

The Impacts of Oil Price on Exchange Rate: Evidence from Iraq

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Abstract

This research is about of oil price fluctuations on Iraq's economic performance. This economic effect on defined economic variables is quantified using a simple Ordinary Least Squares (ARDL) model. Iraq's actual Gross Domestic Product (GDP) is linked to the economic model GDP in relation to crude oil prices (West Texas Intermediate "WTI" crude, the US benchmark for oil pricing). In Iraqi-American dialogue to account for the value of Iraq's exports in terms of foreign currency, especially the US dollar, a rate was included in the model as an independent variable. To account for the years of political unrest, a dummy variable was developed. The elasticity of the economic variables used in the study is considered to be statistically important. Lagged GDP elasticity, oil price elasticity, and exchange rate was included in the study as well.

Keywords: Oil Price, Exchange Rate, Fluctuation, Iraq

Introduction

After the oil price shock in 1973, the changes in oil price became a very important aspect of finance because it has broad effects over macroeconomic variables which resulted in many research papers about the topic such as this one. The price of crude oil is made in United States Dollars internationally, that's why any changes in the price of oil directly affect currency exchange rates, and any increase in the oil price will positively impact the oil-exporting countries but negatively affect oil-importing countries. This relationship is also true in Iraq and the country gets heavily affected after all Iraq is the third-largest exporter of oil in the world.

Crude oil is a mixture of relatively volatile liquid hydrocarbons (compounds consisting primarily of hydrogen and carbon), although it also includes some nitrogen, sulfur, and oxygen. These elements form a wide range of complex molecular structures, many of which can't be readily identified. Approximately 5000–6000 years ago, ancient Sumerians, Assyrians, and Babylonians utilized crude oil obtained from large steps at Tuttul on the Euphrates River as a wound treatment and oil in lamps that would provide light; Berdzenadze I. This is the first known use of crude oil. The demand for crude oil and natural gas increased with the population, and on August 27, 1859, Edwin L. Drake struck crude oil at his well near Titusville, Pennsylvania. He found oil underneath the ground and invented a way to pump it to the surface. This has become the root of today's crude oil production; Curley RP.

Oil has been the backbone of the global economy for over a hundred years, accounting for more than half of humanity's primary energy supply. This high energy density and readily available fossil fuels have played a significant role in several of the largest industries, such as chemicals, transport, electricity, petrochemicals, etc. The availability of inexpensive, plentiful energy lifts nations out of poverty, and energy protection has indeed become a national priority for most nations. The supply of crude oil and

Zamo / The Impacts of Oil Price On Exchange RATE: Evidence from Iraq

natural gas has become very significant, particularly in the face of increasing demand for energy for comfort and technological growth.

Over the last few years, the progress of the crude oil and natural gas production industry has been dramatic. The economic benefits of exploration and production activities of oil (including multiplier effects) are predicted to include approximately US \$1.2 trillion in gross product per year, as well as more than 9.3 million long-term and permanent jobs in the United States. An increase in production in an attempt to meet energy demand has been a result of this rise in global demand for crude oil and natural gas. Many economists have studied the relationship between oil price fluctuation and the macroeconomic performance of many developed countries since the 1970s. Several articles linked the economic growth of the developed economies to oil price fluctuations, while others looked at the macroeconomic and industrial effects of oil price fluctuations on economic activities, production, and real GDP growth in industrialized and OECD countries.

As we all know oil products have an influence on almost every aspect of modern life. As a result, energy economists will not be shocked to learn that crude oil, a source of energy, and its numerous derivatives have become one of the most important measures of global economic activity in recent decades. Oil is essential for about 37% of global energy production. This accounts for almost all the worldwide energy consumption in the transport sector. Globally, per capita and total energy consumption is rising dramatically, particularly with the increasing amount of vehicles and the widespread availability of fossil fuel for electricity generation. Therefore, oil is considered a highly strategic product that affects the economy and security of the world. It is no wonder then, that price variability and the relative decrease in its accessibility have a direct effect on the health, education, and safety of billions of people around the world. Fezzani and Nartova (2011) argue that despite the fact that Iraq has a large crude oil and natural gas reserve, the future of this sector continues to be unclear.

