International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2022, 12(1), 207-216.

The Impact of Oil Prices on Income in Azerbaijan

Sugra Ingilab Humbatova[1], Natig Gadim-Oglu Hajiyev[2]*

[1]Department of Economy and Management, International Centre of Graduate Education (ICGE), Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan; "World Economy" Department, Baku Engineering University, Khirdalan City, Absheron, Baku, Azerbaijan; Agrarian Research Center, Ministry of Agriculture, Azerbaijan, [2]Department of Regulation of Economy, Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan; Agrarian Research Ministry of Agriculture, Azerbaijan. *Email: n.qadjiev2012@yandex.ru

Received: 19 August 2021 **Accepted:** 15 November 2021 **DOI:** https://doi.org/10.32479/ijeep.11937

ABSTRACT

Oil prices in the global market have been fluctuating sharply since the end of the XX century. As oil is a predominant component that affects global indicators, it is necessary to assess by economists. Because GDP per capita, exchange rate, and total trade turnover depend on the effects of oil price shocks. This article researched the impact oil fluctuations on income from a short and long-term perspective. For the purpose of the research, Azerbaijan has been exemplified as an oil-producing country for the period of 2001m01-2021m06. Applying the empirical method, we achieved that world oil shocks affected income (in dollar) significantly in a short perspective. The recent declining oil prices make this topic more valuable to research. Moreover, as many empirical methods show asymmetric dependency, the research focused mainly on negative shocks of oil prices.

Keywords: Oil Revenues, Oil Prices, Population Income, Engle–Granger, ARDL
JEL Classifications: F01, L70, Q31, Q43, J17

1. INTRODUCTION

The historical records of the world oil prices reveal that the USA power as an oil producer (the ability to influence prices, volume and supply of oil) has weakened since 1960 (ECB, 2010). Simultaneously, OPEC embarked on influencing the market and as a result, it caused the oil price shock in 1973 and 1979. After 1970, crude oil has been the driving force for many developed countries (Berg and Gröttheim, 1992). Although between 1971-2014 total primary energy supply grew on average 1.0% yearly (Gasimzade, 2015). Blasting of oil price twice in 1973-1974 and thrice in 1979-1980 led to macroeconomic changes and emerged new notions such as "expenditure inflation" and "stagflation." In other words, the surge in oil prices caused inflation and unemployment (Hamilton, 1983; Bruno and Saks, 1985; Blanchard and Gali, 2007).

Although there is wide range of researches dedicated to the development of alternative energy sources, the world economy is still significantly depending on the crude oil and its derivative products (Imanov and Hasanli, 2014). Researches revealed that there was a general consensus over the importance of oil price on the socio-economic development and well-being of the country. In general, oil prices are used to predict unemployment and short-term progress. However, there had no influence of oil price on the well-being and income of the people (Stiglitz et al., 2010). The reason why we accept this indicator as a significant factor is to have the power to influence all people. Secondly, it is flexible and important for businesses and governments in the short and medium term. Thirdly, analysts forecast stronger shocks in the future thanks to the advancement of technology and geological research (Beneş et al., 2012). It is firmly believed that the surge of oil price leads to the reduction of oil-importers' income in a short term (Easterlin et al., 2010). Contrary, it has positive effects on export and state revenue of the oil-producing countries. Although it is sometimes hard to forecast whether importers or exporters suffer a lot, arguably, oil importers are affected more quickly.

The world oil prices decreased because of several reasons: the declining pace of the world economy, slow progress in Europe and Japan, the increase of oil production in non-OPEC countries. OPEC announced to cut 5 million barrels of oil daily in order to stop oil prices to go down. It was somewhat useful. Since 2009, prices jumped to recover and resisted 75 dollars per barrel. The Economist reportedly revealed that there had been a rising interest to dig out this topic comprehensively (Broadstock and Zhang, 2014). Although, between 1971 and 2014 total primary energy supply grew on average 1.0% yearly (Gasimzade, 2015). The prices constantly increased from 2010 to 2014. However, this growth was related to the volume of demand and changes in crude oil prices. During 4 years, the oil price has started to decline since 2014 (from 105 dollars) and remained flat at the low level for a long period. This has been the third time that the prices declined during 35 years. This is a significant but unexpected case.

Simultaneously, there were some significant decisions taken: increasing oil production by non-OPEC countries, refusing to stick to target prices, and the period of a surge of oil production in 1985-1986.

The oil price has diminished sharply since the financial crisis in 2008. There are several factors caused the reduction of oil price in 2014-2016:

- The unexpected growth of oil production for several years
- The reduction in demand
- The significant change in OPEC policy
- The weakening of some geopolitical risks
- The strengthening of the US dollar exchange rate.

In fact, OPEC refused price support and increased oil production by unconventional sources. It gradually affected the prices and has played a crucial role since 2014. However, the driving force for price drop was generated by supply. The researchers are not enough to explain whether the factors impacted on dropping oil prices in 2008 and in 2014-2016 were the same.

The falling of oil price will negatively affect oil-exporting countries while the world economy is intended to improve in the middle term (Mukhtarov et al., 2020; Mikayilov et al., 2020; Kopytin et al., 2021). Because reduction in revenues influences budget and the exchange rate will slow down as a result of weak economic development. The changes of oil prices strengthen the changes in the financial and currency market (Mukhtarov et al., 2017; Musayev and Aliyev, 2017; Muradov et al., 2019). Furthermore, investment in the oil industry not only decreases in oil-exporting countries but also diminishes in oil-importing countries that possess great potential for oil production.

Concomitantly, the price of agricultural production will parallelly drop as oil prices fall (Paladines Amaiquema, 2015). As a result, people benefit from the low prices of raw materials. Contrary, the rocket of oil prices under equal terms cause prices to increase. Also, oil shocks have different impacts on oil exporters and importers: Oil shocks influence to oil exporters faster than oil importers.

2. LITERATURE REVIEW

Having reviewed short analysis of references, macroeconomic activity has always been the main indicator in all oil-related publishings (Mork et al., 1994; Jimenez-Rodriguez and Sanchez, 2003; Ozturk, 2010; Elder and Serletis, 2010; Jiménez-Rodríguez and Sánchez, 2005; Sonmez, 2016; Herrera et al., 2015; Byström, 2020).

