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The Impact of Oil Price and Government Expenditure on Economic Growth in Malaysia

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Abstract

Purpose: This study examines the impacts of oil prices and government expenditure on economic growth in the context of Malaysia.

Methodology: The time series monthly data from 2000 to 2021 has been considered for this study and examined by the Auto Regressive Distributed Lag (ARDL) model for short and long-run observations.

Findings: The finding reveals that the oil price has a favourable impact on both short- and long-term economic growth; hence, Malaysia is practically an oil exporter. Despite the instability of oil prices, the country generates a significant amount from the sector. As oil price rises, economic activities are eventful. The government allocates more funds to various productive areas of the nation from the oil sector-generated revenue. Government expenditure has a considerable positive effect on economic growth in the short and long run.

Practical Implications: The investigation results indicate that oil prices and government expenditure favourably impact Malaysia's economy in the short and long term.

This article is part of a research on The Association of Primary Government Expenditures Out of Approved Budget with Oil Revenues, supported by the Accountant General's Department of Malaysia through *Geran Penyelidikan Perakaunan dan Kewangan Sektor Awam Tahun 2022* (JANM.IPNCPD.100-3/3/2 Jld. 3(31)).

Originality/Value: Based on the data, policymakers could re-evaluate government expenditures to lubricate the wheels of economic growth while keeping an eye on the volatility of oil prices, contributing to oil revenues.

Keywords: Oil price, government expenditure, economic growth.

1.0 Introduction

Crude oil is one of the most important energy sources, accounting for around forty percent of the world's energy consumption (Chen et al., 2020). The persistent instability of the global economy and global consumer price index demonstrates the significance of crude oil to the global economy. Moreover, crude oil is significantly more vital to the economies of oil-exporting nations. The oil industry produces a significant portion of national revenue, which in turn adds to the total national expenditures of such nations (Nyangarika, 2018; Emmanuel, Olamide & Henry, 2018; Ologunde, Kapingura & Sibanda, 2020). Hoyler (2021) and Su et al. (2021) concur that oil sector revenue is one of the most important sources of revenue for oil-producing nations such as Saudi Arabia, Russia, Iran, Nigeria, etc. This revenue aids in the formulation of a large budget. It promotes economic growth through a variety of channels, including infrastructure development, capital formation, job creation, research and development enhancement, and other areas (Youssef & Mokni, 2019; Mo et al, 2019; Jahangir & Dural, 2018).

Since the recent oil market shocks brought on by the Covid-19 epidemic and the Russia-Ukraine conflict, scholarly literature has stressed the significance of oil sector dynamics in macroeconomics (Su et al., 2021; Mo et al, 2019; Jahangir & Dural, 2018). According to Su et al. (2021), oil market volatility is highly damaging to economic growth in both oil-exporting and oil-importing nations. According to studies, a decline in the oil market reduces oil exporters' earnings from the sector, while an increase in the oil market harms oil-importer nations and vice versa (Dong et al., 2020; Alao & Payaslioglu, 2021). In addition, being a worldwide factor, the oil market is intricately related to local and international macroeconomic variables, as demonstrated by numerous research (Yıldırım, Erdoğan & Çevik, 2018; Hoyler, 2021; Chen et al., 2020). As an oil exporter, the sector contributes significantly to Malaysia’s national economy. Shangle & Solaymani (2020) state that Malaysia's crude oil sector contributed almost nine percent of the real gross demotic products (GDP) in 2010. Balcilar et al. (2019) and Dutta et al. (2021) believe that oil market volatility is important for the economy of Malaysia. The studies also find that the oil market plunge is negatively affecting economic growth by shrinking the government aggregate expenditures in development sectors of the country, while the rise in the oil market generates more revenue that support more significant government expenditure and motivates economic activities of Malaysia. Al-hajj, Al-Mulali & Solarin (2021) and Enamul Hoque et al. (2019) crude oil market shock has considerable impacts on the economy of Malaysia, the shock amplifies the geopolitical risks, international trade and FDI inflows which also impact national revenue collection and economic growth of Malaysia.