Research Problem

This research is concerned with discovering how the price of oil affects the exchange rate of Iraqi Dinars compared with dollars, the research also tries to estimate the extent of the impact.

Research Objective

This research aims to discover the nature and the outcome of the relationship between crude oil prices and the exchange rate of Iraqi Dinars by explaining the variables that govern this relationship and the period of the process.

Research Hypothesis

This research tries to investigate in the impact of oil price on exchange rate for the period of 2004 to 2019. To do so, the following hypothesis has been put.

H0: there is no impact of oil price on exchange rate

H1: there is a positive and significant impact of oil price on exchange rate

Literature Review

Oil and Oil Production

Crude oil is a naturally occurring, unrefined petroleum product composed of hydrocarbon deposits and other organic materials. A type of fossil fuel, crude oil can be refined to produce usable products such as gasoline, diesel, and various other forms of petrochemicals. In 1927, after two long years of drilling in different cities and locations, oil was found in Baba Gurgur Field just north of Kirkuk. Baba Gurgur was considered the biggest oil field in the world for 21 years until the Ghawar Field was found in al-Ahsa, Saudi Arabia. Ever since the oil discovery almost a century ago, Iraq has been relying on oil as its main export more and more; Resulting in a huge neglect in agricultural, manufacturing and confectionary industries that Iraq was well known for before. In 2019, oil comprised 96% of total Iraqi exports. Being an oil-oriented economy; Iraq's economy has been very vulnerable and unstable due to the constant fluctuations in the oil prices in recent years, creating an environment of chaos best favored by corruption to grow.

Production rates of oil have seen dramatic fluctuations throughout history in Iraq. Between the years 1990 and 1991 Iraq scored an all-time low record in production rates after it dropped from 2.04 millions of barrels to just 305,000 barrels per day after the invasion of Kuwait which crippled Iraq economically and politically. Iraq started healing from the damages caused by the invasion and slowly increased the production rates; By 1997 it surpassed the 1 million barrels per day barrier and continued increasing gradually and kept fluctuating between the years. In 1998, production rates surpassed 2 million barrels per day and kept increasing gradually until it surpassed 3 million barrels per day in 2013. The last publicly shared report showed an average of 4.5 million barrels per day produced in the year 2020.

Both oil price and the U.S. dollar exchange rate are leading economic variables, which drive the evolution of the world economy. Their changes deeply affect international trade and economic activity in all countries. An important issue is therefore the link between these two key variables: are they moving independently or not? What are the empirical evidences on the statistical link between them? Are there theoretical grounds that could explain the channels of transmission? Several previous studies have already tackled related issues. On the one hand, empirical works by Throop (1993), Zhou (1995), Amano and van Norden (1995), Dibooglu (1995) have evidenced a relation between oil prices and exchange rate movements. In the case of the dollar, the link is generally found to be positive, which means that an increase in oil price goes with a dollar appreciation. Very few of these papers then try to ask which variable causes the other. That is the case for Amano and van Norden (1995), who show that oil price is a main driving factor of the long-term evolution of exchange rates in Germany, Japan and the United States (see also Bénassy-Quéré et al., 2007).

Exchange Rate

Exchange rate: exchange rate is the price of a currency weighed against another currency, exchange rates can be either fixed or floating. Fixed exchange rates are decided by central banks of a country whereas floating exchange rates are decided by the mechanism of market demand and supply. There are two types of exchange rate: fix and floating exchange rates.

Zamo / The Impacts of Oil Price On Exchange RATE: Evidence from Iraq

First fix exchange rate is a system applied by an administration or central bank that ties the country's true money swapping scale to another nation's cash or the cost of gold. The reason for a fixed conversion scale framework is to keep a cash's worth inside a thin band.

