2015) found a significant positive relationship between monetary policy transmission mechanisms (interest rate, external reserve and exchange rate) and economic growth in Nigeria, while a negative relationship was found for money supply and inflation. This study concluded, therefore, that the inability of monetary policies to effectively maximize its policy objective most times is due to the shortcomings of the policy instruments used in Nigeria. This limits its contribution to growth, albeit monetary policies had brought impressive contribution over the years.

Raji (2013) using Generalized Method of Moments (GMM) and quarterly data obtained from International Financial Statistics (IFS) over 2000–2010, assessed the impact of real exchange rate misalignment on economic performance of WAMZ economies. The study concluded that a significant negative correlation exists between economic growth and misaligned exchange rate in all WAMZ countries. A negative relationship was also found between undervaluation of exchange rate and economic performance in WAMZ. Jelilov *et al.* (2020) adopted ordinary least square methods and data from the CBN spanning from 1990 to 2013 to investigate the impact of interest rate on economic growth in Nigeria. The study found a positive relationship between

interest rate and economic growth while a negative relationship was found between interest rate and investment. The study, thus, concluded that the interest rate has a significant impact on economic growth. [Danladi and Uba \(2016\)](#) investigated the short- and long-term relationship between exchange rate volatility and economic growth in the select WAMZ nations: Nigeria and Ghana, using maximum likelihood autoregressive conditional heteroskedasticity (ARCH) and GARCH models and annual data from the World Bank from 1980 to 2013. An insignificant negative relationship was found to exist between exchange rate volatility and GDP in Nigeria and an insignificant positive relationship in Ghana, while the exchange rate, foreign direct investment (FDI) and the interest rate all have an insignificant negative impact on GDP for both Nigeria and Ghana. In another similar study, [Idris \*et al.\* \(2016\)](#) investigated empirically the effects of exchange rate volatility on the output level of the five English speaking countries in ECOWAS, namely Nigeria, Ghana, the Gambia, the Sierra Leones and Liberia, over the period 1991 to 2014. Using vector error correction models, the study found a co-integration between GDP and exchange rate volatility. The result suggests a positive relationship in the short-run between outputs and the bilateral exchange rate, for Nigeria and Ghana. Furthermore, a positive relationship was found to exist between exchange rate volatility and output in Liberia, while that of Nigeria and Sierra Leone was negative. The study concluded that in general, exchange rate volatility has a significant negative impact on outputs for all the countries considered, except for Liberia.

Finally, [Nwoko \*et al.\* \(2016\)](#), examined the extent to which the CBN monetary policies could effectively be used to promote economic growth, covering the period of 1990 to 2011. The study found a significant and negative relationship amongst money supply, the interest rate and economic growth, and thus concludes that monetary policies have a significant negative impact on economic growth for Nigeria. In India, [Singh and Tripathi \(2014\)](#) analysed the effect of monetary policy shocks on the aggregate as well as the sectoral outputs using the reduced vector autoregressive (VAR) model. The study found that the impact of monetary policy shocks at the sectoral level is heterogeneous. Sectors such as mining and quarrying, manufacturing, construction and trade, hotel, transport and communications seem to decline more sharply than aggregate output in response to a monetary tightening.

The preceding reviews have revealed heterogeneities in the channels through which monetary policies affect the aggregate economy and sectors alike. This has ensued very intense debates on the transmissions of monetary policy tools across member countries in ECOWAS. Whereas the debates on the effect of interest rate are more polarised not just in the direction of impact, but also in the significance, that on exchange rate is more skewed towards the significance of impact across member countries. In these debates lies the urgency for a more in-depth investigation into the monetary policy effect on the aggregate economy and the sectors of an economic bloc such as ECOWAS. This study is, therefore, motivated to close these exigency gaps for a harmonious policy direction, in view of the proposed economic integration in the sub-region.

#### 4. Data and empirical strategy

The data on the variables are sourced from the World Development Indicators ([WDI, 2019](#)) and [International Monetary Fund \(IMF, 2021\)](#). The scope of this data is from 2013 to 2019. Based on availability of data, a total of 13 countries were selected from the ECOWAS region, except for Guinea and Liberia. [Table 1](#) provides more information on the data definitions and sources.

##### 4.1 Empirical strategy

**4.1.1 The test for cross-sectional dependence.** The empirical methods begin with the test for general and temporal dependence across individual variables for ECOWAS countries.

Table 1.  
Variable definitions

| Variables          | Definitions                                                              | Source     |
|--------------------|--------------------------------------------------------------------------|------------|
| gdpp               | GDP per capita (constant 2010 US\$) - <i>sustainable economic growth</i> | WDI (2019) |
| agric              | Agriculture, forestry and fishing, value added (constant 2010 US\$)      | ""         |
| ind                | Industry (including construction), value added (constant 2010 US\$)      | ""         |
| serv               | Services sector value added (constant 2010 US\$)                         | ""         |
| infl               | Consumer price index (2010 = 100) - <i>proxy for inflation</i>           | ""         |
| exr                | The official exchange rate (LCU per US\$, period average)                | ""         |
| labour             | Population ages 15–64, total                                             | ""         |
| capital            | Gross capital formation (constant 2010 US\$)                             | ""         |
| ms                 | Broad money (% of GDP)                                                   | ""         |
| msgrr              | Broad money growth (annual %)                                            | ""         |
| intr               | Interest rate                                                            | IMF (2021) |
| Source(s): Authors |                                                                          |            |

We use the new STATA command `xtcdf`, to calculate the CD-test for cross-sectional dependence described by Pesaran (2004) and Pesaran (2014) for the list of variables of any length. This follows a standard normal distribution with the null hypothesis of either strict cross-sectional independence (Pesaran, 2004) or weak cross-sectional dependence (Pesaran, 2014). The test is suited for both balanced and unbalanced panels where  $N > T$  and vice versa. The test statistic is calculated as follows:

$$CD = \left[ \frac{N(N-1)}{2} \right]^{1/2} \hat{\rho}_N, \tag{1}$$

$$\text{while } \hat{\rho}_N = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \text{ and } \hat{\rho}_{ij} = \frac{\sum_{t=1}^T \varepsilon_{it} \varepsilon_{jt}}{\left( \sum_{t=1}^T \varepsilon_{it}^2 \right)^{1/2} \left( \sum_{t=1}^T \varepsilon_{jt}^2 \right)^{1/2}}.$$