According to another group of research, oil revenues have substantially contributed to the large government expenditures of recent decades, which have laid the framework for Malaysia's prosperity (Hamzah et al., 2013; Saudi et al., 2019; Aslam et al., 2022; Shangle & Solaymani, 2020). According to several studies, the oil sector of Malaysia continues to account for a significant proportion of government spending, but these funds are rarely allocated to development sectors in favour of operating expenses, welfare expenditures, subsidies, and other welfare transfers (Li & Solaymani, 2021; Talha et al., 2021). Therefore, the oil sector's contribution is evident in terms of expenditures but has little effect on economic growth. Moreover, during the COVID-19 epidemic, the global demand for petroleum plummeted, as did Malaysia's revenue from the sector. As a result, Malaysia's GDP development slowed drastically (Hadi et al., 2019; Dutta et al., 2021). In addition, the Russia-Ukraine crisis-induced supply chain disruptions are adding to global oil market volatility (Onour & Abdo, 2022). Malaysia's oil market may have an effect as a global variable, which could affect government spending and economic growth.

Several causes drive this research. First, as an aspirant nation, Malaysia desires to increase its per capita income and advance from an emerging market economy to a developed economy (Subramanie et al., 2020; Isa, Sivapathy & Kamarruddin, 2021). As a result, the country projected an annual economic growth rate, while Malaysia's growth rate has been declining and essentially static for the past decade. Since 2000, the oil market's contribution to national expenditures through national revenue has dropped, according to certain studies (Miranda, 2019). And it could be the reason for the country's poor growth or economic stagnation. Therefore, studies on the impact of oil market dynamics on Malaysia's economic growth via government spending are required to investigate the sluggish growth reasons.

Second, the relevance of the oil market is currently of the utmost importance not just in Malaysia but also in other oil exporting and importing nations due to the reliance on oil revenues for budgetary funding (Emmanuel, Olamide & Henry, 2018; Ologunde, Kapingura & Sibanda, 2020). The globe is experiencing a big oil demand shock due to COVID-19. As an oil-exporting nation, Malaysia loses a significant amount of anticipated money from the industry that might fund its government expenditures (Dutta et al., 2021). Concurrently, the Russia-Ukraine conflict interrupts the oil market's supply chain and substantially impacts oil prices (Adekoya et al., 2022; Nerlinger & Utz, 2022). This quick price hike enables the Malaysian oil industry to reap substantial profits. As a result, the issue is anticipated to influence the nation's economic growth via national expenditures. These factors also compel us to analyse the influence of oil market volatility on economic growth in Malaysia via government spending.

Third, substantial research has been undertaken on the dynamics of the oil market, government spending, and economic growth in the context of major oil producers such as Russia, Saudi Arabia, Iran, Brazil, OPEC nations, and other oil exporting nations (Su et al., 2021; Mo et al, 2019; Jahangir & Dural, 2018). While few studies examine the relationship between the oil market and economic growth in Malaysia, the government expenditure correlation is ignored (Al-hajj, Al-Mulali & Solarin, 2021; Enamul Hoque et al., 2019). The few

studies conducted in Malaysia have primarily focused on oil production and national revenue, oil production expenditure and oil market revenue, the contribution of the oil sector relative to other nations, oil market shocks and the national economy, and the effect of oil on economic growth (Nerlinger & Utz, 2022; Mo et al, 2019; Jahangir & Dural, 2018; Enamul Hoque et al., 2019).

However, the available literature does not analyse the impact of the oil market on economic growth in Malaysia as directed by government spending. To address a blankness in the research, the current study proposes to investigate the effects of oil prices and government spending on economic growth in Malaysia. The study also provides practitioners and officials in the country with some policy recommendations to establish appropriate policies on the oil market for rapid economic growth.

2.0 Literature Review

As the oil business is one of the most important revenue-generating sectors for oil exporters, several studies analyse the oil sector's impact on various economic issues. As a landmark research, Hamilton (1983) focuses primarily on the oil sector dynamics at the national level and the effect of oil prices on macroeconomic activities. The ground-breaking study concludes that the impact of oil prices on American macroeconomics is substantial and that oil price swings are also accountable for the nation's economic recessions.

In the context of oil exporters, many studies evaluate the impact of the oil sector on economic growth. For example, the oil price is closely tied to the economies of OPEC nations (Razek & Michieka, 2019). According to studies, the energy market, particularly the oil industry, is one of the most important determinants in the success of producing nations (Cai et al., 2022; Baek, Ikponmwosa & Choi, 2019). According to the study, the oil sector contributes to economic growth through tax collection and supports growth elements through government spending in these nations.

On the other hand, Li, Huang, and Failler (2022) and Su et al. (2021) claim that oil price shocks have no or only minor effects on the macroeconomy if oil prices fluctuate minimally. The study employs a threshold regression model and concludes that oil price fluctuations above a certain threshold level significantly affect the economy. Rafiq et al. (2021) find that oil price changes significantly impact government expenditures since oil-exporting nations earn a substantial amount of money from the sector. In addition, the analysis reveals that oil importers spend enormous amounts of money on government expenditures; as a result, oil price shocks significantly affect the economies of oil importers channelled through government expenditures.

