

# Impact of International Crude Oil Price on Select Global Economic Factors

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**Abstract:** In the world economy, the international price of crude oil plays the decisive role compared to other economic factors, in the world 70% of the countries are highly dependent on imported crude oil, which plays a decisive role in world exports and imports for the study from the period 2013-2020 taken into account. In the recent past, the international price of crude oil has fallen dramatically, which in turn has reduced the burden of import costs for the large countries despite the decline in the price of crude oil, and global imports have increased enormously. The beta coefficient of the linear regression indicates that global exports were negatively affected by the international crude oil price. The results of the multi-regression model show that the fluctuation of the dollar index had no influence on the volatility of the international crude oil price. The regression weight estimate trend line indicated that the dollar index and the Baltic Dry index are expected to decline in the near future.

**Keywords:** Oil Price Shocks, Stock Markets, Economic Growth.

## I. INTRODUCTION

Crude oil is a naturally occurring, unrefined petroleum product made up of hydrocarbon deposits and other organic materials. Crude oil can be refined into recyclable products such as gasoline, diesel, and various types of petrochemicals. The modern history of petroleum began in the 19th century with the refining of paraffin from petroleum. In 1846 in Baku (Bibi-Heybat settlement) the first borehole was drilled with hammer tools to a depth of 21 meters for oil exploration. In 1848 Young started a small company to refine the crude oil.

## II. TYPES CRUDE OIL

### A. West Texas Intermediate

This type of oil contains small amounts of sulfur and density. Its sulfur content is only 0.24% and its weight is 39.6 degrees. The West Texas Intermediate is considered to be both sweet and light crude. Refining of this oil is usually done in the Gulf regions as well as the United States as it is convenient to oil reserves.

### B. Brent Blend

The term Brent Blend is derived from the geographic location from which this type of oil is extracted. Brent Blend is called a sweet oil with 0.37% sulfur and 38.06 degrees of gravity. Brent blend oil is typically used to make petroleum and gasoline for vehicles.

### C. Dubai Crude

As the name suggests, Dubai Crude Oil comes from Dubai - a huge oil producing country in the world. The crude oil from Dubai has a low density with 31 degrees of gravity and a sulfur content of only 2%.

### D. Russian Export Blend

This type of oil is the standard for Russian crude oil. This is also a perfect example of acidic oil due to its high sulfur content. Russian export oil is heavily exported to Italy and the Netherlands.

### E. Byproducts of crude oil

Petroleum products are usually divided into four categories: light distillates (LPG, gasoline, naphtha), middle distillates (kerosene, kerosene, diesel), heavy distillates and residue (heavy oil, lubricating oils, wax, asphalt). This classification is based on the way crude oil is distilled and separated into fractions (called distillates and residue).

- Liquified petroleum gas (LPG)
- Gasoline (also known as petrol)
- Naphtha
- Kerosene and related jet aircraft fuels
- Diesel fuel
- Fuel oils
- Lubricating oils
- Paraffin wax
- Asphalt and tar
- Petroleum coke

### D. Further products (see also below) include

- Sulfur
- Olefins
- Heat and electricity energy.

### E. CRUDE OIL IN U.S

For nearly a century, the US was both an exporter and an importer of crude oil. The export of domestically produced crude oil made the US a major player in the global crude oil market that sets crude oil prices. That ended in the 1970s when, in response to the 1973 oil embargo, Congress imposed a ban on domestic oil exports, which was lifted in late 2015. The fact is that the US is both an importer and an exporter of a number of raw materials. Economically, the US would be in a stronger position if domestically produced crude oil could reach the world market as other goods do on a daily basis - to the benefit

of US producers and customers. The alternative is a kind of energy isolationism, the foreclosure of domestic production from world markets, the lowering of the prices for this production and finally the discouragement of new production. This works against US competitiveness and American consumers.

#### F. The process of crude oil refining

Once crude oil is extracted from the ground, it must be transported and refined into petroleum products of any value. These products then need to be shipped to end users or retailers. The entire well-to-consumer supply chain for petroleum products is often described as being broken down into three components.

#### G. Upstream activities

Include oil exploration and oil production.

#### H. Midstream activities

Inclusion of distribution of crude oil to refineries; refining crude oil into salable products; and the distribution of products to wholesalers and retailers.

#### I. Downstream activities

Include retail petroleum products. Gas stations are perhaps the most visible downstream companies, but companies that supply heating oil or propane also fall into this category.