4.1.2 *The Driscoll–Kraay estimator.* Given cross-sectional dependence, heteroscedasticity and auto-correlation, the DK estimator uses the Newey–West type correction on the sequence of cross-sectional average of the moment conditions, which yields consistent and robust estimates both for short and long panels. This estimator is superior to other traditional estimators that are also robust to heteroscedasticity. They include the feasible generalised least squares (FGLS) proposed by Parks (1967) and popularised by Kmenta (1986), and the Beck and Katz (1995) panel corrected standard errors (PCSE). Thus, the DK model is stated as follows:

$$y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it}, \tag{2}$$

where  $cov(x_{it}, \alpha_i) \neq 0$  and  $cov(x_{it}, \varepsilon_{it}) = 0$ . To introduce cross-sectional and temporal dependence, both the explanatory variable  $x_{it}$  and the disturbance term  $\varepsilon_{it}$  contain three components: an individual specific long-run mean ( $\bar{x}_i, \bar{\varepsilon}_i$ ), an autocorrelated common factor ( $g_t, f_t$ ) and an idiosyncratic forcing term ( $\omega_{it}, \vartheta_{it}$ ). Accordingly,  $x_{it}$  and  $\varepsilon_{it}$  are specified as follows:  $x_{it} = \bar{x}_i + \theta_i g_t + \omega_{it}$  and  $\varepsilon_{it} = \bar{\varepsilon}_i + \delta_i f_t + \vartheta_{it}$ . The common factors  $g_t$  and  $f_t$  in (2) are expressed as AR(1) processes:  $g_t = \phi g_{t-1} + \omega_t$  and  $f_t = \gamma f_{t-1} + v_t$ . All these are assumed to have a constant unit variance (Hoechle, 2007).

4.1.3 *The model.* Consider the following pooled linearised logarithmic vector model, to ascertain the effect of monetary policy effects in terms of money supply, the interest rate and the exchange rate, while controlling for inflation and other covariates, as well as their interactions, on sectoral outputs and economic performance of ECOWAS economies:



$$G_{it} = \alpha_i + M_{it}\beta + C_{it}\gamma + R_{it}\theta + \varepsilon_{it} \quad (3)$$

Following the definitions in Table 1,  $G_{it}$  is a  $1 \times 4$  vector of regressands (sectoral outputs and economic growth) ( $agric_{it}, ind_{it}, serv_{it}, gdp_{it}$ );  $M_{it}$  is a  $1 \times 3$  vector of monetary policy tools ( $ms_{it}, intr_{it}, exr_{it}$ );  $C_{it}$  is also a  $1 \times 4$  vector of control variables ( $infl_{it}, msgr_{it}, capital_{it}, labour_{it}$ ), and finally,  $R_{it}$  is a  $1 \times 4$  vector of interaction/moderating variables ( $intrms_{it}, exrms_{it}, exrintr_{it}, inflintr_{it}$ ), where  $intrms$  and  $exrms$  are the prevailing interest rate and official exchange rate given the level of money supply; and  $exrintr$  and  $inflintr$  are the official exchange rate and level of inflation given the prevailing interest rate. These interaction variables are incorporated in different estimating sectoral and economic growth equations to observe their moderations in the system. These literature have also controlled for these covariates in Equation 3 in a similar investigation (Jailson, Bruno, & Osvaldo, 2015; Ikechukwu, 2015; Idris *et al.*, 2016). Furthermore,  $\beta$ ,  $\gamma$ , and  $\theta$  are the corresponding parameter vectors. Note that  $\varepsilon_{it} \sim iidN(0, 1)$ ,  $cov(D_{it}, \alpha_i) \neq 0$  and  $cov(D, \varepsilon_{it}) = 0$ ; and  $D_{it}$  is a  $1 \times 3$  compact vector of covariate vectors in Equation (3), and  $\varepsilon_{it}$  and  $\alpha_i$  are the white noise idiosyncratic error and panel specific effect. However, the pooled ordinary least squares regression (OLS) estimates usually suffer from inconsistency. Hence, we perform the Hausman test following Wooldridge (2002). The null hypothesis is that the random-effects model is valid (i.e.  $E(\varepsilon_{it} + \alpha_i/D_{it}) = 0$ ). This null is rejected at 5% significance level, in favour of the fixed-effects model  $E(\varepsilon_{it} + \alpha_i/D_{it}) \neq 0$ .

## 5. Results and discussions

In this section, Table 2 presents the test results for the Pesaran (2004, 2014) cross-sectional dependence test for the individual covariates as defined in Table 1. The results reveal significant dependence across individual cross-sections. Thus, this warrants the use of the DK estimator for this study, as it is robust to general forms of CD and temporal dependence in both large and short panels. Also, it is further robust to heteroscedasticity and autocorrelation. The DK-FE (fixed-effects) estimator for this study has an autocorrelation lag structure of six years. Furthermore, Table 3 evinces the descriptive statistics.

| Variables | CD-test  | Mean $\rho$ | Mean abs( $\rho$ ) |
|-----------|----------|-------------|--------------------|
| lngdpp    | 10.6390* | 0.4600      | 0.7900             |
| lnagric   | 7.9130*  | 0.3400      | 0.7500             |
| lnind     | 9.8450*  | 0.4200      | 0.6900             |
| lnserv    | 18.5860* | 0.800       | 0.8000             |
| intr      | -0.4490  | -0.0200     | 0.0800             |
| lninfl    | 13.3820* | 0.5700      | 0.5700             |
| exr       | 20.2300* | 0.8700      | 0.8700             |
| lnms      | 5.4490*  | 0.2300      | 0.4700             |
| msgr      | 1.8670   | 0.0800      | 0.3800             |
| lncapital | 8.2530*  | 0.3500      | 0.4800             |
| lnlabour  | 23.3600* | 1.000       | 1.0000             |
| lnintrms  | 1.4220   | 0.0600      | 0.5100             |
| exrms     | 15.0630* | 0.6400      | 0.6700             |
| exrintr   | 12.0100* | 0.5100      | 0.7000             |
| inflintr  | 5.4140*  | 0.2300      | 0.5400             |

