

A STUDY AN ANALYSIS OF CRUDE OIL ON CEMENT INDUSTRIES IN INDIA

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ABSTRACT

This study is an attempt to know and analyze the effect of changes in crude oil price and production on cement industry's production and price. Crude oil is one of the most significant sources of fuel. It is major energy contributor to about one third of the world. But currently steady rise in the crude oil prices has put the world under stress. In the previous month i.e. January-2022, the crude oil's price has shown a drastic rise to \$83.92/Bbl after the sudden rise in the Brent Crude oil price. Presently, the price of crude oil is showing as \$104.43/Bbl. The increased crude oil's price resultant into direct outcome on rise of prices of petroleum and its products. This has eventually impacted the cost to transportation industries and subsequently, the cost of transportation for each and every industry. It is because of those consumers are less willing to splurge and that is affecting both paints as well as cement industry. The prime objective of this study is to analyze, production impact and price change of crude oil on Indian Cement Industry as, major producer of cement in the world after China is India, which is more than 7% of the total installed capacity in the world and will continue to increase on rapid pace as India has a lot capacity for growth and development in the infrastructure and construction sector which results in expected growth in the cement sector. Here the researcher analyses the impact with the help of secondary data collection method of last five years data with respect to crude oil and cement industry of India. This paper is an analytical study of crude oil price fluctuation and crude oil production on cement industry of India.

Keywords: Cement Industries, Price Fluctuation, Secondary Data, Research Analyses.

Introduction

One of the dynamic inputs used for the manufacture of wide range of products and facilities is OIL because it is used in one of the basic services i.e. transportation, in absence of which now a days, no business can survive. It is also known as one of the magic words that always makes news. The fluctuation in the price of the oil, will always impact the business. For example, surge in the price of the oil, will increase the cost of import for the goods and service, which resultant in the rise in the price of the final product, originate inflation.

India is the second principal manufacturer of cement in the world after China. It has more than 7% capacity of the universally installed capacity. As the India is a developing country and now a days, real estate and construction sectors are booming like anything, which result into the benefit and increased demand to the cement industry. India has accounted the production of two hundred ninety-four million tonne in FY21 and three hundred twenty nine million tonnes in FY20 and also projected to achieve the level of three hundred thirty four million tonne in FY22 (India Brand Equity Foundation, 2022)

Oil can be used in the production of cement for the ignition of furnace, to be used in the production of cement. It is also one of the key inputs, as effected the transportation cost along with the packing cost for the cement. Cement is packed in the bags which is either made of High-Density Polyethylene (HDP) or laminated woven paper, the price of which impact due to price movement of the crude oil. Therefore, price drive of crude oil, influence the operating cost of cement production.

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Literature Review

Lots Of studies have been carried out on the subject of impact of crude oil price on economy, GDP, Inflation, Stock Market and growth and different industries. Most of the research work have been done globally. Some of them, which we believe are important and pragmatic studies have been made, evaluated significantly to advance for the objective in the contest of India and further to analyze it and induce some inferences and policy commendation.

Harsha Jethmalani (2018) "Crude prices are thirty five percent above the FY18 average. It is to be believe that the recent uptick is possible which will pose as a headwind & lead to upsurge in packaging costs," as per IIFL Institutional Equities in a recent report. Packaging costs to be increased by approximately rupees thirty per tonne. In summary, increasing cost pressures and weak price drifts, indicate towards the doubtful revival of earnings of producers of cement anytime soon. (Jethmalani, 2018)

A large body of studies has appeared investigating the linkages among oil price fluctuation and stock market returns. Narayan and Sharma (2011) analyzed the oil price and returns of five hundred sixty U.S. firms and demonstrate that oil price impacts firm's returns differently based on their sectoral location. Furthermore, the authors found that among fourteen sectors only 5 sectors that price of oil impacts returns of firm depend on different regimes. (Mensi, 2017)

