IMPACT OF CRUDE OIL PRICE FLUCTUATION ON OPEC COUNTRIES -A STUDY
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ABSTRACT:

Globally all the countries are spending 70% of their foreign reserves for crude oil. OPEC countries economy is completely dependent on crude oil exports. In the past decade crude oil price fluctuations was at obstinate level which got affected on only global economy but also the OPEC countries. We had examined to measure the crude oil prices fluctuations impact on OPEC countries for the period of 2004 to 2014. The granger casuality test has been applied on Johansen co integrated data and observed that crude oil exports of Algeria, Nigeria and Saudi Arabia got affected and whereas Kuwait, UAE, Venezuela, Equador crude oil prices were not affected OPEC countries currency got affected. The linear regression model shows that all the OPEC countries GDP got influenced during the study period bivariate correlation has been applied to international crude oil price with select OPEC countries stock indices and export of crude oil. This analysis is useful to OPEC countries banks and international financial institutions such as World Bank and IMF.

Key Words: Dollar index data, GDP, Brent crude oil price, overall exports, crude oil exports, stock market indices.

INTRODUCTION:

Our thesis focuses on assessing the Brent oil prices fluctuation on OPEC countries. The world consumes about 76 million barrels per day of oil and OPEC accounts for nearly 60% of world's proven oil reserves & its exports represent 55% of the oil traded internationally. The organization of the Petroleum Exporting Countries (OPEC) is a group of 12 members that include Iran, Iraq, Kuwait, Qatar, Saudi Arabia, the United Arab Emirates, Libya, Algeria, Nigeria, Angola, Venezuela and Ecuador. Venezuela was the first country to move towards the establishment of OPEC by approaching Iran, Iraq, Kuwait and Saudi Arabia in 1949. OPEC was founded in Baghdad, triggered by a 1960 law instituted by American President Dwight Eisenhower that forced quotas on Venezuelan oil imports in favor of Canadian & Mexican oil industries.

Our study shows that most OPEC revenue is generated and dependant and exports of Brent crude oil, our study is on 7 OPEC countries. These countries include Kuwait, Saudi Arabia, the United Arab Emirates, Algeria, Nigeria, Venezuela and Ecuador. We have

considered the economic variables that have direct correlation with Brent crude oil prices that influences selected OPEC countries economy. If low oil prices continue for a prolonged period of time, this could result in long-term reductions in OPEC oil export revenues, and would force OPEC countries to make difficult economic, social, and political tradeoffs.

History of OPEC: Organization of Petroleum Exporting Countries History OPEC was founded in Baghdad, triggered by a 1960 law instituted by American President Dwight Eisenhower that forced quotas on Venezuelan and Persian Gulf oil imports in favor of the Canadian and Mexican oil industries. Eisenhower cited reasons of national security and land access to energy supplies at times of war. When this led to falling prices for oil in these regions, Venezuela's president Romulo Betancourt reacted by seeking an alliance with oil producing Arab nations as a preemptive strategy to maintain the continued autonomy and profitability of Venezuela's oil resources Thus the Organization of the Petroleum Exporting Countries (OPEC) was formed and now it is a cartel of twelve developing countries. OPEC has maintained its headquarters in Vienna since 1965 and hosts regular meetings among the oil ministers of its Member Countries.

REVIEW OF LITERATURE:

Joseph Ayoola Omojolaibi and Festus O. Egwaikhide: This paper studies about the Fiscal policy in oil-centered economies. In this study few economic variables such as oil price volatility, real gross domestic product (real GDP), fiscal deficit, and gross investment has been considered for a period of 1990-2010 on quarterly basis. The study is limited to 5 countries of Africa these countries are Algeria, Angola, Egypt, Libya and Nigeria. Whereas our analysis is focused on impact of fall in oil prices on OPEC from 2004 to 2014, the variables taken for consideration are GDP, market index, Brent oil prices, overall exports, crude oil exports and dollar index data for a period of 11 years.

