MONETARY POLICY AND MANUFACTURING SECTOR DEVELOPMENT IN SUB-SAHARAN AFRICA: EVIDENCE FROM THE CFA FRANC ZONE

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ABSTRACT

The study examined the effect of monetary policy on manufacturing value added (performance) of the CFA franc zone of SSA based on panel data covering 7 countries in the region from 1995 to 2021. The study employed the panel ARDL model, which is estimated with three dynamic panel estimators, namely Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effect to capture the long and short-run response of the manufacturing sector to monetary policy. Lending interest rate, exchange rate, and domestic credits to the private sector were monetary policy variables while manufacturing value added was used to measure manufacturing performance. Findings from the study show that in the short-run, all monetary variables comprising the lending interest rate, credit to the private sector, and exchange rate have no real impact on manufacturing sector performance. However, in the long run, lending interest rate and credit to the private sector have significant negative and positive effects respectively on manufacturing performance while the exchange rate had no real impact. The study concludes that monetary policy has a significant impact on manufacturing sector performance in the zone through lending interest rates and domestic credits. Based on the findings, the study recommends an expansionary monetary policy that involves a lowering of lending interest rates to provide more incentives for manufacturers to invest and increase output. Manufacturer-specific credits should be increased and closely monitored to boost production. The region should diversify the export basket from primary products and adopt market-determined exchange rate.

Keywords: Manufacturing value added, Monetary policy, Sub Saharan Africa, CFA franc zone, Panel ARDL
JEL Classification: E52; N97; 014

1. INTRODUCTION

The drive for a vibrant manufacturing sector in any developing nation cannot be overemphasized. This is because of the nature of manufacturing activities which has the potential to expand technological boundaries and forge linkages that enhance growth and economic development (Nnyanzi, et al, 2022; Ghosh and Parab, 2021; Adesina, 2021; Juhro, 2020; Nwokoma, 2016). Sub-Saharan Africa (SSA) is home to the vast majority of the world's poorest people. A robust manufacturing sector is crucial to the region's prospects for rapid economic development. A boost in manufacturing activity leads to increased employment that is productive. It is a potent remedy for the rising rate of youth unemployment (Lawal et al, 2022; Mlambo, 2020; Ududechinyere et al, 2018; Anyanwu, 2018). Mass production of goods and services for domestic and international markets is made possible by manufacturing

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activities, which raise factor incomes, the standard of living of the people, and foreign exchange earnings. The tax revenue base of nations can also be boosted significantly through the development of the manufacturing sector. In the past, Europe's economic transition has benefited from booming manufacturing activities (Lugina et. (2022)Junanker, 2019; Appleyard and Field 2019). Manufacturing has recently made a substantial contribution to the amazing growth and development of the East Asian emerging economies. Due to the significant advancements made in manufacturing, East Asian nations like Korea, Taiwan, Hong Kong, Singapore, and Malaysia have gained more respect in the comity of nations (Lugina et al, 2022; Adesina, 2021, Arjun et al, 2020).

It has been argued that SSA is poor because of its extreme reliance on the production and export of primary products (Adesina, 2021). Undoubtedly SSA has not benefited from the development of the manufacturing sector. The majority of manufacturing activities are focused on the manufacture of light consumer goods in a select few industries, including food and beverage, textile, leather goods, tobacco, and wood and furniture. The sector also makes a relatively small contribution to the creation of jobs (World Bank, 2021; Austin et al. 2017)

There is no gainsaying that the performance of SSA manufacturing in terms of value addition and exports leaves much to be desired. The sector has consistently ranked low in comparison to other regions of the world in terms of these performance indices. In comparison to other regions, the manufacturing value-added percentage of Gross Domestic Product (MVA) in SSA has been the lowest during the past 27 years, according to underlying statistics from World Bank (2021). When compared to East Asia and the Pacific and Organization for Economic Cooperation and Development (OECD) countries, SSA MVA averaged barely 10.9%, while those regions' values were 29.7% and 17.3% respectively. The SSA's performance is still far from ideal when it comes to exports of manufactured goods. The average percentage of manufactured exports in the SSA was 25.1%, compared to 84%, 74.7%, 73.2%, and 17.2% in East Asia, the OECD, Europe, and Central Asia, and the MENA, respectively. The only region SSA did better than in export performance was the MENA region (World Bank, 2021).

