Wali Aya Rumbia; Muthalib, Abd Azis; Abbas, Bakhtiar et al.

Article

Crude oil prices, household spending and economic growth in the ASEAN-4 region : an analysis of nonlinear panel autoregressive distributed lag

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Wali Aya Rumbia/Muthalib, Abd Azis et. al. (2020). Crude oil prices, household spending and economic growth in the ASEAN-4 region : an analysis of nonlinear panel autoregressive distributed lag. In: International Journal of Energy Economics and Policy 10 (4), S. 437 - 442. https://www.econjournals.com/index.php/ijeep/article/download/9293/5152. doi:10.32479/ijeep.9293.

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2020, 10(4), 437-442.

Crude Oil Prices, Household Spending and Economic Growth in the ASEAN-4 Region: An Analysis of Nonlinear Panel Autoregressive Distributed Lag

Wali Aya Rumbia[1]*, Abd Azis Muthalib[1], Bakhtiar Abbas[2], Pasrun Adam[3], Heppi Millia[1], La Ode Saidi[3], Muh. Irfandy Azis[4]

[1]Department of Economics, Universitas Halu Oleo, Kendari 93232, Indonesia, [2]Study Program of Management, Sekolah Tinggi Ilmu Ekonomi Enam-Enam, Kendari 93121, Indonesia, [3]Department of Mathematics, Universitas Halu Oleo, Kendari 93232, Indonesia, [4]Department of Accounting, Universitas Borneo Tarakan, Tarakan 77123, Indonesia. *Email: ayarumbia@gmail.com

Received: 24 January 2020 **Accepted:** 30 April 2020 **DOI:** https://doi.org/10.32479/ijeep.9293

ABSTRACT

This paper looks at the long run and short run asymmetric impact of crude oil prices on Indonesia's economic growth. It also assesses whether household spending affects the economic growth in the ASEAN-4 region (Indonesia, Singapore, Thailand and the Philippines) in the long run and short run. We use, to this end, annual time series data of crude oil prices, household consumption expenditure, and GDP for the period 1967-2018. To analyze the data, we employ a nonlinear panel autoregressive distributed lag model. The test results provide evidence that in the long-run, crude oil prices have an asymmetric impact on economic growth. Every 1% increase in crude oil prices, economic growth rises by 0.42%. Meanwhile, household spending does not affect economic growth in the long-run. Furthermore, in the short run, the test results show the presence of an asymmetric impact of crude oil prices on economic growth. Similarly, in the short run, household spending affects economic growth.

Keywords: Crude Oil Prices, Household Spending, Economic Growth, Nonlinear Panel Autoregressive Distributed Lag Model
JEL Classifications: C33, E210, E310, O470

1. INTRODUCTION

All countries in the world are in need of crude oil as a source of raw materials for their industries. This need has triggered crude oil demand growth worldwide. For example, from 2006 to 20019, the global demand for crude oil rose from 85.3 million barrels per day to 100.3 million barrels per day. In fact, this growth continues to rise and is projected to increase to 101.6 million barrels per day (Garside, 2019). OPEC also forecasts that the demand will constantly grow up to 104.8 million barrels per day by 2024 and 110.6 million barrels per day by 2040 (Meredith, 2019). For the ASEAN region, the demand for crude oil is projected at the level of 5.5 million barrels per day by 2040 in which there has been an increase of 3.4 barrels per day since 2017 (Tan and Peng, 2017). The growth in oil demand can drive oil prices to rise if it is not balanced with an increase in world crude oil production. The price of west texas intermediate (WTI) crude oil, for instance, went up from 15.05 USD/barrel in 1986 to 65.23 USD/barrel in 2018, although in 2016, the price of WTI crude was down at the level of 43.29 USD/barrel (EIA, 2019).

