

Kayode A. Akinyemi^a • Isaac A. Ogbuji^b • Sunday A. Adedokun^c**Manufacturing sector performance in Africa: The role of monetary policy instruments****Abstract**

This scientific enquiry investigates the effect of monetary policy instruments on manufacturing performance in twenty African countries over the period of 1997-2016. We use static panel analysis and the results show that liquidity ratio and money supply positively and significantly impact manufacturing output. Lending rate negatively but significantly affects manufacturing output which also conforms to a priori expectation. The positive and significant effect of exchange rate on manufacturing output indicates that the higher the exchange rate the higher the manufacturing output. The study also finds that interest rate negatively impacts manufacturing output. Hence, African countries should endeavor to strengthen their monetary authorities and be dynamic in their monetary policy to effectively control supply of money and reduce lending rate.

Received:
May 3, 2018

Revised:
September 11, 2018

Accepted:
October 20, 2018

Keywords:
Monetary Policy
Manufacturing Output
Money Supply
Lending Rate

JEL Classification:
E43
G52
N67

1. Introduction

Manufacturing sectors in Sub-Saharan African countries have not performed to expectation compared to other sectors of the economy such as services, agriculture, transport, mining and quarry, in spite of the various policies put in place to grow the sector and maximize its potentials. Worldwide, the manufacturing sector has been acknowledged as a device for growth. Emerging economies such as China, India, Malaysia, North Korea and Singapore's economic achievement in terms of growth rate of their gross domestic product is credited to growth in the manufacturing output. The Sustainable Development Goals (SDGs) 2030 place emphases on the need to grow the manufacturing sector. The importance of the manufacturing sector potential to achieve the Sustainable Development Goals (SDGs) 2030 of economic growth, trade, infrastructure development, satisfactory consumption and production respectively therefore cannot be overemphasized.

This paper and more can be downloaded without charge from <http://www.bequarterly.rysearch.com>



Kayode A. Akinyemi: akinyemikayode4real@gmail.com

a, c. Department of Economics, University of Lagos, Nigeria.

b. Department of Finance, University of Lagos, Nigeria.

How to cite this article: Akinyemi, K. A., Ogbuji, I. A., & Adedokun, S. A. (2018). Manufacturing sector performance in Africa: The role of monetary policy instruments. *BizEcons Quarterly*, 3, 27–35.

Improving the growth of the manufacturing sector which can in turn lead to economic growth should be the main focus of monetary authorities all over the world. To create an enabling environment for manufacturing sector in the economy, the monetary authorities need to formulate policies which in the long run will help to improve the output of the sector. Monetary policy instruments that bring increase in money supply and credit to private sector can have a positive impact on manufacturing output (Osmond et al, 2015). Monetary policy is the use of monetary instrument by monetary authorities such as central bank so as to achieve macroeconomic stability (Mesagan and Shobande, 2016; Evans, Adeniji, Nwaogwugwu, Kelikume, Dakare and Oke, 2018). Monetary policy is the sustainability of economic growth and development through economic management which is based on how money affects economic aggregates. Ubiet al (2012) had suggested that dynamics of the domestic and global economic development can only be attained with consistency and transparency of monetary policy.

Even developed economies such as the United State of America (USA), France, Germany and the like cannot but sustain their monetary policy so as to improve their manufacturing sector. Monitoring the response of each sector of the economy is key to the effectiveness of the monetary policy instruments. UK manufacturing industries support the use of asymmetric information for each sector of the economy to analyse the effectiveness of monetary transmission (Tena and Tremayne, 2006). The ensuing argument between government and the public lies on the potency of the monetary policy, if any, on the manufacturing sector. It is against this background that the study set out to examine whether monetary policy has significant effects on the manufacturing sector in Africa. The study aims to provide solution to the following questions; can we attribute the period of manufacturing output growth to appropriate monetary policy? Or do we blame manufacturing output reduction on other factors than monetary policy ineffectiveness? What measures should be put in place for monetary policy to be effective in bringing about sustainable growth in the manufacturing sector? In order to answer these questions, the case of twenty African countries are analysed. Thus, the study uses the twenty largest economies in Africa to proffer answers to the research questions.

