Management Studies and Economic Systems (MSES), 3 (1), 59-82, Summer 2016

Sustainability in Arab Countries: An Investigation of the Relationship Between Economic Development and Energy Consumption

Youssef AbdulRazzak Doughan

Beirut Arab University, Beirut Arab University District, Faculty of Business Administration, Beirut, Lebanon

Received 19 December 2016, Accepted 10 January 2016

ABSTRACT:
Sustainability in 19 different Arab countries has been studied through investigating the relationship between economic development and energy consumption. Data collected has been studied as a whole (Total countries data) and as segregated data (Oil exporting and Oil importing countries data) i.e. three categories. The regression model used measures the effect of independent and control variables i.e. [GDP/capita, dummy variables, interaction of dummy variables with GDP, $GDPPC^2$, Government Health Expenditure (% of GDP), Manufacturing Exports (% merchant exports), Export (% GDP) and Polity2] on energy intensity of human wellbeing (EIWB) (dependent variable). These independent and control variables when analyzed have shown different coefficients signs (positive/negative) and different significant/non-significant values based on what category has been understudy.
Results showed that Economic development has impacted EIWB significantly and positively (1995–2013) for total countries data and oil exporting countries; but not for oil importing ones. Second, GDPPC squared had the same result trend as that of the preceding point in terms of signage and significance. Third, GDP/capita and GDPPC squared results also has led to the conclusion that total countries data and oil exporting countries data support the environmental Kuznets curve trajectory; while oil importing countries do not. Finally, control variables, dummy variables and interaction, have shown different results within the three categories under study; these results ranged from significant to insignificant and from positively to negatively related ones. Hence, these results propose that there could be significant heterogeneity across countries in their routes in the direction of or away from sustainability.

Keywords: *Economic development, Sustainability, EIWB, Energy consumption, Environmental Kuznets Curve*

INTRODUCTION

A chief economic and financial load that governments and enterprises encounter is the cost they have to put to keep their operations running. A major cost encountered for running their operation is the one that results from the high-energy consumption needed. However, one of the major factors that lead to economic development is thought to be the increase in energy consumption.

This increase in consumption has been assumed to affect sustainable development negatively because of resource exploitation sometimes up to the extent of depletion. Sustainable development if applied will in principal lead to a reduction in energy consumption and better utilization of resources,

***Corresponding Author, Email:** *ydoughan@icloud.com*

which presumably affects economic development negatively by hindering it.

As such economic development is defined as the quantitative and qualitative changes in the economy (Todaro and Smith, 2009) where as sustainable development refers to the equilibrium or the interaction among society, environment and economy to maintain human well-being satisfaction (Knight and Rosa, 2011).

The relationship between sustainable development and economic development has been controversial; one of the major debatable subjects between sustainable development and economic development is alleged to be energy consumption.

Hence energy consumption that is harnessed from the environment and its use whether high or low would affect the economic development either positively or negatively; which most probably will lead to a conflicting relationship between economic development and sustainable development.

The Arab countries share several common features such as language; however, they differ when it comes to energy consumption, and the effect this has on economic development.

The current study has examined sustainability in Arab countries through investigating the effect of the variation in GDP/capita and other control variables on Energy Intensity of Human Wellbeing (EIWB). Second, it has studied if the data attained has been in harmony with the environmental Kuznets curve (EKC) expectations or not.

Hence, this study was divided into four sections, section one was made up of an introduction and literature review; section 2 included the research methodology. Section 3 reported results and discussions; and finally the conclusion was presented in section 4.

Literature Review

The EKC hypothesis states that environmental harm primarily rises with income and then drops. This could imply that economic growth is not a threat to global sustainability, and that there are no environmental limits to growth (Stern et al., 1996).

Usually the EKC is studied using a regression representation. One example can be that given by Summers and Heston (1991) where each regression involves a cubic function of real 1985 per capita GDP measured in purchasing power parity dollars ($PPP). Each regression incorporates site-related variables, a time trend, and a trade intensity variable (Summers and Heston, 1991). Stern et al. (1996) used similar approach to that of Summers and Heston and showed that the revolving points for SO_2, and dark matter were approximately $4,000-5,000; where the suspended particles intensity seemed to drop even at low-income levels. Here the time trend and the trade intensity variables had a significant negative coefficient in the SO2 regression and both the time and the trade variables have not been significant in the equation describing the concentration of dark matter. It is to be noted that the time trend has been significant in the suspended particles regression but the trade variable has not. At income levels between $10,000-15,000 rising levels of all three pollutants has been recorded; hence economic growth at middle-income levels would improve environmental quality (Stern et al., 1996).

Grossman and Krueger (1995) published an article discussing "Economic growth and Development". Researchers examined the affiliation between per capita income and several environmental indicators. Their research dealt with four different kinds of indicators; these included "urban air pollution, the state of the oxygen regime in river basins, fecal contamination of river basins, and contamination of river basins by heavy metals". The indicators outcomes resulted from energy consumption being used leading to their production. For example, air pollution results from burning fuels whether from plants, cars or machines. Results attained have shown that there is no verification that environmental quality declines progressively with economic growth; but environmental quality for most indicators has led economic growth to decline first then subsequently to increase. Nevertheless, the turning point value varies with the type of pollutants under study; however, these points start to appear in most cases when countries reach an income of $8,000/ capita (Grossman and Krueger, 1995).

According to Apergis and Payne (2009c) carbon dioxide discharges due to fossil fuels use differ significantly across states even after regulating for the economy or population size.

Hence, Apergis and Payne (2009c) tested the association between carbon dioxide emissions, energy use and actual output for six Central American countries from 1971–2004. Results attained have shown that in the long-run energy use has a positive and statistically significant impact on emissions. Moreover, similar to Ang (2007) actual output has exhibited the same trend as the Environmental Kuznets Curve (EKC) hypothesis, where the level of emissions first escalate with income, steadies, and then decrease; indicating an inverted U-shaped relationship between emissions per capita and real GDP per capita. In other words, when the actual output reaches a certain level, any increase above that level might actually reduce emissions as the need for environmental quality rises (Apergis and Payne, 2009c)

Suri and Chapman (1998) "Economic Growth, Trade and Energy: Implications for the EKC Ecological Economics" added independent variables for trade; these independent variables showed the export-led growth that directed towards an increase in per capita GDP; as well as, the increase of pollution levels in industrial developing countries. This at the same time led to the increase in imports of developed countries with an opposite per capita GDP and pollution levels effect. Furthermore, studying the effect of falling energy prices that leads to increased energy use and energy-based pollution in both developed and developing countries has led to exhibiting strong implications for the EKC analysis. This can be explained because of the fact that energy use at all income levels is price elastic, specifically in the long run. This price elasticity causes increased energy use, with the occurrence of falling real energy prices, even at different GDP levels. The trade and energy prices variables are both important, but whenever trade and energy prices are together in a regression, the trade variables become insignificant. Growth increase energy use; hence for countries, who aim for economic growth with a lesser increase in energy use they have to indulge in a speedy growth in the service industries; second, importing pollution intensive goods; third, installing domestic pollution control devices; and fourth increasing energy efficiency. Finally, the authors state that there exists an inconsistency within the EKC that must be explained. Practically all papers constantly report revolving point evaluations, but pollution rates at these revolving points are seldom quantified. Additionally, the rise in energy prices will decline worldwide levels of energy-based pollution. Hence, governments need to establish policies that will decline pollution levels and CO2 emissions (Suri and Chapman, 1998).

Concerns have been discussed and debated that the EKC oversimplified difficult interactions by concentrating solely on economic development (Roberts and Grimes, 1997). Based on that Figueres and Popova (2011) studied the linkage of various factors including GDP per capita, fossil fuels, alternative and nuclear energy, rural population and life expectancy at birth to the EKC. They used two different econometric methods to check if these variables have a linear or quadratic arrangement. Results attained from the two econometric methodologies do not vary significantly from each other. Furthermore, results from the two methods show that the inclusion of rural population has been insignificant with respect to carbon emission intensity, Hence, results attained indicate that EKC does not apply for all variables; and proves that the EKC sometimes oversimplify difficult interactions by concentrating solely on economic development (Figueres and Popova, 2011).

Finally, the literature on EKC nowadays is massive and developing with dispute among researchers providing different views, and is becoming progressively complex in analytic methods (Carson, 2010; Cavlovic et al., 2000; Rothman, 1998; Stern, 2004).

Moving to ecological footprint, practically all-Arab countries suffer from an ecological debt. The average Ecological Footprint of the Arab region has increased by 78 percent, from 1.2 to 2.1 global hectares per capita from 1961 to 2008. This sharp increase has been due to two main issues. The first is the increase of population number by a factor of 3.5 that led to higher consumption; as for the second reason, it is the increase in the quantity of resources and services consumed per capita that has been attained due to the higher incomes and altered lifestyle (Saab, 2012).

The Arab Forum for Environment and Development (AFED) yearly reports on the Arab countries environmental conditions have persistently stated that the abuse of resources,

the influence of climate alteration, the excessive population growth degrees, the unrestrained economic growth and urbanization have magnified the territory's environmental encounters and have detained its capability to manage them. Reports produced by AFED have shown that the cost of environmental deprivation in the Arab countries has decreased by 5 percent of total GDP. Moreover, the budget allocation set for environmental commitments has not even come adjacent to 1 % of GDP in any Arab countries (Saab, 2012).

Ringold et al. (2013) studied the unavailability of a well-defined structure that can determine the data needed to be tied to ecosystems, which can analyze the human wellbeing. Faced with that situation, the authors developed an economic theory known as the "final ecosystem goods and services – the biophysical features and qualities that people perceive as being directly related to their wellbeing". Steps have been illustrated using data collected from a survey dealing with subject. However according to the authors, sustained modification and application of this process will necessitate continuous cooperation between natural and social scientists; which may lead to better data that will aid in having better management decisions with respect to the various ecosystems (Ringold et al., 2013).

The relationship between energy consumption and economic development has been under study in several research papers. These researches have discussed and argued the benefits and drawbacks, the pros and cons that resulted from the fluctuation of energy consumption on economic development and sustainability.

