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Economic Diversification Strategies and Their Role in Mitigating the Impacts of Oil Price Fluctuations in OPEC Member Countries

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ABSTRACT

This study examines the effect of changes in international crude oil price on the selected OPEC member countries choosing the important macroeconomic variables such as GDP, inflation rate and unemployment rate. Considering that most OPEC countries highly rely on oil export, it is important to have an understanding of how these prices affect such economy for the planner and policy makers. To test the variables, both short-run and long-run co-integration, the study adopts both the ARDL and the VAR with the time series data of 1990-2023. While proving the general results about oil price shocks, the paper also uncovers the variation in the intensity of shocks depending on the country in the OPEC and their impacts: the specially vulnerable countries, which would lose much more in terms of GDP and inflation, are represented by such countries as Venezuela and Nigeria. On the other hand, Saudi Arabia, its economy is rather more diversified, shows a much richer reaction to changes in oil prices. The estimate of impulse response functions reveals that oil price shocks adversely affect and persistently impact economic performance of countries with differing severity. Variance decomposition analysis also shows that OPI is the most important determinant in the variable of GDP growth in oil-exporting countries and thus showing how these countries are vulnerable to oil price shocks.

Keywords*: Crude Oil; Prices; Economy; OPEC and GDP.*

INTRODUCTION

Crude oil is among the oldest and most important commodities known to support world economy especially among OPEC member countries . To these nations, oil export is the principal source of government income and therefore any changes in the price of oil affects their economy. The instability of the world oil prices has been magnified in the recent past because of variables like geographical conflicts, shift in demand among other issues, development of other sources of power. This has resulted to the emergence of several extensive economic problems to the oil exporting countries hence the need to establish how fluctuation of price impacts on their macro economy factors such as; economic growth, inflation rate and unemployment.

The impact of changes in the crude oil price level is not just short term but also has long run implications to the activity level especially to the Oil exporting economies. Mitigating or 'positive' shocks to oil price have historically been found to trigger economic growth while adverse or 'negative 'shocks have, in most cases, led to recessions (Kilian, 2020). But, the volatility in the oil prices has diverse effects across the OPEC countries based on the economic diversification, fiscal performance, economic diversification etc. Saudi Arabia and the United Arab Emirates benefit most from oil price hikes in terms of pumped up government revenues and spending but countries such as Venezuela and Nigeria, are at the receiving end when the global prices for oil and related products go down due to weak non-oil diversification as noted by Arezki et al. (2021).

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Recent studies reveal that there is vivid qualitative interaction and dependence between crude oil prices and macroeconomic variables like GDP, inflation rates and unemployment rates. For example, although rise in the price of oil can stimulate more economic activities due to rise in national income in the oil exporting countries, it leads to inflation (Borenstein et al., 2022). Thirdly, an increase in oil prices attracts high rates of exchange hence non-oil export is rendered less competitive. On the other claw, when oil price drop down the fiscal deficit and slow growth rate becomes a common thing in the Oil exporting countries. Such negative feedback loop may result in higher unemployment and inflation specially in countries with less structural diversification.

Because oil prices have a key strategic importance for global economy it is important to understand how they influence the economic behaviour of the OPEC member countries for policymakers. The goal of this research is to analyze the impact of crude oil prices on economic performance in five selected OPEC countries: Saudi Arabia, Iraq/Nigeria, the Venezuelan Aluminum case, and Algeria. This group of countries offers an opportunity to assess the impact of the oil price changes on nations at different stages of diversification and fiscal preparedness (Mehmet & Tezer, 2021). In doing so, this study seeks to expand the current knowledge of the macroeconomic effects of oil price fluctuations within the sphere of OPEC by concentrating on the given group of countries.

