EXPLORING THE LINKAGE BETWEEN OIL AND GAS SECTOR AND COMPETITIVENESS: A PANEL DATA ANALYSIS FOR THE COUNTRIES OF THE BLACK SEA REGION

Ioannis ANTONIADIS[1]

[1] Department of Business Administration (Kozani), Western Macedonia University of Applied Sciences, Greece, iantoniadis@teiwm.gr

Abstract: *The aim of this paper is to investigate the impact that oil and gas sector has on the global competitiveness of the economies of the countries of the Black Sea Region, measured by the Global Competitiveness Index, with the use of unbalanced panel data techniques for the period from 2006 to 2015. Factors concerning oil and gas sector as fuel exports, oil and gas prices, oil rents, and governance are used as independent variables. Both fixed and random effects models are estimated, and the validity of these models is assessed with the use of Hausman test. Our results are discussed and compared to relevant literature concerning other oil and gas producing regions.*

Keywords: Oil and gas sector, Competitiveness, Black Sea region, Panel data.

JEL Classification Codes: E31, F43, O47, O57.

1. INTRODUCTION

National competitiveness has always been in the epicenter of attention of academics, politicians, practitioners and the media, as it has a profound influence in every day operation of firms and the life of ordinary people. The financial crisis, that hit Europe during 2007-2010 and still plagues countries of the South Europe and South East Europe, and especially Greece, has made the discussion on competitiveness even more pressing. The modern micro and macro environment face challenges and changes in the attitudes towards globalization, increasingly rapid technical and technological change, shrinking economic distance between developed countries and countries in transition, and a shift towards liberalization of international markets. The concerns put forward by Lall (2001) regarding export-oriented, new industrialized, and transitions economies, focused on finding ways to stay ahead of lower wage countries challenging mature industrial countries in sophisticated activities, in terms of competitiveness, remain more than ever relevant today.

Assessing the competitiveness of a country is a challenging task because of the sheer number and variety of factors influencing national productivity. Smit (2010) identifies two directions of thought on the global competitiveness of a country. The one supports the Porter diamond framework that encompass a management view on country competitiveness, and the other one that rejects Porter's notion on country competitiveness. The Porter's Diamond Framework, despite the arguments that is better suited to explain the competitiveness of international firms, rather than countries, is widely accepted and used to investigate and explain the competitive status of the economy of a country compared to other countries.

The most famous and used index for measuring the competitiveness of a country is the *Global Competitiveness Index* that is included in the *Global Competitiveness Report* (GCR), that is published by the World Economic Forum. This index is based on research conducted in 144 countries, and it has long been a globally recognized and acknowledged ranking of country competitiveness that is used as a tool for benchmarking the strengths and weaknesses of the economy and the competitiveness of a country (Porter et al. 2008), from both politicians, academics, media, and practitioners.

Global competitiveness has also been closely related to the developments of energy markets, and more specifically the reliance of a country on oil and gas and the degree to which this sector is developed in each country. The discovery of fossil fuel deposits, and the development of the oil and gas sector by attracting investments, has been seen as an efficient way of financing a country's development efforts (Sabiroglou and Bashirli, 2012). However, these efforts have not always produced the intended outcomes, but instead have usually led in loss of competitiveness in non-energy sectors of the economy due to the "Dutch Disease", or the resource paradox (Oomes and Kalcheva, 2007; Jahan-Parvar et Mohammadi, 2009)

The purpose of this paper is to identify the effect that oil and gas sector has on the competiveness of the countries of the Black Sea Region. The importance of the region is outlined in numerous studies for political, strategic and economic reasons. Integration of the Black Sea markets with Europe would be a significant addition from merely an economic perspective, but beyond that, threats to the stability of the region—an obvious gateway between energy sources in Central Asia, the Caucasus and Europe without much alternative—would eventually affect European economies (Aydin, 2005), adding to the existing potential for economic growth of the region (Astrov and Havlik, 2008). Examining this relationship is very important, since a significant numbers of countries in the region heavily rely on the oil and gas sector through production, trading or transportation (Gribincea and Gaviuk, 2015). This reliance will grow in the years to come as a result of a number of projects that will be fulfilled in the years to come. Therefore, it is important to understand the ways that the oil and gas industry influence the global competitiveness of the countries in the region.