Taking this into consideration monetary policy should be considered to have key implications on the manufacturing sector (see, Tena and Tremayne, 2006; Adeleke and Harold, 2017). However, the literature has found controversial results on the effect of some of the instruments of monetary policy on manufacturing output (Gert and Frank, 2002; Hrushikesh, 2011; Mansor et al, 2005; Bakare et al, 2015; Osmond et al, 2015; Usman and Adejare, 2014; Obinna et al, 2017; Laokulrach, 2013; Bruno et al, 2015). Also, Mesagan et al (2018) provided an exposition on the role of financial development in boosting the manufacturing sector to further bolster the discussion. However, this present study merges the variables employed in the previous studies to dissect the effect of monetary policy instruments on the manufacturing sector in Africa. Also, this study extends the cross-country analyses of the impact of monetary policy on manufacturing output to Africa because hardly have we seen a study on this in the continent. Bruno et al (2015), Gert and Frank (2002), and Tena and Tremayne (2006) provided narrative details.

The study is divided into five sections. The first section is the introduction, the second section is literature review, the third section is the methodology, the fourth section discusses the result of the study and the fifth section is the conclusion and recommendations.

2. Literature Review

In economic literature, there are many studies on monetary policy and manufacturing output. Some of these studies such as Osmond et al (2015), Adeleke and Harold (2017), Ibrahim and Amin (2005), Usman and Adejare (2014), and Obinna et al (2017) are country-specific. Bakare et al (2015) and Laokulrach (2013) focused on fiscal and monetary policies effect on manufacturing and service sector employment. Hrushikesh (2011) deviated in their studies to look at the impact of monetary policy on construction companies and housing pricing while Adolphus and Deborah (2014) examined monetary policy, bank management and real sector finance. Other cross-country studies focused on Europe Bruno et al (2015), Gert and Frank (2002) and Tena and Tremayne (2006).

For country specific studies on monetary policy and manufacturing output, Usman and Adejare (2014) focused on the Nigeria economy and their finding revealed that Treasury Bills has negative impact on industrial output while rediscount rate and deposit have significant positive effect on industrial output.

Osmond et al (2015) examined the case of Nigeria and found a significant effect of money supply on manufacturing output both at current and lagged values at 1 percent critical value. Also, they found that total credit to private sector at lag 2 and 3 significantly influence manufacturing in Nigeria while interest rate and inflation have no effects. Mesagan et al (2018) also focused on Nigeria and found that there is negative relationship between money supply and commercial banks credit on manufacturing sector in the short-run but there is positive relation in the long-run. Adeleke and Harold (2017), using Structural Vector Autoregressive (SVAR), discovered that manufacturing sector growth fluctuations has nothing to do with money supply. Interest rate explains nearly 35 percent differences in manufacturing output growth and that the overall GDP growth has most control on manufacturing sector growth. Obinna et al (2017) looked into Nigeria circumstances to establish that monetary policy rate and money supply conform to theory on manufacturing output. Their forecast error variance decomposition shows that lending interest rate has the biggest difference in the manufacturing contribution to gross domestic product. Ibrahim and Amin (2005) focused on Malaysian economy by considering exchange rate, monetary policy and manufacturing output. They found that monetary tightening leads to negative responses from real activities while exchange rate shocks seem to have larger effects on manufacturing output than on aggregate output.

The next strand of studies are those that included fiscal policy in the model on manufacturing output and other sectors of the economic. For Nigeria, Bakare et al (2015) found the impact of stabilization policy on manufacturing sector performance cannot be overemphasized; certain adjustment to enhance the effectiveness of government fiscal policy and monetary policy measures must be in place to develop

the sector to better the lives of the masses. Marisa Laokulrach (2013) with the use of Ordinary Least Square (OLS) found that changes in monetary policy affect service sector employment negatively. Fiscal policy does not have any significant relationship to employment rate. Hrushikesh (2011) in his study on monetary policy, construction sector output and housing prices in India found that commercial bank credit from supply side and rise in income on demand side positively impact the construction sector growth. Adolphus and Deborah (2014) examined monetary policy, bank management and real sector finance in Nigeria. Their results showed that average bank liquidity ratio of 46.4 was well above the prescribed average minimum of 27.7%. Nigeria had easy monetary policy regime because the average cash reserve ratio was 6.0 per cent.