#### J. How does crude oil convert to Gasoline?

Crude oil is converted into gasoline through a relatively simple refining process. The transformation begins with the extraction of oil from the ground, after which it is usually loaded onto large container ships that deliver it to refineries around the world. As any viewer of news material has seen, crude oil appears as a thick black substance that doesn't resemble the clear and free flowing gas used in automobiles. Because crude oil is actually a mixture of hydrocarbons.

### III. USES OF CRUDE OIL

#### A. Plastic

This is probably the most widespread use of oil I can think of. Plastic is used in almost everything you can find in a store. If an item doesn't contain plastic, it is likely stored or packaged in the oil-based polymer!

#### B. Clothing

Petroleum is used to make clothing non-flammable and colorful. It is used in the manufacture of viscose, nylon, polyester, and even faux fur.

#### C. Furniture

According to Conoco Phillips, couch cushions are often filled with durable, lightweight polyurethane foam. If you have carpeted or linoleum floors, you likely have a petroleum-based product in your home as well.

#### D. Insulation

The insulation you will find in your home - which prevents unwanted heat from escaping or entering - is a petroleum-based product! That means we depend on petroleum to regulate the

temperature in our homes to a greater extent than we know from viscose, nylon, polyester, and even faux furs.

#### E. Cars

I mentioned above that many car bumpers are made of plastic. However, that's not the only place where crude oil is used in the manufacture of your car.

#### F. Kitchen Items

There are a number of items in your kitchen that rely on petroleum as part of their manufacture. For your refrigerator, the molded interior panels, door panels and even the foam insulation are made from petroleum. Many ovens run on natural gas.

### G. OBJECTIVES OF THE STUDY

- To study the relationship of international crude oil price with the select global economic factors.
- To study the international crude oil price influence on global economy.
- To measure the future growth of global economy with international crude oil price.

#### H. Hypothesis

Ho: There is no relationship of crude oil prices with global economic factors.

H1: There is a relationship of crude oil prices with global economic factors.

Ho: There is no impact of international crude oil prices on global economy.

H1: There is a impact of international crude oil prices on global economy.

### IV. METHODOLOGY OF THE STUDY

The focus of the present study is on secondary data using descriptive statistical tools. The following variables were considered for the study and different statistical tools were used depending on the objective.

**1. To satisfy to study the relationship of international crude oil price with the select global economic factors bi-variate tool is used.**

**Bi-variate correlation:** The Bi-variate correlation is a measure of the relationship between the two variables; it measures the strength of their relationship, which can range from an absolute value of 1 to 0. The stronger the relationship, the closer the value is to 1. The relationship can be positive or negative; in a positive relationship, when one value increases, another value increases with it. In the negative relationship, the other value decreases as one value increases.

**2. To satisfy to study the international crude oil price influence on global economy ordinary least square is used. Ordinary least square (OLS):**

In statistics, Ordinary Least Square (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables according to the principle of least squares: minimizing the sum of the squares of the differences between the observed dependent variable (values of the predicted variables) in the given data set and those predicted by the linear function. Least squares is a

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form of mathematical regression analysis that finds the most appropriate line for a data set and provides a visual demonstration of the relationship between the data points. Each data point is representative of the relationship between a known independent variable and an unknown dependent variable.

### 3. To satisfy the objective to measure the future growth of global economy with international crude oil price vector auto regression tool is used.

**Vector auto regression – EViews software:** An econometric model that is used for the linear dependencies between the time series. The VAR model generalizes the univariate autoregressive (AR) model, which allows more than one variable.

$$y_1 = c(1) + c(11)*y_1(-1) + c(12)*y_1(-2) + \dots + c(21)*x_1(-1) + c(22)*x_1(-2) + \dots$$

## V. REVIEW OF LITERATURE

**Rabah Arezki, Hou Wang "oil prices and the global economy"(January 2017):** This is a sample macroeconomic model of the oil market. The model takes into account characteristics of the oil supply such as depletion, endogenous oil exploration and production, as well as characteristics of oil demand such as the secular increase in demand from emerging countries, use efficiency and endogenous demand responses. Among other things, the model provides a useful analytical framework for examining the effects of a change in global GDP growth, a change in the efficiency of oil use, and an opportunity in oil supply. Although sales oil production is more price sensitive than conventional oil today, our analysis suggests that an era of persistently low oil prices is likely to be followed by a period in which oil prices exceed their long-term upward trend.

**Kamiar Mohaddes and M. Hashem Pesaran (July 2016):** The recent drop in oil prices has challenged the generally accepted view that lower oil prices are good for the US and the global economy. In this article, we first use a quarterly econometric multi-country model to show that a fall in oil prices in most countries leads relatively quickly to lower interest rates and inflation. Oil prices tend to lower interest rates and inflation relatively quickly in most countries. And increases the global real stock prices. If one looks at the overall changes in demand and supply to changes in oil prices, one comes to the conclusion that the oil markets are rather slowly balancing each other out, with large episodic fluctuations between low and high oil prices.

