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Frustration in Oil Market Price Effect on External Reserves in Nigeria 1970-2017

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ABSTRACT

This study examines frustration in oil market price shock effect on external reserves Nigeria 1970-2019. Objectives are; to examine frustration in oil market price shock on the Nigerian external reserves 1970 to 2019 and to ascertain the impact of frustration in oil price on the Nigerian external reserves. The study employed the following advanced econometric techniques; Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, Structural VAR approach, Choleski decomposition and Imposing Short-run Restrictions test, statistical tests & Co-integration test. Based on the above econometric techniques conducted, it was observed that all the variables used became stationary after the first differences at degree of order one I (I). There is Co-integration (long run relations) among variables used in the study. Our results indicated that oil price does significantly influence shocks on external reserves in Nigeria the period of the study. Furthermore, frustration in oil price does insignificantly have impact on the external reserves in Nigeria from 1970 to 2019. The researcher recommends that; less emphasis of control should be placed on international market oil price since the oil price has 81% influences of international market externalities 'shock on Nigeria external reserves. Rather, more emphasis should be place on other non-oil sector contributions to Nigeria external reserves since it may has virtually neutral or significant internal control that could lend to positive effect on external reserves in Nigeria. Direct manipulation of cured oil production and supply control policy should be Nigeria interest since Nigeria economy operates system of floating exchange rates.

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The frustration in cured oil price shocks, have both fiscal and monetary policy outcomes which remains a subject of considerable controversy in both academic and policy circles on Nigerian external reserves. The 2002 – 2014 booms in cured prices, current indications that a second global fall-price shocks may be underway, and the observed volatility in other commodity prices have all greatly intensified this interest. Specifically, these have led to significant concerns that cured oil price shocks may complicate the management of; external reserves, domestic retail fuel prices, foreign exchange rate, fiscal and debt policy, by increasing fiscal budget uncertainty and threatening foreign debt sustainability. These concerns are particular in the case of low-income countries, which are relatively more expose to price shocks as they integrate into international markets otherwise known as an open economy in economics.

frustration in cured oil price shocks effect on Nigeria external reserves will implies global monetary and fiscal policies simultaneous transmission (shifts) influence of cured oil price from international markets into Nigerian external reserves sector, how dose cured oil price from international markets, that how what happened to our trading partners contraries economic policy and activities like United State (U.S.) and others as Nigerian major cured trading partners effect or influence Nigeria external economy, specifically her external reserves. To understand this, we must think through what is happening to the international flow of capital and the implication of these capital flows for the domestic economy.

In the past three decades, Nigeria has taken numerous policy initiatives and measures in the management of its external reserves. Although very little was achieved because the structure in place then could not support efficient reserves management, enduring lessons could be distilled from the nation's past experience. Thus, Since the 1970s, Nigerian economy has persistently depended on oil as the main source of foreign exchange earnings with the attendant cycles of economic booms and bursts. From 19970, world Crude oil, average price in nominal US dollar began to rise from $/bbl1.21, $/bbl10.46, $/bbl39.75, $/bbl16.68, $/bbl20.35, $/bbl17.87, $/bbl29.26, $/bbl30.15, $/bbl32.14, $/bbl50.96, $/bbl68.96, $/bbl98.52, $/bbl99.66, $/bbl74.76, $/bbl117.79, $/bbl113.67, $/bbl105.72, $/bbl95.85, $/bbl45.69, $/bbl49.29, $/bbl52.95, and $/bbl68.79(2018) presenting 1970, 1975, 1980,

1985, 1990, 1995, 2000, 2003, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018. (World bonk, 2018).

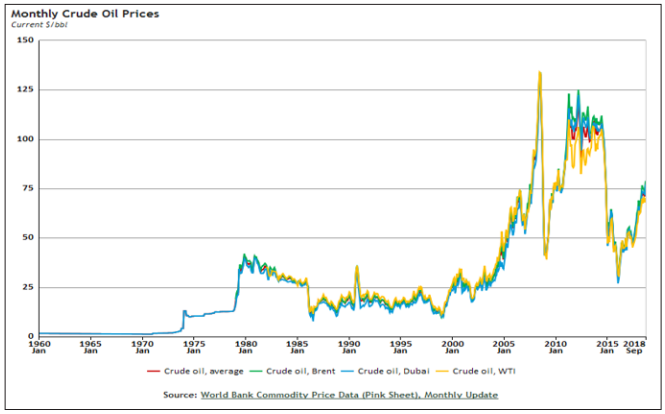


Figure 1

In March, average crude oil price increased 20.3% compared to the previous month's values. Brent oil price increased by 5.9 $/bbl reaching level of $39.07 per barrel. WTI price rose by $7.4 pointing at $37.8 per barrel. Oil prices today are 30% lower compared to the same period of 2015 and 25% higher compared to this year low recorded at January. Historical maximum of crude oil prices of $132.83 per barrel was reached in July of 2008, while record low prices of $1.17 - in February of 1946. Current oil price slum started in June 2014 as a reason of excess of oil supply over oil demand [1].

Following the above, we observed that several key development in the global oil market occurred prior to and during the plunge in prices that began in mid- 2014. A growing role of the U.S. shale oil industry as the cost producer, a shift in OPEC policy, a reassessment of geopolitical risks, and deteriorating global growth prospects. Thus, supply factors have been the dominant force in the sudden price fall in oil; weakening demand prospects were also an important contributor. The latter could partly explain why oil price plunge failed to provide the anticipated boost to global activity.

With high interest rates, raise in exchange rate and fast appreciating U.S. dollar, crude oil prices became under falling pressure and seemed boundless. Oil price process parameters changed drastically in 2003–2007 toward consistently rising prices. Short-term forecasting would imply persistence of observed trends, as market fundamentals and underlying monetary policies were supportive of these trends. Market expectations derived from option prices anticipated further surge in oil prices and allowed significant probability for right tail events. Given explosive trends in other commodities prices, depreciating currencies, and weakening financial conditions, recent trends in oil prices might not persist further without triggering world economic recession, regressive oil supply, as oil producers became wary about fluctuations in exchange rate and inflation. Restoring stable oil markets price, through restraining basket price of the Organization of Petroleum Exporting Countries OPEC policy, is essential for durable external reserves growth.

The movement in oil prices could resulting in another but better managed boom and unprecedented accumulation in the level of external reserves to Nigerian economy from USD4.98 billion in May 1999, to USD59.37 billion as at March 28, 2007. Nigeria's gross external reserves at end December 2011 stood at USD32.6 billion which shows large gap decrease of 26.77 percent when compared with end December 2007, but an increase of 0.9 percent when compared with the level at end December 2010 that stood USD31.7, and then increase by 11.2 percent when compared with the level of 2011 at the end December 2012 that stood USD43.8 billion. Meanwhile, Nigeria's gross external reserves at end December 2013, 2014, 2015 and 2016 stood at USD42.8, USD34.2, USD28.2 and USD26.9 billion's which shows large gap decrease of 1%, 9.6%, 15.6% and 16.9 percent when compared with end December 2012 respective [2,3].

Importantly, it is worth knowing that Nigeria's external reserves is obtain from many sources, but derive mainly from the proceeds of crude oil production and sales. Nigeria produces approximately 2,000,000 barrels per day of crude oil in joint venture with some international oil companies, notably Shell, Mobil and Chevron. Out of this, Nigeria sells a predetermined proportion directly, while the joint venture partners sell the rest. The joint venture partners pay Petroleum Profit Tax to the Federal Government through the Federal Board of Inland Revenue. With monetary policy shift from interest rate, floating foreign exchange rate policy to the current international trade global monetary and fiscal policies shocks influence in Nigeria, the policy relevance of this study become clearer.

The prices, interest rate and exchange rate are the key variable for the global policies simultaneous transmission (shifts) influencing towards domestic economy. To mudell-fleming, when income rises in a closed economy, the interest rate rises, because higher income increases the demand for money. That is not possible in an open economy because, as soon as the interest rate of any domestic economy starts to rise above rate world interest rate, capital quickly flows in from abroad to take advantage of the higher return. This capital flow not only pushes the interest rate back to world interest rate but it also has another effect: because foreign investors need to buy the domestic currency to invest in the domestic economy, the capital inflow increases the demand for the domestic currency in the market for foreign currency exchange, bidding up the value of the domestic currency. The appreciation of the domestic currency makes domestic goods expensive relative to foreign goods, reducing net exports. While the fall in net exports exactly offsets the effects of the expansionary fiscal policy on external reserves. Although monetary transmission mechanism is different when come to open and closed economy. In an open economy, the channel of monetary transmission is not available because the interest rate is fixed by the world interest rate. As soon as an increase in the money supply starts putting downward pressure on the domestic interest rate, capital flows out of the economy, as investors seek a higher return elsewhere. This capital outflow prevents the domestic interest rate from falling below the world interest rate [4].