The increase in crude oil prices has stimulated the interest of policymakers, practitioners, and academics in the world to study the relationship between fluctuations in crude oil prices and economic activity. This has also led to advances in the econometrics field that allows researchers to study the functional relationship between oil prices and macroeconomic variables, both theoretically and empirically (Herrera et al., 2019). From

a theoretical point of view, the effect of oil prices on economic growth can occur through a couple of channels. In the first place, an increase in oil prices can cause the transfer of wealth from oil-importing countries to oil-exporting countries. This increase in wealth can cause consumption to rise which can then drive up GDP and economic growth (Cologni and Manera, 2008; Abel et al., 2014). In the second place, an increase in oil prices can result in higher prices of manufactured goods since oil is an industrial raw material (Adam et al., 2016; Muthalib et al., 2018; Rostin et al., 2019). The increase in prices of goods that occur continuously can cause inflation. If the inflation rate exceeds the inflation estimate set by the government of a country (the Central Bank), the Central Bank will suppress inflation through monetary policy by raising domestic interest rates (Benada, 2014; Adam et al., 2015; Saidi et al., 2019). These higher interest rates can then reduce domestic investment, which in turn can reduce GDP and economic growth.

A number of empirical studies on the impact of oil prices on economic growth have been carried out by previous researchers in many countries. Despite this, their research findings have been inconsistent with one another. Bjørnland (2000) for instance, examined the effect of oil prices on economic growth in such countries as Germany, Norway, the USA, and Britain. He found that there was a negative influence on crude oil prices on economic growth, except in Norway, this effect was positive. Omitogun et al. (2018) investigated the effect of oil prices on economic growth in Nigeria. They revealed that oil prices positively affected economic growth. Kriskkumar and Naseem (2019) looked at the symmetric and asymmetric effects of crude oil prices on economic growth in Malaysia, Brunei, and Vietnam. These three countries are crude oil-exporting countries in the ASEAN region. Their study reported the absence of both symmetrical and asymmetrical impact of oil prices on economic growth in Malaysia, and Vietnam. For Brunei, however, oil prices were found to positively affect economic growth. The variation in results of these studies vary can be caused by differences in data period used by the researcher (Adam et al., 2015; Saidi et al., 2019), and also by the varied cultural, socio-economic and political condition of a country (Ozturk, 2010).

Meanwhile, the impacts of household spending on economic growth have been documented by previous researchers. For example, Karim et al. (2012) examined the effect of household spending on economic growth in Malaysia and reported that household spending drove economic growth, but in the short-run, the effect did not exist. Rafiy et al. (2018) examined the effect of household spending on economic growth in Indonesia. From the evidence, they concluded that household spending had an impact on economic growth, both in the long-run and short-run. As noted earlier that the cultural conditions of the community, as well as socio-economic and political reasons, may account for such differences in finding (Ozturk, 2010).

The fact that there is dissimilarity in findings in some previous studies raises a question "how is the effect of crude oil prices and/or household spending on economic growth in other countries that have not been studied or have been studied but the period of research data is different, whether it is positive, negative, or non-existent?" This current study sets out to answer this question. It aims to investigate the asymmetry impact of crude oil prices on economic growth in the group of selected oil-importing countries in the ASEAN Region (Indonesia, Singapore, Thailand, and the Philippines), which we referred to as a group of ASEAN-4. We also examine the effect of household spending on economic growth in the region. Therefore, this study differs from Kriskkumar and Naseem's research (2019) in terms of research location and variables used. This study includes household spending variable as a control variable. Furthermore, according to our best knowledge, no studies have been conducted to look into the asymmetrical impact of crude oil prices on economic growth in the ASEAN-4 region.

The major aim of this study is to fill this research gap by examining the asymmetrical impact of crude oil prices and also household spending on economic growth in the region of ASEAN-4. To look at the effect, we use a nonlinear panel autoregressive distributed lag model which we later represent in the abbreviation NPARDL (Kouton, 2019).