Kapil Jain (2013) carried out a study on volatility of price of oil and its effect on some particular Indian economic indicators. The study measures the association between crude oil price and NSE and CPI that is, designated macroeconomic variables. The period of six years from two thousand seven – eight to two thousand twelve to thirteen, was taken into consideration for analysis. That data was evaluated by using regression analysis. This study found the substantial positive connection between crude oil's price and inflation in India. Moreover, Indian Stock Market was also impacted by the fluctuations in the price of crude oil. (Srithar, Bairavi, & Mariselvam, 2015)

Objective

- To know the trend of crude oil production and cement production.
- To analyze the association between changes in the price of crude oil and Cement production.
- To study the relationship between price and production of crude oil.
- To study the impact of price changes of crude oil on its import.

Hypothesis 1

Ho: There is a correlation between changes in Crude Oil Prices and production of Cement.

H1: There is no correlation between changes in Crude Oil Prices and production of Cement.

Hypothesis 2

Ho: There is a significant relationship between Crude Oil price and Crude Oil production.

H1: There is no significant relationship between Crude Oil price and Crude Oil production.

Hypothesis 3

Ho: There is a significant relationship between Crude Oil price and Import of Crude Oil.

H1: There is no significant relationship between Crude Oil price and Import of Crude Oil.

Research Methodology

The study has adopted procedures and methodology based on quantifiable and analytical research. The analysis is carried out mainly by arithmetic tools and techniques to find out trends, association, impact and relationship amongst the variables like Crude Oil Price, Crude Oil Production, Production of Cement and Import of Crude Oil and also empirical association of the variables based on defined objectives. The data collected on the basis of Secondary Data Collection Method, through various websites and journals. The researcher has used Random Sampling method as probability sample method.

Data Analysis and Interpretation

The variations in the price of crude oil impacts the various industries and economy of any country. This study only restricts itself to analyze the effect of crude oil price change on the crude oil production, import and cement production in India. Annual data from the FY 2011-12 to FY 2019-20 has been obtained from the statistical database. The variables considered for the study and analysis is multiple linear regression are as follows:

COP: Crude Oil Price per barrel (in \$)
 CPr: Cement Production in Million Metric Tonne
 COPr: Crude Oil Production in Million Metric Ton
 COI: Crude Oil Import in Million Metric Ton

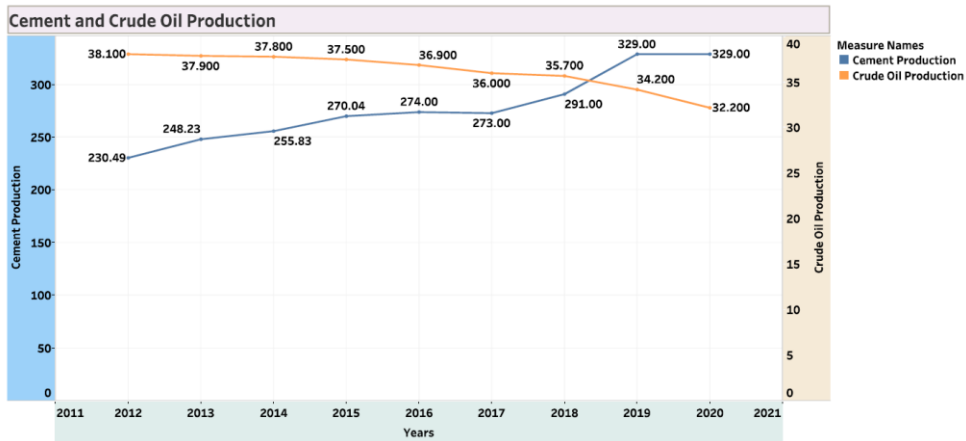
$$CPr = \beta_0 + \beta_1 COP + \mu \dots \dots \dots (1)$$

