

CRUDE OIL FLUCTUATION IMPACT ON SELECT ASIAN COUNTRIES

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ABSTRACT:

In the commodities world, crude oil plays the vital role which can influence global economy because most of the countries foreign reserves are spent for the import of crude oil. My study has been considered to measure the international crude oil fluctuations on the select Asian countries which were selected based on high market capitalization. In this study, international Brent crude oil has been considered along with the countries like China, Japan, India, Taiwan, Hong Kong. The emphasis of the analysis has been focused from year 2008 to 2014 by considering few economic variables which were averaged yoy. Bi - variate and partial correlation has been applied to measure the co-movement of selected economic variables with international crude figures. ADF (Augmented Dickey Fuller Test) has been applied to convert the data into stationary. Granger Causality test has been applied on Johanssen Co-integrated data and observed that all countries stock indices were affected by the international crude oil fluctuations along with inflation and IIP figures . Japanese GDP got affected by the crude oil fluctuations during the analysis period .This study is useful to the selected countries central banks ,investors of equity and commodity segments and the respective countries governments.

Key Words – Crude oil, Crude oil imports, GDP, Gold prices, IIP, Inflation, Overall imports, Stock Indices.

INTRODUCTION:

Most of the Asian countries are dependent on oil importing countries for oil imports. A plunge in oil prices is a worrying sign of weakness for the governments dependent on oil revenues. But it is a positive sign for the oil importing economies such as the Asian economy whose foreign reserves are mostly spent on import of crude oil. It is a panacea for individuals as their disposable income increases and for businesses as it lowers production costs. In Asia low oil prices, are positive for trade balances and government finances as the region is a major oil importer and some nations subsidize the price of fuels. Most of the Asian countries meet their demand by importing from other countries. Any movement in prices is closely tracked in the domestic market place. Crude oil prices act as prime drivers for the price movements of other commodities in the economy. Any fluctuation in crude oil prices affects industrial segments as well. There are innumerable factors which influence the price movement of crude oil throughout the world such as production, natural causes, inventory, demand and supply. The industrial production is affected by the crude oil fluctuations as they depend on crude oil mostly for the

production process. The personal disposable income is affected as crude oil fluctuates; this is clearly visible in the behavior of the stock markets.

OBJECTIVES:

1. To study the relationship of crude oil with select countries stock indices, crude oil imports, currencies and GDP.
2. To know the crude oil crash impact on inflation and IIP.
3. To measure the crude oil crash impact on GDP, stock indices of select countries.
4. To measure the imports of crude oil and gold influence on select countries imports.
5. To measure the intra relationship of select countries stock indices during the crude oil crash period.

SCOPE: This study has been considered to measure the crude oil fluctuations impact on the select Asian countries such as India, Taiwan, China, Hong kong and Japan from the period 2008-2014. The pivotal point of the analysis is to measure the international crude oil price fluctuations on the selected variables of the respective countries which are depending heavily on crude oil imports.

EMPIRICAL STUDY:

1. Countries- China, India, Taiwan , Japan and Hong kong
2. Crude oil
3. Crude oil imports
4. Currencies- Indian Rupee, Chinese Yuan, Hong Kong Dollar, Japanese Yen, Taiwanese Dollar.
5. GDP
6. Gold prices
7. Inflation
8. IIP
9. Overall imports
10. Stock Indices- Nifty, Shanghai, Hang seng , Nikkei, TWSE

NEED: During the analysis period it was observed that the previous analysis in this area was restricted to individual nation's economy and restricted economic variables. This has provided a scope for further study for our analysis. Our analysis studies the crude oil fluctuation impact on select Asian countries such as China, India, Taiwan, Hong kong and Japan which were selected on the basis of high market capitalization along with certain variables such as Crude oil imports, GDP, Gold prices, IIP, Inflation, Overall imports and stock indices.

REVIEW OF LITERATURE:

1. **Jimmy Ran & Jan P. Voon** -The researchers examined the impact of oil price shocks on Asian small open economies such as Hong Kong, Taiwan, Singapore and South Korea. It was observed that it had positive significant effects on unemployment and contemporaneous effects

on CPI. It was also observed that it had no significant impact on RGDP. This study has been limited to Hong Kong, Taiwan, Singapore and South Korea economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

2. **Meliha ENER , Cuneyt KILIC, Feyza BALAN-** The study examined the linkages between crude oil imports and GDP of Turkey. The analysis was carried on quarterly data for the period 1998 Q1 to 2013 Q2. The empirical results suggested that it had a positive impact for two quarters and thereafter it had a negative impact. It was also observed that imports of crude petroleum shocks had a small effect on GDP. This study has been limited to Turkey economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