Note(s): \* significant at 1%

Source(s): Authors

**Table 2.**  
Pesaran's CD-test

**Table 3.**  
Descriptive statistics

| Variables | Mean      | Standard deviation (Std) | Between   | Within   | <i>N</i> | <i>n</i> | <i>T</i> |
|-----------|-----------|--------------------------|-----------|----------|----------|----------|----------|
| gdpp      | 1263.1920 | 879.2839                 | 906.2416  | 81.3513  | 91       | 13       | 7        |
| lnagric   | 21.6658   | 1.6331                   | 1.6871    | 0.1025   | 89       | 13       | 7        |
| lnind     | 21.3940   | 1.7930                   | 1.8448    | 1.8448   | 89       | 13       | 7        |
| lnserv    | 22.3523   | 1.5802                   | 1.6328    | 0.0932   | 89       | 13       | 7        |
| intr      | 6.71429   | 6.8068                   | 6.7705    | 1.8840   | 75       | 13       | 7        |
| infl      | 129.2262  | 40.1859                  | 34.5226   | 22.4175  | 86       | 13       | 7        |
| exr       | 861.2360  | 1678.8730                | 1668.6390 | 468.9169 | 91       | 13       | 7        |
| ms        | 37.2589   | 20.3935                  | 20.8263   | 3.3282   | 88       | 13       | 7        |
| msgrr     | 11.9575   | 8.2658                   | 4.0549    | 7.2786   | 87       | 13       | 7        |
| lncapital | 21.5292   | 1.5990                   | 1.6451    | 0.1760   | 89       | 13       | 7        |
| lnlabour  | 15.5434   | 1.3854                   | 1.4326    | 0.0599   | 91       | 13       | 7        |

**Source(s):** Authors

In ECOWAS, the average of GDP per capita is about \$1263. Also, there is a thriving sectoral value added. While the industrial sector has the lowest output with a mean of 21%, the agricultural, forestry and fishing, and the services sectors share an equal mean of 22%. In terms of the monetary policy channels, the average prevailing interest rate in ECOWAS is 6.7% while money supply is about 37.3% of the GDP, the average growth rate of which is about 12% annually. Furthermore, the exchange rate devaluation ensures that on average, about 861 units of domestic currency of member countries is used to exchange for a dollar, while the mean level of the consumer price index is about 129 units of domestic currencies in each member country. Finally, the data exhibit both between and within variations.

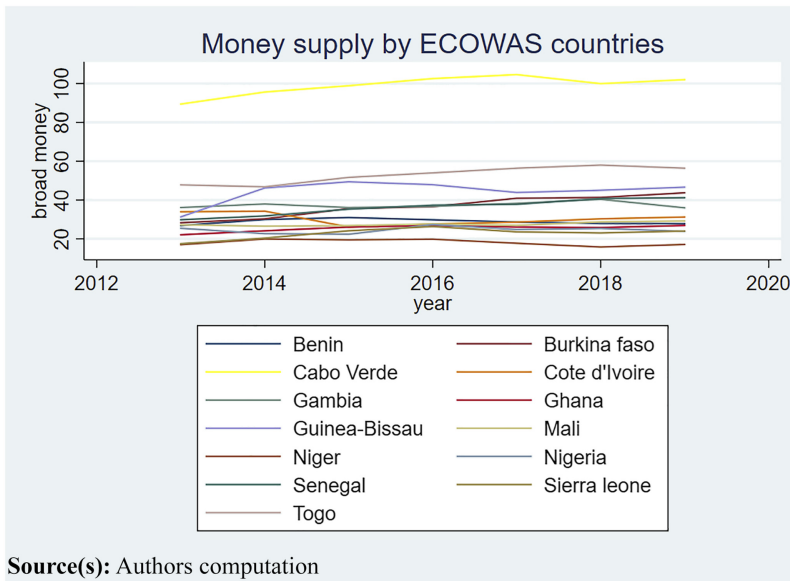
*5.1 Monetary policy channels in ECOWAS countries*

Traditionally, money supply (broad money) is adjudged to be the engine of monetary policy transmissions, which thus has bearings on the interest rate and the official exchange rates of the concerned country. This, of course, depends on the different policy targets for the country, i.e. inflation targeting and/or stabilizing the exchange rate. In effect, monetary policy mechanisms amongst ECOWAS economies are not different as [Figure 1](#) reveals. From 2013 through 2019, Cabo Verde is seen to have the highest share (almost 100%) of her GDP dedicated to money supply in the country, followed by Togo with about 59%. Granted, it is noteworthy that Cabo Verde and Togo may have the smallest size to GDP ratio compared to other member states. But this strategy has had a significant bearing on their respective interest rates, which is very close to 2% annually as at 2019 (see [Figure 2](#)). Of course, we are familiar with the natural domino effects of such low interest rate on economic growth and other economic sectors. Furthermore, other ECOWAS member states including Nigeria and Ghana, have a less than 45% share of their broad money to GDP over the entire period under study.

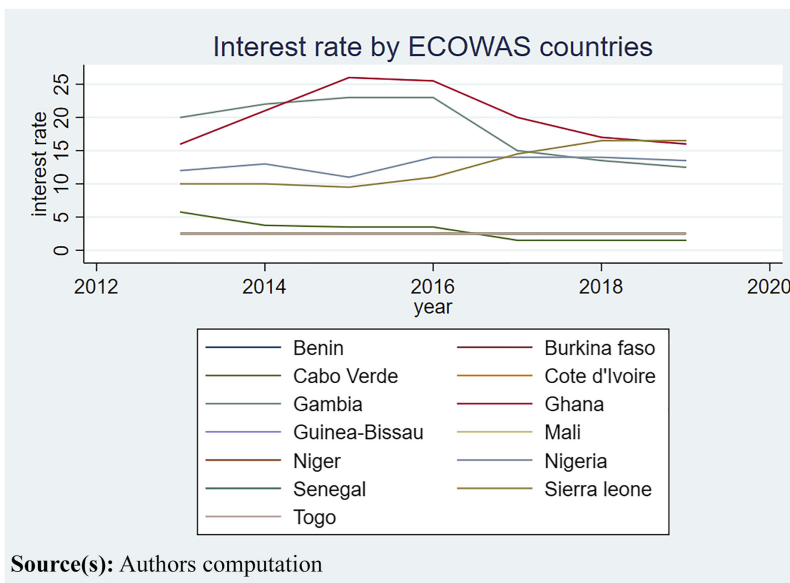
After the mid-80 monetary policy reforms by member countries in ECOWAS, the focus of monetary policymakers shifted towards the use of indirect monetary instruments or market-based mechanisms in view of respective policy targets, in terms of inflation targeting regimes and maintaining price stability. They include the interest rate and exchange rates. [Figure 2](#) reveals that, while every other country in ECOWAS has an interest rate above 14%, that of Cabo Verde and Togo is less than or equal to 2% annually.