Zied Ftiti, Khaled Guesmi, Frederic Teulon: This paper assesses the impact of oil prices on economic growth of the four major OPEC countries (United Arab Emirates, Kuwait, Saudi Arabia and Venezuela). The study is limited for the period spanning from 03/09/2000 to 03/12/2010. The paper examines the co-movements between oil and economic growth. This study is limited for the period of three years. The above study is not relevant to our study and the study is for the different time period horizon. Our study assesses the fluctuations of crude oil prices on OPEC countries. And the above study has not considered all the economic variables. We have considered the variables which are not included in their study.

Usama Alamulali , Che Normee Binti Che Sab : This paper examined the impact of oil revenues on the macro economy in the OPEC by taking the period 2000-2011 i.e. for 1 year only. Whereas our study examines the impact of fluctuations in the prices of Brent oil prices on OPEC. Our study is for the period ranging from 2004 to 2014. The above paper has not taken all variables in consideration for measuring the impact and has considered high prices to examine the impact. Our paper has taken variables such as GDP, market index, Brent oil prices, overall exports, crude oil exports and dollar index data that is not included in this paper to examine price fall effect on OPEC. This study is on macroeconomic level and our study is on OPEC countries economy.

Uma C Swadimath, DR. K H Anil Kumar, and Prasanna B Joshi: This paper is limited to one country that is India, where crude oil is the most essential commodity and also the most traded product which influences an economy. Whereas our study is on the OPEC countries to assess the impact of Brent crude oil price fluctuation on the OPEC countries. The paper studies the causes for rise in crude oil prices and the factors that influence it and its impact on single country that is India by considering few economic variables that has influence on their economy.

Zoheir Ebrahim, Oliver R. Inderwildi, David A. King: This research is confined to "The studies the impact of oil price volatility on macroeconomic level" that suggests how to mitigate and build resilience to prevent global economy. Our study examines fluctuations in the prices of Brent oil and their adverse effect on OPEC countries which is not related to above analysis. The paper examines the impact on global economic level and our study examines the impact of price fluctuation on OPEC countries economy by considering the variables that are not considered in above analysis

Ekpeno L. Effiong : The study examines the impact of oil price shocks on stock market activities that may be different depending on its origin (i.e. demand and supply shocks).Thier thesis is limited to Nigeria and for a period of 1995 to 2012. Our study is on the OPEC countries for the period of 2004 to 2014. Our study examines the effect of oil prices fall on overall economy of OPEC countries. The researchers examines the origin of oil price shocks is crucial for understanding the volatility in Nigeria's stock market Our study is essential to examine the impact on OPEC countries economy by considering the variables that is not considered in their analysis

Christian von Hirschhausen, Franziska Holz, Daniel Huppmann, Claudia Kemfert: This paper examines the effect of sharp decline of crude oil prices and the market power of the Organization of Petroleum Exporting Countries (OPEC). Our study examines the impact on OPEC economies due to fluctuations in the price of oil where the impact on economies of OPEC may differ. This paper is not related to our study and the variables considered to examine the impact are not relevant to our study.

Mark Finleya : The paper assess the future for oil market as oil has larger global energy market which is expected to see shift toward natural gas and renewable forms of energy. That requires continued investment and market-oriented policies. Our analysis is on impact of recent price fall impact on OPEC countries which is different from their analysis that focuses on oil market globally and to meet required demand.

Andrew P. Morriss & Roger E. Meiners: The paper assess the impact of OPEC cartel on oil market that represents the interests of the major oil exporting nations and it indicates that the oil market is greatly affected by the cartel and the international market for oil is not a free market. Our analysis is assessing the impact of oil prices fall on OPEC. Their study is limited to major oil exporting countries and assesses OPEC cartel effect to influence the oil market. Hence our study is not having any relevance to their paper.