Second floating exchange rate is a system where the cash cost of a country is set by the forex market dependent on organic market comparative with different monetary forms. This is as opposed to a fixed conversion scale, in which the public authority altogether or overwhelmingly decides the rate.

Beside components, for example, financing costs and expansion, the money swapping scale is perhaps the main determinants of a country general degree of monetary wellbeing. A higher-esteemed money makes a nation imports more affordable and its fares costlier in unfamiliar business sectors.

A conversion scale is the amount it expenses to trade one cash for another. Trade rates vacillate continually over time as monetary forms are effectively exchanged. This pushes the cost here and there, like different resources, for example, gold or stocks. Current global trade rates are dictated by an oversaw drifting conversion scale. An oversaw gliding conversion scale implies that every cash worth is influenced by the monetary activities of its administration or national bank.

As we all know oil products have an influence on almost every aspect of modern life. As a result, energy economists will not be shocked to learn that crude oil, a source of energy, and its numerous derivatives have become one of the most important measures of global economic activity in recent decades. Oil is essential for about 37% of global energy production. This accounts for almost all the worldwide energy consumption in the transport sector. Globally, per capita and total energy consumption is rising dramatically, particularly with the increasing amount of vehicles and the widespread availability of fossil fuel for electricity generation. Therefore, oil is considered a highly strategic product that affects the economy and security of the world. It is no wonder then, that price variability and the relative decrease in its accessibility have a direct effect on the health, education and safety of billions of people around the world.

Despite the fact that Iraq has a large crude oil and natural gas reserve, the future of this sector continues to be unclear. Different sources show that this country has one of the largest reserves in the world, the experts argue, and that a democratic and real management of the benefits of this sector, through a participatory, democratic and accountable production system, will provide a high level of welfare and thus human growth (Tsui, 2011). Oil revenues derive their significance from the Iraqi economy, which relies on the complete reliance of the oil sector on revenue financing from the general budget of the state's average contribution to public revenue from oil revenues is 94.6%. Throughout the duration of study, crude oil prices in the class are the most important factors in oil revenues.

The real exchange rate is a significant measure of a country's foreign trade competitiveness. The definition of an exchange rate it is the price of a local currency unit equivalent to the foreign currency or the currency exchange rate of another currency. The following can also be used to explain the relationship between the exchange rate and the value of

The local currency: Any rise in foreign exchange means the local currency is devalued, and a low exchange rate means the local currency is appreciated, meaning that the relationship between the exchange rate and the value of the local currency is inverse (Maarroof, 2006). The meaning of the intrinsic relationship

between oil revenues and exchange rates can be seen (when taking exchange rates as a function of revenues), whereas economic theory defines the relationship between them as inverse (any rise in income contributes to a decrease in exchange rates). The economic structure of this relationship is based on the proceeds of oil denominated in foreign currency (in dollars). When oil revenues rise, so does the availability of foreign currency in the domestic economy, allowing the local currency appreciation against the foreign currency. In the distorted Iraqi economy, characterized by economic handicaps and the idea of monetary policy, which attempts to maintain the foreign-currency exchange rate of the Iraqi dinar, it is ineffective to be reliant on one policy at the expense of the dollar reserve (the currency cover). In addition to the failure to assess the path of the foreign currency sold, the seller just intervenes (money laundering), and the purchasing is restricted to a small group of people (banks) who participate in speculative practices in order to achieve big price differences and then unlawfully make large profits; changes in the amount of oil revenues as a shock to be expressed in exchange rates may be explicitly suggested (Qasim, 2018).

Methodology

Participants

Data is simply the raw facts and figures gathered during a company's operations. They can be used to monitor and quantify a wide variety of internal and external business activities. Although the data itself isn't very insightful, it serves as the foundation for all reporting and is thus critical in business.

