
Oil Price Volatility and Consequences for Selected Oil-exporting Economies

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Abstract

This paper examines the impact of oil price volatility on economic growth of selected oil exporting countries (OECs). According to the theoretical sources, one of the possible channels through which there may be an adverse relationship between the abundance of natural resources and the economic growth is price volatility.

Oil price volatility is higher than for other natural resources. In countries where oil revenues are high, oil price volatility can seriously affect macroeconomic stability. There is the possibility that countries will suffer for a double deficit. In this case, is likely that this will exert pressure on country currency (the symptom of Dutch Disease). Commodity price volatility has an impact on the economy through fiscal policy. For the purpose of this paper, we tried to perform a random effect model in panel data analysis for eight OECs during the period 2000-2017. We found that the oil price volatility has a negative effect for major of the selected countries.

Keywords: Economic growth, GDP, Oil price, Volatility, Oil exporting countries

Introduction

Price volatility is the one of the channel according to abundance of natural resources could weak economic performance. From actual data, we can see that some resource rich countries could reach lower economic development contrary to resource poor countries. Recent decline in price of oil cause serious problems with macroeconomic stability of oil-exporting countries (OECs). From theoretic background, price volatility is transmitted through fiscal policy to the economy. Oil dependence could shape economy of OECs, there is a potential risk of losing fiscal position of OECs. The sharp fall in oil prices brings question what are consequences of lower prices for OECs and how they could rich sustainable development. Recent decline in price of oil suggest that countries tend to high their fiscal deficit and diverge their GDP growth from the rest of the world. This article deals with theoretical base of price volatility and in following chapter summarize how OECs can avert possible consequences on their economic development.

The main objective of paper is according to theoretical background and empirical analysis to identify the consequences of oil price volatility on economic performance of OECs. Moreover, we provide a possible solution how countries could avert risk of losing fiscal sustainability.

Since the 1850s, we have seen that the richness of natural resources such as oil and gas is not always related to economic development (Ross, 2012). Countries with abundance of natural resources can suffer from so-called resource curse. Since the 1950s, some economists have argued that, despite the potential benefits, primary exports cannot lead to economic development. The most common arguments were that primary products markets are growing too slowly, commodity prices are falling, revenues are unstable, there is corruption and civil disputes (Perkins *et al.*, 2013). During the last quarter of the 20th century, countries which are rich in natural resources grew less rapidly than those with no such a wealth of natural resources. Therefore, natural resources are not always associated with a positive impact on economic growth and development. Dependence on natural resources is associated with low economic growth and development. Moreover, it is associated with low

economic diversity and is usually associated with low economic performance. Many countries dependent on oil exports cannot turn their wealth in economic development. This phenomenon is known as resource curse. Most countries dependent on the export of primary products, mainly on exports of oil and natural gas. The growth performance of economies rich in natural resources has often been unsatisfactory. In some cases, it has led to the opposite assumption of a comparative advantage. One of the possible ways of explaining the inverse relationship between abundance of natural resources and economic performance is through the phenomenon resource curse. For decades, the abundance of natural resources such as oil, natural gas and other valuable minerals has not necessarily been the source of economic development for all countries. For example, countries such as Angola and Nigeria that are rich in natural resources show low per capita income as well as poor quality of life. While countries that not rich in raw materials such as Korea, Singapore, Taiwan have grown faster.

In literature, Richard Auty is associated with term of natural resource curse, which he used and explained for the first time and has since been adopted by economists around the world. Auty (1993) explained the natural resource scarcity terms as countries rich in mineral resources, unable to use their wealth in their development.

The curse (also known as the paradox of abundance) refers to situations where the country has an export-driven natural resource sector that generates a large amount of government revenue but paradoxically can lead to economic stagnation or even economic decline and political instability.

Oil and natural gas differ from other sources of wealth in two major facts. The first is that natural resources do not need to be produced – they need to be harvested. The second facts are that oil and natural gas are non-renewable. From the economic point of view, oil and gas are more property than source of income. The separation of the oil and gas sector from economic processes together with their non-renewable nature can lead to considerable adverse effect on the economy.