OBJECTIVES:

1. To find the co-relation between international crude oil prices, Dollar index, OPEC countries stock indices & crude oil export.
2. To measure international crude oil price impact on OPEC countries crude oil export.
3. To know the Dollar index impact on OPEC countries currencies.
4. To measure international crude oil price fluctuations impact on OPEC countries GDP & Overall exports.

Hypothesis:

1. Null hypothesis (ho): Crude oil price doesn't impact OPEC countries crude oil exports.
2. Null hypothesis (ho): Dollar index will not impact OPEC countries currencies.
3. Null hypothesis (ho): Crude oil price fluctuations will not impact OPEC countries GDP.
4. Null hypothesis (ho): Crude oil price fluctuations will not impact OPEC countries overall exports.

NEED: The crude oil is an essential commodity of the world. In recent past the crude oil prices are falling drastically. The fall in prices are becoming advantages to the crude oil importers and disadvantage to the crude oil exporting countries in the world. Due to fall in prices the oil exporting countries' economies are affected. We have studied many articles and thesis on crude oil and OPEC and felt there is great need to study about impact of Brent crude oil price fluctuations on OPEC. In the past years not much research is done taking into consideration the 7 OPEC countries and selective economic variables. In order to find out fluctuations in the price of crude oil impact on OPEC countries crude oil exports along with their economy.

SCOPE: this analysis has been confined for the period 2004 to 2014. In this analysis Brent crude oil prices were considered to measure the impact on OPEC countries. Our analysis is emphasized to measure the OPEC countries economy in pre and post recession period. International currency dollar index has been considered to measure the select OPEC countries currencies. In OPEC association 12 countries are there out of that we have considered 7 countries for the analysis purpose.

EMPIRICAL STUDY: Our study has taken in to consideration the following economic variables to measure the impact of Brent crude oil price fluctuations on 7 OPEC countries. These countries are Kuwait, Saudi Arabia, the United Arab Emirates, Algeria, Nigeria, Venezuela and Ecuador and the variables are Dollar index data, GDP, Brent crude oil price, overall exports, crude oil exports, stock market indices and currency of 7 OPEC countries.

RESEARCH METHODOLOGY: This analysis has been done based on secondary market data by using descriptive statistical tools.

The Granger causality test is a statistical hypothesis test for ascertaining whether one time series can be used for forecasting another time series. It is originally considered that regressions reflect "mere" correlations, but Clive Granger on the other hand argued that causality in economics could be reflected by measuring the ability of predicting the future values of a time series using historical values of another. $\mathbb{P}[Y(t+1) \in A | \mathcal{I}(t)] \neq \mathbb{P}[Y(t+1) \in A | \mathcal{I}_{-x}(t)]$

The Johansen test is used for co-integration that allows for more than one co-integrating relationship i.e. large data samples. Therefore this test is more generally applicable than the Engle–Granger test which is based on the Dickey–Fuller (or the augmented) test for unit roots $X_t = \mu + \Phi D_t + \Pi_p X_{t-p} + \cdots + \Pi_1 X_{t-1} + e_t, \quad t = 1, \ldots, T$

Augmented Dickey–Fuller test (ADF) is for a unit root in a time series sample. It is an improved version of the Dickey–Fuller test for a larger and more complex set of time series models. In ADF statistic, a negative number is used in the test. The more negative it is, the greater the rejection of the hypothesis. It is given by the following Formula:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t,$$

Correlation analysis is the statistical tool we can use to describe the degree to which one variable is linearly related to another

r = Σ (xy) / sqrt [(Σ x2) * (Σ y2)]

Linier Regression analysis:

$$y_n = \beta_0 + \beta_1 x_{n1} + \cdots + \beta_k x_{nk} + \varepsilon_n$$

Regression weight estimation:

$$BCF_{Dum} = \frac{\sum_{i=1}^{n} 10^{c_i}}{n}$$

Limitations:
1. Iran, Iraq, Angola, Qatar and Libya were not considered for the analysis.
2. Currency data for all the selected countries 2004 year was not considered and for Venezuela 2004 to 2006 year data has not been considered.
3. Crude oil and overall exports of selected OPEC countries 2014 data has not been considered.

