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A Statistical Analysis of Brent and OPEC Prices on GCC Stock Markets

Dr. Atul Rawal

Assistant Professor, Garware Institute, University of Mumbai, India

ABSTRACT

In this research paper, the researcher focused on the statistical analysis report on BRENT and OPEC oil prices and its significant impact on GCC stock market. The researcher stated that number of factors which are responsible for prices of oil and effected to the GCC stock market. It is stated that some of the factors such as Crude Oil Costs , Current supply and output, Future supply and reserves, Demand from major countries, Political events and crises which are directly predicted to the oil prices and having a strong impact of GCC Stock market. The researcher used the statistical analysis tools to identify BRENT and OPEC oil prices and their significant impact on GCC Stock market. As with any commodity, stock or bond, the laws of supply and demand cause oil prices to change. When supply exceeds demand, prices fall and the inverse is also true when demand outpaces supply. While supply and demand affect oil prices, it is actually oil futures that set the price of oil and predicted to GCC Stock market. The cost of crude oil as a share of the retail gasoline price varies over time and across regions of the country. Crude oil prices are determined by both demand and supply. World economic growth is the most significant factor for demand.

Keywords : BRENT, OPEC, Stock Market

I. INTRODUCTION

Oil prices are determined by the supply and demand for petroleum-based products. During an economic expansion, prices might rise as a result of increased consumption; they might also fall as a result of increased production This situation allows OPEC, which has spare production capacity, to control the total global oil supply and therefore oil pricing. OPEC has raised crude oil prices by a factor of about four since 2002, reducing world demand.

Unlike most products, oil prices are not determined entirely by supply, demand and market sentiment toward the physical product. Rather, supply, demand and sentiment toward oil futures contracts, which are traded heavily by speculators, play a dominant role in price determination

FACTORS & REPORTS THAT AFFECT THE PRICE OF OIL

Supply. For several decades, The Organization of Petroleum Exporting Countries (OPEC) has been the elephant on the world's trading floors, with its 12 oil-producing member nations working together to determine prices by boosting or reducing crude oil production.

OPEC member countries produce about 40 percent of the world's crude oil. Equally important to global

prices, OPEC's oil exports represent about 60 percent of the total petroleum traded internationally.

Crude oil is a global commodity, so what drives crude oil prices tends to be large events or supplies that are large enough to be cost-effective when sent anywhere in the world. The crude oil market is very dynamic, and many forces compete to drive its cost up and down.

FACTORS INFLUENCING CRUDE OIL PRICES INCLUDE:

1) Current supply and output. Until recent years, Organization of Petroleum Exporting Countries (OPEC) often set supply through a quota system. However, American shale oil production doubled between 2011 and 2014, driving down the price. OPEC's response has been to increase supply and drive down the cost per barrel, which is cutting into the affordability of U.S. shale production. All of this means you're likely going to see lower home heating oil prices relative to the late 2000s.

2) Future supply and reserves. Large oil-producing and oil-consuming countries tend to have reserves of crude oil to keep their economies going in the event that oil prices spike. Oil is stockpiled when the price is low and then spread through the economy to keep prices down when the resource becomes scarce. The U.S. has its Strategic Petroleum Reserve that can be tapped easily, while oil-related allies such as Saudi Arabia also have large reserves that can be tapped.

3) Demand from major countries. The price of crude oil jumps when there is a larger demand, and that tends to happen at the beginning, middle and end of the year. Winter — covering the beginning and end of years — can see oil prices climbing as consumers demand more oil for heating their homes and businesses. Summer will also drive up oil prices as more Americans take to the roads for vacation.

Political events and crises. War, natural disasters, political upheaval and new government leaders are all factors influencing crude oil pricing. For example, the "Arab Spring" unrest in 2011 pushed oil prices to a peak of $113 a barrel as unrest and protests rocked Egypt, Libya and Tunisia. They then returned to under $100 per barrel as things calmed down in June. Hurricane Katrina caused a large price increase in 2005 when it destroyed hundreds of oil and gas platforms and pipelines.

