Acta Universitatis Danubius
ŒCONOMICA

Monetary Policy and Productivity Nexus for Oil Exporting African Countries: An Econometric Analysis

Olamide Ebenezer[1], Kanayo Ogujiuba[2], Andrew Maredza[3], O. Adeleke[4]

Abstract: The danger of export dependent economies is exposure to external shocks, that weakens the domestic economy, which is evident in countries exporting oil in Africa. The fortunes from increased oil revenue by these countries, have been sabotaged through the same shocks in oil prices, leading to inconsistencies in monetary policy. This article examined responses of monetary policy in oil exporting African countries {OEAC] to oil prices and by extension its effect on manufacturing sector's productivity. Previous research had mixed results on the relationship with inflation and its effect on growth, leading to an ambivalence as per the effect on manufacturing industries' output. The error correction panel data method was employed in our investigation and it favours structural dynamism as against dynamism of residuals without the usual factor imposition. Three stages of tests [unit root, cointegration and short/long run estimations] were performed. Long run weak association was observed for monetary policy coefficients and that of the productivity growth rate of the manufacturing unit of OEACs. Both the panel and static results have more influence in the short run than in the long run as far as the monetary policy coefficients are concerned. A substantive positive relationship exists for currency undervaluation as well as the productivity growth rate of the manufacturing section of OEACs. This suggests that a decrease in the price of a currency can influence local production and therefore boost real sector advancement. Our results also confirmed the existence of inverse association between the growth rate of the manufacturing unit plus net domestic credit. It is an outcome that lend credence to existing findings about growth and undervalued currencies in many developing economies.

[1] PhD, University of Mpumalanga, South Africa, Address: Cnr R40 and D725 roads Mbombela, 1200, South Africa, E-mail: Ebenezer.Olamide@ump.ac.za.
[2] PhD, University of Mpumalanga, South Africa, Address: Cnr R40 and D725 roads Mbombela, 1200, South Africa, Corresponding Author: Kanayo.Ogujiuba@ump.ac.za.
[3] PhD, University of Mpumalanga, South Africa, Address: Cnr R40 and D725 roads Mbombela, 1200, South Africa, E-mail: Andrew.Maredza@ump.ac.za.
[4] PhD, Federal University, Oye-Ekiti, Nigeria; Adress: PMB 126 YENAGOA, Nigeria, E-mail: adelekeomolade@yahoo.com.

Keywords: Economic; Growth; Manufacturing; Monetary; Oil; Policy

JEL Classification: C50; E00; E23; E27; E52; F10

1. Introduction

Monetary policy as described in the literature is the governmental course of action that is meant to preserve the value as well as regulate the inflow of money in an economy (Jin & Xiong 2020). By implication, too much money in circulation or insufficient money supply always attracts the attention of the monetary authorities because of the attendant consequences on economic activities. Monetary policy instruments that are available to government in stabilizing the supply of money in an economy include interest rate, inflation rate, exchange rate, selective credit control, net domestic credit among others. Many of the oil exporting African countries rely on monetary policy instruments in addressing the likely impacts of oil price dynamics on the macro framework as well as the output of the manufacturing sector. The value of the manufacturing sector of African countries towards achieving their next level of economic development has been recognized in the literature (see Balcilar *et al*. 2017; Signe, 2018; Omolade *et al*. 2019), nevertheless, contemporary research have supported the utilization of the proceeds from oil to develop the manufacturing sector (Christensen, 2016; Omolade & Ngalawa, 2016; Ashfaq *et al*. 2019, Olayungbo 2019). This argument may not be too far from reality as variations to price of oil at the global market has been described as a clog in the wheel of achieving the much-desired economic development by oil exporting African countries (Cherif *et al.* 2016, Alsharif *et al*. 2017, Cheng *et al.* 2019, Olayungbo, 2019).

However, the necessity for countries exporting oil especially those in Sub-Saharan Africa to diversify their economy in the face of dwindling oil revenue has been a recurring decimal in economic literature (Ross, 2019; Giri *et al*. 2019). This is because these countries are fiscally incapacitated whenever there is a global fall in oil price since their economies are monolithic. As pointed out by Ross (2019), one of the dangers of an export dependent economy is that such an economy is exposed to external price shocks, which in turn weakens the domestic economy. This scenario is evident for oil producing nations in Africa where in excess of 75% of the proceeds accruable to them is from oil export (Fadiran, 2021). However, the fortunes enjoyed from an increased oil revenue by these countries, whenever oil price increases have been sabotaged through the same shocks in oil prices, thereby leading to inconsistencies in monetary policy formulation and implementation. Thus, policymakers are advocating for economic diversification into the manufacturing sector as an alternative to oil dependence by these countries, which will in turn ameliorate the adverse effects of oil price fluctuations and drive economic development (Batthaile & Mishra 2015).

2. Literature Review

Studying the connection between oil exporting countries oil price volatility has produced mixed reactions in economic literature. An upsurge in the price of oil drives the surge in the price of manufacturing goods and thence the general price level (Alli 2020). The result of the empirical study about the relationship between price of oil volatility and some sectors (including manufacturing) of the Pakistani economy by Yasmeen *et al.* (2019) for a series spanning 1976-2017 supported the general view that oil price shocks have the tendency of affecting manufacturing growth adversely. In essence, outcome of the Normal Linear Regression (NLR) version of the ARDL showed that production is affected negatively because of increase in electricity tariff which has a direct relationship with oil price fluctuation. As opined by Sayed (2016), many of the nation's exporting oil in Africa depend solely on oil revenue such that any shock to oil price will affect their overall productivity especially the manufacturing sector whose cost of production is a function of oil price variation. Correspondingly, Alhasadi (2019) observed that Libya is one of the most undiversified economies in Africa that is exporting oil. The effect of oil price fluctuations in Libya often aggravates inflationary pressure in the system and consequently the cost of manufacturing. This implies that many of the oil producing nations in Africa have been at the mercy of external price dictates because of the monolithic nature of their revenue base. Also, Hausman *et al.* (2014) posited that one commodity that is difficult to diversify from is oil. This is so because products from oil are inputs in the manufacture of goods and services by countries of the world; be it net oil income earner or oil importer. Razmi *et al.* (2016) opined that apart from the direct consequences of oil price shock on inflation, it could as well affect price constancy as a goal of monetary policy. Beyond this, many of the countries, producing oil in Africa have found it difficult to adjust their exchange rate to shocks in oil prices because they either operate pegged rate of exchange or fit in to a bounding currency union (Christensen, 2016) The adverse effect of these shocks in oil price and subsequent dynamics in monetary policy stance of these countries have multiplier consequences on manufacturing activities. For instance, Opaluwa, Umeh and Ameh (2010) found that volatility in exchange rate affects the manufacturing sector negatively since most of the inputs used for production are imported and subject to exchange rate variations.