In order to examine the relationship between competitiveness and the oil and gas sector for the countries of the region we use the model proposed by Qudah et al. (2016) for the countries of the Gulf Cooperation Council. This model identified oil prices, oil exports and oil rents as the main determinants for the competitiveness of the countries in the region, using panel data. Our results indicate the importance of oil prices and oil rents for the global competitiveness of the countries of the region, and contribute in the general discussion of global competitiveness in the light of the recent developments in the oil and gas sector in the countries of the region.

The rest of the paper is structured as follows. In the following section a short description of the region and the contribution that oil and gas sector has, is presented. In the third section the linkage between global competitiveness and the oil and gas sector is examined. The methodology the model estimated and the description of the variables used are discussed in section 4. In Section 5 the empirical results of the model and the relevant econometric tests are presented. Finally, section 6 concludes the paper, with a discussion of the empirical results, and with proposals for further research.

2. THE OIL AND GAS SECTOR IN THE BLACK SEA REGION

The Black Sea Economic Cooperation (BSEC) is a multilateral economic and political initiative that has been founded in 1992. BSEC covers an area of approximately 20 million square kilometres, with a population of 330 million people, and a combined GDP of about 2,695 billion USD in 2015. The BSEC has 12-member States of the region, namely Albania, Armenia,

Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, the Russian Federation, Serbia, Turkey and Ukraine, that also participate in a number of other regional and international organizations. These 12 countries are also undertaking a number of initiatives concerning financing projects, and enhancing regional cooperation and trade.

Aydin (2005) describes the Black Sea region "as an area of great strategic, political and economic interest for Europe that influenced and shaped European history, as it has been and still is both a source of potential conflicts but also of cultural and economic enrichment" (Aydin, 2005). That is true up to this day, as its geostrategic position, and the continuous conflicts, with most notable last one between Ukraine and Russia over the Crimean Peninsula, the Black Sea region is still struggling to find its way to stability and economic prosperity. The region is characterized by lack of economic development, lack of social cohesion, of security and of stability, hindering this way economic and trade cooperation (Gavras, 2010; Alexandridis and Antoniadis, 2013).

Notwithstanding the tensions risen between the countries of the region, investments and business cooperation has been developed, providing the region with overall increased levels of prosperity and growth for the better part of the period 2006-20151, as can be seen in Table 1. High oil prices and a number of investment projects especially in transportation through pipelines (like TAP in Greece) has helped significantly the countries of the region (Ito, 2010; Gribincea and Gaviuk, 2015).

Table 1. Gross Domestic Product of the BSEC countries (2006-2015) in million US*$*.

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Albania	8,993	10,701	12,881	12,044	11,927	12,891	12,320	12,781	13,220	11,398
Armenia	6,384	9,206	11,662	8,648	9,260	10,142	10,619	11,121	11,610	10,529
Azerbaijan	20,983	33,050	48,852	44,291	52,903	65,952	68,731	73,560	75,198	53,047
Bulgaria	34,304	44,766	54,667	51,783	50,610	57,418	53,903	55,759	56,732	50,199
Georgia	7,745	10,173	12,795	10,767	11,639	14,435	15,846	16,140	16,509	13,965
Greece	273,318	318,498	354,461	330,00	299,379	287,780	245,671	239,862	236,080	194,851
Moldova	3,408	4,401	6,055	5,439	5,812	7,015	7,285	7,985	7,983	6,568
Romania	123,533	171,537	208,182	167,423	167,998	185,363	171,665	191,549	199,493	177,954
Russian Federation	989,931	1,299,705	1,660,844	1,222,644	1,524,916	2,0347	2,154,067	2,231,827	2,052,807	1,331,208
Serbia	30,608	40,290	49,260	42,617	39,460	46,467	40,742	45,520	44,211	37,160
Turkey	530,900	647,140	730,325	614,570	731,145	774,775	788,863	823,257	798,782	717,880
Ukraine	107,753	142,719	179,992	117,228	136,013	163,160	175,781	183,310	133,503	90,615
Total	*2,137,860*	*2,732,186*	*3,329,976*	*2,627,454*	*3,041,062*	*3,659,405*	*3,745,493*	*3,892,671*	*3,646,128*	*2,695,374*

Source: World Bank – World Development Indicators

The importance of the the oil and gas sector for the region, is obvious. Russia and Azerbaijan are the main producing countries of oil and natural gas in the region. The oil sector in Russia, is a mixture of state and privately owned companies active in the energy sector, but state owned companies (NOCs), like Rosneft and Gazprom, are dominant (Olsen, 2013). The Azerbaijan oil and gas sector is dominated by one main company SOCAR, that is state owned (Ciarreta and Nasirov, 2012). Furthermore, researches for new oil and gas fields, are conducted by all countries of the region since there is evidence of the existence of oil and gas fields in the Black Sea (ICM Petroleum Management, 2012; Olsen, 2013), and in regions of Greece[2].

