Commodity Price Shocks and African Stock Markets: Evidence from Ghana

Antwi Kofi Gyasi,
MSc. Strategic Finance,
Lappeenranta University of Technology, Finland.
E-mail: kofigyasi88@yahoo.com

Abstract

The purpose of this study is to examine the linkage between the Ghana stock exchange market and the commodity prices changes – cocoa, crude oil and gold prices, the major exports of Ghana. The study especially aims at the linkage between the Ghana stock market and crude oil prices with the reason that Ghana started exporting oil in commercial quantities in the late 2010. We estimate a bivariate GARCH-BEKK model proposed by Engle and Kroner (1995) using daily returns from MSCI and world commodity prices. We find evidence of a strong bi-directional linkage between the Ghana equity market, gold and crude oil prices both in regards of returns and volatility. While we find evidence of a unidirectional linkage between the Ghana stock market and gold prices both in regards of returns and volatility. Our results are beneficial to both investors and policy makers.

Key Words: volatility transmission, frontier emerging markets, BEKK model
JEL Classification: C 32, G15
1. Introduction

The importance of crude oil on the world economy is widely researched and accepted in the finance literature. Earliest research in this field centred mostly on the relationship between oil price fluctuations and economic variables. Pierce and Enzler (1974) Rasche and Tatom (1977) and Darby (1982) are examples. These researches found an inverse relationship between oil price fluctuations and economic variables. In more recent times, other studies have also confirmed these earlier findings. Hammes and Wills (2003), Cunado and De Garcia (2005), Eizaguirre and De Gracia (2006), Maghyereh (2006), Adjasi (2009) and Basher et al (2012), all confirmed the inverse relationship between oil price changes and such economic variables as exchange rate, consumer price index, Gross Domestic Product (GDP) and interest rates.

Over the years however, studies on the relationship between oil price fluctuations and stock market returns gathered momentum. The results on the relationship between the two have been missed, with most finding an inverse relationship. This could be explained that as oil prices increases, the cost of firms increases hence profit reduces thereby decreasing the value of the firms and vice versa. Sadorsky, (1999), Basher and Sadorsky, (2006), Hammoudeh and Li, (2005), and Kilian and Park, (2009) all found an inverse relationship between oil price fluctuations and the stock returns. Conversely, some studies also found evidence that increases in emerging stock prices result in increased oil prices. Mention can be of Sadorsky, 2001, Basher & Sadorsky, (2006), Narayan & Narayan, (2010), Zhang & Chen, (2011).

In this study, we seek to establish the effect of oil price volatility on the Ghana Stock Exchange (GSE) market. Also, we set out to examine the volatility dynamics between gold, cocoa prices and the Ghana Stock returns. We aim to provide useful inferences from which investors can take a cue in managing their portfolios. Adjasi (2009) used EGARCH model to study the relation between macroeconomic variables including oil price and the stock market of Ghana. The results showed that higher volatility in oil prices reduces volatility of stock prices. However, it is worth noting that Ghana started commercial drilling of crude oil from its jubilee field in December 2010 with an oil reserve estimated to be around one billion barrels. Ever since Ghana started exporting oil in commercial quantities in late 2010, no study has been conducted to assess the impact of oil price volatility on the Ghana Stock Exchange market. In addition, as a commodity export dependent country, Ghana exports gold and cocoa as well. With this in mind, we also want to establish the impact of gold and cocoa price changes on the Ghana Stock Market.

Investors can use the results of this study to diversify their portfolio by investing in commodities. Erb and Harvey (2006) found that a portfolio of stocks and commodities can yield higher returns and lower risk than stock only. More specifically, Arouri and Nguyen (2010), show
that adding oil asset into a diversified portfolio of stocks significantly improve its risk-return feature. Inflation is noted to be a major problem in frontier emerging markets like Ghana. However, investing in commodities has been found to be a hedge against inflation. Hillier found that commodities such as gold, silver and platinum have the ability to hedge adverse equity price movements in US stocks and EAFE stocks and portfolios with these precious metals perform better.

2. Literature Review

There are several studies focusing on the linkage between commodity prices and stock returns. However, as usually is the case, the earliest and majority of the research available focuses on the developed markets. Few focus on the emerging markets not to mention frontier emerging markets like Ghana.