In this study we need data and there are two types of data; primary data or secondary data. The secondary data is obtained by anyone other than the primary user. Censuses, information collected by government agencies, organizational documents, and data collected for other research purposes are all common sources of secondary data.

Procedure and Measure

In order to achieve research objectives an econometrics program has been used. It is a statistical platform that incorporates spreadsheet and relational database technologies with conventional statistical tasks. Based on it, first of all I had to test (unit root test). A unit root test in statistics determines if a time series variable is non-stationary and has a unit root (Pesaran, 2007). Depending on the test used, the null hypothesis is the existence of a unit root, and the alternative hypothesis is either stationary, pattern stationary, or explosive root.

Also in this study I used co-integration test to describe situations in which two or more non-stationary time series are combined (Kremers, Ericsson, & Dolado, 1992). The tests were used to determine how sensitive two variables gave the same average price over a given time span.

Then Granger causality test is a statistical hypothesis test used to determine whether one-time series can be used to predict another. If the likelihood value falls below a certain threshold, the hypothesis is rejected at that stage (Hoffmann, Lee, Ramasamy, & Yeung, 2005).

An autoregressive distributed lag (ARDL) model is an OLS-based model that can model both non-stationary and mixed order of integration time series. A dynamic error correction model (ECM) can be produced

Zamo / The Impacts of Oil Price On Exchange RATE: Evidence from Iraq

from ARDL using a simple linear transformation. The ARDL / EC model can be used to predict and separate long-term relationships from short-term dynamics.

R-square: For a linear regression model, R-squared tests the proportion of the variance in the dependent variable (Y) explained by the independent variables (X). The statistic is adjusted for the number of independent variables in the model with adjusted R-squared. This is important because one can manipulate R-squared by introducing more and more independent variables, regardless of how well they are linked to the dependent variables.

The Figure 1 below shows the oil price time period annually from 2004 to 2019. In 2004 price of oil was 26.38\$ per barrel, then in 2005 one barrel of oil price increased to 57.54\$. This increasing was beneficial for central bank because Iraq at that time earned much more than 2004. After that in 2006 oil price was decreasing incredibly to 16.65\$. After 2006 price started increasing till 2009. Between 2006 and 2009 oil price saw those prices on its own. In 2007 it was 44.72, and in 2008 the price slowed down to 37.97\$ but in 2009 it was 74.61\$ because of some political reasons.

From 2009 to 2011 the price of one barrel was 26.11\$, and after 2011 price started increasing till 2014. Between 2011 and 2014 oil price saw those prices on its own, and in 2012 it was 63.11\$. In 2013 price slowed down to 56.10\$ but in 2014 it was 97.98\$. After peaking at \$107.95 a barrel on June 20, 2014, petroleum prices plunged to \$44.08, and a barrel by January 28, 2015 dropped 59.2 percent in a little over 7 months. From 2018 to 2019 oil price of one barrel was somehow constant between 66\$ to 68\$ per barrel.