[1] With the notable exception of Greece that is still facing an unprecedented financial crisis from 2010 up to this date.

[2] "Repsol buys 60 % of exploration rights in Ioannina, Aetoloakarnania" available in http://www.economywatch.gr/repsol-buys-60-pct-of-exploration-rights-in-ioannina-aetoloakarnania/

Oil rents, are important for the countries of the region (Table 2). Oil rents are defined as the difference between the value of oil crude production at world prices and total costs of production. The values of oil rents as % of the countries' GDP, are falling as the result of the falling oil prices.

Table 2. Oil Rents of the BSEC countries as a % of GDP (2006-2015)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Albania	1.17	0.88	1.07	0.75	1.53	2.75	3.08	3.24	3.12	1.38
Armenia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azerbaijan	41.71	36.60	34.64	23.23	29.00	32.68	28.44	23.60	19.39	11.00
Bulgaria	0.04	0.03	0.04	0.02	0.03	0.04	0.04	0.03	0.02	0.01
Georgia	0.29	0.14	0.16	0.10	0.13	0.16	0.14	0.13	0.10	0.05
Greece	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.00
Moldova	-	-	-	-	-	-	-	-	-	-
Romania	1.09	0.79	0.90	0.57	0.78	1.06	1.03	0.89	0.74	0.34
Russian Federation	12.72	10.44	11.21	8.11	9.53	11.09	10.27	9.17	8.82	5.56
Serbia	0.50	0.36	0.40	0.20	0.39	0.56	0.46	0.30	0.21	0.08
Turkey	0.10	0.09	0.11	0.08	0.10	0.13	0.10	0.08	0.07	0.03
Ukraine	0.78	0.60	0.59	0.45	0.48	0.60	0.57	0.47	0.51	0.29
Average	*5.31*	*4.54*	*4.47*	*3.04*	*3.82*	*4.46*	*4.01*	*3.45*	*3.00*	*1.70*

Source: World Bank – World Development Indicators

In Table 3 the oil and gas exports are presented for the 12 countries of the region as a percentage of their GDP. Oil and gas sector is also a significant exporting sector for the countries of the region. The main exporters of the region are Azerbaijan, Russia, and Greece, followed by Bulgaria.

Table 3. Oil and Gas (fuel) Exports of the BSEC countries as a % of GDP (2006-2015)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Albania	13.69	7.45	21.81	11.60	17.97	21.19	26.59	31.00	1.57	8.81
Armenia	2.07	1.20	0.26	0.10	3.12	8.43	7.93	6.07	6.34	6.42
Azerbaijan	84.59	81.40	97.08	92.86	94.51	94.75	93.42	92.99	92.64	87.02
Bulgaria	13.28	14.61	16.07	12.60	13.30	13.10	16.21	14.75	11.17	9.06
Georgia	3.33	3.95	3.16	4.96	5.50	4.42	3.13	3.41	3.85	8.45
Greece	13.03	12.17	21.64	20.32	26.08	30.87	39.01	39.90	38.50	29.85
Moldova	0.33	0.24	0.29	0.36	0.34	0.69	0.31	0.19	0.25	0.13
Romania	9.98	7.52	9.11	5.89	5.20	5.48	5.09	4.85	5.76	4.43
Russian Federation	62.88	61.45	65.66	66.69	65.62	66.98	70.93	71.25	69.87	63.00
Serbia	3.51	2.62	-	-	-	-	-	-	-	-
Turkey	4.17	4.82	5.85	4.02	3.90	4.70	5.29	4.26	3.76	3.08
Ukraine	6.41	5.12	5.97	5.23	6.93	8.11	5.05	4.20	3.39	1.07
Average	*18.11*	*16.88*	*22.45*	*20.42*	*22.04*	*23.52*	*24.81*	*24.81*	*21.55*	*20.12*

Source: World Bank – World Development Indicators

In the following section, the application of these principles in the Black Sea Region countries is examined.