3. **Muhammad Bachal Jamali, Asif Shah, Hassan Jawad Soomro, Kamran Shafiq, Faiz M.Shaikh-**The study investigates the relationship between changes in crude oil in Pakistan and the macro economy. An analysis was carried out among five key macro economic variables: real gross domestic product, short term interest rate, real effective exchange rates, long term interest rate and money supply. The study revealed that oil price movements caused significant reduction in aggregate output and increased real exchange rate. The study showed that crude oil prices significantly contribute to the variability of real exchange rate long term interest rate in the Pakistan economy while oil price shocks were found to have significant effects on money supply and short term interest rate in the economy. This study has been limited to Pakistan economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

4. **Tara Prasad Bhusal-**Oil is one of the main inputs for many sectors like transportation, manufacturing, electricity generation and others. Oil is also very important for the economic growth of Nepal. This paper examined the short and long-run causality between oil consumption and Gross Domestic Product of Nepal using annual data covering the period between 1975-2009. The study found that there exists bi-directional Granger causality between oil consumption and economic growth in the short and long run. This study has been limited to Nepal economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

5. **Adiqa Kiani-**This paper had discussed the impact of higher oil prices on the Pakistan's economy during the period 1990 to 2008. Pakistan is not oil producing rather oil-importing country. A rise in oil price leads to inflation, increased budget deficit and puts downward pressure on the exchange rate which makes imports expensive. The rising oil prices are the major concern for all the developing economies such as Asia and Pakistan is no exception. The increase in oil prices has further effect on the daily consumption pattern of households. This study analyzed that, how change in real crude oil price effected the real GDP positively and many other factors differently. This study has been limited to Pakistan economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

6. **Dr. Amalendu Bhunia-** This paper investigated the relationship between crude oil price, domestic gold price and selected financial variables in India. The study revealed that increased

crude oil prices increases the production costs which affect cash flow and decrease stock prices. International trade is affected by exchange rate fluctuation which in turn affect stock market. This study has been limited to Indian economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

7. **Dr. Ercan ekmekcioglu**- This paper focuses on the impact of crude oil price rise on the entire world and its macro economics. It also studies the oil price changes and economic output which is critical for analyzing the business environment in terms of macroeconomic variables. It highlights the macroeconomic advantages of world crude oil price changes. Various aspects that affect crude oil are focused in terms of profitability that they facilitate. This study has been focused on world economy and does not concentrate on the select Asian countries; hence, it has no relevance to my study.

8. **Afia Malik**-Oil price shocks raise serious concerns among policy makers around the world. It has adverse impact on net oil importing economies. The study is based on data from 1979–80 Q1 to 2007–08 Q2, analyzes the impact of rising oil prices along with the changing macro conditions on output. It was observed that oil prices and output are strongly related to a great extent non-linear. Lower debt-GDP ratio, lower deficit spending, lower real effective exchange rate, and the existence of foreign exchange reserves and capital investment cause the output to rise. This study has been limited to Pakistan economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

9. **Sidra Nazir and Abdul Qayyum**-Oil is the most prominent indicator of economic growth in Pakistan with increase of its demand. Oil prices are causing an impact on GDP of Pakistan. The study has been carried out using annual data since 1972-2011 in context of Pakistan. Thorough analysis has studied that oil prices had no long run impact on GDP rather it had a short run impact on GDP. This study has been limited to Pakistan economy and does not cover the remaining Asian countries; hence, it has no relevance to my study.

10. **Tobias N. Rasmussen and Agustín Roitman**- The study characterized relationships between crude oil prices and macroeconomic developments across the world. The data was approached from several angles and it was found that the impact of higher oil prices on oil importing economies was generally small i.e.; a 25 percent increase in oil prices typically causes GDP to fall by about half of one percent or less. The cross country differences regarding impact depend mainly on the size of oil imports. It was also observed that higher oil prices are not always costly for oil importing economies it can be offset partly by external receipts. This study has been focused on world economy and does not concentrate on the select Asian countries; hence, it has no relevance to my study.

RESEARCH METHODOLOGY: This analysis has been done on secondary data by using descriptive statistical tools. The following formulas were considered for the analysis.

1. **Co-integration:** Co-integration is a statistical property of time series variables. Two or more time series are co-integrated if they share common stochastic drift. If two time series x and y are co-integrated, a linear combination of them must be stationary. $Y - Bx = u$, Where u is stationary.

