



THE CRUDE OIL PRICES IMPACT ON UK ECONOMY

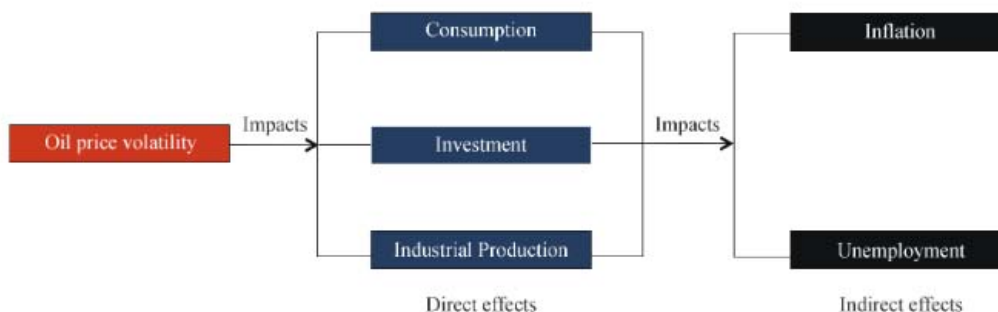
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1 Introduction:

Oil prices play a vital role in economic decisions of the policy makers. The fluctuation in prices of the oil has been a cause of concern over the last three decades. The dependency on oil in various segments has impacted in global vulnerability on various macroeconomic factors. The observes that price fluctuation is apparent in all commodities, however in the case of crude oil the volatility is very high and frequent that it affects the global economy. If the price changes are not controlled or not checked in a timely manner, it may have a huge destabilizing effect on the economy. It will pose as a barrier to the future growth of the economy. Though countries have tried to concentrate on renewable sources of energy more, the dependency factor of the crude oil has not reduced. Ebrahim (2014) states that the world is still dependent on fossil fuels, and the same constitutes 90% of the world's

energy consumption. Oil prices affect various economic activities such as inflation, growth, the balance of payments, trade balances and others directly or indirectly. As oil price increase or decrease, the inflation also follows the same direction since oil is an important input in the economy. When the cost of this primary input increases, secondary and tertiary product prices too get impacted (Cognigni and Manera 2005). Many experts have observed that the large or sudden oil price changes have larger effects on the economy (Lee, Ni, and Ratti, 1995). The oil price increase also has adverse effects on the growth and the Gross Domestic Product (GDP) of an economy. Hamilton (2003) observes that the increase in oil price affect the inflation but decrease in the price does not matter. He also observes that if there is a fluctuation in the price after a period of stable price affects the economy more than the general fluctuations occurring in the price.



Source: (Ebrahim, 2014)

The three main sources that affect the oil prices as defined by Ebrahim (2014) are:

Demand and supply of fuel:

The demand and the supply of the fossil fuels are the fundamental concepts that drive the price of the product. High demand and stable or less supply increases the price and conversely low

demand and stable or high supply results in a reduction of the price. Marginal changes in demand and supply over a short run does not vary the price heavily. In other words, there is a marginal change in price when there is a marginal change in the demand and supply over a short period.

Oil derivatives market and its impact on prices:

Derivative front in oil initiated to handle the risk of increasing prices in an effective manner. Various financial instruments were adopted to manage effectively the funds and diversify risk. With technological advancement and a wide range of financial tools, investors effectively manage their portfolio in the derivatives market. The market has now grown from being primarily to hedge against price shocks to commercial users using the market to accept risk for a reward arising out of the financial transaction. This speculative action in the commodity results in price instability (Kilan, 2010).

Inadequacy of oil market data:

Lack of proper and accurate data from the oil market such as production, inventory, estimation of production and future supplies also result in volatility and uncertainty. Joint Organizations Data Initiative (JODI) was created to provide adequate and accurate data on the oil production and supply with the objective of moderating the excess fluctuation in the prices. Though there has been better transparency in reporting of the data, there is variation in reporting standards, delay in submission of timely data, inconsistency, etc. still affect the prices of the oil. Also, this does not cover data on the reserves of oil (Ahn 2011).

