Impact of Oil Price Shocks on Stock Market Returns: Toda Yamamoto Causality Approach

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Abstract

This paper examines the impact of crude oil shocks on selected African equity market. Oil is viewed as having a direct effect on global stock market returns. In this paper the author tried to determine whether oil shocks could in anyway affects stock market returns and to what extent is the effect. This study employs monthly data over the period of 01/02/2004-01/07/2016. Using correlation matrix and Toda-Yamamoto approach the result revealed a significant positive correlation between oil prices and South African equity returns. The same correlation is seen in the oil prices and the Nigerian equity market. It also revealed that unidirectional causality run from oil prices to Nigeria All share index, also, a unidirectional causality run from Morocco stock return to oil prices. The findings of this study have some important policy implications for portfolio managers and government decision makers.

Keywords: oil prices, correlation, Toda-Yamamoto causality test, unit root, equity market.

1.0 Introduction

It is not a contentious fact that oil plays a critical and vital role in shaping and guiding growth and development in any economy. The importance of oil can therefore not be over emphasised in an economy. No economy can effectively and efficiently attain industrialisation without steady and persistent supply of oil, the total economic activities within an economy is largely dependent of availability of oil.

Also, no economy can attain development and growth without the successful manipulation energy resources. Throughout modern history, oil has played a prominent and inevitable role in economic activities so also political development is also largely affected by oil; profitability of most firms depends on it, therefore business and economic activities relies on the supply of oil, if oil is in short supply then it affects overall economic activities, if prices are also shooting up it increases the cost of production thereby reducing profitability of business firms. This will therefore cause a reduction in stock market returns.

Over the years extensive research has been conducted in the area of oil as it affects the whole economy at large. A large composite of literature is also available on the study of energy and it impact on the economic machinery and macro-economic variables such as economic development, economic growth, economic stability, external debt profile etc. A good example is Hamilton (1983) who, in his paper deduced that the declines in real GNP were directly as a result of persistent increase in price of crude oil. Gilbert and Mark (1984) shows in their model the effect of an oil supply disruptions and survey alternative policy options for dealing with the problem. Mark, Olsen and Maysen (1994) concluded that the negative correlation between oil prices and real output seems, by now to have been accepted as an empirical fact.

But extensive investigation has not been conducted to determine the impact of energy shocks on financial markets and stock market returns as compared to the huge literature available on the impact of oil shocks on macroeconomic variables within an economy. The primary objective of this paper is to determine the impacts of energy shocks from the financial market perspective in Africa

Financial economists have come to agree that, generally oil price shocks have significant effects on various economic activities, and since companies in the stock markets constitute the components of aggregate economic activities, then we can safely assume that there will be correlation between oil price shocks and stock market returns. Since the total economic activity within an economy reflect significantly on the stock market. The interaction between oil prices and stock market returns is specially investigated in this paper.

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The conclusion that oil plays an important inevitable role in the US economy as suggested by Hamilton (1983), Gilbert and Mark (1984), Mark, Olsen and Mysen (1994), and others, suggests that we should expect that the fluctuations in oil prices should be correlated with fluctuations in stock market returns. If oil futures market and the stock market are efficient then oil futures prices and stock prices will be contemporaneously correlated, as each market quickly reacts to information shocks in other markets and as investors' expectations are capitalised.

Also very importantly most study in this area has focus on development markets, however in this paper I also ventured into emerging economies, OPEC countries, so also developed economies in order to measure the variations of oil shock effects in different climes, emphasis shall be placed on interaction between energy shocks and stock market returns.

The main rationale for using oil price shock as a factor affecting stock valuations is that in theory, the value of stock equals the discounted sum of expected future cash flows. Arouri and Rault (2002) state that, these cash flows are affected are affected by macroeconomic events that may be influenced by oil shocks. Thus, oil price change may influence stock market returns.