Price volatility and consequences for oil exporting countries

One of the possible channels through which there is an adverse relationship between resource wealth and economic growth is the price volatility of resources (Gylfason 2001); (Gylfason a Zoega 2006); (Frankel 2012); (Guo *et al.*, 2016); (Badeeb *et al.*, 2017). The oil price shock has different implications for the global economy.

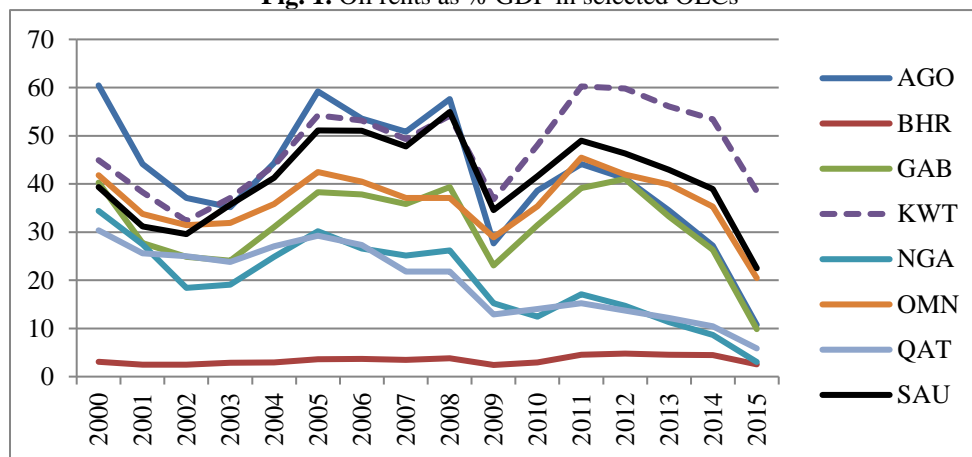
For purpose of this article, we concentrate our attention on consequences for oil-exporting countries (OECs).

For OECs, shocks in commodity price can lead to slow down their development of trade and export.

Fluctuations in oil prices have a significant impact on the economic activity of countries. Sectors of oil and gas in such countries account for a substantial portion of export performance as well as a substantial portion of government revenue. The oil price volatility can be transmitted to the economy through the large fluctuations in government revenues. The consequences of price volatility are that it tends to reduces economic growth.

Oil price volatility is a phenomenon that negatively affects net oil exporters. Moreover, oil price swings have been larger than those of other mineral resources (Regnier 2007). The transmission mechanism, through which price volatility affects the real economy, is demand and also supply side (Jiménez-Rodríguez, Sánchez 2005).

Commodity price volatility causes pro-cyclical fluctuations in government revenues and export earnings with both falling during price downturns (Davis and Tilton 2005). In countries, where rents from oil are high, price volatility can cause serious problems with macroeconomic stability. On Figure 1 we can see how high are oil rents in some countries of major oil exporters in contrast of average oil rents in major OECs.

Fig. 1. Oil rents as % GDP in selected OECs

Source: Data from World Bank January 2018, own processing; for selected countries

Generally, oil price volatility has been the main problem of oil dependence. In long term it influences fiscal stability (Sturm *et al.*, 2009). It is transmitted to the economies of OECs through fiscal policies because oil revenues accrue to governments (Alley 2016 a). Fiscal policy in oil-exporting countries is facing two significant challenges. In the short term it contains terms of macroeconomic stabilization and fiscal planning. In the long term it contains intergenerational fairness and fiscal sustainability.