Another monetary policy channel is the exchange rate. In practice, ECOWAS members use a floating exchange rate with some degree of pegging in the short-term especially for the Francophone member countries. In [Figure 3](#), devaluations in the exchange rate have caused ECOWAS members to grapple with very high domestic exchange rate to the dollar



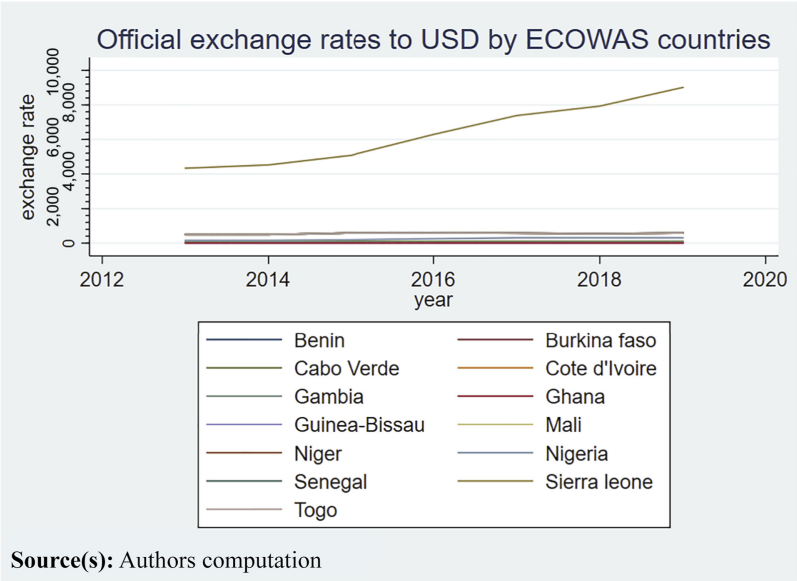


**Figure 1.**  
Money supply by  
ECOWAS countries



**Figure 2.**  
Interest rate by  
ECOWAS countries

benchmark, with Sierra Leone having the highest. This is as high as over 8000 units of leone to a dollar. However, some member countries such as Ghana and Cabo Verde have very low domestic to foreign exchange rates. For instance, [Figure 3](#) shows that less than six Ghana Cedis and less than 95 Cape Verdean escudo equals 1 dollar. Consequently, these variations in the exchange rates have rebounding effects on the consumer price index of member countries,



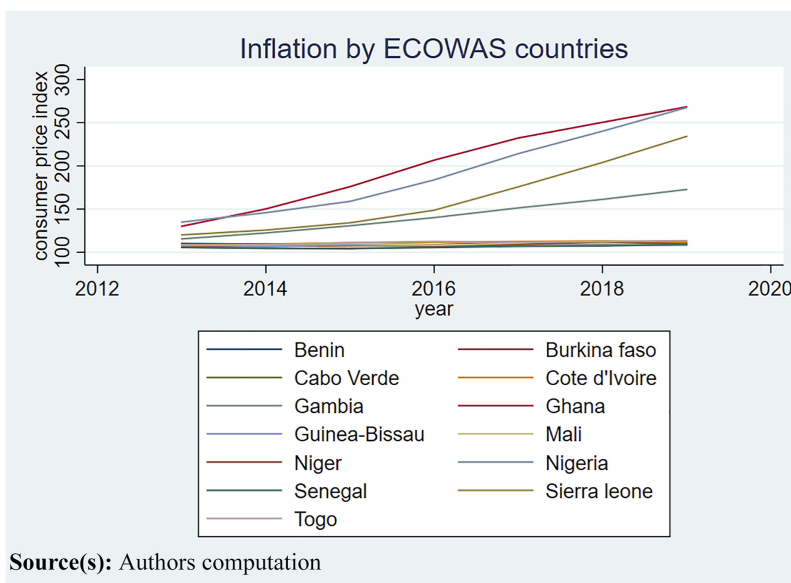
**Figure 3.**  
Official exchange rate  
by ECOWAS countries

which has been on an increasing trend since 2013. As at 2019, ECOWAS member countries such Ghana, Nigeria, Cabo Verde and Senegal have their inflation levels in the double digits. Thus, irrespective of the inflation target regimes and price stability of Ghana and Nigeria's monetary policy stance, respectively, they have the highest level of inflation in the sub-region compared to other member states, with reverberating effects on the general economic wellbeing (see Figure 4).

In what follows, using Tables 4–7, we discuss these monetary policy tools to determine which channel has significant effects on the sectoral value added and economic growth of the ECOWAS sub-region. We also look at the interplay between these tools, such as the interactions between the interest rate and money supply, the exchange rate and money supply, the exchange rate and interest rate, and the inflation and interest rate, respectively. It is important to state here that the subsequent interpretations are based on the FE model using the DK estimator which is informed by the Hausman test (Wooldridge, 2002). Robustness checks are achieved by comparing the DK–FE model with the DK-pooled-OLS model results. These are evinced in Tables 4–7.

5.2 Monetary policy effects on the agricultural sector in ECOWAS

At the 5% level, Table 4 shows that, consistent with theory, interest rate is asymmetric with the agricultural sector outputs, even after controlling for different interactions in ECOWAS economies. Specifically, increasing the interest rate has an in-elastic negative effect on the value added of the agricultural sector in the sub-region. This finding is consistent with Nwosa and Saibu (2012) who found the interest rate to be asymmetric with the agricultural, manufacturing, building and construction sector outputs. However, it contrasts that of Ikechukwu (2015) which concluded that monetary policy is largely insignificant in influencing sector growth in Nigeria. Thus, an increase in the interest rate exerts a downward pressure on the agric-sector value added. Similarly, the effect of an expansionary monetary policy (which raises money supply) and inflation level is significantly and in-



**Figure 4.**  
Level of inflation by  
ECOWAS countries

| lnagric      | DK-OLS    | FE(1)      | FE(2)      | FE(3)      | FE(4)      |
|--------------|-----------|------------|------------|------------|------------|
| intr         | -0.0423*  | -0.0156*** | -0.0151*** | -0.0148*** | -0.0363*** |
| lnexr        | -0.0390*  | 0.1841**   | 0.1810**   | 0.1760**   | 0.1920***  |
| lninfl       | 0.3030*** | -0.3121*** | -0.2990*** | -0.2910*** | -0.6870*** |
| lnms         | -0.3570*  | -0.5781*** | -0.5720*** | -0.5740*** | -0.6120*** |
| msg          | -0.0026   | 0.0001     | 0.0001     | 0.0001     | 0.0003     |
| lncapital    | 0.0504**  | -0.0176    | -0.0195*   | -0.0190*   | -0.0293*   |
| lnlabour     | 1.0750*** | 1.3720***  | 1.3770***  | 1.3770***  | 1.4670***  |
| lnintrms     | 0.3330*   | 0.3940***  | 0.3950***  | 0.3940***  | 0.4180***  |
| lnexrms      |           |            | -0.0000    |            |            |
| extrintr     |           |            |            | -0.0000    |            |
| inflintr     |           |            |            |            | 0.0001**   |
| Constant     | 2.540***  | 1.3410*    | 1.2380*    | 1.2100*    | 1.8840**   |
| Hausman      | 55.41***  | #          | #          | #          | #          |
| R_2          | 0.9760    | #          | #          | #          | #          |
| Within R_2   | #         | 0.6679     | 0.6683     | 0.6685     | 0.6740     |
| Observations | 91        | 91         | 91         | 91         | 91         |