2. LITERATURE REVIEW

Earlier studies have discussed the impact of crude oil prices on economic growth. By research sites or the number of the country involved, these studies can be grouped into two research groups. The first group includes research studies that are conducted in one certain country such as Trang et al. (2017), Wen et al. (2018) and Jawadi and Ftiti (2018). Trang et al. (2017), for instance, analyze the influence of oil prices on economic growth, inflation, unemployment, and budget deficits in Vietnam. The test results of the vector autoregressive (VAR) model on yearly data for the period 2000-2015 point out that the rising oil prices have no impact on the unemployment rate and economic growth, except inflation and budget deficits. Using the VAR model, Wen et al. (2018) examine the dynamic effect of crude oil prices on economic growth and monetary policy in China. The results of monthly data analysis from January 1996 to June 2017, lead to a conclusion that international oil price shocks have a positive effect on economic growth, in the short term. Jawadi and Ftiti (2018) study the effect of changes in oil prices on economic growth in Saudi Arabia. To test the effect, they use the threshold autoregressive model and annual data over the period 1970-2016. The evidence suggests that there is a positive nonlinear effect on oil prices on economic growth.

The second group, on the other hand, belongs to research studies that investigate several countries or a group of country such as Jemenes-Rodrigues and Sanches (2005), Bergmann (2019) and Mo et al. (2019). Jemenes-Rodrigues and Sanches (2005) examine the effect of oil price shocks in the main OECD industrialized countries. Jemenes-Rodrigues and Sanches (2005) examine the effect of oil price shocks in the main OECD industrialized countries. Using both linear and non-linear models, they carry out multivariate VAR analysis to empirically assess linear and nonlinear effect or the so-called asymmetrical effect. The study found that the effect of oil price shocks on GDP growth was asymmetry. In particular, oil price increases have a greater impact on GDP growth than do oil prices decreases, with the former being statistically significant in most cases. Furthermore, the impact

of rising oil prices on economic activity is found to be negative for oil-importing countries, except for Japan which is otherwise. Likewise, oil-exporting countries' economic growth is negatively affected by an increase in oil prices, but Norway benefiting from it. Using linear and nonlinear VAR models, Bergmann (2019) estimates the effect of oil price fluctuations on GDP growth in 12 countries (Australia, Belgium, Canada, Finland, France, Britain, Germany, Japan, Nederland, Norway, Sweden, and the USA). He finds that there is an asymmetric effect of crude oil prices on economic growth, but this effect is weak. Mo et al. (2019) make an attempt to document the effect of crude oil prices on economic growth in BRICS countries using the wavelet-based quantile-on-quantile method. Some findings are revealed in this study. Firstly, in the long run, crude oil prices have an impact on economic growth in South Africa, whereas, in the short run, this impact does not exist. Secondly, there is a positive short-term effect of crude oil prices on economic growth. Lastly, they find the effect of crude oil prices on economic growth is weak in such countries as Brazil, Russia, and India.

Furthermore, a number of previous studies have also considered the impact of household spending on economic growth. Gahtani et al. (2019) and Bonsu and Muzindutsi (2017) are among studies that looked at this impact in one particular country. Gahtani et al. (2019) analyse the effect of household spending on non-oil GDP as a proxy of income in Saudi Arabia. They report that household spending has an influence on economic growth. Bonsu and Muzindutsi (2017) assess the relationship between household consumption spending and several macroeconomic variables (including exchange rates and economic growth) in Ghana. The VAR test results on annual data basis from 1961 to 2013, give empirical evidence that in the short term, there is an effect of household consumption spending on economic growth.

In addition, some other studies regarding the effect of household spending on economic growth have been carried out for the case of countries group. For example, Alper (2018) investigates the effect of household spending, investment and savings on economic growth in developing countries. He used the panel data model to analyze annual data for the period 2005-2016. Test results show that household spending, investment and savings positively affect economic growth. Every 1% increase in household spending, investment and saving, economic growth increases by 0.41%, 0.25%, and 0.5%. Meanwhile, Radulescu et al. (2019) also investigate the effect of household spending and investment on economic growth in eight selected countries in the CEE group of countries (Romania, Bulgaria, the Czech Republic, Poland, Hungary, Slovakia, Slovenia, and Croatia) using the panel data model and annual data from 2004 to 2017. The analysis results lead them to the conclusion that household spending positively affects economic growth, in the short term.