The effects of oil price shocks on the Nigeria's external reserves has assumed that changes in the price of oil are exogenous, determined largely by the actions of United States', great Britain economy activities as major buyer of Nigerian oil at the international market and OPEC polices. Significant historical episodes seem to support this assumption. For instance, oil prices approximately tripled in both 1975 – 1980 and 2008-2009 because of OPEC's decision to curtail the supply of oil. This assumption of erogeneity is critical, because it permits researchers to associate changes in the price of oil with shocks to each country supply and external reserves. Researchers can then determine the effects of a shock to the supply of oil and its external reserves simply by looking at the response of the economy to a change in the price of oil [5].

Nigeria's dependence on oil for over 90% of its foreign exchange earnings makes its capital account vulnerable to the fluctuations in crude oil prices. This, in addition to its high import bills contributed to the fluctuations in the level of reserves over the years and consequently the way the reserves are being managed. During the oil boom of the mid-seventies, which has resulted in the buildup of reserves, the external reserves were diversified into an array of financial instruments including foreign government bonds and treasury bills, foreign government guaranteed securities, special drawing rights (SDRs), fixed term deposits, call accounts and current accounts. This provided significant investment income as well as liquidity. However, during the glut in the global oil market, which led to collapse in the crude oil prices and consequently a drawdown in the reserves, the reserves were held mainly in current accounts and treasury bills. This underscored the need to investigate impact of fall in oil price shock on the Nigerian external reserves as foreign exchange inflow of the country from 1970 to 2017.

Objectives of the Study

The specific objectives of this study are to:

1. Examine the effect of frustration in oil market price shock on Nigerian external reserves 1970 to 2019.
2. Ascertain the impact of frustration in oil price on Nigerian external reserve sector.

Research Questions

1. Dose frustration in oil market price significantly affect shock on Nigeria external reserves 1970 2019?
2. Is there significant impact of oil price frustration on Nigerian external reserve sector?

Hypotheses of the study

1. H_o: frustration in oil market price doesn't significantly influence shocks to Nigeria external reserves sector from 1970 to 2019.
2. H_o: frustration in oil price does not significantly have impact on the Nigeria external reserves from 1970 to 2019.

Theoretical Framework and Review

The practice of opening up the economy to speed-up trade and cooperation amongst countries in the world is an idea which has been advocated and this is captured in the arguments postulated by both these scholars namely, Messrs Adam Smith and David Ricardo. However, the argument of David Ricardo, which is comparative advantage, is accepted intellectually and it is seen as the force that drives the international trade. When countries move out of economic self-sufficiency which is otherwise called autarky, and adopt open economy, it is a demonstration of specialization and exchange. These countries export goods and services in which they have a competitive edge over all other ones. This is comparative advantage at work, while they import those commodities, which they lack comparative advantage in. These countries gain from the dictates of international market and as such realize foreign exchange, besides, availing themselves to international specialization. A country can procure the desired Desired goods and services can be procured at considerable savings by a country especially capital and intermediate goods which are required to support efficient and effective productive activities in the export sector.

On the other hand, countries also benefit from the economies of scale as both the local and international markets, which give support to large-scale operation. In this regard, trade facilitates efficiency resulting from exposure of local firms to international competition and technology and the prospects of their products in the worldwide markets (CBN and NEXIM). Therefore, if a country can export goods and services to the global market it can enjoy economies of scale, learning effects and competitive gains of x-efficiency forces that greatly increase motivation and competition that leads to lower cost curves for the firms.

In these modern times, as opined in the, the increasing share of world trade is mainly driven by technology. Rapid progress made in technology has reduced the costs of transportation, communication and other costs elements that have hitherto were strong trade barriers. Another benefit of the recent advances in technology result in increase in range of available products including induced large economies of scale. These developments concomitantly came with specialization, which triggered firms to seek foreign markets. Therefore, it may be said that increased share of world trade is one of the key success factor behind globalization.

In addition, the increase in Foreign Direct Investment (FDI) is another great driving force in which countries of the Organization for Economic Cooperation and Development (OECD) grew at an average annual rate of 31.4% between 1983 and 1989. However, this investment clearly has been concentrated among what can be described as the 'triad' of the United States, European Union and Japan. As Foreign Direct Investment (FDI) is seen as one of the key conduits for technology flows, it becomes easy to rationalize the poor performance of some countries that developing in global trade especially countries in the region of Sub Saharan Africa.

Meanwhile, Natural Resource Abundance Beneficial to Growth, before the late 80s, the conventional wisdom was that natural resources had positive effect on development. Many development theorists and neoliberal economists agreed to this view until the emergence of new view in the 80s that disagreed that natural resource abundance was not a blessing to the developing countries as people hitherto opined. The key argument was that natural resource endowments according to benign perspective would help the developing countries to change from the economic stage of underdevelopment to that of industrial 'take-off'. This has been exemplified in countries like, the United States, Britain and Australia. Also, the many ways through which abundance of natural resources like oil sector could bring contribution to the economies of the oil producers have been treated in the literature. For instance, the high revenues from oil make the governments of countries producing oil to spend and invest largely without relying on taxation. Again, revenues accruing from oil when well utilized, could serve as springboard or "big push" for economic development. This channel is necessary especially for developing countries where usually shortage of capital becomes a great obstacle to growth and development. More so, the enormous foreign exchange earnings coming from exports of oil, besides being used for the importation of raw material, intermediate and capital goods for production purposes in the non-oil sectors could also help in increasing the foreign reserves of the oil exporters. Interestingly, the foreign reserves when accumulated can be seen as security or collateral, which the oil producing countries can use in attracting foreign investment to them. Furthermore, such holding can be considered as an expensive self-insurance strategy to lessen vulnerability impacts of local and foreign shocks and to intervene in the foreign exchange market. In addition, oil sector can contribute tremendously to development in the oil rich economies through providing intermediate inputs to the parts of the economy. Among the intermediate inputs, comprise gas, crude oil, and liquid feed stocks, including oil and gas into the refining, petrochemical and electricity and energy intensive industries

respectively. In developing countries, this channel is necessary for their economic growth and development. For example, most outputs of the petrochemical industries contribute immensely to the development of the manufacturing industries. Similarly, providing electricity and other basic utilities or infrastructure at affordable prices is of great importance in the process of growing and sustaining the service and manufacturing sub sectors. In the oil rich economies, growth and development could be improved through the market contribution from oil. The contribution from the market refers to the demand by oil sector for several inputs of goods and services which are provided by local sources.

By and large, because of oil production, refining and distribution, there is high likelihood for oil sector-related services to come into being. These oil sector-related services will create vast opportunities for employment and creates sources of earnings for those operating the businesses. Besides the market contribution, the foreign /external reserve effect is very crucial. More so, oil activity usually leads to inflow of foreign resources like foreign /external reserve, FDI and portfolio investment. To be precise, large chunk of foreign /external reserve and FDI into most of the countries that export oil are mainly found in the oil sector. The many ways through which foreign /external reserve I affect strongly on growth and development in the receiving countries have been greatly discussed in the literature. To be specific, foreign /external reserve and FDI inflows to developing countries help in increasing their stock of capital and could help in improving greatly labour productivity and incomes in the host country. As a result, the output levels, job creation, and potential tax revenues are enhanced in the host countries. Empirically speaking, few studies have provided results supporting the benign perspective on the effect of natural resources on economic growth and development. Among these studies, some have not only reported that resource abundance had positively affected growth and development but also discovered that resource dependence had no unfavorable impact on growth.

Oil Prices and Economic Activity

Demonstrating that changes in the exchange rate have a substantial effect on the price of oil have, in turn, important implications for studies that attempt to estimate the impact of oil supply shocks on the external reserve to an economy. They imply, first, that studies that omit exchange rates will miss-measure the impact that oil supply shocks have on the economy external reserve since some of the impact of exchange rate changes will be attributed to oil price changes. Second, they imply that it is incorrect to use changes in the price of oil as a measure of the underlying supply shock because some of these price changes are caused by other factors. Thus, studies that attempt to analyze the effects of oil supply shocks must first isolate the component of oil price changes that is not due to these factors, reviews the channels through which a shock to the supply of oil will affect the economy [5].