3. COMPETITIVENESS AND THE OIL AND GAS SECTOR

Defining and measuring competitiveness whether it refers to firms and organizations (Porter 1980; Buckley et al. 1988; Feurer and Chaharbaghi, 1994), or countries (Porter, 1990; Smit, 2010; Qudah et al., 2016), has always been a hot topic of debate. Competitiveness is what determines the productivity, and the efficiency with which a nation's resources and capabilities are used to create goods and services. As Scott and Lodge (1985) state, "*national competitiveness refers to a country's ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resources*". Delgado et al (2012) define national competitiveness as the expected level of output per working-age individual that is supported by the overall quality of a country as a place to do business, arising from both microeconomic and macroeconomic factors.

Defining competitiveness is a fairly complicated task in a national and global level since it is not easy to adopt an entrepreneurial approach to countries (Smit, 2010), let aside to measure it. Notwithstanding the difficulties involved in such a task there are numerous indices that attempt to measure the global competitiveness of a country. The most recognized and accepted however is the one provided by the *World Economic Forum* (*WEF*) named as the *Global Competitiveness Index* (GCI) that is a composite indicator ranking countries according to selected microeconomic and macroeconomic criteria and measures of national competitive prowess. The results of this index are published every year in the *Global Competitiveness Report* of the World Economic Forum. The strong point of WEF analysis is its emphasis on the micro-economy as the vital determinant of competitive performance (Lall, 2001). This index is generally speaking market oriented, accepting the assumption of efficient markets.

The survey conducted by the WEF includes 144 countries of the world (World Economic Forum, 2016). In Table 4 the scores for the GCI for the period 2006-2015 are presented. Albania and Moldova have the lowest score in terms of competitiveness, while the higher scores are achieved by Azerbaijan, Russia, Turkey and Romania. Greece has seen a decline in her global competitiveness during the period 2006-2013 that can be explained due to the financial crisis that the country has to deal with.

Table 4. Global Competitiveness Index of the BSEC countries (2006-2015)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Albania	3.5553	3.4826	3.5500	3.7241	3.9437	4.0638	3.9065	3.8470	3.8359	3.9267
Armenia	3.8665	3.7583	3.7254	3.7109	3.7580	3.8878	4.0222	4.1023	4.0073	4.0097
Azerbaijan	4.1163	4.0662	4.1018	4.3001	4.2881	4.3138	4.4108	4.5137	4.5306	4.5043
Bulgaria	3.9796	3.9285	4.0343	4.0227	4.1268	4.1625	4.2730	4.3085	4.3674	4.3194
Georgia	3.7500	3.8313	3.8599	3.8093	3.8642	3.9521	4.0725	4.1510	4.2194	4.2221
Greece	4.1214	4.0778	4.1062	4.0400	3.9852	3.9155	3.8596	3.9281	4.0359	4.0244
Moldova	-	-	-	-	3.8627	3.8862	3.9370	3.9408	4.0335	3.9992
Romania	3.9814	3.9718	4.1029	4.1052	4.1609	4.0757	4.0685	4.1254	4.3016	4.3239
Russian Federation	4.1338	4.1899	4.3142	4.1530	4.2379	4.2149	4.1972	4.2459	4.3700	4.4391
Serbia	-	3.7837	3.9001	3.7671	3.8369	3.8769	3.8715	3.7743	3.8961	3.8877
Turkey	4.1372	4.2469	4.1481	4.1609	4.2475	4.2806	4.4523	4.4511	4.4624	4.3723
Ukraine	4.0348	3.9753	4.0858	3.9520	3.9009	4.0000	4.1392	4.0516	4.1386	4.0331

Source: World Economic Forum (2006-2015)

The goal of our paper is to identify the ways that oil and gas sector affects the above mentioned index. An important factor that influences the global competitiveness of a country is

the resources that a country has and the way that it uses them (Hertog, 2011; Qudah et al. 2016). Oil and gas are considered to be the most important resources a country may have. This linkage is also known as the paradox of plenty or the resource curse where rich in resources exporting countries are not able to sustain stable levels of growth, and high growth is followed by long periods of stagnation (Mikesell, 1997; Oomes and Kalcheva 2007). That is especially true for the countries that rely in oil and production, transportation and exports as Russia, Azerbaijan, and less significantly for Greece, Romania and Bulgaria.