3. DATA AND METHODOLOGY

3.1. Data

In this study, we use panel data consisting of annual time time series data that span from 1967 to 2018, and cross-country data for countries: Indonesia, Singapore, Thailand and the Philippines. Time series data consist of the price of crude oil, household spending, and GDP. The proxy for oil prices is the west texas intermediate (WTI) crude oil price in USD barrel. The measurement unit for household spending is IDR. GDP is the proxy for economic growth in USD. The data in this study are obtained and verified from the Federal Reserved Bank of St. Louis for the data on WTI crude oil price, and also from the World Bank for the data on GDP and household spending.

To accommodate time series data, we use GDP, OIL, and CON variables. GDP is useful for accommodating data on gross domestic product data, OIL for data on WTI crude oil price, and CON for data on consumption spending. The GDP, OIL and CON variables are natural logarithmic forms. We also use the variable *h* to collect data on volatility between OIL, CON, and GDP.

3.2. Methodology

As noted above in the introductory subsection, the aim of this study is to examine the asymmetry effect of crude oil prices, and also the effect of household spending on economic growth in the region of ASEAN-4. The ASEAN-4 group includes Indonesia, Singapore, Thailand, and the Philippines. These four countries are oil-importing countries. Despite the fact that Indonesia is carrying out crude oil export activities, the country is still categorized as an oil importer since the crude oil it produces is still unable to satisfy the in-country needs (Wang et al., 2013, Adam et al., 2015).

To test the effect, we employ the NPARDL model put forward by Shin et al. (2014) and has been used by, among others, Salisu and Isah (2017) and Kouton (2019). The procedure of testing the influence using the NPARDL model follows the procedure of testing the autoregressive distributed lag panel model proposed by Pesaran et al. (1999) and Pesaran (2015). The variables involved in the NPARDL model are OIL^{+}, OIL^{-}, *CON* and *GDP*. The OIL^{+}, variable is the sum of positive change in crude oil prices, which we refer to as crude oil prices increase variable, and the OIL^{-} variable is the sum of negative changes in crude oil prices we henceforth call the crude oil prices decline variable. The OIL^{+}, OIL^{-} variables are defined as follows:

$$\sum_{l-1}^{r-1}\delta_{il}^{*}CON_{i(t-l)}+\varepsilon_{it}, i=1,2,3,4$$

$$OIL_t^{-}=\sum_{i=1}^{t}min[\Delta OIL_i,0]=\sum_{i=1}^{t}mix[D(OIL),0]$$

Where $D(OIL_i)=\Delta OIL_i=OIL_i-OIL_{(i-1)}=OIL-OIL(-1)$, i=1,2,…,t is the change in crude oil prices.

The NPARDL model with a time lag of p, q, r is written NPARDL (p, q, r) which states the one-way relationship from crude oil prices and consumption spending to economic growth is as follows:

$$GDP_{it}=C_i+\alpha_i t+\sum_{j=1}^{p}\beta_{ij}GDP_{i(t-j)}+\sum_{k=0}^{q}(\gamma_{ik}OIL_{i(t-k)}^{+}+\theta_{ik}OIL_{i(t-k)}^{-}+\sum_{l=0}^{r}\delta_{il}CON_{i(t-1)}+\varepsilon_{it}, i=1,2,3,4 \quad (1)$$

Where C_i, α_i, β_{ij} (j=1…,p), γ_{ik} and θ_{ik} k=0,1,…,q), δ_{il} (l=0,1,…,r) are parameters of the NPARDL, equation, ε_{it} is an error, and i is a cross-section: Indonesia, Singapore, Thailand and the Philippines

and t=1967,…,2017. The C_i parameter represents a fixed effect and t represents trend. Error ε_{it} is independently distributed over i and t with mean zero, and constant variance σ_i^2, and is independently distributed of regressors OIL_i^+, OIL_i^- and CON_i. The parameters of the equation are estimated by the pooled mean group (PMG) estimator where the parameters are the same across all i (all countries). The GDP, OIL^+, OIL^- and CON variables are assumed to be stationary.