Jorgenson et al. (2014) in their article "Energy consumption, human well-being and economic development in Central and Eastern European nations: A cautionary tale of sustainability" stated that sustainability is basically a confrontation of trade-off between energy consumption and economic development. To the authors to achieve growth of human wellbeing through economic development, nonrenewable energy and other natural resources depend on a broad range of ecosystems that need to exist. To improve sustainability there is a need to decrease the "energy intensity of human well-being (EIWB)"; in other words, the quantity of energy used per unit human wellbeing. The researchers in the above study applied longitudinal analysis techniques to determine the connection between EIWB and economic development for 12 Central and Eastern European (CEE) countries from 1992 to 2010. These countries have shifted from socialist regime economies to market demand economies. Being, indulged in this shift a large number of these countries faced decreases in energy amount; this decrease has been linked with improved energy efficiency and at the same time human wellbeing has enhanced noticeably. Outcomes attained from the study imply that the connection between EIWB and economic growth in CEE countries is complicated and has altered intensely through time. This is especially apparent during the last few years where the research displays an escalating sustainable affiliation between EIWB and economic development. The study is concluded by assuming that future possibilities really exist for comparatively more harmonious associations between development, human wellbeing, and the natural environment (Jorgenson et al., 2014).

Finally, Sweidan and Alwaked (2016) study "Economic Development and the Energy Intensity of Human Wellbeing: Evidence from the GCC Countries" for the period extending from 1995-2012 established two findings. The first finding indicated that in the GCC countries economic development has been the only cause that leads to negative impact on the environment. As for the second finding, it showed that economic development has been affecting EIWB positively all through the period of the study that extended from 1995 to 2012. Thus, based on these findings it was concluded that economic sustainability has been affected negatively. Furthermore, it was stated that since economic development affects negatively the environment, then the policies that the GCC countries has been following has been damaging economic sustainability and needs to be modified (Sweidan and Alwaked, 2016).

RESEARCH METHOD

The model that has been mainly used in the study is inspired from the research carried on by Jorgenson et al. (2014) titled "Energy consumption, human well-being and economic

development in Central and Eastern European nations: A cautionary tale of sustainability". Similar model was also used by Sweidan, and Alwaked (2016) in their research titled "Economic development and the energy intensity of human wellbeing: evidence from the GCC countries".

The model has been divided into three parts the dependent variable, the independent variable and the control variables. It is to be noted that one of the contributions this research has delivered lies in the fact that this has been the first time the effect of economic development on the Energy Intensity of Human Wellbeing (EIWB) (measurement of the energy consumption) has been calculated for 19 Arab countries.

As mentioned earlier, the model that has been used in this research was similar to that of Jorgenson et al. (2014) and Sweidan, and Alwaked (2016) ; however it has been adjusted to include GDP per capita squared $(GDPPC)_{it}^2$ to test for the level of income. Furthermore, a dummy variable for oil importing countries has been added to the model to test whether being oil importing or oil exporting country affect EIWB (measurement of the energy consumption). Moreover, additional control variables has been included in the model, some of which could be relevant to the Arab countries in order to find the more significant variables, which would help explain sustainability in the Arab countries. The model will be expressed as follows:

$$EIWB_{it} = \beta_0 + \beta_1 \text{GDP per capita}_{it} + \sum_{t=1}^{t=19} \beta_{t+1} D_t + \sum_{t=19}^{t=37} \beta_{t+19} D_t * \text{GDP per capita}_{it} + \sum_{\alpha=1}^{\alpha=k} \alpha_k (X_k)_{it} + \gamma_1 (GDPPC)_{it}^2 + \gamma_2 (\text{oil import})_i + u_i + e_{it}$$

- Subscript (i) represents each unit of analysis i.e. country.
- Subscript (t) represents the time period.
- The dependent variable, $EIWB_{it}$, is the energy intensity of well-being
- β represents the coefficient value
- α represents the coefficient value
- γ represents the coefficient value
- β_0 is the intercept
- GDP per capita (GDP per capita_{it}) to test for nation's level of economic development
- The period-specific intercepts

$$\sum_{t=1}^{t=19} \beta_{t+1} D_t$$

- β is the coefficient that increases from one year to the other
- D represents the year dummy for each year, 1995, 2013.
- The interaction for GDP per capita and the dummy variables for each year included in the study where 1995 is the reference category are as follows where β and D are the same as the item above

$$\sum_{t=19}^{t=37} \beta_{t+19} D_t * \text{GDP per capita}_{it}$$

- The model includes the control variables

$$+ \sum_{\alpha=1}^{\alpha=k} \alpha_k (X_k)_{it}$$

- where $(X_\alpha \ldots X_k)$ are control variables
- The model includes $(GDPPC)_{it}^2$ -GDP per capita squared- to test for level of income and to see if the relationship is linear or quadratic.
- The model includes $(\text{oil import})_i$ - to test for oil exporting or importing effect
- The country-specific intercepts (u_i)
- The disturbance term unique to each country at each point in time (e_{it}).
- The coefficient for GDP per capita is the unit change in the dependent variable in 1995 for each unit increase in GDP per capita for the same year. The overall effect of GDP per capita for the other time points (e.g.,1995,..., 2009, 2013) equals the sum of the coefficient for GDP per capita (i.e., its effect in 1995) and the appropriate interaction term if the latter is statistically significant (Allison, 2009).

Furthermore, the research will calculate and employ dummy variables to control for (u_i) and (period-specific intercepts). The former acts as a control for possible unobserved heterogeneity that is temporally invariant within countries (unit-specific intercepts), while the latter

controls for potential unobserved heterogeneity that is cross-sectionally invariant within periods (period-specific intercepts) (Allison, 2009). The unit-specific intercepts approach is similar to the dummy variable fixed effects model, often referred to as one-way fixed effects. Similarly, the insertion of the period-specific intercepts is equal to modeling temporal fixed effects, and including both period-specific and unit-specific intercepts is similar to approximating a two-way fixed effects model (Baum, 2006).

The estimation technique has been based on panel data analysis with fixed and random effects. Based on the diagnostic tests the right estimation procedure has been adopted. In previous studies of this kind, the Prais–Winsten (PW) regression model with panel-corrected standard errors (PCSE) was used and this also has been the case in this study.

Several statistical tests have been done to see how the collected data react; these tests were the Hausman test, Adjusted R^2, Spearman's Rank Correlation Coefficient (rho), Durbin Watson and Multicollinearity.

To achieve the goal of the current research, a sample data from 19 out of 22 Arab countries has been used. The 19 countries in the data set include Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates and Yemen. The three Arab countries that has been exempted from the study are Mauritania, Palestine and Somalia; because of the unavailability of the Energy use (kg of oil equivalent/capita) (ECPC) data for these countries, which is essential for the calculation of EIWB.

The data set in our panel analyses consisted of annual observations from 1995–2013 for the 19 Arab countries. This has resulted in a considerable number of observations (317 observations). The source of the data is the World Bank World Development Indicators (WBWDI).

The data that has been extracted included ECPC, Life Expectancy (LE), Gross Domestic Product per Capita (GDPPC) measured by current U.S. dollars, Health expenditure, public (% of government expenditure), Manufactures exports (% of merchandise exports) and Exports of goods and services (% of GDP) (World Bank, 2016). Furthermore, Democracy data has been extracted from the source of POLITY2 proxy in the Integrated Network for Societal Conflict Research (INSCR) (The website of the Network is: http://www.systemicpeace.org/inscrdata.html, accessed July 9, 2016). Furthermore, the 19 Arab countries have been segregated into exporting or importing oil countries to determine the effect of oil importing on EIWB.

The energy intensity of human well being (EIWB) (dependent variable) has been quantified as a ratio between a percapita energy consumption measure and a measure of human wellbeing. (Dietz et al., 2010), (Knight and Rosa, 2011). Hence, EIWB can be measured using the following formula, EIWB = [(ECPC + C)/LE] X 100; where EIWB is the energy intensity of well-being, ECPC is energy consumption in thousands of kilograms of oil equivalent per capita, LE is average life expectancy at birth in years and C represents the constant that is to be added to permit the coefficient equalization between the two measures (Dietz et al., 2010), the formula will be multiplied by 100 to scale the ratio.

The independent variables that has been used in the research were gross domestic product per capita (GDP per capita), which acts as a measure of a nation's level of economic development; and Gross Domestic Product per capita squared $(GDPPC)^2$ which acts as a measure of the level of income (Jorgenson and Clark, 2012); moreover, data collected has been measured in current U.S. dollars and obtained from the World Bank (2016).

In order to have better assessment and control, several control variables have been used in the model; where the effect of the level of the selected control variable on EIWB in the Arab countries have been studied and analyzed. Below is a description of the control variables that have been used in this study. These control variables were “POLITY2” score that was used to control for level of democratization. The second variable was the Health expenditure, public (% of government expenditure). The third variable was the Manufactures exports (% of merchandise exports). The fourth variable dealt with exports as percent of total GDP; and the last control variable was that of oil importing countries so as to view the effect of oil importing on EIWB.

RESULTS AND DISCUSSION

The collected data was divided into three categories (total data, oil exporting countries and oil importing countries) that will be analyzed for Summary Statistics and Correlation effect, Graphical Representation, Panel Data Analysis and Data Comparison (Fixed-effects with Dummy Variables; and the Fixed-effects with Interaction between GDP and Dummy Variables) and Environmental Kuznets Curve.

Summary Statistics and Correlation Effect

The summary statistics of each variable included its mean, minimum and maximum; as well as, the standard deviations attained. Also, the missing observations were recorded; these missing observations were of the same number for all variables and were skipped from the analysis, and consequently had no effect on the results attained (table 1). Table 1 represented the three data categories that have been used in this study, the first included all the data available (oil exporting and oil importing countries i.e. 19 Arab countries); the second involved oil exporting countries and the third included the oil importing ones. Based on table 1, all variables except importing (value = 1) or oil exporting (value = 0)) showed a high variation between their minimum and maximum values. This can be attributed to the fact that high differences exist among the values of the 19 Arab countries under study. Moreover, the negative sign for the Polity2/democracy variable was because polity2 value was recorded based on a range extending from -10 to 10.

Correlation coefficient for all variables with respect to the above three data categories (total data category, oil exporting and oil importing countries) was carried on in order to determine how variables are correlated to each other and in what direction (table 2). Again all the missing observations were skipped from the analysis and consequently had no effect on the results attained. Correlation results of the first two categories were almost the same but different when compared to the third one. It is worth to be mentioned that in oil exporting and oil importing categories the importing countries variable was excluded from the analysis by the gretl software.