The economy of Azerbaijan is a clear example of that phenomenon, since growth of the economy relied in the oil and gas sector, as capital input growth in the oil sector occurred at a faster rate, compared to other sectors, and therefore made a greater contribution to the economic growth in the economy (Sabiroglu and Bashirli, 2012). Notwithstanding the importance of the oil and gas sector for the Azeri economy overall it had a negative impact in the technological change of the country and its competitiveness, since non-oil sector of the economy remains undeveloped and very fragile, facing significant obstacles (corruption, fiscal system and access to finance) hindering competitiveness and investments, both domestic and foreign (Ciarreta and Nasirov, 2012).

Oil prices play a significant role in the macroeconomic situation of a country and therefore in its competitiveness. In Figure 1 the prices of oil are depicted, showing the significant volatility in the prices that affected both exporting and importing countries in a different way. Ito (2010) calculated that a 1% increase on the price of oil would lead to 0.46% of GDP growth for the Russian economy. Therefore, the increase in the world's oil production during the last 2 years that has driven prices down by almost 50%, has created significant economic problems in exporting economies of the region like Russia and Azerbaijan as it was also shown in Tables 1, 2 and 3.

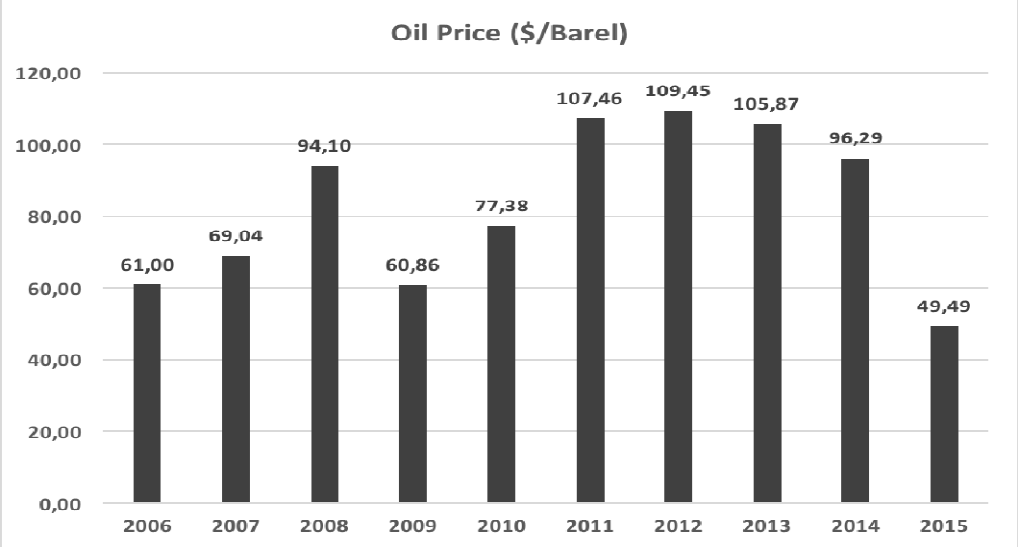

Figure 1. Oil Prices in USD/barrel
Source: OPEC

Countries that rely in oil and gas exports (Jahan-Parvar et Mohammadi, 2009) and imports (Özata, 2014) are influenced severely by oil prices, at a macroeconomic level, namely exchange rates, accounts deficit, and trade balance that affects their competitiveness. Jahan-Parvar et Mohammadi (2009), examined six oil producing countries to identify the effect that oil prices have in their competitiveness. Their results for Russia, showed that the monetary authorities have relied on flexible exchange rate mechanisms to transfer the effects of higher oil prices to real

exchange rates, causing a sustained negative trend in both money growth and inflation, therefore affecting competitiveness in a positive way.

Oil Rents on the other hand have a negative effect in the competitiveness of a country since an increase in oil rents as a percentage of GDP, leads in increased dependence in the oil sector in order to generate more GDP. However, this reduces the competitiveness of the other sectors in the economy, as the oil and gas sector absorbs more resources and funds (Sabiroglou and Bashirli, 2012), resulting in overall lower country competitiveness (Qudah et al., 2016).

4. METHDOLOGY

In order to measure the relationship between the oil and gas sector and the national competitiveness in terms of global competitiveness, the model proposed by Qudah et al (2016) is used in order to assess the effect that the oil and gas sector has in the competitiveness of the countries of the Black Sea region. Unbalanced panel data is used for the 12 countries of the region that are members of the BSEC for a 10-year period namely from 2006-2015.