Equation (1) can be represented in the form of a non-linear error correction panel model (Pesaran, 2015) as follows

$$D(GDP_{it}) = C_i + \alpha_i t + \phi_i GDP_{i(t-1)} + \psi_i OIL_{it}^+ + \varphi_i OIL_{it}^- + \vartheta_i CON_{it} +$$

$$\sum_{j=1}^{p-1} \beta_{ij}^* GDP_{i(t-j)} + \sum_{k-1}^{q-1} (\gamma_{ik}^* OIL_{i(t-k)}^+ + \theta_{ik}^* OIL_{i(t-k)}^-) +$$

$$\sum_{l-1}^{r-1} \delta_{il}^* CON_{i(t-l)} + \varepsilon_{it}, i = 1,2,3,4 \quad (2)$$

In equation (2), ψ_i, φ_i and ϑ_i are the long-term parameters of $\frac{\vartheta_i}{\phi_i}$ dan CON_i (Asterio and Hall, 2011) with the long term multipliers $\frac{\psi_i}{\phi_i}$, $\frac{\varphi_i}{\phi_i}$ dan $\frac{\vartheta_i}{\phi_i}$ are the same for all crossection i (countries) (Pesaran, 2015). The ϕ_i parameters are the error correction parameters. The long-term effect of crude oil prices on economic growth is called the long-term asymmetry effect, if $\frac{\psi_i}{\phi_i} = \frac{\varphi_i}{\phi_i}$ or with the PMG estimator, the value is the same for all cross-sections i. The short-term effect of crude oil prices on economic growth is called the short-term asymmetry effect, if $\gamma_k^* = \theta_k^*$, k=1,2,…,q-1 (Shin et al., 2014; Pesaran, 2015).

Testing the effect of using NPARDL requires several testing steps. In the first step, we test the stationarity or order of the integration of all variables. We use two-panel unit root tests namely the Levin, Lin, and Chu (LLC) test developed by Levin et al. (2002), and the Im, Pesaran, and Shin (IPS) test developed by Im et al. (2003). The hypothesis formula of both tests is H_0: Time series has a unit root against an alternative hypothesis H_1: Time series has no unit root (stationary). While, the criterion of both tests is that H_0 is rejected (H_1 accepted) if the P-value of the test statistic is smaller than the significance level of 1%, 5% or 10%.

If the variables are stationary in first difference, then in the second step, we test the cointegration between crude oil prices increase, crude oil prices decline, household spending, and economic growth. We use the Kao cointegration panel test developed by Kao (1999). The Kao test is a development of the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests for cointegration tests on the panel model. Therefore, it follows the DF and ADF test procedures. Kao's test hypothesis formula is H_0: All time series do not co-integrate versus alternative hypotheses H_1: All time series co-integrate (Asteriou and Hall, 2011).

In the final step, we estimate the model parameters. However, before we proceed to this estimation, we determine in advance the length of time lag p, q, and r based on the smallest value of the AIC (akaike information criterium). As mentioned earlier, the parameter estimation uses the pooled mean group method.

4. RESULTS

We first examine the stationarity of the oil prices increase variable OIL^+ crude oil prices decline (OIL^-), household expenditure (CON), and economic growth (GDP) in level and first difference. The estimation results of the panel unit root test both the LLC test and the IPS test are summarized in Table 1. It appears from Table 1 that all variables are stationary in first difference.

Afterwards, we examine the cointegration between crude oil prices increase, oil prices decline, household spending, and economic growth. The results of the Kao cointegration panel test are reported in Table 2. The table shows that the alternative hypothesis is accepted. In other words, there is cointegration between crude oil prices increase, crude oil prices decline, household spending and economic growth. Moreover, this cointegration result concludes that a long-term relationship exists between the first three variables and economic growth. The long-term effect of each independent variable (regressor) on the dependent variable is characterized by the significance of the coefficient of each independent variable (regressor) reported in Table 3 in panel A.

Lastly, we proceed to set the time lag for the NPARDL model. Based on the AIC information criteria, we set the length of the time lag to be p=2, q=r=1. Thus, in this step, we estimate the parameters of the NPARDL (2,1,1) model. The estimated results of the model parameters are reported in Table 3. As it is shown in panel A, the OIL^+ variable is significant at the 5% significance level, while the OIL^- and CON variables are not significant. In other words, a long-term asymmetric effect of crude oil prices on economic growth exists, and there is no long-term effect of household spending on economic growth. From the OIL^+ variable coefficient it can be said that for every 1% increase in the price of crude oil, economic growth rises by 0.42%.