Huang et al. (1996) examined the relation between daily oil futures return and the US stock markets in a Vector Auto Regression (VAR) framework, he discovered that there is significant contemporaneous correlation between oil future returns and oil company's returns, but have no significant correlation with overall stock market returns.

Therefore, understating the interaction between oil prices and international stock market could have a significant impact on the formulation and implementation of major market policies targeting economic improvement in Nigeria. It could also guide investors in the possible gain from the international portfolio diversification, given the dynamics of stock market causality. Using daily empirical data over *01/02/2004 - 01/07/2016*, we attempt to explain and establish if there is a relationship or correlation between energy shocks and stock market returns. The choice of the country is very simple and quite few, first they control a large chunk of African oil supply especially and secondly, most nations are emerging economies and their economic composition differ greatly with that of developed nations as they are quite isolated from the world financial markets. And finally African markets are markets of huge potentials very suitable for portfolio diversification. This study will to a large extent assist investment experts in making business decisions in emerging markets armed with direct comparison with developed markets. It will also help policy makers who regulate stock markets.

The rest of the article will be organized as follows; section 2, presents survey of the literature. Section 3, will discuss the methodology employed in the study, while section 4, analyses the empirical results.Finally, section 5, contains conclusions and recommendations

2.0 Literature Review

There are very few literatures on the empirical relationship between oil shock and stock market returns. A very reference point in this subject can be found in a paper by Jones and Kaul (1992) who examined the impact of oil prices on stock markets, they found out that oil price shock have effect on aggregate real stock market returns, a lagged effect inclusive in the period between 1947 to 1991. The focus of their paper was macroeconomic, they made use of quarterly data using PPI (Producer Price Index) for fuels as it's measure of oil prices. They conspicuously used daily data on stock price and oil futures prices, this is in sharp contrast the producer price index which is quarterly. But, the conclusion they draw was not consistent with the relationship between oil return and aggregate stock returns in the 1980's. Furthermore, their paper shows a negative reaction of US, Japan, Canada and UK stock prices to oil shocks via the impact of oil price shocks on real cash flows.

Kaul and Jones (1996), testing for the reaction of major international stock markets, the authors tested the reaction of the Canadian stock markets, UK stock markets, Japanese stock markets and the US stock markets to oil price shocks using the standard dividend valuation model. The authors discovered that the reactions in the US and Canada stock markets are accounted to a great extent by the effect of the oil shocks on cash flows. The results for Japan and UK markets were inconclusive.

Huang et al. (1996) concluded that there is significant connection between returns on some American companies' stock returns and changes in oil prices, but they could not empirically link the relationship between oil prices and

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market indices such as FTSE 100 and S & P 500. The test was conducted using Vector Auto- Regressive model. But a different test conducted by Sadorsky (1999) gave contrasting result, using an unrestricted VAR with GARCH effects, the American monthly data showed a significant relationship between oil price changes and aggregate stock returns.

Christophe Rault and Mohamed Arouri (2009) using recent bootstrap panel and co-intergration techniques and seemingly unrelated regression models which has never been used before in this context, concluded that Gulf Oil Countries such as Saudi Arabia, Kuwait, Quatar are susceptible to oil price shocks. They made use of different data set (weekly and monthly) and discovered evidence of co-integration between oil prices and stock market returns. Gulf countries which also form OPEC policy makers are world major oil producers and exporters have a stock market that is vulnerable to the activities of oil prices at the international markets. Therefore Rault and Arouri (2009) suggested that "GCC countries as OPEC policy makers should keep an eye on the effects of oil price fluctuation on their own economies and stock market. The conclusion and derivation of their paper suggested that "there is significant relationship between oil prices and stock markets, which implies some degree of predictability in Gulf countries' stock markets.