This winter, some are predicting costs to stay low. In August, heating oil prices for Massachusetts were down more than $1 per gallon compared to the year before, a price decrease of more than 30%. Improved U.S. oil production numbers and a decline in global demand are believed to be the biggest culprits behind this price decrease. One of the most consistent factors influencing the cost of your heating oil is the weather. In the U.S., prices are typically driven by homes in the Northeast, so they can be a good barometer for your oil pricing.

When the winter is warm, the price of heating oil holds near its price during the rest of the year. The colder the weather, the higher you can typically

expect heating oil prices to rise. The colder weather of the 2014 winter season caused a significant increase in consumer use of heating oil, pushing prices up roughly 7 cents. An important part of the weather is major storm systems that move throughout the U.S.: When a large storm hits, it usually brings lower temperatures and increases the heating demand of each home.

Storms also make it harder to get heating oil to your home. When roads are blocked, trees fall or large snows make it difficult for trucks to move throughout your neighbourhood and city, heating oil companies need to spend more money on the equipment and talent required to get heating oil to your home.

Sometimes this also means home heating oil suppliers can risk running out, and that's one of the toughest factors that affect oil prices. If suppliers can't meet all of the demand in your area, then prices will rise and your company may need to start bidding higher to get the heating oil you need.

The U.S. Energy Information Administration notes that the Northeast U.S. will often have to turn to the Gulf Coast or Europe if it faces a heating oil shortage. Delivery from these sources can take weeks and will have to travel across harsh regions, increasing the cost compared to shipments earlier in the year

II. LITERATURE REVIEW

Mohamed El Hedi Arouri and Christophe Rault (2011), examined that a long-run links between oil prices and stock markets in Gulf Cooperation Council (GCC) using recent bootstrap panel integration techniques and seemingly unrelated regression (SUR) methods. Since GCC countries are major world energy market players, their stock markets are likely to be susceptible to oil price. We show that there is evidence for integration between oil prices and stock markets in GCC countries, while the SUR results indicate that oil price increases have a positive impact on stock prices, except in Saudi Arabia.

Mohan Nandha and Robert Faff (2008), studied to indicate that oil price shocks have an adverse effect on real output and, hence, an adverse effect on corporate profits where oil is used as a key input. The present study examines whether and to what extent the adverse effect of oil price shocks impacts stock market returns. To this end we, analyse 35 DataStream global industry indices for the period from April 1983 to September 2005. Our findings indicate that oil price rises have a negative impact on equity returns for all sectors except mining, and oil and gas industries. Generally, these results are consistent with economic theory and evidence provided by previous empirical studies. Little evidence of any asymmetry is detected in the oil price sensitivities. In light of our findings, we recommend that international portfolio investors consider hedging oil price risk.

George Filis, et. Al(2011),Investigated the time-varying correlation between stock market prices and

oil prices for oil-importing and oil-exporting countries. A DCC-GARCH-GJR approach is employed to test the above hypothesis based on data from six countries; Oil-exporting: Canada, Mexico, Brazil and Oil-importing: USA, Germany, and Netherlands. The contemporaneous correlation results show that i) although time-varying correlation does not differ for oil-importing and oil-exporting economies, ii) the correlation increases positively (negatively) in respond to important aggregate demand-side (precautionary demand) oil price shocks, which are caused due to global business cycle's fluctuations or world turmoil (i.e. wars). Supply-side oil price shocks do not influence the relationship of the two markets. The lagged correlation results show that oil prices exercise a negative effect in all stock markets, regardless the origin of the oil price shock. The only exception is the 2008 global financial crisis where the lagged oil prices exhibit a positive correlation with stock markets. Finally, we conclude that in periods of significant economic turmoil the oil market is not a "safe haven" for offering protection against stock market losses.

Aktham Maghyereh, Ahmad Al-Kandari, (2007) proposed a research study is to examine the linkages between oil prices and stock market in Gulf Cooperation Council (GCC) countries. Prior work argues that oil prices and the GCC stock markets are not related. This conclusion could be due to the fact that only linear linkages have been examined. This study employs newly developed techniques of rank tests of nonlinear integration analysis proposed by Breitung and Gourieroux and Breitung. The Breitung's method is selected in this study due its potential superiority at detecting integration when the error-correction mechanism is nonlinear. The empirical analysis of the paper supports that oil price impact the stock price indices in GCC countries in a nonlinear fashion. Thus, the statistical analysis in this paper obviously supports a nonlinear modelling of the relationship between oil and the economy. The implication of this paper findings is that policy makers at GCC countries should keep an eye on the effects of changes in oil price levels on their own economies and stock markets. For individual and institutional investors, the nonlinear relationship between oil and stock markets imply predictability in the GCC stock markets.