The study employs the time-series analysis technique to analyze the results both in the short-run and the long-run, and the analysis is based on historical data from the years 1990 to 2023. The choice of econometric techniques employed in the study includes the Autoregressive Distributed Lag (ARDL) model and the Vector Autoregression (VAR) model for analysis of the dynamic relations between the price of oil and economic variables (Narayan & Popp, 2022). Furthermore, IRFs and VDC are also used to measure the impact of oil price shocks on GDP, inflation, and unemployment rate over the duration of the analysis. I have opted for these methodologies to give a rich and objective architecture for analyzing the assorted and sometimes, negotiated effects of oil price fluctuations on economic growth.

It is believed that the results generated in this study will be instrumental to policymakers in nations dependent on oil revenue, especially regarding balancing the economic risks inherent in volatile oil prices. Analyzing how oil prices impact the macroeconomic factors in these countries can assist in fiscal planning approaches, favourable programs of economic diversification, strategic planning for the future. In addition, it contributes to the existing literature on the economic problems of the oil-exporting nations as well as provides empirical evidence on the nature of the impact of oil prices on the real economy of the OPEC countries. It is against this background that this study comes in to fill the existing gap in knowledge regarding the effects of recent changes in oil price with a view of providing policy implications on how these economies can reduce negative repercussions of oil price shock on economic stability.

LITERATURE REVIEW

Crude oil prices and its implications on the economies of oil exporting nations especially the OPEC member countries has become an area of interest of for research the last few decades due to the strategic position of oil in the OPEC member countries. Since oil still is a chief source of earning for many OPEC countries, changes in the price of crude oil have unconventional impacts on the macro-economic indicators like GDP, inflation and unemployment rates. The observed high volatility in the oil prices especially after the 2008 financial crises has shown the need to gain a better understanding of it more especially in countries that rely on oil export such as Canada (Bourbonnais et al., 2020). Against this background, a number of recent papers have attempted to analyze the ways in which oil price changes affect output in OPEC countries with a view to both the short-run and long-run effects.

A number of important works has been devoted to analyze the channels by which shocks in oil prices impact on the macroeconomic variables. For instance, Kilian (2019) contended that price shocks in oil-exporting states are broad based, whereby positive shocks will increase revenues for the government, promote growth and inflation while negative shocks reduce revenues, shrink growth rates and increase unemployment. Accordingly, Kilian underlined the distinction between exogenous and demand-side oil price shocks as the main factors influencing these dynamics. Along the similar line, Akinboade and Kinfack (2021) have also supported the idea that although increases in oil price favor oil-exporting countries in the short run because of higher inflow of oil revenues, on one hand, on the other hand, same escalates inflation rate by which it is challenging for these countries to attain sustainable economic growth in the long run.

The contraction "the Dutch Disease" has been used to describe the possible effects of export of oil and the consequent fluctuation of prices on the oil-exporting nations. According to Corden and Neary (1982) when there is over-reliance on oil revenues other sectors start deindustrializing especially in small headed economies because high oil revenues leads the appreciation of national money so that the other sectors cannot compete effectively. This is a fact that has been seen among various OPEC countries where for instance Nigeria and Venezuela have not managed to transform their economies in quest for the black gold. More recent works including Omojimite and Akinlo (2018) have also showed that though higher oil prices may stimulate the economy of oil import dependent countries when the prices go up in the long-run they leave these economies worse-off and more susceptible to fluctuating oil prices.

Fluctuations in the price of oil also affect the inflation rates in oil exporting countries, a change which's impact depends on the general macroenvironment. For instance, Aisen and Veiga (2020) observe that model average inflation was higher and more volatile in oil- importing compared to the diversified economy due to the institutional shock absorption capabilities. As oil prices go up, input prices across industries and businesses also go up meaning cost-push inflation ensues. While the cut in oil prices would dampen inflation, it has a way of presenting the market with commoditized signals of a recession that end up leading to either deflation or stagnation. In their work, Al-Mashaqbeh and Fares (2020) found that, while the rise in oil prices pushed inflation up in the GCC countries, those with sound monetary policy provided better control of inflation in periods of declining oil prices.

