



BUSINESS CYCLE SYNCHRONIZATION: THE RELATIONSHIP BETWEEN NIGERIA AND INDIA

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ABSTRACT

This study assesses the business cycle synchronization of India and Nigeria being trading partners for a long time. The synchronization if any could lead to spill over effect of economic disturbances between the two countries. The study uses one proxy variable for the Nigerian as well as Indian economy. Two Exogenous shocks are included in the VAR system, the crude oil prices and world GDP. The data spanned from 1980 until 2023. The responses of the two economies due to oil and world GDP shocks shows the two countries responded differently, which implies that these two countries may not respond to exogenous shocks at the same time. The business cycles of the two countries have been assessed through the variance decomposition and thus, the result shows the evidence of synchronization in only crude oil price shock. However, there is absence of co-movement between the two countries as result the world GDP shock. This implies that macroeconomic disturbances of Indian economy could affect Nigeria whenever there is a crude oil shock and vice versa. However, a similar study by Nurudeen and Rabah(2025) couldn't find synchronization between the two countries using Global VAR framework. Thus, crude oil price is a potential factor that may connect the two nations.

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1. INTRODUCTION

The financial crisis of 2008 further confirms to the world that we live in globalised world where actions of one country can affect another economically. International business cycle synchronization or international co-movement is an important aspect of business cycle. Many researchers conducted studies in the past on this, See, for example, **Huh Kim Kim, and Park (2014)**. In this aspect, researchers seek to find out the reasons for synchronization of business cycle of different economies. Huh, Kim, Kim, and Park (2014) for example, had conducted their studies on international co-movement related to some selected Asian economies and found the existence of synchronization in the studied area. There are different reasons the studies found why co-movement exists within countries. Some of the reasons found in the literature include similarities in fiscal and monetary policies, bilateral or trade agreements. Sharing of single currency is another reason found in the literature associated with countries co-movement or synchronization. Dependence of one country on the other through trading leads to spill over effect of economic disturbances and thus, business cycle synchronization. For example the war between Ukraine and Russia has sparked inflation in so many African countries. Similarly, During the escalation between Iran and Israel, The parliament of Iran has approved a plan to potentially close the Strait of Hormuz, a crucial waterway for global oil transport. This decision, if implemented, could have significant economic consequences, potentially leading to a sharp increase in oil prices and global inflation. The Strait of Hormuz is a narrow waterway between Iran and Oman, through which approximately 20% of the world's oil transit, about 20 million barrels per day. Such decision by the Iranian parliament could have triggered energy crisis in different parts of the world. This research work studies the synchronization of Nigeria and India. The synchronization of the two countries is studied through exogenous shocks, crude oil prices and world GD. The remainder of the paper include literature review where different theories of business cycle have been briefly discussed as well as some empirical past researches on business cycle. The third part of the paper dwells on methodology. While the fourth and fifth discusses result of the study and conclusion respectively.

2. LITERATURE REVIEW

Theoretical Studies

There are number of economic theories that explained business cycle phenomena in different perspectives. These theories are known as early business cycle theories; they explained business cycle phenomena before the great depression of the 1930s. Some of these theories are reviewed below



Early Business Cycle Theories

Agricultural Theory: In those days, agriculture used to be the dominant industry which employed the majority of the population even in advanced nations. Agricultural production was the main focus by the economist, in order to explain the recessionary and expansionary situations of the economy. **Knop (2015)** explained and summarizes some of these theories.

Sunspot Theory: This theory is called sunspot theory. It is developed by **Jevons (1884)**. According to him, the cause of business cycle is the activity of the sunspot. It leads to betterment or otherwise of the agricultural produce. Thus, the cyclical behavior of the economy revolves around the cyclical behavior of the sunspot. He believes that business cycle lasted for nearly 10.43 years from peak to peak benching his argument on the fact that sunspot cycles lasted for 10:45. He therefore concluded by way of recommendation that farmers should plan accordingly whenever the sunspot is expected.

