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RESEARCH PAPER

The Impact of Oil Price Shocks on the Military Expenditure of Selected MENA Oil Exporting Countries: Symmetric and Asymmetric Cointegration Analysis

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Abstract
This paper examines the symmetric and asymmetric effects of oil prices on military expenditure of selected the Middle East and North Africa (MENA) oil-exporting countries. Using Linear Autoregressive Distributed Lag (ARDL) and Nonlinear Autoregressive Distributed Lag (NARDL) frameworks on annual data covers from 1960 to 2014, this paper documents that oil prices and the military expenditure shares a stable long-run relationship in all cases except Algeria. The ARDL empirical findings reveal that oil price has a positive and significant effect on military spending in all cases except Tunisia. The NARDL results further reveal the existence of asymmetric pieces of evidence that the increase in oil prices increases military spending while the decrease in oil prices reduces the military spending in the long-run for Saudi Arabia, Iran, Algeria, Kuwait, and Oman. In the short run, the results demonstrate the existence of asymmetry effect of oil price on military spending only for Iran.
Keywords: Oil Price Shocks, Military Spending, NARDL.
JEL Classification: Q43, C22, E31.

Introduction

Oil revenue is an important pillar to most oil economies in the Middle East and North African (MENA) Countries. Oil revenue is considered to be the main source of government expenditure and international trade in oil abundant countries in the MENA region. Therefore, oil price shocks can have significant effects on economic activities in both oil importers and exporters countries. Additionally, increases in oil prices would benefit oil exporting countries due to the positive effect on their income and government expenditure (e.g. military and civil expenditure). On the other hand, decreases in the price of oil would benefit the oil importer economies because it would lead to lower costs of production (See, Arezki and Blanchard, 2014; Hou et al., 2015).

Furthermore, most MENA economies have been facing various uncertainties including

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conflicts (internal and external) and political instabilities. The continuous Arab-Israel, Saudi-Iran, and Israel-Iran conflicts, among others, have considerably contributed to instabilities in the region. These conflicts continue to cause disruptions to productive economic activities and efficient utilization of scarce resources. As a result, countries in the MENA region naturally have to commit resources to build and upgrade their military capabilities, causing their military spending to continue to rise. For example, Saudi Arabia has spent more on arms and securities in 2017 and was ranked the third after USA and China. It was also estimated that in 2016 that the Saudi military spending as a share of GDP had reached 12.61. On the other hand, the Iranian nuclear program since the last decade has created an unstable political environment in the MENA countries in general and Gulf States in particular. The Arab Spring in 2011 and the rise of the Islamic State group in Iraq and Syria (ISIS) have also recently brought new kinds of conflict and instabilities, particularly in countries such as Iraq, Syria, Libya, Iran and Saudi Arabia, which directly and indirectly are drawn into the conflict. Thus, the oil income has been playing a central role in building unrest in the region.

Recently, there is a growing debate in the political economy literature on whether natural resources dependency (e.g. oil and gas) contribute to more conflicts. Collier and Hoefflert (2004), for instance, argued that countries that export their primary commodities more than 33 percent of their GDP would face a 22 percent high risk of civil war. However, the risk is very low, about 1 percent for countries that do not depend on primary commodity export. Furthermore, in most countries, increases in oil revenues have been seen to accelerate conflicts, civil wars, and military expenditure as well as arm purchase. According to the Institute for Economics and Peace (2017) the volatility of the sources of the revenue (e.g. oil and gas) and their global prices are considered to be the main sources of civil wars, as well as a cause of boosting the military burden for the natural-resource abundant economies. Thus, oil rents can influence the military spending.

There are several reasons that support the contention that oil revenue is associated with the growth of military spending in the MENA countries. First, oil and gas provide substantial sources to protect the incumbent regimes (e.g. royal regimes of the Gulf cooperation countries) and dictator regimes (Iran, Algeria, Egypt, Tunisia, Libya, Iraq, and Syria) through building strong military and arm forces (Ali and Abdellatif, 2013). Second, the nature of political regimes in the regions coupled with the 'resource curse' phenomenon suggests that there is close connection between oil rent and military spending.

The present study investigates the symmetric and asymmetric effects of oil price shocks on military spending for selected MENA oil exporting countries. There are three reasons for investigating the relationship between oil price and military spending in the MENA region. Firstly, the nature of oil dependency in most countries in the region has been demonstrated to have a dramatic effect on their political economy. Secondly, ceaseless conflict and instabilities in the region continue to lead to an arms race between the different countries. Lastly, there is evidence to suggest strong cointegration between oil dependency and conflict or political instability (Pan et al., 2017).

Table 1 illustrates some macroeconomic characteristics of MENA countries. It can be observed that most countries are highly dependent on oil revenue, especially Saudi Arabia, Kuwait and Oman, while Iran and Algeria are moderately depending on oil revenue. In addition, in terms of export and trade, the contribution of oil export to total exports in most MENA countries were very high, accounting for about 90 percent. The Institute for Economics and Peace (2017) reported that the MENA region was the least peaceful region in the world, noting their high levels of military spending and expenditure on internal security. These factors corresponded with their high negative polity score, displayed in Table 1, suggesting they are the least democratic countries in the world. As observed in Table 1, there is a positive and highly significant correlation between oil price and military spending for most countries under preview.

Table 1. Macroeconomic Characteristics

Country	Population (millions) 2014	Real GDP per capita, 1960-2014	Oil Rent (% of GDP) 1970-2014	Oil Export (% of Merchandise Export)	Military Spending (% of GDP), 2014	Correlation between Oil Price and Military Spending	Polity Score (2015)
Algeria	38.93	3401	20	94	2.7	0.58 (5.06)[a]	2
Kuwait	3.75	40,927	47.51	76	9.78	0.44 (3.25) [a]	-7
Saudi	30.88	22425	42.54	94	11.77	0.70 (6.55) [a]	-10
Egypt	89.57	1477	11.38	36.76	6.5	0.63 (5.84) [a]	-4
Tunisia	11.13	2542	5.86	28	1.88	0.64 (5.89)[a]	7
Iran	78.14	5281	22.28	90	4.13	0.72 (7.68)[a]	-7
Oman	3.90	13865	40.53	86	16.87	0.59 (4.79)[a]	-8

Note: t *statistics* are in parentheses. a, indicate significance level at 1%.
Source: World Bank's World Development Indicator (WDI), PWT 9.0 and Center for Systematic Peace.