The last strand is cross-sectional studies. For example, Tena and Tremayne (2006) focused on modeling monetary transmission in UK manufacturing industry. Asymmetric effects of monetary shocks and cross-sectional differences across industries are shown for some sectors. The results support that sectoral approach is effective for the analysis of monetary transmission as aggregate approach is masked by these asymmetries for specific sector. Gert and Frank (2002) used feasible Generalised Least Square (GLS) for the industrial effects of monetary policy in Euro area and found that durability of the goods produced in the sector is responsible for the differences in the average policy sensitivity over the business cycle. Also, differences in firm size and financial structure are connected with the degree of asymmetry of policy effects over the business cycle. Bruno et al (2015) in their analysis of monetary policy effects on prices found that the size of monetary policy effects on prices is larger on average in country with more flexible exchange rates. The study does find that any significant effect of the size of financial openness on the responsiveness of prices to a monetary policy shock and monetary policy shock has a larger effect on prices in countries with a larger and more developed banking sector.

This empirical study contributes to existing literature by analyzing the role of monetary policy instruments on manufacturing sector performance in Africa. This is to fill a gap that previous studies such as Gert and Frank (2002), Hrushikesh (2011) and Tena and Tremayne (2006), Mansor et al (2005), Bakare et al (2015), Osmond et al (2015), Adeleke and Harold (2017), Usman and Adejare (2014), Obinna et al (2017), Marisa (2013), and Bruno et al (2015) have overlooked in their studies. This study therefore extends the cross-country analyses of the impact of monetary policy on manufacturing output to Africa because hardly have we seen a study on this in the continent. The study also checks the authenticity of general conclusion of different studies on impact of monetary policy on manufacturing output that loosening monetary policy has positive relationship with manufacturing output while tightening of monetary policy has a negative impact on manufacturing output.

3. Methodology

3.1 Data

The study employs secondary data from a panel of twenty African countries to analyse the effect of monetary policy instruments on the manufacturing sector. The African countries in this study include Algeria, Angola, Cameroon, Egypt, Ethiopia, Ghana, Kenya, Liberia, Libya, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Tunisia, and Zambia. The data which cover the period 1997 to 2016 are sourced from the World Bank's World Development Indicators (WDI, 2018).

3.2 Model Specification

There is need to assess the effect of monetary policy in the economy to appreciate its role in the industrial sector. Generally, a change in relative prices and wealth is as a result of changes in the quantities of money supply and money demand. The Fisher's quantity theory of money stated that the price level of the value of money is determined by the quantity of money in circulation. A change in the quantity of money produces the same proportionate change in the price level; that is, with an increase in the quantity of money in circulation results in an increase in price level and vice versa. Living Fisher further assumed that the main channel of firms operating costs is an increase in interest rate which is equipped by a rise in commodity prices. Also, an increase in the price of commodities would follow an increase in the firm's profits which in turn increase investment, and then demand deposit. An increase in public prices, investment and profit results from increase in loan demand and money stock. A rise in the cost of production, which is brought about by decrease in the commodity prices and excess reserves for lending run-out considered interest rate as part of the operating cost of production. This would in turn lead to a decline in investment and profit. In his equation of exchange, Fisher specified that:

$$MV = PT \quad (1)$$

Where M is money in circulation, V is the transaction velocity of circulation of money, P is the price level, and T is the number of transactions made per the period. According to Fisher, the balance values of V (the velocity of circulation of money) and T (the volume of transaction) may not change in the short-run and not be affected with respect to changes in the quality of money. Given this assumption, equation (1) can now be re-written as:

$$MV^- = PT \quad (2)$$

Where bars (-) signify that V and T are constant. With M given as exogenous, the general price level and money supply must have a proportional relationship at equilibrium. It says further that T (total number of transactions made per the period is the quantity of goods [Q]) that is measured in the GDP at a particular period. Hence, $T = Q$ in the above equation. When the equation is re-written, it becomes:

$$MV = PQ \quad (3)$$

Equation 3 shows that money supply has a direct relationship with output i.e. the response of output to money supply is positive.

Following Eregha and Mesagan (2016), and Perry and Olivera (2009), the relationship between manufacturing output and monetary policy is specified as:

$$MVA_{it} = \delta_0 + \delta_1 LIR_{it} + \delta_2 MS_{it} + \delta_3 LR_{it} + \delta_4 EXC_{it} + \delta_5 INT_{it} + \varepsilon_{it} \quad (4)$$

3.3 Estimation Techniques

The Pooled OLS model aids in determining the relationship among these countries manufacturing output and monetary policy thus; where MVA represents the manufacturing, value added of country i, LIR represents liquidity ratio, MS represents money supply, LR represents lending rate, EXC represents exchange rate, INT represents interest rate and ε is the white noise error term in the model. We then proceed to explicitly specify the panel models estimated in this study.