Smiech *et al.* (2020) using four countries (Canada, Mexico, Norway, and Russia) affirmed that oil price changes exhibit heterogeneous effects across the countries under investigation. That is the negative effects of the uncertainty in manufactured products is a function of shocks from oil price fluctuations. Within the same trajectory, Aye *et al.* (2014) utilized the Bivariate GARCH-VAR modified technique in their examination of the dynamic nexus between oil price volatility and production manufacturing in South Africa with the conclusion that ambiguity in price of oil has significant and negative implication on manufacturing outputs of the country. This

according to the study may snowball into discouraging investment and ultimately reducing manufacturing production. This was confirmed for Nigeria in Ibrahim (2018) where price of oil was shown as having positive effect of output but adverse consequences on manufacturing, services, and agricultural products. To ameliorate the adverse effect of oil price instability, diversification of the oil revenue base and the need to resuscitate the oil refineries in the country were recommended for Nigeria. Another strand of the argument is the association amongst interest rate, monetary policy, money supply, exchange rate, inflation, and output (Bashar *et al*. 2013, Basnet and Upadhyaya 2015, Chiweza and Aye 2018, Cheng *et al.* 2019). Although they are oil importing countries, the studies by Chiweza and Aye (2018) and Cheng *et al.* (2019) demonstrated that shocks from oil price volatility aggravate inflation rate in South Africa and China. This was in line with the submission by Dillon and Barrett (2016) that global oil price changes have the tendency to affect local food production especially in countries that are subsistent in food production such as the case in South Africa. Further, Bashar *et al.* (2013) and Cheng *et al.* (2019) also confirmed in their various studies that oil price changes resulted into increased supply of money in Canada and China which suggests the need for the Central Bank to wade in to regulate economic activities in the face of uncertainty in oil price using monetary policy instruments.

A little digression in terms of shocks from oil price and stock market activities was introduced into the oil price variation and manufacturing sector investigation (Razmi *et al*. 2016, Simohammed, Benhabib and Maliki 2016, Enwereuzoh *et al.* 2020, de Jesus *et al.* 2020). Enwereuzoh *et al.* (2020) examined the impact of oil price volatility and stock exchange activities in three oil exporting and four oil importing nations in Africa and found little or no evidence that shocks from oil price affect stock market returns either as an oil importer or exporter. In Nigeria, the relationship amongst shocks in oil price, economic growth and revenue generation was investigated by Adegbie *et al.* (2019) and Olayungbo (2019). Olayungbo (2019) investigated the effect of oil price variations on revenue base of Nigeria via the Bayesian Time Varying analysis approach with a positive association between oil proceeds and economic growth within 1970 and 2015. Among other things, the study recommended that oil proceed from Nigeria should be well utilized in reviving the manufacturing sector. Further, Ibrahim (2018) noted in a study about the nexus between oil price variation in Nigeria and economic activities that oil price affect manufacturing sector negatively but positively on aggregate productivity. By and large, the relationship between oil price shock to productivity especially the manufacturing sector is still neither here nor there. This outcome was in tandem with Orji *et al*. (2019) where it was held that crude oil price affect manufacturing output negatively.

Commenting on the booming and bursting nature of commodity cycle in Argentina, Drechsel and Tenreyro (2017) noted that fluctuations of output in that country is

subject to exogenous oil price variation. This has therefore led to changes in monetary policy stance of that country. Otero (2020) estimated shocks in prices of oil on outputs of various sectors on Colombian economy with S-VAR and supported the theory that oil price shocks influence outputs positively for that country. Furthermore, Gillies (2020) acknowledged that the oil boom between the years 2005 to 2014 aggravated the rate of corruption and consequently affected output in many countries producing oil in Africa. In all, various governments of the affected countries had no choice than to redirect monetary policy target thereafter to militate the effects of corrupt sharp practices by oil companies and their foreign collaborators. Where countries are large exporters of oil products, to study monetary policy responses to oil price changes may become an onerous task. In Algeria, an oil producing country in Africa that happens to be the second largest net oil income earner, Omolade and Ngalawa (2016) concluded that interest rate is not an effective monetary instrument in relation to oil price shock and cost of manufacturing goods. Not only that, but it was also further established that inflation in that country is not a function of supply of money because of oil price surge. One of the recommendations of the outcome of the SVAR estimation technique is the need for Algeria to prioritize monetary instrument in favour of interest rate if the challenge of inflation is to be tackled to a meaningful and reasonable level. Conversely, Omolade *et al.* (2019) submitted that the consequence of oil price decrease is more pronounced on structural inflation than monetary inflation. Omojolaibi and Egwaikhide (2013) reported in their study of some oil exporting countries in Africa that (i) oil price shocks affect manufacturing activities through supply of money in Egypt and (ii) the effect on manufacturing activities in Angola and Nigeria was through real GDP. Likewise, the outcome of the study of 17 selected oil producing countries by El-Anshasy *et al*. (2017) suggested that revenue oil volatility effect on output was not only significantly negative but also resource curse driven. As a rule, monetary policy dynamics is a function of oil price volatility which affect manufactures' productivity by extension.

Chin *et al.* (2017) researched into the combined effects of oil export and production of foods by manufacturing sectors in four of the Africa oil producers that are OPEC members and submitted that positive relationship exists between monetary policy instruments [money supply, exchange rate and oil exports] with inflation but a negative association between food output and inflation. In essence, oil price increase resulted into high inflation rate in the selected oil producing countries. The results are in tandem with the outcome of the study by Alenoghena (2020) on Nigeria where it was found that shocks from price of oil changes affected economic activities of the manufacturing sector adversely. On the other hand, Ilugbemi and Fawehinmi (2020) focused on the effect of oil price changes and monetary policy dynamics on economic activities of countries not producing oil and observed that volatility in oil price and monetary policy subtleties have substantial influence on economic and