Mork et al. (1994) researched GDP growth and macroeconomic outcomes in OECD countries as a result of the drop-in oil prices. The results change from country to country. However, researches show that the change of oil prices heavily affects oil-dependent countries. Although there are plenty of publications referring to economic activity, there is almost no research on the effect of it on income and consumption of people. Some economists Mehra and Peterson (2005), Blanchard and Gali (2010) and Kilian (2008) researched the impact of oil fluctuations on consumption. However, each holds different views on it. For example, using the "lifecycle" consumption model popularized by Mehra and Peterson (2005) Modigliani and Brumberq (1954) empirically researched the impact of oil price on consumption in the USA. Zhang and Brodstock (2014) referring to Mehra and Peterson (2005) enlarged their researches for some ASEAN and East Asian countries.

However, Blanchard and Gali (2010) and Kilian (2008) prefer different approaches. They design a model that oil can be used as a raw material for production and the rest for consumption. They empirically indicate that oil price fluctuation influences people through food price. Because importing oil is expensive and the food price depends on it.

2.1. The Impact on Oil-Importing Countries

2.1.1. Developed countries

Research on the well-being of the people is mainly focused on oil-importing countries. As for the USA, Staniford (2007) researched average well-being indicators based on the real income generated from oil fluctuations in 1976-2006. According to his researches, there is no relation between social well-being and the growth of real income. The reason behind it is that the USA economy is so big that the dependence of the economy and people's income on oil prices cannot be noticed. Besides, Graham and Chattopadhyay (2010) (2008:M01-2009:M12) used daily petrol prices and the well-being of the people for the USA. They revealed that while the petrol prices increased in the third quarter of 2008, there was a negative dependence between gas price and the well-being. However, it has turned to the positive later. If we take the whole picture, there is a negative dependence at the end (there have been some differences between different income groups). Graham and Chattopadhyay (2010) reveal that oil price has an enormous impact on the well-being. Indeed, while the petrol prices increase 1 dollar, the well-being will parallelly increases 530 dollars in order to stabilize it. The extensive research on the relationship between well-being and oil prices belonged to Boyd-Swan and Herbst (2012). This research was devoted to the changes between the standard of living and the petrol prices in the USA in 1985-2005. Surprisingly, the impact of high oil prices on the standard of living was stronger in less populated areas. But this is insignificant for those who live in the city. Besides, the negative impact of higher oil prices is short. Thus, the first negative impact of oil prices is compensated with the upcoming positive impact of oil prices. Later Edelstein and Kilian (2009), using VAR model, indicated that energy prices have always been the main indicator for the increase of real consumption yet are not a dominant factor.

2.1.2. Developing countries

The world oil prices and their impact on economic development have been researched in many articles but its impact on consumption has just commenced. Mehra and Petersen (2005) are the first researchers on this topic. They used similar methods as Broadstock and Zhang (2014) and researched economy of some Asian countries. They found some empiric evidence to have non-linear asymmetric correlation between oil and the consumption prices. The leading economist of OECD Wang (2013) came to the same conclusion. Unlike previous authors, he used the logistics model in order to better research the relationships (Muhammad et al., 2017).

Salim and Rafiq (2013) Andersen et al. (2004) using VAR methods researched the impact of oil fluctuations in six main Asian developing countries (China, India, Indonesia, Malaysia, Philippines and Thailand) (Rosnawintang et al., 2021 (ASEAN -5 Countries); Anuar et al., 2021 (ASEAN +3 Countries)). Oil fluctuations influence on production in a short term in China and Thailand while it influences on GDP in India, Philippines and Malaysia. By the support of Thailand Oil Fund, the negative impact of oil prices on macroeconomic indicators has weakened and affected economic indicators positively. Bouzid (2012) researched cause and effect relationships while studying oil prices and economic development in Tunisia in 1960-2009. Tunisia is not oil-producing country but importing one. Obviously, the rise of oil prices lowers economic development. The rise of oil prices negatively affected daily consumption. According to the results of the researches, Grencer's test – used to determine the relations between energy prices and economic development – revealed the relations between the real price of GDP and oil (Syaharuddin et al., 2021).

Masih et al. (2010) researched the impact of oil price fluctuations on shares using VEC model including interest rate, economic activity, real share income, oil price in South Korea.

2.2. The Impact on Exporting Countries

The previous researches were limited by oil importing countries. The impact of oil prices on well-being in oil exporting countries seems complex, because positive influence can be compensated by rising exchange rate and the unsuitable side effects of rising oil prices (Corden and Neary, 1982; Corden, 1984; Frankel, 2010; Chauvet et al., 2012; Al Sabah, 2019). Although there were few macroeconomic researches in oil-exporting countries, the existing one reflects high variations from one country to another one. For example, Jimenez-Rodriguez and Sanchez (2004), using general model for oil-exporting and importing countries, revealed that in spite of the fact that oil prices had a negative impact in almost all oil-importing countries in a short term, the situation differs from country to country. Noteworthy to note that there is a positive relation with the change of GDP per person and standard of living (Easterlin et al., 2010; Mohamad and Mohammad, 2021). The rise of unemployment impacts badly on people's standard of living (Di Tella et al., 2001; 2003). These researches were done in the example of developing countries (Jin, 2008; Graham, 2009; Easterlin, 2010) and those of having transition economy (Easterlin, 2010). However, the impact of oil price on people's income has been less researched. Some existing researches were dedicated to some countries (for example, Tiliouine et al., 2006).

Some researches were done by using VAR method in 1980. However, the surprising part is not having enough researches dedicated to the second biggest oil exporters. Ito (2012 researched the impact of oil prices on macroeconomic indicators in Russia using VAR model. The research was done around for 15 years (1994: Q1-2009: Q3) and 63 observations. He found that not only did the rise of oil prices impact on GDP and exchange rate but also it influenced on the inflation rate.

Nigerian case was assessed by Apere and Ijeoma (2013) using exponential general autoregressive conditional heteroskedastic (EGARCH), impulse response function, and lag-augmented VAR (LA-VAR) models. Besides, Oriakhi and Osaze (2013) researched the relations between oil prices and the economic development of Nigeria based on the quarterly data in 1970-2010. They claim that oil price fluctuations impact real state expenditure, currency, and import. Thus, oil price fluctuation defines state expenditures. Englama et al. (2010) and Cini (2008) used short and long term analysis for cointegration method and vector error correction model (VECM). They (1999:M1-2009:M12) claimed that Nigerian economy and exchange rates were affected if oil prices change.

Another economist Nusair (2016) researched short and long-term dependencies of oil prices on GDP in the Gulf countries using NARDL. The rise of world oil prices doesn't cause economic development. However, there has been a mutual relation between low prices and economic development in terms of significantly causing economic stagnation. As for Kuwait and Saudi Arabia, they revealed that low prices of oil didn't affect economic development significantly. The low prices of oil only lowered GDP in Kuwait and Qatar. To conclude, oil fluctuations had an effect on real GDP in the Gulf countries. Besides, Moshiri and Banihashem (2012), using VAR model researched the impact of oil fluctuation on the economic development in Kuwait and Saudi Arabia and six other OPEC countries in 1979-2009. Alkhathlan (2013) concluded with the positive and significant impact of oil revenues on GDP in a short and long term in 1970-2010. He found out that positive oil prices increased GDP growth and real oil shocks decreased real GDP.