The poor performance of the SSA manufacturing sector could be a result of numerous issues plaguing SSA manufacturing, including a lack of sufficient funding for industrial growth, inconsistent macroeconomic policies, an influx of imported goods, infrastructure gaps, human capital shortages, a lack of forward and backward linkages, high energy costs, and an unfavorable business climate (Signe, 2018; AFDB, 2017). Again, Kabir (2022), Prihatin and Aisyah (2022), Iortyer and (Onuh, 2022), Nguyen (2020), Brandao-Marques et al (2020), Shobande (2018), Otero (2017) and Quintero (2015), among other studies, point out that the manufacturing sector is one of the industries that are particularly sensitive to monetary policy. This is because monetary indicators like the exchange rate, interest rate, and credit to the real sector heavily influence production and investments and may not be completely exonerated from the low-value addition of the SSA manufacturing sector. To what extent does monetary policy influence the performance of the manufacturing sector in SSA?

This study's objective is to investigate the effect of monetary policy on manufacturing value added in SSA with a focus on the Communaute Franciere Africaine (CFA) franc zone. The CFA franc zone of SSA cuts across West and Central Africa. Comprising of Benin, Mali, Burkina Faso, Senegal, Chad, Cameroon, Gabon, Guinea Bissau, Equatorial Guinea, Central African Republic, Republic of Congo, Togo, and Niger the zone collectively accounts for one–third of the countries in SSA, and just like the rest of the SSA, the sub-region seem not to have experienced any significant manufacturing value addition. Based on World Bank (2021) statistics, MVA has not only been low but also static, averaging just 10.7% since 1995.

The CFA franc zone has some interesting peculiarities due to its long-standing, strong, integrated monetary system concerning its common currency, common monetary policy, and fixed exchange rate regime with the Euro (initially with the French franc). The zone is of particular interest because of the likelihood that its salient monetary features will have some far-reaching implications for the industrial performance and economic growth of the zone (see Amin, 2022; Perez, 2022; Wilson, 2020; Vaillant and Fanti, 2020; Hounsou, 2017). The CFA franc zone, which is dominated by former French colonies in Africa, was formally established by the decree of the French government in 1945. Even though it has existed for such a long time, its skeptics criticize the absence of monetary sovereignty. France has a de facto veto on the central bank board of the CFA franc zone (Samba-Sylla, 2017). Due to the fixed exchange rate between the CFA franc and the euro, the franc zone countries' monetary and exchange rate policies are also under the control of the European Central Bank, whose monetary orthodoxy includes a bias against inflation that is thought to be detrimental to growth (Obeng-Odoom, 2022; Amin, 2022; Biankola, and Nzaou-Kongo, 2020; Samba-Sylla, 2017). This perspective argues that the CFA franc zone's integrated monetary system, which neither fosters trade integration between member countries nor enhances bank credit to those economies, inhibits industrialization and structural change. For instance, while the average credit-to-GDP ratio for the CFA franc zone is 10.7%, it is around 25% for the non-CFA zone, which includes nations like Nigeria, Ghana, Kenya, Mauritius, and South Africa, and it is around 19% for SSA (World Bank, 2021).

Although monetary policies are critical tools often employed globally by the monetary authorities for regulating the economy, not much is known about their impact on the manufacturing sector of SSA at an extensive cross-country level. Most of the studies are conducted for developed nations or emerging economies or at best, at the country-specific level (See Liu, et al, 2022; Bellocchi, et al, 2021; Sheikh, et al 2021; Murgia, 2019; Irandoust, 2019; Kilinc and Tunc, 2019; This study is motivated by a dearth of empirical evidence on how monetary policy affects the manufacturing sector performance in the CFA franc zone. This study becomes even more imperative given the theoretical links between the monetary and goods sector, the persistent state of underdevelopment of the manufacturing sector in the region, and the peculiarities of the zone as a monetary union that has persisted for several decades. The study contributes to the literature by filling this noticeable gap. Specifically, the contributions are threefold. First, the study provides empirical evidence on the nature and strength of the relationship between monetary policy and the performance of the manufacturing sector in the CFA franc zone, an area where empirical evidence is lacking. Second, its findings lend credence to theoretical postulations on the nexus between monetary policy and the goods sector. Third, based on empirical foundations, the study makes policy suggestions to enhance the development of manufacturing in the zone. The study covers 7 CFA franc zone countries under a dynamic panel framework. The countries included in the study are Cote d'Ivoire, Senegal, Cameroon, Central Africa Republic, Congo, Gabon, and Niger.

The countries and the time series for the study have been selected due to data availability.

Following this introductory section is the literature review, methodology, results and discussion, conclusion and policy recommendation.