Al-hajj, Al-Mulali, and Solarin (2021) and Enamul Hoque et al. (2019) claim that oil price shock used to have a significant impact on government expenditure and economic growth in Malaysia. Still, the effect has been diminishing in recent years due to economic diversifications. Similarly, some research concludes that the oil price is closely tied to Malaysia's economic

growth because it continues to generate revenue (Shangle & Solaymani, 2020; Sun, Lu & Solaymani, 2021).

Another group of studies confirms that oil price volatility has a significant impact on the fiscal budget and economic growth of oil-exporting nations, such as Saudi Arabia, Russia, Iran, Iraq, Kuwait, Nigeria, Malaysia, and others (Dong et al., 2020; Alao & Payaslioglu, 2021; Hoyler, 2021, Chen et al., 2020). According to Shangle & Solaymani (2020), the Malaysian economy and the majority of industries benefit from rising oil prices and suffer from falling oil prices.

The country's economy benefits from the shocks since extensive revenue collections help the financial sector and reinvestment, while low oil prices benefit productive sectors by cutting operational expenditures. According to Husaini et al. (2019), oil price volatility significantly impacts the producer pricing index in Malaysia and inhibits long-term economic growth. According to studies, a rise in oil prices is strongly correlated with Malaysia's government spending, capital creation, and inflation rate but it is also conducive to economic growth (Talha et al., 2021; Musa & Maijama'a, 2020). Therefore, the findings confirm that the Malaysian oil industry is an important sector contributing significantly to government expenditures, affecting economic growth in advance.

Numerous past research has also focused on oil price shocks, government spending, and economic development in various sample settings. Polbin, Skrobotov, and Zubarev (2020) and Ebi and Aladejare (2022) find that an oil price shock could significantly impact the budgeting process and economic growth through its effect on revenue collection. Several further investigations concur with similar conclusions (Adekoya et al., 2022; Nerlinger & Utz, 2022). Tang & Al Qahtani (2020) claim that oil price and economic growth are closely intertwined for oil exporters. A drop in oil price might have cut the inflation rate and stabilised the economy, but it also affected the employment rate and economic growth trade. Aloui et al. (2018) suggest that oil price volatility boosts government oil sector subsidies, resulting in a massive expenditure of government funds for oil price stabilisation. The research further asserts that the oil industry subsidy restricts the allocation of government expenditures to other development sectors, which depresses economic activity due to a lack of capital. This dilemma parallels the Malaysian situation during times of high oil prices. Dutta et al. (2021) and Ologunde, Kapingura, and Sibanda (2020) reach comparable conclusions regarding oil price volatility, government spending, and economic growth in Malaysia.

The problem of oil prices, government spending, and economic growth has been widely examined in prior research. However, most of the study focuses on the leading oil exporting nations, such as Saudi Arabia, Iran, the Russian Federation, and the other OPEC and Sub-African oil exporting nations. While most previous research focuses on oil industry dynamics, Malaysia is omitted as a case study. Some studies examine the Malaysian context but exclude oil prices, government spending, and economic growth from a single analysis. In addition, most available research employs a static estimating model with a fixed effect.

Therefore, the current study incorporates the factors in a single study, along with a few control variables, and examines the influence using a robust ARDL model to offer short- and long-run impacts.

3.0 Methodology

3.1 Data

The study uses quarterly time series data since 2000 to 2021. The crude oil price data has been collected from the Energy Information Administration (EIA) USA, while the government expenditure data (log) has been collected from the Accountant General's Department of Malaysia, and the log from GDP per capita used as the proxy of economic growth and collected from the World Bank.