Emami and Adibpour (2012), using SAVR model, researched the relations between production, state expenditure, oil price shocks based on annual data in Iran. They think that production, state expenditure, the amount of money, and positive oil shocks influences positively on the economic development of Iran. Mehrara (2008) analysed the relations between oil prices and production growth in 13 oil exporting countries and a applied dynamic system of groups for calculating oil shock results. He revealed that negative shocks affect badly for a long term. Simultaneously, oil revenues generated from negative shocks are twice more than positive shocks. Another research analysed state budget determinants of oil exporting countries using constant and random selection methods in 1990-2015.

3. DATA AND METHODS

3.1. Data Descriptions

The research relies on time-series data of the World oil prices (WOP), Population income in manats (PIM), and Population income in dollars (PID) (2001m01-2021m06) (Table 1). The data were generated from the National Bank of Azerbaijan. The level changes were given in the statistics (Table 2).

3.2. Methodology

The research used autoregressive distributed lags bounds (ARDL) (Pesaran et al., 2001), Engel-Granger cointegration test, fully modified ordinary least squares (FMOLS) by (Phillips and Hansen, 1990), dynamic ordinary least squares (DOLS) (Stock and Watson, 1993) and canonical cointegrating regression (CCR) (Park, 1992).

3.3. Unit Root Test

It is quite important to test the stationary of variables through the Unit Root Test before assessing regression equations. Many methods require variables to be non-stationarity in order to have long-term or cointegration relations. Notably, if any time series are stationary with the real values of the variables, it is regarded as I(0). If the variable is not I(0), the first difference is calculated and the stationary is tested. If it was stationary, the variable would be regarded as I(1). In order to make the results of the stationarity test more reliable, three different Unit Root tests will be done and the analysis will be conducted with and without trends. The Unit Root tests are these: Augmented Dickey-Fuller, (ADF), (Dickey and Fuller, 1981), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS).

3.4. Auto Regressive Distributed Lags Bounds Testing (ARDLBT)

It is worth to mention that ARDL method has more advanatages than other cointegration methods and it yields reliable results for small samples. The ARDL test models can be used as:

$$\Delta LPID_t = \psi_0 + \sum_{i=1}^{p}\psi_{1i}\Delta LPID_{t-1} + \sum_{i=0}^{p}\psi_{2i}\Delta LWOP_{t-i} + \lambda_1 LPID_{t-1} + \lambda_2 LWOP_{t-1} + \varepsilon_t \quad (1)$$

Table 1: Data and internet resource

PID	Population income-dollars	www.cbar.az
PIM	Population income-AZN	www.cbar.az
WOP	World oil prices – barrel/dollars	www.cbar.az

Table 2: Descriptive statistics of the variables

	PIM	PID	WOP
Mean	2596.547	2279.640	65.43602
Median	2335.850	2428.118	62.15000
Maximum	7715.300	7308.516	133.9000
Minimum	270.4400	295.4014	18.60000
Std. Dev.	1923.025	1379.828	28.97444
Skewness	0.627177	0.196227	0.409217
Kurtosis	2.495479	2.754026	2.192058
Jarque-Bera	18.73645	2.198871	13.55670
Probability	0.000085	0.333059	0.001138
Sum	638750.5	560791.4	16097.26
Sum Sq. Dev.	9.06E+08	4.66E+08	205682.0
Observations	246	246	246

$$\Delta LPIM_t = \psi_0 + \sum_{i=1}^{p}\psi_{1i}\Delta PIM_{t-1} + \sum_{i=0}^{p}\psi_{2i}\Delta LWOP_{t-i} + \lambda_1 PIM_{t-1} + \lambda_2 LWOP_{t-1} + \varepsilon_t \quad (2)$$

L – is a logarithm function, ψ_0- constant value, ε_t- white noise error, *PID*- Population income in dollars, *PIM*- Population income in manats, *WOP* - World oil prices – barrel/dollars. ψ_{1i}, ψ_{2i}- short-term coefficients, λ_1, λ_2 – long term coefficients.

In order to assess short-term relations among variables, ARDL error correction model (ECM) was designed:

$$\Delta LPID_t = \psi_0 + \sum_{i=1}^{p}\psi_{1i}\Delta LPID_{t-1} + \sum_{i=0}^{p}\psi_{2i}\Delta LWOP_{t-i} + \varphi_1 ECT_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta LPIM_t = \psi_0 + \sum_{i=1}^{p}\psi_{1i}\Delta PIM_{t-1} + \sum_{i=0}^{p}\psi_{2i}\Delta LWOP_{t-i} + \varphi_2 ECT_{t-1} + \varepsilon_t \quad (4)$$

The ARDL bounds-testing cointegration method applies the Wald test (F - stat) on λ_i to show the existence of long-term cointegration between selected variables. The null hypothesis called H_0: $\lambda_1=\lambda_2=0$ is tested for the absence of cointegration (H_1: $\lambda_1\neq\lambda_2\neq0$). However, the alternative hypothesis is having cointegration relations among variables. Pesaran et al. (2001) proposed two types of boundaries based on F- statistics (i.e., upper bound and lower bound).
If the estimated value of the F-criterion is below the lower bound, then there is no significant long-term relationship between the variables. In addition, if the predicted value of the F - criterion is higher than the upper limit, then there is a long-term relationship between the variables. However, if the calculated statistics of the F-test are within the limits, the results are uncertain.

3.5. Engel-Granger Co-Integration Test

The Engel-Granger (EG) cointegration test creates an opportunity not only to verify the existence of a long-term relationship, but also to determine the direction of these relationships between the variables, as well as to investigate the short-term relationship.

In the first stage of the assessment process through the EG cointegration test, the regression equation is evaluated for non-stationary variables in the original case, but are stationary if differentiated to the same level (usually I (1)). So, for the two variables in our example:

$$LPID_t=\psi_0+\lambda_1\ LWOP_t+\varepsilon_t \quad (5)$$

$$LPIM_t=\psi_0+\lambda_1\ LWOP_t+\varepsilon_t \quad (6)$$

Here, ψ_0 and λ_1 represent the regression coefficients, LPID, LPIM, and LWOP - the dependent and independent variables, ε - the white noise error, and t - the time. After evaluating the regression equation, the next step is to check the stationarity of the white noise error. If ε_t is stationary, there is a cointegration relationship between these variables and it is not spurious. That is why these equations (5-6) are regarded as long-term equations. Finally, the ECM is assessed using the cause-and-effect relationship between the variables, in other words, stationary variables to check the strength and direction of the dependency and white noise error for a periodic delay (ECT_{t-1}) (equation 3-4).