2. **Granger causality test:** Null hypothesis: The null hypothesis refers to a general statement or default position that there is no relationship between two measured phenomena. Rejecting or disproving the null hypothesis- and thus concluding that there is a relationship between two phenomena. Alternative hypothesis: In statistical hypothesis testing, the alternative hypothesis is applicable when probability is > 0.5 . Alternative hypothesis is that the quality is poorer in the second half of the record. GCT : $P[Y(t+1) \in A | I(t)] \neq P[Y(t+1) \in A | I_x(t)]$

3. **Augmented Dickey-Fuller Test:** Augmented Dickey-Fuller Test is a test for a unit root in a time series sample. It is an augmented version of the Dickey-Filler test for a larger and more complicated set of time series models.

4. **Correlation coefficient** is a numerical indicator of the strength and direction (positive or negative) of the linear relationship between two variables. When working with continuous variables, as we have so far in this chapter, the correlation coefficient to use is **Pearson's r**.

Pearson r coefficient varies between -1 and $+1$, with $+1$ indicating a perfect positive relationship (a high score on variable X = a high score on variable Y), -1 a perfect negative relationship (a high score on X = a low score on Y), and 0 no relationship.

LIMITATIONS:

1. Gold has been considered as one of the major import product for China and India.
2. Unstationary data for Japan inflation has been considered for the analysis.
3. Inflation data has been considered based on WPI , but selected Asian countries follows different methods to measure the Inflation

DATA ANALYSIS :

Correlations

	Crude oil	shanghai	Nifty	Hangseng	Nikkei	TWSE
Crude oil Pearson Correlation	1	-.514	.439	.623	.239	.553

Interpretation: 1a. The above analysis of correlation has been applied to select countries stock indices with crude oil and observed that Shanghai index is negatively moderate correlated whereas all the other indices were positively correlated with crude oil during the study period.

Correlations

	Crude oil	China gdp	India gdp	Hong kong gdp	Japan gdp	Taiwan gdp
Crude oil Pearson Correlation	1	.382	-.441	-.381	-.097	-.867*

Interpretation:1b. The bi-variate correlation has been applied to crude oil with GDP of select countries and the result unveils that China GDP is positively correlated at the same point of time all other countries GDPs were negatively correlated.

Correlations

	crudeoil	China currency	India currency	Hongkong currency	Japan currency	Taiwan currency
Crude oil Pearson Correlation	1	-.652	.370	.263	-.207	-.950**

Interpretation:1c.Correlation between crude oil and currency is strongly negatively correlated with the China and Taiwan currency, whereas, Indian and Hong Kong currencies are slightly to moderately correlated.

Correlations

	Crude oil	China crude imp	India crude imp	Hong kong crude imp	Japan crude imp	Taiwan crude imp
Crude oil Pearson Correlation	1	.905**	.808*	.890**	.931**	.831*

Interpretation:1d) Correlation analysis between crude oil and imports of crude oil of select Asian countries were observed strongly correlated during the analysis period.

Model Summary	
Multiple R	0.999
R Square	0.999
Adjusted R Square	0.992
Std. Error of the Estimate	0.021
Log-likelihood Function Value	-11.481

ANOVA					
	Sum of Squa	df	Mean Square	F	Sig.
Regression	0.322	5	0.064	146.533	0.063

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	Std. Error		
(Constant)	92.782	3.201			28.983	0.022
China inflation	0.157	0.033	0.399	0.085	4.721	0.133
India inflation	-0.68	0.168	-1.376	0.34	-4.05	0.154
Hong kong inflation	0.264	0.141	0.413	0.22	1.872	0.312
Japan inflation	0.714	0.24	7.622	2.562	2.975	0.206
Taiwan inflation	-0.249	0.075	-9.159	2.762	-3.317	0.186

Interpretation:2a . The above analysis has been applied to measure the crude oil crash impact on select Asian countries inflation.

The R square is observed 99.9% and ANOVA shows that crude oil impacted all the countries inflation as the probability value is observed less than 0.5% ie;0.063 which is significant . Coefficient values of all countries are found to be significant with the inflation.

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Interpretation:2b. The above analysis has been applied to measure the crude oil crash impact on select Asian countries IIP .

The R square is observed 99.9% and ANOVA shows that crude oil impacted all the countries IIP as the probability value is observed less than 0.5% ie;0.063 which is significant . Coefficient values of all countries are found to be significant with the IIP.

	Null Hypothesis:	F-Statistic	Prob.
	CRUDEOIL does not Granger Cause HANGSENG	0.06237	0.9404
	CRUDEOIL does not Granger Cause NIFTY	0.15451	0.8617
	CRUDEOIL does not Granger Cause SHANGHAI	0.31160	0.7486
	CRUDEOIL does not Granger Cause TWSE	0.16310	0.8549
	CRUDEOIL does not Granger Cause NIKKEI	0.27610	0.7721

Interpretation:3a. The above analysis of Granger Causality Test results shows that all the calculated values were found to be non significant where null hypothesis of crude oil does not grange cause the select Asian countries stock indices were rejected . Accept the alternative hypothesis ie; crude oil causing all the countries stock indices during the study period.