Political and economic views on crude oil and the economy of UK

The drop in oil prices has been analyzed from different angles by different scholars and authorities. While some suggest that there is a direct connection between the drop in oil prices and anti-inflation status of an economy, others perceive that price fall might invite secondary consequences that ultimately lead to inflation. Thus, political institutions of the world are among these authorities that have a distinctive view of reduction in oil prices. The recent drop in oil prices has also resulted in mixed reactions among different economies of the world. While countries like America and UK will be able to take advantage of the situation, Russia, and Saudi Arabia will be among the countries that will be at the receiving end (Bowler, 2015; The Economist, 2015) as they are oil producers and exporters. The political ambience of UK is especially taken into account in this context. Assumptions are that fall in oil prices is supposed to change the pattern of consumption of oil. The consumers will use more oil than usual, thereby resulting in affecting the energy policy of the country. Hence, the situation might

compel the UK government to rethink about the energy policy of the country and cut down the rate of emissions. One of the possible political stances that the country might take in order to curtail the excessive domestic use of oil is to increase its import of natural gas prices are both of these are interlinked. The political authorities of the country are making endeavors pass on the positive effects of this situation on the general masses. Political personalities like George Osborne, who is an eminent British Political Party politician, has reported in The Guardian the recent drop in oil prices is the lowest in the five years. Nevertheless, the benefit of the phenomenon is remaining restricted to the big companies only. Therefore, an investigation will be done to know the reason behind this so that the benefits can be passed on to the "...families at petrol pumps, through utility bills and airfares." This political stance suggests that political attempts are being made to "fend off a political onslaught" that has been created in UK due to historic drop in oil prices (Allen, Mason and Monaghan, 2015).

Effect of crude oil prices on a country's business

A sharp decline in oil price acts as a warning bell for the oil exports. As the decrease in oil demand is one of the major causes of the global reduction in oil prices, firms which exclusively rely on oil exports has to think of opportunities "to reinvigorate their efforts to diversify." Low oil prices for a temporary span might encourage firms to move towards a more intensive nature of production that is centered on fossil fuels or energy. Since fall in oil prices is directly related to substantial volatility in the foreign exchange and the equity markets of a number of emerging economies, the investors are forced to reassess their future prospects in the oil-exporting countries. Eventual shift of interest of the investors in the firms of oil producing factories contributes towards "capital outflows, reserve losses, sharp depreciations, or rising sovereign CDS spreads in many oil-exporting countries (World Bank, 2015)."

The literary sources that have been used here in order to understand how crude oil determine inflation in an economy. The very phenomenon of reduction in fuel prices is seen as a positive factor in some of the sources, while others suggest that phenomenon has a long term effect on a country's economy and ultimately leads to

inflation. This gap in various perspectives on falling crude oil prices in UK has encouraged in establishing the actual relationship between inflation and crude oil. However, the weakness of the research that is its second major gap is that time and resources bind the research. The researchers will not be able to gain access to a wider pool of secondary sources for making a more in-depth analysis of this fiscal correlation.

2. Research Methodology:

- > The study aims to study the changes in crude oil prices and its influence on its inflation of UK
- > To ascertain the factors (determinants like Exchange rate, exports, GDP & inflation) that influence on crude oil over short and long term.

Data Collection

The study is based on macroeconomic factors that impact the economic growth of UK. The study employs secondary data as the variables taken are from already available resources from government. The study focus is towards analyze how the crude oil prices impact the inflation, so time-series data is used as the study covers the period of 1995 to 2015.

Hypothesis Testing:

The hypothesis test has been made for testing on causality and cointegration between oil prices and inflation based on this following hypothesis are formulated:

- ❖ To check on the causality on both variables oil prices and inflation whether there is a relationship

3. Results

Description of Data:

Table-1: Description of Data

	CRUDEOIL	EXCHANGE	EXPORTS	GDP	INFLATION
Mean	82.85049	0.595095	36610.20	0.315000	2.690244
Median	82.15000	0.615865	36917.00	0.550000	2.400000
Maximum	132.5500	0.694637	43375.00	1.300000	5.000000
Minimum	42.89000	0.489318	26207.00	-2.200000	0.300000
Std. Dev.	23.27132	0.058101	5260.674	0.742328	1.018039
Skewness	-0.031047	-0.353558	-0.243861	-1.987928	0.368550
Kurtosis	1.950429	1.992062	1.724077	6.847510	2.822829
Jarque-Bera	1.888485	2.652917	3.187500	51.01794	0.981789
Probability	0.388974	0.265416	0.203162	0.000000	0.612079
Sum	3396.870	24.99400	1501018.	12.60000	110.3000
Sum Sq. Dev.	21662.17	0.138405	1.11E+09	21.49100	41.45610
Observations	41	42	41	40	41

between these variables over short and long run?