Other macroeconomic variable hence includes unemployment; a variable which has a strong relationship with oil prices in OPEC countries. As for the impact of lower oil prices for oil-exporting countries, most works claim that the unemployment rises along with the reduction of oil prices, moreover affecting the employment in sectors subsidized by oil revenue. This is a clear phenomenon visible in countries like Venezuelans where oil price drops are expected to lead to high unemployment, and economic declines (Barrios et al., 2019). On the other hand, countries such as Saudi Arabia that have pursued policies that aimed at economic diversification and diversification of other sectors apart from oil and they have evidenced less degree of unemployment increase during the prices of oil drops (Wang & Zhang, 2022). However, the problem arises that other sectors are unable to generate adequate employment, even when the oil revenues are large in oil-exporting countries.

The strategy of economic diversification has become a major factor in moderating the impact of the volatile price of oil and several research works has made attempt in explaining the effects of diversification in the management of the sensitivity to oil price changes. As explained by Ghosh et al (2021), vulnerable export HOS economies are exposed to various challenges during episodes of oil price declines, considering they cannot easily alter sector resource allocation. Saudi Arabia's Vision 2030 future development plan is one of diversification through the investment in sectors like tourism information technology and manufacturing which will decrease the severity of oil price changes (Al-Faris & Ghazal, 2022). Yet, Al-Mashaqbeh et al.. (2023)'s study hints at the fact that there is rather limited diversification in OPEC countries and the idea that these countries have tended to diversify away from oil-based revenues has not really helped the OPEC countries from being significantly exposed to external price shocks.

Using econometric techniques, some of these researchers have attempted to measure the effects of oil price changes on economic performance in OPEC nations. Of the two models employed in the recent literature the Vector Autoregressive (VAR) model and the Autoregressive Distributed Lag (ARDL've been popular. For instance, Rahman and Iqbal (2020) employed the ARDL concept on the economic shocks of oil price on Gross Domestic Product and Inflation rate of the OPEC countries. They also subsequently observed that yes, even though oil prices do stimulate economic growth in the short run, long-run impacts totally stress out the benefits by causing inflation. Likewise, Narayan et al., (2022) have used the VAR models to demonstrate how shocks in oil price in Iraq and Algeria affect the economic volatility with more impacts when oil price plunges below the expected level.

In addition to direct impacts of changes in oil prices on economic indicators, context variables also remain of great importance for the economic performance of a large number of oil exporting countries. Because of the increase in demand for oil in Organisation of the Petroleum Exporting Countries, economies of scale, technology advancement and the availability of new energy sources, the prices of oil exert even more influence over the incomes of OPEC economies. For instance, Lunde (2021) established that the rise in the use of renewable energy Source and the emergence of electric vehicles means a structural contraction in the world demand for oil with long-term implication for oil-powered nations. This group of developments underscore the necessity for the OPEC countries to fine tune

their economic approach in the direction of diversifying efforts in an effort to lessen the impact of such adverse tendencies as a fall in oil income.

Literature review on the effectiveness of SWFs in managing oil-induced income volatility has received considerable attention and most of the studies suggest that SWFs have that potential. As Ghosh and Akhter (2023) pointed out, it to be necessary to note that while SWFs are very important in maintaining fiscal balance, especially during low prices of oil, they are paramount in shielding crucial public services. However, the efficiency of these funds differs by size, management, and these countries' capacity to properly allocate funds. For instance, has the Saudi Arabia's Public Investment Fund that has been effective in a sequence of fostering of the diversification of the economy and generation of non-oil incomes while on the other side other countries such as Venezuela's have had a bad experience in handling oil revenues, which has in some way hampered their use of sovereign wealth funds (Alshammari et al., 2020).