First, regarding advanced market, El-Sharif et al (2005) sought to investigate the relationship between the price of crude oil and equity values in the oil and gas sector using data relating to the United Kingdom. The findings show that, the relationship is always positive. They found that the relationship is often highly significant and it connotes a direct impact of volatility in the price of crude oil on share values. Employing a multivariate vector-auto regression (VAR) method, Papapetrou (2001) examined the dynamic relationship between oil prices and real stock prices for Greece. The results suggest that oil prices are important in explaining stock price movements.

Miller and Ratti, (2009), analyzed the long-run relationship between the world price of crude oil and international stock markets. They established that stock market indices respond negatively to increases in oil price in the long run in six (6) OECD countries. In a similar study, Park and Ratti, (2008), concluded that Norway exhibits a positive response in real stock returns to an oil price increase. They also found that for many European countries increased volatility of oil prices depresses real stock returns. Using a bivariate GARCH method, Malik et al (2009) examined the volatility dynamics between five different US sector indexes and oil prices. They revealed evidence of transmission of shocks and volatility between oil prices and some of the examined market sectors.

Arouri and Nguyen (2010) studied the short-term linkages in the aggregate and the sector by sector levels in Europe. They found that the reactions of stock returns to oil price changes varies greatly depending on the activity sector. Another study by Malik and Ewing (2009) examined the relationship between stock market and oil prices in Greece using cointegration, VECM and a multivariate VAR method. They found that oil prices exercise significant negative influence on the stock market. Employing a two regime Markov-switching EGARCH model, Aloui and Jammazi (2009) examined the relationship between crude oil shocks and stock markets in the UK, France and Japan. The findings show that rises in oil price has a
significant role in determining the volatility of stock returns. Jawadi et al (2010) found evidence of considerable linkages between stock and oil markets and significant long-run relationships exists between these markets. They studied the USA, France, Mexico and Philippines market using a nonlinear approach.

Second, regarding emerging markets, Chen and Lv (2015) examined the asymptotic dependence between the Chinese stock market and the world crude oil market employing the Extreme Value Theory (EVT). They found a positive extremal dependence. They concluded that the oil and stock move together especially during crisis period hence contagious effect. Using a VAR model, Cong et al (2008) investigated the relationships between oil price shocks and Chinese stock market. They found that oil price shocks transmit significantly to manufacturing indices. Kapusuzoglu (2011) studied the long-term and short-term dynamics between Istanbul Stock Exchange (ISE) market and international Brent oil price. They found a long term relationship between the stock and oil markets. They also observed that there was one way causality relationship from the stock exchange market to oil price.

Maghyereh and Al-Kandari (2007) used a nonlinear cointegration model to examine the linkages between oil prices and stock market in the Gulf Cooperation Council (GCC). They found that oil price impacts the stock price indices in GCC countries in a nonlinear fashion. Using a VAR-GARCH model, Arouri et al (2011) studied the linkages between the oil and stock markets in the Gulf Cooperation Council (GCC) countries. They found evidence of substantial return and volatility spillovers between world oil prices and GCC stock markets. Using bootstrap panel cointegration techniques and seemingly unrelated regression (SUR) methods, Arouri and Rault (2012) studied the GCC stock and oil market. They found that with the exception of Saudi Arabia, it was noted that oil price increases have a positive impact on stock prices.

Narayan and Narayan (2010) studied the impact of oil prices on Vietnam’s stock prices. They established that oil prices have a positive and statistically significant impact on stock prices. Adjasi (2009) used EGARCH model to study the relation between macroeconomic variables including oil price and the stock market of Ghana. The results showed that higher volatility in oil prices reduces volatility of stock prices.

3. Methodology

In this study, the returns and volatility dynamics between Ghana equity market and commodity market are examined using a Bi-variate VAR-GARCH-BEKK model. Basically VAR-GARCH (1, 1) - BEKK model is specified in this study.
3.1 Research Questions

In this study, we seek to answer the following questions; (1) what is the linkage between the Ghana Stock Exchange (GSE) market and oil prices changes? (2) How can policy makers and investors benefit from the results of this study?