Table 1: Variable Description and Data Sources

Variable	Definition	Source	Scale of Measurement
Log Economic Growth (LGDP)	GDP is obtained by dividing the gross domestic product by the total population.	World Development Indicators (WDI) The World Bank	GDP Per Capita (Constant US $ 2015)
Oil Price (OIL)	Daily actual oil price per barrel according to West Texas Intermediate.	U.S. Energy Information Administration	Oil price per barrel in USD
Government Expenditure (LGE)	Government expenditure.	Accountant General's Department of Malaysia	Nominal expenditure
Trade Openness (TO)	Trade is the sum of imports and exports of services and goods % of GDP.	World Development Indicators (WDI)	Trade (as % of GDP)
Labour Force (LF)	LF includes people ages 15 and older who supply labour to produce goods and services during a specified period.	World Development Indicators (WDI)	Population aged (15 and above). Per cent of the total population

3.2 Empirical Model

We estimated the following econometric form of a model for the current study:

$$LGDP_t = \alpha_1 + \alpha_2 OIL_t + \alpha_3 LF_t + \alpha_4 TO_t + \alpha_5 LGE_t + \mu_t$$

Where α_1 is constant and α_2 to α_5 indicates coefficients of estimates of GDP per capita concerning labor force (LF), trade openness (TO), government expenditures (GE), and oil price (OIL), respectively. The study utilises quarterly data of Malaysia from 2000 to 2021. GDP, LF and TO data has been obtained from the World Development Indicators. OIL (crude oil price) has been collected from the Energy Information Administration (EIA) and the GE data has been collected from Accountant General's Department of Malaysia. To overcome the probe of

heteroscedasticity, GDP and GE are transformed into a natural log as LGDP and LGE. GDP per capita is also used as the proxy of economic growth.

3.3 Unit Root Test

An augmented Dickey-Fuller test (ADF) in statistics and econometrics tests the null hypothesis that a unit root exists in a time series sample. The alternative hypothesis varies based on the test version employed, but it is typically stationarity or trend-stationarity. It is an improved version of the Dickey-Fuller test for a broader, more complex collection of time series models.

The test follows the form of

$$\Delta yt = \alpha + \beta t + \gamma y_{t-1} + \delta \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p-1} + \varepsilon_t$$

Where α is a constant, βt is the coefficient on a time trend and Δy_{t-p-1} is the lag order of the autoregressive process. Imposing the constraints $\delta \Delta y_{t-1}$ corresponds to modelling a random walk and $\delta_{p-1} \Delta y_{t-p-1}$ using the constraint corresponds to modelling a random walk with a drift. While ε_t is the error correction.

3.4. ARDL Bounds Test Approach to Cointegration

The study employs the ARDL approach to assess the connection oil price, government expenditure and economic growth. This estimation framework has been developed and constructed by (Pesaran, Shin, & Smith, 2001). This estimation method has the following benefits over other approaches for cointegration. This technique uses Auto Regressive Distributed Lag (ARDL) and chooses suitable lag order for the model (Sohag et al., 2015). This technique is appropriate for variables that have integrated order I(0) or I(1) but not for I(2) (Persan & Pesaran, 1997). This method is suitable and valid for a small sample size (Mah, 2000; Pattichis, 1999). The ARDL bound test takes the form to test the bond test considering the study's variables. The technique is also able to provide short-term and long-term estimations.

$$LGDP_t = \beta_o + \beta_1 OIL_{t-1} + \beta_2 LF_{t-1} + \beta_3 TO_{t-1} + \beta_4 LGE_{t-1} + \beta_5 D1_{t-1} + \beta_6 D2_{t-1} + \sum_{i=0}^{n} \beta_7 \Delta LGDP_{t-i} + \sum_{i=11}^{n} \beta_8 \Delta OIL_{t-i} + \sum_{i=0}^{n} \beta_9 \Delta LF_{t-i} + \sum_{i=0}^{n} \beta_{10} \Delta TO_{t-i} + \sum_{i=0}^{n} \beta_{11} \Delta LGE_{t-i} + \mu_t$$

Where ln $LGDP_{-t}$ indicates the logarithmic form of gross domestic products per capita, and b0 indicates the intercept. $\sum^{n}_{i=0} \beta_{10} \Delta LGDP_{t-i}$,$\sum^{n}_{i=11} \beta_{8} \Delta OIL_{t-i}$,$\sum^{n}_{i=0} \beta_{12} \Delta LF_{t-i}$,$\sum^{n}_{i=0} \beta_{13} \Delta TO_{t-i}$ *and* $\sum^{n}_{i=0} \beta_{14} \Delta LGE_{t-i}$ the values of lag difference $\Delta LGDP_{t-i}$, ΔOIL_{t-i}, ΔLF_{t-i}, ΔTO_{t-i}, and ΔLGE_{t-i} respectively. Finally, μ_t indicates the error terms, which is the summation of the coefficients β_7, β_8, β_9, β_{10} and β_{11}.