Odusami (2008), concluded that there is a non-linear relationship between crude oil price and aggregate US stock return. Empirical results from Odusanmi (2008) showed that oil price shock impact negatively on the US aggregate stock return in a non-linear fashion, it also showed that "the arrival of unexpected news relating to fluctuations in crude oil price are a significant source of discrete jumps in US stock market returns. He concluded that, generally the non-linear effect of crude oil shocks observed in the US stock markets returns can be explained by investors reaction to unexpected news from OPEC meetings which have little and insignificant effect on the US aggregate stock market returns. They therefore concluded that the US stock market is efficient to news coming from OPEC meetings,

3.0 Data and Methodology

3.1 Data

This study employed monthly time series covering 01/02/2014 to 01/07/2016. Highly capitalized equity market from Nigeria Allshare index, South African index 40, Morocco (MASI), Tunisia (TUN) are employed. All these variables are sourced from investing.com and have been employed in related studies (see Allen and McDonald, 1995; Lamba and Otchere, 2001; Ogum, 2002; Collin and Biekpe, 2003). Another reason why these studies utilised such a proxy is that it is normally level non-stationary, unlike return series which are level stationary. As mentioned earlier, level non-stationarity of series is one of the preconditions for the series to be applicable for co-integration analysis. On the other hand, studies that seek to establish whether return linkages exist between stock markets use stock market returns as their proxies. Since return series are not readily available, they are computed from market indices series as follows:

$$y_t = (lnP_t - lnP_{t-1}) \times 100$$

Where y_t is current continuous compounded returns, P_t is the current month stock price index and P_{t-1} is the previous month stock market index.

3.2 Unit Root Test

In time series analysis, before running the co-integration test the variables must be tested for stationarity. For this purpose, we use the conventional ADF tests, the Phillips–Perron test following Phillips and Perron (1988) .Therefore, before applying this test, we determine the order of integration of all variables using unit root tests by testing for null hypothesis $H_o: \beta = 0$ (i.e β has a unit root), and the alternative hypothesis is $H_1: \beta < 0$. All the variables should be integrated at first order difference I(1) so as to avoid spurious result.

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3.3 Toda Yamamoto Granger Causality

The conventional Granger causality tests in an unrestricted VAR framework is conditional on the assumption that the underlying variables are stationary, or integrated of order zero in nature. If the time series are non-stationary, the stability condition of the VAR is supposed to be violated. This implies that the $\chi 2$ (Wald) test statistics for Granger causality that are used to test the joint significance of each of the other lagged endogenous variables in VAR equations becomes invalid. In the case of non-stationary time series, one must investigate co-integration and if that exists, one must proceed with vector error correction model instead of unrestricted VAR. If the series are not integrated of order $I(1)$ or are integrated of different orders no test for long run relationship is employed. On the other hand employment of unit root and co-integration tests may suffer from low power against the alternative therefore they can be misplaced and may suffer from pre-testing bias (Toda and Yamamoto, 1995; Pesaran et al, 2001). To obviate some of these problems, Toda &Yamamoto (1995) and Dolado and Lutkepohl (1996) employ a modified Wald test for restriction on the parameters of the VAR (k) with k being the lag length of the VAR system. In their approach the correct order of the system (k) is augmented by the maximal order of integration (d_{max}) then the VAR($k + d_{max}$) is estimated with the coefficients of the last lagged d_{max} vector being ignored. Toda and Yamamoto (1995) confirm that the Wald statistic converges in distribution to a chi-square random variable with degrees of freedom equal to the number of the excluded lagged variables regardless of whether the process is stationary, possibly around a linear trend or whether it is cointegrated.

The TY procedure avoids the bias associated with unit roots and cointegration tests as it does not require pre-testing of cointegrating properties of the system (Zapata & Rambaldi, 1997 and Clark & Mizra, 2006). The method proposes an augmented level VAR modeling and hence causality testing with a possibly integrated and cointegrated system (of arbitrary orders) unlike the general VAR modeling where the long-run information of the system is often sacrificed in the mandatory process of first differencing and pre-whitening (Clark & Mirza, 2006; Rambaldi and Doran,2006). The test (MWALD) statistic is valid as long as the order of integration of the process does not exceed the true lag length of the model (Toda & Yamamoto, 1995).