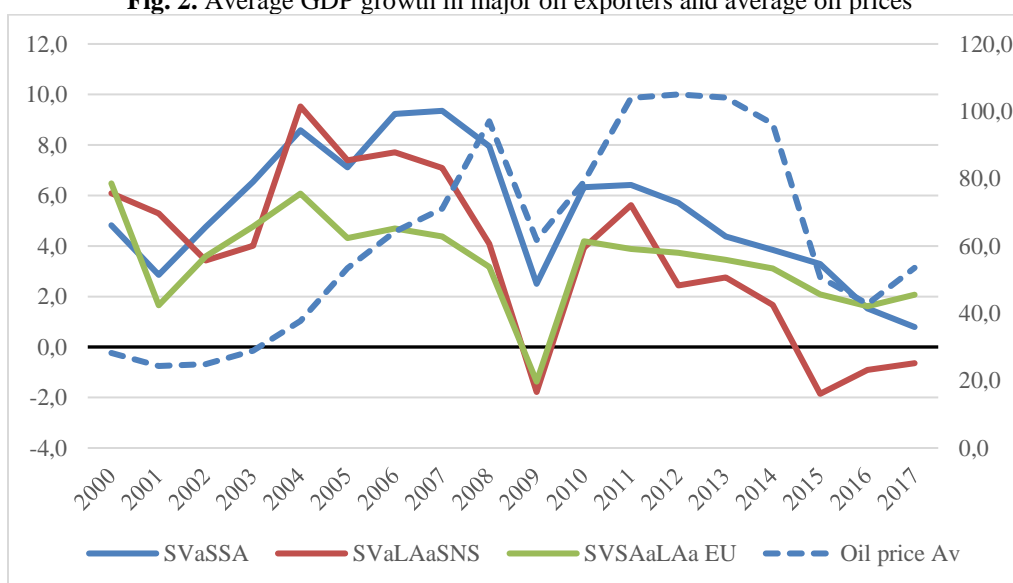
The impact of oil price volatility is transmitted to budget deficit Rafiq *et al.*, (2009). Commodity price volatility is also associated with uncertainties. Oil price volatility makes expected government revenues unpredictable which means that real revenues diverges from expected revenues. This differences between real and expected revenues often lead to fiscal deficit.

Fiscal volatility has been higher for resource-dependent economies that those whose fiscal policies are less dependent on export revenues (Alesina and Tabellini, 2005). Increase in oil export tend to higher government revenues and it leads to a rise in the fiscal balance. The effects are strong and statistically significant. On the other hand, non-oil export does not significantly increase fiscal balance. It means that the non-oil sectors in most of OECs are not well developed to contribute to growth of the fiscal balance (Alley 2016 b). Fiscal balance would continue to decline while governments rely on current oil price to project future revenues. Thus, governments need to factor into their revenues projection prospective global factors driving oil prices. The oil exports have negative effects on fiscal balance in the long term. Many resource-rich countries run negative fiscal balance despite rising oil exports. The sharp fall in oil prices brings question what are consequences of lower prices for OECs and how they could rich sustainable development.

The price of oil (Brent) oscillated between 100-110 USD/bbl in 2010-2014. This relatively stable price of oil should be so-called “new norm”. Shortage of stability occurred in June 2014, when oil prices began to fall due to the growing imbalance between supply and demand. In addition, other factors have contributed to inequality in the oil market, including the increase in oil production in some OPEC countries and outside OPEC, and the high oil supply in OECD countries, and the slowdown in the economic growth of the major importers of this energy commodity This situation was followed by effort to stabilized tie oil price on level 50-60 USD/bbl. (Obadi *et al.*, 2016). As we know, Oil price decline in 2014 could be explained by the significant increase in the supply of oil. But the drivers of the recent oil price decline have changed to demand side. In early 2016, oil prices reached a ten-year minimum. Brent crude oil prices dropped by 82 USD/bbl. (70%) from their peak in June 2014 to the low in January 2016. Since then, they have recovered moderately by around 17 USD/bbl. and they are expectedly to rise only gradually in the medium term (ECB Economic Bulletin, Issue 4/2016). Such significant decrease in oil prices along recent periods has especially influenced oil exporter countries. There is a possible way that oil price slump could possibly lead to twin deficits, which is likely to put pressure on the country’s currency (symptom of the Dutch disease). The extent of this pressure depends on a variety of factors:

budget balance, the amount of external debt, whether country implemented oil stabilization funds or sovereign wealth funds etc. (Barisitz, Breitenfellner 2017). Oil exporter countries were adversely affected from this situation because of various impacts such as stress on income, budget and foreign trade balance. Decreasing oil prices also caused income transfer between importer countries and exporter countries. Advantageous position between oil importer and oil exporter countries shifted - importer countries decreasing production costs and inflation rates.