manufacturing activities of the selected countries. An indication that substantiates the important relationship that exist between shock in oil price, monetary policy, and economic performance of many countries, be it oil producing or non-oil producing. The combined effect of monetary and fiscal policies on one hand and productivity capacity of Nigeria on the other hand was examined by Okunoye and Hammad (2020) with an explanation that money supply, monetary policy rate and exchange rate changes are reflections of oil price shocks and by extension, increase the cost of manufacturing activities. Yildirim and Arifli (2020) examined how shocks in oil price and exchange rate affected the economy of Azerbaijan for the period running from 2006 to 2018 and concluded that negative oil price shocks effect currency depreciation, trade balances, inflation rate and economic activities adversely. Sound expansionary monetary policy framework was recommended for Pakistan by Yasmeen *et al*. (2019) in a study that investigated the short and long run associations between changes in oil prices and some major sectors of the economy which include the manufacturing sector. The outcome of the classical normal regression model of the ARDL for the period 1976 to 2017 further revealed that frequent oil price increases lead to increase in cost of manufacturing goods in that country. Jin and Xiong (2020) noted in their study that strong negative association exists between the period of any great shocks to oil prices and exchange rate with a weaker relationship for any other period. In all, they agreed that oil price shocks affect monetary variable in terms of exchange rate. Sayed (2017) researched into the causes, impact, and implications of oil price decline since 2007 till 2019 and the required monetary policy variables to address the effects on outputs of manufacturing sectors in Middle East and Northern Africa countries and concluded that increase in oil price will increase cost of production and thereby affect manufacturing sector's productivity. Alli (2020) employed the non-linear ARDL to investigate the connection between changes in oil price, inflation, and cost of production by manufacturing outfit for Egypt. He observed a great challenge on the part of monetary policy in addressing the implications of oil price changes on manufacturing costs. For Libya, Aimer (2016) pointed out that shocks in oil price affect economic sectors such as the manufacturing sub-sector of the economy. Exploring how oil price variations influence economic activities, it was established that an opposite relationship subsists amongst oil price unpredictability and the industrial cluster of the Libyan economy. While examining the consequences of oil price changes on manufacturing outputs of 20 oil and non-oil producing African countries, Akinlo and Apanisile (2015) revealed that shocks to prices of petroleum products affects oil exporting countries positively and significantly but with a positive and insignificant consequences for non-oil producing countries. Similarly, Rotimi and Ngalawa (2017) observed in their study on the process of transmission of shocks by oil price on manufacturing activities in net oil income earnings of selected African countries and concluded that the effect was adversely very large. Not only that, the result of the Panel-SVAR for the period of 1980 to 2015 further revealed that this effect

permeates through monetary variables such as supply of money, inflation, exchange rate among others. Thus, this paper adds to the prevailing literature by examining in what way monetary policy in oil producing states in Africa respond to changes in oil prices and by extension its effect on the cost of production of manufacturing products.

3. Data and Methodology

The wisdom in the seminal output of Arrow was the foundation of Romer's postulation about the link between out (Y_{it}), labour (L_{it}) and K_{it}). Romer (1996) opined that there is a strong connection between knowledge investment and output. In essence, there is direct association between efforts towards knowledge enhancement productivity. If investment in knowledge is increased, this will enhance productivity of a nation. This relationship was expressed as follows:

$$Y_{it} = f\{K_{it,} A(t) L_{it}\} \quad (1)$$

Thus, the left-hand side of eqn. (1) is the firm's output while $A(t)$, K_{it}, and L_{it} are respectively the firm's knowledge stock, capital and labour for t period.

Therefore, Romer opined that past knowledge leads to experience whereas experience resulted from investment in knowledge such that all these have positive effects on labour and subsequently on the final output of a firm. Above narrative can be represented as:

$$G(t) = f\{I(v)dv = k(t) \quad (2)$$

By implication, the left-hand side of eqn. (2) is the firm's output growth rate, accumulated investment is $I(v)dv$, $k(t)$ is capital stock for time t. Romer further stated that if $G(t)I$ is represented as y, then:

$$Y=k(t) \quad (3)$$

Such that by substitution,

$$Y=k(t) \quad (4)$$

And y is the real output.

Further, Romer (1996) introduced the money demand association where interest rate, growth of money and inflation were responsible for real income. As such, the combined effects of increase in real income function arising from decrease in rate of interest would account for balances of real money demand. Above scenario was expressed as:

$$M/P = L(1/r, y) \quad (5)$$

In another sense, eqn. (5) means:

$$M/P=\alpha y-\beta r \quad (6)$$

Making αy the subject of the expression gives:

$$\alpha y= M/P+ \beta r \quad (7)$$

Making α the denominator of both sides will give:

$$y=1/\alpha(M/P)+ \alpha/\beta(r) \quad (8)$$

The balances of real money elasticity is $1/\alpha$ while α/β is the elasticity of rate of interest.

Replacing eqn. (8) in (3) gives:

$$G(t)=1/\alpha\ (M/P)+\alpha/\beta(r)+\mu(i,t) \quad (9)$$

Above eqn. (9) points to the fact that the combined rate of interest and balances of real money demand while holding labour constant determine investment in stock of capital. The outcome variable is the growth of OEACs manufacturing sector, other explanatory elements considered sacrosanct to the modelling apart from monetary policy are supply of money, rate of interest, net domestic credit (as proxy for financial deepening) and capital formation as variable of control. We can therefore explicitly model our expression thus:

$$G_{it} = \quad f(r, m2, exr, inf, cps/gdp, gcf) \quad (10)$$

Hence,

G_{it} = Output rate of growth for manufacturing sector for *i* country during *t* time,

r is rate of interest (lending rate),

m2 is broad money supply,

exr is real rate of exchange,

infl is rate of inflation,

cps/gdp is domestic net credit (financial sector deepening),

gcf is stochastic variable for each of the countries under consideration.

i rises from 1 to 9 and *t* from 1 to 40.

Variables (Measurement and definitions)

Below is the tabular explanation of the variables beginning with the dependent factor which is output growth rate of OEACs. The variables were selected from past empirical literature.

Variables	Definition	Measurements	Data source
G_{it}	This is individual country's output. It is also referred to as the GDP per country in the analysis	This variable was measured in USD as the value added by the manufacturing unit of individual oil exporting Africa country.	WDI
Exr_{it}	This Rate is the real form of exchange rate as it has taken into consideration the element of inflation which is more consistent than nominal exchange rate.	This variable was measured as the average of local currency of each country to a unit of USD. It is the ratio of nominal exchange rate to the consumer price index (CPI).	Penn World Trade (PWT) 6.1
Int	This is the lending rate by banks as credit advanced to the customers. This rate is considered more important in economics as it determines the extent to which credit can be assessed in an economy because of its expected positive effect. The higher the rate, the lower the willingness to borrow by investors. It stands for the real monetary policy variable of individual country's Central/Reserve Bank	This consist of nominal and real interest rate. The measurement of this has element of inflation. Real interest rate on the other is arrived at after accounting for inflation. It is arrived at after deflating the nominal rate of interest.	WDI
Infl	The inflation rate is the percentage rate of change in consumer prices.	It is measured using the consumer price index. Two measurements are available, that is Producers Price Index and Consumers Price Index. This study employed the CPI because of its frequency in application.	WDI
MS	The money supply is the total quantity of money in the economy at any given time.	This is indicated as M2 [broad money or money plus quasi money]. The measure incorporates the money circulating as well	WDI

Variables	Definition	Measurements	Data source
		as in the bank. The rate of money supply is equal to M2 divided by GDP	
NDC	This is the domestic credit provided by the banking sector of individual country. It is an indicator of the performance of the financial sector.	It is measured as the percentage of banking sector domestic credit to real GDP at constant 2000 USD.	WDI

3.2. Estimation Technique

The Error Correction Model as proposed by Westerlund (2007) formed the estimation approach to the study. The choice of the Westerlund (2007) was informed by it the fact that it ignored the residual dynamics and favoured the structural dynamics values (Ishibashi 2012). This approach imposed no restriction unlike its residual dynamics' counterpart. Some of the advantages of this method is that: (1) It is Error Correction based method; (2) It gave more preference to the short run dynamism which had been adjudged to be suitable for the feeble effects of monetary policy on real variables (Rittenberg and Tregarther 2008); and (3) it captures the inherent problem of normality, heteroscedasticity series, trend analysis and cross-sectional dependency.