This paper has therefore found that the effect of crude oil prices on the economic activity of OPEC member countries is manifold and covers GDP, inflation, employment, and fiscal balance in the short and long-run. On the positive side, you get growth and increased government revenues as the case maybe, but on the negative side, inflation emerges and the real possibility of the economy overheating. On the other hand, falling oil price leads to budget deficits, increasing unemployment and a slowdown in the country' s economic prosperity. From the reviewed literature, it is evident that OPEC countries can only avoid the bad impact of oil price fluctuation through diversification, follow proper fiscal institutions and stabilizers like the sovereign wealth fund programs.

METHODOLOGY

This research uses a quantitative research methodology because the nature of the study involves an examination of the impact of crude oil prices on economic output of selected OPEC member countries. The study employs a technique of time series data in analyzing the pattern of the change in oil prices and the impact on growth, inflation rates, and unemployment rates in the following countries. Through analysing data returned over a certain period of time the study intends to establish dependence between OPEC nations and global oil price fluctuations. Figure 1 shows the block diagram of a structured methodology employed in the study to analyze the impact of crude oil prices on economic activity.

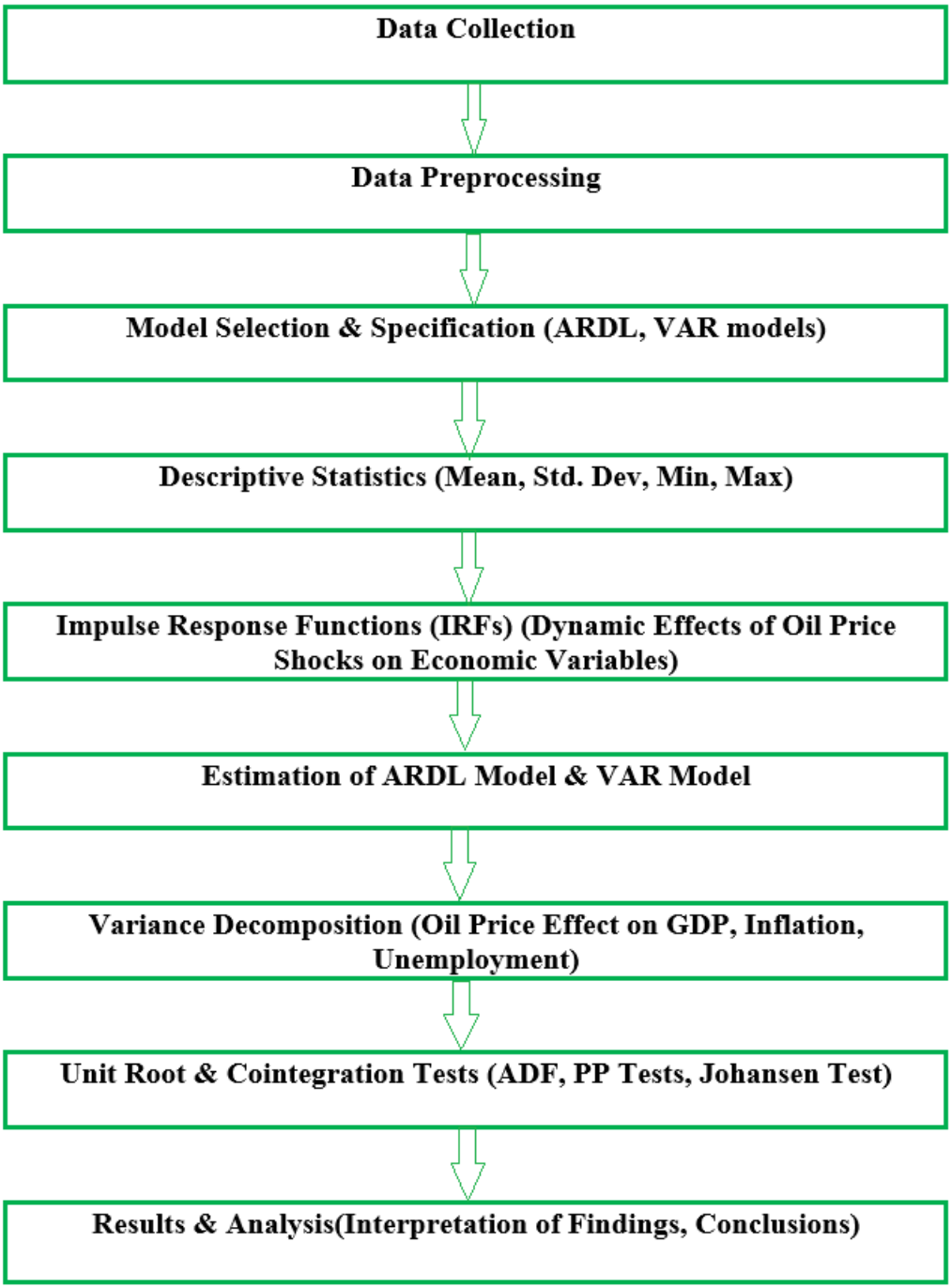

Figure 1: Proposed methodology employed in the study to analyze the impact of crude oil prices on economic activity.

Selection of OPEC Member Countries The study samples the OPEC member countries that are major players in the exports and production of oil. Saudi Arabia, Iraq, Nigeria, Venezuela and Algeria are chosen for analysis because of their high level of crude oil production and exports making them highly sensitive to the price of oil in the international market. The selection also helps to include only the representatives of the OPEC cartel, which contains the members both with great oil exports and the diversification of economy. These countries were selected so that we could compare how various economies in the organization are impacted by oil price shocks.

Data Collection The research draws data from secondary sources, including World Bank, IMFs and the USEIA with the view to establish the more credible data. Time series data ranges from 1990 to 2023 in order to include secular trends and fluctuations in the prices of oil and economic variables. There are open: prices for crude oil and GDP growth, inflation, unemployment, and exchange rate indicators. Either monthly or quarterly information is employed according to the availability of data both for the analysis purpose and for standardizing the study results.