Here ψ_0, ψ_{1i}, ψ_{2i}, φ_1 and φ_2 represent the coefficients, p is the optimal delay scale, and ε is the white noise error of the model. To determine the optimal delay scale, the relationship between the variables is first evaluated in the Vector Autoregressive (VAR) model. Then, the equations are evaluated using the Least Squares (LS) method, taking into account the optimal delay scale. Engle and Granger reveal that if there is cointegration between variables, the evaluation would be done through ECM. If the cointegration relationship is stable, the coefficients of Error Correction Term (ECT), or ECT_{t-1}, φ_1 and φ_2 must be negative and statistically significant. In other words, this ratio is called the Adjustment Speed and is usually rated between "-1" and "0." Using equations 3-4, the following cause-and-effect relationships can be tested:

The Granger cause-and-effect relationship for the short-run period is evaluated using F-statistical or X_i - quadratic statistical values together with the coefficients of all delayed first-order differences ($\Delta LWOP_{t-1}$) for each variable (H_0:ψ_{2i}=0, i=1…p) in order to check the statisical significance of the coefficients. The rejection of : indicates that LWOP has an effect on LPID and LPIM in the short term.

In order to check the Granger cause-and-effect relationship for the long run, the statistical significance of ECT_{t-1} coefficient is tested. It is important to test it: (H_0: φ_1=0 və φ_2=0). If H_0: is rejected, the long-run period indicates that the deviations from the equilibrium have an effect on the dependent variable and will return to the equilibrium state over time. A strong cause-and-effect relationship should be tested simultaneously both in a short-term and a long-term period. In other words, hypothesis (H_0: ψ_{2i}=φ_1=0, i=1…p,; H_0: ψ_{2i}=φ_2=0, i=1…p,) should be tested using the F-statistical or X_i-square statistical values by the Wald test.

3.6. FMOLS DOLS and CCR

Other evaluation methods used - FMOLS, DOLS, and CCR - and analysis of the results of Engle-Granger analysis are very useful in the research process. Because reviewing the results several times through the ARDLBT co-integration approach allows for a more reliable analysis. Note that the Engle-Granger and Philips-Ouliaris cointegration tests were used to test for all regression equations evaluated using FMOLS, DOLS, and CCR.

Table 3: Correlation analysis

Correlation			
t-Statistic			
Probability	**LPIM**	**LPID**	**LWOP**
LPIM	1.000000		
-			
-			
LPID	0.951616	1.000000	
(48.37381)	-		
[0.0000]	-		
LWOP	0.563822	0.732585	1.000000
(10.66377)	(16.81172)	-	
[0.0000]	[0.0000]	-	

Note: t-Statistic ( ), Probability [ ].

3.7. Diagnostics

This study checks the stability of ARDL model through sequential correlation test (Breusch-Godfrey LM test (H_0: "no serial correlation")), heteroscedasticity test for both Breusch-Pagan-Godfrey (H_0 "no heteroskedasticity problem"), and Autoregressive Conditional Heteroscedasticity test (ARCH) as well as Ramsey RESET Test (statistical). In all cases, it is desirable not to reject the null hypothesis. The Jarque-Bera test will be used to check the normal distribution of white noise error. The tested H_0: is a normal distribution in the white noise error." The CUSUM and CUSUMSQ tests are also used to research the stability of the ARDL model.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics of the Variables and Correlation Analysis

Before moving to empirical evaluation, descriptive statistics and correlation analysis should be taken. The results of the descriptive statistics are given in Table 2 and show that the average value of PID is 2596,547, the standard error is 1923,025, the average value of PID is 2279,640, the standard error is 1379,828, the average value of WOP is 65.43602, and the standard error is 28.97444. The Jarque-Bera test shows that the remains of the series are normally distributed.

Table 3 presents the results of the correlation matrix and shows that there are positive correlations of PID- Population income-dollars, PIM- Population income-AZN, WOP - World oil prices - barrel/dollar.

4.2. Unit Root Tests Results

According to the ADF and PP tests, there is no variable I (0) in the "With Intercept only," "With Intercept & Trend" models and "No Intercept & No Trend" models. All variables are I (1). According to the KPSS test, all variables in the "With Intercept only" and "With Intercept & Trend" models are I (0). The ARDL and the ARDL boundary-test methods can be used to estimate short-term and long-term dependencies between variables which enable the assumption of single root test assessment results in ADF, PP, and KPSS (Table 4).

4.3. VAR Lag Order Selection Criteria

In order to determine optimal lag for ARDL model, VAR Lag Order Selection Criteria was employed and we got the below-mentioned results. The models selection criterion used is AIC. The results of models selection criteria are reported in (Tables 5 and 6).

4.4. Cointegration Testing Results

The results of the ARDL boundary test are given in Table 7. In both ARDL-related equations (F_{LPIM}=($LPIM/LWOP$) və F_{LPID}=($LPID/LWOP$), F test result indicates the existence of cointegration between the variables.

4.5. ARDL Bounds Test, Long Run and Short Run Results

Table 8 presents the results of the long and short-term methods of ARDL. The evaluation results of the ARDL model show that World

Table 4: Result of ADF, PP and KPSS unit root test

Model	Variable	ADF	PP	KPSS	Stationarity	I (0,1,2)
			At Level Form			
With Intercept only	LPIM	-1.990845	-1.680737	1.881153***	N/S	I (1)
	LPID	-2.133721	-2.011873	1.587265***	N/S	I (1)
	LWOP	-2.332174	-2.221467	0.691022**	N/S	I (1)
			At First differencing			
	ΔLPIM	-3.910922***	-44.47367***	0.306301	N/S	I (1)
	ΔLPID	-3.310444**	-36.15962***	0.346591	N/S	I (1)
	ΔLWOP	-12.17096***	-11.86749***	0.099557	N/S	I (1)
With Intercept and Trend			At Level Form			
	LPIM	-0.845095	-5.447651	0.423235***	N/S	I (1)
	LPID	-0.723357	-2.516070	0.468971***	N/S	I (1)
	LWOP	-2.340647	-2.176757	0.416942***	N/S	I (1)
			At First differencing			
	ΔLPIM	-5.345733***	-54.32220***	0.137854*	N/S	I (1)
	ΔLPID	-4.564715***	-43.10056***	0.145265*	N/S	I (1)
	ΔLWOP	-12.15826***	-11.82933***	0.043841	N/S	I (1)
No Intercept and No Trend			At Level Form			
	LPIM	2.021445	2.486988	N/A	N/S	I (1)
	LPID	1.158030	1.539380	N/A	N/S	I (1)
	LWOP	0.225453	0.340469	N/A	N/S	I (1)
			At First differencing			
	ΔLPIM	-3.113545***	-34.78587***	N/A	N/S	I (1)
	ΔLPID	-2.989938***	-32.75520***	N/A	N/S	I (1)
	ΔLWOP	-12.17960***	-11.88445***	N/A	N/S	I (1)