Perry Sadorsky (1999), found the results from a vector auto regression show that oil prices and oil price volatility both play important roles in affecting real stock returns. There is evidence that oil price dynamics have changed. After 1986, oil price movements explain a larger fraction of the forecast error variance in real stock returns than do interest rates. There is also evidence that oil price volatility shocks have asymmetric effects on the economy.

Nicholas et,.al. (2009),investigated how explicit structural shocks that characterize the endogenous character of oil price changes affect stock-market returns in a sample of eight countries — Australia,

Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. For each country, the analysis proceeds in two steps. First, modifying the procedure of Kilian [Kilian, L., (forthcoming). Not All Oil Price Shocks are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market. American Economic Review.], we employ a vector error–correction or vector autoregressive model to decompose oil-price changes into three components: oil-supply shocks, global aggregate-demand shocks, and global oil-demand shocks. The last component relates to specific idiosyncratic features of the oil market, such as changes in the precautionary demand concerning the uncertainty about the availability of future oil supplies. Second, recovering the oil-supply shocks, global aggregate-demand shocks, and global oil-demand shocks from the first analysis, we then employ a vector autoregressive model to determine the effects of these structural shocks on the stock market returns in our sample of eight countries. We find that international stock market returns do not respond in a large way to oil market shocks. That is, the significant effects that exist prove small in magnitude.

Sunil K.Mohantya, Mohan and Nandhab Abdullah (2011), studied have found a link between oil price changes and stock prices. However, these studies mostly concentrate on developed economies and analyse the impact of oil price shocks on stock returns at the aggregate stock market level. We assess the relation between changes in crude oil prices and equity returns in Gulf Cooperation Council (GCC) countries using country-level as well as industry-level stock return data. Our findings show that at the country level, except for Kuwait, stock markets have significant positive exposures to oil price shocks. At the industry level, the responses of industry-specific returns to oil shocks are significantly positive for only 12 out of 20 industries. Our study also provides evidence that oil price changes have asymmetric effects on stock market returns at the country level as well as at the industry level.

Farooq Malika and Shawkat Hammoudehb (2007), examined the volatility and shock transmission mechanism among US equity, global crude oil market, and equity markets of Saudi Arabia, Kuwait, and Bahrain. Our results show significant transmission among second moments. In all cases, Gulf equity markets receive volatility from the oil market but only in the case of Saudi Arabia we found a significant volatility spill over from the Saudi market to the oil market. Our results are important for building accurate asset pricing models, forecasting future equity and oil price return volatility, and will further our understanding of the interaction of the stock markets of Gulf countries vis-à-vis the US equity market and the global oil market.

Shawkat Hammoudeha and Kyongwook Choib(2006), developed a vector-error correction (VEC) model, the short-run bilateral causal relationships among Gulf Cooperation Council's (GCC) weekly equity index returns are limited and mostly unidirectional. Their

relationships with three global factors (the oil price, the US S&P 500 index, and the US T-bill rate) suggest that the US T-bill rate has direct influence on some of these segmented GCC markets. The S&P 500 index and the Western Texas Intermediate (WTI) or the Brent oil price have no such direct impact, implying that local or regional factors such as liquidity and profitability directly affect them. In contrast, the impulse response analysis suggests that the S&P 500 shocks have positive dynamic impacts on all GCC markets over a 20-week forecast horizon, implying that GCC stock markets rise with US markets, while the impact of the T-bill rate is important but mixed. Moreover, a positive oil shock will benefit most of GCC markets. The variance decomposition implies that the largest portions of total variations in GCC index returns come from their own domestic or other GCC shocks over the forecast horizon. Excepting the oil price factor, which accounts for 30 percent of Oman's and 19 percent of Saudi Arabia's total variations, the global factors account for only a small percentage of these stock markets 'total variations.