Cob web Theory: This is a kind of backward looking theory in the sense that this year's prices of the farm produce are determined by last year's prices. As such, farmers are forced to accept prices at the market once there is shock in demand and supply. If, for example, a higher price prevailed until the end of the farming season, at the next season, the farmers plan their farming decisions based on the last year's planting season. Now, it so happens that the farmers overestimated the prices and over produced the crops. Similarly, in $yt+1$, the farmers plan the planting decisions based on the prices that prevailed at that period, but supply and demand have returned to normal level. In order to clear the market goods, the price will continue until when the market is under supply, this will continue until when the market is stable without a demand or supply shock. Thus, this cyclical behavior in terms of demand and supply and the prices leads to business cycle.

Malthus Theory (1798): Reverend Thomas Malthus is a British economist who observed the agricultural situation in the 1700's. The main capital at that time was land, which is naturally given, and it is fixed. Since capital which is the land is fixed, the agricultural production is assumed to be fixed, such is the case for technology. Malthus believed that in this situation, problems may arise as the population grows while the agricultural farm produce remain constant. Hence, this leads to underproduction, falling standard of living of the people, and of course starvation. One of the serious setbacks of this theory is that, capital and technology are constant. As such, the theory is criticized severely, by economist around the world.

Hawtrey's Monetary Theory: Before the great depression gold standards were used in most economies of the world the international monetary system required that an economy be backed by certain amounts of gold for its paper currency issue. This was because no economy is self-sufficient. As such economies of the world trade between themselves, once a country faces deficit it will experience shortage of gold and vice versa in the case of trade surplus. According to Hawtrey, when money supply increases, the bank credit becomes easily accessible; this will make the rate of interest to fall, thus, a fall in the interest rate will encourage investors to invest in goods and services as well as new inventories. This will create more jobs and employment and hence more consumption. With much investment and consumption, the economy moves to a new expansion stage. Similarly, with the increase in demand, the investors also will decide to expand the size of their business in order to satisfy the market as well as to make more profit.

This expansion situation continues until the economy reaches a peak. However, the problems looms in, when the economy substitute its domestic consumption for foreign consumption as a result of increase in income, thus, creating a gap in the country's current account. Now, a country which is under gold standard will have a problem of shortage of money supply since part of its gold has to be foregone to settle the current account deficit. Similarly, the outflow of gold to settle the current account deficit will mean a decrease in money supply, thus creating panic in the economy.

Moreover, the decrease in the money supply will lead to increase in interest rate, thereby discouraging the investor's morale to borrow and invest. Since there is no borrowing, there will not be investment, and consequently there will loss of jobs an employment since investors are likely to cut their investment by withdrawing their capital due to fear of further loss. It is a simple logic that once there is no investment, the growth of the economy will be threatened, and this scenario will lead to crash, and the economy swings in to recession.

Under-Consumption Theory: This theory was put forward by Sismodi and Hubson. The main idea behind this theory is that, it explains how recession sets in as result of under consumption in the economy. The two theorists classified the society into two, that is, those belonging to the rich class as well as the poor section. They assert that, the two classes of people have different consumption pattern, as well as different savings. People who are



rich tend to save relatively high portions of their income compared to the poorer group. Construed differently, the rich people's propensity to save is relatively higher than that of the poor people. This is because as income rises, excess will be saved, while those having low income will consume almost all of their income. Thus, during expansion, the rich people are in a position to save more and more and earn more and more profit in the form of interest. Now, the increase in savings will lead to more investment in the economy, hence, more and more consumer goods will be produced by the manufacturers.

The problem is that, there is too much saving while consumption is declining. In this way, there is so much production but with too little consumption, this will lead to a crash in the economy as a result of less demand which happened due to low consumption ability of the people. The market will have so much of production with a very low consumption, this is similar to the situation that led to the great depression, as a result of the adoption of Say's famous classical law of market which states that supply creates its own demand. This statement led to so much of output in the market with very less consumption. As a result, manufacturers become stranded with so much of goods without demand.

Karl Marx and Under-Consumption: Karl Marx was a famous philosopher and a communist leader, he has predicted the fall of capitalism due to under consumption. He opined that capitalism comprises of phases, i.e. the peak and contraction, with each of the two current phases being stronger than the previous one. In other words, when the economy reaches peak level it will crash after a certain period of time, however the previous peak has always been lower than the current one, similarly, when the economy contracts, it became worse than the previous contraction and the trend goes on in a similar manner.