Fig. 2. Average GDP growth in major oil exporters and average oil prices



Notes: Oil price for 2017 is an average of 11 months. The groups of OEC: SVaSSA are Oman, Saudi Arabia, Gabon, Qatar, Angola, Bahrain, Nigeria and Kuwait. SVaLAaSNS are Kazakhstan, Ecuador, Iran, Russia and Venezuela. SVSAaLAaEU are Algeria, Brazil, Malaysia, Norway and United Arab Emirates.
Source: Own calculation based on World Bank and IMF databases, 2017

Some oil exporters have managed to cushion, to some extent, the initial adverse impact on their output from the recent oil price decline by running substantial and rising fiscal deficits. Started from 2014, there are well documented sharply downturn in deficit that has grown over the coming years. Nonetheless, GDP growth in these countries has still declined significantly compared with the rest of the world.

The study by (Gocer, Akin 2016) presents effect of changes in oil prices on countries' national incomes, exports and political stabilities by utilizing from seven net oil exporter countries' (Saudi Arabia, Russia, Canada, Nigeria, Kuwait, Kazakhstan, Venezuela) in 1998-2015 data under horizontal cross-section dependency by means of panel unit root and panel cointegration methods with structural break. The results suggest that 1% increase in oil prices would increase national incomes of Saudi Arabia by 0,63%, Russia by 0,98%, Canada by 0,47%, Nigeria by 0,93%, Kuwait by 0,86%, Kazakhstan by 0,92% and Venezuela by 0,66%. Also 1% increase in oil prices would increase export incomes of Saudi Arabia by 1,10%, Russia by 0,99%, Canada by 0,36%, Nigeria by 1,04%, Kuwait by 1,20%, Kazakhstan by 1,34% and Venezuela by 0,79%. Despite the fact that these countries gain considerable amount of income from oil export, there is a potential of harm subject to the decrease in oil prices in the meantime. The economists recommend diversifying their export products. Also, they examined effect on political stability which is in different directions for 7 OECs. Increasing oil prices were distorting political stability in Saudi Arabia, Russia and Venezuela and positive effect on political stability in Canada, Nigeria and Kazakhstan.

Based on these findings, it is recommended for OECs, which try to increasing their national income and rich political stability, they should diversify their export item. There is an argument that performance of diversified economy is better in long term (Hesse, 2008). Akinwale (2012) finds solutions in economic diversification,

healthy fiscal policies and in the creation of various specialized funds that would flow incomes from natural resources. There are several arguments for decreasing dependence on mining sector. First arguments are that dependence on crude oil decline terms of trade for commodity export. Second, volatility of commodity prices impacts domestic economy. Third, in countries with high dependence on crude oil is supported to reach lower rate of technological change in resource extraction activities relative to other sectors. Last, rent-seeking behaviors weak governance and civil wars.

Another research highlighted the importance of price volatility and suggested that arrangements should be in line with global and development economic environment. (Kojo 2014).

Empirical studies suggest that in oil downturns, this is severely hindering economic growth. While oil booms play a limiting role in stimulating economic growth. Countries rich in natural resources that suffer from a weak and undiversified economic base without a stabilization mechanism to mitigate shocks could be vulnerable to boom-bust cycles. In the case of policymakers, it would be beneficial to introduce institutional mechanisms to manage oil booms and declines through the expenditure cuts and begin with diversification of economy.

In order to isolate the economy from the volatility of oil revenues, it is necessary to separate fiscal expenditure from current income.