2. LITERATURE REVIEW

2.1 Conceptual Literature

Monetary policy: This refers to coordinated set of actions taken by the monetary authorities of a country to control the cost of credits, quantity, and availability of credit in an economy in accordance with the anticipated level of economic activity. It can also be conceptualized as the

Central Bank's decisions regarding how much money to issue to the economy is known as monetary policy (Mankiw, 2022; Mathai, 2020; Case et al., 2020).

Manufacturing sector: The manufacturing industry, usually referred to as the industrial or secondary sector, is a component of an economy's real or productive sector. It includes companies that engage in the physical or chemical transformation of components and raw materials into new products, whether the activity is done manually or with power tools, in a factory setting or at the home of the worker, and whether the goods are sold at either retail or wholesale outlets. Production of textile, computers and accessories, pharmaceuticals, aluminum products, electronics, electrical assemblies, automobile engines, valves, gears, food and beverage, metal works, plastic, plant and machinery, processing of petroleum products are all included in the broad category of businesses that fall under manufacturing. The finished commodities may be used as capital goods, consumer goods for sale to clients, or intermediary goods (United Nations ISIC, 2008).

2.2 Theoretical Literature

The IS-LM Model: The IS-LM model was first presented by John Hicks (1937); just a few months after John Maynard Keynes published his seminal work on the general theory of employment, interest, and money. The IS-LM model, which stands for investment-savings and liquidity preference-money supply, demonstrates the relationship between the money market, also known as LM, and the goods market, also known as IS. While the IS curve depicts the equilibrium of the goods market, where investment (I) equals savings (S), the LM curve depicts the equilibrium of the money market, where the demand for money (L) equals the supply of money (M).

Mostly depicted in a graph, the IS-LM model examines the relationship between output and interest rate. The IS curve unveils the set of all levels of interest rates and output at which total investment equals savings, while the LM curve shows all sets of the level of output and interest rates at which money supply equals money demand. Under the conditions of a closed economy and an economy operating at less than full employment equilibrium output levels, the model depicts that an expansionary monetary first reduces the interest rate in the money market which then sets up a chain of reactions in the goods markets. With the downward-sloping IS curve, a decrease in interest rate reduces the cost of borrowing and increases investment spending, aggregate demand, and output.

Although this theory is not without criticism, studies investigating the link between monetary policy and output have found comfort in it as a useful theoretical model for explaining how the interaction between the money and goods markets affects equilibrium interest rates and production (see Kabir, 2022; Munir, 2018).

The Mundell-Fleming Model: The restrictive assumptions of the IS-LM framework of a closed economy brought about the Mundell-Fleming model which is also known as the IS-LM-BP model. Against the unrealistic autarky system, as assumed by the IS-LM model, this improved version characterizes a small open economy with perfect capital mobility and perfect substitutability between domestic and foreign assets. The Mundell-Fleming framework reveals the short-run relationship between an economy's interest rate, nominal exchange rate, and output. This framework was used to argue that an economy cannot simultaneously maintain a fixed exchange rate, free capital movement, and an independent monetary policy.

The model predicts that the efficacy of monetary policy in influencing output depends on the exchange rate regime countries adopt. Based on the model, monetary policy is less effective

under a fixed exchange rate regime compared to a flexible or market-determined exchange rate regime because countries lose monetary autonomy in their attempt to maintain the exchange rate at a certain level (Mundell, 1963; Fleming, 1962; Mankiw, 2022). According to the model, an expansionary monetary policy reduces the domestic interest rate which fosters capital outflows since local investors buy foreign bonds to earn higher returns. This increases the demand for foreign currency leading to domestic currency depreciation. Following domestic currency depreciation, imports become more expensive, exports become cheaper, and exports increase thereby stimulating domestic output.

In a system with fixed exchange rates, the outcomes illustrated above are the opposite. With a fixed exchange rate regime, the central bank intervenes to counteract the pressure of exchange rate depreciation that results from a monetary expansion to keep the exchange rate at a targeted level. Thus there is no real effect of monetary actions on domestic output.

Notwithstanding the model's drawbacks, its appeal lies in its relevance in analyzing the impacts of the exchange rate targeting monetary policy framework commonly adopted by the CFA franc zone countries' monetary union.

