

# IMPACT OF CRUDE OIL PRICES ON THE EXCHANGE RATE OF INDIAN RUPEES AGAINST USD

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**Abstract:** India imports 80 per cent of its crude oil to meet its growing energy requirements. This significantly affects the economy as crude oil prices directly affect the inflation rate of India as well as the overall GDP. Crude oil prices also significantly affect the current account balance, which means that as the price of crude oil increases, the current account deficit increases simultaneously. The exchange rates are also affected by inflation and current account balance of a country.

*This paper is an empirical study between the impact oil prices on exchange rate of Indian rupees against US dollars.*

*In this paper, I study the direct impact of crude oil prices on the exchange rate without taking into account the other factors and analyse whether a statistical model can be derived to accurately predict the exchange rates using the crude oil prices.*

**Key words:** Fiscal deficit, Statistical model, current account deficit.

## Introduction

India is the third largest importer of Crude oil in the world and it spends 330 million to import 4,930,000 Barrels per day to sustain its economy. Due to its rapid growth this amount is bound to increase unless India finds an alternative source. India uses crude oil for fuel, transportation of goods and commodities, power generation etc. The price of crude oil significantly impacts the overall economy of India as a whole.

The exchange rate of Indian rupees against Dollars is affected by the demand and supply of both currencies. Economic factors such as trade, interest rates, current account deficit etc. affect the demand and supply of currency hence affecting the exchange rate.

These two variables are both affected by similar factors hence these two variables can be analysed to see whether a statistical model can be developed to accurately predict the exchange rate using the crude oil prices.

## Literature Review

The review of literature reveals that the increase in prices of crude oil will have a negative impact on the GDP. According to A. Aparna, using VAR analysis inversely correlates oil prices and GDP. Priyanshi Gupta and Anurag Goya ( June 2015) used the four stage process of analysis which included Cyclical Co-movement of oil prices, Granger Causality tests , Vector Auto Regression (VAR) Analysis ,Stability Test to study the impact of oil prices on price level and net exports. They concluded that oil prices have a positive impact on price levels and a negative impact on net exports. Research conducted by Akansha Sanjay Jain, Nitish Sunil Patil(2015) suggest that increasing oil prices increases the inflation and interest rates in India.

An empirical study done by Joscha Beckmann, Robert Czudaj, and Vipin Arora June (2017) shows that there is evidence that crude oil prices and exchange rate have a significant effect on each in the long term as well as each variable have a minor short term linkage but there is still a statistical model to be derived.

Dr. K. Soundarapandiyam, Dr. M. Ganesh stated that Crude oil prices had a negative impact on the CPI and CPI and GDP were similar. Najaf R\* and Najaf K found that oil prices had a positive impact on the stock exchange and that inflation I the key causal factor.

## Gaps in Literature

- The gap in the literature is that there is no significant model or technique that has been formulated to study the direct relationship between oil prices and exchange rate.
- Researchers have not singled out the impact of crude oil and exchange rate.

## Hypothesis:

H0= Oil prices and exchange rate are correlated.

H1: Oil prices and exchange rate are not correlated.

H0=A statistical model can be developed between crude oil prices and the exchange rate to accurately predict the prices

H1: A statistical model cannot be developed.

## Objectives:

- a.) To study the economic factors that affects the exchange rate of Indian Rupees.
- b.) To analyze the effect of change in oil prices on the Indian economy.
- e.) To study whether oil prices and exchange rate are correlated.
- To derive an empirical conclusion whether a statistical model can be developed or not.

**Research Methodology:**

The research has econometric and analytical areas of research. The econometric and analytical study of this research uses secondary data. Data of world crude oil prices has been taken from OPEC statistics in addition World Bank data center online. Exchange rate of Indian rupees data has been extracted from IMF data bank website.  
 Statistical tool Used is E views, which is used to find the relationship between two variables.  
 Analysis Technique used is Correlation, regression and trend analysis  
 The dependent variable is the exchange rate and the independent variable is the crude oil prices.  
 The data has been collected from 1976 to 2017 and it's the yearly average price.