4. Results and Discussion

4.1. Unit Root Test Results

According to Demetriades and James (2011); Ishibashi, (2012); and Frimpong, (2012), the error correction panel cointegration technique can be used, when all the variables to be included in the model are integrated of order one. This is an important pre-condition for the usage of this technique. Two methods of panel unit root test are applied in the study namely, the ADF and IPS. The panel unit root result is shown in table 1, indicating that both ADF and IPS methods confirm that all the variables are integrated of order one I(1). The ADF appears to be a better approach since it is suitable for both unbalanced and balance panels unlike IPS that is only suitable for balanced panel. The implication of this result is that the variables can be used for the analysis.

Table 1. IPS and ADF - Fisher Chi-square Unit Root Tests

Variable	IPS unit root test			ADF-Fisher Chi-square unit root test		
	t* Statistics	P Value	Order of integration	P* Statistics	P Value	Order of integration
Mgr	-5.1512	0.000***	I(1)	201.51	0.000***	I(1)
Infr	-4.2698	0.000***	I(0)	165.851	0.000***	I(1)
Intr	-6.9332	0.000***	I(1)	90.5803	0.000***	I(1)
Ms	-2.8047	0.006***	I(1)	105.45	0.000***	I(1)
Ndc	-4.9793	0.000***	I(1)	176.394	0.000***	I(1)
Exr	-4.7159	0.000***	I(1)	199.655	0.000***	I(1)
Cap	-4.9161	0.000***	I(1)	190.967	0.000***	I(1)

*"***" "**" and "*" represent statistical significance at 1%, 5%, and 10%, respectively. Note: mgr is the manufacturing growth rate, infr is the inflation rate, intr is the interest rate, ms is the broad money supply, ndc is the net domestic credit, exr is the exchange rate and cap is the gross capital formation.*

Source: Author's Computation

4.1.2. Error-Correction-Based Panel Cointegration Test

Establishing the existence of a long run relationship amongst the variables of interest is a standard practice in panel data estimation. For robustness, the Westerlund panel cointegration test is adopted. The reason for this is that the cointegration tests are performed based on the asymptotic distribution plus cross-sectional dependence, thereby making the result more reliable. The result of the test is shown in Table 2 below.

Table 2. Westerlund Panel Cointegration Test (Asymptotic Distribution Values)

Statistics	Value	Z-value	P-value
Gt	-3.771	-1.942	0.026**
Ga	-3.534	5.481	1
Pt	-4.494	4.389	1
Pa	-1.898	4.948	1

*NOTE: "***" "**" and "*" represent statistical significance at 1%, 5%, and 10% respectively. Note: gt and ga are cross-sectional unit cointegration tests, while pt and pa are panel cointegration tests.*

Source: Author's Computation

The Westerlund Error Correction Based Panel Cointegration makes use of four criteria, as shown in the table, in testing for the existence of cointegration. The result from the table indicated that cointegration is confirmed in Gt alone. Notwithstanding, the existence of cointegration is rejected in other three criteria namely Gs, Pt and Pa. It can be concluded from the results that though cointegration exists, but it appears to be weak since only one criterion confirmed cointegration out of four. The result might not be unconnected to the fact that monetary policy variables are included in

the model and there is a near consensus that real variables might not demonstrate long run relationship with monetary variables (See Philips and Sun, 2003). Despite this, cointegration was confirmed and the error correction model, using the within fixed panel regression was done and presented in table 3

Table 3. Fixed-effects (within) Regression Results of Manufacturing Growth Rate and Monetary Policy

Long-run model		**Short-run model**	
Variable	Coefficient	Variable	Coefficient
Infr	-0.1758862 -0.1848733	*Dinfr*	-0.031391 -0.129809
Intr	-0.0123941 -0.1858485	*Dintr*	0.4748447 -0.316862
Lms	0.1839855 -0.4956953	*Dlms*	.7774004* -1.059281
Lndc	0.1338133 -0.4116798	*Dlndc*	-.6077424* -0.499157
Exr	-0.1774174 -0.2047998	*Dexr*	.2501215** -0.646286
Lcap	0.1849015 -0.2279221	*Dlcap*	-.2185353** -0.373678
Constant	42.13699 -46.53014		
sigma_usigma_e	0.4400788		
rho	0.11628055 0.12528863		

F(16, 121) =4.89; Prob> F = 0.0000;R-sq: within = 0.39 ; between = 0.100; overall = 0.24 Note: infr is inflation rate, intr is the interest rate, lms is log of broad money supply, lndc is the log of net domestic credit, exr is the exchange rate, lcap is the log of gross capital formation, Dinfr is the differenced inflation rate, Dintr is the differenced interest rate, Dlms is the differenced log of broad money supply, Dlndc is the differenced log of net domestic credit, Dexr is the differenced exchange rate and Dlcap is the differenced log of gross capital formation.
Source: Authors' Computation

The results in table 3 validates the weak long run association observed in the cointegration test. The result shows that none of the variables including the monetary policy variables which include interest rate and money supply have weighty effects on the productivity of manufacturing in the long run. However, the short run result which is presented at right hand side of the table is the differenced version of the variables. Money supply as a monetary policy variable shows significant impact on output of manufacturing sector with a coefficient of ***0.7774004***. This simply implies that money supply is an important factor that can affect the growth rate of the

manufacturing sector in the OEACs. However, the effect is not continued in the long run thus supporting the school of thought that argues on the super-neutrality of money. Net domestic credit has a substantial impact on the growth rate of the manufacturing sector in the OEACs but did not conform to *a priori* expectation due to the sign of the coefficient. The NDC coefficient is ***-0.6077424*** and it is statistically significant. This on a side implies that increase in the net domestic credit might not bring about positive impact on the manufacturing sector growth in the OEACs. It speaks volume of the sectors that are benefiting from the NDC according to the result in this study, manufacturing sector appears not to be benefiting from the NDC as expected.