The general panel data model $y_{it} = \alpha + \beta \cdot x_{it} + u_{it}$, would be estimated specifically for our case, as follows:

$$GCI_{it} = \alpha + \beta_1 \cdot OILPR_{it} + \beta_2 \cdot EXP_{it} + \beta_3 \cdot OILRENT_{it} + \beta_4 \cdot CORRUPT_{it} + u_{it}, \quad (1)$$

where i=1,..,12 representing the 12 countries of the sample , t=2006, …2015 represents the period of time examined. The independent variable, GCI_{it} represents the global competitiveness index provided by the Global Competitiveness Report. The dependent variables include oil prices ($OILPR_{it}$) oil in USD/barrel, oil and gas (fuel) exports (EXP_{it}) as a percentage of total exports of the country, oil rents ($OILRENT_{it}$) which is the difference between the value of oil crude production at world prices and total costs of production, and finally the corruption ($CORRUPT_{it}$) as a measure of controlling for corruption especially in the public sector (Umlan, 2013)measured in a scale of 0 to 5 (the higher the value, less levels of corruption are perceived in the economy). With the exception of oil prices that was provided by OPEC database, the other independent variables were collected from the World Bank Development Indicators and the World Bank Worldwide Governance indicators database.

In Table 5 the descriptive statistics of the variables used in our model are presented. It is also important to note the high volatility that oil and gas exports demonstrated for most of the countries during the time period examined.

Table 5. Descriptive Statistics of the sample

Variable	Obs	Mean	Std. Dev.	Min	Max
GCI	115	4.056	0.214	3.483	4.531
OILPR	120	83.09	21.17	49.49	109.4
EXP	112	0.214	0.287	0.000954	0.971
OILRENT	110	0.0378	0.0859	0	0.417
CORRUPT	120	0.411	0.0828	0.264	0.648

In Table 6 the correlation matrix of the variables is presented. We find no serious correlation between the variables used in our model with the exception of the variables concerning oil exports and oil rents, depicting the competitiveness of the oil and gas sector.

Table 6. Correlation matrix

	GCI	OILPR	EXP	OILRENT	CORRUPT
GCI	1.0000				
OILPR	0.1038	1.0000			
EXP	0.5543	0.0736	1.0000		
OILRENT	0.4238	0.0339	0.8647	1.0000	
CORRUPT	-0.0363	-0.0505	-0.5985	-0.5718	1.0000

In the following Section the empirical results of our model, with three different estimation methods, are presented and the appropriate econometrics tests are performed to choose the appropriate one that explains the relationship between national competitiveness and the oil and gas sector.

5. EMPIRICAL RESULTS

In Table 7 the results of our model are presented. Due to missing data Moldova had to be excluded from our sample, resulting to a total of 101 observations. In the three columns of the following table the results of the regression (1) are presented using 3 different methods, OLS, fixed effects (FE), and random effects (RE) in columns 1, 2, and 3 respectively, to choose the appropriate model after the appropriate econometric tests. In all cases our models are statistically significant as F- statistic implies for the OLS and FE method and the Wald X2 statistic for the RE model. In all cases the values of R^2 and Adjusted R^2 are high, and higher than the ones of relevant studies like the one of Quadah et al. (2016).

Table 7. Regression Results

	(1)	(2)	(3)
VARIABLES	**OLS**	**Fixed Effects**	**Random Effects**
OILPR	0.0012	0.0020***	0.0013**
	(0.001)	(0.001)	(0.001)
EXP	0.4938***	0.0115	0.6177***
	(0.131)	(0.273)	(0.178)
OILRENT	-0.0701	-1.4590***	-0.9021**
	(0.422)	(0.417)	(0.395)
CORRUPT	0.9390***	1.9966***	1.7884***
	(0.265)	(0.396)	(0.375)
Constant	3.4745***	3.1470***	3.1094***
	(0.142)	(0.192)	(0.185)
Observations	101	101	101
Number of countries	11	11	11
R-squared	0.2910	0.3748	0.3207
Adj. R-squared	0.2614	0.2730	-
F-statistic	9.8493	12.8892	-
Wald Chi2	-	-	39.5901

*Standard errors in parentheses, stars denoting levels of significance *** p<0.01, ** p<0.05, * p<0.10*

The signs of the variables denote the way that these variables affect the competitiveness of the countries of the sample and their statistical importance. Oil Prices have a positive effect on competitiveness of the countries depicting the importance of oil for the countries of the region,

especially for the countries of the region that heavily rely on the oil gas and transportation sector. The same is true about oil and gas exports that have a positive and statistically significant on competitiveness for the OLS and RE model but not for the fixed effects model since fixed effects model takes under consideration the specific differences of the countries, and only 3 countries of the region rely heavily on oil and gas sector exports.