**Note(s):** FE is fixed-effects. # means no data. \*, \*\*, and \*\*\* mean significant at 10%, 5% and 1%, respectively  
**Source(s):** Authors

**Table 4.**  
DK results for the  
agricultural sector in  
ECOWAS

elastically negative. This finding is consistent with the pioneering work of [Johnson \(1980\)](#). However, it contradicts that of [Ali \(2020a\)](#) which found positive effects of money supply on wheat production in Iraq. However, money supply and the level of inflation have more elasticity on the agricultural sector than the prevailing interest rate. On the other hand, exchange rate devaluations by member states tend to have significantly in-elastic and symmetric impacts on the agric-sector. This is consistent with [Ali \(2020b\)](#) for Pakistan, [Ogunjimi \(2019\)](#) for Nigeria, but contradicts [Chimwemwe \(2020\)](#) who found asymmetry between the exchange rate and agricultural imports in Malawi.

**Table 5.**  
DK results for the  
industrial sector in  
ECOWAS

| lnind        | DK-OLS     | FE(1)      | FE(2)      | FE(3)      | FE(4)      |
|--------------|------------|------------|------------|------------|------------|
| intr         | -0.0368*   | -0.0130    | 0.0085     | 0.0091     | -0.1990*** |
| lnexr        | -0.1560*** | 0.0930     | -0.0228    | -0.1060    | 0.1720     |
| lninfl       | 0.0076     | -0.5130**  | 0.0605     | 0.0682     | -3.8950*** |
| lnms         | -0.3990    | -0.5690**  | -0.3010**  | -0.4720*** | -0.8770*** |
| msgr         | 0.0040*    | 0.0027*    | 0.0018*    | 0.0024*    | 0.0043*    |
| lncapital    | 0.7760***  | 0.3630     | 0.2760*    | 0.3240*    | 0.2570*    |
| lnlabour     | 0.3420***  | 1.2050**   | 1.4240***  | 1.3610***  | 2.0600***  |
| lnintrms     | 0.2010     | -0.1220*** | -0.1050*** | -0.1280*** | 0.0933     |
| lnexrms      |            |            | -0.0001*** |            |            |
| exrintr      |            |            |            | -0.0000**  |            |
| inflintr     |            |            |            |            | 0.0011***  |
| Constant     | 0.8320     | -0.5370    | -5.1060**  | -4.1850**  | 4.3540*    |
| Hausman      | 404.28***  | #          | #          | #          | #          |
| R_2          | 0.9593     | #          | #          | #          | #          |
| Within R_2   | #          | 0.4034     | 0.6281     | 0.5392     | 0.5388     |
| Observations | 91         | 91         | 91         | 91         | 91         |

**Note(s):** FE is fixed-effects. # means no data. \*, \*\*, \*\*\* mean significant at 10%, 5%, and 1% respectively  
**Source(s):** Authors

**Table 6.**  
DK results for the  
services sector in  
ECOWAS

| lnserv       | DK-OLS     | FE(1)     | FE(2)     | FE(3)    | FE(4)     |
|--------------|------------|-----------|-----------|----------|-----------|
| intr         | -0.0191*   | -0.0026*  | -0.0047   | -0.0061* | -0.0077*  |
| lnexr        | -0.1040*** | -0.01920  | -0.0079   | 0.0124   | -0.0171   |
| lninfl       | 0.1020*    | -0.0144   | -0.0705   | -0.107   | -0.1070   |
| lnms         | 0.5240***  | 0.0565    | 0.0303    | 0.0410   | 0.0481    |
| msgr         | -0.0029*   | -0.0004   | -0.0003   | -0.0003  | -0.0003   |
| lncapital    | 0.5230***  | 0.0027    | 0.0112    | 0.0088   | -0.0003   |
| lnlabour     | 0.6360***  | 1.3540*** | 1.3330*** | 1.330*** | 1.3780*** |
| lnintrms     | 0.2410**   | 0.0073    | 0.0056    | 0.0083   | 0.0132    |
| lnexrms      |            |           | 0.0000*   |          |           |
| exrintr      |            |           |           | 0.0000** |           |
| inflintr     |            |           |           |          | 0.0000    |
| Constant     | -1.5660*** | 1.2100*   | 1.6570**  | 1.7900** | 1.3450*   |
| Hausman      | -73.78***  | #         | #         | #        | #         |
| R_2          | 0.9758     | #         | #         | #        | #         |
| within R_2   | #          | 0.7810    | 0.7905    | 0.7962   | 0.7814    |
| Observations | 91         | 91        | 91        | 91       | 91        |

**Note(s):** FE is fixed-effects. # means no data. \*, \*\*, \*\*\* mean significant at 10%, 5% and 1%, respectively  
**Source(s):** Authors

Furthermore, the effect of the interactions of monetary policy tools on the agric-sector is heterogeneously in-elastic. On the one hand, the interest rate given an expansionary monetary policy has a significant and positive effect on the agric-sector value added, by an average of 40%. In inflation targeting regimes, the level of inflation given interest rate also exerts a significant and positive effect on the value added of the agric-sector. However, it is more infinitesimal. In contrast, exchange rate devaluation given expansionary monetary policies and interest rate is insignificant for the agricultural sector. Moreover, this is attributed to the fact that the agricultural sector in ECOWAS countries is still highly labour intensive, with insignificant capital investments to facilitate mechanisation of the sector.