ADF denotes the Augmented Dickey–Fuller single root system respectively. PP Phillips–Perron is single root system. KPSS denotes Kwiatkowski–Phillips–Schmidt–Shin (Kwiatkowski et al., 1992) single root system. ***, ** and * indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 2001M01−2021M06. S: Stationarity, N/S: No Stationarity, N/A: Not applicable

Table 5: VAR lag order selection criteria

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model 1	3	332.8535	40.55824*	0.000235*	–2.679441*	–2.475190*	–2.597125*
Model 2	3	327.0125	32.79650*	0.000247*	–2.630357*	–2.426106*	–2.548040*

Note: *Indicates lag order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan−Quinn information criterion

Table 6: Modellər

Model 1	F_{LPIM}=(LPIM/LWOP)	ARDL (3, 0) (AIC) C lag, automatic
Model 2	F_{LPID}=(LPID/LWOP)	ARDL (3, 0) (AIC) C lag, automatic

oil prices (WOP) have a positive and significant impact on both Population income-manats (PIM) and Population income-dollars (PID) in the long run. Thus, a 1% increase in world oil prices (WOP) increases Population income-manats (PIM) by 1.38% and Population income-dollars (PID) by 1.59%.

However, the situation is completely different in the short term. Thus, World oil prices (WOP) have a negative and significant impact on both Population income-manats (PIM) and Population income-dollars (PID).

4.6. Diagnostic

Table 9 presents the results of diagnostic tests of the ARDL model. The evaluation results of the Breusha – Godfrey (BG) method confirmed that our ARDL model had no problems with sequential correlation. The results of the Breusha-Pagan-Godfrey (BFG) method confirmed that heteroscedasticity was not a problem. The results of the ARCH method indicate a heteroscedastic problem. Normality Test (Jarque – Bera) JB is not desirable. In Model 1, the graph of the total amount of recursive balances (CUSUM) is unstable and the graph of the squares of recursive balances (CUSUM) is fixed. In Model 2, the graph of the total amount of recursive balances (CUSUM) and the graph of the squares of recursive balances (CUSUM) are fixed.

4.7. Engle–Granger Analysis Results

Another feature that indicates a cointegration relationship between the variables is that the white noise errors obtained from the estimates are stationary. Table 9 shows the results of the stationary test by applying single root tests ADF on the white noise error of each long-run equation evaluated by FMOLS, DOLS and CCR (Table 10). In general, white noise errors are stationary, but it appears in the first 2 equations. Based on these results, the fact that white noise errors are stationary in all models and thus the existence of a cointegration relationship is once again confirmed. However, this result does not support the results of the Engle-Granger and Phillips-Ouliaris cointegration tests given above (Table 11).

4.8. Analysis of FMOLS, DOLS, CCR

The outcomes of the established models of FMOLS, DOLS VƏ CCR methods are compatible with those of ARDL method. It confirms that we chose the right method for research (Table 11).

Table 7: ARDL Results from bound tests

	Dependent variable	Significance									Significance
		F–statistic	I (0) Bound				I (1) Bound				
			10%	5%	2.5%	1%	10%	5%	2.5%	1%	
Model 1	ARDL (3, 0) (AIC) C lag, automatic	3.595230*	3.02	3.62	4.18	4.94	3.51	4.16	4.79	5.58	Cointegration
Model 2	ARDL (3, 0) (AIC) C lag, automatic	5.938353***	3.02	3.62	4.18	4.94	3.51	4.16	4.79	5.58	Cointegration

Table 8: Long run and short run coefficients

	Model 1	Model 2
LWOP	1.375924	1.590746***
C	2.795045	1.249297
EC=*LPIM*–(1.375924**LWOP*+2.795045)		
EC=*LPID*–(1.590746**LWOP*+1.249297)		
Short Run Coefficients (Error correction estimates)		
$\Delta LWOP_{-1}$	–0.732231***	–0.674406***
$\Delta LWOP_{-2}$	–0.397878***	–0.353401***
ECT_{-1}	–0.026729***	–0.063206***

***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively.

Table 9: Diagnostic test results (F/LM version)

	Ramsey RESET Test (t–statistic)	Normality Test (Jarque–Bera) JB	Heteroskedasticity test		Breusch–Godfrey Serial Correlation LM Test:	R^2	D_W	GUSUM/ GUSUM of Squares
			ARCH χ^2	Breusch−Pagan−Godfrey	χ^2			
ARDL (3, 0) (AIC)	0.763322	34.32570	19.90246	1.866616	2.685015	0.973458	2.066766	No–stability/
C lag, automatic	0.4460	0.000000	0.0000	0.1170	0.0703			stability
	0.582661	N/A	18.53155	7.391440	5.406294			
	0.4460	N/A	0.0000	0.1166	0.0670			
ARDL (3, 0) (AIC)	1.958599	30.60421	17.80435	2.323941	2.373486	0.964954	2.049371	Stability/
C lag, automatic	0.0513	0.000000	0.0000	0.0573	0.0954			stability
	3.836110	N/A	16.71288	9.134286	4.892397			
	0.0513	N/A	0.0000	0.0578	0.0901			