Moreover, they should reserve a stability fund to stabilize incomes from oil sector to use this fund when oil price fall to obtain stable domestic economy. In other way, they could be prone to instability of economic system³ (Alley 2016 c) also recommends supporting and export diversification policy when oil exports have not significantly contributed to the fiscal position. If policies focus on suggested areas, OECs should maintain fiscal positions in both short and long term.

In addition, OECs should take advantage from reform of energy prices and taxation in sense to create space for accompanying growth enhancing fiscal measures. In a number of low and middle-income countries, energy sector reforms to broaden access to reliable energy would have important development benefits (Husain *et al.*, 2015).

Empirical analysis

In this paper, we tried to test the impact of oil price volatility on GDP growth of selected oil exporting countries by performing a simple econometric model with two main variables and dummy variables for every selected country. After performing Hausman test for choosing the appropriate model, we found that the random effect model is an appropriate model for our selected equation.

The model is then look as fellow:

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it} + \varepsilon_{it} \quad [1]$$

Where:

- α_i ($i=1 \dots n$) is the unknown intercept for each entity (n entity-specific intercepts).
- Y_{it} is the dependent variable (DV) where i = entity and t = time.
- X_{it} represents one independent variable (IV),
- β_1 is the coefficient for that IV,
- u_{it} is the error term between entity
- ε_{it} is the error term within entity

In this paper, we used data from World Bank (oil prices and other indicators) and IMF (GDP growth in constant prices) for the period 2000-2017. For oil prices in 2017 is the average price of eleven months of world

³ Findings from this research are in line with findings from researches Lederman and Maloney (2007); (Hesse 2008) for instance.

oil prices (Average of three benchmarks – Brent, WTI and Dubai). The examined OECs are Angola, Bahrain, Gabon, Kuwait, Oman, Nigeria, Qatar and Saudi Arabia.

We aware that this simple model is not quite enough to explore the impact for oil price volatility on economic growth but only to confirm the common known theories about the relationship between the mentioned variables in OECs.

Results

Our finding in this paper are in line with many studies. The coefficient of cross-section random effects is 0,08 and the p-value is less than 1%. That is mean when the oil prices go up by one unit the GDP goes up by 0,8%. As it seen in the below table, the independent variable (oil price) has been transformed to the first difference because the times series was nonstationary.

Table 1. The equation outputs

Dependent Variable: GDPG				
Method: Panel EGLS (Cross-section random effects)				
Sample (adjusted): 2001 2017				
Periods included: 17				
Cross-sections included: 8				
Total panel (balanced) observations: 136				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OILPRICE)	0.078138	0.022439	3.482309	0.0007
C	5.246665	0.919782	5.704250	0.0000

Source: Own calculations

In this case, we can conclude that the association between the oil price and the GDP growth in the selected OECs is high. Therefore, the volatility of oil prices making the economic development in these countries more fluctuated because the unclear Outlook of the oil market and the then the macroeconomic planning in the OECs became more difficult.

Table 2. Descriptive statistics of the model

	GDPG	OILPRICE
Mean	5.332944	62.61786
Median	4.443500	57.62846
Maximum	26.17000	105.0096
Minimum	-7.076000	24.35183
Std. Dev.	5.305836	28.39403
Skewness	1.216843	0.213454
Kurtosis	5.289491	1.672297
Jarque-Bera	66.98757	11.67028
Probability	0.000000	0.002923
Sum	767.9440	9016.972
Sum Sq. Dev.	4025.720	115289.6
Observations	144	144