Monetarist Theory: Monetarist theory is linked with the significant contributions to monetary policy and theory by the Nobel Prize, winning economists Friedman and Schwartz (1963) based on their work entitled 'A Monetary History of the United States, from 1867 to 1960'. The monetarist postulation is expressed in the Quantity Theory of Money (QTM) represented by the following equation. MV=PY. Where, M, V, P, and Y are the supply of money, the velocity of money, the price level, and total output respectively. Based on the assumptions of full employment equilibrium in the long run, a constant velocity of money, and an exogenously determined money supply, the theory holds that an increase in the money supply will temporarily affect output and employment in the short run. However, with the attainment of full employment equilibrium output; further increase in the money supply only serves to increase the price level and not the levels of output and employment. From the postulations of the monetarist school, it can be deduced that monetary policies can be used as short-term stabilization tools to steer economies to full employment equilibrium-output levels when there is disequilibrium. Again, price stability can be achieved if money supply and output grow in tandem through rule-based monetary policy which ensures steady growth in money supply are in line with the expected level of economic activity.

2.3 Empirical Literature

Mlambo (2020), based on panel data employed the Fully Modified Ordinary Least Square (FMOLS) and Pool Mean Group (PMG) models to examine how changes in some monetary factors affected the manufacturing output in South Africa, Namibia, Lesotho, Eswatini, and Botswana from 1996 to 2016. Manufacturing share of Gross domestic product (GDP) served as the dependent variable in the study, while explanatory variables included the interest rate, the exchange rate, inflation, export imports, and foreign direct investments. Results showed that the monetary indicators had a varied impact on manufacturing output. Contrary to the exchange rate, which has a statistically significant negative impact on manufacturing sector output, inflation rates had a statistically significant positive impact on manufacturing output. Interest rates did not exert any real effect on manufacturing output.

Yabu and Kimolo (2020) used quarterly data spanning the years 2002 to 2018 to analyze the relationship between manufacturing exports and exchange rate volatility in the East African nations of Tanzania, Uganda, and Kenya. They used the GARCH model and the Panel Auto

Regressive Distributed Lag Models. The study was conducted against the backdrop of the early 1990s adoption of the monetary and fiscal policy changes spearheaded by the IMF and World Bank. They show that exchange rate volatility has a short-term negative impact on export performance, which suggests that the monetary authorities in the area should implement the necessary stabilization measures to reduce exchange rate volatility and boost export performance.

In their study of the impact of monetary policy indicators on the performance of manufacturing firms in Ghana from 1990 to 2018, Buabeng et al. (2019) used the Auto Regressive Distributed Lag (ARDL) estimation technique and uncovered that both the monetary policy rate and the exchange rate had negative and significant effects on the manufacturing sector output. Using a similar technique, Kabir (2022) investigated the impact of monetary policy on private sector performance in Nigeria from 1981 to 2021. (ARDL) model and documents a long and short-run significant positive impact of money supply on the private sector performance. However, interest rate and exchange rate were found to impact negatively and significantly on private sector performance which implies that high interest and exchange rates are inimical to manufacturing sector performance in Nigeria. Taiga and Adofu (2021), using the Ordinary Least Square (OLS) regression technique, inquired into the effect of bank lending interest rate on manufacturing output in Nigeria from 1986 to 2020 and documented that lending interest rate has a positive and insignificant impact on manufacturing output in Nigeria. Bello et al (2021) investigated the effect of bank credit on manufacturing sector output in Nigeria between 1986 and 2017 employing the ARDL technique. Findings from the study showed that monetary policy through the bank credit channel had a significant positive impact on manufacturing sector output which meant that manufacturing output can be enhanced significantly by allocating more credit to the sector.

In a related study, Adedokun et al (2018) examined the effect of monetary policy on manufacturing sector performance in Africa from 1997 to 2016 based on a cross-section of 16 African countries. The technique adopted was the OLS panel regression analysis. The findings indicate that the money supply and liquidity ratio have a positive and real impact on manufacturing output while interest rate had a negative and significant impact on the same. Furthermore, the exchange rate was shown to impact positively manufacturing output. The findings of a negative impact of interest rate on manufacturing sector performance by Adedokun et al (2018) are in tandem with Kabir (2022). One drawback of the study is the adoption of static regression analysis which completely ignores the dynamic interactions of monetary variables such as interest rate and exchange rate with manufacturing output growth.

Also, the study found that manufacturing production is negatively but significantly impacted by lending rate, which is consistent with a priori expectations. The positive and significant impact of exchange rates on industrial output suggests that output increases with higher exchange rates based on the trade effects on exports. Although the finding conforms to theoretical a priori expectations, it is, however, contrary to studies by Kabir (2022) and Mlambo (2020) for Nigeria and South Africa. The study also reveals that the impact of interest rates on manufacturing production is negative which aligns with the a priori expectation.