**Limitation:**

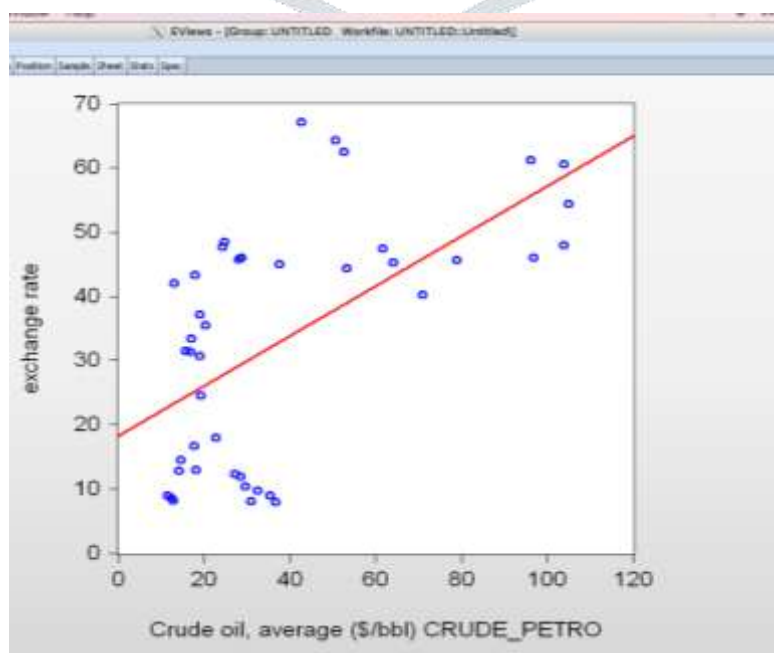
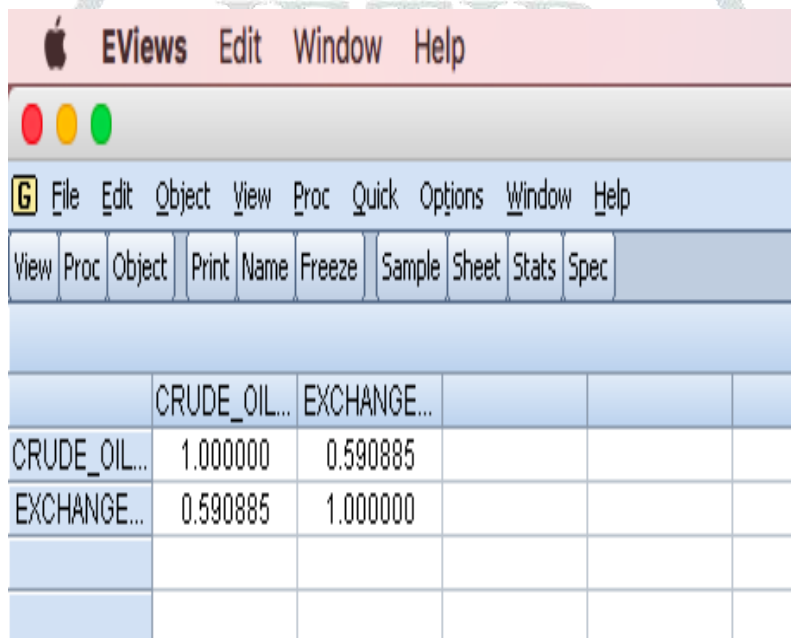
Changed arising due to uncontrollable factors cannot be taken into consideration and effect the date.  
 There is a limitation of time hence each and every variable cannot be taken into consideration.  
 The tools that are used are very basic.

**Results And Discussion**

Year	Average	year	Crude oil, average
1976-77	8.9775	1976	11.63
1977-78	8.5858	1977	12.57
1978-79	8.2267	1978	12.92
1979-80	8.0975	1979	30.96
1980-81	7.9092	1980	36.87
1981-82	8.9683	1981	35.48
1982-83	9.666	1982	32.65
1983-84	10.34	1983	29.66
1984-85	11.8886	1984	28.56
1985-86	12.2349	1985	27.18
1986-87	12.7782	1986	14.35
1987-88	12.9658	1987	18.15
1988-89	14.4817	1988	14.72
1989-90	16.6492	1989	17.84
1990-91	17.9428	1990	22.88
1991-92	24.4737	1991	19.37
1992-93	30.6488	1992	19.02
1993-94	31.3655	1993	16.84
1994-95	31.3986	1994	15.89
1995-96	33.4498	1995	17.18
1996-97	35.4999	1996	20.42
1997-98	37.1648	1997	19.17
1998-99	42.0706	1998	13.06
1999-00	43.3327	1999	18.07
2000-01	45.6843	2000	28.23
2001-02	47.6919	2001	24.35
2002-03	48.3954	2002	24.93
2003-04	45.9515	2003	28.9
2004-05	44.9315	2004	37.73

2005-06	44.2735	2005	53.39
2006-07	45.2495	2006	64.29
2007-08	40.2607	2007	71.12
2008-09	45.9933	2008	96.99
2009-10	47.4433	2009	61.76
2010-11	45.5626	2010	79.04
2011-12	47.9229	2011	104.01
2012-13	54.4099	2012	105.01
2013-14	60.5019	2013	104.08
2014-15	61.1436	2014	96.24
2015-16	64.2801	2015	50.75
2016-17	67.1596	2016	42.81
2017-18	62.5	2017	52.81

**Eviews results**



The correlation coefficient between the two variables is +0.590885, which shows that the two variables are moderately correlated and as the price of crude oil increases, with it exchange rate of Indian rupees against USD also increases.