3.5 Gregory Hansen Cointegration Test

We utilised the Gregory Hansen Cointegration (G-Hansen) Test developed by Gregory & Hansen (1996) to examine the robustness of the ARDL bounds test of cointegration. The authors developed this test by extending Hylleberg, Engle, Granger, & Yoo (1990). The null hypothesis of G-Hansen shows no cointegration at a breakpoint while the alternative hypothesis indicates cointegration at a breakpoint. When the cointegration relationship is confirmed, the ARDL test is applied to interrogate coefficients during the long and short run. Short-term findings also include the error correction term, which specifies the convergence speed to overcome the short-run disequilibrium and leads to equilibrium in the long run.

4.0 Results and Discussion

4.1 Variable Descriptive Statistics

Table 2 demonstrates the descriptive statistics of the concerned variables, including the model. The Table contains the mean, median, maximum, minimum and standard deviation. Besides, it also provides some tests, i.e., Skewness and Jarque-Bera, that determine the data distribution stability. The Jarque-Bera test shows that the data are normally distributed. At the same time, the Skewness test results indicate that the data trends are mixed due to the negative and positively skewed. Additionally, the Kurtosis results show that the data distribution is normal.

Table 2: Descriptive Statistics

	LGDP	LF	LGE	TO	OIL
Mean	3.8650	63.7808	10.6160	189.8925	57.1043
Median	3.8700	63.9750	10.6720	196.7800	58.2116
Maximum	3.9300	65.2300	10.7793	220.4100	123.9533
Minimum	3.8000	60.4300	10.2396	154.9400	20.4000
Std. Dev.	0.0437	1.2688	0.1301	20.9704	27.2462
Skewness	-0.0892	-1.3079	-0.9663	-0.4933	0.5366
Kurtosis	1.6506	4.5700	3.2110	1.9199	2.3860
Jarque-Bera	3.7051	18.6164	7.5596	4.2798	3.0575
Probability	0.1568	0.00009	0.0228	0.1176	0.2168
Sum	185.5200	3061.480	509.5716	9114.840	2741.007
Sum Sq. Dev.	0.0900	75.6635	0.7963	20668.70	34890.82
Observations	48	48	48	48	48

Where,
LGDP = Log form of GDP per capita
OIL = Oil price
LGE = Log form of government expenditure
LF = Labour force
TO = Trade openness

4.2 Unit Root Test Results

The augmented Dickey Fuller Test results show that the government expenditure is significant by a 10% significance level without taking any lag. The result of the first difference shows that all the concentrated variables are significant. Additionally, the Phillip-perron unit root test also shows similar results. So, the variables have no unit root, and we can proceed with further analysis.

Table 3: Results of Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests

	Augmented Dickey-Fuller Unit Root Test		Phillips-Perron Unit Root Test	
	Level	First diff	Level	First diff
LGDP	-1.9231	-6.4012***	-0.8303	-10.1930
LF	-1.1057	-5.1937***	-1.1443	-9.1096***
LGE	-2.6815*	-10.4280***	-3.3443**	-9.2582***
TO	-1.5640	-5.8504***	-1.4488	-9.7359***
OIL	-2.0366	-5.8462***	-2.1060	-7.2099***

Note: *, **, *** denotes level of significance at 10%, 5%, 1%.

Where,
LGDP = Log form of GDP per capita
OIL = Oil price
LGE = Log form of government expenditure
LF = Labour force
TO = Trade openness

4.3 Correlation Matrix

Table 4 shows the correlation matrix of the variables. Government expenditure and the oil price positively correlated with economic growth. It implies that if government expenditure or oil price increases by one unit, the economic growth increases by 0.360 and 0.397 units. Table 4 shows that if the oil price increased by one unit, the government expenditure also increased by 0.758 units. However, the coefficients of the control variables are mostly negative on economic growth.

Table 4 depicts the correlation matrix of the variables. The correlation matrix shows that the LF and TO negatively correlate with GDP per capita. At the same time, the LGE (log government expenditure) and OIL are positively correlated with the LGDP (log GDP).

Table 4: Correlation Matrix of Regressors

	LGDP	LF	LGE	TO	OIL
LGDP	1.000				
LF	-0.458	1.000			
LGE	0.360	-0.609	1.000		
TO	-0.422	0.532	-0.705	1.000	
OIL	0.397	-0.569	0.758	-0.675	1.000

Where,
LGDP = Log form of GDP per capita
OIL = Oil price
LGE = Log form of government expenditure
LF = Labor force
TO = Trade openness

4.4 Short-term Results ARDL

This section of this study provides different regression results, including short-term and long-term results using the ARDL model. First, the study estimated shut-term analysis; then, to check the long-run relationship, this study uses ARDL bound test. Based on the bound test results, the study also estimates long-term estimation.