In panel B of Table 3, it appears that the coefficients of the D(OIL^+) and D(OIL^-) variables are significant at the 1% significance level. However, the two coefficients are different. The difference in coefficients implies that in the short run, there is an asymmetric effect of crude oil prices on economic growth. Furthermore, the coefficient of the D(CON) variable is significant at the 1% significance level. In other words, in the short run, there is an effect of household spending on economic growth.

5. DISCUSSIONS

The present study finds that there is an asymmetry impact of crude oil prices on economic growth both in the long run and in the short run. This finding is similar, among others, to that of Wen et al. (2018), Jawadi and Ftiti (2018), Jemenes-Rodrigues and Sanches (2005), Bergmann (2019) who earlier found evidence of the impact of oil prices on economic growth. On the other hand, the finding in this study is not in line with that of Trang et al. (2017) and Kriskkumar and Naseem (2019) who found the absence of impact of oil prices

Table 1: Panel unit root test

Variable	LLC test statistics		IPS test statistics	
	Constant	Constant and linear trend	Constant	Constant and linear trend
OIL^+	−1.3472	−0.0770	1.4253	−0.8984
D(OIL^+)	−8.7463*	−7.9439*	−9.8919*	−9.1951*
OIL^-	2.7750	−1.3499	4.8345	−1.5347
D(OIL^-)	−9.0334*	−8.4358*	−7.9355*	−7.45532*
CON	−4.1202	0.4331	−0.6825	1.8327
D(CON)	−7.5479*	−8.5367*	−5.67433*	−6.0270*
GDP	−2.9342	−0.7905	−0.0189	−0.2639
D(GDP)	−5.7101*	−5.5984*	−5.8915*	−5.4074*

*means significant at the 1% significance level

Table 2: Panel cointegration test

Dependent variable	Independent variable	Kao residual cointegration test/ADF test statistics
GDP	OIL^+	−3.3228*
	OIL^-	
	CON	

*means hypothesis H_1 is accepted (cointegration exists)

Table 3: Estimation results of NPARDL (2,1,1) model

Independent variables	Coefficient	t-statistic
A. Long term equation, dependent variable: GDP		
OIL^+	0.4183	2.0632**
OIL^-	0.3465	1.2428
CON	−0.1831	−0.3631
B. Short term equation, dependent variable: D(GDP)		
COINTEQ01	−0.1572	−2.3536**
D(GDP[−1])	0.1586	1.7879***
D(OIL^+)	0.0631	6.0280*
D(OIL^-)	0.1143	4.1407*
D(CON)	1.3990	2.6167*
C	4.2548	2.3115**
t	0.0106	2.2478**

*, ** or *** means significant at the 1%, 5% or 10% significance level, COINTEQ01 is an error correction variable

on economic growth. This difference in findings could be due to the time period of the data used (Adam et al., 2015; Saidi et al., 2019) and also differences in country characteristics (Ozturk, 2010).

Besides that, this study finds that household spending has an impact on economic growth. This finding confirms that of Gahtani et al. (2019), Bonsu and Muzindutsi (2017), Alper (2018) and Radulescu et al. (2019) who previously reported the same. However, the finding in this study differs from that of Karim et al. (2012) who found that in the short-run there is an impact of consumption spending on economic growth.

6. CONCLUSIONS

Crude oil is indispensable for the world economy as it is needed by all countries as an industrial raw material in all sectors of the economy. Meanwhile, household spending is a macroeconomic variable in which in the calculation of national income, it is a component of GDP. In this study, GDP is used as the proxy for economic growth.

The present study intends to examine the asymmetric effect of crude oil prices, and also the effect of household spending on economic growth. To test this effect, we use time-series data of WTI crude oil prices, household consumption spending and GDP ranging from 1967 to 2018. To analyze the data, we employ the NPARDL model.

Panel unit root test results show that all variables are stationary in first difference. The cointegration panel test results show that there is cointegration between crude oil prices increase, crude oil prices decline, consumption spending and economic growth. The estimation results of NPARDL model parameters show that first, in the long run, there is an asymmetric impact of crude oil prices on economic growth. Second, in the long run, household spending does not impact on economic growth. Third, in the short run, there is an influence asymmetric crude oil prices on economic growth. Fourth, in the short run, there exists an effect of household spending on economic growth.