DATA ANALYSIS:
OBJECTIVE-1

		Crude oil	Dollar index
Crude oil	Pearson Correlation	1	-0.439
	Sig. (2-tailed)		0.177

Crude oil Vs. Indices	Crude oil	Algeria index	Kuwait index	Saudi Arabia index	UAE index	Nigeria index	Venezuela index	Ecuador index
Pearson Correlation	1	-0.213	-0.045	-0.018	0.153	0.265	0.302	.620*
Sig. (2-tailed)		0.53	0.896	0.959	0.654	0.431	0.366	0.042
N	11	11	11	11	11	11	11	11
Crudeoil Vs. Opec oil exports	Crude oil	Algeria crude exp	Kuwait crude exp	Saudi crude exp	UAE crude exp	Nigeria crude exp	Venezuela crude exp	Ecuador crude exp
Pearson Correlation	1	0.355	.632*	-0.017	0.543	0.513	0.492	0.584
Sig. (2-tailed)		0.284	0.037	0.96	0.084	0.107	0.124	0.059
N	11	11	11	11	11	11	11	11

INTERPRETATION: The above table depicts the co-relation between international Brent crude oil with OPEC Countries stock indices along with the crude oil exports. The analysis depicts that   Algeria, Kuwait, Saudi Arabia; indices were negatively co-related where as UAE, Nigeria, Ecuador, Brent crude oil with stock indices positively co-related. International crude oil price fluctuations were slightly negatively co-related with Saudi Arabia crude oil exports where as all other selected OPEC Countries was positively co-related. The Dollar index is also moderately negatively co-related with international crude oil prices.

OBJECTIVE 2

ICR and MODEL	None	None	Linear	Linear	Quadratic	AIC	SIC
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept		
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend		
crude oil prices vs algeria exports	Log Likelihood by Rank and Model						
0	-136.8778	-136.878	-135.222	-135.222	-133.7928	31.30618	31.39384
1	-134.4779	-133.117	-132.984	-125.662	-124.315	31.66176	31.83707
2	-133.2944	-130.893	-130.893	-123.458	-123.4584	32.28764	32.55061
CRUDEOILPRICES EQUADOREXP							
0	-125.8054	-125.805	-124.497	-124.497	-123.8055	28.84563	28.93329
1	-121.0564	-111.693	-110.88	-103.981	-103.9802	28.67919	28.85450
2	-120.2423	-109.825	-109.825	-98.6258	-98.62575	29.38718	29.65015
CRUDEOILPRICES KUWAITEXP							
0	-145.4614	-145.461	-142.912	-142.912	-140.8505	33.21366	33.30131
1	-131.5854	-125.656	-123.939	-123.882	-123.7864	31.01897	31.19428
2	-129.9953	-123.717	-123.717	-119.11	-119.11	31.55451	31.81747
CRUDEOILPRICES NIGERIAEXP							
0	-143.805	-143.805	-142.112	-142.112	-140.4183	32.84556	32.93321
1	-140.7997	-140.467	-138.9	-136.269	-134.5782	33.06660	33.24191
2	-140.763	-137.9	-137.9	-133.059	-133.0594	33.94733	34.21030
CRUDEOILPRICES SAUDIARABIAEXP							
0	-170.4939	-170.494	-169.645	-169.645	-169.2141	38.77642	38.86408
1	-168.2484	-163.862	-163.306	-161.66	-161.5493	39.16631	39.34162
2	-167.8267	-162.932	-162.932	-157.25	-157.2495	39.96149	40.22445
CRUDEOILPRICES UAEEXP							
0	-145.7027	-145.703	-144.541	-144.541	-143.5519	33.26726	33.35492
1	-143.3857	-140.976	-139.863	-117.062	-116.2698	33.64127	33.81658
2	-142.7351	-139.648	-139.648	-112.415	-112.415	34.38557	34.64853
CRUDEOILPRICES VENEZUELAEXP							
0	-142.553	-142.553	-139.795	-139.795	-138.5903	32.56733	32.65498
1	-139.6073	-139.416	-137.278	-131.532	-130.4354	32.80163	32.97694
2	-138.8402	-137.274	-137.274	-129.962	-129.9618	33.52006	33.78302