3.2 VAR-GARCH (1, 1) - BEKK

Inputted into the models are the percentage returns of each of the variable under consideration lagged one period.

\[
\begin{bmatrix}
    r_{1,t} \\
    r_{2,t}
\end{bmatrix} = \begin{bmatrix}
    a_{1,0} \\
    a_{2,0}
\end{bmatrix} + \begin{bmatrix}
    \beta_{1,1} & \beta_{1,2} \\
    \beta_{2,1} & \beta_{2,2}
\end{bmatrix} \begin{bmatrix}
    r_{1,t-1} \\
    r_{2,t-1}
\end{bmatrix} + \begin{bmatrix}
    \mu_{1,t} \\
    \mu_{2,t}
\end{bmatrix} \tag{1}
\]

\[u_t | \Omega_{t-1} \sim N(0, H_t), \] \tag{2}

\(r_t\) is an \(n \times 1\) vector of daily percentage returns at time \(t\) for individual market under consideration.

The vector \(\mu_t\) captures the innovation for each market at time \(t\) as well as the \(n \times n\) conditional variance-covariance matrix \(H_t\). The market information lagged one period is denoted by \(\Omega_{t-1}\).

The \(n \times 1\) vector is the constant. The own and cross market mean spillover is captured by the estimates of matrix\(\beta\), which are the parameters of the vector autoregressive (VAR) term.

In the spirit of Engle and Kroner (1995), general conditional covariance matrix for VAR-GARCH (1, 1) - BEKK model is specified as depicted below:

\[
H_t = W_0 + \sum_{j=1}^{p} A_{j1} \Omega_{t-j} A_{j1}' + \sum_{j=1}^{q} G_{j1} H_{t-j} G_{j1}', \tag{3}
\]

where the parameter matrices for the variance equation are defined as \(W_0\), which is restricted to be lower triangular and two unrestricted matrices \(A_{11}\) and \(G_{11}\). Thus, the second moment can be represented by:

\[
H_t = C_0 + \begin{bmatrix}
    a_{11} & a_{12} \\
    a_{21} & a_{22}
\end{bmatrix} \begin{bmatrix}
    \epsilon_{t-1,1} \\
    \epsilon_{t-1,2}
\end{bmatrix} + \begin{bmatrix}
    a_{11} & a_{12} \\
    a_{21} & a_{22}
\end{bmatrix} \begin{bmatrix}
    \epsilon_{t,1} \\
    \epsilon_{t,2}
\end{bmatrix} + \begin{bmatrix}
    g_{11} & g_{12} \\
    g_{21} & g_{22}
\end{bmatrix} H_{t-1} \begin{bmatrix}
    g_{11} & g_{12} \\
    g_{21} & g_{22}
\end{bmatrix} \tag{4}
\]

According to Engle and Kroner (1995), the BEKK model can be estimated using the full information maximum likelihood or an instrumental variables estimator. Letting \(L_t\) be the log-likelihood of observation \(t\), \(n\) be the number of variables and \(L\) be the joint log likelihood gives,

\[
L = \sum_{t=1}^{T} l_t, \tag{5}
\]

\[
L_t = \frac{n}{2} \ln(2\pi) - \frac{1}{2} \ln|H_{r_f,t}| - \frac{1}{2} \psi_t H_{r_f,t}^{-1} \psi_t. \tag{6}
\]
In this study, BFGS (Broyden, Fletcher, Goldfarb, Shanno) algorithm is used as the nonlinear maximization method since it works better with RATS software.

The Ljung-Box Q-statistic which is distributed as $\chi^2$ with $(p - k)$ degrees of freedom, where $k$ is the number of explanatory variables is is used to test for independence of higher relationships as shown in volatility clustering by the MGARCH model Huang and Yang, (2000).

3.3 Data

The daily price data for the Ghana Stock Exchange, oil, gold and cocoa are used in this study. The data stretches over a period of five (5) years starting from 24th February, 2011 to 24th February, 2016 generating 1306 observations. The price data is then transformed to a simple percentage returns with the formula;

$$\text{Ret} = \left[ \frac{P_t - P_{t-1}}{P_{t-1}} \right] \times 100$$

4. Descriptive Statistics

The descriptive statistics are presented in table (1). A careful examination of the skewness and kurtosis shows that the data is not normally distributed. A normally distributed series is not skewed and has coefficient of kurtosis of 3. As shown in the table, all the variables have excess kurtosis emphasizing that the data exhibits fatter tails hence leptokurtic; a common characteristic of financial data which exhibits excess peakedness at the mean. The null hypothesis for JB test of normality is rejected for all the indices meaning that the distribution is not normal. These characteristics of the data make non-linear models and in this case VAR-GARCH- Bekk model suitable for the study.

