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Modeling Short Run Relationship between Naira-USD Exchange Rate and Crude Oil Price in Nigeria

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ABSTRACT

The vector auto-regressive (VAR) model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate auto-regressive model to a dynamic multivariate time series. The VAR model has proven to be especially useful for describing the dynamic behavior of economic and financial time series and for forecasting. It often provides superior forecasts to those from univariate time series models. The data used are monthly observations from January 2006 to October 2016 of Nigeria Crude Oil price and Naira to the dollar exchange rate. The VAR model was employed for modelling the data. The unit root test reveals that all the series are non-stationary at the level and stationary at first difference. The co-integration relations among the series indices were identified by applying Johansen's co-integration test. The result of Johansen's test indicates no existence of co-integration relation between the variables. The final result shows that a vector autoregressive (VAR) model of lag three with no co-integration equations best fits the data.

Key Words: *Vector Autoregressive Model (VAR), Co integration, Unit Root Test, Naira-USD Exchange rate*

1. INTRODUCTION

Most researchers have done considerable research on forecasting of the exchange rate for developed and developing countries using different approaches. The approach might vary in either fundamental or technical approach. Like the work of [1], used a technical approach to forecast Nigeria Naira – US dollar using seasonal ARIMA model from 2004 to 2011. He reveals that the series (exchange rate) has a negative trend between 2004 and 2007 and was stable in 2008. His excellent work expatiates on that seasonal difference once produced a series SDNDER with slightly positive trend but still within discernible stationarity. Further works by [2], [3], [4], and [5] among others try to measure the forecast performance of ARMA and ARFIMA model on the application to US/UK pounds and Naira/US foreign exchange. They reveal that ARFIMA model was found to be better than ARMA model as indicates by the measurement criteria. Their persistent result reveals that ARFIMA model is more realistic and closely reflects the current economic reality in the two countries which was indicated by their forecasting evaluation tool. [6] used an intervention analysis to model the Nigeria exchange rate in the presence of financial and political instability from the period (1970 -2004). [7] researched the forecasting exchange rate between the Ghana cedis and the US dollar using time series analysis for the period January 1994 to December 2010. Their findings reveal that predicted rates were consistent with the depreciating trend of the observed series and ARIMA (1, 1, 1) was found to be the best model to such series and a forecast for two years were made from January 2011 to December 2012 and reveals that a depreciation of Ghana cedi's against the US dollar was found.

The theory of forecasting exchange rate has been in existence for many centuries where different models yield different forecasting results either in the sample or out of sample. The exchange rate which means the exchange one currency for another price for which the currency of a country (Nigeria) can be exchanged for another country's currency say (dollar). A correct exchange rate does have important factors for the economic growth for most developed countries whereas high volatility has been a major problem to economic series of African countries like Nigeria. There are some factors which affect or influences exchange

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