Figure 1 exposes the co-movement between real oil price and military spending share of GDP for MENA oil exporting countries, with higher correlation coefficient which is about 0.78. This indicates that an increase in real oil price has a significant effect on military spending in these economies. At the first glances of the figure, in the first oil boom period during 1973-1979, sharp increase of oil prices has generated more military spending, then oil price decrease company diminishing in military spending during 1980-1999, excluding 1991, which is military spending extremely high due to the Iraqi invasion over Kuwait, consequently, Kuwait Government spent more on military in this year. Furthermore, in the second oil boom period during 2000-2014, clearly real oil price co-movement with military spending for MENA oil exporting countries, for example when real oil price reaches was and 25.53 US dollars per barrels in 1999, Military spending was 8.28 percent of GDP while real oil price reach 117 U.S. dollars per barrel in 2011, military spending rose to 18.48 percent of GDP.

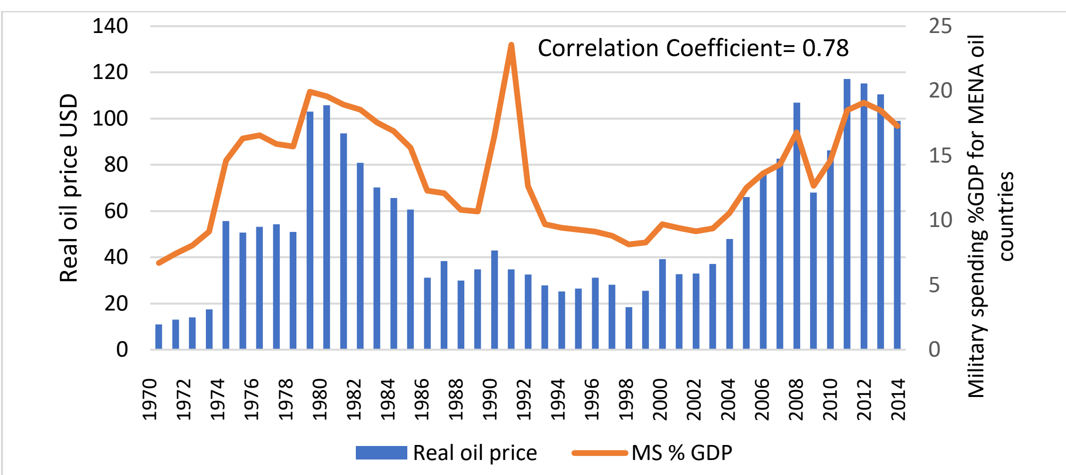

Figure 1. Relationship between Real Oil Price and Military Spending Share of GDP in MENA Oil Exporting Counters (Average)
Source: World Bank's World Development Indicator (WDI), and British Petroleum (BP) Database.

Literature Review

Since the first oil price shock in the early 1970s, several studies have examined the effect of oil price on macroeconomics in oil importing countries (Rasche and Tatom, 1977; Mork and Hall, 1980; Hamilton, 1983; 1988; Mork, 1989; Mory, 1993; Kiseok Lee et al., 1995; Hooker, 2002; Lee and Ni, 2002; Jiménez-Rodríguez and Sanchez, 2005; Lardic and Mignon, 2006; 2008; Apergis et al., 2015). After the 2000s, the second strand of oil price studies shifted its focus on oil exporting countries. (Eltony and Al-Awadi, 2001; Mehrara and Sarem, 2009; Farzanegan, 2011; Iwayemi and Fowowe, 2011; Jbir and Zouari-Ghorbel, 2011; Mehrara and Mohaghegh, 2011; Emami and Adibpour, 2012; Hamdi and Sbia, 2013; Moshiri, 2015; Nusair, 2016). In this regard, the effect of oil price shocks on government expenditure has been examined as an economic activity.

However, the direct relationship between oil price and military spending has not been examined greatly for oil exporting countries. Therefore, this section covers only two related literature that concentrates on military spending. First, resource dependency relationship with conflicts, civil wars, and military spending (Al-Mawali, 2015; Ali and Abdellatif, 2013; Bannon and Collier, 2003; Basedau and Lay, 2009; Collier and Hoefflert, 2004; Musayev, 2015; Varisco, 2010). Second, the effect of oil price shock (or oil revenue) on government spending in oil exporting countries (Eltony and Al-Awadi, 2001; Emami and Adibpour, 2012; Farzanegan, 2011; Hamdi and Sbia, 2013).

Oil dependency has been found to significantly fuel conflict and civil wars (Bannon and Collier, 2003; Varisco, 2010). Collier and Hoefflert (2004) observed that countries whose primary commodity export share GDP comprised about 33 percent had approximately 22 percent risk of civil war erupting. Meanwhile the risk was only 1 percent for countries that do not depend on primary goods export. Certain natural resources have also been found to directly trigger conflicts. Ross (2004a; 2004b) demonstrated that oil, nonfuel mineral and drugs had a causal link with conflicts and civil war. However, this was not necessarily true for legal agricultural commodities. Varisco (2010) also noted that armed conflict has a direct and strong relationship with oil dependency. A similar conclusion was also reached by Strüver and Wegenast (2016) when they showed that oil increases the conflict potential between nations and the militarization increase parallel with the increase of oil dependency.

These findings echo the ‘resource curse’ hypothesis, which states that the abundance of natural resources, including oil, can result in conflict and civil war. On the contrary, the ‘rentier states’ theory suggests that authorities use oil revenue to buy off peace through providing a different kind of financial benefit, both directly (through free education and healthcare services several governmental allowances, and public-sector employment with extremely high salaries) and indirectly (for example through energy, food, telecommunications, water, housing and transportation subsidies) (Beblawi, 1987). Thus, rentier states tend to more stable and peaceful. In response to this argument, Basedau and Lay (2009) used the square term and U-shape technique for oil-producing countries. They found that a U-shape relationship between oil dependency and civil wars existed and that a positive relationship between oil and internal stability highly depended on exceptionally high oil revenue per capita.