According to Karl Marx, due to the classification of the society into rich capitalist and the poor working class, the capitalist consumes less and saves more for further investment, while the working classes who sell their labor power to the capitalist do not have enough to save and invest. Because of the income inequality the poor working class do not have the ability to consume all the output produced by the capitalist, thus, the business takes place and the economy swings into recession. He predicted that once the misery which the working class is subjected to be too much, they turn and overthrow the capitalist, hence that will be the end of the capitalism.

Over Investment Theory: Over investment theory can be explained from the perspective of two economists: Hayek and Wicksel's Investment theory.

(a) Hayek's Theory of Investment; Hayek emphasized monetary forces as the main factor causing fluctuation and instability in the investment sector, and thus leads to business cycle. When the economy is in recession, the rate of interest at this time is normally below the natural rate, and therefore the investors find it cheaper and profitable to take bank loans and invest. This means that investors will be induced to take more loans to invest and expand in new inventories etc. As a result, the economy expands, and new jobs and employment will be created. However, this expansion phase cannot continue forever, because as banks continue to expand loan due to high demand by investors, the excess reserve maintained by the banks may be exhausted and therefore the banks will take measures in order to restrict outflow of capital, this makes the rate of interest shoot up, thereby uplifting the interest rate above the natural level. Once the rate of interest shifted, investors will be discouraged to take loans and further invest, thus, the economy will begin to contract as investment has a direct impact on the economy. This will lead to loss of jobs and employment which will in turn leads to loss of consumption and this affect the entire economy. In a nutshell, Hayek's theory, which is closer to that of Hawtrey, tells us of the role of investment in the economy and how it can lead to business cycle.

(b) Wicksel's Theory of Investment: Wicksell emphasized on non-monetary force as a factor leading to business cycle. According to him the main reason why an economy swings in to recession is because of innovation. Investors always try investing in new innovations and new ways of doing business in order to boost the demand of the consumers.

The economy will expand as long as consumers are willing to buy the new product, however, the expansion will not continue so long as the investment exceeds investment. Once the point is reached where investment is higher than savings, then the economy will begin to face recessionary alert.

Business Cycle in the Classical School

The concentration of this part is centred on the macroeconomic aspects of the classical economics. The determination of the variables in the classical school will also be reviewed. Generally, classical economics make the following main assumptions: (a) All markets are highly competitive; (b) Both firm and households/consumers



have perfect information about the market. Given the above two assumptions, price will be given, the cost of producing X commodity will be least efficient cost of producing all the commodities. The price is determined in the classical as long the marginal benefit equals the price of purchasing product and the supplier is willing to supply at that price. In this situation no body, not even a firm can alter or distort the price of a commodity. Once there is imperfection and therefore no longer a perfectly competitive. Hence all imperfect markets are markets of the Keynesian or neoclassical economics; (c) Flexibility of prices: i.e. Wages and prices are perfectly flexible. Excess supply will make a demand to be low and hence prices falls, such is the case when there is low supply, the movement of prices that is correction of disequilibrium in the market will be instantaneous, meaning that no lag in price coming back to equilibrium, once there is a lag in prices to adjust, it shows inflexibility or rigidity in the prices and (d) Savings and investment are always equal. The circular flow of income, where by total earnings will be equal to total expenditure.

The classical model believed that market can deviate from the equilibrium level of output and employment, but they believed that such deviation only last temporarily. If the economy is allowed to function independently it will restore itself back to equilibrium level. It is also the belief of the classical that the deviation of output from its long run path is mostly caused by the changes in aggregate supply, and these changes are caused by the government intervention through its policies. Hence, if the economy is allowed to work independently, there shall not be deviations of output from the long term trend. **Knop (2015)** has given an example in this regard. There was an imposition of labor tax in the United States. Such tax imposition reduces the labour supply, and increases wages; hence the aggregate supply curve shifts to the left thereby, decreasing the output. Thus, this shift in output to the classical is conceived as permanent unless something has changed to increase aggregate supply.

Keynesian School Propositions

Keynesian model was the first to make a real distinction between micro and macroeconomics. After the failure of classical economics to address the great depression of 1930's, Keynes came up with a framework known as the Keynesian economics. Keynes main tools of analysis are cross model, aggregate demand and supply, Hicksian IS-LM model and Philips curve.

