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Impact of Oil Price Fluctuations on Human Development: A Standard Study of Iraq

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Abstract

This paper examines the impact of oil price fluctuations on Human development in Iraq. We employed UNDP statistical data in HDI and oil prices were obtained from OPEC official statistics. EGARCH model is applied to estimate the series of oil price fluctuation. Further, we applied ARDL bound test approach to estimate the long run relationship between HDI and oil price fluctuation. Evidence shows that there is a long run relationship among the variables under study. A significant impact on human development index is witness due to fluctuations in oil prices. Since the dependence of Iraqi economy on oil exports tightly align the government spending with oil revenues. Therefore, this study proposes that Government should adopt a diversified policy and invest in other sectors of the economy, such as the industrial sectors. Investment in these sectors will help to increase the output of exportable goods. Exports of these goods can earn more foreign exchange. This will reduce the heavy reliance on oil revenues. The government needs to spend more money to provide infrastructure like transport facilities and stable electricity supply. This will help encourage private companies to invest more in their economic resources by reducing the cost of doing business.

Keywords: Human development; Oil price fluctuations; Iraq; ARDL; EGARCH.

1. Introduction

The oil emergency was one of the greatest variables driving some oil utilization and industrialized nations, for example, the US and Britain into a retreat that kept going over a year. The history rehashed itself, when Iranian oil interfered with the creation of the Iranian transformation, trailed by the Iraq-Iran war, which prompted taking off oil costs in 1979– 80. This time, notwithstanding supply stuns, oil costs ascended because of foreseen supply deficiencies and rising worldwide interest, as inventories request Increased. Value stuns have majorly affected US total national output, and the US economy has dove into subsidence. The timetable for the breaking down of the Soviet Union goes back to Saudi Arabia's choice to quit ensuring oil costs and increment creation in 1985. The sudden fall in oil costs is one of the key components influencing the financial crises of the USSR. The locale lost about $20 billion every year because of declining oil send out incomes, which prompted substantial government acquiring in consequent years. The sharp changes in oil costs have assumed a vital job in pushing the economy into retreat and even the crumple of the administration. In other words, financial specialists and worldwide policymakers are firmly following the oil value slant (Dogah, 2015).

Iraq is the seventh largest producer and exporter of oil. Iraqi economy heavily dependent on oil exports, crude oil exports accounts for 99% of total country's exports. The high level of dependence on oil exports has linked the economic vulnerability with volatility in oil prices. Fluctuations in oil prices can affect the economic health (Englama *et al.*, 2010). Since the dependence of Iraqi Economy on oil exports, a dynamic impact of oil prices has been observed on economic prosperity of Iraq. The shortage of fund creates delays in payment by government and ultimately slows down the investment activities. Being an oil export dependent economy, socio-economic development of Iraq is very slow as compare to other oil economies like Iran and Saudi Arabia. According to UNDP (2018) report on human development indices and indicators Iraq stood 120 among total 189 countries. Therefore, Iraq being a mono-product economy suffers a lot in term of economic development due to volatile oil prices. Previously, many studies have been conducted to investigate the oil price volatility and economic development. However, socio-economic development and its relationship with oil price fluctuation have been neglected among economic literature in general and in Iraq particularly.

This study aimed to investigate the potential cause of slow human development in Iraq. For, this purpose oil price volatility is investigated to influence the human development in Iraq. Therefore, this investigation is motivated to enhance economic literature on human development led growth hypothesis by providing empirical evidence. Findings of this study would provide guidelines for policy makers on empirical basis to analyze and improve the human development of Iraq. Rest of the study is structured as section 2 consists of previous literature on the subject

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matter. Section 3 explains the methodology of this study. While section 4 presents and discuss the results of econometric analysis. In the last, sections 5 conclude the study with practical implication.