4. Empirical Results and Discussion

In this section, the empirical result is presented and discussed. In discussing the result, the pooled OLS, fixed effect, and random effect results are presented. The F-test and the Wald-Test enables us to choose between pooled OLS and the other two, while the Hausman test makes it possible to choose between the fixed and random effect models.

Table 1 shows the results of the impact of monetary policy instruments on manufacturing sector performance. The estimation of the panel data models includes; the pooled OLS, fixed effect and random effect models. The pooled OLS was rejected because the value (42.215) of Wald test statistics and F-statistics value of 47.2 are significant at 1% which provides evidence of omitted variables, making the fixed effect and random effect models more appropriate.

Table 1. Monetary policy and manufacturing output

Dependent variable: Manufacturing Value Added			
Regressors	Pooled OLS	FE	RE
Liquidity Ratio	0.013*** (3.734)	0.011*** (3.172)	0.023*** (5.233)
Money Supply	0.421*** (3.653)	1.512*** (3.844)	-0.127*** (-4.260)
Lending Rate	-0.128*** (-3.002)	-0.069*** (-2.136)	0.402*** (4.329)
Exchange Rate	0.006*** (3.105)	0.005** (1.014)	0.006*** (3.410)
Interest Rate	0.037 (0.453)	-0.069** (-2.262)	0.022 (0.762)
F-test [prob]		47.211 (0.000)	
Wald test [prob]			42.215 (0.000)
Hausman test [prob]			32.357 (0.000)

Note: FE, fixed effect; RE, random effect; (), t-statistics.

*** and **Indicate 1% and 5% level of significance.

However, the random effect model of the null hypothesis of the appropriateness of GLS estimates was rejected based on the significance of Hausman test statistic value of 32.36. The fixed effect estimation result shows that liquidity ratio has a positive and significant impact on manufacturing output at 1% in the selected Africa countries. This is normal because banks look at the company's ability to pay debt obligations and its margin of safety before approval of loan. Money supply has positive and significant effects on manufacturing output. That is, an increase in the volume of money in the economy will in turn lead to an increase in the output of manufacturing sector which also conforms to theory and the literature (e.g., Osmond et al, 2014, Adeleke and Harold, 2017, Obinna et al, 2017).

In the result, lending rate has a negative and significant effect on manufacturing output. It thus means that as the lending rate increases, manufacturing output decreases. The result is in tune with the findings of Obinna et al (2017). Exchange rate has a positive and significant impact on manufacturing output also. In other words, as exchange rate increases the prices of imported goods increase which in turn decrease consumption and as a result increase the consumption of locally produced goods and bring about increase in manufacturing output. The impact of interest rate is negative, and it is significant at 5% on manufacturing output. It means manufacturing output decreases as interest rate increases. This is because investors want to make quick money hence; they diversify money into security markets. This finding tallies with Osmond et al (2015). Generally, the results obtained in this study regarding the effect of monetary policy on manufacturing performance for the selected African countries show that monetary policy is dynamic in nature relating it more intuitively to the findings of Osmond et al (2015).

5. Conclusion

This study has analysed the effect of monetary policy instrument on manufacturing performance in selected African countries over the period of 1997-2016. The panel analysis was conducted to explore the effect of monetary policy instruments on manufacturing sector in Africa. Secondary time series data from the period 1997-2016 and data are extracted from the World Bank's World Development Indicators. The study made use of twenty countries in Africa. The significance of Hausman test statistic makes the fixed effect model as the most appropriate for this study. Fixed effect estimation shows that liquidity ratio and money supply have a positive and significant impact on manufacturing output. Lending rate is negative and significant effect on manufacturing output which also conforms to a priori expectation. The positive and significant effect of exchange rate on manufacturing output is desirable and good for the economy. Interest rate increases lead to decrease in manufacturing output. This is because investors want to make quick money hence; they diversify money into security markets.

The study, therefore, recommends that African countries should strengthen monetary authorities to effectively control supply of money to enhance manufacturing output and curb inflation. Lending rate should be reduced to the barest minimum for the manufacturing sector to thrive. The liquidity ratio should be checked before approval

of loans to enable the real sector to fulfill their credit obligations. Interest rate ought to be at reasonable level so that it will not have a countercyclical effect on manufacturing output. If the recommendations are considered, monetary policy instruments will affect manufacturing performance positively in Africa. This will reduce consumption of imported goods, increase output of manufacturing sector and in the long run lead to economic growth.