However, TY approach has some weaknesses as well. The approach is inefficient and suffers some loss of power since the VAR model is intentionally over-fitted (Toda & Yamamoto, (1995). Kuzozumi & Yamamoto (2000) also warn that for small sample size, the asymptotic distribution may be a poor approximation to the distribution of the test statistic.

A VAR of order p can be represented by

$$y_t = a_0 + a_1 t + \sum_{i=1}^{p} \Phi_i y_{t-i} + \Psi w_t + u_t ....(1)$$

where y_t is a $(n \times 1)$ vector of endogenous variables, t is the linear time trend, a_0 and a_1 are $(n \times 1)$ vectors, w_t is a $(q \times 1)$ vector of exogenous variables and u_t is a $(n \times 1)$ vector of unobserved disturbances where $u_t \sim N(0, \Omega)$, t = 1 2…..T.

In our case, TY version of VAR($k + d_{\max}$) can be written as:

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$$\begin{bmatrix} oilp_t \\ masi_t \\ nig_t \\ sa40_t \\ tun_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{bmatrix} + \begin{bmatrix} A_{11,1}A_{12,1}A_{13,1}.....A_{15,1} \\ A_{21,1}A_{22,1}A_{23,1}.....A_{25,1} \\ A_{31,1}A_{32,1}A_{33,1}.....A_{35,1} \\ .... \\ A_{51,1}A_{52,1}A_{53,1}.....A_{55,1} \end{bmatrix} \begin{bmatrix} doil_{t-1} \\ masi_{t-1} \\ nig_{t-1} \\ sa40_{t-1} \\ tun_{t-1} \end{bmatrix} + ... + \begin{bmatrix} A_{11,k}A_{12,k}A_{13,k}.....A_{15,k} \\ A_{21,k}A_{22,k}A_{23,k}.....A_{25,k} \\ A_{31,k}A_{32,k}A_{33,k}.....A_{35,k} \\ .... \\ A_{51,k}A_{52,k}A_{53,k}.....A_{55,k} \end{bmatrix}$$

$$\begin{bmatrix} doil_{t-k} \\ masi_{t-k} \\ nig_{t-k} \\ sa40_{t-k} \\ tun_{t-k} \end{bmatrix} + \begin{bmatrix} A_{11,p}A_{12,p}A_{13,p}.....A_{15,p} \\ A_{21,p}A_{22,p}A_{23,p}.....A_{25,p} \\ A_{31,p}A_{32,p}A_{33,p}.....A_{35,p} \\ .... \\ A_{51,p}A_{52,p}A_{53,p}.....A_{55,p} \end{bmatrix} + \begin{bmatrix} doil_{t-p} \\ masi_{t-p} \\ nig_{t-p} \\ sa40_{t-p} \\ tun_{t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix} ....(2)$$

where d is the first-difference operator and the order of p represents ($k + d_{max}$). Directions of Granger causality can be detected by applying standard Wald tests to the first '*k'* VAR

coefficient matrix. For example,

H_{01}: $A_{12,1} = A_{12,2} = ... = A_{12,k} = 0$, implies that *ex* does not Granger cause *doil*

H_{02}: $A_{21,1} = A_{21,2} = ... = A_{21,k} = 0$, implies that *doil* does not Granger cause *ex*

H_{03}: $A_{13,1} = A_{13,2} = ... = A_{13,k} = 0$, implies that *iip* does not Granger cause *doil*

H_{04}: $A_{31,1} = A_{31,2} = ... = A_{31,k} = 0$, implies that *doil* does not Granger cause *iip* and so on.