From the result, exchange rate is another variable with significant impact in the short run on the manufacturing output growth. The coefficient of exchange rate is ***0.2501215*** and it is statistically significant. The result support currency devaluation as means of improving the growth of the manufacturing sector. The idea is that when currency is devalued, importation is discouraged, and hence foreign goods will not be able to compete with the domestic output of the manufacturing sector and hence their sales is increased, and growth rises. Again, this also failed to have sustained effect as exchange rate does not have long run significant impact on the manufacturing output of the OEACs. Capital formation is expected to have positive significant impact on the manufacturing productivity and that is the result obtained in this study. However, the coefficient is negative hence, the implication is that capital formation might not have significant positive impact on the growth of the manufacturing sector's productivity. The reason for this might not be unconnected to the fact that gross capital formation for the aggregate economy was used hence it might not reflect the nature of investment in manufacturing sector of the OEACs only. The F statistics result is a signal that our model is significant and hence the joint outcome of monetary policy variables plus additional shift factors used in the model will significantly affect the growth in the output of manufacturing sector in the OEACS

It is necessary to develop a cross sectional dependency test because the countries used in the panel estimation have some similarities like oil being the mainstay of their economies. Correlation matrix was generated and used for this purpose. The results are presented in table 4.

Table 4. Correlation Matrix of Residuals

	e1	e2	e3	e4	e5	e6	e7	e8	e9
e1	1								
e2	-0.023	1							
e3	0.1781	0.0685	1						
e4	-0.083	0.9714	0.104	1					
e5	0.2524	-0.156	0.1766	-0.106	1				
e6	-0.071	-0.288	-0.099	-0.278	-0.114	1			
e7	0.0189	0.9495	0.1184	0.956	0.0478	-0.3	1		
e8	-0.096	-0.343	0.3221	-0.308	0.3056	0.0513	-0.33	1	
e9	-0.103	-0.128	0.5182	-0.041	0.294	-0.061	-0.081	0.7907	1

Breusch-Pagan LM test of independence: chi2(36) =181.946, Pr = 0.0000, H_0: There is no cross-sectional dependence

Source: Authors' Computation

Table 4 indicates the presence of common factor affecting the cross-sectional units and therefore, there was the need to boost strap the variables in the estimation to get a more reliable result (See Persyn and Westerlund 2008). This will enable us to get the robust P value. Results are shown in table 5.

Table 5. Panel Cointegration Test with Cross-Sectional Dependence

Statistics	Value	Z-value	P-value	Robust P-value
Gt	-3.771	-1.942	0.026**	0.030**
Ga	-3.534	5.481	1	0.995
Pt	-4.494	4.389	1	0.76
Pa	-1.898	4.948	1	0.885

*"***" "**" and "*" represent statistical significance at 1%, 5%, and 10%, respectively. Each test includes trend and constant terms. The lag and lead lengths are selected based on AIC and Bartlett kernel window width is set according to $4(T/100)^{2/9} \approx 3$. We allow for 400 bootstrap replications. Note: gt and ga are cross-sectional unit cointegration tests while; pt and pa are panel cointegration tests*

Source: Authors' Computation

Using the t P values gotten from the bootstrapping estimation, the result remains the same as cointegration is again established in only one of the four panel tests. The implication is that there is a feeble long run association between manufacturing sector output growth, monetary policy variables and other variables used in the estimated model. However, to further test the robustness of the estimated parameters the Systemic Generalized Method of Moments SYS-GMM was used, and the result is presented as robustness check (see Mitze, 2010; Frimpong, 2012) in table 6.

Table 6. Dynamic Panel Data Estimation of the Relationship between Manufacturing Growth Rate and Monetary Policy using SYS-GMM.

Variables	Coefficient	Standard error
Dlmgr L.1	3.54E-13	2.70E-13
Dlinfr	1.38E-13	2.93E-13
Dlintr	-1.63E-12	1.02E-12
Dlms	2.59E-12	1.60E-12
Dlndc	-5.20e-12**	1.55E-12
Dlexr	2.71e-11***	2.40E-12
Dlcap	6.38e-12***	1.51E-12
Constant	-8.54E-13	4.56E-13

Wald chi2(15) = 315.95, Prob> chi2 = 0.000

Note: Dmgr is the differenced manufacturing growth rate, Dinfr is the differenced inflation rate, Dintr is the differenced interest rate, Dlms is the differenced log of broad money supply, Dlndc is the differenced log of net domestic credit, Dexr is the differenced exchange rate, and Dlcap is the differenced log of gross capital formation.

Source: Authors' Computation

The SYS-GMM result presented in table 6 is a confirmation of the results presented in the error-correction based regression as virtually all the variables that were significant in that estimated model are also significant under the dynamic panel estimation in table 6. The implication is that these variables have jointly more of short run effects than the long run on the growth of the OEACs manufacturing productivity.

Our findings on the long run association amongst monetary policy variables and output growth has shown that findings in this study are in tandem with the school of thought that argues in favour of monetary policy having only has transitory effect on real variables. This is obvious from the result, as money supply only had effect on manufacturing productivity in the short run and not in the long run (see Rittenberg and Tregarther, 2008; Mundel, 1963). Some authors have also confirmed the same result in their various studies (see Cipollini *et al*., 2012; Nenbee and Madume, 2011; Gul *et al*., 2012). Furthermore, findings from the study shows that money supply might be a better strategy instrument to influence the growth rate of the AOECs manufacturing sector. This is very evident in the result that confirmed significant relationship between money supply and manufacturing output growth in withe short run. The inference is that expansionary monetary policy will stimulate the growth, but only in the short run. However, Anthony and Mustafa (2011), Gul *et al. (*2012) and Ditimi *et al.* (2011), also obtained similar results and it is an attestation to the efficacy of monetary policy in the short run with the use of money supply. One of the ambiguous results obtained is the net domestic credit which failed to stimulate the growth rate of the OEACs manufacturing sector significantly and positively. The result is in tandem with studies showing that the credit allocation in many developing countries is counterproductive to the industrial cluster. The study concludes that the

bulk of credit allocated to the real sector are diverted into other sectors where investors can recoup invested capital with little or no risk. Manufacturing businesses in most developing countries suffer a lot of setbacks and hence might not be lucrative enough to encourage creditors. The reason why net domestic credit failed to influence manufacturing output growth might be connected to this as well. For instance, in some oil producing countries (Algeria, Nigeria and Egypt among others), domestic credit has been on the decline. The devaluation of currency to stimulate the real sector of any economy has been given backing by the findings from this study. The result has shown that when currency is overvalued, it affects the manufacturing growth of the OEACs. Notwithstanding this result is contrary to the results of Omolade and Ngalawa (2019) where they concluded that currency depreciation will affect the manufacturing sector growth negatively. They supported their findings that many of the manufacturing firms depend on foreign inputs especially raw materials such that if currency is devalued, their import and production cost rise and hence it affects productivity. However, findings from this study have shown that at least in the short run, this will work for the OEACs.