2. Literature Review

According to human capital theory the development of knowledge, creativity and skills is embodied the ability to produce economic value. Holistically, economies invest on the human development on the basis of current economic profits and future earnings (Adelakun, 2011; Jhingan, 2003). Low investment on human development leads to lower economic growth due to inefficient and unskilled labor force. It is evident that most of previous studies are economic growth focus specifically in terms of GDP and GDP growth (Alley *et al.*, 2014; Ani *et al.*, 2014; Chang and Wong, 2003; Du *et al.*, 2010; Edesiri, 2014; Eltony and Al-Awadi, 2001; Guo and Kliesen, 2005; Katsuya, 2010; Nagmi and Moftah, 2016; Rukmani and Bartleet, 2007; Shanaz and Sazan, 2016; Wilson *et al.*, 2014). This shows the negligence of investment in human capital development specifically in Iraqi context. However, some studies has also focused on oil price volatility but limited to investments only (Atilla, 2013).

Various investigations have uncovered positive results utilizing different methodologies ranging from Ordinary Least Square Method (OLS), Generalized Method of Momemt (GMM), Generalized Autoregressive Conditional Heteroscedasticity (GARCH) Model, Vector Error Correction Model (VECM) to Vector Autoregressive Model in the examination of the connection between oil price unpredictability and economic prosperity (Elmi and Jahadi, 2011; Ndungu, 2013). However some investigations focused on oil prices fluctuation impact on micro-economic variables (Shahidan *et al.*, 2013).

Utilizing a Vector Autoregressive Model by Adel found that oil returns impact on government interest in Syria and found a positive outcome. Similarly some investigations asserted that the connection between oil price fluctuations and human capital advancement are closely relevant. Two separate focusing oil price fluctuations on economic growth have revealed that countries investing on human development are more prosperous to attain benefits from increase in oil prices.

From the investigated ponders above, it is very simple to deduce that the connection between oil price vulnerability and human capital improvement has been less contemplated, particularly as it identifies with the Iraqi economy. As such, the majority of the writing in Iraq focused on oil price instability economic development nexus. It is likewise evident that reviews on oil price instability and investment is inconclusive. For example, a few examinations detailed positive outcomes while some others announced negative outcomes. In this way, it isn't certain whether there is constancy impact in oil value instability. In view of these results, we add to the current assemblage of learning by investigating the steadiness impact in oil cost and the effect of oil price instability on human capital development in Iraq.

3. Methodology

This examination expected to explore the connection between human development and oil price fluctuations. In the first step we generate a time series of change in oil prices. In second step we regressed human development indicators against oil price volatility. We utilize following function to estimated proposed model.

HDI = f (PR,K, GDP) (1)

Where HDI stands for human development index obtained from UNDP annual reports. PR represents the oil price fluctuations and K is Gross Fixed Capital Formation and GDP represents the Gross Domestic Product. The data on selected variables were obtained on yearly basis consisting the time period of 1971 to 2017.

3.1 Model Estimation

EGARCH (Exponential Generalized Autoregressive Conditional Heteroskedasticity) Model was utilized to create the series of oil price fluctuations. EGARCH Model is useful to determine in deciding the industriousness impact in price vulnerability. EGARCH Model has been exhibited by numerous investigations to provide more concise results as compare to other models like GARCH and ARCH. Following equation is utilized to measure EGARCH model:

$$\log(\llbracket\sigma_t\rrbracket^2) = \omega + \sum_{j=1}^{q}\beta_j \log(\llbracket\sigma_{(t-j)}\rrbracket^2) + \sum_{i=1}^{p}\alpha_i \left|\mu_{(t-1)}/\sigma_{(t-1)}\right| + \sum_{k=1}^{r}\lambda k\ \mu_{(t-1)}/\sigma_{(t-1)} \quad (2)$$

In this equation oil price variations are represented by $\llbracket\sigma_t\rrbracket^2$. $\llbracket\sigma_{(t-j)}\rrbracket^2$ Shows the variance of previous time period. β Shows the persistence in volatility.

Further the investigation utilizes the ARDL strategy to quantify the connection between oil price fluctuations and human development index. Despite the fact that some informative factors are endogenous this estimation gives more reliable results over long period estimation. Unit root test has been applied first to measure the no co-integration at second difference. To get vivacious outcomes ADF and PP unit root tests has been used to get more robust results. The unit root test outcomes are shown in Table 1. The ADF and PP tests demonstrate that the connection variable is the indispensable of HDI in first difference.