$$COPr = \beta_0 + \beta_1 CPr + \mu \dots \dots \dots (2)$$

$$COI = \beta_0 + \beta_1 COP + \mu \dots \dots \dots (3)$$

Empirical Analysis

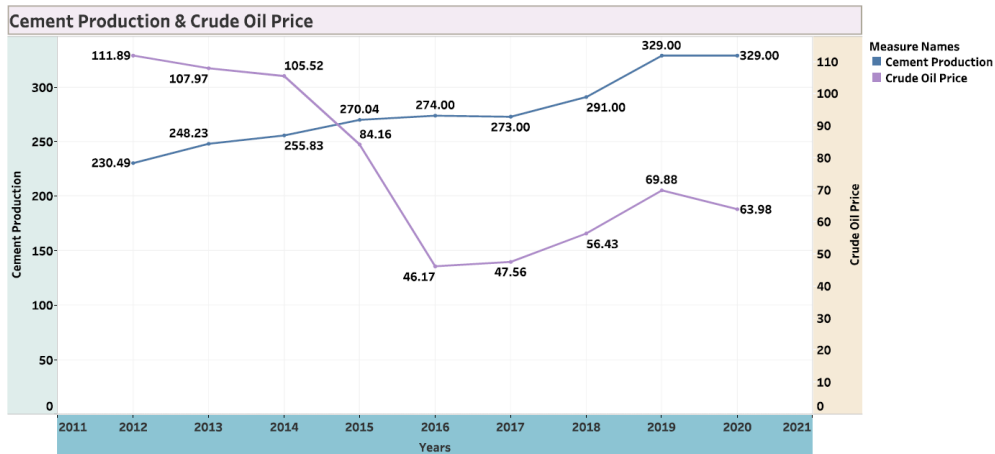
Table 1: Production of Crude Oil(Petroleum Planning & Analysis Cell (Ministry of Petroleum & Natural Gas), 2022) and Cement(India Brand Equity Foundation, 2021) Trend



The trends of Cement Production and Crude Oil Production for Years. Color shows details about Cement Production and Crude Oil Production. For pane Sum of Cement Production: The marks are labeled by Cement Production. For pane Sum of Crude Oil Production: The marks are labeled by Crude Oil Production.

The above table clearly shows that cement production was at the lowest in the F.Y 2011-12 and it was peak in the F.Y 2019-20 in comparison to crude oil production. But the researcher can also analyze that crude oil production was at its peak in the F.Y 2011-12 and at its lowest in F.Y 2019-20, which clearly indicates that cement production is having inverse proportion (relationship) with crude oil production. Therefore, we can state that there is a significant relationship between COPr and CPr.

Table 2: Relationship between Cement Production Volume and Crude Oil Price(Ministry of Petroleum and Natural Gas (India), 2022)



The trends of Cement Production and Crude Oil Price for Years. Color shows details about Cement Production and Crude Oil Price. For pane Sum of Cement Production: The marks are labeled by Cement Production. For pane Sum of Crude Oil Price: The marks are labeled by Crude Oil Price.

$$CPr = \beta_0 + \beta_1 COP + \mu$$

$$CPr = 337.974 + (-0.606) COP + \mu$$

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	0.606 ^a	0.368	0.277	28.68668	0.368	4.070	1	7	0.083	0.678

- Predictor: (Constant), Crude Oil Price (COP)
- Dependent Variable: Cement Production (CPr)

ANOVA ^a						
Model	Sum of Square	df	Mean Square	F	Sig.	
Regression	3349.624	1	3349.624	4.070	0.083 ^b	
Residual	5760.478	7	822.925			
Total	9110.103	8				