Toda Yamamoto (1995) proposed an interesting simple procedure requiring the estimation of an augmented VAR which guarantees the asymptotic distribution of the Wald statistic (an asymptotic $\chi 2$-distribution), since the testing procedure is robust to the integration and co-integration properties of the process. TYDL approach to Granger causality has two major advantages. One advantage is: it can be applied, regardless of whether a series is integrated of order zero, one or two. Secondly, it can be applied irrespective of whether the variables are co-integrated. Thus, it avoids the potential bias associated with unit root and co-integration tests. The TYDL procedure uses a modified-Wald test for restrictions on the parameters of the VAR(k) model. This test has an asymptotic chi-squared distribution with k degrees of freedom in the limit when VAR[k + dmax] is estimated. Here, dmax is the maximal order of integration for the series in the system. Following Dolado and Lütkepohl (1996), we use dmax = 1 as it performs better than other orders of dmax.

ISSN: 1596-9061

4.0 Empirical Results

4.1 Descriptive Statistics

Table 1: Summary of Descriptive statistics

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	J-B	Prob.
OILP	0.00185	0.006341	0.254459	-0.407402	0.09196	-0.68004	4.985714	35.96396	0
MASI	0.003091	0.009367	0.183381	-0.169717	0.046147	0.159545	5.433184	37.38783	0
NIG	0.001021	0.090936	0.324064	-0.365883	0.076107	-0.50636	7.949172	158.436	0
SA40	0.010283	0.038205	0.120966	-0.161438	0.047179	-0.34511	3.936512	8.402681	0
TUN	0.009647	4.548484	0.095492	-0.142611	0.037259	-0.41425	4.887909	26.38927	0

Source: eviews 9

Table 1 above provides descriptive statistics the study obtained from mean, median, mode, maximum, minimum, skewness, kurtosis, standard deviation, Jarque-Bera, propability, standard deviation, for all the data sets. Oil price (brent in dollars) and four proxies of sub-Saharan African market (NIG Allshare, Tunindex, Morr.Allshare-MASI, South Africa 40), over the period of 02/01/2004-07/01/016 were employed in this study. Whilst it is clear that all the statistics show the characteristics common with most financial data, for instance non normality in the form of fat tails. Firstly, returns in African stock markets are larger than those of their developed counterparts. More specifically, the South African stock markets (SA40) has the largest unconditional average monthly stock market return of around 1.02%. The returns for SA40 fluctuate between the minimum of –16.14% and a maximum of 12.09%. The Nigerian All-share index recorded the least returns of around 0.1021%, the minimum and maximum are -36.58% and 32.4% respectively. Among the African markets, Tunindex has the second highest average returns and MASI the third with unconditional average returns of 0.964% and 0.5272% respectively. Oil prices have maintained a relative numbers across the descriptive statistics.

A common observation is that the African markets have more extreme values (i.e. the difference between the maximum and the minimum) for the monthly returns. This could be an indication that volatility is much higher in African stock markets which is well in line with most theoretical and empirical underpinnings.

Interestingly, contrary to the common findings that the unconditional standard deviation for African markets tends to be high, indicating the existence of more risky markets (see Tastan, 2005), the picture seems to be mixed in our case. As evident from the Table 1 Nigeria, has the highest unconditional standard deviation of around 7.5%, whilst Tunisia has the lowest of about 0.37%. This could be due to the fact that there has been a lot of political issues and investors are risk averse. Returns of most of the stock markets under consideration are negatively skewed except for the Moroccan stock markets. All the stock markets under consideration have distributions with positive excess kurtosis and show evidence of fat tails. A distribution with a kurtosis value of more than 3 is described as leptokurtic relative to normal (Bala and Premaratne, 2003 and Hosking, 2006). This implies that the distribution of stock returns in all the stock markets tends to contain extreme values.

Lastly, the Jarque-Bera (JB) statistic tests whether the series are normally distributed. As can be seen from the Table 1, the JB indicates that the hypothesis of normality is rejected for all return series. This non-normality is also evident from the fatter tails of the kurtosis and negative and positive skewness. This is contrast to the market efficiency hypothesis.