N/A: Not Applicable

Table 10: FMOLS, DOLS, CCR results

	ECT									J–B stat
	Augmented Dickey–Fuller test statistic			Cointegration Test –				R squared		
	Constant	Constant, Linear Trend	None	Engle–Granger tau–statistic	Engle–Granger z–statistic	Phillips–Ouliaris tau–statistic	Phillips–Ouliaris z–statistic			
F_{LPIM}=(LPIM⁄LWOP)										
Fully modified least squares										
LWOP	1.188984***	–0.746647	–2.674498	–0.785478	–0.731390	–1.553040	–1.678738	–5.341868	0.307105	23.13884
C	2.654249**				0.9407	0.9496	0.6882	0.7025		0.000009
Dynamic least squares										
LWOP	1.148330***	–1.107659	–2.403208	–1.112237	–0.731390	–1.553040	–1.678738	–5.341868	0.323511	24.32070
C	2.817366**				0.9407	0.9496	0.6882	0.7025		0.000005
Canonical cointegrating regression										
LWOP	1.188010***	–0.745860	–2.674260	–0.784996	–0.731390	–1.553040	–1.678738	–5.341868	0.307132	24.32070
C	2.658467**				0.9407	0.9496	0.6882	0.7025		0.000005
F_{LPID}=(LPID⁄LWOP)										
Fully modified least squares										
LWOP	1.383650***	–2.364013	–3.905171**	–2.373805**	–2.375549	–10.86747	–2.723008	–13.48833	0.527332	8.994424
C	1.821675**				0.3387	0.3076	0.1951	0.1909		0.011140
Dynamic least squares										
LWOP	1.347806***	–2.200551	–3.627042**	–2.204925**	–2.375549	–10.86747	–2.723008	–13.48833	0.553575	11.54146
C	1.965661**				0.3387	0.3076	0.1951	0.1909		11.54146
Canonical cointegrating regression										
LWOP	1.382058***	–2.362729	–3.907001**	–2.372658**	–2.375549	–10.86747	–2.723008	–13.48833	0.527398	9.002177
C	1.828447**				0.3387	0.3076	0.1951	0.1909		0.011097

ADF denotes the Augmented Dickey–Fuller single root system respectively. ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 2001M01−2021M06. N/A: Not applicable

Table 11: Granger cause-and-effect analysis evaluation results. Wald Test

	Short-term period		Long-term period		Strong impact	
	Δ*LWOP*		ECT_{-1}		ECT_{-1} and Δ *LWOP*	
	Chi–square	F–statistic	t–statistic	F–statistic	Chi–square	F–statistic
Model 1	0.276736	0.276736	–2.019826*	4.079696*	4.333445	2.166723
	0.5988	0.5993	0.0445	0.0445	0.1146	0.1168
Model 2	0.285164	0.285164	–2.550481*	6.504956	6.761226	3.380613
	0.5933	0.5938	0.0114	0.0114*	0.0340*	0.0357*
ADF Unit Root test						
–0.702651/				–2.370872/		
–2.647509/				–3.948757**/		
–0.731390				–2.375549**		

ADF denotes the Augmented Dickey–Fuller single root system respectively. ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 2001M01 − 2021M06

5. DISCUSSION

As an important component of the production, oil supply and oil price influence GDP per person, inflation rate, exchange rate and macroeconomic indicators (Chai et al., 2016). The world oil fluctuations influence energy consumption through exchange rate and GDP (Chai et al., 2016). We also researched the impact of oil fluctuation on GDP per person. We focused on oil price, exchange rate and gross trade volume. The negative and positive impact of crude oil price fluctuation on its profitability also proved for Azerbaijan (Jiang et al., 2018). The dramatic reduction in oil prices paved the way to prepare for the new period - post-oil period and led to reforms (Hesami et al., 2020). Azerbaijan commenced reforms too.

Researches revealed that low oil prices influenced GDP per person, gross trade volume and exchange rate. As an oil exporting country, Azerbaijan should have a diverse economy in order not to face difficulties later. Researches also showed that oil revenues decreased as a result of low oil prices and our conclusion overlaps with the same results as other articles:

"...sheds light on the vulnerability of oil-producing regions to the oil price volatility. Gross domestic product (GDP) and government revenues in many Gulf countries exhibit a strong dependence on oil, while more diversified economies improve resilience to oil price shocks" (Vandyck et al., 2018).

6. CONCLUSION AND POLICY IMPLICATIONS

Policy and reforms on economics have been prepared taking the opportunities of every country. Although these problems are similar, territory, demographics, wealth, economic situation differs in every country. That is why, recommendations should be like this:

The outcomes of the research are important in terms of helping optimisation of GDP per person and insurance against oil fluctuation. The research is one of the first researches to reveal mutual relations of GDP per person and oil price in oil-exporting countries using advanced statistics methods. It assists to understand the impact of oil prices on GDP per person in oil-exporting countries for a long and short term. This article stresses the importance of removing the dependence of economy from oil prices and reveals the benefits of economic policy and sustainable development in Azerbaijan and similar states.

The outcomes of the research overalps with targets hypothesis which explains the impact of oil prices on GDP per person. So, we can conclude that the changes in GDP per person better explain the impact of oil prices and why it is a strong indicator.

We can suggest the following recommendations in order to eliminate the dependence of GDP per person from oil prices:

- Since oil is a non-renewable resource, the more the oil and gas industry decreases, the more other fields should develop. Although some countries have large reserves, our carbohydrogen reserves might deplete. However, financing the non-oil sector depends on oil reserves. That is why, development of non-oil sector to provide sustainable development and employment should be a priority. Besides, Azerbaijan should preserve oil reserves for future generations
- The excessive dependence on oil might exacerbate macroeconomic uncertainty. Low oil prices might require less state expenditure and this might lead to delay the develeopment of the non-oil sector, employment and the volume of GDP per person.
- Diversification of economics can create an opportunity to provide new workplaces and sustainable development for future generations. It can extend the base for GDP per person and resistance against low oil prices
- Regulation of tax-budget, money and credit policy, exchange rate can be a strong base for diversification of economy and removing the impact of oil fluctuation on GDP per person and national economy
- Policy and strategies motivating dynamic trade sectors can accelerate economic activity and increase non-oil GDP. Azerbaijan's strategic road map will lure the production industry through horizontal and vertical diversification and form new sources of increasing GDP per person and the non-oil sector.

REFERENCES

Al Sabah, N.A.S. (2019), Economic Determinants of Public Budgets: The Case of Main Oil Exporters. Available from: https://www.sciencespo.fr/kuwait-program/wp-content/uploads/2019/09/economic-determinants-of-public-budgets-the-case-of-main-oil-exporters.pdf

Alkhathlan, K.A. (2013), Contribution of oil in economic growth of Saudi Arabia. Applied Economics Letters, 20(4), 343-348.

Andersen, T.G., Tim, B., Nour, M. (2004), Analytical evaluation of volatility forecasts. International Economic Review, 45(4), 1079-1110.