References

- Adeleke, O. & Harold, P. E. (2017). Monetary Policy Transmission and Growth of the Manufacturing Sector in Algeria. *Investment Management and Financial Innovations*, 13(4)212-224.
- Adolphus, J. T. & Deborah, P. (2014). Monetary Policy, Bank Management and Real Sector Finance in Nigeria: Who is to blame? Proceedings of the first Middle East Conference on Global Business, Economics, Finance and Banking (ME14 DUBAI Conference) Dubai, 10-12.
- Bakare, T. A. & Osobase, A. O. (2015). Effect of Fiscal and Monetary Policies on Industrial Sector Performance- Evidence from Nigeria. *Journal of Economics and Sustainable Development*. 6 (17) 67-82.
- Bruno, C., Lana, M. P. & Vladimir S. (2015). A Cross-Country Analysis of Monetary Policy Effects on Prices. *Finance a Uver-Czech Journal of Economic and Finance*, 65(5) 377-390.
- Eregba, P. B. & Mesagan, E. P. (2016). Oil Resource Abundance, Institutions and Growth: Evidence from Oil Producing African Countries. *Journal of Policy Modeling* 38 603–619.
- Evans, O., Adeniji, S. O., Nwaogwugwu, I., Kelikume, I., Dakare, O., & Oke O. O. (2018). The relative effect of monetary and fiscal policy on economic development in Africa: a GMM approach to the St. Louis equation. *BizEcons Quarterly*, 2, 3–23.
- Gert, P. & Frank, F. (2002). *The Industrial Effects of Monetary Policy in Euro Area*. European Central Bank, Working Paper 165.
- Hrushikesh, M. (2011). Monetary Policy, Construction Sector Output and Housing prices in India: An Emerging Economy Perspective. *Applied Econometrics and International Development* Vol. 11(1) 195-207.
- Ibrahim, M. I. & Amin, R. M. (2005). Exchange Rate, Monetary Policy and Manufacturing Output in Malaysia. *Journal of Economic Cooperation* 26, (3) 103-130.
- Juan, D. T. & Tremayne, A. R. (2006). Modelling Monetary Transmission in UK Manufacturing Industry. Working Paper 06-29 (11) Statistics and Econometrics Series.
- Marisa L. (2013). The Impacts of Fiscal and Monetary Policies on Service Sector Employment: A Study of Thailand. DOI: 10.7763/IPEDR. 2013.V61(8)35-40.
- Mesagan, E. P., & Agatha, A. N. (2017). The Efficiency Market Theory: A Case of Commercial Banks Stocks in Nigeria. *Ovidius University Annals, Economic Sciences Series*, 17(2), 583-587.

- Mesagan, E. P., & Shobande, O. A. (2016). Role of Apex Banks: The Case of Nigerian Economy. *Journal of Economics & Business Research*, 22(2), 171-186.
- Mesagan, E., Olunkwa, N., & Yusuf, I. (2018). Financial Development and Manufacturing Performance: The Nigerian Case. *Studies in Business and Economics*, 13(1), 97-111.
- Obinna, A. U. Ebenezer, E. B. & Adeyemi, A. O. (2017). Monetary Policy Shocks and Manufacturing Sector Output in Nigeria: A Structural Var-Approach. *Journal of Internet Banking and Commerce*. 22, (8) 1-22.
- Osmond, N. O. Egbulonu, K. G. & Emerenimi, F. M. (2015). Monetary Policy and Manufacturing Sector in Nigeria. *International Journal of Economics and Management Studies*. 2(1) 17-25.
- Perry, G., & Olivera, M. (2009). *Natural resources, institutions and economic performance. A FEDESARROLLO publication, November 15 version.*
- Ubi, P. S. Effion, L. & Itam, E. E. (2012). Monetary Policy and Industrialisation in an Emerging Open Economy: Lessons from Nigeria, *International Journal of Academic Research in Business and Social Sciences*, 2(8), 270-288
- Usman, O. A. & Adejare, A. T. (2014). Impact of Monetary Policy on Industrial Growth in Nigeria. *International Journal of Academic Research In Business And Social Sciences January* 4(1) 17-25.
- World Development Indicators (2018). *The World Bank Databank*. Available at: <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators>. Accessed September 10, 2018.



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported license. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0>