Table-1. Unit Root Test Results

	ADF test		PP test	
Variables	I(0)	I(1)	I(0)	I(1)
PR	-1.43	-5.24*	-1.315	-5.716**
K	-2.27**	-8.36*	-4.317***	-13.587*
GDP	-2.83	-5.92**	-3.618	-7.136**

Further, to examine the co-integration we employed unrestricted ECM model. Following equation represents the ECM model to estimate the co-integration between HDI and PR.

〖ΔHDI〗_t=ϑ_1+ϑ_2 HDI+ϑ_3 〖PR〗_(t-1)+ϑ_4 〖GDP〗_(t-1)+ϑ_5 K_(t-1)+∑_(i=1)^p▒ϑ_i 〖ΔHDI〗_(t-i)+∑_(j=0)^q▒ϑ_j 〖ΔPR〗_(t-j)+∑_(k=0)^r▒ϑ_k 〖ΔGDP〗_(t-k)+∑_(l=0)^s▒ϑ_l 〖ΔK〗_(t-l) (3)

The co-integration among variables is determined on the basis of F-statistics. The null hypothesis is therefore rejected if the calculated F statistic value is higher than the upper bound, hence, indicating co-integration. The null hypothesis of no co-integration is accepted if the calculated F statistic value is lower than the lower limit. In contrast, if the calculated F statistic is in the boundary range, the inference will be Indeterminate. Further, Breusch-Godfrey LM test to establish length of lag.

Table-2. ARDL Estimations

Specifications	Max. lag length	*F*-test	Lower-upper bound (1%)	Lower-upper bound (5%)	Lower-upper bound (10%)
HDI/(*PR, GDP, K*)	3	2.53	5.19-6.84	3.62-4.91	2.91-4.10

Dependent variable: is shown outside the brackets.

Table-3. Coefficient Estimation

Independent	
PR	2.84
	(1.72)
GDP	1.43*
	(4.82)
K	0.76*
	(4.28)
Constant	66.53
	(3.74)
Adj. R^2	0.78
F-statistics	28.72*

The t-statistics are presented in parenthesis. AIC is utilized for selection of lag.

Table 2 and 3 shows the outcomes of ARDL test based on factors chose for this model. The results shows that there is a co-integration among variables on interest. A long run relationship among the HDI and oil prices fluctuations has been confirmed. Further, we employed granger causality test is applied using following equation:

〖ΔHDI〗_t=C_0+∑_(i=1)^p▒C_i 〖ΔHDI〗_(t-i)+∑_(j=1)^q▒C_j 〖ΔPR〗_(t-j)+∑_(k=1)^r▒C_k 〖ΔGDP〗_(t-k)+∑_(l=1)^s▒C_l 〖ΔK〗_(t-l)+ω 〖ECT〗_(t-1) +μ_4t (4)

The equation (4) consists to diagnose long run causality on the basis of Granger Causality test. Table 4 demonstrates the consequences of the long run causal relationship. This revelation gives solid proof of the long run causal connection between HDI and oil price fluctuations. These outcomes affirm the consequences of bound tests that build up a long run connection among HDI and PR in the presence of control variables.

Table-4. Granger Causality Test Results

Dependent	1
GDP	0.812*
	(6.38)

* sig. at 1% level. Values in parenthesis are *t*-values.

The increase in oil wealth led to improve the human development index. More importantly, we find that the persistence effect is large and significant. The conclusion is that fluctuations in oil prices can take a long time to die. Tables 2 and 3 also show the there is a long run relationship between two variables. The R2 is 0.78 which is highly significant and shows the goodness of model fit.

4. Conclusion

This study evaluated the impact of oil price fluctuations in Iraq on human capital development index using the EGRACH model and the ARDL bound test method. The results show that changes in Human development index can be attributed to fluctuations in oil prices. The state of Human development has been adversely affected by

fluctuations in oil prices. On the basis of the above results, we propose that the Government adopt a diversified policy and invest in other sectors of the economy, such as the industrial and agricultural sectors. Investment in these sectors will help to increase the output of exportable goods. Exports of these goods can earn more foreign exchange. This will reduce the heavy reliance on oil revenues. The government needs to spend more money to provide infrastructure like transport facilities and stable electricity supply. This will help encourage private companies to invest more in their economic resources by reducing the cost of doing business. The Government should also increase the expenditure of human development through the provision of basic infrastructure facilities.

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