According to Keynesian assumptions wages (w) and prices are constant and exogenous where as these variables are endogenous and flexible in the classical school. Therefore, if these variables are constant, it means demand for labour is inversely related to real wages. This is the same case with the classical stance, only that wages and prices are not flexible. Similarly, the labour supply is positively related to wages.

To the classical school individuals between the ages of 18-65 are fully employed, but in Keynes's view some of the labour force cannot find jobs even though they are willing to work. Again, Keynes considers that some people are called discouraged workers i.e. those who for one reason or the other did not engage themselves in a work. Real wages are the equilibrium real wages according to classical economics whereas the Keynesian real wages are different from the equilibrium prices. The price is fixed by firm owners and labour union. They sit to negotiate wages of w_{t+1} given that the firm owners know very well about the prices of p_{t+1} .

Since prices are sticky and are assumed to be determined by the market forces, Keynes assumed that these prices are given by the central bank i.e. targeted prices. If central bank wants to increase employment, they will provide a wrong targeted price so that employment will shift to the right. Total savings in Keynesian school depends on income i.e. $S(y)$ unlike in the classical where savings depends on interest rate.

The Monetarists (Impulse Mechanism Approach)

Keynes macroeconomics thinking existed since the general theory until 1960's when there was a problem of STAGFLATION. At that period, both the UK and US economies experienced a situation whereby both inflation and unemployment rose positively, and they had no explanation regarding this stagflation. Stagflation led to a development of a new school of thought called the monetarist. The monetarists were led by the thinking of the Milton Friedman. Another advocate of this school of thought is Lucas Jr. The belief according to Keynesians is that people make their labour supply decisions based on wages. i.e. work for higher wage instead of leisure. But the problem is people will be suffering from money illusion. Friedman believes that if workers based their decisions on nominal wages that make them irrational. But since people are rational they do not look at only the increase in nominal wages but also the increase in prices. As such Friedman restated that Philips curve is

$$W = U^{-1} + P_e$$



That is, wages are inversely related to unemployment plus expected inflation. Friedman opined that the world is in a problem of stagflation because of the assumption by the Keynes that workers based their labour supply decision on nominal wage; he therefore, augmented the Philips curve with future inflation expectation.

The Business Cycle and New Economist

The followers of this school are called new economist or fine-tunes. Although they originated from Keynesian school, their beliefs are somewhat different from that of the Keynesians. This school of thought believed in both Keynes and Friedman, that is, in altering economic activities government intervention as believed by Keynes and central bank intervention as believed by the Friedmanites were essential. The core macroeconomic objective is to maximize the fluctuation of output gap. To minimize the gap according this school, use of both fiscal and monetary policies becomes imperative. This is called discretionary fiscal and monetary policy. The rule of chasing the economic activities should be done by constantly increasing or decreasing the money supply by 3 percent (i.e. the rule of +3) otherwise known as the k rule. The k rule should be rigid, but that does not mean that the rule cannot be revised. It is possible to revise the rule depending on the stabilization need of the economy.

The Real Business Cycle Theory

Sequel to the paper by **Kydland and Prescott (1982)** the thinking in the area of business cycle has changed to monetary equilibrium business cycle (MBCT), which assumes the role of money supply in business cycle. The RBCT assume the role of the real variable in a cycle. The real variables are assumed in a cycle to be the random changes in technology. **Lucas (1987)** believed that **Kydland and Prescott (1982)** have taken a macroeconomic modeling into a new height, in this way Lucas (1996), relaxed his view on the strong importance he attaches to monetary shock, and began to appreciate that monetary shocks are not that important alone. In a real business cycle model, aggregate output depends on capital, labour and some level of technology. This can be expressed as

$$Y = A F(K, L)$$

Technology is very important as responsible for turning points in the economy. Technology shifts production function upward thereby increasing the demand for labour, this raises productivity and employment as well as output. Thus, technology causes output to expand, hence demand for labour increases and employment shifts above its level, this process is continuous and leads to instability in the economy. Hence, business cycle sets in. Despite endorsement by many economist, the real equilibrium business cycle has been criticized by a number of experts in the field, they include Hoover (1988), Shffron (1989), Mnkiv (1989), Phelps (1990), Eichenbaum (1991) etc