5. Concluding Remarks

This article concludes that the association between monetary policy and productivity of the manufacturing sector in the OEACs is more of transitory than permanent. That is, monetary policy variables will mostly affect the manufacturing sector growth rate in the short run than in the long run. Another policy derivative from the study is that money supply remains an important instrument for policy that can be used to inspire the development of the overall industrial sector group of the OEACs. The result from the study confirmed that expansionary monetary policy will significantly push the output growth rate in the manufacturing sector of the OEACs. Nonetheless, our results indicate that money supply might be a better instrument than interest rate to expand the efficiency of the bigger industrial cluster in the OEACs. However, the net domestic credit in the economies of the OEACs are not adequate to inspire positively, the growth of the manufacturing sector. Our findings suggest that credit allocated to these economies might not go into the manufacturing sector hence the observed weak manufacturing sector growth rate. The manufacturing sector of the OEACs can benefit immensely from currency devaluation. It is obvious that many OEACs have overvalued currency because the oil revenue accruing to them, but this has been shown to be injurious to the growth of their manufacturing sectors. Therefore, it has become obvious that currency devaluation might be a good step to growing the industrial cluster base in the OEACs. Currency depreciation discourages importation and encourages export; hence the domestic manufacturers are expected to benefit in this regard.

Acknowledgments: The Authors acknowledge Olaniran Oladotun [Department of Banking and Finance, Osun State Polytechnic, Iree, Nigeria] for editorial inputs and other anonymous reviewers from the University of Mpumalanga, South Africa, for their valued inputs.

Conflicts of Interest: The authors have no conflicting interest.

References

Adegbie, F.; Akintoye, I. R. & Olayinka, O. G. (2019). Evaluation of Petroleum Crude oil Price Volatility on Nigeria National Income and Nigeria Economy. *European Journal of Accounting, Auditing and Finance Research*, Vol.7, No.6, pp.65-83.

Aimer, N. M. M. (2016). The Effects of Oil Price Volatility on the Economic Sectors of Libya. International *Journal of Business and Social Research*, Volume 06, Issue 12.

Akinlo, T. & Apanisile, O. T. (2015). The Impact of Volatility of Oil Price on the Economic Growth in Sub-Saharan Africa. *British Journal of Economics, Management & Trade, 5(3):* pp. 338-349.

Alenoghena, R. O. (2020). Oil Price Shocks and Macroeconomic Performance of the Nigerian Economy. A Structural VAR Approach, *FACTA UNIVERSITATIS Series: Economics and Organization* Vol. 17, No 4, pp. 299 – 331, https://doi.org/10.22190/FUEO200801022A.

Alexey, K. (2011). Dutch Disease and Monetary Policy in Oil-Exporting Economy. *Masters Dissertation, Department of Economics, Central European University.*

Ali, I. M. (2020). Asymmetric impacts of oil prices on inflation in Egypt: A nonlinear ARDL approach. *Journal of Development and Economic Policies*, Vol. 23, No. 1, pp. 5 – 28.

Alsharif, N.; Bhattacharyya; Sambit; Intartaglia & Maurizio, (2017). Economic diversification in resource rich countries: history, state of knowledge and research agenda. *Resource Policy* 52, pp. 154–164.

Anthony, E. & Mustafa, I. (2011). Impact of Financial Sector Reforms on Non-Oil Export in Nigeria. *Journal of Economics 2(2)* pp. 115-120.

Auty, R. & Evia, J. (2001). A growth collapse with point resources: Bolivia. In R.M. Auty eds. *Resource Abundance and Economic Development*, pp. 179–92. Oxford: Oxford University Press.

Aye, G.C.; Dadam, V.; Gupta, R. & Mamba, B. (2014). Oil price uncertainty and manufacturing production. *Energy Economics* 43 (2014) pp. 41–47. http://dx.doi.org/10.1016/j.eneco.2014.02.004.

Ayobami, O. T. (2019). Exchange Rate Volatility and the Performance of Manufacturing Sector in Nigeria (1981 – 2016). *African Journal of Economic Review*, VII (2).

Balcilar, M.; van Eyden, R., Uwilingiye, J., & Gupta, R. (2017). The Impact of Oil Price on South African GDP Growth: A Bayesian Markov Switching-VAR Analysis. *African Development Review*, Vol. 29, No. 2, pp. 319–336.

Barro, R. & Lee, J. (1993). International comparisons of educational attainment. *Journal of Monetary Economics*, 32 (3): pp. 363-394).

Bashar, O. H.; Wadud, I. M. & Ahmed, H. J. A. (2013). Oil price uncertainty, monetary policy and the macroeconomy: The Canadian perspective. *Economic Modelling*, Vol. 35, pp. 49-259. http://dx.doi.org/10.1016/j.econmod.2013.07.007

Basnet, H. C. & Upadhyaya, K.P. (2015). Impact of oil price shocks on output, inflation and the real exchange rate: evidence from selected ASEAN countries. *Applied Economics*, Vol. 47 No. 29, pp. 3078-3091. DOI: 10.1080/00036846.2015.1011322.

Battaile, B. & Mishra, S. (2015). Transforming Non-renewable Resource economies. *IMF Working Paper. International Monetary Fund.*

Bouakez, H.; Rebei, N. & Vencatachellum, D. (2008). Optimal pass-through of oil prices in an economy with nominal rigidities. *Working paper 08/31, CIRPEE.*

Central Bank of Nigeria (2010). *Statistical Bulletin*. Edition

Cherif, Reda; Hasanov, Fuad & Zhu, Min (Eds.), (2016). Breaking the Oil Spell: The Gulf Falcons' Path to Diversification. *IMF Working Paper. International Monetary Fund.*

Chin, L.; Bala, U.; Kaliappan, S. R. K. & Ismail, N.W. (2017). The Impacts of Oil Export and Food Production on Inflation in African OPEC Members. *International Journal of Economics and Management* Vol. 11 (S3), pp. 573 – 590. http://www.econ.upm.edu.my/ijem.

Christensen, B. V. (2016). Challenges of low commodity prices for Africa. *BIS Papers* No 87.

Corden, W. & Neary, J. (1982). Booming Sector and De-Industrialisation in a Small Open Economy. *Economic Journal* 92: pp. 825-848.

Dillon, B. & Barrett C. (2016). Global oil prices and local food prices: evidence from East Africa. *American Journal of Agricultural Economics*, Vol. 98 No. 1 pp. 154-171.