Table 5 shows the relationship between this study's dependent and independent variables using the ARDL approach. The coefficient of ECM is -0.805537, and the P-value is lower than 0.05 meaning the coefficient is negative and significant. The coefficient of ECM shows that the divergence of the economic growth (LGDP) from the long-run path is corrected by around 80 per cent over the following year. At the same time, the coefficients of oil and government expenditure are positive. While the results of R-square 0.537087 and the F-statistics 9.513893 are positive as well. Besides, the Prob(F-statistics) is also below 0.05, which allows the study to examine the long-run relationship of the variables.

Table 5: Short Term Results Using ARDL Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.426730	0.520721	6.580738	0.0000
@TREND	0.002720	0.000413	6.590752	0.0000
D(LGE)	0.001201	0.017205	1.069819	0.0947
D(OIL)	0.000140	7.55E-05	1.854505	0.0717
D(TO)	0.000140	0.000182	0.766139	0.4485
ECM	-0.805537	0.122454	-6.578274	0.0000
R-squared	0.537087	Mean dependent var		0.002553
Adjusted R-squared	0.480634	S.D. dependent var		0.008201
S.E. of regression	0.005910	Akaike info criterion		-7.305581
Sum squared resid	0.001432	Schwarz criterion		-7.069392
Sum squared resid	0.001432	Schwarz criterion		-7.216701
Log likelihood	177.6811	Hannan-Quinn criter.		1.798606
F-statistic	9.513893	Durbin-Watson stat		
Prob(F-statistic)	0.000004			

Where,
LGDP = Log form of GDP per capita
OIL = Oil price
LGE = Log form of government expenditure
LF = Labour force
TO = Trade openness

4.5 Bound Test Results

Table 6 provides a picture of the ARDL bond test results. The value of F-statistics is 7.810373, which is higher than the lower bound of 3.03 and upper bound of 4.06 at a 10% significance level. Besides, the F-statistics are also higher from lower and upper bounds at 5% and 2.5% and show a 1% significance level. The ARDL bound test results imply that the long-run relationship between the dependent and independent variables exists.

The T-statistics of the ARDL bound test is -5.956726, which is also higher than the lower bound -3.13 and the upper bound -4.04 at a 10% significance level. At the same time, by the 5% significance level, the lower bound is -3.41 and the upper bound is -4.36; besides, by the 2.5% significance level, the lower bound is -3.65 and the upper bound is -4.62, and by the 1% significance level the lower bound is -3.69 and the upper bound is -4.96. The T-statistics imply once to confirm that the dependent and the independent variables have a long-run relationship.

Table 6: ARDL Bounds TEST

F-Bounds Test		Null Hypothesis: No Levels Relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.810373	10%	3.03	4.06
k	4	5%	3.47	4.57
		2.5%	3.89	5.07
		1%	4.4	5.72
t-Bounds Test		Null Hypothesis: No Levels Relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.956726	10%	-3.13	-4.04
		5%	-3.41	-4.36
		2.5%	-3.65	-4.62
		1%	-3.96	-4.96

4.6 Long-run Results ARDL

Table 7 demonstrates the long-run relationship of the variables using the ARDL approach. The coefficient of oil price (OIL) is 0.000375, which is positive, and the P-value shows the significance level is 0.0002, which is lower than 0.05. it implies that the impact of oil price is highly significant on economic growth by a one percent significance level. The coefficient of government expenditure (LGE) is 0.041978, and the P-value is 0.0130, which is lower than 0.05 and implies that government expenditure is also positively related to long-term economic growth, with a significant coefficient.

Table 7: Long Run Coefficients Using ARDL Approach Levels Equation

Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LF	-0.002250	0.001243	-1.810344	0.0784
LGE	0.041978	0.025107	1.671965	0.0030
OIL	0.000375	9.07E-05	4.137621	0.0002
TO	0.000522	0.000140	3.722004	0.0007
EC = LGDP - (-0.0022*LF 0.0420*LGE + 0.0004*OIL + 0.0005*TO)				

4.7 Diagnostic Results

Table 8 provides the results of some diagnostic tests of the estimation. The F-statistics result of Heteroskedasticity is 0.9375, and the probability is 0.3382. If the probability remains lower than 0.05, then the data used have a heteroskedasticity problem. The probability of heteroskedasticity shows the probability value is upper than 0.05. So, the date of this study has homoskedasticity rather than heteroskedasticity, which allows the study to run further

estimation. To confirm the normal distribution of the data in the study, we perform several other tests, i.e., the Breusch-Godfrey Serial Correlation LM Test and the Jarque Bera Test for Normality. The F-statistics of the tests are 1.2333 and 1.2643, respectively. And the probability value of both tests is upper than 0.05. It implies that the data distribution is very strong, and there is no heteroscedasticity serial correlation and no abnormality.