Table 1: Summary statistics total data, using the observations using (317 observations)
(Missing values were skipped)
Dependent variable: EIWB

Variable	Mean	Minimum	Maximum	Std. Dev.	Missing obs.
EIWB	697768	614827	858959	60554.7	44
GDP/capita current US	10789.8	278.969	96077.0	16047.6	44
GDPPC squared	3.73132e+08	77824.0	9.23079e+09	1.12313e+09	44
Gov Health Exp	8.25605	1.69323	19.4597	2.97766	44
Manufact exports	25.6356	1.17829e-05	82.2663	27.7871	44
Export GDP	43.4704	4.96947	101.340	19.2297	44
Polity2	-4.48778	-10.0000	9.00000	4.60435	44
Importing Countries	0.501577	0.00000	1.00000	0.500788	44

Summary statistics oil exporting countries using 158 observations
(Missing values were skipped)

Variable	Mean	Minimum	Maximum	Std. Dev.
EIWB	696910	638494	858959	58485.2
GDP/capita current US	17277.5	278.969	96077.0	20180.0
GDPPC squared	7.03167e+008	77824.0	9.23079e+009	1.51923e+009
Gov Health Exp	6.78072	1.69323	12.1607	1.83352
Manufact exports	6.44642	1.17829e-005	34.7686	5.78283
Export GDP	48.0919	4.96947	101.340	18.9376
Polity2	-7.04430	-10.0000	3.00000	2.97301
Importing Countries	0.000000	0.000000	0.000000	0.000000

Summary statistics oil importing countries using 159 observations
(Missing values were skipped)

Variable	Mean	Minimum	Maximum	Std. Dev.
EIWB	698621.	614827.	851836.	62717.0
GDP/capita current US	4342.92	372.189	24378.9	5145.70
GDPPC squared	4.51726e+007	138525.	5.94333e+008	1.10468e+008
Gov Health Exp	9.72211	4.43314	19.4597	3.17062
Manufact exports	44.7041	1.20187	82.2663	27.8726
Export GDP	38.8780	10.8065	87.9135	18.4559
Polity2	-1.94733	-10.0000	9.00000	4.53726
Importing Countries	1.00000	1.00000	1.00000	0.000000

Table 2: Correlation coefficients total data, using the observations (317 observations)
(Missing values were skipped)
Dependent variable: EIWB
5% critical value (two-tailed) = 0.1102 for n = 317

EIWB	GDP/capita	GDPPC squared	Gov Health	Exp Manufact	Export GDP	Polity2	Importing Countries	
1	-0.4023	-0.2408	0.0383	-0.1251	-0.5229	0.243	0.0142	**EIWB**
	1	0.9137	-0.2098	-0.3285	0.6132	-0.4345	-0.4036	**GDP/ capita**
		1	-0.1679	-0.2353	0.4062	-0.3084	-0.2934	**GDPPC squared**
			1	0.5252	-0.0321	0.4084	0.4947	**Gov Health Exp**
				1	-0.2233	0.4074	0.6895	**Manufact export**
					1	-0.4211	-0.24	**Export GDP**
						1	0.5544	**Polity2**
							1	**Importing Countries**

Correlation coefficients oil exporting countries, 158 observations
(Missing values were skipped)
Dependent variable: EIWB

EIWB	GDP/capia	GDPPC squared	Gov Health Exp	Manufact exports	Export GDP	Polity2	
1	-0.5293	-0.3421	0.3082	-0.4354	-0.7281	0.5578	**EIWB**
	1	0.9232	-0.0499	-0.0393	0.6576	-0.4113	**GDP/capita**
		1	-0.0546	-0.1144	0.4603	-0.2975	**GDPPC squared**
			1	0.0066	-0.2925	-0.061	**Gov Health Exp_**
				1	0.0598	-0.515	**Manufact exports**
					1	-0.3201	**Export GDP**
						1	**Polity2**

Correlation coefficients oil importing countries, 159 observations
(Missing values were skipped)
Dependent variable: EIWB

EIWB	GDP/capita	GDPPC squared	Gov Health Exp	Manufact exports	Export GDP	Polity2	
1	-0.465	-0.2873	-0.1085	-0.1758	-0.353	0.1221	**EIWB**
	1	0.9546	0.0531	-0.2805	0.726	-0.2839	**GDP/capita**
		1	-0.0037	-0.3454	0.6604	-0.3434	**GDPPC squared**
			1	0.344	0.3419	0.2786	**Gov Health Exp**
				1	-0.1329	0.1206	**Manufact exports**
					1	-0.3954	**Export GDP**
						1	**Polity2**

Graphical Representation

The highest average GDP per capita value that has been recorded was for Qatar (49,509.20 US$) and the least has been for Comoros (500.75 US$). Furthermore, it has been observed that the highest average GDP per capita values that have been recorded were for the Arab oil exporting countries (figure 1).

The highest average EIWB value that has been recorded was for Djibouti (845,167.31) and the least has been for Lebanon (640,411.60) (figure 2) indicating how much energy is needed in developing countries.

The relationship between average GDP and average EIWB per capita (figure 3); as well as, the relationship between average Energy use (ECPC) and average EIWB per capita (figure 4) and the relationship between average Life Expectancy (LE) / capita and average EIWB / capita (figure 6) appeared to be inversely proportional.

However, the relationship between average Energy use (ECPC) and average GDP/capita (figure 5) and the relationship between average GDP / capita average Life Expectancy (LE) / capita (figure 7) appeared to be proportional with the exception of Bahrain; but it is to be noted that all oil exporting countries with the exception of Iraq have exhibited a high ECPC (figure 4) and a high GDP per capita values (figure 1).