Abul Bashera Alfred and A.Haugb Perry Sadorskyc (2012), Investigated some of the facts which are stated 1) the relationship between oil prices and emerging market stock prices and 2) the relationship between oil prices and exchange rates, relatively little is known about the dynamic relationship between oil prices, exchange rates and emerging market stock prices. This paper proposes and estimates a structural vector auto regression model to investigate the dynamic relationship between these variables. Economic activity increases oil prices. There is also evidence that increases in emerging market stock prices increase oil prices

Abdullah Fayyad and Kevin Daly (2011), emphasized on an empirical investigation into the relationship between oil price and stock market returns for seven countries (Kuwait, Oman, UAE, Bahrain, Qatar, UK and USA) by applying the Vector Auto Regression (VAR) analysis. During this period oil prices have tripled creating a substantial cash surplus for the Gulf Cooperation Council (GCC) Countries while simultaneously creating increased deficit problems for the current accounts of the advanced economies of the UK and USA. The empirical investigation employs daily data from September 2005 to February 2010. Our empirical findings suggest the following: (1) the predictive power of oil for stock returns increased after a rise in oil prices and during the Global Financial Crises (GFC) periods. (2) The impulsive response of a shock to oil increased during the GFC period. (3) Qatar and the UAE in GCC countries and the UK in advanced countries showed more responsiveness to oil shocks than the other markets in the study.

Mohamed El Hedi Arouria and AmineLahianib (2011), investigated the return links and volatility transmission between oil and stock markets in the Gulf Cooperation Council (GCC) countries over the period 2005–2010. We employ a recent generalized VAR-GARCH approach which allows for

transmissions in return and volatility. In addition, we analyse the optimal weights and hedge ratios for oil-stock portfolio holdings. On the whole, our results point to the existence of substantial return and volatility spill overs between world oil prices and GCC stock markets, and appear to be crucial for international portfolio management in the presence of oil price risk.

Irene Henriques and Perry Sadorsky (2008), focused on energy security issues coupled with increased concern over the natural environment are driving factors behind oil price movements. While it is widely accepted that rising oil prices are good for the financial performance of alternative energy companies, there has been relatively little statistical work done to measure just how sensitive the financial performance of alternative energy companies are to changes in oil prices.

Hilde C. Bjørnland (2009), analysed the effects of oil price shocks on stock returns in Norway, an oil-exporting country, highlighting the transmission channels of oil prices for macroeconomic behaviour. To capture the interaction between the different variables, stock returns are incorporated into a structural VAR model. I find that following a 10% increase in oil prices, stock returns increase by 2.5%, after which the effect gradually dies out. The results are robust to different (linear and non-linear) transformations of oil prices. The effects on the other variables are more modest. However, all variables indicate that the Norwegian economy responds to higher oil prices by increasing aggregate wealth and demand. The results also emphasize the role of other shocks; monetary policy shocks in particular, as important driving forces behind stock price variability in the short term.

Syed A.Bashera and PerrySadorskyb (2006), contributed their efforts on stock markets and energy prices by studying the impact of oil price changes on a large set of emerging stock market returns. The approach taken in this paper uses an international multi-factor model that allows for both unconditional and conditional risk factors to investigate the relationship between oil price risk and emerging stock market returns.

Basel Awartania and Aktham Issa Maghyerehb (2013), exploited a new spill over directional measure proposed by Diebold and Yilmaz (2009, 2012) to investigate the dynamic spillover of return and volatility between oil and equities in the Gulf Cooperation Council Countries during the period 2004 to 2012. Our results indicate that return and volatility transmissions are bi-directional, albeit asymmetric. In particular, the oil market gives other markets more than it receives in terms of both returns and volatilities. These trends were more pronounced in the aftermath of the Global Financial Crisis in 2008 as the net contribution of oil has intensified after a burst during the crisis. The empirical evidence from the sample is consistent with a system in which oil is playing the dominant role in

the information transmission mechanism between oil and equities in the GCC countries.

Brahim Akouma Michael Grahamb(2012),examined the short term and long term dependencies between stock market returns and OPEC basket oil returns for the six Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) and two non-oil producing countries in the region (Egypt and Jordan), over the period 2002–2011. We utilize the wavelet coherency methodology in our empirical analyses.