Besides triggering conflicts and civil wars, oil price shock has also been demonstrated to significantly influence government spending. Eltony and Al-Awadi (2001) examined the effect of oil price on macroeconomic variables for Kuwait and found that government expenditure was greatly influenced by oil price and oil revenue. They noted that the variance of oil revenue caused about 17 percent of the variance of government expenditure. Farzanegan (2011) applied the VAR approach to analyze the dynamic effect of oil revenue shocks to the Iranian government expenditure for different kinds of expenditure (military, education, security, health and cultural). He found that military and security spending was significantly affected by oil revenue and oil price shocks, while social expenditures were not. The SVAR model was used by Emami and Adibpour (2012) to study the asymmetric effect of oil price shocks on growth and macroeconomic variables for the Iranian economy. In regards to oil price and government expenditure, they found that increase in oil price has a positive effect on government spending. Oil revenue remains to be the primary source of income for government spending for the MENA region, including countries like Bahrain (Hamdi and Sbia, 2013) as well as Oman (Ahmad and Masan, 2015). On the contrary, oil price shocks do not have a significant impact on macroeconomic variables (including government expenditure) for Nigeria (Iwayemi & Fowowe, 2011).

Recently, Ali and Abdellatif (2013) investigated the effect of different types of natural resource on military spending for rentier economies in the MENA countries. They found that oil dramatically has an impact on military spending. The similar finding suggested by Al-Mawali (2015) for six rentier states of Gulf cooperation countries (GCC) in which oil drives military expenditure. More recently, Musayev (2015) found that military expenditure has a positive effect on growth for nations extensively rely upon the natural resource.

Empirically, since the past two decades, researchers have little attention to the effect of government expenditure on civil conflicts and violence. Based on the Game theory model, Azam (1995) pointed out that governments can decrease the level of conflicts and maintenance the peace in the countries when giving their opposition different kind of gifts in term of social spending. Fjelde (2009) discussed that governments of oil abundant countries, use political corruption to buy support for different parts of societies and found that both oil production and political corruption significantly increase the level of conflicts' risk In another work, Fjelde and De Soysa (2009), investigated the state capacity to achieve the required level of civil peace and avoid the risk of conflicts through different kind of political policy instruments, coercion, co-optation, and cooperation. They found that the states that spending more on political goods to buy citizen loyalty can gain a higher level of peace than are states' coercive capacities. Social spending such government spending on education and health have a substantial effect to reduce the risk of civil war and different kind of violence (Thyne, 2006; Barakat and Urdal, 1992).

In contrast to social spending, military spending induce violence, civil war, and different kind of conflicts (internal and external) due to the fact that higher military spending may crowded out different kind of social spending and generate more conflicts. Henderson and Singer (2000) reported that in Asian, African and Middle Eastern countries, more militarization will generate more conflicts and civil disturbance. Recently Bodea et al. (2016) found that, in the major oil exporting countries, an increase in military spending linked to lower risk of major and minor conflicts. However, in the countries with little oil, the higher level of military spending directly associated with increasing of conflict and civil war

Based on this brief background review, the studies that investigated the impact of oil price shocks on military spending for oil exporting countries is limited. Hence this study tries to fill some of the gap in the literature by using the symmetric and asymmetric relationship between oil price shocks and military spending for selected MENA oil exporting countries. For this purpose linear ARDL that proposed by Pesaran et al. (2001) and nonlinear ARDL proposed by Shin et al. (2014), which allows the estimating of the positive and negative effect of oil price shocks on military spending.

Model Specification and Data Source

In meeting the objective, the study concentrated on seven oil exporting countries in the Middle East and North Africa (MENA) countries with annual data during the period 1970-2014 for Saudi Arabia, Kuwait 1960-2014, for Iran 1963-2014, for Algeria, 1971-2014 for Oman, 1962-2014 for Egypt and for Tunisia from 1965-2014. Meanwhile, data on military spending in constant U.S. dollars, is collected from the World Bank, data on oil price is gathered from the British Petroleum (BP) database, while data on real GDP is gained from the Penn World Table (PWT) 9.0.

To study symmetric cointegration between oil price and military spending, this article employs the ARDL model proposed by Pesaran et al. (2001) to show the linear relationship between oil price and military spending for selected oil exporting countries. Using the ARDL model has several advantages, researchers can gain valid results regardless whether variables under investigation are integrated at the same order or not. That is the ARDL model has more flexibility over other co-integration techniques by relaxing the restriction, which allow for combinations of I(0) or I(1) but not I(2) variables. By making use of a bounds testing procedure for the presence of the equilibrium vector, and it is not constrained by the requirement of co-integrating models that all variables are I(1). Moreover, the ARDL model allows for estimation of long and short run relationship among the variables under investigation. Other advantages include that independent and dependent variables can be introduced in the lags. The ARDL estimators have desirable small sample properties (Pesaran and Shin, 1998) that the test remains valid under fractional integration and unit root processes. Therefore, the model is considered useful when the variables are integrated in different order and / or in short samples. However, the NARDL model proposed by Shin et al. (2014) has important advantages over the previous approaches that analysed the relationship between oil price and military spending. Essentially, the NARDL inherited the advantages of ARDL model but the latter does not allow for asymmetry investigation. This leads to a main advantage of the NARDL approach, which allows for the decomposition of the interest variables such as oil price into both positive and negative partial sum of processes to explore the magnitude of the impact of increase and decrease of oil prices, respectively.