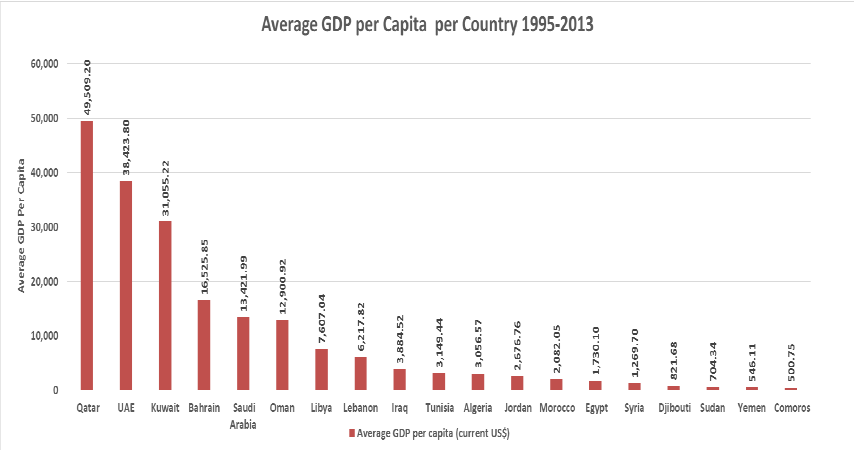

Figure 1: Average GDP per capita per country 1995-2013

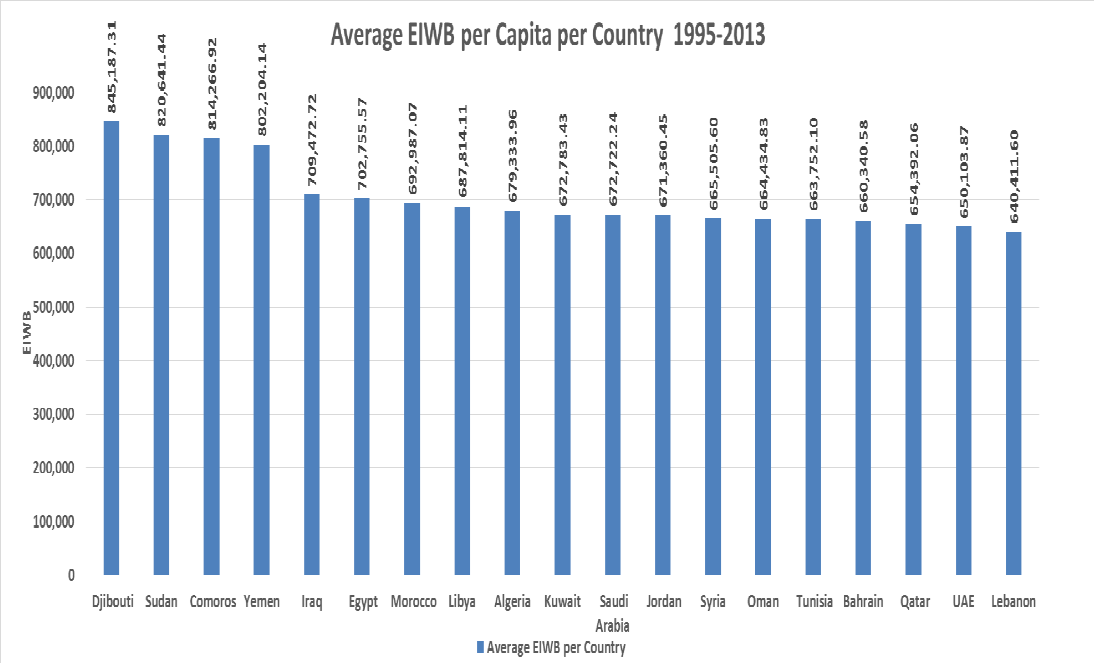

Figure 2: Average EIWB per capita per country 1995-2013

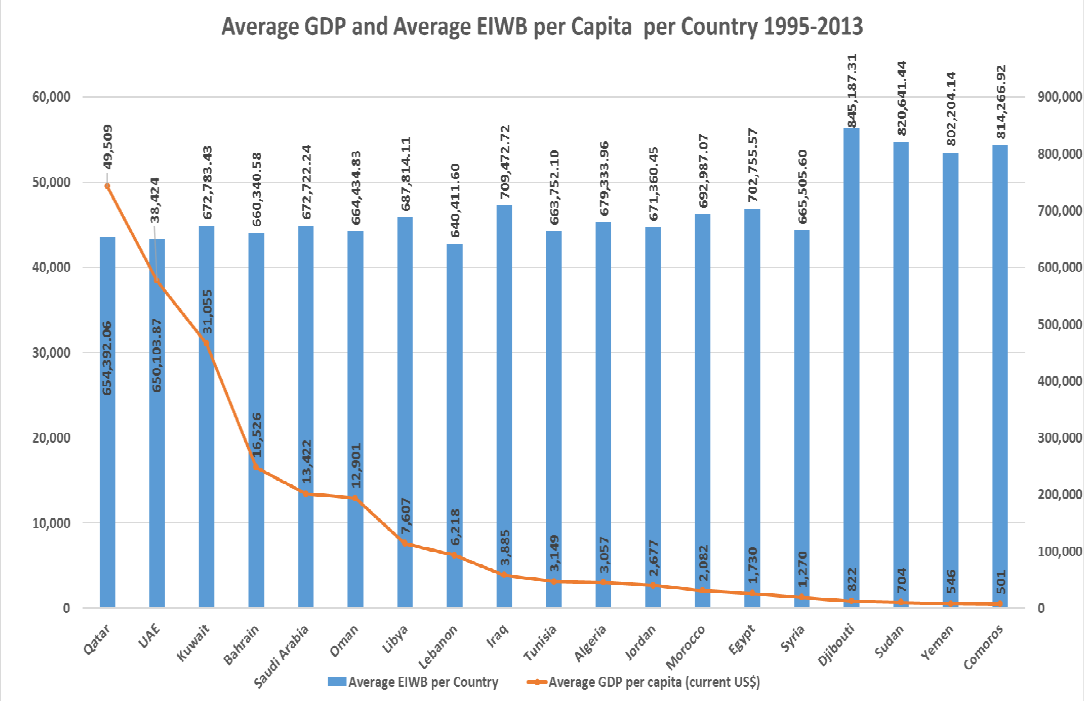

Figure 3: Average GDP and average EIWB per capita per country 1995-2013

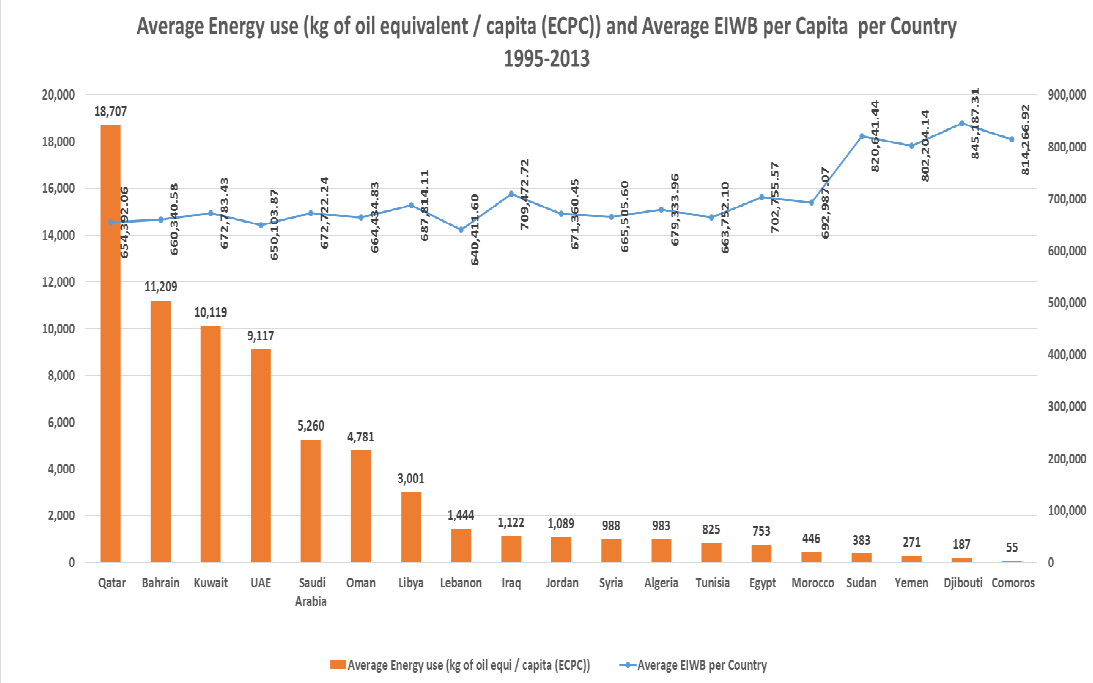

Figure 4: Average energy use (ECPC) and average EIWB per capita per country 1995-2013

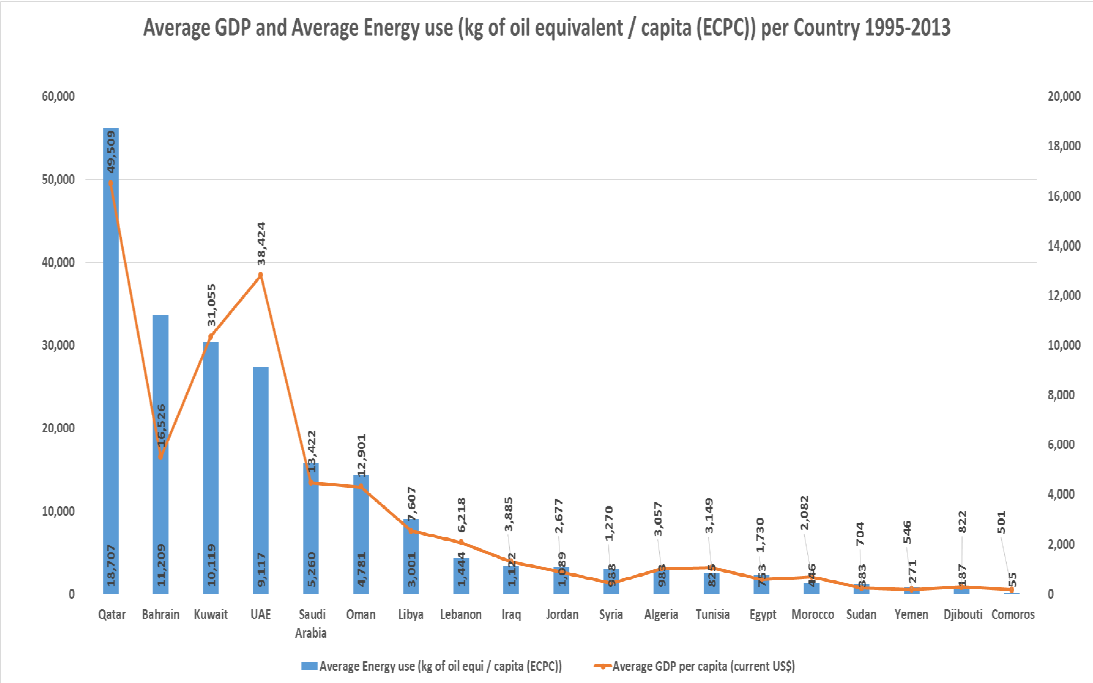

Figure 5: Average GDP and average energy use (ECPC) per capita per country 1995-2013

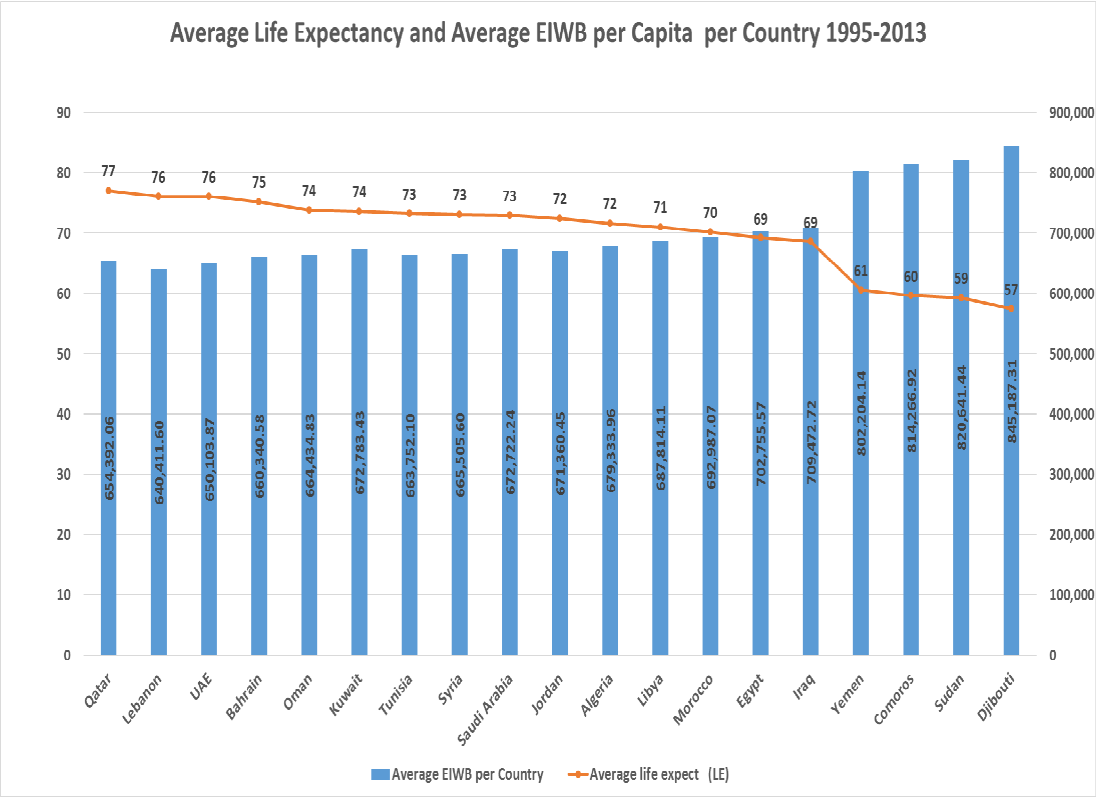

Figure 6: Average life expectancy and average EIWB per capita per country 1995-2013