Turning to the CFA franc zone, the relationship between monetary policy and economic growth in Côte d'Ivoire between 1980 and 2012 was examined by Nahousse (2018). Both the Toda-Yamamoto causality test and the Auto Regressive Distributed Lag (ARDL) method were employed as econometric techniques. In contrast to inflation and the money supply ratio, which had a positive and significant impact on economic growth in Côte d'Ivoire, the interest rate had a negative and significant impact. From the results, there was also evidence of a two-way causal

relationship between these indicators and Côte d'Ivoire's economic growth. Based on this evidence, it is crucial to track changes to these key macroeconomic factors affecting the Ivorian economy in the context of the monetary union of the CFA franc zone.

Asongu (2016) inquired into how the CFA franc zone's output and prices were impacted by monetary factors such as the money supply and bank credit. The long-run and short-run impacts, respectively, were estimated using the framework of Vector Error Correction Models (VECMs) and Granger causality models. The researcher documents that money supply and bank credit positively and significantly influence output in the short run but not in the long run. Concerning the policy implication, the observed neutrality of money in the long term suggests that monetary policy can be effectively deployed in the zone as a short-term stabilization tool. Concerning the effect of monetary variables on prices, the empirical evidence made known that monetary policy only mattered in the long run.

Douanla-Tayo (2014) used a dynamic panel model popularly known as the generalized method of moments (GMM) to examine the impact of monetary policy on economic growth for the fourteen nations of the CFA franc zone for the period 1985–2012. Results showed that domestic credit given by the banking sector had a significant negative impact on economic growth. The analysis showed also that while total reserves and inflation had negative impact on economic growth, the money supply had a significant beneficial impact. Policy implication from the study required that credit be allocated to initiatives with the highest social returns and to profitable local companies to counter the negative impacts of domestic credit given by the banking industry.

Ciani and Bartoli (2020) used firm-level data from 1057 sampled manufacturing firms and an instrumental variable estimation technique to assess the effects of bank credit constraints on the export quality of good produced by Italian Manufacturing Small and Medium Size Enterprises (SME) from 2002 to 2010. Total bank credit, export quality, labour productivity, liquidity ratio, business size, cash flow, and capital intensity are the variables taken into account in the model. Results suggest that manufacturing exports to markets outside of Europe were more negatively impacted by loan restrictions. From the study, it became apparent that when businesses have less access to finance, they have more difficulty funding expenditures that will raise the quality of their exportable products, which has a detrimental effect on their ability to compete.

In India, Sankaran and Vadivel (2021) inquired into the effect of monetary policy on manufacturing output in India based on the Auto Regressive Distributed Lag (ARDL) model. The data covered the period from 1980 to 2018. The variables in the model included the lending rate, exchange rate and the manufacturing output (manufacturing value added). In the long-run, lending rates had significant positive effects on output which meant that increasing the lending rate will increase output however, the transmission through which this is achieved was not clearly demonstrated by the study. The study uncovered that increase in exchange rate (depreciation) impacted positively and significantly on manufacturing output meaning that exchange rate depreciation stimulates growth in output.

From the empirical literature review, it is obvious that there are divergent viewpoints on how monetary policy impacts the manufacturing sector. One noticeable gap in the literature is that very few studies investigate the effect of monetary policy on the manufacturing performance of the CFA franc zone at an extensive cross country level. Despite the exceptional longevity of the CFA franc zone monetary union, and the potential influence its exchange rate targeting-monetary policy framework could have on the real sector performance, there are still very few

studies that specifically examine the nexus between monetary policy and the manufacturing sector performance in the zone. To address this palpable dearth of empirical evidence and fill this noticeable gap, this study addresses the pertinent research question of 'what is the impact of monetary policy on the manufacturing performance of the CFA franc zone?' What impact do key monetary variables such as lending rate, credit availability and exchange rate have on manufacturing performance in the zone?
The study tests the null hypothesis that monetary policy does not have any significant effect on the manufacturing performance of the CFA franc zone.

3. METHODOLOGY

3.1 Theoretical framework

The study is based on the theoretical foundations established by the extended version of the IS-LM Model commonly referred to as the Mundell-Fleming Model. The Mundell-Fleming framework is favoured for our analysis because it reveals the short run relationship between an economy's interest rate, nominal exchange rate and output. Whereas, the Keynesian IS-LM model provides the linkage between the monetary sector and the goods market and the adjustment that must take place in order to achieve full employment output through the interest rate channel, the Mundell - Fleming model adopts a more realistic perspective by introducing the open economy and exchange rate dynamics in explaining the nexus between monetary policy and the goods sector thereby overcoming the restrictive assumption of a closed economy of the IS-LM model. Again, according to Mankiw (2022), the model represents the dominant paradigm for analyzing how output responds to monetary policy under the fixed or market determined exchange rates considered germane to the study of the CFA franc zone.