ISSN: 1596-9061

Table 2: Correlation Matrix

Correlation Probability	DLMASI	DLNIG	DLOILP	DLTUN	DLSA40
DLMASI	1.000000				

DLNIG	0.157742	1.000000			
	0.0547	-----			
DLOILP	0.100252	0.277312	1.000000		
	0.2238	0.0006	-----		
DLTUN	0.138676	-0.076371	0.062570	1.000000	
	0.0917	0.3546	0.4484	-----	
DLSA40	0.188534	0.215084	0.463896	0.012826	1.000000
	0.0213	0.0084	0.0000	0.8766	-----

Source: eviews9

Table 2 shows the pairwise correlation matrix and there is evidence of correlation among the markets. Correlation between all the markets is positive, which tends to indicate that there is a common trend/factor that is driving the markets in the same direction. However, there is significant correlation between oil prices and Nigeria Allshare index, South African Allshare index with 0.277 and 0.4638 respectively. This could be as a result of oil-dependence for Nigeria and South African is highly a developed market. Also, evident from Table 2, there are no correlation between oil prices and most of the stock markets returns for example MASI, and TUN. However, the correlation matrix cannot provide any empirical answer since correlation does not imply causality (Gujarati, 2005). Furthermore, correlation merely provides insight into short run market linkages, but fails to account for long term interaction activities in stock markets (Narayan and Smyth, 2005). Therefore we need to infer this from other empirical tests

Table 3: Unit Root Test

	1(0)		1(1)		
Variable	ADF	PP	ADF	PP	Order of integration
lnoilp	-2.4399	-2.304	-8.9131***	-8.9739***	1 (1)
In magi	-2.4006	-2.3228	-7.79181***	-11. 0678***	1 (1)
LnNIG	-1.6034	-10.6529	-10.6529***	-10.7107***	1 (1)
In S40	-1.7853	-1.7581	-12.0802***	-13.0859***	1 (1)
In Tun	-2.2334	-2.0972	-10.7397***	-10.8241***	1 (1)

Note: all variable are in the natural log form
***level of significant at 1% **level of significant at 5%
Source: calculated using eview9

All that data are transformed into the natural log form. To determine the order of integration of the variables, the ADF (augmented Dickey-Fuller) test complemented with the PP (Philips-Perron) test in which the null hypothesis is $H_0 = \beta = 0$ (i.e β has a unit root), and the alternative hypothesis is $H_1 : \beta < 0$ are implemented. The results for both the level and differenced variables are presented in Table 3

The stationarity tests were performed first in levels and then in first difference to establish the presence of unit roots and the order of integration in all the variables. The results of the ADF and PP stationarity tests for each variable show that both tests fail to reject the presence of unit root for NIG, MASI, OILP SA40, and TUN data series in level, indicating that these variables are non-stationary in levels. The first difference results show that these variables are stationary at 1% significance level (integrated of order one 1(1)). As mentioned in the preceding sections, a linear combination of I (1) series could be I (0) if the series are cointegrated. Hence, VAR models will add only two extra lag (i.e dmax=2) for the implementation of the Toda-Yamamoto causality test. Following the

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modelling approach described earlier in section 3.1, we determine the appropriate lag length and conduct the causality test.

Table 4: Analysis of Optimal Lag Structure Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-19.67729	NA	9.74e-07	0.347567	0.451646	0.389861
1	1091.693	2128.822	2.21e-13	-14.95342	-14.32895*	-14.69966*
2	1118.891	50.18168*	2.14e-13*	-14.98438*	-13.83951	-14.51915
3	1130.058	19.81886	2.61e-13	-14.78956	-13.12430	-14.11286
4	1148.147	30.82634	2.89e-13	-14.69221	-12.50656	-13.80405
5	1164.047	25.97853	3.32e-13	-14.56405	-11.85801	-13.46442
6	1180.443	25.63244	3.81e-13	-14.44286	-11.21642	-13.13177
7	1200.900	30.54221	4.14e-13	-14.37888	-10.63205	-12.85632
8	1223.662	32.38003	4.40e-13	-14.34736	-10.08014	-12.61334

FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterio
HQ: Hannan-Quinn information criterion
***level of significant at 1% **level of significant at 5%
Source: calculated using eview9

This study tested the lag structure to obtain the optimal lag structure of the data sets using the alkaike and schwatz lag structure to obtain the minimum value. The optimal lag structure is obtained when the Alkaike criterion is the lowest value. As evidenced in table 4.

Table 5: TYDL Granger causality test (X^2 statistics) through modified Wald (MWALD) test

Variables	**Chi-Square**	**P-value**	**Remark**
NIG≠OILP	0.0758	0.9328	None
OILP=NIG	5.8273*	0.0543	Uni-directional
MASI=OILP	6.0405**	0.0450	Uni-directional
OILP≠MASI	0.71225	0.7004	None
SA40≠OILP	1.9453	0.3775	None
OILP≠SA40	2.8100	0.2454	None
TUN≠OILP	0.3453	0.8414	None
OILP≠TUN	2.8100	0.2454	None

**level of significant at 5% *level of significant at 10%
Source: calculated using eview9

The results for the TYDL approach to Granger causality are presented in Table 5. There are no evidence of granger causality between the various market returns and the oil price. Indeed, African market cannot dictate the oil prices at the international market. The results indicate that at the 10 per cent level unidirectional causality runs from oil prices to Nigeria All share index. Surprisingly, MASI indicates 5% level of unidirectional causality running from running from MASI from oil prices. However, there are no causality between oil prices and the remaining stock market returns.

4.2 Discussion of Findings

Correlation between all the markets is positive, which tends to indicate that there is a common trend/factor that is driving the markets in the same direction. However, there is significant correlation between oil prices and Nigeria Allshare index, South African Allshare index with 0.277 and 0.4638 respectively. This could be as a result of oil-dependence for Nigeria and South African is highly a developed market. This is in line with the findings of Christophe Rault and Mohamed Arouri (2009), Odusami (2008),) and ,Huang et al. (1996) who examined the relation between daily oil futures return and the US stock markets in a Vector Auto Regression (VAR) framework and discovered that there is significant contemporaneous correlation between oil future returns and oil company's returns. However, there are no correlations between oil prices and most of the stock markets returns for example

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MASI, and TUN. A slight difference in the findings could be as a result of methodological differences. See Sadorsky (1999).

Furthermore, the result from TYDL revealed that no evidence of granger causality between the various market returns and the oil price. Indeed, African market cannot dictate the oil prices at the international market. Surprisingly, MASI shows unidirectional causality running from running from MASI to oil prices. However, there are no causality between oil prices and the remaining stock market returns. This is because they are not oil exporting countries.

5.0 Conclusion

This paper examined the impact of crude oil shocks on selected African equity markets. Oil is viewed as having a direct effect on global stock market returns. In this paper the author tried to determine whether oil shocks could in anyway affect stock market returns to what extent using monthly data over the period of 01/02/2004-01/07/2016. By employing the correlation matrix and Toda-Yamamoto approaches, the result revealed a significant positive correlation between oil prices and South African equity. The same correlation is seen in the oil prices and the Nigerian equity market. It also revealed that unidirectional causality runs from oil prices to Nigerian All share index oil prices and also, a unidirectional causality run from MASI oil prices. As expected, the study document weak correlation and no causality between oil prices and TUN. This has been attributed to poorly developed market and issues of political uprising in the country.

This study provides important policy implication for the selected equity markets in Africa. The effective management of high dependence of the Nigerian financial sector through the equity market on oil price will directly reduce the systematic risk exposure of the capital market and indeed, enhance efficiency in resource allocation in the sector.

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