Since the NARDL model is an asymmetric expansion of the linear ARDL model of Pesaran et al. (2001), it is useful to start by presenting the linear model shown in the following conditional error correction model (ECM):

$$\Delta LMS_t = \delta + \gamma_0 LMS_{t-1} + \gamma_1 LY_{I-1} + \gamma_2 OILP_{t-1} + \sum_{i=1}^{p} \omega_i \Delta\, LMS_{t-i} + \sum_{i=0}^{q} \varphi_i \Delta\, LY_{t-i} + \sum_{i=0}^{s} (\vartheta_i\, \Delta OILP_{t-i}) + v_t \quad (1)$$

where LMS is natural logarithm of military spending in local currency, LY is the natural logarithm of real GDP at national price, and OILP is real oil price, δ is intercept, v_t is error term $\gamma_0, \gamma_1 and\ \gamma_2$ are long run coefficients while ω_i, φ_i and ϑ_i are short run coefficients p, q and s are the maximum lag on the first difference variables selected by some information criteria such as Schwarz Information Criterion (SIC) or Akaike Information Criterion (AIC). In the final step, this study used the Wald Test to examine the long run and short run asymmetry between oil price and military spending.

To study the asymmetric co-integration between oil price and military spending, the Nonlinear Autoregressive Distributed Lag (NARDL) model recently advocated by Shin et al. (2014) was used. NARDL proceeds in steps. In the first step, we specify the level equation for military spending in the selected MENA oil exporting countries in the following parsimonious form.

$$LMS_t = \alpha_0 + \alpha_1 LY_t + \alpha_2^{+} OilP_t^{+} + \alpha_3^{-} OILR_t^{-} + \mu_t \quad (2)$$

where MS is the natural logarithm of military spending, Y is the natural logarithm of real GDP; OILP is the natural logarithm of real oil price. And $\alpha = (\alpha_0, \alpha_1, \alpha_2, \alpha_3)$ are the long run coefficients that will be estimated.

$OILP_t^+$ and $OILP_t^-$ are positive and negative changes in $OILP_t$:

$$OILP^+ = \sum_{i=1}^{t} \Delta OILR^+ = \sum_{i=1}^{t} \max(\Delta OILR_i^+, 0) \quad (3)$$

$$OILR^- = \sum_{i=1}^{t} \Delta OILR^- = \sum_{i=1}^{t} \min(\Delta OILR_i^-, 0) \quad (4)$$

At time t, α_2 captures the long-run relationship military spending and oil price increase that is expected to be positive, while α_3 indicates the long-run relationship between military spending and oil price decrease that is also expected to be positive and in the different magnitude. As Shin et al., (2014) illustrated, we can extend the concept of partial asymmetric for long and short run to obtain the following asymmetric error correction model:

$$\Delta LMS_t = a + \beta_0 LMS_{t-1} + \beta_1 LY_{I-1} + \beta_2^+ OILP_{t-1}^+ + \beta_3^- OILP_{t-1}^- + \sum_{i=1}^{p} \pi_i \Delta LMS_{t-i} + \sum_{i=0}^{q} \emptyset_i \Delta LY_{t-i} + \sum_{i=0}^{s} (\theta_i^+ \Delta OILP_{t-i}^+ + \theta_i^- \Delta OILP_{t-i}^-) + \mu_t \quad (5)$$

where P and s are lag order and $a_2 = -\beta_2/\beta_0$, $a_3 = -\beta_3/\beta_0$, are long run effect of oil price increase and oil price decrease respectively on military spending. $\sum_{i=0}^{s} \theta_i^+$ and $\sum_{i=0}^{s} \theta_i^-$ measure the short run impact of oil price (increase and decrease) on the dependant variable respectively. Additionally, to examine the property of the data before the estimation of the dynamic model in equation (5), some tests are necessary. The current study applied the stationary of data tested using the well-known augmented Dickey Fuller (ADF) and (PP) unit root tests. Moreover, the conventional co-integration approach is also based on linear ARDL (Pesaran et al., 1999). Besides, the general to specific approach used to obtain the final specification of NARDL model by removing the insignificant lags. Then the study used the bound test approach of Shin et al. (2014) to examine long run co-integration among included variables and tested the null hypotheses of $\beta_0=\beta_1=\beta_2=\beta_3=0$ jointly.

In the final step, the Wald test is used to examine the long run and short run asymmetry between oil price and military spending. The NARDL approach established based on two null hypotheses: First, the long run relationship is symmetric, $\alpha^+ = \alpha^-$ and the second, the short run relationship is symmetric, $\theta_i^+ = \theta_i^-$. Then, these two hypotheses can be tested by jointly using the Wald test, if the null hypotheses cannot be rejected, the NARDL model is modified to the simple ARDL (Pesaran et al., 2001)

However, if these two restrictions or one of them can be rejected, that means asymmetric relation exists among interested variables. In this case when asymmetric relation (either in long run or short run, or both) is detected in the equation (5), the asymmetric cumulative dynamic multiplier effects of a one percent change in $OILR_{t-1}^+$ and $OILR_{t-1}^-$ respectively can be evaluated as below (Ibrahim, 2015):

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial LMS_{t+j}}{\partial OILP_{t-1}^+} = \sum_{j=0}^{h} \lambda_j^+ , \; m_h^- = \sum_{j=0}^{h} \frac{\partial LMS_{t+j}}{\partial OILP_{t-1}^-} = \sum_{j=0}^{h} \lambda_j^- , \; h = 1,2,3 \quad (6)$$

when $h \to \infty$, m_h^+ and m_h^- converge to the long run asymmetric estimated parameter α^+ and α^- respectively.

Hence, the NARDL model is a desirable and powerful technique due to its ability for simultaneous analysis of the short run and long run asymmetries, through clarifying the traverse between short run disequilibrium, and long run equilibrium.

Empirical Results and Economic Discussion

Unit Root Test

The traditional unit root test, such as the Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP) tests cannot utilize series that have different shocks and breaks because these tests lack power in the presence of the structural break in the series. In other words, the traditional unit root may fail to reject the null hypothesis in the case of having the break in the series (Zivot and Andrews, 1992).

Based on the fact, in the last 100 years, MENA region witnessed various economic and political shocks, starting from Arab-Israel war in 1948, 1967, and 1973 through the different type of external and internal conflicts until the ISIS phenomenon. Accordingly, Zivot and Andrews (1992) is applied to capture the possibility of structural breaks in the series.