- ❖ To ascertain in the directional relation between inflation and crude oil in the short term?

Econometric Specification:

The econometric model is chosen in such a manner it would permit and generate all the parameters taken and does not leave any missing data that is vital.

The econometric model under this study is shown below:

Inflation = f (crude oil, exchange rate, exports, GDP)

Where,

Crude oil prices and inflation of UK represent the total economic growth of UK.

To test for the long-term causality between inflation and oil prices in UK. The cointegration and Vector error correction model were employed to identify the relationship between the variables as from the study of (Asari, 2011) in these sectors. To establish any short-term causality on the above said variables Wald statistics test were employed. Foremost in undertaking this short-term causality test is to observe on the stationarity of the variables over the time series, through unit root test and cointegration test the number of cointegration equation is obtained. Further on checking on lag difference in time series before regression unit root tests are undertaken, these test were adopted from Dickey and Fuller (1979) and Phillips-Perron test are also applied in checking out on stationarity of the data.

The stationary properties of data are verified using the Augmented Dickey-Fuller unit roots. The results of the test are provided based on the Level and Intercept and to check on stationary of data the level of series are considered with first lag difference and second lag difference to check on Correlation and Shocks due to the Crude oil on inflation.

The financial time series data like Crude Oil, inflation, Balance of Trade, Exchange rate, Exports appeared to be non-stationary. In order to analyze the presence and form of such data, the unit root tests has been used.

Unit root tests:

Time series of this test is denoted by Y_t in the form of

$$y_t = \alpha + \beta t + ut$$

where ut is a white noise disturbance

This test is used for testing the hypothesis

H_0 : series contains a unit root versus.

H_1 : series is stationary.

The existence of unit root is proved by the null (i.e.,) polynomial function has a unit root equal to the unit. The null hypothesis also informs that Y_t is a trend is stationary

Table-2: Unit root tests

Variable	T-statistics PP	ADF	Order of Integration	Significance
BOT	-12.11	-9.6	I(1)	0.000*
Crude Oil	-8.08*	-4.79	I(1)	0.0004*
Exchange	-4.89	-5.22	I(1)	0.0001*
Exports	-6.30	-6.27	I(1)	0.000*
Inflation	-3.77	-3.86	I(1)	0.0052*

*denotes on first difference

the results are obtained of first difference with crude oil of -4.79, exchange rate of -5.22, exports of -6.27 and inflation(-3.86), all these variables rejects on the null hypothesis and provide that trend is stationary.

In order to check for co integrity between the variables, the study checks for potential number of lags, Akaike information criteria & Schwarz Info criteria were employed and results are provided in the below mentioned table.

Table-3 Akaike information criteria & Schwarz Info tests

Lag	Probability(p-value)	AIC	HQIC	SIC
0	0.15	-1.03	-1.15	-1.15
1	0.00*	-6.93	-6.93	-11.80

*significant at 1% level.

The summary of five variables provides that p-value of five variables provide that p-value of 0.15, AIC of -1.03, HQIC-1.15 & SBIC of -1 at

level '0'. With the first difference and lag of 1, the p-value of -0.00 < 0.05, AIC of -6.93, HQIC of -6.93 & SIC of -11.80.

The Johansen tests for co integration are provided below:

Table-4 Johansen tests co integration tests

Max Rank	Eigen value	λ_{trace}	$\alpha = 5\%$	λ_{max}	$\alpha = 5\%$
0	0.69	74.99	69.81	46.23	0.001*
1	0.32	28.75	47.85	15.48	0.70
2	0.20	13.27	29.79	8.99	0.83
3	0.09	4.27	15.49	4.07	0.85
4	0.005	0.202	3.84	0.202	0.65

The at most two variables denotes they are integrated and they have long-run relationship. According to Trace Statistics, Critical values and Max & Eigen values of two tests provides the variables are co integrated.