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
CRUDEOILPRICES does not Granger Cause ALGERIAEXP	11	0.43190	0.6763
CRUDEOILPRICES does not Granger Cause EQUADOREXP	11	3.42148	0.1361
CRUDEOILPRICES does not Granger Cause KUWAITEXP	11	6.41213	0.0565
CRUDEOILPRICES does not Granger Cause NIGERIAEXP	11	0.55905	0.6108
CRUDEOILPRICES does not Granger Cause SAUDIARABIAEXP	11	0.34673	0.7263
CRUDEOILPRICES does not Granger Cause UAEEXP	11	1.67014	0.297
CRUDEOILPRICES does not Granger Cause VENEZUELAEXP	11	0.56096	0.6099

INTERPRETATION: The above table depicts Johansen co-integration test has been applied to international crude oil prices with select OPEC Countries crude oil exports. The Log Likelihood rank values were observed decreasing trend in all leaner and quadratic intercept model along with the alpha level. Hence the data of crude oil exports of selected OPEC Countries with international Crude oil prices is co-integrated.

OBJECTIVE 3

Model Summary

Multiple R	.901
R Square	.812
Adjusted R Square	.531
Std. Error of the Estimate	235.985
Log-likelihood Function Value	-31.015

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	965192.346	6	160865.391	2.889	.162
Residual	222755.937	4	55688.984		
Total	1187948.283	10			

Coefficients

	Un standardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	Std. Error	t	Sig.

(Constant)	15603.691	47743.798			.327	.760
Algeria currency	405.812	8604.344	.088	1.866	.047	.965
Kuwait currency	-32.575	45.720	-.386	.542	-.712	.516
Saudi Arabia currency	9795.693	8032.270	.689	.565	1.220	.290
UAE currency	-66208.958	178651.404	-.200	.540	-.371	.730
Nigeria currency	-5376.006	9507.650	-.936	1.656	-.565	.602
Venezuela currency	-8.849	26.334	-.203	.606	-.336	.754