A glance at the relationship between oil price and military spending as demonstrated in Figure2 shows some degree of co-movement between these two variables can be observed. Therefore, suggesting the possibility of the existence of a long-run relationship between oil price and military spending. Additionally, over the sample period, different oil price shocks happened and left their effect on economic activities. In particular, the first oil price shock in the 1970s, the Iranian Revolution in 1979, Iraq-Iran war 1980-1988, the Iraqi attack on Kuwait in 1990/1991, the Iraqi war in 2003, and lastly the Arab spring corresponding with the ISIS phenomenon in 2011 and years after in Iraq, Syria and Libya.

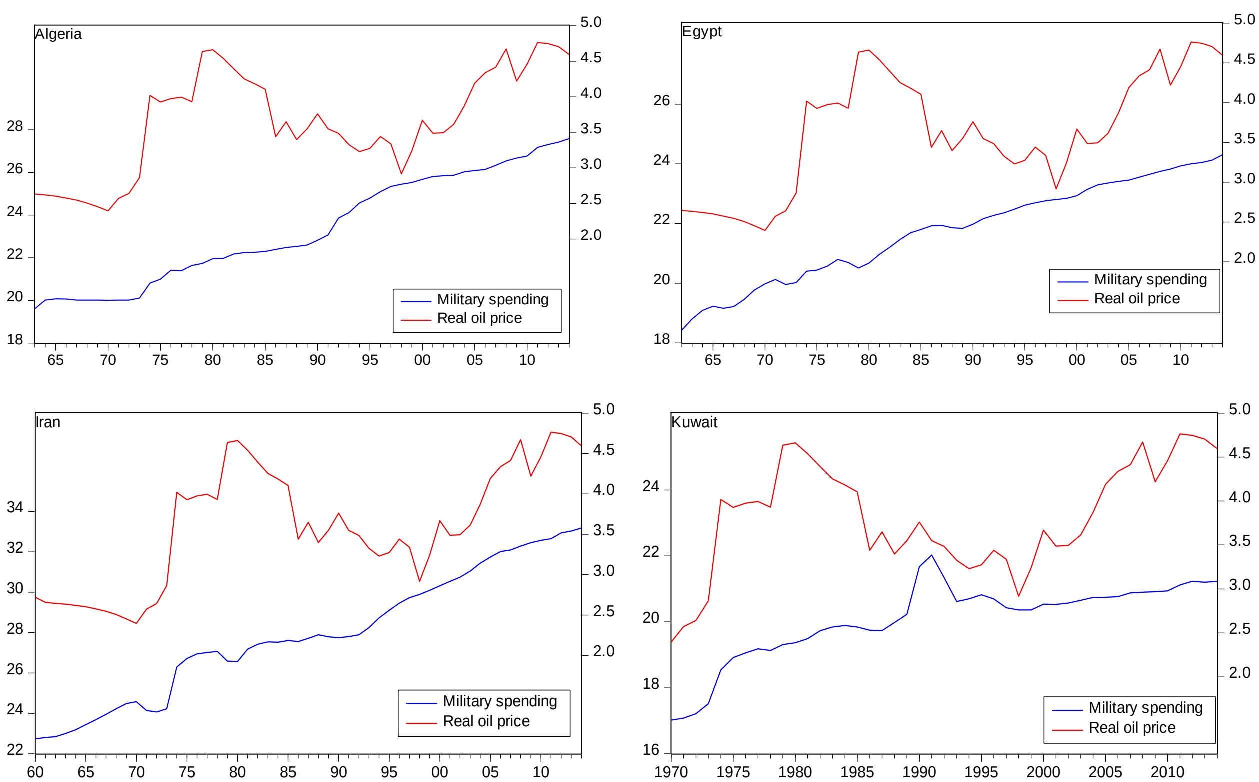

Figure 2. Relationship between Real Oil Price and Military Spending in Constant U.S. Dollar for Individual MENA Oil Exporting Counters
Source: Research finding.

As shown in Table 2, three models are proposed, model A allows for one time change in the intercept, model B allows one-time change in the trend only and model C allows one-time change in both intercept and trend. The null hypothesis of the unit root is tested against the alternative of no unit root in the level and the first difference for each variable. As reported in Table 2, the results show that the variables as stationary in the *I*(0) and *I*(1). That means no variables are integrated in order of I (2). Then we can apply linear ARDL and nonlinear ARDL to show the asymmetry relationship between oil price and military spending.