Ditimi, A.; Nwosa, P. I. & Olaiya, S.A. (2011). An Appraisal of Monetary Policy and Its Effects on the Macro-Economic Stabilization in Nigeria. *Journal of Emerging trends in Economics and Sciences. No. 2*, pp. 232-237.

Drechsel, T. & Tenreyro, S. (2017). Commodity Booms and Busts in Emerging Economies. *Journal of International Economics*, doi: 10.1016/j.jinteco.2017.12.009.

El-Anshasy, A.; Mohaddes, K., & Nugent, J. B. (2017). Oil, Volatility and Institutions: Cross-Country Evidence from Major Oil Producers. *Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper* No. 310. https://www.dallasfed.org/~/media/documents/institute/wpapers/2017/0310.pdf.

Engel R. F. & Granger, C.W. (1997). Co-integration and error correction: representation and testing. *Econometrica*, 55, (2), pp. 251-276.

Enwereuzoh, P. A.; Odei-Mensah, J. & Owusu J.P. (2020). Crude oil shocks and African stock markets Research. *International Business and Finance* 55 (2021) 101346. https://doi.org/10.1016/j.ribaf.2020.101346.

Fischer, S. & Modigliani, A.F. (1978). Towards an understanding of the real effects and costs of inflation. *Weltwirtschaftliches Archive*, 2, (6), pp. 810-832.

Frimpong, P. (2011). *Population health and economic growth: Panel cointegration analysis in Sub-Saharan Africa*. Lund, Sweden.

Gillies, A. (2020). Corruption trends during Africa's oil boom, 2005 to 2014: The Extractive Industries and Society. https://doi.org/10.1016/j.exis.2020.06.006.

Giri, R.; Quayyum; Saad Noor; Yin, & Rujun J. (2019). Understanding export diversification: key drivers and policy implications". *IMF Working Papers WP/19/105*.

Gul, H.; Mughal, K. & Rahim, S. (2012). Linkage between Monetary Policy and Economic growth. *Universal journal of Management and Social Sciences. Vol. 2 No.5*

Gylfason, T. (2001). Natural resources, education, and economic development. *European Economic Review*, 45: pp. 847–859.

Hansen G. D. & Prescott E. C. (1998). Malthus to Solow". *NBER Working Paper 6858.*

Hausmann, R.; Hidalgo, C. A.; Bustos, S.; Coscia, M.S. & Yildirim, M. A. (2014). *The Atlas of Economic Complexity: Mapping Paths to Prosperity.* MIT. Press.

Ibrahim, H. M. & Amin, M.R. (2005). Exchange Rate, Monetary Policy and Manufacturing Output in Malaysia. *Journal of Economic Cooperation 26, 3* pp. 103-130.

Ibrahim, T. M. (2018). Oil price Fluctuation and Aggregate Output Performance in Nigeria. *MPRA Paper* No. 88636. https://mpra.ub.uni-muenchen.de/88636/.

Ilugbemi, A.O. & Fawehinmi, F. O. (2020). Impacts of Oil Price Volatility and Monetary Policy on Economic Performance of Non-Oil Producing Countries in Africa. *Izvestiya Journal of Varna University of Economics*, 64 (2), pp. 180 – 197.

IMF (2008). *International Monetary Fund economic report: Africa focus.* Special Issue, No.21, pp. 3-32.

Ishibashi, S. (2012). The segmentation of loan and interest rate by regional financial institutions: A panel cointegration analysis. *International Journal of Business Research,* 8, (5), pp. 3-17.

Jaggers, K. & Monty, G. (2000). Polity IV project. Center for International Development and Conflict Management. University of Maryland, College Park.

Jana, K.; Giovanni, L.; Leopold, V. & Thomas, W. (2006). Dynamic Stochastic General Equilibrium Models as a tool for Policy Analysis. *CESifo Economic Studies Advance Access Published Vol. 10*, p. 1093.

Jin, H. & Xiong, C. (2020). Fiscal Stress and Monetary Policy Stance in Oil-Exporting Countries. *Journal of International Money and Finance* (2020). https://doi.org/10.1016/j.jimonfin.2020.102302.

Johannes, F. (2003). *Economic Growth: Theory and Evidence*. University of Cape Town Press. Cape Town, South Africa.

Jordi, S. & Mark, N. (2007). Exchange rate anomalies in the industrial countries: A solution with structural VAR Approach. *Journal of Monetary Economics*, 45, (3), pp. 561-586.

Kayode, A. (2000). Basic Economic Issues on Nigeria. *Central Bank of Nigeria (CBN) economic Review* Vol. 23

Kydland, T. & Prescott, H. (1977). *The resource curse at work: A cross-country perspective with a focus on Africa.* in: Basedau, Matthias; Mehler, Andreas (eds. Resource Politics in sub-Saharan Africa, Hamburg: Hamburg African Studies/Etudes Africaines Hambourgeoises No. 13, pp. 23-38.

Lama, R. & Medina, P. (2010). Is Exchange Rate Stabilization an Appropriate Cure for the Dutch Disease? *IMF working paper, WP/10/182.*

Lawal, E.O. (2016). Effect of exchange rate fluctuations on manufacturing sector output in Nigeria. *Journal of Research in Business and Management*, 4(10), pp. 32-39.

Lucas, R.E. (1973). *Models of business cycles*. Basil Blackwell, Oxford.

Lucas, R.E. (2003). Macroeconomic priorities. *American Economic Review*, 93, (1), pp. 1–14.

Maddalla, G.S. & Wu, S. (1999). A comparative test of unit root with panel data. *Oxford bulletin of economics and statistic*, 19, (9), pp. 305-9049.

Majid, A. (2008). The Contribution of Oil Sector to Arab Economic Development. *OFID Pamphlet Series. Vienna. Austria*.

Mark, G. & Peter, K. (2011). A Model of Unconventional Monetary Policy. *Journal of Monetary Economics Vol. 58, pp. 17-34.*

Michael, W. (2008). *Macro-Economic Theory: A Dynamic General Equilibrium Approach*. Princeton University Press.

Mohamed, T. (2011). Monetary Policy and the Dutch Disease Effects in a Small Open Oil Exporting Economy. *34th International conference on Environment and Natural Resource Management in Developing and Transitional Economies, Lyon France*

Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *The Canadian Journal of Economics and Political Science*, 29, (4), pp. 475-485.

Nenbee, S. G. & Madume, J.V. (2011). The impact of Monetary Policy on Macroeconomic Stability in Nigeria. *International Journal of Economic Development Research and Investment*, Vol. 2 No. 2.

Nick, G. (2009). Trends and random walks in macroeconomic time series: Some evidence and implications. *Journal of Monetary Economics*, 10, (2), pp. 139-162.