The standard deviation is annualized and shows how volatile the commodity prices and the Ghana stock returns are. Adjusted Dickey Fuller test is used to test for the presence of unit root in the data whiles KPSS test for stationarity. The ADF has a null hypothesis of the presence of unit root and as shown in the table, all the variables are statistically significant at the 1% significant level meaning that the null hypothesis is rejected in favor of the alternate hypothesis of no unit root presence in the data. The KPSS test on the other hand has a null hypothesis of stationarity and as depicted in the table, all the indices are statistically insignificant hence the null hypothesis is not rejected meaning the data is stationary. LB in the table represents the Ljung-Box $Q$-statistics for residual serial correlation up to the 15th order. The LB statistics show that there is autocorrelation in returns for all the indices and this signifies the presence of ARCH effects and this is confirmed by the ARCH test. The ARCH test is a Lagrange multiplier (LM) test for autoregressive conditional heteroskedasticity (ARCH) in the residuals (Engle 1982).
by the $R^2$ from the test regression. All the variables are statistically significant at 1% significant level and have large values which signify the presence of ARCH effects in the data hence justifying the model selection for the analysis.

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>COCOA</th>
<th>CRUDE</th>
<th>GOLD</th>
<th>GSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.0923</td>
<td>-0.8755</td>
<td>-0.0984</td>
<td>-0.2689</td>
</tr>
<tr>
<td>Median</td>
<td>0.0000</td>
<td>-0.0217</td>
<td>-0.0174</td>
<td>0.0000</td>
</tr>
<tr>
<td>Maximum</td>
<td>8.4236</td>
<td>12.3235</td>
<td>4.7102</td>
<td>9.3641</td>
</tr>
<tr>
<td>Minimum</td>
<td>-10.0389</td>
<td>-8.6711</td>
<td>-9.3538</td>
<td>-10.6661</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>25.4037</td>
<td>34.0280</td>
<td>18.0732</td>
<td>20.6064</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.0415</td>
<td>0.3605</td>
<td>-0.7017</td>
<td>0.0027</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>6.6753</td>
<td>6.5433</td>
<td>9.0208</td>
<td>17.8137</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>725.8379**</td>
<td>702.2489**</td>
<td>2052.6980**</td>
<td>11786.0900**</td>
</tr>
<tr>
<td>ADF (T- Stat)</td>
<td>-34.2789**</td>
<td>-38.9683**</td>
<td>-37.4932**</td>
<td>-16.5670**</td>
</tr>
<tr>
<td>KPSS (LM Stat)</td>
<td>0.1030</td>
<td>0.1440</td>
<td>0.1025</td>
<td>0.2059</td>
</tr>
<tr>
<td>ARCH (LM Test)</td>
<td>213.6099**</td>
<td>272.0657**</td>
<td>30.7659**</td>
<td>88.1243**</td>
</tr>
<tr>
<td>LB15</td>
<td>30.1950**</td>
<td>24.2150**</td>
<td>15.2600**</td>
<td>15.2220**</td>
</tr>
<tr>
<td>Sum</td>
<td>7.4934</td>
<td>-71.0933</td>
<td>-7.9888</td>
<td>-21.8380</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>3298.4350</td>
<td>5918.1910</td>
<td>1669.5040</td>
<td>2170.2910</td>
</tr>
<tr>
<td>Observations</td>
<td>1289</td>
<td>1289</td>
<td>1289</td>
<td>1289</td>
</tr>
</tbody>
</table>

** denotes statistically significant at 1% significant level. ARCH (LM) is the Lagrange multiplier test for ARCH up to lag 15, LB15 is Ljung-Box Q-statistic at lag 15 and ADF denotes Augmented Dickey Fuller for unit root test. KPSS denotes Kwiatkowski–Phillips–Schmidt–Shin test for stationary process. KPSS Lagrange Multiplier is not significant and hence we cannot reject the null hypothesis of stationary. Standard deviation and the mean are annualized.
The graph above shows that all the variables exhibit volatility clustering. It means that large returns of either sign are expected to follow larger returns and small returns of either sign to follow small returns. The main contributing factor for this feature of financial data is that information that impact on the financial markets appear in bunches. The use of the non-linear model, VAR GARCH – BEKK is deemed appropriate since it caters for this feature of financial data. The figure above shows that all the series under consideration exhibit some form of volatility clustering at one point in time.
5. Results and Discussion