Although there is no clear established real relationship between oil price shock and external reserve in an economy, but in his study established that along with labor and capital, energy is an input to the production process [5]. Oil in turn is an important component of total energy sources. An increase in the price of oil due to an OPEC shock to supply will force business firms to economize on the use of oil. Since close substitutes for oil are not readily available, this will lead to a reduction in energy input and a consequent decline in aggregate supply. There will be other effects as well. Analysts have often likened exogenous increases in the price of oil to a tax increase for a consumer that leads to a reduction in demand. An increase in the price of oil also redistributes income between the Value added tax (VAT) and the rest of the world because the VAT. is a net importer of oil. Within industry, profits are redistributed from oil consuming to oil-producing firms. The last effect reveals an aspect that is potentially important when trying to determine the net impact of oil supply shocks on economy-wide output. Just as oil-consuming industries react to an exogenous increase in the price of oil by reducing output, industries involved in the production of oil will react by increasing output. They do so because the higher price of oil makes it profitable to engage in both exploration and drilling for oil in locations where it was previously unprofitable to do so. An increase in the level of activity by firms directly engaged in the production of oil leads, in turn, to increased production in industries that supply these firms with inputs. Similarly, an exogenous decrease in the price of oil will force a contraction in the output of industries involved in producing oil. Thus, the overall effects of any exogenous change in the price of oil on real output will depend upon the relative magnitude of the effects on the oil consuming and oil-producing sectors. While previous research has focused upon the impact of exogenous oil price changes on oil-consuming sectors of the economy, recent evidence suggests that the impact upon the oil-producing sector may be substantial as well. In particular, experience over the short period since the oil price decline in early 1986 suggests that the immediate impact on oil producers may be large enough to outweigh the implicit on oil consumers.

These considerations to imply that using theory alone to predict the exact response of aggregate output to an exogenous change in the supply of oil would lead to a somewhat ambiguous answer [5]. In contrast, the effect on the price level is unambiguous. An exogenous reduction in the oil supply leads to an increase in the price of oil and in the aggregate price level. (It is these increases in the price of ail that causes domestic oil producers to increase their output.) We have contended that the omission of exchange rates will bias the measured impact that oil price changes have on the economy.

Stated that to see what the precise effects will be, it is necessary to examine what economic theory tells us about the impact of exchange rate changes on the economy [5]. Recall, first, that the sample period of this study includes four episodes of sharp increases in the price of oil. Oil prices almost tripled in 1973-1979, again over the 1981-1999, again in 2000 -2014 then in 2015-2018 periods. As indicated, these episodes were preceded by declines and increases in the value of the dollar. The proximity of these dollar declines suggests that omitting the effects of the exchange rate changes would exaggerate the effect of oil price shocks. For instance, theory tells us that an increase in the value of the naira against dollar will lead to lower inflation. A higher dollar implies that the price of Nigerian imports from U.S increases and those domestic producers must increase prices on goods sold in the Nigerian. In addition, if domestic producers are to remain competitive in world markets, they must reduce export prices as well. Similarly, when the dollar falls, the price of imports goes down. In addition to the direct impact on the price level, a decline in the dollar's value also allows domestic producers to reduce prices on products that compete with imports. For our purposes, this implies that ignoring exchange rate effects will lead one to attribute the inflation that followed the dollar's depreciation in both the early and late 1970s largely to the oil price increases.

Stile on the channels through which a shock to the supply of oil will affect the economy, Bharat established that crude oil traded in world markets is priced in dollars, This fact has important

implications for the relationship between the value of the dollar and the price of oil because oil importers who do not use the dollar as currency must, in effect, obtain dollars to purchase oil. Thus, if the value of the dollar changes, the price they pay in terms of their own currencies will change. For similar reasons, oil exporters will also not be indifferent to fluctuations in the value of the dollar.

However, the benefits of foreign reserves as a shock absorber of crisis associated with external economic transactions cannot be overemphasized. emphasizes this position by positing that there is a restriction to the level of foreign exchange reserves required to prevent the financial crisis, given the fact that accumulation of large foreign reserves implies higher costs. If foreign exchange reserves holding are spurred by preventable desires, it should terminate at the level where the country has reached its optimal level. In addressing the issue of what constitute an adequate foreign reserve. argued that some of the conditions for the demand for foreign exchange reserves of an economy centre on variables, like total trade (import and export), external debt, possible trade shocks severity and considerations of monetary policy. Also in his study, argued that, there are some common parameters used to assess the adequacy of foreign reserves for an economy. To the author, some of these measures show the level of foreign weakness of an economy and the ability of foreign exchange reserves to guide against this vulnerability. These parameters are: sufficiency of imports, adequacy of debts and monetary sufficiency. Notwithstanding, recently, an active strategy for foreign exchange reserves administration appears to centre on the creation of future wealth for a country. This happens when exchange rate, debt management and monetary policy issues to central banks are of marginal interest. On the other hand, when weaknesses in the financial and corporate sectors are low; when government seriously drives a flexible exchange rate policy; and when the government has an efficient fiscal policy and sound management framework as well as highly developed domestic financial markets, in this case, the foreign exchange reserves portfolio is organized into active and non-active parts. The inactive portfolio centre on macroeconomic objectives concentrating on mainly finance while the active portfolio is used for maximizing profit, taking into consideration the objective of liability management arguing in tandem with the motive of profit maximization to foreign exchange reserves administration, posit that, "over a decade now, foreign currency reserves administration has changed its aim from sustaining liquidity and economic protection objectives to that of maximizing total profit [6-10].

Empirical Related Literature Review

Examine the degree to which economic fundamentals entering the oil price decline explain the impact on economic growth across oil exporting economies, and derive policy implications as to what factors help to mitigate the negative effects [11]. They employed an event-study approach using cross-section panel regressions covering multiple historical episodes could potentially help shed light on the factors underlying the macroeconomic effects of oil price shocks.

They find that pre-existing fundamentals account for about half of the cross-country variation in the impact of the shock. Oil exporters that weathered the shock better tended to have a stronger fiscal position, higher foreign currency liquidity buffers, a more diversified export base, a history of price stability, and a more flexible exchange rate regime. Within this group of countries, the impact of the shock is not found to be related to the size of oil exports, or the share of oil in fiscal revenue or economic activity.

Examined the dynamic pass-through of crude oil price shocks to retail fuel prices using a novel database on monthly retail fuel prices for 162 countries [12]. Auto-regression impulse response functions were employed. The author's findings suggest that on average, a one cent increase in crude oil prices per liter translates into a 1.2 cent increase in the retail gasoline price at peak level six months after the shock. However, the estimates vary significantly across country groups, ranging from about 0.5 cent in Mena countries to two cents in advanced economies. The results also show that positive oil price shocks have a larger impact than negative price shocks on the retail gasoline price. Finally, the paper underscores the importance of the new dataset in refining estimates of the fiscal cost of incomplete pass-through.

ascertained Impact of oil price fluctuations on Indian economy. The study employs VAR analysis and examines Variance Decomposition to capture the linear inter-dependencies among the variables, structural stability tests and Granger-causes [13]. The results of cyclical correlation analysis suggest that oil is pro-cyclical to output, price level, stock market, gold, interest rate and foreign exchange reserves, while it is counter cyclical to money supply, net exports, and exchange rate. Also, it is found that oil Granger-causes output, general price level and net exports. The structural stability tests demonstrate that there is no evidence of structural break in the VAR model, confirming the reliability of estimated relationships under the VAR model.

Worked on dynamic crude oil price shocks to retail fuel prices pass through, evidence from 162 countries a new global retail fuel price database [14]. The author has made use of impulse response functions. The findings of the study suggested that on average, one cent increase in crude oil price per liter translated into a 1.2 cent increase in the retail gasoline price at peak level six months after the shock, that the estimated variables very significantly across country groups ranging from about 0.5 cent in developing countries to two cent in advanced economies. The results show that positive oil price shocks have a larger impact than negative price shocks on the retail gasoline price. Kangni and Chadi concluded to underscores the importance of the new dataset in refining estimates of the fiscal cost of incomplete pass-through.

(2018), investigated on the impact of the 2014 – 2016 collapse in oil price on the eight oil producing countries. An impulse response function was adopted in the study. The finding raveled low responsiveness of activity in key oil importing emerging markets, and that among oil exporting countries, those with flexible exchange rates, more diversified economies, and larger fiscal buffers fared better than other does.