Table 2. Unit Root Test

Country	Level								
	MS			Y			OILP		
	Model A	**Model B**	**Model C**	**Model A**	**Model B**	**Model C**	**Model A**	**Model B**	**Model C**
Saudi	-5.47***(0)	-4.36*(0)	-5.68**(0)	-6.24***(8)	-4.21(9)	-5.59**(0)	-4.52(8)	-3.52(5)	-2.99(0)
	[1974]	[1976]	[1974]	[1992]	[1984]	[1981]	[1992]	[1998]	[1985]
Iran	-4.42(1)	-3.42 (1)	-4.37(1)	-5.56**(9)	-4.08(6)	-5.45**(9)	-3.91(6)	-3.17(5)	-2.63(0)
	[1985]	[1993]	[1985]	[1980]	[1987]	[1980]	[1992]	[1975]	[1975]
Algeria	-4.45(0)	-3.86(2)	-4.80(2)	-4.57(7)	-6.08***(9)	-6.02(9)	-4.49(8)	-3.81(8)	-1.98(4)
	[1991]	[2005]	[1990]	[1975]	[1979]	[1981]	[1992]	[1999]	[1981]
Egypt	-4.34(4)	-4.84**(3)	-5.10***(5)	-3.18(3)	-4.24(10)	-5.49**(8)	-4.35(8)	-3.21(5)	-3.16(5)
	[1980]	[1987]	[1983]	[1978]	[1990]	[1995]	[1992]	[1975]	[1991]
Kuwait	-4.29(4)	-4.83**(1)	-5.36***(1)	-3.81(0)	-5.05***(6)	-6.65***(5)	-4.42(8)	-3.52(5)	-3.25(5)
	[1990]	[1991]	[1995]	[1979]	[1992]	[1989]	[1993]	[1998]	[1996]
Oman	-5.26**(0)	-4.82**(0)	-5.31**(0)	-4.90**(9)	-4.07(0)	-4.26(1)	-3.95(0)	-3.99(6)	-3.74(6)
	[2012]	[1975]	[2011]	[2001]	[1978]	[1984]	[1985]	[1999]	[1997]
Tunisia	-3.83(0)	-5.71***(5)	-6.79***(5)	-3.68(9)	-3.81(5)	-0.500(4)	-5.16**(8)	-3.51(5)	-5.74***(8)
	[1974]	[1984]	[1980]	[1991]	[1983]	[1983]	[1992]	[1999]	[1998]
	First difference								
Saudi	-8.06***(0)	-7.61***(0)	-9.07***(3)	-6.20***(0)	-6.12*** (8)	-5.29*** (8)	-8.20***(0)	-7.53***(0)	-6.82***(1)
	[1975]	[1986]	[1977]	[1974]	[1983]	[1984]	[1974]	[1985]	[1989]
Iran	-5.93***(2)	-5.62***(0)	-6.09(2)	-8.25***(0)	-5.039**(5)	-8.23***(0)	-7.93***(0)	-7.18***(0)	-18.12***(0)
	[1977]	[1975]	[1976]	[1970]	[1981]	[1970]	[1979]	[1987]	[1981]
Algeria	-6.86***(0)	-6.19***(0)	-6.60***(0)	-9.28***(0)	-8.39***(0)	-9.19***(0)	-8.76***(0)	-6.96***(0)	-8.76***(0)
	[1974]	[1975]	[1974]	[1997]	[1976]	[1971]	[1974]	[1974]	[1974]
Egypt	-6.70***(3)	-6.52***(3)	-6.74***(3)	-6.13***(0)	-5.80***(0)	-6.81***(0)	8.85***(0)	-7.00***(0)	8.75***(0)
	[1986]	[1976]	[1981]	[1970]	[1967]	[1968]	[1974]	[1974]	[1977]
Kuwait	-8.88***(1)	-5.91***(1)	-11.13***(1)	-6.73***(1)	-6.65***(1)	-7.05*** (8)	-8.20***(0)	-7.53***(0)	-6.82***(1)
	[1990]	[1997]	[1990]	[1982]	[1985]	[1991]	[1974]	[1985]	[1989]
Oman	-6.00***(0)	-6.09***(2)	-6.26***(2)	-6.26***(0)	-5.00**(4)	-5.38**(4)	-7.48*** (0)	-7.75***(0)	-7.94***(0)
	[1975]	[1988]	[1992]	[1986]	[1997]	[1997]	[1981]	[1984]	[1986]
Tunisia	-7.41***(3)	-5.02**(0)	-8.97***(3)	-7.92***(3)	-5.78***(0)	-8.61***(3)	-8.58***(0)	-7.00***(0)	-8.60***(0)
	[1983]	[2008]	[1983]	[1983]	[2008]	[1983]	[1974]	[1989]	[1974]

Note: Numbers in square brackets are the structural break dates. Number of lags in parentheses AIC. MS, Y and OILP are the logarithms of military spending, real GDP and real oil price respectively. ***, **, * indicate significant at the 1%, 5% and 10% level of significant.
Source: Research finding.

Linear ARDL Results

The short and long run of linear ARDL's results are represented in Table 3 and 4 respectively. Table 3 provides the short run dynamics of linear ARDL and some diagnostic test. The purpose of this estimation is to establish the long run relationship between the selected variables. The bound test approach proposed by Pesaran et al. (2001) is used to test the hypotheses for no cointegration between oil price and military spending against alternative hypotheses of cointegration between them. F-statistics bound test. The result indicates that oil price and military spending real GDP have a long-run relationship in the six of seven MENA countries, as the F-statistics is greater than critical upper bound, excluding Algeria, where F- statistics is lower than upper bound. Based on the results from Table 3 we can estimate the long run coefficients between variables under study as shown in Table 4. We find that oil price has a positive and highly significant effect on military spending only for Saudi Arabia, Iran, and Oman, while positive but insignificant for Algeria, Egypt, Kuwait, and Tunisia. Furthermore, the impact of real GDP on military spending is positive and statistically significant at 5 percent for all of them, excluding Algeria and Kuwait which are negative and significant. The time trend also has a positive effect on military spending in all cases but insignificant for Saudi Arabia and Oman.

Various diagnostic tests are used to check the adequacy of the dynamic model. Jarque-Bera statistic indicates to the normality problem only for Iran, and Oman. LM test indicates the absence of serial correlation problem for all excluding Algeria. Furthermore, the ARCH test shows the absence of autoregressive conditional heteroskedastic in the residuals for all excluding Egypt. Even though the long run effect of oil price on military spending is positive for all cases, it is statistically significant only for three countries, Saudi Arabia, Iran, and Oman. Therefore, these results suggest that the linear specification of ARDL may not provide conclusive evidence on the relationship and nonlinear ARDL can be applied to investigate the possibility of an asymmetric relationship between variables. This would allow us to see whether the positive and negative oil price changes have any differential effects on the military spending in this selected MENA countries.

Table 4. Long-run ARDL Estimation Results

	SAU	**IRN**	**DZA**	**EGY**	**KWT**	**OMN**	**TUN**
Trend	0.014 (1.44)	0.16^{***} (19.1)	0.27^{***}(6.80)	0.045^{***}(2.79)	0.09^{***} (9.22)	0.008 (0.38)	0.08^{**}(2.07)
LY	1.10^{**} (2.46)	1.05^{**} (2.51)	-3 $.19^{**}$(2.55)	0.98^{***}(3.58)	-1.37^{***}(4.41)	0.86^{**} (2.2)	2.92^{*}(1.99)
OILP	0.57^{***} (4.6)	0.51^{***}(4.02)	0.44 (1.51)	0.053 (1.05)	0.18(1.36)	0.59^{***} (4.8)	0.066(0.17)

Note: Numbers in parentheses are t values. ***, **, * indicate significant at the 1%, 5% and 10% level of significant.

Source: Research finding.