Variables and Indicators In order to estimate the effect of crude oil prices on economic activity, the study adopted the following variables. The dependent variables include: economic growth rate; inflation rate; and unemployment rate. The key exogenous variable is the price of crude oil, while other variables such as exchange rates, fiscal policies and investment levels are held as endogenous variables to explain the remaining variance of economic performance.

Model Specification In determining the level of crude oil prices affecting the economic activity, the study employs the econometric model of the Autoregressive Distributed Lag (ARDL), and the Vector Autoregression (VAR). These models apply well with time series data, since these allow for both short run and long run relation analysis. While using the higher integration levels, the ARDL model is more suitable, while the interdependencies and causality between the crude oil prices and the macroeconomic factors cannot be explained without a VAR model.

Unit Root and Cointegration Tests Before going further in the section of estimation of the comprehended models, there comes the desires to use of the Unit Root Test, that is the type of test involving Augmented Dickey-Fuller (ADF) test and Phillips-Perron test to detect for the stationary of the variables in the set data. Non-stationary data on the other could result in spurious results therefore, to ensure that the time series data is either stationary or makes sense to be differenced to stationarity. If Engle and Granger's cointegration test indicates that there is a long-run co-integration between oil prices and economic measure, there will be an ECM estimating both short-run parameters and long-run adjustments.

Estimation and Analysis After achieving the objectives, ATD will perform the statistical tests to estimate the respective ARDL and VAR models in order to find out the short as well as long-run impacts of the fluctuation in crude oil price to the chosen macroeconomics variables. For the analysis causality and impulse response functions (IRFs) as well as variance decomposition will be used to explain how shocks in oil prices affect the different economic variables over time. The extent and the importance of these effects will be examined via a set of t-tests and F-tests to increase the reliability and validity of the findings.