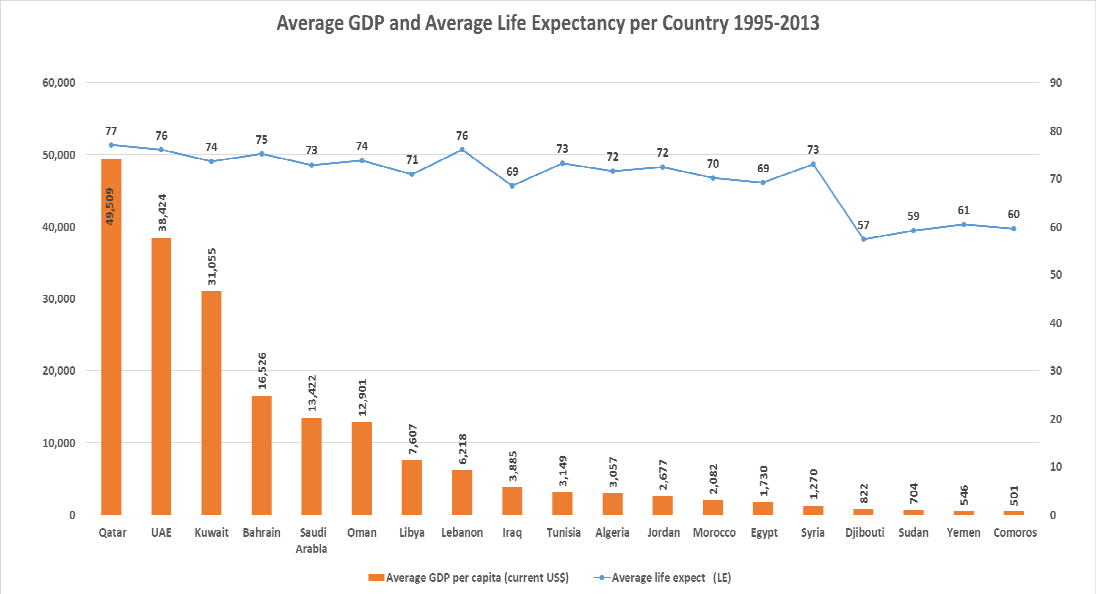

Figure 7: Average GDP and average life expectancy per capita per country 1995-2013

Panel Data Analysis

The Hausman test was equal to 8.0397 with p-value = probability (chi-square (6) > 8.0397) = 0.235203; consequently the Hausman test was in favor of random effect estimation. However, according to Beck and Katz (1995) the generalized least-squares estimator (used in random effects) can lead to "overconfidence with panel datasets that do not have many more time periods than panels" (i=19 and t=19 in the current study) (Jorgenson et al., 2014 p. 423). Furthermore, papers that examined the effect of economic development on EIWB have all used a fixed effect model; since by using time-series cross-sectional Prais-Winsten (PW) regression model with panel-corrected standard errors (PCSE) and by treating countries as clusters; the results provided consistent estimates in the presence of serial correlation and heteroscedastic error terms (Wooldridge, 2009 in T. Dietz et al., 2012); moreover, time dummies were included in the study in order to account for the time-specific effects.

Analysis of data attained has been compared to the different research that has taken place concerning economic development and EIWB. This comparison has been carried on first; by comparing total data (oil exporting and oil importing countries combined data) and segregated data (oil exporting countries and oil importing countries); second, by comparing data of the three categories with dummy variables; as well as, with interaction between GDP per capita, time and dummy variables; and finally to compare significant vs. non-significant results attained among the three different categories (total data, oil exporting and oil importing countries).

The results of the estimated model have postulated coefficients, highlighted for statistical significance, and corrected standard errors in terms of (PCSE). The report also showed the adjusted R2 value for the model, rho and Durbin-Watson tests; as well as, multi-collinearity test has been done in order to indicate that the reported results were not induced by any of the 19 countries encompassed in the study. In addition, to the total data category, segregation of the data into two distinctive categories was carried on, one for oil exporting and the other for oil importing countries. These two data categories have been subjected to the same analysis as that of the total data category available.

The main effect of GDP per capita on EIWB and the effect of the yearly dummy variables have been studied. Also, the effect of GDP per capita on EIWB and the interaction of GDP and time/dummy variable has been carried on as well.

As for control variables, the effect of the level of GDPPC squared, Government health expenditures as percent of GDP, Manufacturing exports (% merchant exports), Exports as a percent of GDP and Polity2 / democratization on EIWB has been studied and analyzed. Tables 3 A, 3 B and 3 C reported the findings for the estimated above model with the dummy variables only. Furthermore, tables 4 A, 4 B and 4 C reported the findings for the estimated model mentioned above with the dummy variables and the interaction between GDP/capita and the dummy variables. By comparing results attained the following was noted for both of the above set of tables:

1. GDP/capita, GDPPC squared, Government Health Expenditure as percent of GDP, Manufacturing Exports (% merchant exports), Export as % GDP and Polity2 have exhibited different coefficients signs (positive or negative) based on the category to which they belong to (total data, oil exporting data and oil importing one); furthermore, the same interpretation can be given with respect to significance or non-significance of results attained.
2. Adjusted R-squared values were high and indicated that the percentage of variation was clarified by the independent variables and that they actuality affect the dependent variable.
3. The rho values were positive and indicated that observations have a similar correlation between variables.
4. The Durbin-Watson statistics values were positive and close to zero indicating positive autocorrelation in the sample.
5. Multicollinearity has been omitted by the gretl software because it was exact and may lead to broader confidence intervals and reduced dependable probability values for the independent variables.

Table 3A: Total data (oil exporting and oil importing countries)
Fixed-effects, using 317 observations
Included 19 cross-sectional units
Time-series length: minimum 11, maximum 19
Dependent variable: EIWB
Omitted due to exact collinearity: Importing Countries / (PCSE) standard errors

	Coefficient	Std. Error (PCSE)	p-value	Sig.
Constant	705969	3585.39	<0.00001	***
GDP/capita current US	1.26933	0.165437	<0.00001	***
GDPPC squared	-8.36E-06	1.48E-06	<0.00001	***
Gov Health Exp	850.329	249.249	0.00074	***
Manufact exports	62.4232	51.7667	0.22891	
Export GDP	-83.8853	47.6597	0.07951	*
Polity2	-109.227	226.183	0.62954	
dt_2	-3064.74	1955.01	0.11812	
dt_3	-5924.49	1956.19	0.00269	***
dt_4	-8614.11	1966.31	0.00002	***
dt_5	-11395.8	1960.6	<0.00001	***
dt_6	-14035.9	1988.84	<0.00001	***
dt_7	-16041.4	1951.3	<0.00001	***
dt_8	-18263.8	1968.91	<0.00001	***
dt_9	-22033.3	1975.72	<0.00001	***
dt_10	-24881.3	2050.19	<0.00001	***
dt_11	-28279.5	2149.69	<0.00001	***
dt_12	-31524.4	2213.84	<0.00001	***
dt_13	-34958	2300.3	<0.00001	***
dt_14	-38676.2	2514.79	<0.00001	***
dt_15	-40177.4	2312.73	<0.00001	***
dt_16	-42500.8	2412.31	<0.00001	***
dt_17	-45937.2	2602.78	<0.00001	***
dt_18	-45895.4	2681.64	<0.00001	***
dt_19	-47537.3	2654.24	<0.00001	***
Adjusted R-squared			0.991191	
rho			0.930008	
Durbin-Watson			0.144129	

Table 3B: Oil exporting countries with dummy variables,
Fixed-effects using 158 observations
Included 10 cross-sectional units
Time-series length: minimum 11, maximum 19
Dependent variable: EIWB
Omitted due to exact collinearity: Importing Countries / (PCSE) standard errors

	Coefficient	Std. Error (PCSE)	p-value	Sig.
Constant	691549	5412.88	<0.00001	***
GDP/capita current US	1.56135	0.235908	<0.00001	***
GDPPC squared	-9.91E-06	1.85E-06	<0.00001	***
Gov Health Exp	770.289	398.018	0.05523	*
Manufact exports	401.173	146.605	0.00712	***
Export GDP	132.178	83.484	0.11591	

Polity2	48.2503	640.843	0.9401	
dt_2	-3218.41	3023.93	0.28925	
dt_3	-6695.4	3024.88	0.0287	**
dt_4	-7849.96	3014.97	0.01035	**
dt_5	-11429.6	3021.66	0.00024	***
dt_6	-15948.5	3209.73	<0.00001	***
dt_7	-16382.1	3039.38	<0.00001	***
dt_8	-19223.8	3083.94	<0.00001	***
dt_9	-25436.6	3194.96	<0.00001	***
dt_10	-28973	3369.86	<0.00001	***
dt_11	-33885.2	3753.06	<0.00001	***
dt_12	-38240.1	4027.43	<0.00001	***
dt_13	-41962.6	4347.75	<0.00001	***
dt_14	-47320.8	4948.79	<0.00001	***
dt_15	-44124.6	4120.34	<0.00001	***
dt_16	-47957.3	4659.87	<0.00001	***
dt_17	-55541.8	5418	<0.00001	***
dt_18	-55189.1	5804.8	<0.00001	***
dt_19	-56553.8	5683.01	<0.00001	***
Adjusted R-squared			0.989468	
rho			0.83843	
Durbin-Watson			0.229082	

Table 3C: Oil importing countries with dummy variables
Fixed-effects using 159 observations
Included 9 cross-sectional units
Time-series length: minimum 11, maximum 19
Dependent variable: EIWB
Omitted due to exact collinearity: Importing Countries / (PCSE) standard errors

	Coefficient	Std. Error (PCSE)	p-value	Sig.
Constant	731913	6196.96	<0.00001	***
GDP/capita current US	-1.28492	1.16906	0.27382	
GDPPC squared	5.83E-05	3.06E-05	0.05865	*
Gov Health Exp	706.142	321.899	0.03009	**
Manufact exports	-30.0696	51.4719	0.56013	
Export GDP	-376.296	74.5939	<0.00001	***
Polity2	166.052	225.308	0.46249	
dt_2	-2616.25	2349.46	0.26759	
dt_3	-5761.37	2355.29	0.01582	**
dt_4	-9865.43	2401.61	0.00007	***
dt_5	-12298.6	2387.79	<0.00001	***
dt_6	-13262.5	2406.78	<0.00001	***
dt_7	-15720.1	2404.53	<0.00001	***
dt_8	-17969.5	2440.15	<0.00001	***
dt_9	-19937.1	2485.48	<0.00001	***
dt_10	-21647.7	2624.48	<0.00001	***
dt_11	-23535.9	2749.71	<0.00001	***
dt_12	-26518.9	2855.86	<0.00001	***

dt_13	-29183.3	3050.19	<0.00001	***
dt_14	-29358.1	3582.75	<0.00001	***
dt_15	-35526	3549.01	<0.00001	***
dt_16	-37013.6	3700.12	<0.00001	***
dt_17	-38064.2	3886.96	<0.00001	***
dt_18	-39021.1	3945.98	<0.00001	***
dt_19	-41097.5	3912.17	<0.00001	***
Adjusted R-squared			0.993752	
rho			0.932014	
Durbin-Watson			0.174207	