REFERENCES

Abel, A.B., Bernanke, B.S., Croushore, D. (2014), Macroeconomics. 8th ed. New York: Pearson Education Inc.

Adam, P., Rianse, U., Cahyono, E., Rahim, M. (2015), Modeling of the dynamics relationship between world crude oil prices and the stock market in Indonesia. International Journal of Energy Economics and Policy, 5(2), 550-557.

Adam, P., Rianse, U., Harafah, L.M., Cahyono, E., Rafiy, M. (2016), A model of the dynamics of the effect of world crude oil price and world rice price on Indonesia's inflation rate. AGRIS Online Papers in Economics and Informatics, 8(1), 3-12.

Alper, E.A. (2018), The relationship of economic growth with consumption, investment, unemployment rates, saving rates and portfolio investments in the developing countries. Gaziantep University Journal of Social Sciences, 17(3), 980-987.

Asteriou, D., Hall, S.G. (2011), Applied Econometrics. 2nd ed. London: Palmagrave Macmillan.

Benada, L. (2014), Effect of crude oil on the Prague stock exchange. Procedia-Social and Behavioral Sciences, 109, 1316-1321.

Bergmann, P. (2019), Oil price shocks and GDP growth: Do energy shares amplify causal effects? Energy Economics, 80, 1010-1040.

Bjørnland, H.C. (2000), The dynamic effects of aggregate demand, supply and oil price shocks: A comparative study. The Manchester School, 68(5), 578-607.

Bonsu, C.O., Munzindutsi, P.F. (2017), Macroeconomic determinants of household consumption expenditure in Ghana: A multivariate cointegration approach. International Journal of Economics and Financial Issues, 7(4), 737-745.

Cologni, A., Manera, M. (2008), Oil prices, ınflation and ınterest rates in a structural cointegrated var model for the G-7 countries. Energy