EMPRICCAL LITERATURE REVIEW

Akin (1987) conduct a study on the multiple determinants of business cycle synchronization for 81 countries, including 27 emerging markets. The study investigates the extent of synchronization and co-movement among certain variables of those countries. These variables include trade area intensity, intra industry trade, trade partner similarity, free trade area membership, economic similarity, as well as oil import dependency. The data used for the study was from 1970-2008. Simultaneous equation model was used in analyzing the data. The paper was divided into two; the first part dwelled on the correlation of GDP's among the sample. This was looked at from pre- globalization period (1970-89), and the globalization period (1990-2000). The correlation coefficient shows that there is an evidence of increase in correlation in bilateral agreements among the regional groups. Similarly, in the globalization period, there is a formation of more clusters among the EU, and Asian countries.

In this regard, the second part of the paper's finding reveal that bilateral trade intensity, intra industry trade and similarity in economic structures are very important variables that determine the correlation in output. Similarly, financial integration series leads to an increase in co-movement of GDP in the less developed world, and reverse is the case, for the developed countries. Other variables that are important determinant in output synchronization include fiscal spending, stability in exchange rates and crude oil dependence.

Smets and Wouters (2007) examine a study on shocks and frictions in US business cycle using a Bayesian DSGE approach. The paper focused on the new neo-classical synthesis models with sticky prices and wages. A US monthly time series data was used from 1966 to 2004. The study incorporated variables such as real GDP, hours worked; consumption, investment, real wages, prices, and short-term nominal interest rate. The researchers believed that the stochastic dynamic is driven by seven orthogonal structural shocks. These identified shocks include, total factor productivity shock, risk premium shocks, investment specific technology shocks, wage markup shocks, price markup shocks, exogenous spending shocks and monetary policy shocks.



To find out the importance of friction in the model, in order to compare the marginal likelihood of the different models, prices and wages stickiness are found to be equally important in this regard, while friction from labour and goods market are found to be unimportant. To address the business cycle issue and to achieve the objective of the paper, variance decomposition was used. The result of the variance or the forecast error variance reveal that the demand shocks such as risk premium, exogenous spending, and investment specific technology shocks, explain significant fraction of the variation in output. Similarly, wage mark up (or supply of labour) and productivity shocks explain most of its variation in the medium to long run, and finally productivity shock has a significant and negative impact on hours worked, meaning that there is a negative relationship between productivity and hours worked.

Shapiro and Watson (1998) investigate the sources of business cycle fluctuations in the US economy. The variables considered in the model includes, total hours worked (ht), output, inflation, nominal interest rate and real oil prices. A structural VAR framework was used in estimating the model and identifying restrictions. The variables were subjected to a unit root test through Augmented Dickey Fuller (ADF) test, where all the variables were found to be differenced stationary. A multivariate unit root test indicates the presence of co-integration among the variables. After establishing these ex-ante diagnostic check facts, the model was estimated and analyzed through impulse response functions and variance decompositions. In the analysis, three important shocks were considered which are assumed to be responsible for the co-movement in output. These shocks include labour supply disturbances, technological disturbances, and aggregate demand disturbances. The labour supply and technological disturbances are identified as those shocks having a permanent impact on output while the aggregate demand shocks have a temporary impact on the level of output.

Thus, the findings of the study reveal that, aggregate demand account for 20 to 30 per cent of variation in output across the business cycle horizon, similarly, technological shocks accounts for one third of output variation, unlike the aggregate demand shock; it is not an important factor in recession determination except for the recession of 1970's. The findings further reveal that permanent shifts in labour input play a large role in explaining the variability and fluctuations of output in all frequencies. Thus, they are important factors in recession, however, permanent shock to labour accounts for around 40 percent of output variation through all the horizons.