Table 4 A: Total data with interaction between GDP and Dummy Variable and Dummy Variables
Fixed-effects, using 317 observations
Included 19 cross-sectional units

	Coeff.	Std. Error (PCSE)	p-values	Sig.
Constant	716257	4672.42	<0.00001	***
GDP/capita current US	1.20232	0.249322	<0.00001	***
GDPPC squared	-9.20E-06	1.91E-06	<0.00001	***
Gov Health Exp	892.461	262.68	0.00079	***
Manufact exports	75.9345	51.8451	0.14425	
Export GDP	-161.25	51.0196	0.00176	***
Polity2	56.2903	225.074	0.80271	
gdp_dt1	-1.37132	0.376155	0.00032	***
gdp_dt2	-1.24078	0.3312	0.00022	***
gdp_dt3	-1.01481	0.313262	0.00136	***
gdp_dt4	-0.861638	0.378657	0.0237	**
gdp_dt5	-0.705435	0.322728	0.02973	**
gdp_dt6	-0.638916	0.229951	0.00587	***
gdp_dt7	-0.470517	0.194668	0.01635	**
gdp_dt8	-0.42553	0.188647	0.02493	**
gdp_dt9	-0.442354	0.169404	0.00955	***
gdp_dt10	-0.348332	0.143585	0.01596	**
gdp_dt11	-0.335784	0.122525	0.00657	***
gdp_dt12	-0.286355	0.109802	0.00964	***
gdp_dt13	-0.244023	0.104388	0.02018	**
gdp_dt14	-0.170635	0.0912577	0.06265	*
gdp_dt15	-0.196835	0.119577	0.10097	
gdp_dt16	-0.1048	0.106669	0.32679	
gdp_dt17	-0.011005	0.0876901	0.90023	
gdp_dt18	-0.01087	0.0852853	0.89871	
dt_2	-3026.3	2526.61	0.23211	
dt_3	-6790.01	2518.8	0.00749	***
dt_4	-11172.2	2559.3	0.00002	***
dt_5	-14069.6	2542.35	<0.00001	***
dt_6	-15887.4	2504.43	<0.00001	***
dt_7	-19057.4	2485.2	<0.00001	***
dt_8	-21575.7	2503.17	<0.00001	***
dt_9	-24428.1	2481.15	<0.00001	***
dt_10	-27354.5	2509.7	<0.00001	***
dt_11	-29927.8	2559.07	<0.00001	***

dt_12	-33138.9	2594.32	<0.00001	***
dt_13	-36699.9	2683.58	<0.00001	***
dt_14	-40346.9	2943.34	<0.00001	***
dt_15	-43725.2	2844.52	<0.00001	***
dt_16	-46842.4	2918.92	<0.00001	***
dt_17	-51201.1	3095.17	<0.00001	***
dt_18	-51020.2	3228.85	<0.00001	***
dt_19	-53008.7	3222.98	<0.00001	***
Adjusted R-squared			0.991515	
rho			0.941872	
Durbin-Watson			0.139567	

Table 4 B: Oil exporting countries with interaction between GDP and Dummy Variable and Dummy Variables
Fixed-effects, using 158 observations
Included 10 cross-sectional units

	Coefficient	Std. Error (PCSE)	p-value	Sig.
Constant	699509	7200.35	<0.00001	***
GDP/capita current US	1.74042	0.310185	<0.00001	***
GDPPC squared	-1.18E-05	2.98E-06	0.00014	***
Gov Health Exp	669.814	452.309	0.14163	
Manufact exports	518.032	158.603	0.00147	***
Export GDP	223.555	90.2797	0.01487	**
Polity2	1356.22	842.132	0.1103	
gdpdt1	-0.0614248	0.113684	0.59013	
gdpdt2	0.00180831	0.102909	0.98601	
gdpdt3	0.115714	0.104691	0.27156	
gdpdt4	0.13041	0.110463	0.24044	
gdpdt5	0.139532	0.112184	0.21635	
gdpdt6	-0.764775	0.852061	0.37147	
gdpdt7	-1.17073	0.858992	0.17583	
gdpdt8	-1.12262	0.832067	0.18018	
gdpdt9	-0.523079	0.83841	0.53405	
gdpdt10	-0.853939	0.745405	0.25456	
gdpdt11	-0.682986	0.670718	0.31088	
gdpdt12	-0.914738	0.390411	0.02101	**
gdpdt13	-0.82217	0.338311	0.01679	**
gdpdt14	-0.888882	0.357021	0.01435	**
gdpdt15	-0.626972	0.397439	0.11768	
gdpdt16	-0.52165	0.342307	0.13053	
gdpdt17	-0.147682	0.28641	0.60719	
gdpdt18	-0.00831064	0.295345	0.9776	
gdpdt19	0.140783	0.256531	0.58431	
dt_2	-2827.41	3347.95	0.4003	
dt_3	-6542.23	3335.83	0.0525	*
dt_4	-8817.13	3282.14	0.0084	***
dt_5	-12436.2	3295.64	0.00027	***
dt_6	-18679.3	3555.65	<0.00001	***
dt_7	-18835.7	3249.03	<0.00001	***
dt_8	-22605.2	3418.72	<0.00001	***
dt_9	-28490.5	3519.4	<0.00001	***
dt_10	-32774.5	3767.38	<0.00001	***
dt_11	-38529.5	4252.05	<0.00001	***
dt_12	-43939.7	4604.21	<0.00001	***
dt_13	-48502	5014.23	<0.00001	***
dt_14	-54132.1	5617.78	<0.00001	***
dt_15	-49538.4	4755.9	<0.00001	***
dt_16	-54820	5396.75	<0.00001	***
dt_17	-64900.5	6269.53	<0.00001	***

dt_18	-64699.3	6797.54	<0.00001	***
dt_19	-66215.1	6683.36	<0.00001	***
Adjusted R-squared			0.989741	
Rho			0.80445	
Durbin-Watson			0.291164	

Table 4 C: Oil importing countries with interaction between GDP and Dummy Variable and Dummy Variables
Fixed Effect, using 159 observations
Included 9 cross-sectional units

	Coefficient	Std. Error (PCSE)	p-value	Sig.
Constant	732849	8817.16	<0.00001	***
GDP/capita	-1.9661	1.77646	0.27086	
GDP/capita current US	7.85E-05	5.91E-05	0.18653	
Gov Health Exp	741.649	360.987	0.04234	**
Manufact exports	-31.891	57.118	0.57777	
Export GDP	-381.327	105.195	0.00044	***
Polity2	160.827	255.029	0.52962	
gdpdt1	0.16716	1.53903	0.91371	
gdpdt2	0.547968	1.46676	0.70944	
gdpdt3	0.562514	1.46739	0.70222	
gdpdt4	0.222056	1.59757	0.88971	
gdpdt5	0.749862	1.47855	0.61308	
gdpdt6	0.373732	1.10646	0.73619	
gdpdt7	0.219229	1.20482	0.85596	
gdpdt8	0.212962	1.17018	0.85593	
gdpdt9	0.162236	1.05122	0.87764	
gdpdt10	0.343403	0.857822	0.68971	
gdpdt11	0.436549	0.684552	0.52501	
gdpdt12	0.462959	0.59893	0.44122	
gdpdt13	0.24188	0.532263	0.65043	
gdpdt14	-0.00991947	0.439343	0.98203	
gdpdt15	0.2088	0.660436	0.75249	
gdpdt16	0.185697	0.594837	0.7555	
gdpdt17	0.225665	0.462675	0.62672	
gdpdt18	0.100372	0.430296	0.816	
dt_2	-3578.41	3349.17	0.2877	
dt_3	-6778.65	3356.45	0.0459	**
dt_4	-9942.61	3450.7	0.00478	***
dt_5	-13872.3	3481.23	0.00012	***
dt_6	-13802	3356.06	0.00008	***
dt_7	-15752.5	3345.29	<0.00001	***
dt_8	-17960	3370.1	<0.00001	***
dt_9	-19711.6	3407.7	<0.00001	***
dt_10	-22061	3538.3	<0.00001	***
dt_11	-24386.4	3670.36	<0.00001	***
dt_12	-27531.5	3839.42	<0.00001	***
dt_13	-29207.6	4073	<0.00001	***
dt_14	-27520.4	5182.38	<0.00001	***
dt_15	-35064.5	5000.2	<0.00001	***
dt_16	-36383.9	5338.86	<0.00001	***
dt_17	-37719.8	5984.53	<0.00001	***
dt_18	-37778	6178.26	<0.00001	***

dt_19	-39130.6	6484.64	<0.00001	***
Adjusted R-squared				0.992878
rho				0.947513
Durbin-Watson				0.154657

Data Comparison

When comparing data attained the following was observed:

1. GDP/capita results has shown a positive relationship for the total data (oil exporting and oil importing countries combined data) category, positive relationship for the oil exporting countries category and a negative relationship for the oil importing countries one. Accordingly, by comparing these results with the research carried on by Jorgenson et al. (2014) (CEE countries) and Dietz et al. (2012) (is there a Kuznets Curve), it has been found that total data and oil exporting countries categories have opposite coefficient sign to that of Jorgenson et al. and Dietz et al. indicating an opposite relationship with respect to GDP/capita; which is antagonistic to that of oil importing countries category that has the same coefficient sign i.e. same relationship with respect to GDP/Capita with both Jorgenson et al. and Dietz et al.

On the other hand, when comparing GDP/capita results to those of Sweidan and Alwaked (2016) (GCC countries), similar relationship existed to those of total data and oil exporting countries categories and an opposite relationship to that of oil importing countries category.

Furthermore, when the dummy variables and interaction between dummy variables and GDP/capita and control variables were introduced; similar results to that mentioned above were attained for all three categories when compared to previous research studies done.

Additionally, GDP/capita values were significant for the total data and the oil exporting countries category; while it was insignificant for the oil importing countries category when both dummy variables standalone data was used; as well as when interaction data was added to it (table 5).

2. GDPPC squared has been added so as to monitor income development in the different 19 Arab countries under study. GDPPC results has shown a negative relationship with respect to total data, negative relationship for oil exporting countries and a positive relationship for oil importing ones. Comparing attained data to that of Jorgenson et al. (2014) and to Sweidan and Alwaked (2016) could not be done because these two studies did not include GDPPC squared calculation in them. However, when comparing results to that of Dietz et al. (2012), results attained showed an opposite relationship with respect to total data and oil exporting countries; vs. similar relationship when compared to oil importing ones for both dummy variables standalone results, as well as dummy variables and interaction ones.