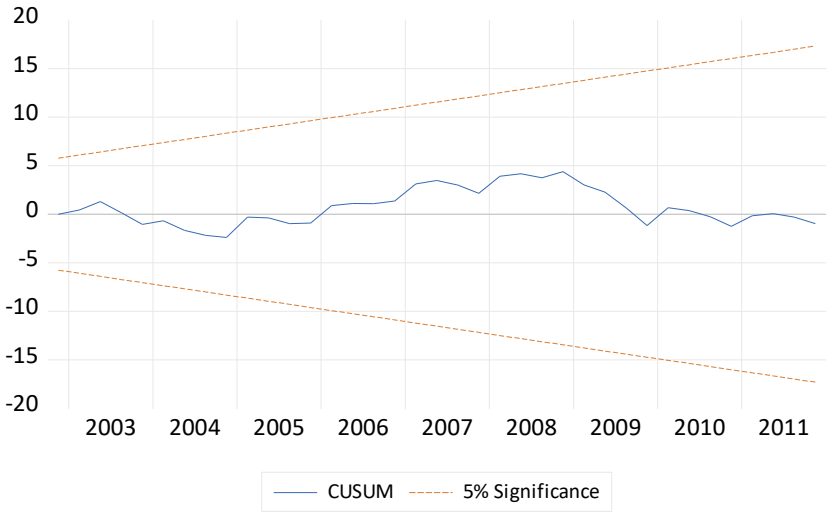
Table 8: Diagnostic Tests

	F-statistics	Probability
Heteroskedasticity Test: ARCH	0.9375	0.3382
Breusch-Godfrey Serial Correlation LM Test	1.2333	0.3037
Jarque Bera Test for Normality	1.2643	0.5314

4.8 Cumulative Sum of Recursive Residual Plot

Graph 1 shows the graphical results of data distribution by the Cumulative Sum of Recursive Residuals. The CUSUM plots stay within the lines, confirming that the model is stable and accurately specified. The chosen model appears robust and accurate in assessing the short-run and long-run relationship between the determinants under consideration.

Graph 1: Plot of Cumulative Sum of Recursive Residuals

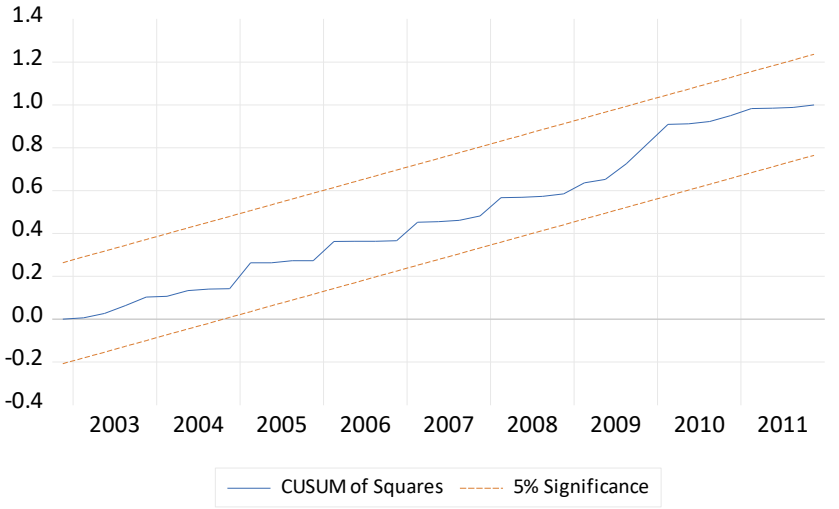


Source: Author Compilation from ARDL Estimation Technique

4.9 Cumulative Sum of Square of Recursive Residual Plot

Graph 2 shows the graphical results of data distribution by the Cumulative Sum of Squares of Recursive Residuals. The plots stay between the lines, confirming that the model is stable and accurately stated. The chosen model appears robust and accurate in assessing the short-run and long-run relationship between the examined factors.