3. METHODOLOGY

Data and Sources

The variables of the study are GDP for both India and Nigeria and two exogenous variables oil prices and world GDP. All the variables are annual and spanned from 1980 to 2023. The variables were sourced from the reserve bank of St. Louis

Augmented Dickey Fuller(ADF) Test

Augmented Dickey Fuller Test (ADF): is one of the formal methods of testing stationarity. It is more robust than Dickey fuller test, as it takes care of the serial correlation which apparently made DF test inefficient. This test is conducted by augmenting the equations by adding the lag values of the dependent variable symbolically. The ADF test consists of estimating the following regression function

$$\Delta Y_t = \alpha_1 + \alpha_2 t + \alpha_3 Y_{t-1} + \sum_{i=1}^n \beta \Delta Y_{t-i} + e_t$$

Co-Integration Test

When variables have unit root, that is they are deviating from their mean values, we check whether the combination of the variables will produce residual that will be stationary at level, this is when the issue of co integration came into being. Test of Co integration measures the presence of long run equilibrium with the system of variables. The literature on co integration has evolve overtime, the first is the Engle and Granger (EG), the test assumes that when there is two or more variables that have unit root, a regression of them can be run and the test of stationary can be carried out on the residual of the regression equation, if the residual is stationary the variables have long run equilibrium. there are some problems that are associated with test, for example, when there are more than two variables it is possible to have more than one co-intergrating equation but EG can only give us one co-integrating equation. Next is on the issue on what variable should be endogenous within the system and finally, since the test is two step procedure, when there is an error in the first step it will be carried to the second stage.

To overcome the problems identified with EG, Johnson (1992), introduced a multivariate system that allow for checking the presence of N number of co integrating vectors. The test is based on reduced form VAR. the condition for using the test is that the variables has to be integrated of the same order and that the sample size should also be large enough to avoid size distortion. When the order of integration is not the same, Peasaran and Shin(2001)

and Narayan(2005) introduced ARDL bound testing for co-Integration, the test can be performed when the order of integration of the variables are different and also for small sample size. In this analysis therefore, a Johansen (1991) test was used since all the variables are first differenced stationary.

3.4.1 Vector Error Correction Model (VECM)

After careful assessment of the time series properties of the variables under consideration, we found that the best technique to apply in assessing the business synchronization of countries using small system of variables is VECM

Consider the basic VECM specification below:

$$W_t = \phi_1 + \Gamma_1 \Delta w_{t-1} + \Gamma_2 \Delta w_{t-2} + \Gamma_k \Delta w_{t-n} + \Pi w_{t-1} + V$$

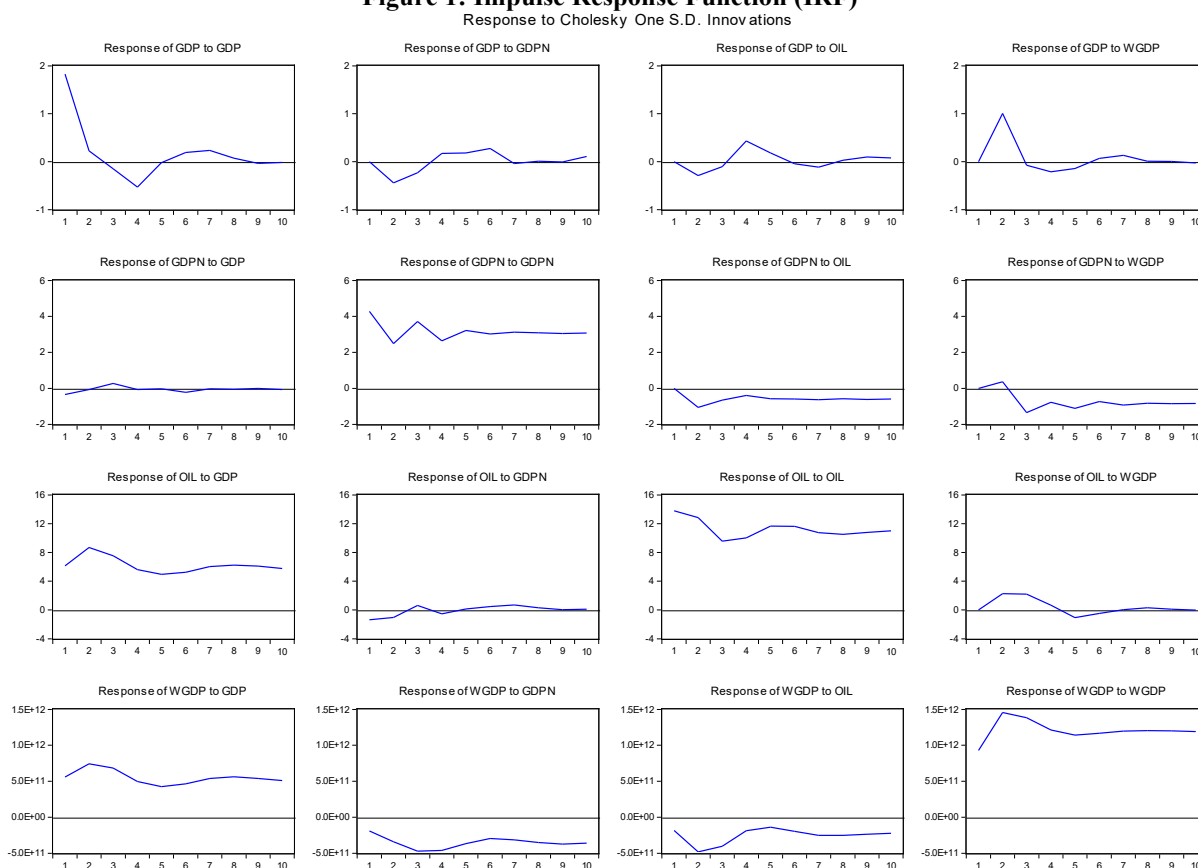
Where W_t is an $N \times M$ vector of endogenous variables, $w_{t-1} \dots \dots \dots w_{t-n}$ is the vector of explanatory variables up to lag N , Γ is the vector of coefficients. Π matrix represent the long run information of the model and is decompose into α and β matrix, V is the $1 \times N$ vector of error terms. To analyzed the impact of shocks in the system, we used impulse response functions, which refers to the reaction of any dynamic system in response to some external change. In both the cases, the impulse response describes the reaction of the system as a function of time (or possibly as a function of some other independent variable that parameterizes the behavior of the system). The IRF gives the j th period response when the system is shocked by a one standard deviation shock.