	Null Hypothesis:	F-Statistic	Prob.
	CRUDEOIL does not Granger Cause China GDP	23.3315	0.0062
	CRUDEOIL does not Granger Cause Japan GDP	0.18084	0.841
	CRUDEOIL does not Granger Cause Hong kong GDP	5.16958	0.0778
	CRUDEOIL does not Granger Cause Indian GDP	1.22117	0.3855
	CRUDEOIL does not Granger Cause Taiwan GDP	6.29353	0.0844

Interpretation:3b. The above analysis of Granger Causality Test results shows that all the calculated values were found to be significant where null hypothesis of crude oil does not grange cause the select Asian countries GDPs were accepted. Reject the alternative hypothesis i.e.; crude oil not causing the all the countries GDPs during the study period except in the case of Japan where crude oil was causing GDP.

	Null Hypothesis:	F-Statistic	Prob.
	CHINA GOLD does not Granger Cause CHINA IMP	10.3242	0.0263
	INDIA GOLD does not Granger Cause INDIA IMP	1.19217	0.3925

Interpretation:4a. The above analysis of Granger Causality Test results shows that all the calculated values were found to be significant where null hypothesis of China and Indian gold prices does not grange cause the China and Indian imports were accepted. Reject the alternative hypothesis i.e.; China and Indian gold prices does not cause the China and Indian imports.

	Null Hypothesis:	F-Statistic	Prob.
	CHINA CRUDE does not Granger Cause CHINA IMP	5.47159	0.0998
	INDIA CRUDE does not Granger Cause INDIA IMP	4.50539	0.1248

Interpretation: The above analysis of Granger Causality Test results shows that all the calculated values were found to be significant where null hypothesis of crude oil prices does not grange cause the China and Indian imports were accepted. Reject the alternative hypothesis i.e.; crude oil prices does not cause the China and Indian imports.

Control Variables			shangai	nifty	hangseng	nekkei	twse	
crudeoil	shangai	Correlation	1					
		Significance (2-tailed)	.					
		df	0					
	nifty	Correlation	-0.619	1				
		Significance (2-tailed)	0.191	.				
		df	4	0				
	hangseng	Correlation	-0.186	0.815	1			
		Significance (2-tailed)	0.725	0.048	.			
		df	4	4	0			
	nekkei	Correlation	-0.301	0.67	0.78	1		
		Significance (2-tailed)	0.563	0.146	0.068	.		
		df	4	4	4	0		
5.		twse	Correlation	-0.336	0.926	0.885	0.578	1
			Significance (2-tailed)	0.514	0.008	0.019	0.23	.
			df	4	4	4	4	0

Interpretation: The above analysis of partial correlation has been applied among all the select countries indices of Asia and the result shows that Nifty, Hang seng, Nikkei and TWSE were negatively correlated with Shanghai whereas Hang seng, Nikkei and TWSE are strongly correlated with Nifty during the study period .Nikkei and TWSE were also strongly correlated with Hang seng.

FINDINGS:

1. This analysis had observed that Chinese GDP is positively correlated with crude oil but at the same time Shanghai is negatively correlated during the same period.
2. The countries which were considered for the analysis has been observed that their crude oil imports were strongly correlated with the international crude oil price movement.
3. International crude oil prices are impacting the inflation and IIP for all the selected Asian countries such as China, Taiwan, India, Hong Kong and Japan.
4. The study results show that crude oil fluctuations are causing all the countries stock indices during the analysis period. It was also observed that the countries GDPs were not affected by crude oil fluctuations except in case of Japan.

CONCLUSION:

I conclude the analysis of crude oil fluctuation impact on select Asian countries. This study has been focused from the period of 2008 to 2014. In this study countries such as China, Taiwan, India, Hong Kong and Japan were considered based on high market capitalization and few economic variables were also considered of the respective countries.

China’s stock market is moving in opposite direction with international crude oil prices but whereas other countries indices were behaving along with the international crude oil. The study had observed that imports of gold and crude oil were strongly affecting the overall imports of respective countries. All the countries stock indices were impacted by the crude oil fluctuations.

GDP's of selected countries were not influenced by the crude oil but Japan GDP is getting influenced. Hence, there is a further scope to do research in this area where crude oil fluctuations impact on micro level economic variables which were economically weaker countries and depends heavily on crude oil imports.

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