**Yanan he, shouyang wang "Global economic activity and crude oil prices" (2010):** The empirically investigated cointegrating relationship between crude oil prices and global economic activity. The Kilian economic index serves as an indicator for global economic activity. Based on a supply-demand framework and cointegration theory, we find that real forward prices for crude oil are cointegrated with the Kilian economic index and a trade-weighted US dollar index, and the price of crude oil is significantly affected by fluctuations in the Kilian economic index by both long-term equilibrium conditions.

## VI. DATA ANALYSIS & INTERPRETATION

### Objective 1. To study the relationship of international crude oil price with the select global economic factors

H0: There is no relationship of crude oil prices with global economic factors.

H1: There is a relationship of crude oil prices with global economic factors.

		Correlations						
		Crude oil index	GDP	imports	exports	inflation	BDI	dollar index
Crude oil index	Pearson Correlation	1	-.791*	-0.461	-0.53	-.873**	0.353	.967**
	Sig. (2-tailed)		0.034	0.25	0.177	0.005	0.391	0
	N	8	7	8	8	8	8	8
GDP	Pearson Correlation	-.791*	1	.826*	.894**	.790*	-0.54	.848*
	Sig. (2-tailed)	0.034		0.022	0.007	0.035	0.211	0.016
	N	7	7	7	7	7	7	7
Imports	Pearson Correlation	-0.461	.826*	1	.869**	0.251	-0.621	0.641
	Sig. (2-tailed)	0.05	0.022		0.005	0.548	0.1	0.087
	N	8	7	8	8	8	8	8
Exports	Pearson Correlation	-0.53	.894**	.869**	1	0.424	-0.619	0.701
	Sig. (2-tailed)	0.007	0.007	0.005		0.295	0.102	0.053
	N	8	7	8	8	8	8	8
Inflation	Pearson Correlation	-.873**	.790*	0.251	0.424	1	-0.054	.780*
	Sig. (2-tailed)	0.005	0.035	0.548	0.295		0.9	0.022
	N	8	7	8	8	8	8	8
BDI	Pearson Correlation	0.353	-0.54	-0.621	-0.619	-0.054	1	-0.513
	Sig. (2-tailed)	0.001	0.211	0.1	0.102	0.9		0.194
	N	8	7	8	8	8	8	8
dollar index	Pearson Correlation	-.967**	.848*	0.641	0.701	.780*	-0.513	1
	Sig. (2-tailed)	0	0.016	0.087	0.053	0.022	0.194	
	N	8	7	8	8	8	8	8

\* Correlation is significant at the 0.05 level (2-tailed).

**Interpretation:** It indicates that all global economic factors, with the exception of BDI, have a negative relationship with crude oil. Therein GDP (-0.791), imports (-0.461), exports (-0.530), inflation (-0.873), the dollar index (-0.967) has a negative relationship and the probability value of this variable does not seem to be statistically significant at a level of 5%. From this it was concluded that there is a negative relationship between GDP, imports, exports, inflation, dollar index and crude oil and it was observed that BDI has a positive relationship with crude oil. It is concluded from this that the alternative hypothesis was accepted and the null hypothesis was rejected.

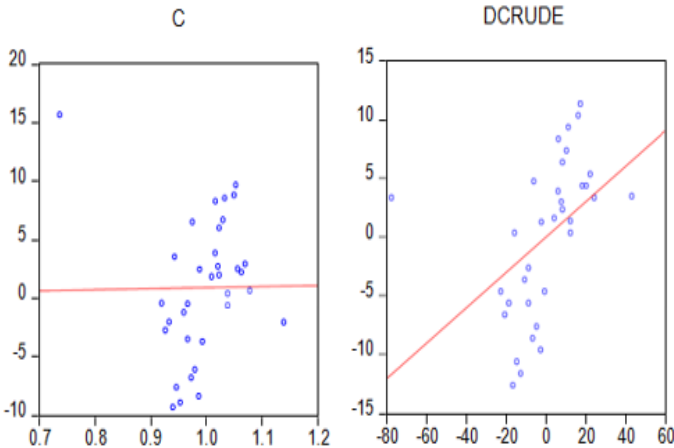
### Objective 2. To study the international crude oil price influence on global economy