Chaker Alouia et. Al (2012),investigates the effects of oil price shocks on stock market returns in emerging countries. It differs from previous works in three main aspects: i) we distinguish three groups of countries, the largest net-oil importing countries, the moderately oil-dependent countries, and the largest net-oil exporting countries; ii) The potential influence of bullish and bearish market conditions on the causal relationship between oil and stock returns is controlled for in our analysis; iii) The empirical investigation is based on an analysis of long-term correlation and a conditional multifactor pricing model. Using data from twenty-five emerging countries, our results suggest that oil price risk is significantly priced in emerging markets, and that the oil impact is asymmetric with respect to market phases.

Mazin A.M.Al Janabi Abdul Nasser and Hatemi-JmanuchehrIrandoust (2010), study is to explore whether the Gulf Cooperation Council (GCC) equity markets are information ally efficient with regard to oil and gold price shocks during the period 2006–2008 using daily dollar-based stock market indexes dataset. This paper extends research literature related to the assessment of market efficiency in emerging markets by providing a robust bootstrap simulation technique for the entire GCC financial markets

Shawkat Hammoudeha and HuiminLib (2008), examined sudden changes in volatility for five Gulf area Arab stock markets using the iterated cumulative sums of squares (ICSS) algorithm and analyses their impacts on the estimated persistence of volatility. This algorithm identifies large shifts in volatility of the stock markets during the weekly period 1994 to 2001. In contrast to Aggarwal et al. [Aggarwal, R., Inclan, C., & Leal, R., 1999, Volatility in emerging markets. Journal of Financial and Quantitative Analysis 34, 33–55

III. PROBLEM STATEMENT AND RESEARCH OBJECTIVES

The researcher emphasized that BRENT and OPEC oil prices are the significant components to predict the GCC Stock markets. There are also some other factors which are also responsible to predict the stock market. The researcher trying to identify the factors and causes which are responsible for predicting the GCC Stock market. It is stated that worldwide supply and demand determines the prices for crude oil. Demand will vary depending on factors such as the economy and the weather. Weather events in the

United States and political events in other countries can affect supply.

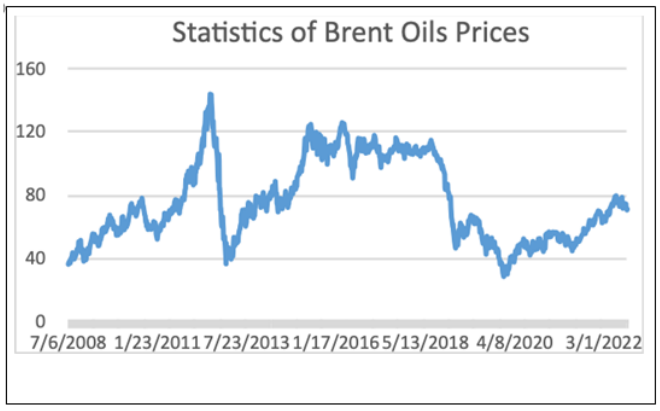
1. Identify the factors and causes of affecting GCC Stock market.
2. To study the causes of BRENT price oil and its significant impact on GCC Stock Market.
3. To Study the OPEC oil prices and its significant impact on GCC Stock Market.

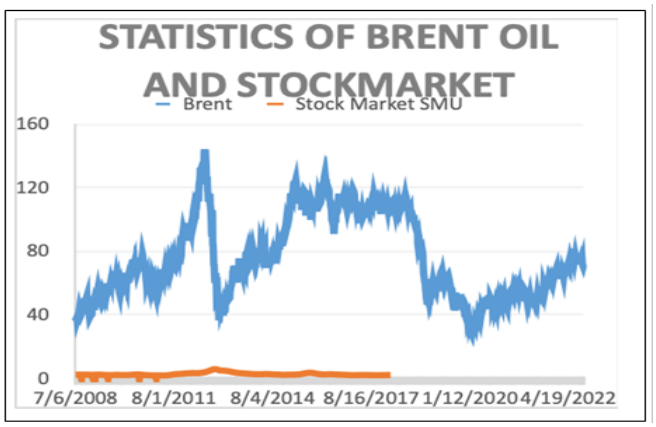
IV. METHDOLOGY

GARCH is a statistical model that can be used to analyze a number of different types of financial data, for instance, macroeconomic data. Financial institutions typically use this model to estimate the volatility of returns for stocks, bonds and market indices.