Table 3. Short run Linear ARDL Estimation Results

	MENA Oil Exporting Countries						
	SAU	**IRN**	**DZA**	**EGY**	**KWT**	**OMN**	**TUN**
Constant	3.78 (0.92)	-0.96(0.32)	10.42** (2.67)	3.80**(2.40)	10.49***(3.61)	3.49***(2.90)	0.72 (1.05)
Trend	0.007(1.19)	0.09*** (5.25)	0.056***(2.91)	0.02** (2.44)	0.027*** (3.42)	0.003(0.39)	0.003(0.66)
DUM	0.33* (1.82)	0.07 (0.55)	-0.12 (0.74)	0.09 (0.94)	1.09***(7.59)		
LMS (-1)	-0.51*** (7.78)	0.55***(5.69)	-0.20***(2.77)	-0.47***(4.62)	-0.30***(4.48)	-0.37***(4.13)	-0.04(0.95)
LY (-1)	0.56** (2.28)	-0.59**(2.39)	-0.66** (2.29)	0.46*** (2.72)	-0.41**(2.64)	0.32 (1.59)	0.125 (1.54)
OILP (-1)	0.29*** (3.69)	0.28*** (3.43)	0.09* (1.68)	0.025(1.08)	0.054 (1.28)	0.22*** (3.54)	0.0029 (0.19)
ΔLMS							
ΔLMS (-1)		0.41***(3.50)		0.47*** (3.74)	0.17**(2.33)	0.36***(3.07)	
ΔLY	-0.088(0.23)				-0.81*** (4.94)	1.06***(3.09)	1.006*** (20.25)
ΔLY (-1)	-0.73** (2.03)					-1.05***(2.94)	
Δ OIL	-0.23 ** (2.21)				0.345***(4.28)		0.088*** (4.37)
Δ OILP (-1)							0.042*(1.86)
Adj. R^2	0.96	0.99	0.99	0.96	0.96	0.98	0.98
F-stat	19.01***	8.33***	2.55	5.77***	6.66***	9.81***	6.67**
ECM	-0.51 (9.09) ***	-0.55*** (5.95)	-0.20***(3.35)	-0.47*** (4.96)	-0.30***(5.38)	-0.37***(6.53)	-0.042*** (5.53)
J-B	4.25 [0.083]	54 (0.00)	19(000)	4.89(0.086)	5.24(0.072)	6.20 (0.045)	2.08(0.352)
LM (2)	0.167 [0.846]	0.515 (0.601)	8.87 (0.000)	2.71 (0.077)	1.49(0.238)	1.95 (0.158)	0.051(0.949)
ARCH (2)	3.15 [0.0541]	1.17(0.318)	0.45 (0.50)	2.82(0.07)	0.71(0.49)	0.130(0.878)	0.023(0.976)
RESET test	3.71 [0.008]	0.405 (0.686)	13.69 (0.000)	2.26 (0.02)	2.32(0.136)	1.91(0.175)	7.65 (0.0086)

F-test bounds critical values

	10%	5%	1%
Lower Bound	2.72	3.23	4.29
Upper. Bound	3.77	4.35	5.61

Note: Numbers in parentheses are t values. ***, **, * indicate significant at the 1%, 5% and 10% level of significant

Source: Research finding.

Nonlinear ARDL Results

Table 5 provides a dynamic short run of NARDL results and the diagnostic checks. The results, based on the long run coefficient of positive and negative oil prices are reported in Table 6. The F-bound test indicated that the variables under study are cointegrated, because the F- statistics is greater than critical upper bound for all countries, excluding Algeria. Thus, we can reject the null hypothesis of no-cointegration between variables understudies and accept the alternative hypotheses of cointegration between them. But in case of Algeria, the decision is neutral and we cannot reject or accept the null hypotheses because of the F-statistics being greater than critical lower bound and lower than upper bound. The use of the Wald test for the short and long run asymmetry F-statistics are reported in the lower panel of Table 5. The results suggest long run asymmetry relationship only for Iran, Algeria, Kuwait, and Oman. That means oil price increase and decrease has a different effect on military spending in these countries. For example, in the case of Iran, 1 percent increase of oil price lead to increase military spending about 0.95 while 1 percent decrease of oil price cause diminishing military spending about 0.60. Furthermore, the results suggest short run asymmetry of oil price only for Iran and Algeria. In case of Iran, only oil price increase has a positive and highly significant effect on military spending while the oil price decrease has negative but insignificant effect.

We noted that the long run effect of real GDP on military spending is positive and highly significant for Saudi Arabia, Iran, and Egypt, while it is negative and statistically significant for Kuwait. In case of none of real GDP, oil price increase, and oil price decrease are statistically significant. As observed in Table 6, the long run effects of dummy variables are positive in all case but only significant at 10 percent for Iran and 1 percent for Kuwait. Iraq-Iran war 1980-1988 led to increases in military spending by 0.53 in the case of Iran while Iraqi attacks on Kuwait 1990/1991 accelerated the military spending in Kuwait by 3.35.

Summary and Conclusion

This study investigates the impact of oil price shocks on military expenditure of the selected MENA oil exporting countries based on the linear ARDL and nonlinear ARDL approaches to study the symmetric and asymmetric relationship between oil price shocks and military spending. NARDL model proposed by Shin et al. (2014) allows for short and long run asymmetric through decomposition of oil price as an explanatory variable to negative and positive oil price, while the linear ARDL captures only symmetric relationship between oil price and military spending. In case of linear ARDL, F-bound test shows the long run relationship between oil price shocks and military spending for all countries expect Algeria. However, the long run coefficients of oil price are positive and statistically significant only for Saudi Arabia, and Oman, while the coefficients are positive but not significant for the rest of MENA countries. Moreover, similar to ARDL, NARDL's bound test rejects the null hypothesis of no cointegration between oil price shocks and military spending. However, the Wald test shows the long run asymmetry relationship between oil price and the military expenditure only for Iran, Algeria, Kuwait and Oman. Furthermore, the results show the existence of short-run asymmetric relationship only for Iran and Algeria. Likewise, the results suggest that oil price increase has a positive effect, while oil price decrease has a negative effect on military spending in the long run for Iran, Algeria, and Kuwait. This finding is parallel with previous studies (Al-Mawali, 2015; Ali and Abdellatif, 2013; Musayev, 2015) that argued the oil dependency stimulates the military spending in the major oil exporting countries.

the policy implications of empirical results are clear, political unstable which is expressed as dummy variables with plenty of oil income which is denoted by oil price, lead the MENA oil exporting countries to boost their military spending dramatically, this situation may affect other social spending in these countries.