| lngdpp                | DK-OLS     | FE(1)      | FE(2)      | FE(3)      | FE(4)      |
|-----------------------|------------|------------|------------|------------|------------|
| intr                  | -0.0203    | 0.0003     | 0.0026     | 0.0018     | -0.0346*** |
| lnexr                 | -0.0778*** | 0.0077     | -0.0049    | -0.0058    | 0.0225     |
| lninfl                | 0.3370***  | -0.1730*** | -0.1110*** | -0.134***  | -0.8080*** |
| lnms                  | 0.1770     | -0.0927    | -0.0636    | -0.0861    | -0.150*    |
| msg                   | 0.0003     | 0.0005     | 0.0004*    | 0.0005*    | 0.0008*    |
| lncapital             | 0.5690***  | 0.1130*    | 0.1030*    | 0.110*     | 0.0930**   |
| lnlabour              | -0.4930*** | 0.6510***  | 0.6750***  | 0.661***   | 0.8110***  |
| lnintrms              | 0.1900     | -0.0242*** | -0.0224**  | -0.0246*** | 0.0161     |
| lnexrms               |            |            | -0.0000*   |            |            |
| exintr                |            |            |            | -0.0000    |            |
| inflintr              |            |            |            |            | 0.0002***  |
| Constant              | -0.2680    | -4.3690*** | -4.8650*** | -4.6160*** | -3.4520*** |
| Hausman               | 802.91***  | #          | #          | #          | #          |
| R <sub>2</sub>        | 0.8208     | #          | #          | #          | #          |
| Within R <sub>2</sub> |            | 0.6322     | 0.6633     | 0.6395     | 0.6882     |
| Observations          | 91         | 91         | 91         | 91         | 91         |

**Note(s):** FE is fixed-effects. # means no data. \*, \*\* and \*\*\* mean significant at 10%, 5% and 1%, respectively

**Source(s):** Authors

**Table 7.**  
DK results for  
economic growth in  
ECOWAS

Clearly, monetary policy generally exerts an in-elastic and significant impact on the agricultural sector outputs.

### 5.3 Monetary policy effects on the industrial sector in ECOWAS

For the industrial sector in ECOWAS economies, Table 5 reveals that all the monetary policy channels considered have a significant and negative impact on the industrial sector except for the exchange rate, which is insignificant. Again, consistent with theory, a high interest rate reduces the value added of the industrial sector, at 5% level of significance. Furthermore, an expansionary monetary policy in terms of money supply and a high inflation level also exert a significant and negative impact on industrial outputs. These findings are consistent with Tule *et al.* (2016) and Ogunjimi (2019) for Nigeria. Although, the effects of the monetary policy channels on the industrial sector are asymmetric, inflation level has an overly elastic negative effect followed by money supply, whose in-elastic effect is greater than that of the prevailing interest rate. Clearly, the effects of monetary policy on the industrial sector are overwhelmingly significant and negative. On the other hand, the growth rate of money supply tends to have a significant and positive effect on the value added of the industrial sector. Evidently, the industrial sector is also highly labour intensive compared to the capital-intensive mechanism. This is evinced by the symmetric effect of labour on industrial outputs at the 1% level, while capital is at the 10% level.

Dynamically, the interest rate and exchange rate given an expansionary monetary policy in terms of money supply still exert a significant negative effect on the industrial sector. This reality may be attributed to the fact that most of the Francophone ECOWAS members peg their currency – CFA to the French Franc. This pegging policy automatically nullifies the desired effect of an expansionary monetary policy on their exchange rate and interest rate. More so, it may be due to a poor fiscal base or the moribund nature of some member-specific industries, leading to low productivity. Furthermore, given that ECOWAS economies are mostly import dependent, exchange rate devaluation amid expansionary monetary policy and high interest rate makes imports more expensive which are incorporated in the operations of resident industries, leading to downsizing and output reductions. However, the level of inflation given the prevailing interest rate exerts an infinitesimally significant and

positive impact on the value added of the industrial sector. This stems from the loose policy ban on importation by some ECOWAS countries, which has somewhat increased the demand for domestic goods regardless of the surge in domestic prices. An example is the Nigeria's trade policy on the importation of milk, rice, tomatoes, etc., and Nigeria's GDP is about 75% of that of ECOWAS as a whole. They are more expensive, yet still in high demand.

#### *5.4 Monetary policy effects on the services sector in ECOWAS*

[Table 6](#) reports that monetary policy tools are generally mute in influencing the services sector value added. Specifically, the interest rate, exchange rate and the level of inflation are asymmetric with the services sector in ECOWAS. In addition, while an expansionary monetary policy is symmetric, its growth rate is asymmetric and also insignificant. This finding belies [Ogunjimi \(2019\)](#) for Nigeria. Similarly, although positive, it is less capital intensive compared to labour, as capital is insignificant, while labour is elastic and significant. Furthermore, in inflation targeting regimes given an expansionary monetary policy, the effect of interest rate and inflation is positive, but insignificant and infinitesimal. Conversely, in an exchange rate targeting regime, given an expansionary monetary policy and interest rate, the effect of exchange rate devaluation is significantly positive on the services sector outputs, but also infinitesimal. Indeed, the effect of monetary policy on the services sector outputs in ECOWAS is generally mute.

#### *5.5 Monetary policy effects on sustainable economic growth in ECOWAS*

We now turn to the discussion of monetary policy effects on sustainable economic growth in ECOWAS. [Table 7](#) reveals that the interest rate and inflation level exert an overwhelmingly negative and significant impact on sustainable economic growth, at the 5% level. Although these effects are in-elastic, inflation has a more pronounced effect than interest rate. This suggests that ECOWAS economies are currently facing the problem of stagflation. These findings are consistent with [Balogun \(2007\)](#), [Chaudhry et al. \(2015\)](#), [Nwoko et al. \(2016\)](#), and [Danladi and Uba \(2016\)](#) which found asymmetric effects between the interest rate and inflation with economic growth for WAMZ countries. It is further consistent with [Onifade, Alagöz, Erdoğan and Obademi \(2020\)](#) for Nigeria in the long-run, but symmetric in the short-run. However, it contradicts [Chaudhry et al. \(2015\)](#), [Jelilov et al. \(2020\)](#) and [Serletis and Liu. \(2020\)](#) who found symmetric and persistent effect between the interest rate and inflation with economic growth in Nigeria, G7 and emerging economies. Furthermore, the exchange rate, money supply and its growth rate are generally mute. This finding contradicts [Raji \(2013\)](#), [Chaudhry et al. \(2015\)](#), [Danladi & Uba \(2016\)](#) and [Idris et al. \(2016\)](#) who found the exchange rate to be significant and negative on the economic growth of WAMZ, while [Khan et al. \(2020\)](#) and [Mahara \(2020\)](#) found symmetric effects in Pakistan and Nepal. Also, it contradicts [Luciano, Luiz Carlos, Frederico Gonzaga and Oreiro \(2020\)](#) and [Dong, Ma, Wang and Wei \(2020\)](#) who found symmetric effects in China. The reason for this is by the fact that ECOWAS economy is consumption-based and not productive. Therefore, the natural effects that stem from exchange rate devaluation in the positive net exports are generally mute as it is not a production-based economy. Moreover, although significantly positive, the economy of ECOWAS countries is more labour intensive than capital, as labour exerts a more significant and positive effect on the economic growth than capital.