Moreover, when studying significance with respect to the three categories; it has been found that the all three categories results were significant when the dummy variables data was used only; yet when interaction was encompassed in the analysis, total data and oil exporting countries remained significant; while oil importing ones was not anymore (table 5).

3. Government Health Expenditure as percent of GDP, results realized has shown a positive relationship for all three categories for both dummy variables standalone data and the dummy variables and interaction one. This positive relationship has been found to be similar to that of Sweidan and Alwaked (2016) results; but antagonistic to that of Jorgenson et al. (2014); furthermore, no comparison has been done to that of Dietz et al. (2012) because no such analysis has taken place in their research study.

As for significance, it has been found that all three categories were significant when dummy variables data was used alone; however, when the interaction data was introduced, only total data and oil importing countries values were significant, but oil exporting countries was not (table 5).

4. Manufacturing Exports (% merchant exports), results has shown a positive relationship with respect to total data, positive relationship for oil exporting countries and a negative relationship

for oil importing countries for both dummy variables standalone data and the dummy variables and interaction one. This relationship has been found to be analogous to that of Jorgenson et al. (2014); but could not be compared to Sweidan and Alwaked (2016), and Dietz et al. (2012) results; because no such analysis has taken place in both research study.

As for significance, it has been found that only the oil exporting countries has shown significant values for both dummy variables data and dummy variable plus the interaction one; however, both total data and oil importing countries values were insignificant (table 5).

5. Export as % GDP results has been found to be different for total data and oil importing countries; but similar to that of oil exporting countries when compared to Jorgenson et al. (2014) for both dummy variables data and dummy variable plus the interaction one. On the contrary, when compared to Sweidan and Alwaked (2016), the relationship was opposite for oil exporting countries, but similar to total data and oil importing countries for both dummy variables data and dummy variable plus the interaction one; furthermore, no comparison has been done to that of Dietz et al. (2012) because no such analysis has taken place in their research study.

As for significance, it has been found that when considering dummy variables standalone data, the oil exporting countries was insignificant; while the other two categories were. On the other hand, when values dummy variable plus the interaction one were introduced; all three categories were significant (table 5).

6. Polity2 / Democratization attained results has shown different relationship based on whether the dummy variable data was used alone, or with the addition of the GDP dummy interaction. When the dummy variables data was used alone, total data has shown similar relationship to that of Jorgenson et al. (2014) but different relationship to that of oil exporting and oil importing countries categories; consequently, opposite relationship results were achieved when the dummy variable data was compared to Sweidan and Alwaked (2016). On the other hand, when the interaction data was included, all three categories has shown opposite relationship to that of Jorgenson et al. (2014), but similar relationship to that of Sweidan and Alwaked (2016); furthermore, no comparison has been done to that of Dietz et al. (2012) because no such analysis has taken place in their research study. Furthermore, all three categories have been insignificant for both dummy variables data and dummy variable plus the interaction one (table 5).

7. Dummy Variables, looking at the dummy variables standalone data, it has been witnessed that all values have a negative relationship with EIWB and were significant except for year 1 in the three different categories. Furthermore, no comparison has been made with other research because of the unavailability of similar data (table 5).

8. Dummy Variables plus GDP dummy Interaction results attained varied among the three different categories (total data, oil exporting and oil importing countries). First, when the total data category has been compared to Jorgenson et al. (2014) and Sweidan and Alwaked (2016), the following has been witnessed. All yearly values had different relationship to both studies except for years 14 and 15 that had a similar relationship to that of Sweidan and Alwaked (2016). Second, with respect to oil exporting category, all yearly data had different relationship with both Jorgenson et al. (2014) and Sweidan and Alwaked (2016) studies except for years 2, 3, 4 and 5 that were similar. Over and above, only Sweidan and Alwaked (2016) study had similar relationship to years 14 and 15 in the oil exporting countries category. Third, Oil importing countries category had similar relationship with both Jorgenson et al. (2014) and Sweidan and Alwaked (2016) studies except for years 14 and 15 for Jorgenson et al. (2014) and Sweidan and Alwaked (2016) studies respectively. No comparison has been done to that of Dietz et al. (2012) because no such analysis has taken place in their research study (table 5).

Table 5: Comparison between attained results vs. CEE, GCC & is there a Kuzent curve

Variable	Relationship of control variables / CEE Countries (Dummy Variable)						Relationship of control variables / GCC Countries (Dummy Variable)									Relationship of control variables / CEE Countries (Dummy Variable plus Interaction)						Relationship of control variables / GCC Countries (Dummy Variable plus Interaction)									Relationship of control variables / Is there a Kuznets curve (Dummy Variable)						Relationship of control variables / Is there a Kuznets curve (Dummy Variable plus Interaction)						CEE Countries (Dummy Variable))		GCC Countries (Dummy Variable)	
	Producing & Importing		Producing / Exporting		Importing		Producing & Importing			Producing / Exporting			Importing			Producing & Importing		Producing / Exporting		Importing		Producing & Importing			Producing / Exporting			Importing			Producing & Importing		Producing / Exporting		Importing		Producing & Importing		Producing / Exporting		Importing		Is there a Kuznets curve		Is there a Kuznets curve	
	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SiGnF	SIGN	SAME / DIF	SiGnF	SIGN	SAME / DIF	SiGnF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SiGnF	SIGN	SAME / DIF	SiGnF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF	SIGN	SAME / DIF
GDP/capita	+ve	DIF	+ve	DIF	-ve	SAME	+ve	SAME	Y	+ve	SAME	Y	-ve	DIF	N	+ve	DIF	+ve	DIF	-ve	SAME	+ve	SAME	Y	+ve	SAME	Y	-ve	DIF	N	+ve	DIF	+ve	DIF	-ve	SAME	+ve	DIF	+ve	DIF	-ve	SAME	-ve	SAME	-ve	DIF
GDPPC squared	-ve	N/A	-ve	N/A	+ve	N/A	-ve	N/A	Y	-ve	N/A	Y	+ve	N/A	Y	-ve	N/A	-ve	N/A	+ve	N/A	-ve	N/A	Y	-ve	N/A	Y	+ve	N/A	N	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	-ve	DIF	+ve	SAME	N/A	N/A	N/A	N/A
Gov Health Exp	+ve	DIF	+ve	DIF	+ve	DIF	+ve	SAME	Y	+ve	SAME	Y	+ve	SAME	Y	+ve	DIF	+ve	DIF	+ve	DIF	+ve	SAME	Y	+ve	SAME	N	+ve	SAME	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufact exports	+ve	SAME	+ve	SAME	-ve	DIF	+ve	N/A	N	+ve	N/A	Y	-ve	N/A	N	+ve	SAME	+ve	SAME	-ve	DIF	+ve	N/A	N	+ve	N/A	Y	-ve	N/A	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Export GDP	-ve	DIF	+ve	SAME	-ve	DIF	-ve	SAME	Y	+ve	DIF	N	-ve	SAME	Y	-ve	DIF	+ve	SAME	-ve	DIF	-ve	SAME	Y	+ve	DIF	Y	-ve	SAME	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Polity2	-ve	SAME	+ve	DIF	+ve	DIF	-ve	DIF	N	+ve	SAME	N	+ve	SAME	N	+ve	DIF	+ve	DIF	+ve	DIF	+ve	SAME	N	+ve	SAME	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_2	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	N	-ve	N/A	N	-ve	N/A	N	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	N	-ve	N/A	N	-ve	N/A	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_3	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_4	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_5	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_6	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_7	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_8	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_9	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_10	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_11	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_12	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_13	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_14	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_15	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_16	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_17	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_18	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dt_19	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	-ve	N/A	-ve	N/A	-ve	N/A	Y	-ve	N/A	Y	-ve	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	+ve	SAME	+ve	SAME	-ve	DIF	Y	+ve	SAME	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	+ve	SAME	+ve	SAME	-ve	DIF	Y	+ve	SAME	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	+ve	SAME	+ve	SAME	-ve	DIF	Y	+ve	SAME	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	+ve	SAME	+ve	SAME	-ve	DIF	Y	+ve	SAME	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	Y	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	Y	-ve	DIF	Y	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	-ve	DIF	-ve	SAME	Y	-ve	SAME	Y	-ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	SAME	N	-ve	SAME	N	+ve	DIF	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	N	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	DIF	N	-ve	DIF	N	+ve	SAME	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-ve	DIF	-ve	DIF	+ve	SAME	-ve	N/A	N	-ve	N/A	N	+ve	N/A	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gdpdt19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	+ve	N/A	N/A	N/A	N/A	N/A	N/A	+ve	N/A	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Environmental Kuznets Curve

Based on the data attained with respect to GDP per capita and GDPPC squared for the three data categories, the following has been observed. The total data category and the oil exporting countries category have exhibited a positive GDP per capita value and a negative GDPPC squared value that were in both cases significant. This trend stipulates that as GDP increases GDPPC squared value follows a negative trend forming an inverted U-shape curve which confirms with the Environmental Kuznets Curve trajectory.

However, when looking at the oil importing countries GDP and GDPPC squared realized data, both entities have positive values and with the interaction variables being introduced both values were found to be insignificant. This trend stipulates that as GDP increases GDPPC squared value increases consequently leading to the formation of a U-shape curve which does not confirm with the Environmental Kuznets Curve trajectory but is opposite to it.

This variation in the results attained, has indicated that the inverted U-shape curve most probably has been due to the effect of the oil exporting countries category; and accordingly the higher the GDP per capita value the more is its effect on economic development.

Nevertheless, this proposes that there could be significant heterogeneity across countries in their routes in the direction of or away from sustainability.

In order to have a comprehensive understanding of the effect of GDP/capita on EIWB; figure 8 showed the estimated effect of economic development for every year (i.e. GDP and interaction taking place). The first coefficient (1.20232) was the effect of economic development on EIWB in 1995 and decreased in 1996 (-0.1690) then started rising in 1997 (-0.0385). This rise continued in increasing with an estimated coefficient of 0.1875 for GDP per capita in1998 until 2013 (1.191) that was close in value to the first GDP coefficient calculated in 1995 (1.20232). Hence, it can be concluded that the estimated effect of GDP/capita coefficient on EIWB is positive and that as the coefficient of GDP/capita increased EIWB increased as well.

