

ВЛИЯЕ ЛИ НАИСТИНА КУРСЪТ НА ДОЛАРА ВЪРХУ ЦЕНАТА НА ПЕТРОЛА?

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DOES THE USD EXCHANGE RATE REALLY AFFECT OIL PRICES?

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Abstract

This paper is intended to study the relationship between the USD exchange rate and the crude oil prices. The empirical analysis uses regression on time-series data to search for a link between these variables. The results are in favour of the predictions of conventional economic wisdom. Negative link is found which means strong dollar leads to cheap crude oil, and vice versa.

Keywords: *US dollar, crude oil, regression analysis*

JEL Codes: *E31; E52.*

Many analysts relate the fluctuations in oil prices to the changes in the dollar exchange rate. This linkage is done because the oil market has global character and the trade with crude oil uses US dollar. Nowadays the American currency is accepted as an international medium of exchange. However, the exchange rate of the US dollar is not fixed nor it has gold as a nominal anchor. Now, this currency has a floating exchange rate with respect to other currencies. Thus depreciations or appreciations of the currency in which the crude oil is quoted will inevitably affect the price of the commodity traded.

If so, the problems of this link would seem very simple. The devil emerges when we remind that both the items - US dollar and crude oil have their own importance as subject of trade. Thus dollar itself could be an investment for a

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speculating Forex trader. Crude oil too. Which item would be a better choice for investing?

Along with the above mentioned ones, lots of economic and political factors do influence the price of crude oil. Of course, such factors impact the exchange rate of the US dollar. The simple assumption on the link of interest could lead us to deep theoretical reasoning. But the picture of the nature of the link could be complete if the theoretical predictions are confirmed by statistical estimation.

In this respect, the present article is intended to estimate the link between the US dollar exchange rate and the price of crude oil through statistical technique. We will estimate a simple regression with quarterly data on these variables. The period covers the years from 2005 to 2016. First two quarters of 2016 are included in the time-series used. The quantitative data is downloaded via MetaTrader 4 platform.

As pointed, our analysis estimates a regression between crude oil prices and US dollar exchange rate. The price is dependent variable in the simple model. It has been taken as units of dollar. The exchange rate of the US dollar is expressed on the background of the common currency of the Euro area. This is the most widely traded currency pair in the globe. The right quotation is Euro versus Dollar given in short 'EUR_USD'. Both the variables were put in the estimations with their short scripts.

Table no 1 - Regression between USD Exchange Rate and Crude Oil Price

Dependent Variable: Oil_Price
Included observations: 46

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-111.0321	36.45548	-3.045691	0.0039
EUR_USD	144.5304	27.78377	5.201971	0.0000
R-squared	0.380809	Mean dependent variable	78.05130	
Adjusted R-squared	0.366737	S.D. dependent variable	23.79434	
S.E. of regression	18.93502	Akaike info criterion	8.762408	
Sum squared residuals	15775.54	Schwarz criterion	8.841914	
Log likelihood	-199.5354	F-statistic	27.06050	
Durbin-Watson statistic	0.186172	Prob(F-statistic)	0.000005	

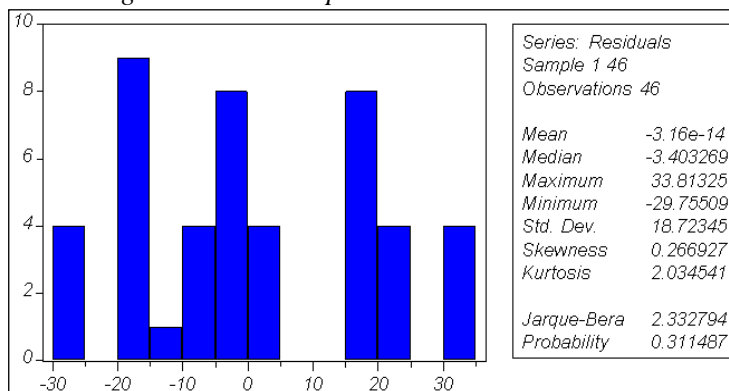
Source: Authors' calculations

The estimation on the regression relationship between these variables is presented in Table 1. It was derived in raw state from E-Views output. The parameters of regression prove a negative relation between the variables of interest. Formally, the appreciations of Euro with respect to US dollar cause the oil price to increase. Appreciation of the common currency means depreciation of dollar. Therefore, the depreciations of the dollar lead to more expensive crude oil. Such a link was also predicted by Hecht (2015) and Kowalski (2016).

Empirical estimates have also proven this relationship is clearly expressed. The p-value at which the coefficient is statistically significant equals to zero. The last thing makes this finding to be reliable empirical evidence. In this respect, the adequacy hypothesis is confirmed by the F-statistic. Another important thing is related to the explanatory power of the model. It shows that above one third of the deviations in oil prices are explained by the US dollar exchange rate fluctuations. The rest of the deviations could be caused by economic factors.

The skewness of the empirical distribution of the residuals of unexplained deviations of the dependent variable seems to confirm the existence of factors positively affecting the crude oil price. These factors are not included in the model of our study. Jarque-Bera statistic does not confirm the hypothesis for a statistically significant differing form normal symmetric distribution. However, the form of the distribution and the quantitative indicators of descriptive statistics are in favour of non-normal empirical distribution. These details are seen on Figure 1.

Figure no 1. Descriptive Statistics on Residuals



Source: Authors' calculations

Granger causality is another important detail of the picture of the relationship found. The test is applied under assumptions of up to 4 lags. The results are collected in Table 2. As evident, no significant bilateral causal

relationship found by this procedure. It means that not every increase in the price of crude oil is preceded by a weakening of the USD. This is evidence for a bigger importance of other factors affecting the oil prices. The last conclusion was also implied by the explanatory power of the model.

Table no 2 - Pairwise Granger Causality Tests

Lags: 1; Null Hypothesis:	Obs	F-Statistic	Probability
EUR_USD does not Granger Cause Oil_Price	45	0.58226	0.44969
Oil_Price does not Granger Cause EUR_USD		0.90647	0.34650
Lags: 2; Null Hypothesis:	Obs	F-Statistic	Probability
EUR_USD does not Granger Cause Oil_Price	44	0.25249	0.77813
Oil_Price does not Granger Cause EUR_USD		0.44567	0.64361
Lags: 3; Null Hypothesis:	Obs	F-Statistic	Probability
EUR_USD does not Granger Cause Oil_Price	43	0.14347	0.93319
Oil_Price does not Granger Cause EUR_USD		0.31349	0.81550
Lags: 4; Null Hypothesis:	Obs	F-Statistic	Probability
EUR_USD does not Granger Cause Oil_Price	42	0.08382	0.98683
Oil_Price does not Granger Cause EUR_USD		0.25590	0.90397

Source: Authors' calculations

In conclusion, we can say strong dollar means not only weak gold but also weak black gold. Our empirical study confirmed this assumption finding a negative link between the US dollar exchange rate and crude oil price.

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