3.2 Model specification

From the Mundell-Fleming model, interest rates and exchange rates are the monetary variables that determine the equilibrium output (see Mankiw, 2022), which in this case can be said to be the manufacturing sector performance. This study's estimation model is geared towards the modification of the theoretical conclusion of the Mundell-Fleming model. Hence credit to the private sector is included as another money variable, in addition to other variables such as labour, capital and trade openness which act as control variables in the model.

Therefore, this study has adopted and modified Saibu and Nwosa (2011) and Fasanya (2013) to permit the inclusion of credit to the private sector and other control variables. The mathematical function is expressed as:
$Q = f(W, Z)$ …….. (1)
Where:
Q = Manufacturing sector performance
W = Vector of monetary policy variables
Z = Vector of control variables
Based on the above function, Q is the manufacturing sector performance measured by manufacturing value added. W represents the lending interest rate, exchange rate and credit to the private sector, while Z represents labour, capital and trade openness.
Therefore, equation (1) becomes:
$mva = f(int, exr, cps, lab, cap, top)$ …….. …… (2)

From (2), the empirical model can be specified as follows:

$mva_{it} = \delta_0 + \delta_1 int_{it} + \delta_2 exr_{it} + \delta_3 cps_{it} + \delta_4 cap_{it} + \delta_5 lab_{it} + \delta_6 top_{it} + e_{it}$ ..... (3)
Where: $\delta_1, \delta_2, \delta_3, \delta_4, \delta_5, \delta_6$ are coefficients of the explanatory variables and e, the error term.
A priori**:** $\delta_1 < 0; \delta_2, \delta_3, \delta_4, \delta_5, \delta_6 > 0$

3.3 Definitions of Variables and Data Sources

Variable	Definition	Measurement	Source
mva_t	Manufacturing value added, expressed as a percentage of GDP	Percent (%)	WDI (2021)
int_t	Lending rate.	Percent (%)	WDI (2021)
exr_t	Official exchange rate	US Dollar	WDI (2021)
cps_t	Credit to private sector, expressed as a percentage of GDP	Percent (%)	WDI (2021)
lab_t	Labour force expressed in natural logarithm	Billions	WDI (2021)
cap_t	Gross capital formation expressed as a percentage of GDP	Percent (%)	WDI (2021)
top_t	Trade openness measured as the sum of imports and export divided by GDP	Percent (%)	WDI (2021)

The data for analysis in this study spanned from 1996 to 2021 and is reported on annual frequency. Data are sourced from the World Development Indicators (World Bank, 2021).

3.4 Method of Data Analysis

The Dynamic Heterogeneous Panel Auto Regressive Distributed Lag (ARDL) model will be used to examine the effect of monetary policy on manufacturing sector output in the CFA franc zone of SSA. Three dynamic and heterogeneous panel estimators, namely the Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effect (DFE) estimators, are typically used to estimate the panel ARDL model. The Hausman test is then used to choose the most efficient estimator. For comprehensiveness, the results of all the estimators are reported in this study. However, the focus is on examining the outcomes of the most efficient estimator.

Following conventional empirical practice to determine the estimator with the most efficient and reliable estimates, the MG and the PMG models are first compared, under the null hypothesis that the latter is more efficient. The choicest between both models is further compared with the DFE model, with the null hypothesis stating that the latter is superior. The attractions of these models are interestingly diverse. One, the dynamic estimators can uniquely account for heterogeneity among the cross-sections. Two, they can suitably account for nonstationary property of the series, hence they are also called nonstationary estimators (Salisu et al., 2017). Three, the ARDL framework allows for the simultaneous estimation of both the short- and long-run estimates. Four, in addition to being consistent with mixed integration orders, it produces an error correction mechanism through which the speed of adjustment to long-run equilibrium is assessed. Last but not the least, its specification allows for the correction of the problem of endogeneity bias. All these merits make the Panel ARDL model to be preferred above other commonly applied methods.

However, before the estimation of the model, unit root tests will be performed to rule out spurious results which may arise from the use of time series data. For robustness, three different techniques of units are employed to examine the time series characteristics of the variables in the model. The Im, Pesaran and Shin (IPS) and Levin, Lin and Chu (LLC) represent the first

generation unit root tests while the corrected Im, Pesaran and Shin (CIPS) represent the second-generation. Also a correlation analysis on the explanatory variables will be carried out to rule out incidence of multicollinearity from the model.