Examine the Commodity Price Shocks and Fiscal Outcomes within the experience of 116 developing countries [15]. The empirical study employed reduced-form cross-country panel regressions; the dataset was an unbalanced annual panel, covering the period 1990–2010 which adopted the benchmark fiscal exposure equation models. Thus, findings indicate that commodity prices have a significant impact on fiscal outcomes. Both revenue and expenditure rise in response to commodity (import or export) price increases; the response of the fiscal deficit is ambiguous. A floating exchange rate regime only partially offsets the impact; foreign-exchange reserves do not dampen the effects. Hence, Nikola and Issouf concluded that there is a strong case for fiscal hedging against commodity price shocks. Hedging instruments based on a limited set of benchmark world prices for a narrow set of commodities may suffice to realize most of the potential benefits.

Investigated on Crude Oil Prices: Trends and Forecast [15]. The study used Levy processes offer flexibility for accounting for basic features of financial series, namely skewness, excess kurtosis, and frequent small and large jumps with stochastic differential equation (SDE). Based on model, the study findings implied that crude oil density forecast, market participants short-term expectations seemed to be strongly influenced by underlying fundamentals characterizing oil markets. Noureddine observed that these fundamentals were characterized by expansionary monetary policy since 2001, sharply depreciating U.S. dollar, which fell by over 65 percent vis-à-vis Euro since 2001, higher world economic growth and consequently higher demand for oil. Given crude oil supply rigidities, traders expected excess demand for crude oil to increase, and consequently to cause further pressure on oil prices.

On the second equation model, Noureddine observed that parameters changed significantly in 2003M5–2007M10 as it was compared with 2000M1–2003M4 under strong impulses from monetary policy. To Noureddine, Location parameter μ increased from 0.08 to 0.29. Consequently, mean return increased from -0.005(annualized to-0.005*255 = -1.28 percent) in 2000M1–2003M4 to 0.12 (annualized to 30.6 percent) in 2003M5–2007M10. Scale parameter δ increased slightly from 2.69 to 2.76; however, by exceeding unity, it remained high, indicating a stretched out distribution. Shape parameter measuring skewness β remained small in the range -0.02–-0.06 indicating symmetric oil price returns distribution. Shape parameter measuring tail steepness α increased significantly from 0.54 in 2000M1–2003M4 to 0.97 in 2003M5–2007M10, indicating steeper tails and therefore higher frequency of smaller jumps. Consequently, volatility fell considerably, from 2.2 in 2000M1–2003M4 (annualized to 35 percent) to 1.7 in 2003M5–2007M10 (annualized to 27 percent). In spite this decline, volatility remained high for daily data, implying that oil markets were constantly facing significant uncertainty and were sensitive to news and small shocks and attractive to speculators.

Studied on the impact of fluctuations in global oil prices on domestic inflation over 72 advanced and developing economies within the period from 1970 to 2015 [16]. Using an unbalanced panel data of the different countries, they employed structural VARs with three variables (global crude oil production, the index of global economic activity, and the real price of oil). They find that a 10 percent increase in global oil inflation increases, on average, domestic inflation by about 0.4 percentage point on impact, with the effect vanishing after two years and being similar between advanced and developing economies. They also find that the effect is asymmetric, with positive oil price shocks having a larger effect than negative ones. The impact of oil price shocks, however, has declined over time due in large part to a better conduct of monetary policy. Sangyup, Furceri, Loungani, Mishra, and Marcos also furthered their study and examined the transmission channels of oil price shocks on domestic inflation during the recent decades, by employing monthly dataset from 2000 to 2015. The results suggest that the share of transport in the CPI basket and energy subsidies are the most robust factors in explaining cross-country variations in the effects of oil price shocks during the this period.

Examined the impact of the oil price decline on Nigeria with focused on international reserves, oil prices likely played a meaningful role, real GDP growth as was compared to pre-shock forecasts for 26 countries with substantial oil exports in their economy within the period of 2013 to 2017 [17]. They researcher's made use of a cross-country regression and impulse scattered response graph approaches. The finding of the study revealed that Nigeria experienced a substantial decline in oil exports in the wake of the shock, as did most oil exporters. While a number of other countries have oil exports exceeding Nigeria's 2013 level of 17.6 percent of GDP, Nigeria is heavily dependent on oil for export receipts and fiscal revenue. However, it was also find that there was no correlation across countries between the importance of oil in either exports or fiscal revenue and the impact of the shock on real GDP, and the impact on Nigeria was larger than could have been foreseen based on any of these metrics.

Study on the Lower hydrocarbon prices impact on macroeconomic performance in five exporting countries. The study made use of time series trend and graph [18]. The results show that Real GDP growth of 2.7 percent is estimated for 2016. Inflation remained low despite subsidy cuts, averaging about 2.7 percent in 2016. Fiscal and external balances have deteriorated from large surpluses to deficits due to sustained lower energy prices. The authorities are adjusting by cutting current expenditures in 2016, undertaking energy pricing and labor reforms, and placing stronger emphasis on raising non-hydrocarbon revenues. While banking system liquidity has tightened and credit to the private sector has moderated, banks remain sound and well capitalized.

In analyzing the factors that influences foreign exchange reserves in Nigeria over the period of 1999 to 2011, used the Autoregressive Distributed Lag (ARDL) to investigate restructured econometrics the Buffer Stock Model" of with emphasis on level of income, interest rate, imports and exchange rate [19,7]. Their findings altered the presence of buffer stock model for foreign exchange reserves aggregation and provided vital indicators in support level of income as the key variable influencing reserves aggregation in Nigeria. recently conducted an empirical analysis of the factors influencing foreign exchange reserves in Bangladesh, applying the Augmented Dicky Fuller (ADF) test, to analyze unit roots properties of the variables and Engle Granger residual based co-integration test to examine the long run relationship among the variables, and some diagnostic tests for better modeling, results of the analyses revealed the presence of strong relationship among foreign exchange reserves, exchange rate, remittances, domestic interest rate, broad money, United Payment Interface (UPI) of export and import, and per capita income [20]. The study therefore suggested an efficient exchange rate administration, strong remittance related policies, quality products for exports trade and sustainable national income level as possible measures that can enhance healthy amount of foreign exchange reserves for a developing country like Bangladesh. Extended the study on the factors contributing to foreign exchange reserves by investigating the effect of variation in external reserve positions of Nigeria on domestic investment, price level, and exchange rate during the period 1986 to 2006. Using the Ordinary Least Square (OLS) and vector error correction (VEC) estimation techniques, they found that change in foreign exchange reserves in the country affects only foreign direct investment (FDI) and exchange rates, and does not affect local investment and price level [21].

Investigated on the impact of crude oil price volatility on economic growth in Nigeria (1980 -2014) [22]. The study utilizes secondary data tool for data analysis with the aid of multiple regressions, they findings revealed that there is a positive and significant relationship between oil price and economic growth. Based on the findings the researchers hereby conclude that oil price volatility does not have a positive impact on the economy (contrary to the findings of some earlier studies) but oil price itself does.

Studied on the impact of oil shock on the Nigerian economy [23]. He employed time series quarterly data with the aid of Structural

Vector Auto-regression (impulse response), ADF unit root test, and short-long test approach. The findings indicated positive responses the Nigeria Gross domestic product dispatch the up and down impulse. This implies that the Nigeria economy was impacted positively notwithstanding the negative and positive movements in from the Structural Vector Auto-regression impulse response results. The findings also show long run impact of oil shock on the Nigerian economic growth with the period of the study.

Examined on the recent oil price shock, exchange rate and its effect on the stability of the Nigerian economy from 1971Q1 to 2014Q4 [24]. The study empirically used time series data with the aid of Structural Vector Autoregressive (SVAR) Model and its impulse response functions as well as variance decomposition test. The findings reported that oil price shocks had negative effect on external reserve, exchange rate and economic growth. The negative effect of oil price shocks on external reserves and economic growth tended to be more significant in the long run. It was also revealed that oil price shocks had a deleterious effect on the macroeconomic performance of Nigeria. The author then recommended that effective macroeconomic management is required to reduce the adverse effect of oil price shocks in the country.

Established the effects of oil price, external reserves and interest rate on exchange rate volatility in Nigeria covering the period 1970 to 2011 [25]. The study employed Johansen Co-integration technique and vector correction mechanism. The result established that proportionate change in oil price leads to a more than proportionate change in exchange rate volatility in Nigeria; which implies that exchange rate is susceptible to changes in oil price. investigated accumulation of external reserves and its effects on exchange rates and inflation in Nigeria using ordinary least squares regression analysis. He found that foreign exchange reserves do not have significant effect on foreign exchange rate. The study also discovered that foreign exchange reserves do not have significant effects on inflation in Nigeria.