Graph 2: Plot of Cumulative Sum of Squares of Recursive Residuals



Source: Author Compilation from ARDL Estimation Technique

4.10 Discussion

The research explores the effect between oil prices and government spending to economic growth in Malaysia. The 2000-2021 time series data of the variables investigated by the ARDL model reveal that oil prices benefit Malaysia's economic growth. Suppose a country is able to create more revenue from the oil sector. In that case, it can generate more economic growth through various avenues, including increased investment, infrastructure development, human development, social and welfare development, research and innovation, etc. The findings are consistent with several earlier investigations (Adam, Rahim & Rosnawintang, 2019; Alom, 2015).

On the other hand, research indicates that a rise in oil revenue due to a high price harms economic activity (Talha et al., 2021; Musa & Maijama'a, 2020). As a result of the relationship between the price of oil and every area of a country's economy, from the agricultural to the industrial, rising oil prices negatively influence domestic growth (Dutta et al., 2021). In addition, some research indicates that the Malaysian government offers substantial energy sector subsidies to boost the country's productive industries (Lahiani et al., 2019). Therefore, the oil sector has a steady positive effect on Malaysia's economy.

The coefficients of government expenditure are likewise positive for the short-term periods. Even though oil revenue contributes to government expenditures, the country has several ways to fund government expenditures. During the analysed period, Malaysia incurred many public obligations and maintained positive economic growth from the government expenditure but at a minimal level (Hasnul, 2015).

The study also investigated the long-term impact of oil prices and government expenditure on economic growth. The results indicate that oil prices and government expenditure are favourably associated with long-term economic growth. The results suggest that oil revenues and government expenditures are essential to Malaysia's economy. Several studies proved

that the oil industry and government expenditure play critical roles in Malaysia's long-term economic growth (Hasnul, 2015; Shangle & Solaymani, 2020). Despite the Malaysian government pursuing an expansionary fiscal policy and increased government expenditure more than its aggregate revenue in recent decades but still, the country is able to run the economy positively (Lahiani et al., 2019; Alom, 2015), while the oil sector revenue and government expenditure have remained crucial to economic growth.

5.0 Conclusion

This study investigates the effect of oil prices and government expenditure on economic growth in Malaysia. This study concludes that oil rent and government expenditure contribute positively and significantly to Malaysia's short- and long-term economic growth. The findings are consistent with several earlier investigations (Adam, Rahim & Rosnawintang, 2019; Alom, 2015). Malaysia is one of the oil exporters, and the oil industry generates substantial revenue for the country's economy. Additionally, this revenue is invested in several industries and productive sectors through government expenditure, thus contributing to the national economy. Additionally, the results indicate that oil prices and government expenditure are favourably associated with the long-term economic growth of Malaysia. The results suggest that oil prices and government expenditures are essential to Malaysia's economy. However, we obtain the results by deploying the ARDL method for this study's time series data from 2000 to 2021.

This study has a number of implications and contributions, i.e., in policy, theoretical perspective and the body of knowledge. First, policymakers should make supportive policies so that the country can benefit continuously from the oil sector. Moreover, the globalised world is extremely concerned about carbon emissions, and the oil sector contributes to their increase. Consequently, governments should observe global carbon emission policies and formulate national oil policy critically to simultaneously address global and national oil sector interests.

Second, there is a paucity of literature on the impact of the oil sector on economic growth in oil-exporting Malaysia, considering government expenditures. Consequently, this study contributes to the topic in light of rigorous econometric model on the economic growth of Malaysia. Thus, the current study fills the gap in the relevant literature in the context of Malaysia. In addition, this study includes extensive short- and long-term evidence on the dynamics of the oil sector, government expenditure, and economic growth.

In addition to the study's robustness, some limitations are also highlighted. The research focused solely on Malaysia. Due to its reliance on monthly data, the study may be limited in its ability to describe the impact of the oil industry, government spending, and economic growth from yearly and daily perspective. The study employs the ARDL model for the estimate, although the CS-ARDL or other dynamic models might provide more robust results.

Given the limitations of the present study, there are several suggestions for further research. To understand the dynamics of oil sector, government expenditure, and economic growth, a future study may first focus on a few nations or regional oil exporters. Future research can be undertaken utilising annual and daily data and additional econometric models, such as CS-ARDL, quantile via moment, threshold regression, etc., to investigate the topic from various

angles. To study the relationship between oil price dynamics and oil rents, future research can consider additional variables, such as investment, inflation, trade, etc.

Data Availability Statement: Will be provided upon request.

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