In terms of the interactions amongst monetary policy channels, the natural effect of an expansionary monetary policy would be improved economic growth. However, in ECOWAS where the average interest rate is as high as 6.7%, the growth effect of monetary expansion is contractionary due to low investment channels, as foreign or domestic investors would instead prefer to earn interests on their cash balances. In addition, due to poor infrastructures and political risks in member countries, the devaluation effect of exchange rate given



expansionary monetary policy could not significantly translate to improved sustainable economic growth in ECOWAS. Finally, the level of inflation dependent on the prevailing interest rate has a significant and positive effect on sustainable growth. This effect may be attributed to autonomous consumption and trade policy in ECOWAS countries.

## 6. Conclusions and policy implications

Following the recent preference for market-based mechanisms in monetary policy transmissions amongst ECOWAS members, this study examined the effect of monetary policy channels in terms of money supply, the interest rate and the exchange rate, while controlling for inflation, on the sectoral outputs and sustainable economic growth in select ECOWAS members. It further examined the effect of their interactions on the sectoral and economic performance of ECOWAS. The descriptive statistics revealed a very high interest rate, inflation and exchange rate. Hence, policymakers should coordinate and implement monetary policies that would plunge and stabilise these rates to a level that would attract both foreign and domestic investments.

For the sectoral effects of monetary policy while the effect of monetary policy channels on the agricultural sector value added is largely heterogenous and significantly in-elastic, that on the industrial and services sector is overwhelmingly homogeneous and negative, but insignificant for the services sector. Particularly, interest rate, inflation and money supply have a significant and negative effect on the sectoral value added in ECOWAS, but insignificant for the services sector. Moreover, the exchange rate is significant and symmetric only for the agric-sector, while it is mute and homogeneously negative for the industrial and services sectors. Indeed, interactions between the interest rate, inflation and money supply show that a monetary expansion promotes the agricultural sector outputs, given an inflation targeting regime through the interest rate channel. However, while interest rate given money supply is harmful to the industrial sector including construction, the interactions between the interest rate, inflation and money supply are generally mute and symmetric with the services sector. More so, exchange rate devaluation given an expansionary monetary policy and a high interest rate is mute and asymmetric with the agric-sector, but significant for the industrial sector. On the other hand, exchange rate devaluation given money supply and the interest rate is significant and positive for the services sector outputs. Consequently, policymakers in respective ECOWAS member countries should focus their monetary policy stance to an inflation targeting regime as already instituted in Ghana. This will plunge the interest rate to boost capital investments across sectors for an accelerated output proliferation for the international market given exchange rate devaluation. In effect, for a more persistent effect, policymakers should further focus on stabilising the exchange rates across ECOWAS members.

Furthermore, the effect of monetary policy on sustainable economic growth in ECOWAS is also homogeneous. While the interest rate and inflation have a significant negative impact, a monetary expansion with exchange rate devaluation is generally mute and negative. The interactions also reveal that amid expansionary monetary policy, the prevailing interest rate and exchange rate devaluation cause economic growth of ECOWAS to decline. On the other hand, interacting inflation with the interest rate in ECOWAS improves growth. Indeed, monetary expansion that reduces the interest rate with exchange rate devaluation in an inflation targeting regime is conducive for improved sustainable economic growth in ECOWAS. Therefore, policymakers should coordinate and implement an inflation targeting monetary policy stance amid sufficient fiscal interaction, in all ECOWAS member states. Furthermore, government of member states should be genuine in reviving moribund industries in their countries and thus, encourage a favourable business environment for businesses to thrive. This way, foreign and domestic investments can be attracted to scale

their domestic industries, while encouraging domestic consumption through a trade policy that would (i) place an embargo on importation of domestically produced goods; and (ii) mostly encourage the importation of intermediate goods that go into the production process of the industrial and manufacturing sectors. This would enable the harnessing of the domino effects from an exchange rate devaluation through the exportation of internationally competitive products yielding a positive net exports, which would promote sustainable economic growth.

Finally, it is noteworthy that the ECOWAS economies and sectors are highly labour intensive. Hence, policies should be implemented, to attract both foreign and domestic investments into ECOWAS countries. This could be in terms providing a conducive environment in terms strong institutions especially ensuring political stability, rule of law, government effectiveness and better regulatory quality. This should co-exist with an inflation targeting monetary policy regime and exchange rate stabilisation.

## References

- Adebayo, A. K., & Harold, N. (2016). Monetary policy shocks and industrial output in BRICS countries. *SPOUDAI Journal of Economics and Business*, 66(3), 3–24.
- Ali, M. H. (2020a). The effect of some short-term debt instruments on the money supply and its effect on the production of wheat crop in Iraq during the period (1990–2018). *Journal of Economics and Administrative Sciences*, 26(122), 379–393. Available from: <https://www.iasj.net/iasj/article/191997>.
- Ali, S. (2020b). Exchange rate effects on agricultural exports: Transaction-level evidence from Pakistan. *American Journal of Agricultural Economics*, 102(3), 1020–1044. doi:10.1002/ajae.12027.
- Balogun, E. D. (2007). *Monetary policy and economic performance of West African Monetary Zone countries*. MPRA Paper 4308. Germany: University Library of Munich.
- Bank of Ghana (2021). Monetary policy framework. Available from: <https://www.bog.gov.gh/monetary-policy/our-monetary-policy-framework/#:~:text=The%20Bank%20of%20Ghana%20uses,rate%2Doriented%20monetary%20policy%20operation.&text=The%20Bank%20of%20Ghana%20currently,term%20deposits%2C%20and%20reserve%20requirements>.
- Beck, N., & Katz, J. N. (1995). What to do (and not to do) with Time-Series Cross-Section Data. *American Political Science Review*, 89(03), 634–647. doi: 10.2307/2082979.
- Central Bank of Nigeria (2018). The conduct of monetary policy. Available from: <https://www.cbn.gov.ng/MonetaryPolicy/Conduct.asp#:~:text=The%20conduct%20of%20monetary%20policy%20by%20the%20Central%20Bank%20of,of%20the%20naira%2C%20and%20achieve>.
- Chaudhry, I. S., Ismail, R., Farooq, F., & Murtaza, G. (2015). Monetary policy and its inflationary pressure in Pakistan. *Pakistan Economic and Social Review*, 251–268.
- Chimwemwe, N. (2020). Exchange rate movements and agricultural trade in Malawi. *African Economic Research Consortium*. Available from: <https://publications.aercafricalibrary.org/xmlui/handle/123456789/956>.
- Danladi, J. D., & Uba, P. U. (2016). Does the volatility of exchange rate affect the economic performance of countries in the West African monetary zone? A case of Nigeria and Ghana. *British Journal of Economics, Management & Trade*, 11(3), 1–10.
- Dong, B., Ma, X., Wang, N., & Wei, W. (2020). Impacts of exchange rate volatility and international oil price shock on China's regional economy: A dynamic CGE analysis. *Energy Economics*, 86, 103762. doi:10.1016/j.eneco.2017.09.014.
- Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *The Review of Economics and Statistics*, 80(4), 549–560. Available from: <http://www.jstor.org/stable/2646837>.