Generally, empirical studies on the impact of oil prices fall on the external reserve to an economy have provided different results on the relationship. Many studies have showed that oil price increase had positive effect on the growth of external reserve to an economy .While some on the other hand concluded, an increased in the price of oil may have detrimental impacts on macroeconomic performance [26-29].The findings largely depend on whether the economies in question are oil exporting or importing, period of the study and the degree of the countries dependency on oil.

Authors from U.S. provide number of striking conclusions on this subject matter. For instant, reported strong causal and negative relationships between oil price and real GNP; oil prices were fined to have contributed too many of the U.S. recession. [27,30] established that monetary policy measures might not have strong effects in reducing oil price shocks. In a similar study on the U.S economy, employed the Markov State Switching approach to analyze the effect of oil price shocks on post war business cycle fluctuations [31]. It was revealed that the behavior of oil prices has been a contributing factor to the slow growth of output. However, the movement in oil prices has not been a major determinant in the slow growth process of the U.S. employed error correction model to determine the effect of oil price shocks on U.S. economic growth. The finding was that oil prices reduced GDP which supported the argument of [28,27]. In a similar study argued that oil prices could have greater impact on real GNP in an environment where oil prices are less volatile than in an environment where oil prices fluctuation are persistent. It was further posited that a positive normalized shocks largely affect growth while negative normalized shocks pose no effect on output growth in the U.S. shows that a significant part of oil prices uncertainty in the U.S. was due to adjustments within the energy sector and not within the rest of the economy. found that consumer and import prices are also affected by oil price increases. The impact of oil price shocks on real GDP growth in the U.S. was largely attributed to the oil price shocks of 1973-74, 1979 and 1991. [32-34] to investigate the relationship between oil prices and exchange rates in Norway adopted a non-linear approach. Evidence from the study revealed a negative relationship between exchange rates and crude oil prices. The study conducted by showed that volatility of oil prices has a negative effect on consumption and aggregate output [29]. The effect of oil price uncertainty was found to exert statistically significant effect on durable consumption and fixed investment.

Methodology

For this study, Ex Post Facto Research Design fits perfectly. This is because the study attempts to explore cause and affect relationships where cause already exist and cannot be manipulated, but rather to use what already exist and look backwards to explain why. In the study the economies of Nigeria were examined with reference to impact of fall in oil price shock on the Nigerian external reserves as postulated by the theoretical foundation and espoused in analytical framework explored in chapter two.

Model Specification

Model is an abstraction form of reality drawn in such a way to reveal the relevant aspect of the subject under consideration. Therefore, to empirically study this work (i.e. the impact of fall in oil price shock on the Nigerian external reserves), the researcher postulates the following models. To begin, the function is represented as mathematical function such that

$$GER = F(\Delta OIP_t\ TOEI_t, FER_t) \quad \ldots (1)$$

Explicitly

$$GER = \beta_0 + \beta_1 \Delta P_t + \beta_2\ TOEI_t + \mu_t \quad \ldots (2)$$

$$IogGER_t = \beta_0 + \beta_1\ \Delta OIP_t + \beta_2\ logTOEI_t + \beta_3\ FER_t + \mu_t \quad \ldots (3)$$

Where, GER is gross external reserves, Log is natural logarithm, ΔOIP mean change that is a rise or fall in real oil price could lead to foreign exchange rate FER appreciation and depreciation respectively, while TOEI is the total oil exported and import, μ is the white noise disturbance term, while t in the model represents at current period time, β_0, β_1…, β_3 are the parameters of the coefficient.

Results Analysis and Discussion

Unit Root Tests Analysis

The researcher applied Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root test to eliminate the presence of spurious result and autocorrelation in the models, test for the stationarity of the variables at different levels of significance and test for the order of integration of the variable in the model. The result is presented in tables.

Unit Root Test, (Tests include intercept and trend)

Variables	PP Statistic at level form	PP Statistic at 1st difference	ADF Statistic at level difference	ADF Statistic at 1st difference level	5% critical value
GER	-2.016855	-5.681153	-1.779755	-5.720265	-3.510740
TOE	-2.538080	-6.607010	-2.302524	-6.580468	-3.510740
OIP	-1.319796	-3.533952	-1.378481	-7.210344	-3.510740

Source: Computed by the authors using E-views Statistical package version 9.0

In the table 2 above, the PP and ADF unit root test statistic results show that at level form, gross external reserves (GER), oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER) were not significant because with the application (i.e. either ADF and PP) at level, in absolute terms at 5% levels of significance were less than the 5% critical value. Their PP and ADF test statistic were ([2.016855PP, 1.779755ADF] GER, [2.538080PP] [2.302524ADF] TOE, [1.319796PP, 1.378481ADF] OIP and FER [0.153706PP, 0.267421ADF] respectively. Thus, their statistic values were lower in absolute terms than the 5% critical value of [3.510740].

While at the first difference, all the variables that is gross external reserves (GER), oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER) were statistically significant (i.e. stationary) at 5% levels of significance. Their PP and ADF test statistic were [5.681153PP, -5.720265ADF] GER, [6.607010PP 6.580468ADF] TOE, [3.533952PP, 7.210344ADF] OIP and FER [4.307306PP, 3.510740ADF] respectively.

Generally, the results indicated that time series are integrated of order one (1). The integration of a group variables at the same order with the respective application (ADF, and PP), thus implies a linear combination of series which could be said to be co-integrated. The level of their integrations indicates the number of time series have to be differenced before their stationarity is induced. Considering the ADF and PP test statistics at 5% critical values, it is observed that these tests (i.e. the t- statistics) are strong. Based on the above results, we can now further the other estimations model since the problem of spurious results has been adjusted with the aid of ADF and PP unit root test. Having found that all the variables are integrated of order one, co-integration tests are conducted to see if there is a long-run or equilibrium relationship between the variables.

Co-integration Test

The estimated equation reported that there is a long run relationship between the D(ASC,2) and the explanatory variables; D(ALR,2) D(ACGSF,2)D(TBRATE,2) D(CRR,2) and D(MPR2)) is the hypothesis to be tested in this test. Firstly, the summary of the Johansen Co-integration Test is shown in the Table below. The model with lag 1 was chosen with the linear deterministic test assumption.
: Unrestricted Cointegration Rank Test (Trace)
Series: D(GER,2) D(TOE,2) D(OIP,2) D(FER,2)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.901095	207.3508	47.85613	0.0000
At most 1 *	0.667123	105.5525	29.79707	0.0000
At most 2 *	0.569158	57.15324	15.49471	0.0000
At most 3 *	0.366771	20.10460	3.841466	0.0000

Source: Computed by the Authors using E-views Statistical package.

Under the Johansen co-integration test, two are three co-integrated vectors. In Johansen's method, the eigenvalue, trace or Max-Eigen statistic and critical value are used to determine whether co-integrated variables exist. As we observed from the trace statistics, here only the absolute values of D(GER,2) D(TOE,2) D(OIPN,2) D(FER,2) variables were all greater than 5% critical value (i.e. DGER[207.3508 > 47.85613], DTOE[105.5525 >29.79707], DOIP[57.15324 >15.49471], and DFER [20.10460 > 3.841466] respectively.

Also, their eigenvalues are significantly greater than zero (I.e. 0.901095GER, 0.667123TOE, 0.569158OIP and 0.366771FER. In other words, the null hypothesis of no co-integration among the variables is rejected since all variables in the equations at 5% were statistically significant. The test result shows the existence of long-run equilibrium relationship between the variables D(GER,2) D(TOE,2) D(OIPN,2) and D(FER,2).