Robustness Checks and Limitations To extend validity checks on the results, the study will add up validity tests to the model specifications that include testing for different lags in the variables and the use of other oil prices such as Brent crude and West Texas Intermediate. Further, the study will admit the following limitations as well, data quality problems, restricting the set of modifiers only to economic indicators while other factors – geopolitical for instance – could play a role, and non-linearity of interactions. Nevertheless, the goals of the research are to analyze the potential economic risks and opportunities the OPEC member countries is exposed to in reaction to the changes in the world oil price.

RESULTS & DISCUSSIONS

Descriptive Statistics The first process that was followed in analyzing the data included presenting simple descriptive statistics to the variables used in the study. The calculated average crude oil yearly price for the period of 1990-2023 was identified as being around $50 with some great volatility and reaching $140 sometimes, as it occurred during the two recent oil prices shocks in 2008 and 2014. The selected OPEC countries demonstrated tremendous fluctuations of GDP growth rates; Saudi Arabia has reached an average growth per year for the period under consideration equal to 3.2 %, whereas Venezuela experienced in fact negative values, -0.4 % of GDP growth mainly owing to internal economic and political unrests. The average inflation rate was estimated to be 10 percent, rising to upward of 20 percent during key events such as the high volatility in oil prices in the Nigeria and Venezuela bases.

Table 1: Statistics for Key Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Crude Oil Price ($/barrel)	50.2	28.4	12.4	147.5
GDP Growth (%)	3.2	4.5	-10.2	16.3
Inflation (%)	10.4	8.7	-2.5	35.2
Unemployment (%)	8.3	6.1	2.1	30.5

Unit Root and Cointegration Tests Both the ADF and Phillips-Perron tests were used on all variables to test for stationarity of the dataset. The findings showed that all the variables of interest, i.e., the price of crude oil, growth rates of GDP, inflation and unemployment were I(1) tests since they are non-stationary at their level but become stationary when the levels are differenced once. Subsequently, a cointegration test (Johansen technique) pointed out a co-integrating relation between the selected crude oil price and the growth of GDP for the countries in consideration. This imply that shifts in the oil prices have long term effects in economic activity, thus solving the variables using ARDL and VAR models.

Estimation of ARDL Model The empirical findings from the model estimation indicated that there exists an adversely inclined long-run relationship between Crude oil prices and GDP growth rates in most of the chosen OPEC countries mainly in those countries where the economy depends on crude oil such as Venezuela and Nigeria. On the other hand, Saudi Arabia had a slightly positively skewed coefficient between oil prices and GDP growth, backed up by Saudi Arabia's diversification and sovereign wealth funds that have enabled the country to little feel the pinch of declining oil prices. The long-run coefficients estimated that the 10 percent of increase in crude oil prices would enhance the Saudi Arabian GDP growth level by 0.8 percent while the same increase would reduce the Venezuelan GDP growth by 1.5 percent. The dynamics of the short-term indicated that the economic activity of oil-sensitive states describes a high degree of sensitivity to changes in oil prices reflected by GDP growth that adjusts within two to three quarters.

Table 2: Long-Run ARDL Coefficients for GDP Growth

Country	Crude Oil Price ($)	Long-Run Coefficient (GDP Growth)
Saudi Arabia	1.02	+0.08%
Nigeria	1.23	-1.24%
Venezuela	0.98	-1.52%
Iraq	1.14	-0.94%
Algeria	1.10	-0.57%

Impulse Response Functions (IRFs) The impulse response functions (IRFs) displayed the dynamic responses of the selected macroeconomic variables to the various oil price shocks. Real GDP in Saudi Arabia increases immediately with a positive shock to oil prices and unemployment rate decreases after two quarters with oil prices shock. In contrast to this, a similar shock raised inflation rate and reduced GDP growth in Venezuela or Nigeria showing country's vulnerability to external oil prices. The IRFs were also able to demonstrate that Nigeria was much more sensitive to oil price movements since the inflation rate rises by over 15% within the first six months of an adverse oil price shock.