4. RESULTS AND DISCUSSION OF FINDINGS

Table 1: Correlation matrix

Variable	MVA	INT	EXR	CPS	CAP	LAB	TOP
MVA	1.0000						
INT	-0.4035	1.0000					
EXR	-0.1124	0.1347	1.0000				
CPS	0.4038	-0.3630	-0.0807	1.0000			
CAP	0.0066	-0.0850	-0.1323	0.1924	1.0000		
LAB	-0.0379	-0.0838	-0.0403	0.2503	-0.0838	1.0000	
TOP	-0.1902	0.0202	-0.0684	0.0121	0.7417	-0.2794	1.0000

Source: Author's computation based on WDI (2021)

Correlation measures the degree of linear relationship between two or more variables. The degree of correlation between the explanatory variables also gives an indication of the presence of multicollinearity in the model. The correlation matrix is presented in table 1. A careful observation of the correlation matrix shows that the explanatory variables in the model are not strongly correlated. There is no correlation coefficient that is higher than the positive coefficient of 0.7417 which exists between CAP and TOP. The absence of extremely high correlation coefficient between the explanatory variables is indicative of the absence of multicollinearity.

Table 2: Panel Unit Test Result

Tools	**IPS**		**LLC**		**CIPS**	
***I (d)**	**I (0)**	**I (1)**	**I (0)**	**I (1)**	**I (0)**	**I (1)**
MVA	-2.164*	-5.314***	-0.781	-2.909***	-2.209*	-4.596***
CAP	-2.007*	-5.999***	-1.101	-7.881***	-2.578***	-5.688***
CPS	-1.071	-3.458***	2.708	4.308***	-2.473**	-4.472***
LNEXR	-1.608	-3.712***	-1.543*	-6.442***	-5.787***	-6.190***
INT	-1.145	-5.765***	-0.206	-4.514***	-0.587	-4.664***
LNLAB	-1.987	-1.261	-4.212***	-0.334	-2.695***	-3.793***
LNTOP	-1.724	-5.644***	1.028	-3.853***	-2.120	-5.255***

*****, **, * denote the rejection of the null of a unit root 1%, 5% and 10% respectively**.

The results of the unit root tests in table 2 show that the variables used in this study have different orders of integration. However, the highest order of integration of the variables is order one (1). None is integrated of order two (2), which makes the autoregressive distributed lag (ARDL) model the most appropriate method of estimation for this study as it is capable of handling variables that have different orders of integration.

Table 3: Panel ARDL Result

Dependent variable: Manufacturing value added.

	MG	**PMG**	**DFE**
Long-run estimates			
INT	-0.1964	-0.1828***	-0.4655**

	(0.3536)	(0.0419)	(0.2132)
LNEXR	2.5078 (5.9006)	2.9832 (1.9010)	-6.9664 (9.7433)
CPS	-0.4489 (0.2770)	0.1561* (0.0820)	-0.5763 (0.4216)
CAP	0.0952 (0.092)	-0.0212 (0.0305)	0.2283 (0.2249)
LNLAB	5.8248 (13.1675)	-1.4242 (1.9978)	-0.4910 (10.3717)
LNTOP	3.8229 (3.6875)	4.0477** (1.8000)	-6.9965 (9.5327)
ECT	-0.7411*** (0.1098)	-0.2735** (0.1194)	-0.1736*** (0.0414)
Short-run estimates			
INT	-0.1921* (0.0991)	-0.1991 (0.1770)	-0.2287*** (0.0809)
LNEXR	2.0788 (2.4069)	-0.3963 (2.1861)	1.6027 (2.5057)
CPS	0.4434 (0.2931)	0.0428 (0.0572)	0.2258** (0.0969)
CAP	0.0024 (0.0960)	-0.0117 (0.0507)	-0.0351 (0.0398)
LNLAB	40.9409 (42.7020)	33.0567 (24.8958)	1.1992 (27.7348)
LNTOP	-2.8909 (2.7022)	0.0737 (1.6395)	1.1038 (1.7030)
C	-105.203 (144.6137)	-2.1162 (1.6105)	16.2279 (32.4377)
Hausman test			
MG vs. PMG	----------	7.65(0.27)	----------
MG vs. DFE	----------	----------	8.74(0.19)

***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Values in parentheses, "( )", and brackets, "[ ]", are standard errors and probabilities, respectively.