Economics, 30, 856-888.
EIA (Energy Information Administration). (2019), Spot Prices for Crude Oil and Petroleum Products. Washington, DC: US Department of Energy. Available from: https://www.eia.gov/dnav/pet/hist/leafhandler.ashx?n=pet&s=rwtc&f=a.
Gahtani, G.A., Bollino, C.A., Bigerna, S., Pierru, A. (2019), Estimating the household consumption function in Saudi Arabia: An error correction approach. Applied Economics, 52, 1-13.
Garside, M. (2019), Daily Demand for Crude Oil Worldwide from 2006 to 2020 (in Million Barrels). Berlin: Statista, Rechtsanwalt Maximilian Conrad Raabestr. Available from: https://www.statista.com/statistics/271823/daily-global-crude-oil-demand-since-2006.
Herrera, A.M., Karak, M.B., Rangaraju, S.K. (2019), Oil price shocks and U. S. Economic activity. Energy Policy, 129, 89-99.
Im, K., Pesaran, M.H., Shin, Y. (2003), Testing for unit roots in heterogeneous panels. Journal of Econometrics, 115(1), 53-74.
Jawadi, F., Ftiti, Z. (2018), Oil price collapse and challenges to economic transformation of Saudi Arabia: A time-series analysis. Energy Economics, 80(C), 12-19.
Jemenes-Rodrigues, R., Sanches, M. (2005), Oil price shocks and real GDP growth: Empirical evidence for some OECD countries. Applied Economic, 37, 201-228.
Kao, C. (1999), Spurious regression and residual-based tests for cointegration in panel data. Journal of Econometrics, 90(1), 1-44.
Karim, Z.A., Karim, B.A., Zaidi, M.A.S. (2012), Fixed investment, household konsumstion and economic growth: A structural vectorerror correction model (SVECM) study of Malaysia. International Journal of Business and Society, 13(1), 63-76.
Kouton, J. (2019), The asymmetric linkage between energy use and economic growth in selected African countries: Evidence from a nonlinear panel autoregressive distributed lag model. Energy Economics, 83, 475-490.
Kriskkumar, K., Nassem, N.A.M. (2019), Analysis of oil price on economic growth of ASEAN net oil exporters. Energies, 12, 1-19.
Levin, A., Chien-Fu Lin, C.F., Chu, C.S.J. (2002), Unit root tests in panel data: Asymptotic and finite-sample properties. Journal of Econometrics, 108, 1-24.
Meredith, S. (2019), OPEC Lowers Forecast for Oil Demand Growth, Says Its Own Market Share is Dwindling. New York: CNBC. Available from: https://www.cnbc.com/2019/11/05/opec-report-global-oil-demand-growth-forecast-cut-over-the-medium-and-long-term.html.
Mo, B., Chen, C., Nie, H., Jiang, J. (2019), Visiting effects of crude oil price on economic growth in BRICS countries: Fresh evidence from wavelet-based quantile-on-quantile tests. Energy, 178, 234-251.
Muthalib, A.A., Adam, P., Rostin, R., Saenong, Z., Suriadi, L.O. (2018), The influence of fuel prices and unemployment rate towards the poverty level in Indonesia. International Journal of Energy Economics and Policy, 8(3), 37-42.
Omitogun, O., Longe, A.E., Muhammad, S. (2018), The impact of oil price and revenue variations on economic growth in Nigeria. OPEC Energy Review, 42(4), 387-402.
Ozturk, I. (2010), Literature survey on energy-growthnexus. Energy Policy, 38, 340-349.
Pesaran, M.H. (2015), Time Series and Panel Data Econometrics. 1st ed. New York: Oxford University Press.
Pesaran, M.H., Shin, Y., Smith, R.P. (1999), Pooled mean group estimation of dynamic heterogeneous panel. Journal of the American Statistical Association, 94(446), 621-634.
Radulescu, M., Serbanescu, L., Sinisi, C.I. (2019), Consumption vs. Investments for stimulating economic growth and employment in the CEE Countries-a panel analysis. Economic Research Ekonomska Istraživanja, 32(1), 2329-2353.
Rafiy, M., Adam, P., Bachmid, G., Saenong, Z. (2018), An analysis of the effect of consumption spending and investment on Indonesia's economic growth. Iranian Economic Review, 22(3), 753-766.
Rostin, R., Muthalib, A.A., Adam, P., Nur, M., Saenong, Z., Suriadi, L.O., Baso, J.N. (2019), The effect of crude oil prices on inflation, interest rates and economic growth in Indonesia. International Journal of Energy Economics and Policy, 9(5), 14-19.
Saidi, L.O., Adam, P., Rahim, M., Rosnawintang, R. (2019), The effect of crude oil prices on economic growth in South East Sulawesi, Indonesia: An application of autoregressive distributed lag model. International Journal of Energy Economics and Policy, 9(2), 194-198.
Salisu, A.A., Isah, K.O. (2017), Revisiting the oil price and stock market nexus: A nonlinear panel ARDL approach. Economic Modelling, 66, 258-271.
Shin, Y., Yu, B.C., Greenwood-Nimmo, M. (2014), Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In: Sickels, R., Horrace, W., editors. Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications. New York: Springer. p281-314.
Tan, F., Peng, S.L. (2017), Southeast Asia Crude. Imports to More than Double by 2040: IEA. London: The Thomson Reuters's Data Protection Officer. Available from: https://www.reuters.com/article/us-asia-oil/southeast-asia-crude-imports-to-more-than-double-by-2040-iea-iduskbn1cv0kp.
Trang, N.T.N., Tho, T.N., Hong, D.T.T. (2017), The impact of oil price on the growth, inflation, unemployment and budget deficit of Vietnam. International Journal of Energy Economics and Policy, 7(3), 42-49.
Wang, Y., Wu, C., Yang, L. (2013), Oil price shocks and stock market activities: Evidence from oil-importing and oil-export. Journal of Comparative Economics, 41(4), 1220-1239.
Wen, F., Min, F., Zhang, Y.J., Yang, C. (2018), Crude oil price shocks, monetary policy, and China's economy. International Journal of Finance and Economics, 24(7), 1-16.