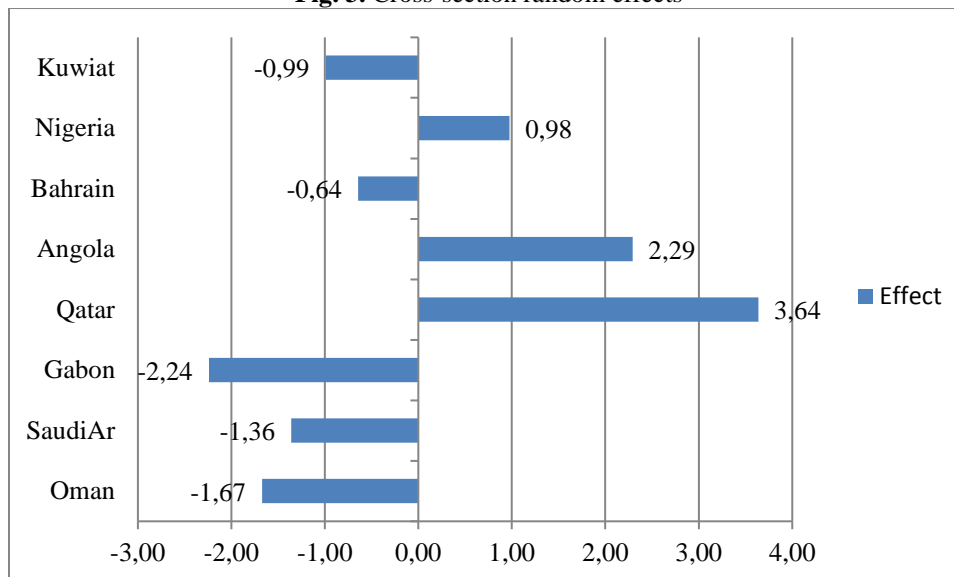
Source: Own calculations

While we aware that the impact of volatility on economic growth is vary between OECs according to the share of oil export in GDP of the country, the selected random effect model (by Hausman test) shows that 5 of

8 selected countries have a negative sign effect. That is mean that the major OECs have an adverse effect of oil price volatility.

The highest negative effect of volatility according our results of individual effects is on Qatar economic growth and highest positive effect is on Gabon economic growth (see figure 3).

Fig. 3. Cross-section random effects



Source: Own calculations

Conclusions

Oil price volatility is higher than for other natural resources. Therefore, in the countries where oil revenues are high, oil price volatility can seriously affect macroeconomic stability. There is the possibility that countries will suffer for a double deficit. In this case, it is likely that this will exert pressure on country currency (the symptom of Dutch Disease). The extent of this pressure depends on a number of factors budget balance, the amount of external debt, whether country implemented oil stabilization funds or sovereign wealth funds. At the same time, it acts on countries through fiscal policy – in the short term with consequences on macroeconomic stability and fiscal planning, and in the long term, it influences fiscal sustainability. Fiscal volatility is higher in countries where is more dependent on oil revenues. The rise in oil exports tends to lead to higher government revenues. Sectors other than oil are not well developed in most of OECs. Fiscal balance will therefore so far fall until the government adjusts future revenue planning to the current state of oil prices. Government revenue is becoming unpredictable through this channel, which exacerbates the fiscal deficits of individual oil exporting countries. Since 2014, we have seen a decline in oil prices because of oil market imbalances (increase in oil production in some OPEC and non-OPEC countries and high oil supply in OECD countries, slowing the growth of the major importers in November 2014). However, the major drivers of declining oil price in 2016 was global demand. Some of the major OECs have been able to reverse sufficiently the impact on economic growth through the deepening of fiscal deficits. Nevertheless, despite the fact that GDP growth in these countries has still declined significantly compared with the rest of the world.

From our findings, it is clear that the volatility of oil prices has a high impact on GDP growth of the selected countries. That is mean when the oil prices go up by one percent the GDP goes up by 08 per cent.

The main recommendations therefore include a reduction in dependence on the mining sector, the diversification of exports and the whole economy, the creation of so-called oil funds, which will ensure income source for future generations and are successfully realized in many OECs. At the same time; they isolate oil

revenues from the economy, which are so against the appreciation of the domestic currency. Finally, yet importantly, the adoption of energy and tax price reforms, which would benefit mainly the medium and low-income countries of OECs in terms of economic development.

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