As from the estimation of Johansen test and Max Eigen value, we obtain a series of tests to support

equation model.

$$D(\text{LOGINFLATION}) = C(1) * (\text{LOGINFLATION}(-1) - 9.5663100026 * \text{LOGCRUDE}(-1) - 7.96327840669 * \text{LOGEXCHANGE}(-1) + 20.1797968407 * \text{LOGEXPORTS}(-1) + 1.42244178387 * \text{LOGBOT}(-1) - 186.238753486$$

$$\begin{aligned}
 & + C(2)*D(LOGINFLATION(-1)) + C(5)*D(LOGEXPORTS(-1)) + \\
 & C(3)*D(LOGCRUDE(-1)) + C(6)*D(LOGBOT(-1)) + C(7) \\
 & C(4)*D(LOGEXCHANGE(-1)) +
 \end{aligned}$$

Long-run Causality Tests:

Table-5 Long run Causality tests

Constant	Δln inflation	Δln crudeoil	Δln Exports	Δln Exchange	Δln BOT
ECT(-1)	-0.135(0.06)	0.09, (0.03)	-0.01(0.01)	-0.029(0.009)	-0.164(0.08)
R ²	-2.04 (0.298)	2.51	-0.117	-3.057	(-1.85)
Adjusted R ²	0.167	0.149	-0.03	0.281	0.133
SE Of Regression	3018	1.07	0.07	0.06	5.67
F-statistics	2.27	2.11	0.77	3.48	1.97

The long-run causality test results are provided in above table has been normalized for crude oil. All variables Inflation, Crude oil, Exports, Exchange, Balance of Trade are established with VECM in one co integration equation and one lag in every equation is established. The VECM permits long-run equilibrium relationship will allows for a wide range of short-run causality. The co-efficient of error-correction term of inflation variable carrier the non-significant at 1% level and has a coverage of 29.8%. The exports of inflation provides significant with 12.6% coverage. Exchange rate provides 28.1% coverage & significant and Balance of Trade is not significant with 13.3% coverage on the VECM model.

The Model provided is shown below:

$$\begin{aligned}
 (LOGINFLATION) & = C(1)*(\\
 & LOGINFLATION(-1) - \\
 & 9.5663100026*LOGCRUDEOIL(-1) + \\
 & 20.1797968407*LOGEXPORTS(-1) - \\
 & 7.96327840669*LOGEXCHANGE(-1) + \\
 & 1.42244178387*LOGBOT(-1) - 186.238753486 \\
 &).
 \end{aligned}$$

The co-efficient C(1) of inflation is negative and the probability value 0.04 is less than 0.05 provides the term to be significant and there is a long-run causality running from Inflation to crude oil, exports, exchange and balance of trade.

Short-run Causality Test:

Wald Statistics

Wald statistic test is conducted to determine the presence of short term relationship between inflation, one of the variables and the rest of the four variables. Wald Statistics helps to test the combined significance of the subset of co-

efficients of crudeoil, exports, exchange and balance of trade. These four variables are individually insignificant based on t-test results C(3) = C(4) = C(5) = C(6) = 0

Where C3 denotes on crude oil, C5 denotes on Exports, C4 denotes on Exchange and C6 Denotes on Balance of trade.

The aim of this study obtain the relationship between important variables as inflation and oil prices of UK in the period 2005 to 2015. A unit root test of data was examined with the help of augmented Dickey-Fuller test (ADF) test, P-P test, Johansen Cointegration test, granger causality test were applied for examining the short-run and long-run causality relationship among them.

4. Conclusion:

Thus the major conclusion built-in representation is:

The unit root test is simplified with the testing of inflation and other variables in macroeconomic data, they are examined at the first level of difference through the ADF test. The time series of data of the other variables are also observed through the ADF test on the first level of difference in namely exports, exchange rate, GDP and Balance of trade, as the GDP data provided on the quarterly basis on negative figure the variables log return provided to be missing and eliminated for study. The inflation and oil prices indicate from the study that there exists a long-run relationship. The Johansen test confirms that inflation between other macroeconomic variables that one almost equation is established by test results of Cointegration.

- The Granger test from the study confirms that there present a unidirectional causality along the variables, especially on inflation and oil prices, between exports, exchange and balance of trade. The equation is further run in estimation across four variables to examine on short-run between them by the test of Wald statistics. There is long-run causality between inflation and oil price, exchange rate, the balance of trade and exports.
- There is no short run causality found from inflation in oil prices, exchange, exports and balance of trade.

The outcomes of the study are similarly linked with empirical studies were undertaken by (Bosworth, Collins 1999), (Bengo, Sanchez-Robles 2003), (Hansen and Rand 2004). The study estimated on the VAR model to integrate on the correlation between oil prices and inflations. Over the long-run period, though the influence of oil prices is found in inflation yet on short-run causality the variables were not significant in establishing their relationship.

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