This analysis does show that crude oil prices do have an impact on the exchange rate.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.17893	4.034570	4.505791	0.0001
CRUDE_OIL_AVERAGE_\$_BB	0.389099	0.083998	4.632243	0.0000

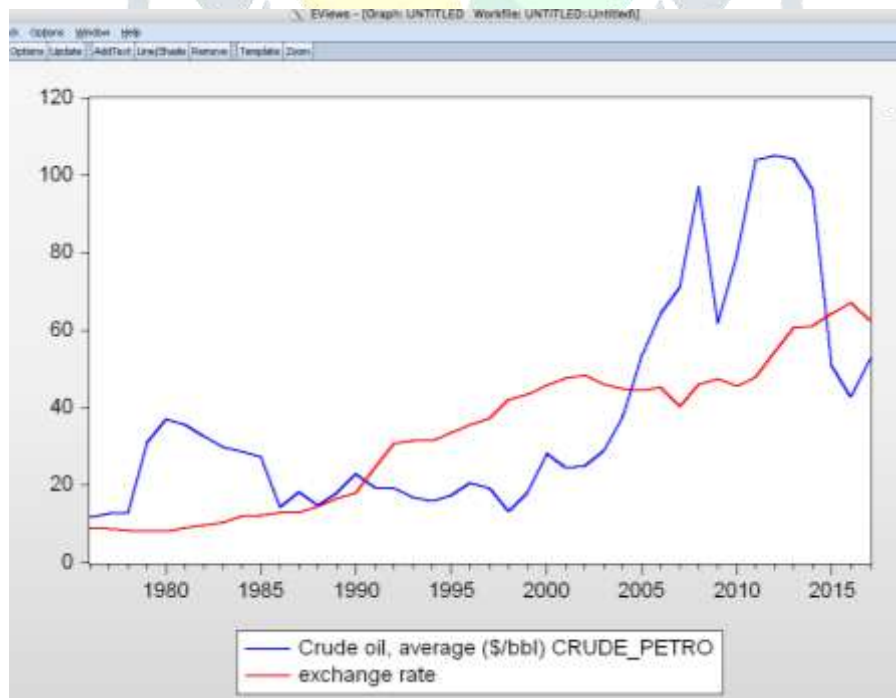
  

R-squared	0.349146	Mean dependent var	33.29695
Adjusted R-squared	0.332874	S.D. dependent var	18.82060
S.E. of regression	15.37225	Akaike info criterion	8.349452
Sum squared resid	9452.237	Schwarz criterion	8.432198
Log likelihood	-173.3385	Hannan-Quinn criter.	8.379782
F-statistic	21.45768	Durbin-Watson stat	0.154177
Prob(F-statistic)	0.000038		

The constant (C) is \$18.17893, which means that if the crude oil value remains zero the value of the exchange rate will increase by \$18.17893.

The coefficient is 0.389099 signifies that for every 1 dollar increase in the crude oil prices, there will be 0.389099 increase in the exchange rate.

**Trend analysis**



The above table shows that there has been an overall increase in the price of both the variable.

There has been a fluctuation in price of both the variables because there are other factors, which also affect the variables such as inflation, shortage of crude oil, difference in interest rates etc.

From the graph above, we can deduce that out of the two variables, the crude oil prices have been fluctuating and that it doesn't directly affect the exchange rate.

The fluctuation can happen from external factors, which cannot be controlled

### Conclusion

The correlation analysis shows that the two variables are moderately correlated.

The regression analysis shows that the dependent variable is affected by the independent variable but the effect is not to a great extent.

The trend analysis shows that the crude oil prices are fluctuating throughout the time series whereas the exchange rate has increased in a constant manner.

The correlation and regression analysis shows that the crude oil prices do affect the exchange rate whereas the trend analysis shows that the crude oil prices have no effect on the exchange rate.

It can be concluded that crude oil prices does affect the exchange rate hence  $H_0$  is accepted.

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