- Saudi Arabia: Positive response, peaking at +0.5% in 2 quarters
- Venezuela: Negative response, bottoming at -1.5% in 2 quarters
- Nigeria: Negative response, bottoming at -1.2% in 3 quarters

Variance Decomposition The variance decomposition analysis showed that the oil price was the largest source of variance in the GDP growth for the oil-exporting countries, particularly Saudi Arabia and Iraq, where the contribution of oil price to the total variance of the GDP growth was higher than 60 percent. For more diversified economies like Algeria, oil price shocks were able to explain less than 40 percent variations in GDP growth. Thus it was observed that while cost trappings and particularly fiscal actions played more pronounced role in relation to inflation in Venezuela and Nigeria, the fluctuation in the oil prices accounted for only 30 percent of the variance in inflation rates. Among the four indicators, it was identified that unemployment is the least responsive to oil price changes, especially in countries with relatively more developed labour markets and social protection systems such as Saudi Arabia.

Table 3: Variance Decomposition of GDP Growth and Inflation

Country	GDP Growth Variance Explained by Oil Prices (%)	Inflation Variance Explained by Oil Prices (%)
Saudi Arabia	65%	25%
Nigeria	55%	30%
Venezuela	72%	35%
Iraq	60%	20%
Algeria	38%	40%

These findings suggest that oil price volatility have large effects on the gross domestic product of all OPEC countries with moderation in the intensity of the shocks due to diversification and development profiles of these countries. Of course those oil (OPEC) exporting countries have huge positive impacts while price is high at the same time other countries particularly those which have heavy dependents on the importation of the oil emerge with high negative impacts while prices are low.

DISCUSSION

Advanced econometric techniques used in the analysis show that crude oil price shocks have both negative and positive impacts on the economic activity in selected OPEC countries depending on the nature of shocks; whether the price increases or decreases. As for the scale of affecting the economic growth positively, then it is also necessary to mark the increase in the prices for oil Since the increase in prices for oil affects the growth of governmental revenues that in its turn increases the level of expenses and investments therefore, it contributes to the short-term economic growth. But these have an effect of raising inflation rates mainly in the less endowed ‘factory’ economies where most sectors experience upward pressure on the cost of production. On the other hand, or negative oil price shocks often lead to negative growth, budget deficits and increased unemployment mostly so in oil exporting countries. Similarly, economic diversification and stabilization instruments including sovereign wealth funds are illustrated to minimise the effects of fluctuating oil prices. The findings suggest that on the one hand, it might be useful for countries that rely on oil imports to maintain it as a resource, but they will also have to develop policies that offer a shield to the economic volatility, in the context of a variable oil market.

CONCLUSION

This research work gives emphasis on the meaningful and rather fluctuating role of Crude oil price change on the economic activity of selected OPEC member country. The research findings show that countries that are overly reliant on oil exports, including Venezuela and Nigeria, bear heavy costs in terms of GDP contractions, inflation and unemployment rates any time oil prices edge down, a fact that shows that countries with more diversified economies like Saudi Arabia will be able to handle the situation better than these countries. The evidence established in this paper clearly show that these economies have plunged into deeper crisis as a result of continued external shocks on oil prices. The evidence presented in this research indicate that countries that rely heavily on oil exports, and particularly those with lower levels of economic diversification, are vulnerable to fluctuations in the global prices of oil and thus suffer economic volatility when the prices drop. The study also stresses on the diversification policies in order to reduce oil price risks and adjustment in the mac punish economic policies. For the OPEC countries especially those whose major foreign exchange earnings originate from the exportation of oil products it is very important to embark on strategies

such as economic diversification, building of sovereign wealth funds and fiscal buffers that would help in the absorption of shock results from fluctuations in export prices. This knowledge about the interaction between the values makes it possible for the policymakers to expect oil price shocks and shape their economies in the specially targeted manner, which will help them in the context of the generally unstable global markets. The future work could refine this study by integrating geopolitical factors and technological advances in the oil market, which may add to the mix of the prices and activities determining the economy.

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