Vector Autoregression Estimates

	GER	TOE	OIP	FER
GER(-1)	0.964665	2.747452	6.02E-06	-3.61E-06
	(0.16824)	(8.03928)	(1.1E-06)	(1.5E-06)
	[5.73371]	[0.34175]	[5.67049]	[-2.43582]
GER(-2)	0.219009	40.96348	-1.08E-06	-2.11E-06
	(0.24828)	(11.8636)	(1.6E-06)	(2.2E-06)
	[-0.88211]	[3.45288]	[-0.68685]	[-0.96653]
TOE(-1)	0.003524	0.618936	-4.32E-10	-3.08E-09
	(0.00309)	(0.14762)	(1.9E-08)	(2.7E-08)
	[1.14060]	[4.19285]	[-0.02220]	[-0.11314]
TOE(-2)	0.002697	0.005155	1.34E-08	2.18E-08
	(0.00293)	(0.13999)	(1.8E-08)	(2.6E-08)
	[-0.92039]	[0.03683]	[1.72316]	[0.84426]
OIP(-1)	11896.23	-3632404.	-0.267409	0.091699
	(28152.8)	(1345233)	(0.17751)	(0.24782)
	[0.42256]	[-2.70020]	[1.50646]	[0.37002]
OIP(-2)	-15908.85	-1763009.	0.104914	0.303536
	(20679.0)	(988108.)	(0.13038)	(0.18203)
	[-0.76933]	[-1.78423]	[0.80465]	[1.66749]
FER(-1)	-7736.061	419398.2	0.128053	1.119113
	(18229.2)	(871051.)	(0.11494)	(0.16047)
	[0.42438]	[0.48149]	[1.11410]	[6.97408]
FER(-2)	-576.8131	367473.5	-0.096531	-0.014038
	(22058.3)	(1054018)	(0.13908)	(0.19417)
	[-0.02615]	[0.34864]	[-2.69406]	[-0.07230]
C	-428587.3	3.10E+08	3.064830	-15.25940
	(1448985)	(6.9E+07)	(9.13610)	(12.7551)
	[-0.29578]	[4.48238]	[0.33546]	[-1.19634]
R-squared	0.810017	0.806458	0.917312	0.977584
Adj. R-squared	0.768940	0.764611	0.899433	0.972737
Sum sq. resids	8.15E+13	1.86E+17	3238.734	6312.775
S.E. equation	1483849.	70903187	9.355927	13.06199
F-statistic	19.71932	19.27159	51.30813	201.7012
Log likelihood	-713.9304	-891.7975	-163.1200	-178.4700
Akaike AIC	31.43176	39.16511	7.483478	8.150871
Schwarz SC	31.78954	39.52289	7.841256	8.508648
Mean dependent	1723697.	6.61E+08	34.90978	66.71032
S.D. dependent	3086935.	1.46E+08	29.50259	79.10888
Determinant resid covariance (dof adj.)	1.33E+32			
Determinant resid covariance	5.56E+31			
Log likelihood	-1942.305			
Akaike information criterion	86.01326			
Schwarz criterion	87.44437			

Source: Computed by the Authors using E-views Statistical package.

The above equation estimated oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER) on the dependent gross external reserves (GER).

The Victor Auto regression result above shows that total oil exported and import (TOE) coefficients at both lag one and two has positive relationship with the dependent variable (i.e. gross external reserves (GER) in Nigeria within the period under study. The estimated result implies that a unit increases in these independent variables used (i.e. total oil exported and import (TOE), will lead to increases on gross external reserves (GER) in Nigeria by [0.618936 TOE (-1), and 0.002697 TOE (-2)] percent.

The sign borne by the parameter estimates of β2, is in conformity with the economic a priori expectation. Thus the fact is that the constant variable shows positive. This implies that if total oil exported and import (TOE) coefficient in Nigeria being held constant, then, the gross external reserves (GER) will stand at 0.964665 GER(-1), 0.219009 GER(-2) percent respectively. This proved that the independent variables used in this study really impact positively on the gross external reserves (GER) in Nigeria within the period of the study 1980 to 2019.

On the other hand, the coefficients of oil price (OIP) and foreign exchange rate (FER) have negative linear relationships with gross external reserves (GER) the dependent variable. It means that if the oil price (OIP) coefficient in Nigeria decreases; by –[0.267409 OIP(-1), -15908.85 OIP(-2)] in the both lag respectively. The implication of negative or fall in oil price in relation to GER; is decreasing the volume and value level of the inflow of foreign capital gain and sale from oil accruing to Nigerian gross external reserves (GER), by 0.26% and 159.0% respective of the both lag. Thus, the outcome of this result is in line with initial expectation since price relationship should be inverse relationship with value and volume of the exogenous. Theoretically, the sign of the gross external reserves (GER), the dependent variable is positive. Thus if fact is that the oil price result shows positive, it will implies that the Nigeria gross external reserves (GER) coefficients will be expected to be influence and increases by 0.26% and 159.0% respective of the both lag.

In the same view of results, foreign exchange rate (FER) coefficient has negative linear relationships with gross external reserves (GER) the dependent variable. This implies that decrease in naira value to foreign exchange rate (FER) capital sale inflows to Nigerian economy will appreciated and led to a favorable to Nigerian exported oil side but will at the same time unfavorable to imported oil side. However, Nigerian oil export in this case study excided that of oil import, therefore, we will take our decision on the oil exported from Nigeria to international market. Based on this, foreign exchange rate (FER) coefficient being negative implies appreciated favorable to Nigerian exported oil thereby increases to the Nigerian gross external reserves (GER) the dependent variable by[-7736.061 FER(-1), -576.8131 FER(-2)] respective of the both lag.

Generally, the implication is that External Reserves sector of the economy with an adverse movement in her monetary and fiscal policy instruments will have enabling good control to inflation rates that will simultaneously expand the investment expenditure on importation, and as well, increasing the non oil sector of the economy like agricultural sector output for export to other countries. This in the long run will lead to economic stabilization of such nation.

T-test: The calculated t-value for the regression coefficients of oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER) are [4.19285 TOE(-1) 1.72316 TOE(-2)], [2.70020 OIP(-1) [1.78423 OIP(-2)], [6.97408 FER(-1) 2.69406 FER(-2)] respectively. The tabulated t- value is 1.569. Since the calculated t-values of all the independent variables were greater than the tabulated t-value at 5% level of significance; we conclude that the regression coefficient is statistically significant to the study within the period of study (I.e. 1970 to 2017).

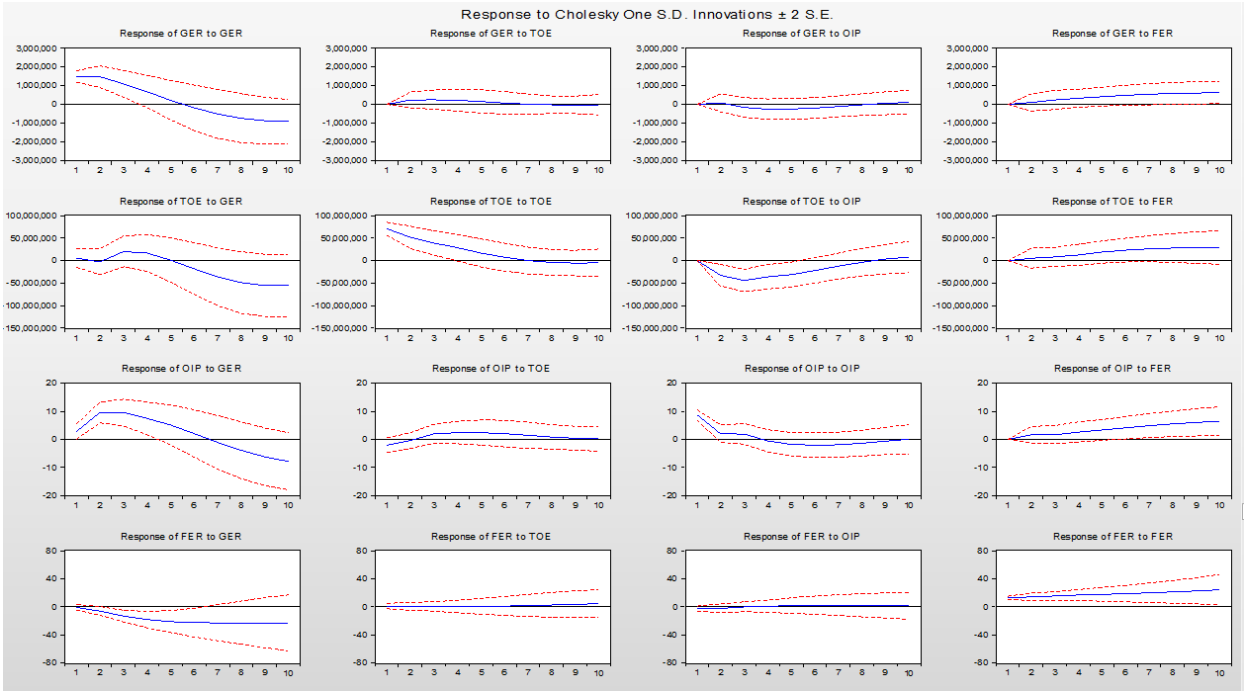
F-Test: This is used to test for the joint influence of the explanatory variables (i.e. oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER)] on the dependent variable [i.e. Gross External Reserves (GER)]. Thus, the **F-calculated** value stood at [19.71932] while the **F-tabulated** value is 3.32 at 5% level of significance. Since the **F-calculated** 19% value is greater than The F-tabulated value 3.32%, we then concluded that the regression plane is statistically significant. In other words, it means that the joint influence of all the explanatory variables (i.e. oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER)] on the dependent [i.e. gross external reserves (GER)] are statistically significant.