Nigeria. *Arabian Journal of Business and Management Review, Vol. 2 No.1*

Nneka, B.C. (2012). Investigating the Performance of Monetary Policy on the Manufacturing Sector in

Okunoye, I; & Hammed, S. (2020). Oil Price Shock and Fiscal-Monetary Policy Variables in Nigeria: A Structural VAR Approach. MPRA Paper No. 104145. https://mpra.ub.uni-muenchen.de/104145.

Olomola, P. (2007). Oil Wealth and Economic Growth in African oil Exporting Countries. *AERC research paper 170 African Economic Research Consortium, Nairobi September 20.*

Omojolaibi, J.A. & Egwaikhide, F.O. (2013). A Panel Analysis of Oil Price Dynamics, Fiscal Stance and Macroeconomic Effects: The Case of Some Selected African Countries Central Bank of Nigeria. *Economic and Financial Review Volume 51/1*.

Omolade, A. & Ngalawa, H. (2016). Monetary policy transmission and growth of the manufacturing sector in Algeria. *Investment Management and Financial Innovations*, 13(4-1), pp, 212-224. doi:10.21511/imfi.13 (4-1).2016.07.

Omolade, A.; Ngalawa, H. & Kutu, A. (2019). Crude oil price shocks and macroeconomic performance in Africa's oil-producing countries. *Cogent Economics & Finance*, 7:1, 1607431, DOI: 10.1080/23322039.2019.1607431.

Onyeiwu, C. (2012). Monetary Policy and Economic Growth of Nigeria. *Journal of Economics and*

Oomes, N. & Kalecheva, K. (2007). Diagnosing Dutch-Disease: Does Russia have the Symptoms? *IMF*

Opaluwa; Umeh. & Ameh (2010). Acosta, P., Lartey, E. and Mandelman, F. (2009). Remittances and the Dutch Disease. *Journal of international economics*. 79:102-116

Orji, A.; Nwagu, G.U.; Ogbuabor, J.E.; Nwosu, E. & Anthony-Orji, O.I. (2019). Empirical Analysis of the Nexus between Crude Oil Price Volatility and Selected Economic Sectors in Nigeria. *Institutions and Economies*, Vol. 11, No. 4, pp. 135-156.

Otero, J. D. Q. (2020). Not all sectors are alike: Differential impacts of shocks in oil prices on the sectors of the Colombian economy. *Energy Economics* 86, 104691. https://doi.org/10.1016/j.eneco.2020.104691.

Papademos, L. (2003). The Contribution of Monetary Policy to Economic Growth. *European Central Bank Conference Paper*

Peersman, G. & Smet, F. (2002). The Industry Effects of Monetary Policy in the Euro-Area. *European Bank Working Paper No. 65*.

Philips, T. & Sun, H. (2003). Fully modified OLS for heterogeneous cointegrated panels. *Advances in Econometrics*, 15, (5), pp. 93-130.

Razmi, F.; Azali, M.; Chin, L. & Habibullah, M.S. (2016). The role of monetary transmission channels in transmitting oil price shocks to prices in ASEAN-4 countries during pre- and post-global financial crisis. *Energy*, 101, pp. 581-591. http://dx.doi.org/10.1016/j.energy.2016.02.036.

Ridhwan, M.; De Groot, H. & Rietveld, P. (2011). The Regional Impact of Monetary Policy in Indonesia. *Tinbergen Institute Discussion Paper 081/3*.

Rittenberg, T. & Tregarther, Y. (2008). *The real exchange rate and economic growth: Theory and Evidence.* Kennedy School of Government Manuscript No. 5, pp. 34-47.

Romer, P. (1996). Increasing returns and long-run growth. *Journal of Political Economy*, 94(86), pp. 1002-1037.

Roodman, D. (2006). *How to do xtabond2: An introduction to "difference" and "system" GMM in stata*. Centre for Global Development, Working Paper No. 103, pp. 78-109.

Rotimi, M. E. & Ngalawa, H. (2017). Oil Price Shocks and Economic Performance in Africa's Oil Exporting Countries. *Acta Universitatis Danubius. Œconomica*, Vol. 13, no 5.

Sachs, J., Warner, A. (1995). Natural Resource Abundance and Economic Growth. *Working Paper 5398, NBER, Cambridge: M.A.*

Sahinoz, S. & Cosar, E. (2010). Understanding Sectoral Growth Cycles and Impact of Monetary Policy in the Turkish Manufacturing Industry. *Central Bank of Republic of Turkey Working Paper 10/13*

Sayed, M.A. (2016). The Impact of Oil Prices on the Economic Growth and Development in the MENA Countries. Online at https://mpra.ub.uni-muenchen.de/89073/*MPRA Paper No. 89073*.

Sidrauski, M. (1967). Inflation and Economic Growth. *Journal of Political Economy Journal of Monetary Economics*, Vol. 31, pp. 217-298.

Signé, L. (2018). *The potential of manufacturing and industrialization in Africa*. Africa Growth Initiative.

Simohammed, K.; Benhabib, A. & Malik, S. (2016). The Impact of Oil Prices on Macroeconomic Fundamentals, Monetary Policy and Stock Market for eight Middle East and North African Countries. *Topics in Middle Eastern and African Economies* Vol. 18, No. 2.

Simon, J. E. (2001). Growth with exhaustible natural resources: The competitive economy. *Review of Economic Studies*, 33, (4), pp. 139-152.

Śmiech, S.; Papież, M.; Rubaszek, M. & Snarska, M. (2020). The role of oil price uncertainty shocks on oil-exporting countries. *Energy Economics*. https://doi.org/10.1016/j.eneco.2020.105028.

Tobin, J. (1965). Money and Economic Growth. *Econometrica*, Vol. 33, pp. 671-684.

Westerlund, J. (2007). Testing for Error-Correction in Panel Data. *Oxford Bulletin of Economics and Statistics* 69, pp. 709-748.

Woodford, M. (2001). The Taylor Rule and optimal monetary policy. *The American Economic Review*, *91*(2), pp. 232-237. http://dx.doi.org/10.1257/aer.91.2.232.

Working Paper No. 07/102

World Bank (2004). *World Development Indicators*. *World Development Indicators*. Retrieved August 6, 2011. http://data.worldbank.org/data-catalog/world-development-indicators.

Yasmeen, H.; Wang, Y.; Zameer, H. & Solangi, Y.A. (2019). Does oil price volatility influence real sector growth? Empirical evidence from Pakistan. *Energy Reports* Vol. 5, pp. 688–703.

Yildirim Z. & Arifli A, (2020). Oil price shocks, exchange rate and macroeconomic fluctuations in a small oil-exporting economy: Evidence from Azerbaijan. *Energy*, https://doi.org/10.1016/j.energy.2020.119527.