- Hoehle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal: Promoting Communications on Statistics and Stata*, 7(3), 281–312. doi: [10.1177/1536867x0700700301](https://doi.org/10.1177/1536867x0700700301).
- Idris, A. S., Hassan, S., & Muhammed, A. (2016). Effects of exchange rate volatility on outputs in some selected West Africa countries. *International Journal of Development and Economic Sustainability*, 4(1), 1–10.
- Ikechukwu, K. (2015). Interest rate and credit sensitivity of sectoral output in Nigeria. *International Journal of Business and Finance Research*, 9(4), 103–114.
- Ikenna, O. D. (2012). Financial deregulation bounding to credit mobilization in Nigeria: A case for the real sectors and SMEs. *IOSR Journal of Humanities and Social Science*, 5(5), 40–59.
- International Monetary Fund (2021). Monetary policy related interest rate. Available from: <https://data.imf.org/regular.aspx?key=61545867>.
- Jailson, D. C. T.D. O., Bruno, F. F., Osvaldo, C., & da, S. F. (2015). Monetary policy in Cape Verde and macroeconomic changes: Empirical evidences. *African Journal of Business Management*, 9(3), 76–95. doi: [10.5897/ajbm2014.7459](https://doi.org/10.5897/ajbm2014.7459).
- Jelilov, G., Celik, B., & Adamu, Y. (2020). Foreign portfolio investment response to monetary policy decisions in Nigeria: A Toda-Yamamoto approach. *International Business Research*, 13(3), 166–166.
- Johnson, D.G. (1980). Inflation, agricultural output, and productivity. *American Journal of Agricultural Economics*, 62(5), 917. doi: [10.2307/1240284](https://doi.org/10.2307/1240284).
- Kamanta, J. (1986). *Elements of econometrics*, (2nd ed.). New York: Macmillan.
- Khan, S., Sherazi, H., & Liaqat, S. (2020). Impact of money supply and domestic credit on economic well-being: A case of Pakistan. *European Online Journal of Natural and Social Sciences, Česká Republika*, Available from: <https://european-science.com/eojnss/article/view/6078> (accessed 20 March 2021).
- Luciano, F. G., Luiz Carlos, D. S. R., Frederico Gonzaga, J., Jr., & Oreiro, J. L. (2020). Manufacturing, economic growth, and real exchange rate: Empirical evidence in panel data and input-output multipliers. *PSL Quarterly Review, Economia Civile*, 73(292), 51–75.
- Mahara, T. (2020). Money supply-economic growth nexus: Evidence from a Landlocked country. *Quest Journal of Management and Social Sciences*, 2(1), 132–153, Available from: <https://ssrn.com/abstract=3649376>.
- Nwoko, N. M., Ihemeje, J. C., & Anumadu, E. (2016). The impact of monetary policy on the economic growth of Nigeria. *African Research Review: An International Multi-Disciplinary Journal, Ethiopia*, 10(3), 192–206.
- Nwosa, P. I., & Saibu, M. O. (2012). The monetary transmission mechanism in Nigeria: A sectoral output analysis. *International Journal of Economics and Finance*, 4(1), 204–212. doi: [10.5539/ijef.v4n1p204](https://doi.org/10.5539/ijef.v4n1p204).
- Ogunjimi, J. (2019). Exchange rate dynamics and sectoral output in Nigeria: A symmetric and asymmetric approach. *American Journal of Social Sciences and Humanities*, 5(1), 178–193, doi: [10.20448/801.51.178.193](https://doi.org/10.20448/801.51.178.193), Available from: <https://ssrn.com/abstract=3560822>.
- Onifade, S. T., Alagöz, M., Erdoğan, S., & Obademi, O. (2020). Inflation, oil revenue, and monetary policy mix in an oil-dependent economy: Empirical insights from the case of Nigeria. *International Journal of Business, Economics and Management*, 7(2), 96–10. doi: [10.18488/journal.62.2020.72.96.109](https://doi.org/10.18488/journal.62.2020.72.96.109).
- Osinubi, T. S., & Akinyele, A. O. (2006). Commercial bank lending rates and the real sector of the Nigerian economy. *The IUP Journal of Bank Management*, (3), 27–48.
- Parks, R. W. (1967). Efficient estimation of a system of regression equations when disturbances are both serially and contemporaneously correlated. *Journal of the American Statistical Association*, 62(318), 500. doi: [10.2307/2283977](https://doi.org/10.2307/2283977).

- Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels*, CESifo Working Paper No. 1229.
- Pesaran, M. H. (2014). Testing weak cross-sectional dependence in large panels. *Econometric Reviews*, 34(6-10), 1089–1117. doi: [10.1080/07474938.2014.956623](https://doi.org/10.1080/07474938.2014.956623).
- Raji, R. O. (2013). Impact of misaligned real exchange rate on economic performance: A case study of West African monetary zone. *IOSR Journal of Economics and Finance*, 1(6), 56–67.
- Serletis, A., & Liu, J. (2020). Inflation and economic activity in advanced and emerging economies. *International Journal of Finance & Economics*. doi: [10.1002/ijfe.2367](https://doi.org/10.1002/ijfe.2367).
- Singh, S. K., & Tripathi, R. D. (2014). Sectoral effects of monetary policy shock: Evidence from India, MPRA Paper, 62069. Available from: <http://mpra.ub.uni-muenchen.de/62069/>.
- Siri, A. (2012). *Monetary policy rules: Lessons learned from ECOWAS countries*. Nairobi: African Economic Research Consortium.
- Tule, M. K., Egbuna, E. N., Akinboyo, O. L., Afangideh, U. J., & Oladunni, S. (2016). The impact of the Central Bank of Nigeria's monetary tightening measures on credit availability to selected sectors of the economy. *West African Financial and Economic Review (WAFER)*, 14(1).
- Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data* (108(2), pp. 245–254). Cambridge, MA: MIT Press.
- World Development Indicators (2019). World Bank data. Available from: <https://data.worldbank.org/country/>.

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