Coefficient of Multiple Determination (R^2):
The computed coefficient of determination ($R^2 = 0.810017$) shows that 81% of the total variations in the dependent variable (gross external reserves (GER)) is influenced by the variation in the explanatory variables namely, oil price (OIP) total oil exported and import (TOE) and foreign exchange rate (FER). While other remaining 19% out of the total one hundred variations in the dependent variable is accounted to the other factors not included in the model, and have been captured by the error term in the regression model. Based on the R2 value, we could conclude that our linear regression model has good fit.

Impulse Response Functions
Having confirmed the existence of unit root and co-integration in the series and following the debates about advantages and drawbacks of different VAR specifications, we then proceed to estimate an unrestricted VAR system in first differences with two lags of each variable of the three equations. The study demonstrated the advantages of unrestricted VAR by examining impulse response functions in cointegrated systems. Other researchers have shown the strengths of an unrestricted VAR are superior in terms of forecast variance. An intuitive way to interpret the variables in the VAR model is to compute an impulse response function (IRF) and Variance Decomposition measures. The impulse response function (IRF) traces out how the changes in one variable impact on current and future value of the endogenous variables in the model. The impulse response functions can be used to produce the time path of the dependent variables in the VAR, to shocks from all the explanatory variables. If the system of equations is stable, any shock should decline to zero. This also means that short-run values of the variable in question converge to the long-run equilibrium values. An unstable system would produce an explosive time path. In that sense, short-run values of the variable will diverge from its equilibrium values.

Impulse Response Analysis in Var Models with Near Unit Roots Indentified By Long-Run Restrictions.

Figure 2



Source: Computed by the Authors using E-views Statistical package

Figure 2 displays the impulse response functions of the log of first differences of the variables (gross external reserves (GER), oil price (OIP), total oil exported and import (TOE) and foreign exchange rate (FER) to one standard deviation structural shocks. The combined graphs are based on the output of the unrestricted VAR with analytic response standard error over 10 periods and Cholesky degrees of freedom adjusted, which show the response to Chelosky one standard deviation innovation. Each graph as shown in plots in Figure 2 includes a point estimation of impulse response functions as well as lower and upper bounds for a 95% confidence interval. As usual, the solid lines depict the variable percent change in response to a standard deviation of one in the respective macro variable whereas the dotted lines represent the 95% error bands.

The graph external reserve (GER) is consistent and positive but less and sloe persistent over the time horizons, since it lies with bounds line of the 95% confidence interval. It starts first by causing the deviation between the short-run equilibrium values of gross external reserves (GER) to rise, but after an unanticipated decrease in total oil exported and import (TOE), gross external reserves (GER) decline and remains within the bounds line of the 95% confidence interval. The response of Oil Price (OIP) an unexpected shock to gross external reserves (GER) was inconsistently; moved down negative form the initial periods and then moved up positively towards the end of the period within the bounds line of the 95% confidence interval. However, the gross external reserves (GER) when disturbed by a shock in falls in oil prices (OIP), gross external reserves (GER) became steady and stabilize on the bounds line of the 95% confidence interval within two quarter. Thereafter, gross external reserves (GER) responded little positive and remains permanent as results of one percentage rise in oil prices after the eighth quarter. The impulse response functions for foreign exchange rate (FER) and external reserves (GER) as a result of unanticipated shocks are also shown in the figure 2. Thus, an unexpected shock of foreign exchange rate (FER) to and gross external reserves (GER) shows a contemporaneously strong and positive form the initial periods to the end of the period. The figure shows that gross external reserves (GER) also have a predictable and stable relationship with foreign exchange rate (FER). As can be observed from the graph, the impact of the shock will first cause oil price to increase (appreciate) up to fifth quarter and thereafter wanes and tends to increase (upwards) till the 10th quarter is reached. Ultimately, the disturbance by a shock in foreign exchange rate (FER) is stabilized in the 10th quarter. This is also consistent with the positive supply-side effect which causes prices on non-tradable to all and leads to the depreciation of the total oil exported and import (TOE) supplied.

Variance Decomposition variables

Table 4: Variance Decomposition of GER:

Period	S.E.	GER	TOE	OIP	FER
1	1483849.	100.0000	0.000000	0.000000	0.000000
2	2111771.	98.44193	2.504607	42.49848	1.420788
3	2410468.	96.31923	2.947597	28.78081	1.830291
4	2547153.	93.32044	3.994127	23.39400	3.378833
5	2605867.	89.86770	4.959762	21.52871	5.760973
6	2665530.	86.39112	5.544592	21.07667	9.293427
7	2770021.	83.45625	5.591402	20.49906	13.79821
8	2926313.	81.24249	5.188333	18.92500	18.40131
9	3114529.	79.56419	4.537672	16.54006	22.18932
10	3309547.	78.11629	3.857159	14.04636	24.88391

Cholesky Ordering: GER TOE OIP FER

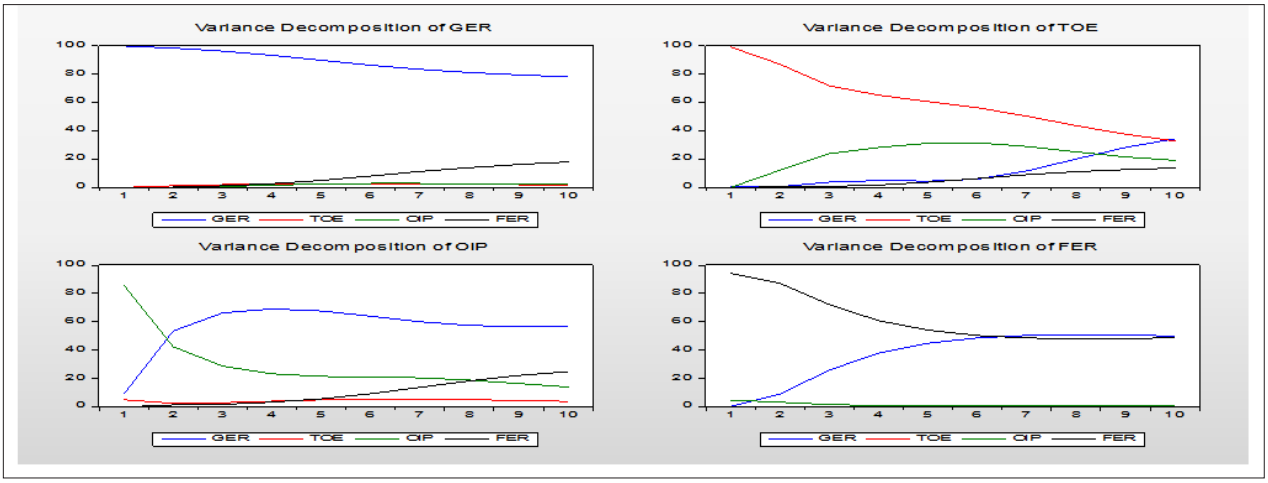
Source: Computed by the Authors using E-views Statistical package

While impulse response functions trace the effects of a shock to one endogenous variable on other variables in the VAR, the alternative variance decomposition technique measures the proportion of forecast error variance in one variable explained by innovations in itself and the other variables. Thus, from the variance decomposition Choleski (VDC), we can measure the relative importance of fluctuation of say, nominal or real shocks to variations in gross external reserves (GER). To identify a set of orthogonal vectors that span a particular subspace in each of the variables and the dynamic responses to such innovations, variance-covariance matrix of the VAR was factorized using the Choleski decomposition method suggested by .The results of the forecast error variance decomposition of the endogenous variables, at various quarters, generated by the four variables, reduced form VAR model are shown in table 5. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. As expected, the results show that the percentage of variance explained by own shock for gross external reserves (GER) declines to about 98 percent in the second quarter and continues falling until it ends with an average of around 78 percent at the end of the 10th period. This indicates that gross external reserves (GER) are highly endogenous with the remaining factors accounting for the volatility in External Reserves (GER) to varying degrees.