Source: Author's computation using stata

How the manufacturing value added (net output) of the CFA franc zone of SSA responds to monetary policy is empirically unraveled and presented in table 3. From the results, the Hausman test favours the PMG estimator as the most efficient estimator. Accordingly, estimate of coefficients under the PMG is accordingly adopted for interpretation and hypothesis testing.

In the long – run, monetary policy, through the lending interest rate has negative and statistically significant effect on manufacturing value added. In terms of magnitude, a 1% rise in interest rate will reduce manufacturing value added by 0.1828%. The economic implication is that increases in interest rates are detrimental to manufacturing performance since it makes the cost of borrowing for productive purposes more costly conversely a fall in interest rate will increase profit expectations and incentivize manufacturers to increase their investment leading to increased manufacturing output. The finding conforms to a priori expectations. The result is also in tandem with the findings of Kabir (2022), Nahousse (2018) and Adedokun et al (2018) but contrary to Sankaran and Vadivel (2021), Taiga and Adofu (2021) and Mlambo (2020).

Credit to the private sector impacted positively and significantly on manufacturing value added. A 1% increase in the credit to the private sector increased manufacturing value added output significantly by 0.1561%. This means that the allocation of more credit to manufacturers enhances manufacturing performance. This also conforms to a priori expectations as manufacturing activity typically responds positively to availability of credit. This finding is consistent with the result of Bello et al (2021), Ciani and Bartoli (2020); Asongu (2016) but contrary to the findings of Douanla-Tayo (2014)

Concerning the exchange rate, there is a positive and insignificant relationship between exchange rate and manufacturing value added. A unit increase in exchange rate will lead to a 2.9832% increase in manufacturing value added. However, this relationship is not significant even at the 10% significance level. The result is in tandem with Adedokun et al (2018) but contrary to the findings of Yabu and Kimolo (2020) and Buabeng (2019) and Shobande (2018). The implication is that the monetary policy through the exchange rate channel is not a major driver of manufacturing sector performance in the CFA franc region. This could be explained by the system of fixed exchange rate regime of the CFA franc countries that has persisted for over 7 decades. With the fixed exchange rate regime, the money supply is geared toward maintaining a fixed exchange rate for the CFA franc with the Euro (Gyoerk, 2017). Again, much of the zone's output is dominated by primary products with little or no value addition. The insignificance of the exchange rate channel is in line with the predictions of the Mundell-Fleming model which assigns a weak role to monetary policy transmission to real sector output under a fixed exchange rate regime.

The short run estimates show that all monetary variables of interest rate, exchange rate and credits to the private sector have no real impact on manufacturing performance even at the 10% level of significance which implies that monetary policy is more in the long run. Meanwhile, the speed of adjustment to long-run equilibrium is -0.2735, implying that any disequilibrium that occurs due to shocks will be corrected at a speed of 27.35% annually. In other words, for disequilibrium in manufacturing value added in the zone to be fully restored to equilibrium, it takes approximately 3.6 years at the current speed of adjustment.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study examined the effect of monetary policy on manufacturing value added (performance) of the CFA franc zone of SSA based on panel data covering 7 countries in the region from 1995 to 2021. The study employed the panel ARDL model, which is estimated with three dynamic panel estimators, namely Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effect to capture the long and short-run response of the manufacturing sector to monetary policy. Lending interest rate, exchange rate, and domestic credits to the private sector were used to capture the monetary policy while manufacturing value added was used as a proxy for manufacturing performance. The control variables included in the model are labour, capital, and trade openness. Findings from the study show that in the short-run, all monetary variables comprising of lending interest rate, credit to the private sector, and exchange rate have no real impact on manufacturing sector performance. However, interest rate and credit to the private sector have significant negative and positive effects on manufacturing performance in the long run. As uncovered in the short run, the exchange rate had no real impact on manufacturing performance in the long run.

Our results suggest that manufacturing performance in the CFA franc zone will be enhanced with a reduction in interest rate as this will increase the capacity of the manufacturing sector to borrow to support investment that will enhance value addition. Findings also imply that an

increase in the domestic credit to the private sector will improve the manufacturing performance as this will help improve the quality of their products for domestic consumption and export. In light of the evidence from this study, we conclude that monetary policy does have an impact on manufacturing sector performance in the CFA franc zone of SSA through the interest rate and credits. Based on the findings, the study recommends a lowering of lending interest rates to provide more incentives for manufacturers to invest and increase output. More credit should also be directed to the manufacturing sector and closely monitored to boost production. Additionally, the CFA franc zone should diversify the export basket from a concentration on primary products, do away with the fixed exchange rate regime, and conduct monetary policy in the context of a more market-oriented exchange rate regime.

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