Furthermore, when studying the variation between successive years, figure 9 showed the variation of coefficient values from one year to the other. The highest decrease among all values has been witnessed in year 1996 (-1.3713), while the highest increase took place in 1999 (0.2260), followed by 2002 (0.1684). Following 2002 values fluctuated minimally until reaching the year 2013 (0.0001).

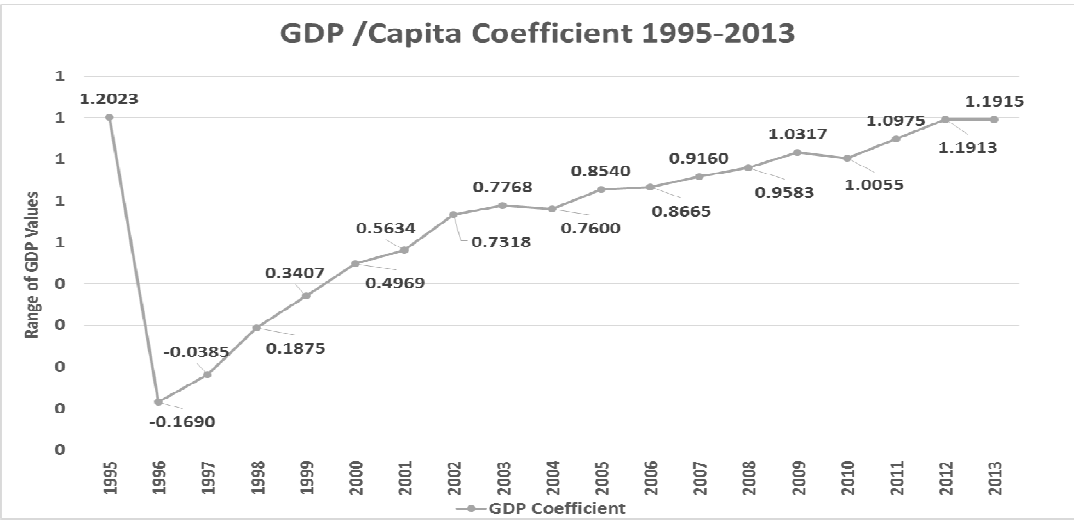

Figure 8: GDP per capita coefficient 1995-2013

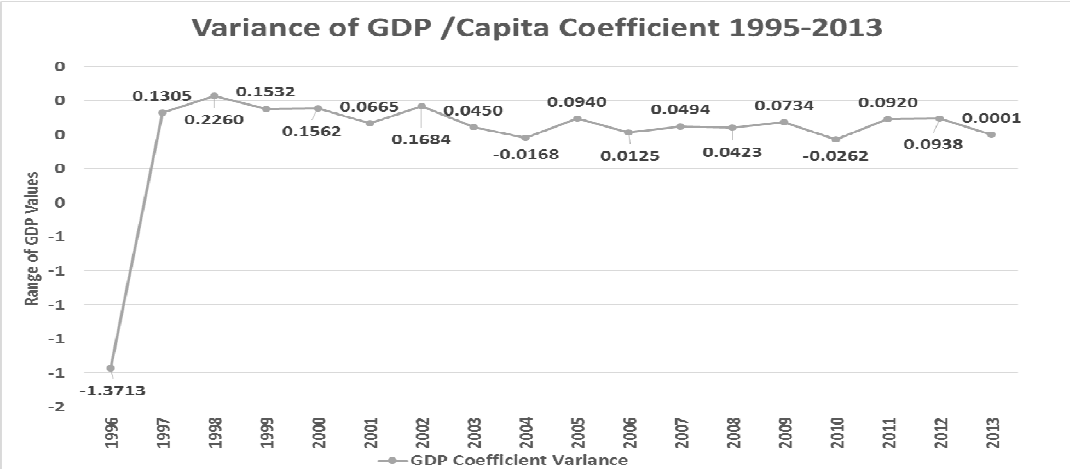

Figure 9: Variance of GDP per capita coefficient 1995-2013

CONCLUSION

Sustainability and economics has been understudy for quite some time; however, using energy as a way to enhance economic development has started not long ago; but regrettably, this approach has had a negative effect on the environment. Sustainability involves the use of scarce resources to attain the satisfaction of individuals' needs and wants, while maintaining these resources for present and future generations.

This research has studied the effect of economic development on energy consumption in the Arab world based on measuring EIWB in 19 Arab countries.

Countries are both oil exporting and oil importing ones and thus this study included three categories (total countries data, oil exporting countries and oil importing countries.

To realize the objectives of the research, a time-series cross sectional Prais–Winsten regression model with panel-corrected standard errors (PCSE) has been used. Data for the 19 Arab countries for the period 1995–2013 has been collected and accordingly 317 observations were obtained.

This research has been able to present a somewhat clear representation of the relationship between economics development and energy consumption in the Arab world using EIWB. The main results attained from this research have been the following; first, economic development has been impacting EIWB significantly and positively during the period 1995–2013 when studying the total countries data and the oil exporting countries; but for oil importing countries, economic development has been impacting EIWB insignificantly and negatively during the same period. Second, GDPPC squared per capita had the same trend as that of the preceding point in terms of signage and significance. The results of GDP per capita and GDPPC squared has led to the conclusion that total countries data and oil exporting countries data support the environmental Kuznets curve trajectory i.e. inverted U-shape curve; while that of oil importing countries do not support the environmental Kuznets curve trajectory i.e. a U-shaped curve. Third, the control variables used (Manufacturing Exports (% merchant exports), Government Health Expenditure as percent of GDP, Export as % GDP and Polity2); as well as, the dummy variables and the dummy variables and interaction, have shown different results with the three categories under study; these results ranging from significant to insignificant and from positively related to negatively related ones.

Furthermore, results have shown that stress on the environment had increased in a noticeable manner between 1995 and 2011, after which (2012–2013) the stress went back to very close

level to that observed in 1995. Thus, to decrease this stress, policies should be developed, reviewed or adjusted to counter the unexpected environmental damages by the Arab countries especially the oil exporting ones.

AKNOWLEDGMENT

Would like to thank Prof. Nehale Moustafa and Associate Prof. Abdallah Nassereddine for the aid and support in making this research a reality.

REFERENCES

Ang, J. B. (2007). CO2 Emissions, Energy Consumption, and Output in France. *Energy Policy* 35, pp. 4772–4778.

Apergis, N. and Payne, J. E. (2009c). CO2 Emissions, Energy Usage, and Output in Central America. *Energy Policy*, 37 (8), pp. 3282–3286.

Baum, C. F. (2006). *An Introduction to Modern Econometrics Using Stata*, Texas: Stata Press.

Carson, R. T. (2010). The Environmental Kuznets Curve: Seeking Empirical Regularity and Theoretical Structure. *Review of Environmental Economics and Policy*, 4 (1), pp. 3-23.

Cavlovic, T., Baker, K. H., Berrens, R. P. and Gawande, K. (2000). A Meta-Analysis of Kuznets Curve Studies. *Agricultural and Resource Economics Review*, 29 (1), pp. 32-42.

Dietz, T., Rosa, E. A. and York. R. (2012). Environmentally Efficient Wellbeing: Is There a Kuznets Curve? *Applied Geography*, 32 (2012), pp. 21-28.

Integrated Network for Societal Conflict Research (2015). POLITY2 Score to Control for Level of Democratization.Available:http://www.systemicpeace.org/. (October 17, 2015).

Figueres, F. and Popova, E. (2011). Environmental Kuznets Curve for Carbon Intensity: A Global Survey, Bachelor Thesis, Sweden-Gjuterigatan, Jönköping International Business School, Jönköping University.

Grossman, G. and Krueger, A. (1995). Economic Growth and the Environment. *The Quarterly Journal of Economics*, 110 (2), pp. 353-377.

Jorgenson, A. K., Alekseyko, A. and Giedraitis, V. (2014). Energy Consumption, Human Well-Being and Economic Development in Central and Eastern European Nations: A Cautionary Tale of Sustainability. *Energy Policy*, 66 (2014), pp. 419–427.

Knight, K. W. and Rosa, E. A. (2011). The Environmental Efficiency of Well-Being: A Cross-National Analysis. *Social Science Research*, 40 (3), pp. 931–949.

Roberts, J. T. and Grimes, P. E. (1997). Carbon Intensity and Economic Development 1962-1971: A Brief Exploration of the Environmental Kuznets Curve. *World Development*, 25 (2), pp. 191-198.

Rothman, D. S. (1998) Environmental Kuznets Curves A Real Progress or Passing the Buck? A Case for Consumption-Based Approaches. *Ecological Economics*, 25 (1998), pp. 177-194.

Ringold, P. L., Boyd, J., Landers, D. and Weber, M. (2013). What Data Should We Collect? A Framework for Identifying Indicators of Ecosystem Contributions to Human Well-Being. *Front Ecological Environment,* 11 (2), pp. 98–105.

Saab, N. (2012). Arab Environment 5, Survival Option, Ecological Footprint of Arab Countries. Beirut: Chemaly & Chemaly.

Stern, D. I. (2004). The Rise and Fall of the Environmental Kuznets Curve. *World Development*, 32 (8), pp. 1419-1439.

Stern, D. I., Common, M. S. and Babbier, E. B. (1996). Economic Growth and Environmental Degradation: The Environmental Kuznets Curve and Sustainable Development. *World Development*, 24 (7), pp. 1151-1160.

Summers, R. and Heston, A. (1991). The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988. *Quarterly Journal of Economics*, 1991: 106, pp. 327-368.

Suri, V. and Chapman, D. (1998). Economic Growth, Trade and Energy: Implications for the Environmental Kuznets Curve. *Ecological Economics*. Special Issue on the Environmental Kuznets Curve, (forthcoming).

Sweidan, O. D. and Alwaked, A. A. (2016). Economic Development and the Energy Intensity of Human Wellbeing: Evidence from the GCC Countries. *Renewable and Sustainable Energy Reviews*, 55 (2016), pp. 1363-1369.

Todaro, M. P. and Smith, S. C. (2009) *Economic Development*, Chapter (1), 10th ed. New Jersey-Harlow: Pearson, Prentice Hall, p. 8.

World Bank (2016). World Development Indicators 2016 (Accessed 10 May 10, 2016).