The VDC demonstrate the significant role played by the nominal variables. For example, at the second quarter, the fraction of gross external reserves (GER) forecast error variance attributable to variations in oil exported is about 2.5 percent. It then increases from the third quarter up to about 5.5 percent at 7th quarter and by the end of the 10th quarter, the contribution averages drop to become around 3.9 percent. The variance of oil price (OIP) accounts for about 42.2 percent in the second quarter, decreases to about 21.5 percent in the 5th quarter and decreases further in the long term with an average value of 14.0 percent. The variance of foreign exchange rate (FER) accounts for about 1.4 percent in the second quarter, increases to about 9.2 percent in the 6th quarter and increases further in the long term with an average value of 24.8 percent. It is also important to consider the ordering of the variables when conducting these tests, as in practice the error terms of the equations in the VAR will be correlated, so the result will be dependent on the order in which the equations are estimated in the model. The results did not significantly change with different ordering for the variables in the model. The overall findings confirm the importance of nominal variables in contributing to gross external reserves fluctuations in Nigerian.

Figure 3 below shows that the response of gross external reserves (GER) to its own shocks is contemporaneously strong and negative form the initial periods to the time it subsides to zero towards the end of the period. This means that any unanticipated increase in the oil price (OIP), total oil exported and imports (TOE) and foreign exchange rate (FER) consistently reduces the deviation between the short-term equilibrium values of the external reserves (GER) level and its long-run equilibrium values. The response of total oil exported and import (TOE) an unexpected shock to gross.

Figure 3: Variance Decomposition Choleski (VDC),



Source: Computed by the Authors using E-views Statistical package

Furthermore, the plots in figure 3 give special encouragement to those that would interpret Nigerian gross external reserves sector fluctuations as operating through changes in the level at which the Federal government sets domestic oil price to increase up to 145 naira per liter of fuel. An downward shock to the gross external reserves value in the upper-left panel of Figure 3 tends to result in a decline in total oil exported as a results of destruction in the oil region, fall in oil price at the international market and higher increase in foreign exchange rate which is unfavorable to Nigerian external sector economy. The fact that oil price decreases immediately in response to a downward shock to the short-term gross external reserves suggests that the interest rate increase may have occurred as a result of a positive shock to the demand for foreign currency, with the oil dealers. We should realize, from looking at these charts that shot-period shocks to the variables could result from a variety of alternative factors.

Evaluation of Hypotheses

Null Hypotheses I: frustration in oil market price does not significantly influence shocks to Nigeria external reserves from 1970 to 2019.

The objective, hypothesis one of this study was tested using Impulse response and variance decomposition analysis in VAR models procedures. First and foremost, the Impulse response graph of the dependent variables (gross external reserves) shows that the response of gross external reserves (GER) to oil price shocks is contemporaneously strong and negative form the initial periods to the time it subsides to zero towards the end of the period. This means that any unanticipated change (fall) in the oil price (OIP), total oil exported and imports (TOE) and foreign exchange rate (FER) consistently reduces the deviation between the short-term equilibrium values of the gross external reserves (GER) level and its long-run equilibrium values in Nigeria. in actual senses, the response of Oil Price (OIP) resulted from external economic activates such as international market and influences of other country like U.S. on oil deals with Nigerian economy could be say to be an unexpected shock to Nigerian gross external reserves (GER).

From figure 2, it how's inconsistently; moved down negative form the initial periods and then moved up positively towards the end of the period within the bounds line of the 95% confidence interval. However, the gross external reserves (GER) when disturbed by a shock in frustration in oil prices (OIP), gross external reserves (GER) became steady and stabilize on the bounds line of the 95% confidence interval within two quarter. Thereafter, Nigerian gross external reserves (GER) responded little positive and remains permanent as results of one percentage rise in oil prices after the eighth quarter. Based on the finding, we reject the null hypothesis one of this study and accept the alternative hypothesis that said, "Frustration in oil price does significantly influence shocks to Nigeria external reserves from 1970 to 2019".

Null hypothesis II: frustration in oil price does not significantly have impact on the Nigeria external reserves from 1970 to 2019.

From the VAR model (i.e. table 3) we examine frustration in oil price significantly have impact on the Nigeria external reserves from 1970 to 2019 by considering the size and sign of the coefficients used in the VAR model and as well their significance as we compare the t-statistic both calculated and tabulated critical value at 5% level of significance. The result shows that the exogenous variable (i.e. [2.70020(-1), 1.78423(-2)]OIP > 1.569% did have the expected signs, greater than and also does pass the test of significance at 5 % level of significance.

Having satisfied those t-statistic values and the computed coefficients of OIP was all statistically significant and as well has the right sign that was in line with the theatrical assumption (i.e. negative), we therefore reject the null hypothesis two of this study and accept the alternative hypothesis. In other words, frustration in oil price does significantly have impact on the Nigeria external reserves from 1970 to 2019.

Policy Implications of our Findings

1 The fact that all the coefficients of the microeconomic and macroeconomic variables employed bore the correct signs imply that there is prospect for these variables examined in the study are effective in influencing improvements in Nigeria external reserves sector.

2 The increase in foreign exchange rate and total oil exported can be used to influence improved supply of foreign currency to Nigeria external reserves sector especially in the short run. Emphasis on proper structuring of both domestic and international market oil price can stimulate growth in the Nigeria external reserves sector.

Conclusion

In this paper, we carried out evaluation of the effect of frustration in oil market price shock implementation on Nigeria external reserves, from 1970-2019. We find evidence that independent variables such as (oil price (OIP), total oil exported and import (TOE) and foreign exchange rate (FER)) employed by both theoretical and statistical criteria have strong significant effect on gross external reserves (GER) in Nigeria. The results support the view that fall in oil price do have a significant shock influence on the Nigeria external reserves, while other variables indicate significant impact of fall in oil price on the Nigeria external reserves.

However, building confidence for the result, we review Mundell-Flemig theory model assumption which that the behaviour of an economy depends on the exchange rate system it has adopted. Indeed, the conception theory of this study was made to understand how alternative exchange rate regimes work and how the choice of exchange rate regime impinges on monetary and fiscal policy with reference to fall in oil price shock effect on the Nigerian external reserved. Thus, we agreed that the economy operates with a floating exchange rate. That is we assumed that central bank of Nigeria allows the exchange rate to adjust to changing economic conditions. Therefore, begin with the assumption of a small open economy with perfect capital mobility.

This assumption means that the Nigeria an external reserve in this economy (Nigerian economy) is determined by the world oil price which is influenced by the floating exchange rate.Meanwhile, analyzing the impact of policies in an open economy, we must specify the international monetary system in which the country has chosen to operate, that is, we must consider how Nigerian's engaged in international trade and how finance can covert the currency of one country into the currency of another. Under a system of floating exchange rates, the exchange rate is set by market forces and is allowed to fluctuate in response to changing economic conditions. In this case, the exchange rate adjusts to achieve simultaneous equilibrium in the fall in oil (goods market) price and the Nigerian external reserved sector as Nigeria oil market are dominated to a great degree by the externalities' such as united states and great Britain.

Based on the results, there is hope that improvement in the Nigeria external reserves, innovative intermediation and creation of special Nigeria external reserves and foreign exchange rate Management schemes could enhance the potency of oil price measures on external reserves in Nigeria.

Recommendations

1. Less emphasis of control should be placed on international market oil price since the oil price has 81% influences of international market externalities 'shock on Nigeria external reserves. Rather, more emphasis should be place on other non-oil sector contributions to Nigeria external reserves since it may has virtually neutral or significant internal control effect lending to the Nigeria external reserves sector. More so, when falls in oil price only increases the cost of funds to the oil export.
2. Direct manipulation of cured oil production and supply

control policy should be Nigeria interest since Nigeria economy operates system of floating exchange rates. Under this, the exchange rate is set by market forces and is allowed to fluctuate in response to changing economic conditions. Control of cured oil total supply should adjust and measure with the floating exchange rates by market forces other than just tinkering with the money supply should be a better monetary policy action to impact on the Nigeria external reserves sector. While this is being done, monetary authorities must keep inflation rate on check for sustainable long-term interest in agricultural sector investments.

3. Efforts should be made to enhance the budgetary allocation to the agricultural sector. While external reserves from cured oil sector are expected to invest in agricultural sector and other non-oil sectors of the economy, monetary authorities must support this by enhanced palliatives. Apart from insurance, unforeseen situations like escalated costs should be covered by an assurance of subsidy payments [35-49].

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