4. RESULT DISCUSSION

Assessment of the Stochastic Properties

The variables used in this study are GDP for both Nigeria and India and two exogenous variables that include world GDP and crude oil prices (opec basket). The four variables are subjected to Augmented Dickey Fuller (ADF) test. The finding of the test reveals that all the variables are integrated of order one, i.e. $I(1)$. The variables are further checked for combined stationarity, in other words, we checked for co-integration through the Johanson (1991) test. Thus, this test reveals the presence of co-integration among the four variables. The result of both unit-root and co-integration is in appendix.

Figure 1: Impulse Response Function (IRF)



The impulse response function reveals the response of GDP for the case of India and GDPn for the case of Nigeria to oil prices and world GDP shocks. The main idea is to check for similar or erratic responses to oil prices and world GDP shocks of both economies. India and Nigeria are trading partners with around USD \$16 Billion worth of transaction annually. Nigeria being a small economy in comparison to the India economy may be exposed to economic disturbances from India in times of trial. Looking at the responses of Nigerian economy to oil price shock in the third box of the second row, it is observed that the response was negative for the entire forecasted periods. This implies a one standard deviation shock to oil prices, Nigerian economy will react negatively; this is because even though Nigerian economy is a crude oil producer, it still imports refined oil from abroad. However, we expect the trend to change with the recent launch of Dangote refinery which is expected to refine and supply more than the domestic need of the Nigerian economy. Thus, at the moment we expect a crude oil price shock to affect both Indian and Nigerian economy. In the case of India, the response was mixed. From 1st until 3rd horizons, the reaction was negative, similarly from 6th until 8th horizons the response was also negative while the remaining periods were positive. This implies that both Nigeria and Indian economies are prone to oil price shocks, but the shocks goes in to each economy differently. Nigeria’s response to world GDP is also negative from the 2nd horizon

Figure 2: Forecast Error Variance Decomposition (FEVD)