Anuar, S., Faurani, S.S., Ahmad, Z.S. (2021), World oil price shocks in macroeconomic ASEAN+3 countries: Measurement of risk management and decision-making a linear dynamic panel approach. International Journal of Energy Economics and Policy, 11(4), 75-83.
Apere, O.T., Ijeoma, A.M. (2013), Macroeconomic impact of oil price levels and volatility in Nigeria. International Journal of Academic Research in Economics and Management Sciences, 2(4), 15-25.
Berg, C., Gröttheim R. (1992), Monetary policy in Sweden since 1992. In: Monetary Policy in the Nordic Countries: Experiences Since 1992. Basle: BIS Policy Papers, No. 2. p140-182.
Blanchard, O., Gali, J. (2007), The Macroeconomic Effects of Oil Price Shocks: Why are the 2000s so Different from the 1970s? MIT Department of Economics Working Paper No. 07-21. Available from: https://www.ssrn.com/abstract=1008395
Bouzid, A. (2012), The relationship of oil prices and economic growth in Tunisia: A vector error correction model analysis. Conference: Romanian Economic Journal, 15(43), 3-22.
Boyd-Swan, C., Herbst, C.M. (2012), Pain at the pump: Gasoline prices and subjective well-being. Journal of Urban Economics, 72(2-3), 160-175.
Broadstock, D., Zhang, D. (2014), Impact of International Oil Price Shocks on Consumption Expenditures in ASEAN and East Asia. ERIA Discussion Paper 2014-24. Jakarta, Indonesia: ERIA.
Bruno, M., Sachs, J. (1985), Economics of Worldwide Stagflation. Cambridge, MA: Harvard University Press.
Byström, J. (2020), Oil Prices and Consumer Spending in Sweden: Do Oil Price Shocks Affect Private Consumption? Available from: https://www.diva-portal.org/smash/get/diva2:1443616/fulltext01.pdf
Chai, J., Zhou, Y., Liang, T., Xing, L., Lai, K.K. (2016), Impact of international oil price on energy conservation and emission reduction in China. Sustainability, 8, 508.
Chauvet, M., Selody, J.G., Laxton, D., Kumhof, M., Benes, J., Kamenik, O., Mursula, S. (2012), The Future of Oil: Geology Versus Technology, International Monetary Fund, Working Paper No. WP/12/109. Washington, DC: International Monetary Fund.
Cini, M. (2008), European Commission reform and the origins of the European transparency initiative. Journal of European Public Policy, 15: 743-760.
Corden, W.M. (1984), Booming sector and Dutch disease economics: Survey and consolidation. Oxford Economic Papers, 36, 359-380.
Corden, W.M., Neary, J.P. (1982), Booming sector and de-industrialization in a small open economy. The Economic Journal, 92, 825-848.
Di Tella, R., MacCulloch R.J., Oswald, A.J. (2003), The macroeconomics of happiness. The Review of Economic and Statistics, 85(4), 809-827.
Di Tella, R., MacCulloch, R.J., Oswald, A.J. (2001), Preferences over inflation and unemployment: Evidence from surveys of happiness. The American Economic Review, 91(1), 335-241.
Dickey, D.A., Fuller, W.A. (1981), Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica: Journal of the Econometric Society, 49, 1057-1072.
Easterlin, R.A. (2010), Happiness, Growth, and the Life Cycle. Oxford: Oxford University Press.
Easterlin, R.A., McVey, L.A., Switek, M., Sawangfa, O., Zweig, S. (2010), The happiness-income paradox revised. Proceedings of the National Academy of Sciences of the United States of America, 107(52), 22463-22468.
Edelstein, P., Kilian, L. (2009), How sensitive are consumer expenditures to retail energy prices? Journal of Monetary Economics, 56(6), 766-779.
Elder, J., Serletis, A. (2010), Oil price uncertainty. Journal of Money Credit and Banking, 42(6), 1137-1159.
Emami, K., Adibpour, M. (2012), Oil income shocks and economic growth in Iran. Economic Modelling, 29(5), 1774-1779.
Englama, A., Duke, O., Ogunleye, T., Isma'il, U. (2010), Oil prices and exchange rate volatility in Nigeria: An empirical investigation. Central Bank of Nigeria Economic and Financial Review, 48(3), 31-48.
Engle, R.F., Granger, C.W.J. (1987), Co-integration and error correction: Representation, estimation, and testing. Econometrica: Journal of the Econometric Society, 55(2), 251-276.
European Central Bank. (2010), Monthly Bulletin. Available form: https://www.ecb.europa.eu/pub/pdf/mobu/mb201008en.pdf
Frankel, J.A. (2010), The natural resource curse: A survey. Working Paper No. 15836. Cambridge, MA: National Bureau of Economic Research. p02138.
Gasimzade, E.E. (2015), Influence of oil prices on innovation in renewable energy sector. The Journal of Economic Sciences: Theory and Practice, 72(2), 73-86.
Graham, C. (2009), Happiness Around the World: The Paradox of Happy Peasants and Miserable Millionaires. Oxford: Oxford University Press. Available form: https://www.researchgate.net/publication/227468101_Happiness_Around_the_World_The_Paradox_of_Happy_Peasants_and_Miserable_Millionaires
Graham, C., Chattopadhyay, S. (2010), (Un?) Happiness and Gasoline Prices in the United States, Brookings Institution Report. Washington, DC: Global Economy and Development at Brookings.
Hamilton, J. (1983), Oil and the macroeconomy since World War II. Journal of Political Economy, 91, 228-248.
Herrera, A., Lagalo, L., Wada, T. (2015), Asymmetries in the response of economic activity to oil price increases and decreases? Journal of International Money and Finance, 50, 108-133.
Hesami, S., Rustamov, B., Rjoub, H., Wong, W.K. (2020), Implications of oil price fluctuations for tourism receipts: The case of oil exporting countries. Energies, 13, 4349.
Imanov, G., Hasanli, Y. (2014), Forecasting of oil and gas extraction in Azerbaijan on the basis of Hubbert's model. The Journal of Economic Sciences: Theory and Practice, 71(1), 40-52.
Ito, K. (2012), The Impact of Oil Price Volatility on Macroeconomic Activity in Russia. Economic Analysis Working Papers. Vol. 9. Berlin, Germany: ResearchGate.
Jiang, Y., Ma, C.Q., Yang, X.G., Ren, Y.S. (2018), Time-varying volatility feedback of energy prices: Evidence from crude oil, petroleum products, and natural gas using a TVP-SVM model. Sustainability, 10, 4705.
Jimenez-Rodriguez, R., Sanchez, M. (2004), Oil Price Shocks and Real GDP Growth: Empirical Evidence from Some OECD Countries. European Central Bank, Working Paper No. 362, European Central Bank, Frank Fur Tam Main. HKS Working Paper No. RWP10-005. Germany: European Central Bank.
Jiménez-Rodríguez, R., Sánchez, M. (2005), Oil price shocks and real GDP growth: Empirical evidence for some OECD countries. Applied Economics, 37(2), 201-228.
Jin, G. (2008), The impact of oil price shock and exchange rate volatility on economic growth: a comparative analysis for Russia, Japan, and China. Research Journal of International Studies, 8, 98-111. Available from: https://www.eurojournals.com/rjis_8_09.pdf
Kilian, L. (2008), The economic effects of energy price shocks. Journal of Economic Literature, 46(4), 871-909.
Kopytin, I.A., Pilnik, N.P., Stankevich, I.P. (2021), Modelling five variables BVAR for economic policies and growth in Azerbaijan, Kazakhstan and Russia: 2005-2020. International Journal of Energy Economics and Policy, 11(5), 510-518.
Kwiatkowski, D., Phillips, P., Schmidt, P., Shin, Y. (1992), Testing the null hypothesis of stationarity against the alternative of a unit root. Journal of Econometrics, 54(1-3), 159-178.
Mackinnon, J.G. (1996), Numerical distribution functions for unit root and cointegration tests. Journal of Applied Economics, 11(6), 601-618.
Masih, R., Peters, S., Mello, L. (2011), Oil price volatility and stock price