INTERPRETATION: The above table depicts the regression analysis weight estimation has been applied to Dollar index with select OPEC Countries currencies. The international currency Dollar index fluctuation is found to be significance with the OPEC Countries currencies. The probability value is found to be significant during the study period. All the OPEC Countries currencies were stronger with the Dollar index during the study period, except Saudi Arabia.
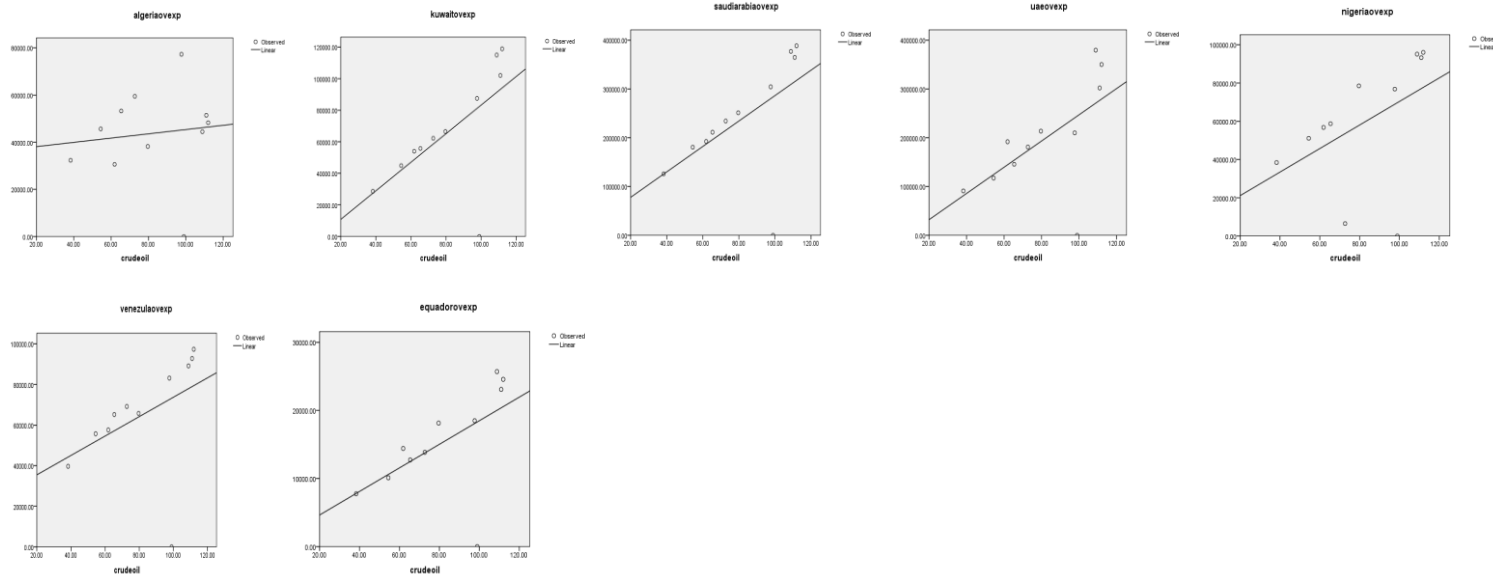
OBJECTIVE 4

Variables	Dependent	Independent							
		Algeria ov exp	Kuwait ov	Saudi Arabia ov exp	UAE ov exp	Nigeria ov exp	Venezuela ov exp	Ecuador ov exp	Crude oil
Number of Positive Values	10	10	10	10	10	10	10	11	
Number of Zeros	1	1	1	1	1	1	1	0	
Number of Negative Values	0	0	0	0	0	0	0	0	
Number of Missing Values	User-Miss	0	0	0	0	0	0	0	0
	System-M	1	1	1	1	1	1	1	1

Model Summary and Parameter Estimates

Dependent Variable :Algeria over all exp

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.014	.127	1	9	.730	3.630E4	90.564

The independent variable is crude oil.

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INTERPRETATION: The leaner regression between the crude oil fluctuation and overall exports of OPEC Countries hypothesis probability value is found to be non significant because the calculated value is grater then 0.5 that is 0.730. The null hypothesis Ho between international crude oil prices and OPEC Countries crude oil exports accepted and rejected the alternative hypothesis H1.

		Variables							
		Dependent	Independent						
		Algeria GDP	Kuwait GD	Saudi Arabia GDP	UAE GDP	Nigeria GDP	Venezuela GDP	Equadar GDP	Crude oil
Number of Positive Values		11	11	11	11	11	11	11	
Number of Zeros		0	0	0	0	0	0	0	
Number of Negative Values		0	0	0	0	0	0	0	
Number of Missing Values	User-Miss	0	0	0	0	0	0	0	0
	System-M	1	1	1	1	1	1	1	1

Model Summary and Parameter Estimates

Dependent Variable: Algeria GDP

	Model Summary					Parameter Estimates	
Equation	R Square	F	df1	df2	Sig.	Constant	b1