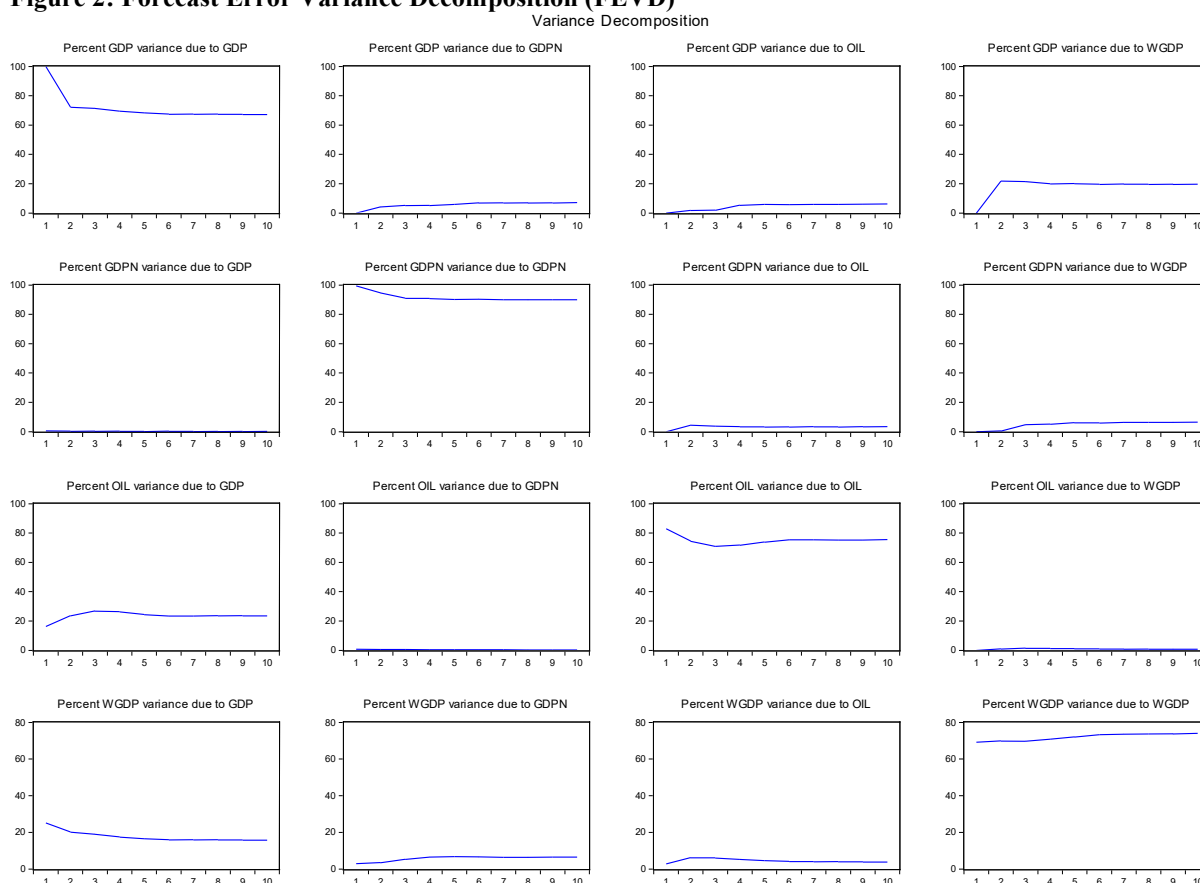


Figure 2 presents the result of forecast error variance decomposition in the system. The contribution of both India and Nigeria to fluctuation due to oil shock is very similar to each other in all the forecasted periods. This shows similar movement and synchronization between Nigeria and India in terms of oil price shock. Furthermore, the contribution of India is much more than the contribution by the Nigeria due to world GDP shock. India contributed up to 20 percent while the Nigerian economy contributed less than 2 percent of total disturbances in the system.

5. CONCLUSION

This research work studies the synchronization of Nigeria and Indian economy. We use impulse response function and variance decomposition extracted through vector error correction model (VECM) to study the synchronization behaviour of the two countries. The impulses reveal the responses of the two economies to oil prices and world GDP. The responses of the two economies due to oil and world GDP shocks shows the two countries responded differently, which implies that these two countries may not respond to exogenous shocks at the same time. The business cycles of the two countries have been assessed through the variance decomposition and thus, the result shows the evidence of synchronization in only crude oil price shock. The study concludes therefore, that, crude



oil price is a potential factor that connects India and Nigerian economy, thus a shock in the crude oil prices may have a spill over effect in both economies.

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