Oil rents on the other hand, as expected have a negative effect on competitiveness for all 3 models and it is not statistical significant only in the OLS model, indicating the existence of the resource curse (Mikesell, 1999). These results are in line with the results of Qudah et al (2016) on the effect that oil and gas sector and of Ulman (2013) on the effect of governance and corruption, have on competitiveness respectively.

Regarding the econometric tests performed to choose between the estimation method that should be used the results favour the Fixed Effects model. The Breusch and Pagan Lagrangian multiplier test for random effects provides us with a value for X^2=115.23 (.0000) indicating that we cannot use a simple OLS regression, as there are significance differences across countries in or sample. In order to determine whether using the fixed or random effects model the Hausman test is used to test whether differences in coefficients are systematic or not (Hausman, 1981). The value of the X^2_4 statistic used in the Hausman test equals to 13.67 which is statistical important at a level of 1%. Therefore, our initial hypothesis H_0, that the country level effects are adequately described by a random-effects model should be rejected. The same results are derived when running the relevant test for the fixed effects model (2) in Table 6, assuming under the null hypothesis H_0, that the observed and unobserved fixed effects u_i are equal to zero. The F(10,86) statistic for model 2, equals to 16.89, and is statistically significant at a 1% level of significance, leading us to reject the null hypothesis (Greene, 2000).

The choice of the fixed effects model denotes the heterogeneity of the countries of the region in terms of the importance the oil and gas sector have on their competitiveness. Azerbaijan for instance relies solely in oil and gas exports (>80-90% of total exports), while other countries like Ukraine barely exceeds 5% in average for the examined time period. The different characteristics of the countries therefore play a significant role on the interaction of oil and gas sector and global competitiveness for the countries of the region. The choice of the random effects model by Qudah et al (2016) reflects the differences between the two regions examined.

6. CONCLUSIONS

In this paper, the relationship between global competitiveness of the countries of the Black Sea region and the oil and gas sector has been examined for a 10 years' time period from 2006 to 2015, with the use of panel data analysis.

The existence of the natural resources curse is apparent in our results. While oil prices have a positive effect on the competitiveness of the countries, oil rents have a negative effect indicating that countries of the region depend on oil and gas sector, at the expense of the rest sectors of the economy (Sabiroglou and Bashirli, 2012), harming the overall competitiveness of the country. Therefore, especially for the two large exporters of the region, Russia and Azerbaijan, it is important to attract investments in other sectors of their economy in order to increase their competitiveness. Significant efforts must also be made in tackling corruption since it has a positive effect in competitiveness. The application of corporate governance framework and mechanisms can improve the transparency of the oil companies in the region (Orazalin et al. 2015), especially of the ones that are state-owned (NOCs), contributing to the battle against corruption and therefore the improvement of competitiveness.

The limitations of the present research come from the small size of the sample and the limited number of variables included. The research can be expanded in surveying in more detail

the effect that natural gas prices and natural gas rents have in the competitiveness of the countries in the region, since natural gas has become of great importance for the region and the European Union. Accordingly, the construction of pipelines and the foreign direct investments in the sector can provide a fruitful field of further study on the relationship of the oil and gas sector and transportation in the competitiveness of an economy in the Black Sea region.

Further research should also expand the scope of studying this relationship not only in the Black Sea region but in all the countries in South-East Europe, since the developments in the sector with important investment projects in new oil and gas fields and the construction of new pipelines, will change dramatically the microeconomic and macroeconomic environment that affects the competitiveness of the countries of the region.