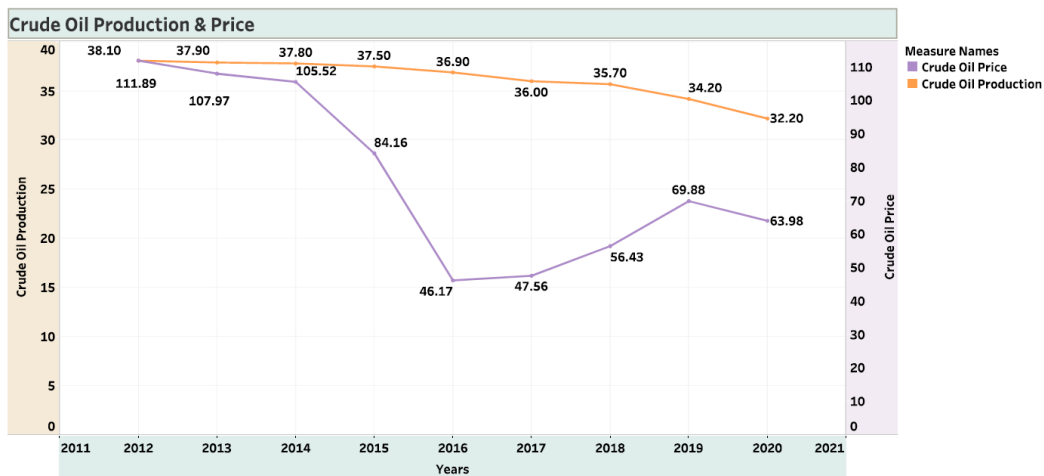
- Dependent Variable: Cement Production
- Predictors: (Constant), Crude Oil Pricing

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	337.974	31.301		10.798	0.000
Crude Oil Price	-0.780	0.387	-0.606	-2.018	0.083

- Dependent Variable: Cement Production

From the above linear regression model, researcher can analyze from the Table 1.2 that if anyone changes the value of nominal Crude Oil Price by one unit, there would be negative impact of 0.606 unit on cement production. Hence, it can state that there is substantial association between the Crude Oil Price change and Cement Production in India i.e. null hypothesis is accepted.

Table 3: Relationship Between Crude Oil Production Volume(Petroleum Planning & Analysis Cell (Ministry of Petroleum & Natural Gas), 2022) and crude oil price (Ministry of Petroleum and Natural Gas (India), 2022)



The trends of Crude Oil Production and Crude Oil Price for Years. Color shows details about Crude Oil Production and Crude Oil Price. For pane Sum of Crude Oil Production: The marks are labeled by Crude Oil Production. For pane Sum of Crude Oil Price: The marks are labeled by Crude Oil Price.

$$COPr = \beta_0 + \beta_1 COP + \mu$$

$$COPr = 32.967 + 0.564 COP + \mu$$

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	0.564 ^a	0.318	0.221	1.7519	0.318	3.264	1	7	0.114	0.473

- Predictor: (Constant), Crude Oil Price (COP)
- Dependent Variable: Crude Oil Production (COPr)

ANOVA ^a						
Model	Sum of Square	df	Mean Square	F	Sig.	
Regression	10.018	1	10.018	3.264	0.114 ^b	
Residual	21.485	7	3.069			
Total	31.502	8				

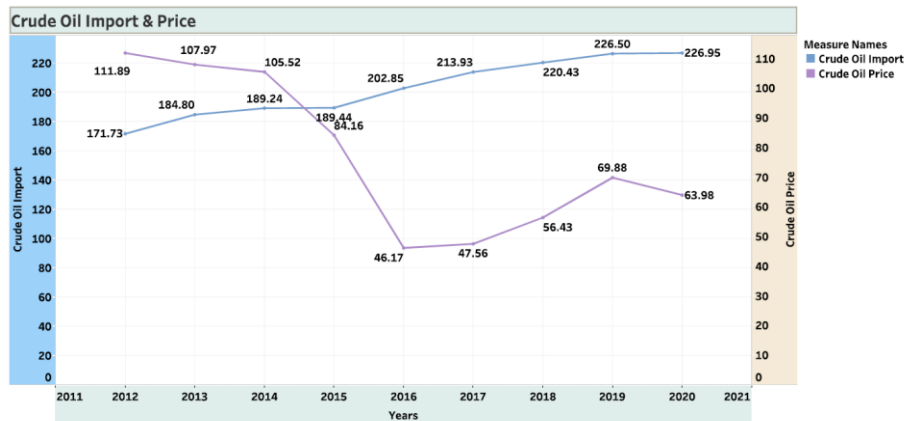
- Dependent Variable: Crude Oil Production
- Predictors: (Constant), Crude Oil Pricing