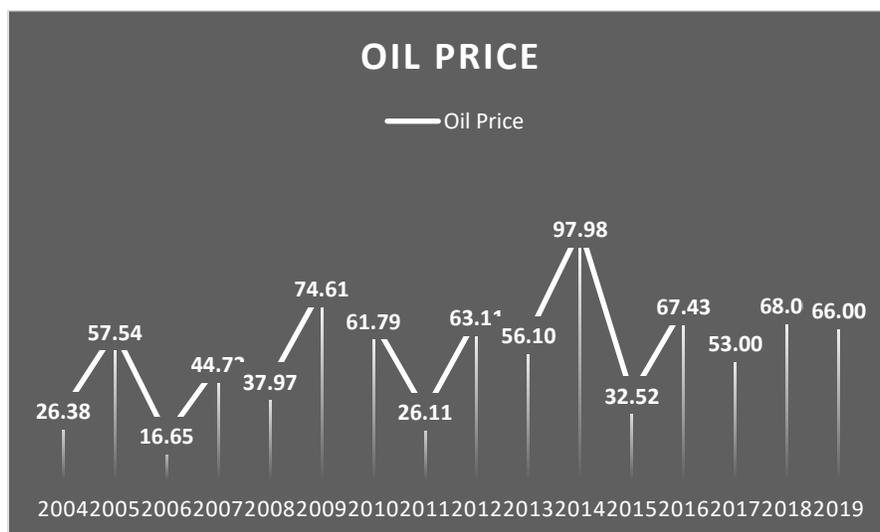


Figure 1 The oil price time period annually from 2004 to 2019

Data Analysis

Stationary process is a stochastic process whose unconditional joint probability distribution does not alter as time is changed in mathematics and statistics. If P-value is smaller than 5%, the data are stationary and

could be relied on. Based on Table 1 our data are less than 5% which means the data are stationary data because P value is (0.0037) and is less than 5%.

Table 1 Unit root test for oil price

Null Hypothesis: D(OILPR) has a unit root		
Exogenous: Constant		
Lag Length: 3 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.870485	0.0037
Test critical values: 1% level	-4.200056	
5% level	-3.175352	
10% level	-2.728985	

Based on Table 2, P value is (0.0041) which means data of exchange rate is stationary data.

Table 2 Unit root test for exchange rate

Null Hypothesis: D(EX,2) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=4)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.585433	0.0041
Test critical values: 1% level	-4.057910	
5% level	-3.119910	
10% level	-2.701103	

Co-Integration Test

Co-integration test describes situations in which two or more non-stationary time series are combined in such a way that they cannot deviate from equilibrium over time. The tests are used to determine how sensitive two variables are to the same average price over a given time. Based on Table 3, p value of the

Zamo / The Impacts of Oil Price On Exchange RATE: Evidence from Iraq

variables are less than 5% which means they are related to each other, rate of oil price is (0.0061) and exchange rate is (0.0040) which tells us variables that are related to each other

Based on Table 3, oil price (-1) has effects on exchange rate because the probability of oil price (-1) is less than %5 which is (0.0477); it's the result of ARDL test.

Table 3 ARDL test

Date: 04/28/21 Time: 01:20				
Sample (adjusted): 2006 2019				
Included observations: 14 after adjustments				
Trend assumption: Linear deterministic trend				
Series: OILPR EX				
Lags interval (in first differences): 1 to 1				
Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.602935	21.23666	15.49471	0.0061
At most 1 *	0.447470	8.305466	3.841466	0.0040

Granger Causality Test

The Granger causality test was first suggested by Granger and it is a statistical hypothesis test for deciding whether one-time series is useful in forecasting. The Granger causality test is a statistical hypothesis test used to see whether one-time series can be used to predict another. If the likelihood value is less than a certain threshold, the hypothesis is rejected at that level.

Based on Table 4, granger causality tests rejected our hypothesis because probability result is (0.0218), and it is less than 5% which means hypothesis is rejected. Oil price depends on exchange rate because when price of oil will increase central bank will get more dollars and when supply of US dollar becomes more and more, automatically domestic exchange rate which is dinar will increase. If oil price will decrease again, income of central bank becomes less and less at that time because lack of dollar supply in market domestic currency will increase in market.

Table 4 Granger Causality test

Pairwise Granger Causality Tests

Date: 04/28/21 Time: 01:22

Sample: 2004 2019

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
EX does not Granger Cause OILPR	15	6.93710	0.0218

Table 5 Dependent variables

Dependent Variable: EX

Method: ARDL

Date: 04/28/21 Time: 20:37

Sample (adjusted): 2007 2019

Included observations: 13 after adjustments

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (3 lags, automatic): OILPR

Fixed regressors: C

Number of models evaluated: 4

Selected Model: ARDL(1, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
OILPR(-1)	0.076901	0.110171	0.698012	0.0477
C	61.08657	49.28391	15.76307	0.0000