Table 5. Short-run NARDL Estimation Results

	MENA Oil Exporting countries						
	SAU	**IRN**	**DZA**	**EGY**	**KWT**	**OMA**	**TUN**
Constant	5.03(1.41)	-4.02(1.38)	3.82 (1.34)	-1.29 (1.12)	10.93^{***}(3.84)	6.44^{***} (3.71	0.42 (0.61)
DUM	0.24 (1.44)	0.23^{*}(1.68)	0.002 (0.12)	0.082 (0.97)	1.09^{***} (8.16)		
LMS (-1)	-0.469^{***} (5.59)	-0.43^{***}(4.54)	-0.18^{***} (3.32)	-0.60^{***}(6.40)	-0.32^{***}(4.96)	-0.28^{**} (2.51)	-0.021 (0.46)
LY (-1)	0.40^{*} (1.76)	0.79^{***}(2.90)	-0.09 (0.41)	1.07^{***} (6.39)	-0.39^{**}(2.62)	-0.10 (0.59)	0.065 (0.80)
OILP+(-1)	0.28^{**} (2.62)	0.41^{***}(3.29)	0.151^{*}(1.88)	0.049 (1.53)	0.15^{**}(2.62)	0.29^{***} (3.79)	0.009 (0.44)
OILP- (-1)	0.197^{***}(2.73)	-0.26^{***}(2.70)	-0.197^{**}(2.55)	0.080^{*}(1.84)	-0.13^{**}(2.44)	0.06 (0.75)	0.0017 (0.048)
ΔLMS (-1)	0.032	0.37^{***}(3.40)		0.92^{***}(6.22)	0.16^{**}(2,50)		0.035 (0.70)
ΔLMS (-2)			0.549^{***}(4.48)				
ΔLMS (-3)				0.41^{***} (3.37)		-0.41^{***} (3.52)	
ΔLY			0.12 (0.25)		-0.72^{***}(4.74)	1.40^{**} (2.68)	1.01^{***} (18.84)
ΔLY (-1)	-0.83^{**} (2.49)					-1.47^{***} (3.11)	
ΔLY (-2)				-2.23^{***}(6.20)		1.16^{**} (2.53)	
Δ OILP+	-0.32^{**} (2.44)	0.88^{***}(4.88)	0.436^{***}(3.99)	0.160^{***}(2.87)	0.46^{***}(4.35)		0.113^{***} (4.11)
Δ OILP-		-0.27(0.90)	-0.218 (1.27)				
Δ OILP+ (-1)	0.30^{*}(1.76)					-0.156 (96)	
Δ OILP- (-1)					0.18 (1.20)		
Δ OILP+ (-2)				0.113^{*} (1.88)			
Δ OILP- (-2)				0.17^{*}(1.98)			0.08^{*} (1.71)
Δ OILP- (-3)						-0.21^{*} (1.71)	
Adj. R^2	0.69	0.41	0.38	0.61	0.87	0.60	0.93
F-stat	9.13^{***}	5.31^{**}	3.05	13.25^{***}	7.88^{***}	6.10^{***}	4.55^{**}
W_{LR}	2.72	19.05^{***}	7.33^{***}	0.22	13.84^{***}	12.82^{***}	0.020
W_{SR}	1.29	8.83^{***}	7.60^{***}	0.25	2.42	0.09	0.539
J-B	0.47 (0.79)	15.32 (0.000)	64(000)	3.53(0.17)	17.18(000)	0.319(0.852)	4.64 (0.10)
LM (1)	1.624 (0.21)	0.04 (0.842)	1.433 (0.238)	0.92 (0.343)	0.537 (0.469)	0.426 (0.519)	1.04 (0.313)
ARCH (1)	0.41 (0.52)	0.037(0.847)	0.196 (0.66)	0.73(0.40)			0.013 (0.91)
ARCH (2)					2.11 (0.11)	2.40(0.085)	
Ramsey RESET	4.09 (0.000)	6.21 (0. 000)	1.99 (0.08)	0.20 (0.65)	0.0022 (0.96)	1.64(0.21)	0.02 (0.88)

	F-test bounds critical values		
	10%	5%	1%
Lower bound	2.72	3.23	4.29
Upper bound	3.77	4.35	5.61

Note: Numbers in parentheses are t values. ***, **, * indicate significant at the 1%, 5% and 10% level of significant.

Source: Research finding.

Table 6. Long-run NARDL Estimation Results

	SAU	**IRN**	**DZA**	**EGY**	**KWT**	**OMN**	**TUN**
Constant	10.05(1.59)	-9.25(1.44)	21 .11(1.52)	-2.142(1.08)	33.69^{***}(10.01)	22.74^{***}(3.26)	20.45^{***}(1.90)
Dum	0.53 (1,39)	0.53^{*} (1.76)	0.01 (0.012)	0.136(1.00)	3.35^{***} (4.12)	NA	NA

LY	0.86 (1.67)	1.81***(3.69)	-0.50 (0.42)	1.78***(9.98)	-1.22***(4.01)	-0.35 (0.51)	3.10 (0.94)
OILP+	0.60***(3.43)	0.95***(5.47)	0.83**(2.22)	0.082 (1.60)	0.46*** (3.46)	1.02*** (4.52)	0.42 (0.80)
OILP-	0.41*** (3.19	-0.60***(3.09)	-1.09***(4.78)	0.134*(1.69)	-0.40***(3.03)	0.22 (0.90)	0.083 (0.04)

Note: Numbers in parentheses are t values. ***, **, * indicate significant at the 1%, 5% and 10% level of significant.
Source: Research finding.

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