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Coeff.</th>
<th>SE.</th>
<th>Sig.</th>
<th>Coeff.</th>
<th>SE.</th>
<th>Sig.</th>
<th>Coeff.</th>
<th>SE.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta_{ii} )</td>
<td>0.07017</td>
<td>0.04093</td>
<td>0.08647</td>
<td>0.03521</td>
<td>0.03830</td>
<td>0.35780</td>
<td>0.05663</td>
<td>0.03760</td>
<td>0.13203</td>
</tr>
<tr>
<td>( \beta_{ij} )</td>
<td>-0.03540</td>
<td>0.01578</td>
<td>0.02490</td>
<td>-0.01255</td>
<td>0.01257</td>
<td>0.31834</td>
<td>-0.01567</td>
<td>0.02065</td>
<td>0.44799</td>
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<td>( \beta_{ji} )</td>
<td>-0.01404</td>
<td>0.02807</td>
<td>0.61705</td>
<td>-0.01040</td>
<td>0.03477</td>
<td>0.01235</td>
<td>0.00845</td>
<td>0.02497</td>
<td>0.73502</td>
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<tr>
<td>( \omega_{ii} )</td>
<td>0.31849</td>
<td>0.01910</td>
<td>0.00000</td>
<td>0.33539</td>
<td>0.02782</td>
<td>0.00000</td>
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<td>0.02954</td>
<td>0.00000</td>
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<tr>
<td>( \omega_{ij} )</td>
<td>0.02109</td>
<td>0.04996</td>
<td>0.67285</td>
<td>-0.06057</td>
<td>0.03943</td>
<td>0.12452</td>
<td>-0.12737</td>
<td>0.07736</td>
<td>0.09665</td>
</tr>
<tr>
<td>( \omega_{jj} )</td>
<td>0.08274</td>
<td>0.04677</td>
<td>0.07684</td>
<td>-0.06638</td>
<td>0.02672</td>
<td>0.01298</td>
<td>-0.02118</td>
<td>0.02161</td>
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<td>0.04677</td>
<td>0.00000</td>
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<td>0.02578</td>
<td>0.01860</td>
<td>-0.06638</td>
<td>0.02672</td>
<td>0.01298</td>
<td>-0.02118</td>
<td>0.02161</td>
<td>0.32691</td>
</tr>
<tr>
<td>( \gamma_{ji} )</td>
<td>-0.13029</td>
<td>0.01259</td>
<td>0.00000</td>
<td>0.05331</td>
<td>0.02065</td>
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<td>( \gamma_{jj} )</td>
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<td>0.00000</td>
<td>0.19455</td>
<td>0.02144</td>
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<tr>
<td>( \delta_{ii} )</td>
<td>0.78205</td>
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<td>0.00000</td>
<td>0.82604</td>
<td>0.01316</td>
<td>0.00000</td>
<td>0.80422</td>
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<td>0.00000</td>
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<td>0.00401</td>
<td>0.04408</td>
<td>0.00981</td>
<td>0.00001</td>
<td>0.00424</td>
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<tr>
<td>( \delta_{ji} )</td>
<td>0.01505</td>
<td>0.00749</td>
<td>0.04444</td>
<td>-0.01056</td>
<td>0.00549</td>
<td>0.05422</td>
<td>0.06715</td>
<td>0.02129</td>
<td>0.00161</td>
</tr>
<tr>
<td>( \delta_{jj} )</td>
<td>0.98399</td>
<td>0.00330</td>
<td>0.00000</td>
<td>0.98114</td>
<td>0.00384</td>
<td>0.00000</td>
<td>0.97198</td>
<td>0.00758</td>
<td>0.00000</td>
</tr>
</tbody>
</table>

Panel B: Diagnostic tests

| LogLik | -4208.27 | -4523.56 | -3870.64 |
| LB(i) | 91.4217 | 92.75183 | 96.67623 |
| LB(i) | 20.59184 | 17.2751 | 20.09085 |
| LB(i) | 20.59184 | 9.13688 | 12.24035 |
| LB(i) | 55.48437 | 36.23618 | 15.78968 |

The study examines the returns and volatility dynamics between the Ghana equity market and the commodity market. Also, the study establishes the potential of commodities to provide the maximum benefits of portfolio diversification. The empirical results section presents the statistical results of the study and also answers the research problems described above.