fluctuations in an emerging market: Evidence from South Korea. Energy Economics, 33(5), 975-986.

Mehra, Y., Petersen, J. (2005), Oil prices and consumer spending. Federal Reserve Bank of Richmond Economic Quarterly Summer, 91(3), 53-72.

Mehrara, M. (2008), The asymmetric relationship between oil revenues and economic activities: The case of oil-exporting countries. Energy Policy, 36(3), 1164-1168.

Mikayilov, J.I., Mukhtarov, S., Mammadov, J. (2020), Gasoline demand Elasticities at the backdrop of lower oil prices: Fuel-subsidizing country case. Energies, 13, 6752.

Modigliani, F., Richard, B. (1954), Utility analysis and the consumption function. In: Kurihara, K.K., editor. Post-Keynesian Ecnomics. London: Allen & Unwin. p17-42.

Mohamad, I.H., Mohammad, I.Y., Rahman, A.S. (2021), The correlates of terms of trade in oil exporting countries of gulf cooperation council region. International Journal of Energy Economics and Policy, 11(4), 543-548.

Mork, K.A., Olsen, O., Mysen, H.T. (1994), Macroeconomic responses to oil price increases and decreases in seven OECD countries. The Energy Journal, 15(4), 19-36.

Moshiri, S., Banihashem, A. (2012), A symmetric effects of oil price shocks on economic growth of oil-exporting countries. SSRN Electronic Journal, 47, 3-13.

Muhammad, U.Z., Kashif Z.M., Haram, A. (2017), Oil price shock and its impact on the macroeconomic variables of Pakistan: A structural vector autoregressive approach. International Journal of Energy Economics and Policy, 7(5), 83-92.

Mukhtarov, S., Aliyev, S., Zeynalov, J. (2020), The effect of oil prices on macroeconomic variables: Evidence from Azerbaijan. International Journal of Energy Economics and Policy, 10(1), 72-80.

Mukhtarov, S., Mikayilov, J.I., İsmayılov, V. (2017), The relationship between energy consumption and economic growth: Evidence from Azerbaijan. International Journal of Energy Economics and Policy, 7(6), 32-38.

Muradov, A., Hasanli, Y., Hajiyev, N. (2019), World Market Price of Oil: Impacting Factors and Forecasting. Berlin, Germany: Springer International Publishing. Available form: https://www.springer.com/gp/book/9783030114930

Musayev, A., Aliyev, K.H. (2017), Modelling oil-sector dependency of tax revenues in a resource rich country: Evidence from Azerbaijan. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 65, 1023-1029.

Musayev, T. (2019), The oil boom in Azerbaijan and modeling of economic growth in post-oil era. The Journal of Economic Sciences: Theory and Practice, 76(2), 31-45.

Nusair, S.A. (2016), The effects of oil price shocks on the economies of the Gulf Co-operation Council countries: Non-linear analysis. Energy Policy, 91, 256-267.

Oriakhi, D.E., Osaze, D. (2013), Oil price volatility and its consequences on the growth of the Nigerian economy: An examination (1970- 2010). Asian Economic and Financial Review, 3(5), 683-702.

Ozturk, I. (2010), A literature survey on energy-growth nexus. Energy Policy, 38(1), 340-349.

Paladines Amaiquema, J.R. (2015), Consequences of oil and food price shocks on the ecuadorian economy. International Journal of Energy Economics and Policy, 7(3), 146-151.

Park, J.Y. (1992), Canonical cointegrating regressions. Econometrica, 60(1), 119-143.

Pesaran, H., Shin, Y., Smith, R.J. (2001), Bound testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289-326.

Phillips, P.C.B., Hansen, B.E. (1990), Statistical inference in instrumental variables regression with I (1) Processes. Review of Economics Studies, 57(1), 99-128.

Rosnawintang, T., Adam, P., Pasrun, Y.P., Saidi, L.O. (2021), Effects of crude oil prices volatility, the internet and inflation on economic growth in ASEAN-5 countries: A panel autoregressive distributed lag approach. International Journal of Energy Economics and Policy, 11(1), 15-21.

Salim, R, Rafiq, S. (2013), The impact of crude oil price volatility on selected Asian emerging economies. In: Hoque, T., editor. Global Business and Social Science Research Conference. Beijing, China: World Business Institute Australia. p1-33.

Staniford, S. (2007), Happiness, Economic Growth, and Oil Prices, the Oil Drum: Discussion about Energy and Our Future. Available from: http://www.theoildrum.com/node/2810

Stiglitz, J.E., Sen A.K., Fitoussi, J.P. (2010), Report of the Commission on the Measurement of Economic Performance and Social Progress. Paris, France: The Commission.

Stock, J.H., Watson, M. (1993), A simple estimator of cointegrating vectors in higher order integrated systems. Econometrica, 61(4), 783-820.

Syaharuddin, Y., Purwadi, P., Sampeliling, A. (2021), Attention of economic growth and oil prices: Evidence from Indonesia. International Journal of Energy Economics and Policy, 11(5), 425-433.

Tiliouine, H., Cummins, R.C., Davern, M. (2006), Measuring wellbeing in developing countries: The case of Algeria. Social Indicators Research, 75(1), 1-30.

Vandyck, T., Kitous, A., Saveyn, B., Keramidas, K., Los Santos, L.R., Wojtowicz, K. (2018), Economic exposure to oil price shocks and the fragility of oil-exporting countries. Energies, 11, 827.

Wang, Y.S. (2013), Oil price effects on personal consumption expenditures. Energy Economics, 36, 198-204.