Linear	.665	17.846	1	9	.002	16.160	1.570

The independent variable is crude oil.
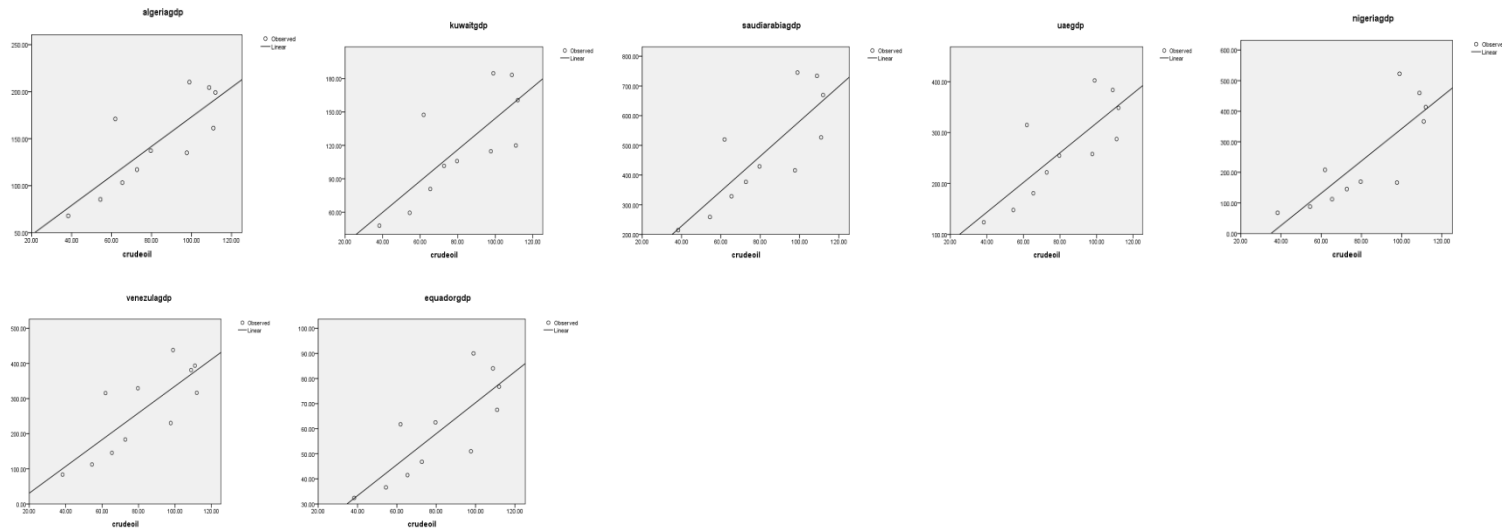
INTERPRETATION: The crude oil price fluctuations affected the OPEC Countries GDP during the study period. The linear trend of regression probability value is observed significant which is 0.002 < 0.5. The null hypothesis is rejected and accepted the alternative hypothesis.

FINDINGS:

1.   International crude oil prices were negatively co related with Kuwait and Saudi Arabia equity analysis
2.   International crude oil prices were having negatively co relation with Saudi Arabia crude oil exports. But whereas all the select OPEC countries crude oil exports are positively correlated during study period
3.   International crude oil prices affected the crude oil exports of Algeria, Nigeria and Saudi Arabia during the study period.
4.   Crude oil exports of Equador, Kuwait, and UAE were not affected by the International crude oil prices fluctuations.
5.   International currency dollar index influenced the OPEC countries currencies during the study period.
6.   International crude oil prices had failed to influence the OPEC countries overall exports during the period of 2004 to 2014.
7.   OPEC countries GDP got influenced by the international crude oil fluctuations.

CONCLUSION: We conclude the analysis of international crude oil price fluctuation impact on OPEC countries crude oil exports. The study has been emphasized for the period of 2004 to 2014. In the recent past international crude oil prices had experienced steep rise and steep fall which affected the OPEC countries overall economy. We had examined the international crude oil prices impact on select OPEC

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countries and observed that Algeria, Nigeria and Saudi Arabian crude oil exports got affected and rest of the countries crude oil exports are not affected. Inspite of international currency dollar index effect has been observed on OPEC Countries currency. Overall exports of OPEC countries were not affected with crude oil price fluctuation but GDP of all countries got affected. Hence further study is recommended in this area to measure the crude oil price fluctuations effect on OPEC countries economy by considering various economic variables. Because, in spite of huge volatility few countries oil exports were not affected in OPEC

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