A bivariate GARCH – BEKK model is employed to find satisfying answers to the questions. Analysis of the Ghana and the commodity market namely gold, crude oil and cocoa yielded three (3) pair-wise models and these are GSE-COCOA, GSE-CRUDER and GSE-GOLD.

First, the matrix \( \beta \) in the mean equation, Eq. (1) is analyzed. The matrix \( \beta \) presents the returns dynamics between the variables. The diagonal parameters \( \beta_{ii} \) and \( \beta_{jj} \) depicts the own returns spillovers. The off-diagonal parameters \( \beta_{ij} \) and \( \beta_{ji} \) depicts the return spillovers across the markets. First four parameters as depicted in the table below presents the matrix \( \beta \) in the mean.
equation. This part of the equation captures the linkages between the markets with respect to the returns.

It can be seen that diagonal parameters $\beta_{ii}$ is not significant for the Ghana stock market. This means that the returns of the market do not depend on its own past returns. The time-varying variance-covariance is analyzed and attention is focused on the matrices $\gamma$ and $\delta$ shown in the tables below. These matrices capture the volatility dynamics within and across the pair of markets. The diagonal estimates in matrix $\gamma$ shows the own ARCH effects whereas the diagonal estimates in matrix $\delta$ captures the own GARCH effect. The off-diagonal estimates on the other hand present the cross-market shock transmission or volatility spillovers across the markets. The estimated diagonal parameters, $\gamma_{ii}$, $\gamma_{jj}$ and $\delta_{ii}$, $\delta_{jj}$ as depicted in the table shows that all the variables have all the parameters to be statistically significant implying that own past shocks and volatility have a major impact on the conditional variance of all the variables employed in this study. The off-diagonal estimates $\gamma$ and $\delta$, on the other hand present the cross-market shock transmission or volatility spillovers between the pairs. As shown in the tables below,

The Ghana stock market receives shock transmission from all the commodities under consideration namely; cocoa (13%), crude oil (5%) and gold (16%). We found a bi-directional relationship between the Ghana stock market, cocoa and crude prices and a unidirectional relationship with gold prices. GSE only receives shocks from gold prices. GSE ships shocks to cocoa (6%) and crude (6.7%). This shows that the GSE and the commodity markets are highly linked.

Further, the off-diagonal estimates $\delta$, presents the volatility spillovers between the pairs. GSE receives volatility spillover from all the commodities, cocoa (1.5%), crude oil (1.1%) and gold (6.7%). GSE ships volatility to cocoa (3.9%) and crude oil (4.4%). There exists a unidirectional relationship between the GSE and the gold prices. It only receives volatility from gold prices shock.

From the analysis above, it can be summarized that the Ghana stock market is very integrated with changes in cocoa prices and crude oil prices. It however, exhibits a strong unidirectional relationship with gold prices by receiving shocks and volatility.

Panel B in the tables below presents Ljung-Box Q-statistic for 24 lags proves that there is no dependence in the standardized and squared residuals. This underscores the fitness of the GARCH-BEKK model to the data.

6. Conclusions and Recommendations

Ghana has been a major exporter of cocoa and gold for many years and it is not surprising that there exists a strong relationship between these commodities and the Ghana stock exchange
market. These are confirmed by Adjasi (2009). One main focus of this study is to examine the relationship between the Ghana stock market and the crude oil prices. Ghana started exporting crude oil in commercial quantities in late 2010 and no comprehensive study has been conducted on the relationship between oil price changes and Ghana stock returns. It is therefore confirmed in this study that there is a strong bi-directional relationship between the Ghana stock exchange and crude oil prices. But how does knowing this affect investors and policy makers?

Ghana receives volatility spillover from oil price fluctuation and at the same time, transmits volatility to oil prices. It means that oil price fluctuation impacts on the performance of the Ghana stock market. The same applies to cocoa price volatility. Policy makers would therefore be recommended to implement policies that would ensure stable oil prices. Investors can use the results of this study to diversify their portfolio. The significant relationship between oil prices and the Ghana stock market implies that investors can to an extent predict the movement of the stock market hence making sound economic decisions respecting their portfolios. With regard to gold prices, the unidirectional relationship means that the Ghana stock market only receives shocks and volatility from gold price changes. Thereby, any significant changes in the prices of gold will massively affect the performance of the Ghana stock market. Investors and policy makers alike benefit from this information.

References