V. STATISTICAL ANALYSIS AND INTERPRETATION

RESULT 1: Statistical Analysis of BRENT oil prices and its Significant Impact on Stock Market



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. arch StockMarketSMU Brent, noconstant arch(1/1) garch(1/1)

Number of gaps in sample:  500
(note: conditioning reset at each gap)


(setting optimization to BHHH)
Iteration 0:   log likelihood =  -2173.725  (not concave)
Iteration 1:   log likelihood =  -2025.389
Iteration 2:   log likelihood = -1916.0119
Iteration 3:   log likelihood = -1809.0432
Iteration 4:   log likelihood =  -1738.036
(switching optimization to BFGS)
Iteration 5:   log likelihood = -1696.2822
Iteration 6:   log likelihood = -1673.9656
Iteration 7:   log likelihood = -1673.9468  (backed up)
Iteration 8:   log likelihood = -1621.6704
Iteration 9:   log likelihood = -1567.2799
Iteration 10:  log likelihood = -1557.6773
Iteration 11:  log likelihood = -1554.4862
Iteration 12:  log likelihood = -1552.5422
Iteration 13:  log likelihood = -1549.2488
Iteration 14:  log likelihood = -1549.2488  (backed up)
(switching optimization to BHHH)
Iteration 15:  log likelihood = -1549.2488  (backed up)
Iteration 16:  log likelihood =  -1546.999
Iteration 17:  log likelihood = -1545.6747
Iteration 18:  log likelihood = -1544.3431
Iteration 19:  log likelihood = -1544.1136
(switching optimization to BFGS)
Iteration 20:  log likelihood =  -1543.487
Iteration 21:  log likelihood = -1543.4052
Iteration 22:  log likelihood = -1543.3953
Iteration 23:  log likelihood = -1543.3948
Iteration 24:  log likelihood = -1543.3943
Iteration 25:  log likelihood = -1543.3937
Iteration 26:  log likelihood = -1543.3935
Iteration 27:  log likelihood = -1543.3935

ARCH family regression

Sample: 7/5/2004 - 2/24/2014, but with gaps     Number of obs   =      1,370
Distribution: Gaussian                          Wald chi2(1)    =  475582.25
Log likelihood = -1543.393                      Prob > chi2     =     0.0000

------------------------------------------------------------------------------
             |                 OPG
StockMarketSMU |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
StockMarketSMU |
       Brent |   .0322573   .0000468   689.62   0.000     .0321656    .0323489
-------------+----------------------------------------------------------------
ARCH         |
         arch |
          L1. |   1.080124   .0416335    25.94   0.000     .9985237    1.161724
             |
        garch |
          L1. |  -.0012862   .0006226    -2.07   0.039    -.0025064   -.000066
             |
        _cons |   .0033398   .0006854     4.87   0.000     .0019963    .0046832
------------------------------------------------------------------------------
```

DATA INTEPRETATION: This data analysis statistics report is compiled using STATA software with references to algorithm GARCH (1,1) model. The statistics report is showing of BRENT oil prices in between 2004 to 2018 in GCC countries. The probability of statistics is .0321656 at 95% confidential interval which is less than 0.05, so the null hypothesis is reject and result is significant. The researchers are concluded that there are a significant impact of BRENT oil prices and stock market.

VI. CONCLUSION

In the research paper, the researchers given the statistics report on BRENT and OPEC oil prices and its significant impact on stock market. The statistics are showing that there is a significant relationship between BRENT and OPEC oil prices to the stock market. This research study is based on the GCC countries BRENT and OPEC oil prices in between 2004 to 2018. During this research study, the researchers found that BRENT oil prices are the significant impact to the stock market where as OPEC oil prices are having negative impact on stock market. At this level the researcher concluded that BRENT and OPEN oil prices are having significant impact on stock market in GCC countries.

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