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	32.967	1.912		17.246	0.000
Crude Oil Price	0.043	0.024	0.564	1.807	0.114

- Dependent Variable: Crude Oil Production

From the above linear regression model, from Table 1.3, researcher can identify that if there is a change in the value of nominal Crude Oil Price by one unit, there would be positive impact of 0.564 unit on crude oil production. Hence, it can state that here is substantial relationship between Crude Oil Price change & Crude Oil Production in India i.e. null hypothesis is accepted.

Table 4: Relationship Between Crude Oil import Volume and Crude Oil Price(Ministry of Petroleum and Natural Gas (India), 2021)



The trends of Crude Oil Import and Crude Oil Price for Years. Color shows details about Crude Oil Import and Crude Oil Price. For pane Sum of Crude Oil Import (all (CrudeOil)): The marks are labeled by Crude Oil Import. For pane Sum of Crude Oil Price: The marks are labeled by Crude Oil Price.

$$COI = \beta_0 + \beta_1 COP + \mu$$

$$COI = 249.084 + (-0.782) COP + \mu$$

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	0.782 ^a	0.612	0.557	13.37962	0.612	11.050	1	7	0.013	0.687

- Predictor: (Constant), Crude Oil Price (COP)
- Dependent Variable: Crude Oil Import (COI)

ANOVA ^a					
Model	Sum of Square	df	Mean Square	F	Sig.
Regression	1978.168	1	1978.168	11.050	0.013 ^b
Residual	1253.099	7	179.014		
Total	3231.267	8			

- Dependent Variable: Crude Oil Import
- Predictors: (Constant), Crude Oil Price

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	249.084	14.599		17.062	0.000
Crude Oil Price	-0.600	0.180	-0.782	-3.324	0.013

- Dependent Variable: Crude Oil Import

From the above linear regression model, in Table 1.4 researcher can analyze that if, change the value of nominal Crude Oil Price by one unit, there would be negative impact of 0.782 unit on crude oil import volume. Hence, it can state that here is no substantial relationship between the Crude Oil Price change & Crude Oil Import Volume in India i.e. null hypothesis is disallowed.

Conclusion

Indian economy is emerging economy and to meet its foremost crude oil requirement, India has to mostly depends upon the imports from other countries. Crude oil price has always negative impression on the Indian industries except for one or two industries. This paper examined the impacts of the price fluctuation of crude oil on the cement industries of India. The crude oil price unpredictability has also intensified. However, oil price futures are difficult to expect, as it is affected by many factors which are generally volatile. The study also propose that the oil price variations have substantial relationship with the cement production and production of crude oil but not with the crude oil import.

In this context, policymakers, financial expert and economist have paid close thought to adjustments in internationally dealt crude oil price and anxious about probable impact of crude oil price on the cement industries and production of crude oil but not on its import. The study also observed, how the outcome of crude oil price shockwaves on production of cement industry fluctuations, the paper finds the instability of crude oil production, has dependent on the vital cause of the crude oil price fluctuations but not on its import.

The study powerfully recommended that the government of India must take genuine measures to evade exogenic impacts of prices of crude oil, for which the Indian Government must suggest the policy for energy consumption and innovative technologies should be implemented that use eccentric energy so that they can accelerate and request inland and as well as overseas straight investments in India for the same.

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