H0: There is no impact of crude oil on GDP

H1: There is impact of crude oil on global GDP

Dependent Variable: GDP				
Method: Least Squares				
Sample (adjusted): 2 35				
Included observations: 34 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.904225	1.0271	0.8804	0.3852
DCRUDE	0.150668	0.051	2.95253	0.0059
R-squared	0.214095	Mean dependent var		0.70098
Adjusted R-squared	0.189536	S.D. dependent var		6.63729
S.E. of regression	5.975271	Akaike info criterion		6.47016
Sum squared resid	1142.524	Schwarz criterion		6.55994
Log likelihood	-107.993	Hannan-Quinn criter.		6.50078
F-statistic	8.717408	Durbin-Watson stat		3.28773
Prob(F-statistic)	0.005862			

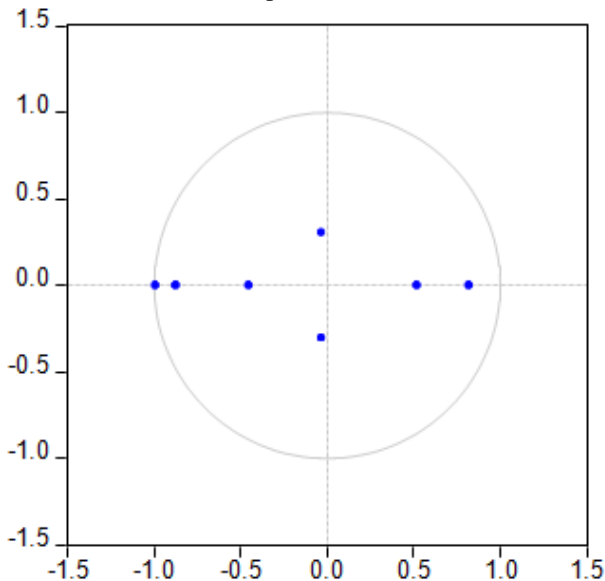
**Interpretation:** Independent variable Crude oil dependent variable GDP. The table above reflects the common least square results used to study the impact of crude oil on GDP. The probability value for total GDP found to be significant, i.e. H. less than 0.05. The coefficient value (0.150668) has a positive impact on GDP. Therefore, the study came to the conclusion that the influence of crude oil on the development of GDP is being monitored. Therefore, the alternative hypothesis was accepted and the null hypothesis rejected.



**Fig1. GDP vs. Variables (Partialled on Regressors)**

**Interpretation:** The leverage graph above shows that GDP in crude oil prices is heading in a positive direction as the trendline moves from the bottom to the top.

**Objective 3.** To measure the future growth of global economy with international crude oil price



**Fig2. Inverse Roots of AR Characteristic Polynomial**

**Interpretation:** The above graph of the polynomial shows the distribution of the data for selected variables the VAR roots lie within the circle, indicating that the data is normally distributed. Therefore vector autoregression can be used.

Included observations: 33 after	
Adjustments	
Standard errors in () & t-statistics in []	
	CRUDE
CRUDE (-1)	0.265733
	-0.13357
	[ 1.98940]
C	-0.082504
	-2.34396
	[-0.03520]
GDP	-0.649978
	-0.77863
	[-0.83477]
BDI1	0.011695
	-0.00818
	[ 1.42999]
IMPORTS	0.665162
	-0.7286
	[ 0.91294]
EXPORTS	-0.933406
	-0.71791
	[-1.30018]
DOLLAR	0.624786
	-0.28064
	[ 2.22627]
INFLATION	-0.453055
	-0.61915
	[-0.73174]
R-squared	0.911677
Adj. R- squared	
	0.886947
Sum sq. resids	3442.133
S.E. equation	11.73394
F-statistic	36.86475
Log likelihood	
	-123.5061
Akaike AIC	7.970064
Schwarz SC	8.332854
Mean dependent	
	16.77725
S.D.	
dependent	34.89819

**Interpretation:** The above analysis of vector autoregression shows CRUDE, BIP, IMPORTS, EXPORTS, BDI, INFLATON, DOLLAR INDEX with the RAW INDEX. the Coefficient value of GDP, EXPORT, INFLATION shows a negative direction in the future, it can be expected that it will fall due to the price of crude oil.

**VII. CONCLUSION**

The study concludes with the title Role of the price of crude oil in global exports and imports for the period 2013-2020. The present study has been underlined by considering some of the world's macroeconomic variables. The study found that the dollar index does not affect international crude oil price fluctuations. The Baltic Dry Index is likely to decline in the near future due to fluctuations in the international crude oil price. Global exports were negatively impacted by the international price of crude oil. Hence, there is another area of research in which, in addition to crude oil production, various

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other macroeconomic variables are taken into account that could have an impact on the international crude oil price in the near future.

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