REFERENCES

1. Alexandridis A., Antoniadis I., 2013., Export performance and intra-industry trade of the Economies of the Black Sea Region., *Journal of European Economy*., Vol.12 (3), pp 296-308.
2. Astrov, V., & Havlik, P. (2008). *Economic Developments in the Wider Black Sea Region* (No. 349). The Vienna Institute for International Economic Studies, wiiw.
3. Aydin, M. (2005). Europe's new region: The Black Sea in the wider Europe neighbourhood. *Southeast European and Black Sea Studies*, *5*(2), 257-283.
4. Buckley, P. J., Pass, C. L., & Prescott, K. (1988). Measures of international competitiveness: A critical survey. *Journal of marketing management*, *4*(2), 175-200.
5. Ciarreta, A. & Nasirov, S., 2012. Development trends in the Azerbaijan oil and gas sector Achievements and challenges. *Energy Policy*, 40(C), pp.282–292.
6. Delgado, M., Ketels, C., Porter, M. E., & Stern, S. (2012). *The determinants of national competitiveness* (No. w18249). National Bureau of Economic Research.
7. Feurer, R. & Chaharbaghi, K., 1994. Defining Competitiveness. *Management Decision*, 32(2), pp.49–58.
8. Gavras, P. (2010). The current state of economic development in the Black Sea region. *Southeast European and Black Sea Studies*, *10*(3), 263-285.
9. Greene, W. H. (2000). *Econometric analysis* (International edition).
10. Gribincea, C., & Gaviuk, A. (2015). The Overview Of The Main Gas Pipelines In The Black Sea Region: Political And Economic Aspects. *ECONOMY AND SOCIOLOGY: Theoretical and Scientifical Journal*, (2), 99-106.
11. Hausman, J. A., & Taylor, W. E. (1981). Panel data and unobservable individual effects. *Econometrica: Journal of the Econometric Society*, 1377-1398.
12. Hertog, S. (2011). *Princes, brokers, and bureaucrats: Oil and the state in Saudi Arabia* (First Edition ed.). Ithaca,
13. ICM Petroleum Management (2012) : "Is the Black Sea the Next North Sea ?", *IENE Conference*, Thessaloniki, May 30/31, 2012. (http://www.iene.gr/6thSEEED/articlefiles/sessionIII/Hutta.pdf)
14. Ito, K., 2010. The impact of oil price volatility on the macroeconomy in Russia. *The Annals of Regional Science*, 48(3), pp.695–702.
15. Jahan Parvar, M.R. & Mohammadi, H., 2009. Oil prices and competitiveness: time series evidence from six oil-producing countries. *Journal of Economic Studies*, 36(1), pp.98–118.

16. Lall, S., 2001. Competitiveness indices and developing countries: an economic evaluation of the global competitiveness report. *World development*, 29(9), pp.1501–1525.

17. Mikesell, R.F., 1997. Explaining the resource curse, with special reference to mineral-exporting countries. *Resources Policy 23*, (4), 191–199. December.

18. Olsen, M. (2013). The Future of National Oil Companies in Russia and How They May Improve Their Global Competitiveness. *Houston Journal of International Law*, *35*, pp. 617-654.

19. Oomes, N. & Kalcheva, K., 2007. *Diagnosing Dutch disease: does Russia have the symptoms?* IMF Working Papers, 07(102).

20. Orazalin, N., Makarov, R., & Ospanova, M. (2015). Corporate governance and firm performance in the oil and gas industry of Russia. *Journal of Business Economics and Finance*, *4*(4).

21. Özata E. (2014). Sustainability of current account deficit with high oil prices: Evidence from Turkey. *International Journal of Economic Sciences*, Vol. III, No. 2/2014, pp. 71-88.

22. Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. New York: The Free Press.

23. Porter, M. E. (1990). *The competitive advantage of nations*. London : MacMillan Press.

24. Porter, M. E., Delgado, M., Ketels, C., & Stern, S. (2008). Moving to a new global competitiveness index. *The global competitiveness report*, *2009*, 43-63.

25. Qudah, A.A., Badawi, A. & AboElsoud, M.E., 2016. The Impact of Oil Sector on the Global Competitiveness of GCC Countries: Panel Data Approach. *Research Journal of Finance and Accounting*, 7(20), pp.32–39.

26. Sabiroglu, I.M. & Bashirli, S., 2012. Input–output analysis in an oil-rich economy The case of Azerbaijan. *Resources Policy*, 37(1), pp.73–80.

27. Scott, B. R. and Lodge, G. C. (Eds.) (1985), *US Competitiveness in the World Economy,* Harvard Business School Press, Boston, Mass.

28. Smit, A. J. (2010). The competitive advantage of nations: is Porter's Diamond Framework a new theory that explains the international competitiveness of countries?. *Southern African Business Review*, *14*(1).

29. Ulman, S.-R., 2013. Corruption and National Competitiveness in Different Stages of Country Development. *Procedia Economics and Finance*, 6, pp.150–160.

30. World Economic Forum (2016), The Global Competitiveness Report 2015-2016, Geneva, available in http://reports.weforum.org/global-competitiveness-report-2015-2016/ (accessed in 1/2/2017)