Zamo / The Impacts of Oil Price On Exchange RATE: Evidence from Iraq

R-squared	0.963789	Mean dependent var	1181.077
Adjusted R-squared	0.937924	Hannan-Quinn criter.	6.649722
S.E. of regression	0.054014	Durbin-Watson stat	1.335335
Sum squared resid	246.4877		
Log likelihood	-37.57156		
F-statistic	37.26226		
Prob(F-statistic)	0.000067		
*Note: p-values and any subsequent tests do not account for model			

Based on Table 5, R-square test is significant and this study model is (0.963789). Adjusted R-square is (0.937924) which means both R-square and adjust R-square don't have any problems with the models because the rates are more than 50%. S-E regression is the standard error of the regression (S), also known as the standard error of the estimate. It conveniently shows how far off the regression model is on average by using the response variable's units. S-E regression is (0.054014); this rate less than %5 which means standard error is less than requested. Oil price (-1) has effects on exchange rate because the probability of oil price (-1) is less than %5 which is (0.0477).

Conclusion

This research is about oil price impact on exchange rate. One of the great issues that are facing developing countries such as Iraq is reliance only on one sector, which is oil production. The issue of overdependence on the oil sector in Iraq has increased ever since the mid-2000s and the sector faced a significant drop in the prices in 2014. Iraq's economy is heavily dominated by the public sector due to the government's ownership of most of the oil fields in Iraq, and the revenue acquired from this affects the domestic currency through public spending.

References

- Aliyu, S. U. R. (2009). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation.
- Berdzenadze, I. (2015). Oil's Role in the World Economy and Global Crisis. Accessed on, 12, 06-17.
- Curley, R. (Ed.). (2011). Fossil fuels. Britannica Educational Publishing.
- Cleveland, C. J. (Ed.). (2009). Concise encyclopedia of the history of energy. Academic Press.
- Farris A (2012). Oil. Energy BC, May 2012. www.energybc.ca/profiles/oil.html. Accessed 31 August, 2016
- Fezzani, B., & Nartova, D. (2011). Oil prices fluctuation impact on Iraq's economy. *European Journal of Social Sciences*, 26(4), 626-633. *European Journal of Social Sciences*. 26(4), 627.

- Ghosh, S. (2011). Examining crude oil price–Exchange rate nexus for India during the period of extreme oil price volatility. *Applied Energy*, 88(5), 1886-1889.
- Hoshiar Maarooof, 2006. The Analysis Of The International Economics, First Edition , Dar Jurair For Publishing And Distribution, Amman.
- Narayan, P. K., & Narayan, S. (2010). Modelling the impact of oil prices on Vietnam's stock prices. *Applied Energy*, 87(1), 356-361.
- Narayan, P. K., Narayan, S., & Prasad, A. (2008). Understanding the oil price-exchange rate nexus for the Fiji Islands. *Energy Economics*, 30(5), 2686-2696.
- Rahman, M. (2004, November). Oil and gas: the engine of the world economy. In Presentation as OPEC Secretary General at the Tenth International Financial and Economic Forum, Vienna, Austria (pp. 10-11).
- Qasim, M. (2018). The Effect of Economic Variables in the Exchange Rate of the Iraqi Dinar for the Period (1995-2015). *Journal of University of Human Development*, 98.
- Sek, S. K., Teo, X. Q., & Wong, Y. N. (2015). A comparative study on the effects of oil price changes on inflation. *Procedia Economics and Finance*, 26, 630-636.
- Sari, R., Hammoudeh, S., & Soytas, U. (2010). Dynamics of oil price, precious metal prices, and exchange rate. *Energy Economics*, 32(2), 351-362.
- Tsui, K. K. (2011). More oil, less democracy: Evidence from worldwide crude oil discoveries. *The Economic Journal*, 121(551), 89-115