Financial Development and Economic Growth in Oil-Dependent Economy: The case of Bahrain

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Abstract

This paper attempts to identify the relationship between energy consumption, oil prices, market shares, dividend yields and economic growth for the Kingdom of Bahrain from year 2006 to 2016. For this purpose, unit root test, Johansen cointegration techniques for analysing the long run relationship, and Vector Error Correction Model (VECM) are used. The key findings are summarized as follow: (i) long run relationship exists between the suggested variables. (ii) Both energy and financial markets are significant in the long run relationship, and positively affect the economic growth of Bahrain. (iii) According to the estimated ECM term, the model is stable in the short run. (iv) Decline in the international price of oil has negative significant drawback on the economic growth of Bahrain. Accordingly, it is recommended that policy makers in the Kingdom of Bahrain focuses on implement strong strategies that aim at encouraging investments in non-oil sectors and carbon emissions reduction policy in the long run without impeding energy sector or economic growth in order to move towards sustainability.

Key Words: Oil prices; energy consumption; financial sector performance; economic growth; Bahrain.

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1. Introduction

Since the discovery of oil in 1930s, the six Gulf Cooperation Council (GCC) countries including: Kingdom of Bahrain, Kingdom of Saudi Arabia, Kuwait, Oman, Qatar and the United Arab Emirates, have witnessed a considerable high rates of economic growth. Such growth did not only have the means to build the foundations of basic infrastructure, but also to improve the standards of living, levels of education, life expectancy and lower rates of poverty. Although many economists attribute this growth to several factors, oil revenues played the key role as its benefits covered the entire Arab world and not only the GCC countries due to the appearance of alternative forms of energy (such as wind, water, and solar power). Nevertheless this, the importance of oil exceeds economic aspects and affects social life in general. Thus, the prevailing view among economists is that there is a strong relationship between the growth rate of a country and oil-price changes. Precisely what form this relationship takes, and how it might be modified, and other such questions are issues of outstanding value. Accordingly, the subject of oil price-economic growth relationship has become an interesting subject for many researchers. It has been proved that various transmission channels exist through which oil prices may have an impact on economic activity ((Balke, Brown et al. 2002) (Brown and Yücel 2002), (Lescaroux and Mignon 2008) or (Lardic and Mignon 2006) among others). These consequences are expected to be different in oil importing and in oil exporting. Whereas an oil price increase should be considered good news in oil exporting countries and bad news in oil importing countries, the reverse should be expected when the oil price decreases.

On the other hand, although the financial developments are considered as an important factor for sustainable growth, the financial system in the GCC was tightly regulated and protected from foreign competition by keeping relatively high levels of government controls over the banking and financial system. While those financial and regulatory policies were aimed at providing stability to the financial system, they had their negative effects on the financial system's competitiveness and efficiency.

Looking at the case of oil exporting countries like the GCC, where both oil prices and investments are matter, it has been noticed that there is an adverse impact of the hikes of oil prices on investments as the firms' costs are consequently increase. In addition,

changes in oil prices do not only affect the supply and demand, but also influence inflation, foreign exchange and stock markets.

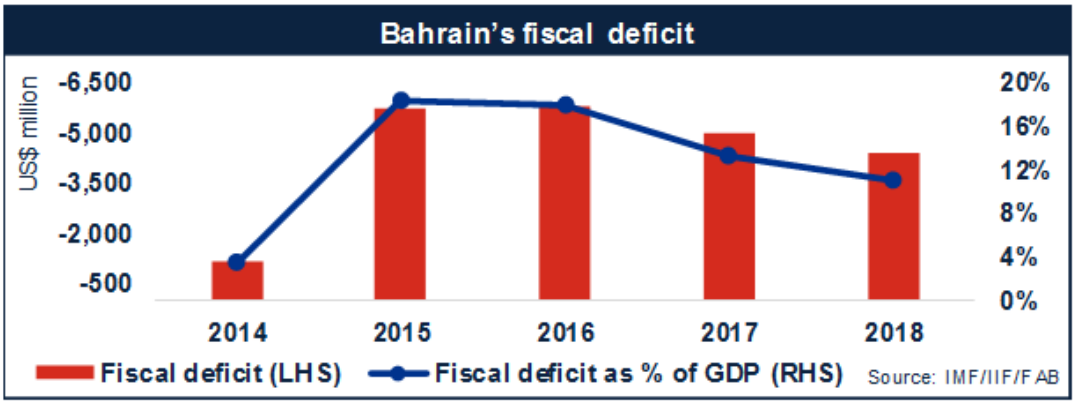
As in most GCC countries, Bahrain's economic growth has been strongly influenced by the fluctuations in oil and gas prices in international markets. This reveals Bahrain's economic dependence on its oil sector even though it is considered as the least oil dependent compared to its regional peers. Bahraini growth rates have generally followed a similar path to Saudi growth rates but have been less volatile because of huge gaps in oil and gas production and reserve between the two countries. Precisely, Bahrain's oil and natural gas production and sales create about 85 % of the Bahraini government revenues. Oil is about 70 % of government revenues and about 60 % of export revenues.

Alternatively, the kingdom of Bahrain has succeeded as one of the Gulf's financial centers for decades. Despite increasing competition from emerging financial centers in the region, its advanced regulatory framework, educated workforce and relatively low-cost environment means that it remains an attractive platform for companies engaging with the wider GCC and beyond. The recent decline in oil prices, however, serves as a reminder of the government's reliance on its hydrocarbons resources for revenues. Facing a stubborn fiscal deficit; as shown in Figure (1), Bahrain is in the process of overhauling its subsidy framework and seeking new income streams, both of which are challenging prospects in an economy renowned for generous social support and light-touch taxation. Revenue-enhancing measures include increasing tobacco and alcohol taxes and increasing fees on some government services (primary health care). A cost-cutting program entailed the removal of the meat subsidy in 2015 and raising petrol prices by 60% in January 2016 (which is likely to create savings worth $148.4 million); the gradual phasing-in of price increases for electricity, water, diesel and kerosene by 2019; and an increase and unification of natural gas prices for industrial users at $2.5 per million BTUs beginning April 2015. As a result, the 2015 non-oil primary balance improved by 2.5% of non-oil GDP relative to 2014. However, this was insufficient to mitigate the negative impact of lower oil revenues.

The kingdom's long-standing diversification strategy, meanwhile, has taken on a new urgency with the prospect of volatile oil prices for some years to come.

In order to understand the phenomena of the Bahrain's economy, this study extends the scope of the analysis to the various links between oil prices and several macroeconomic and financial variables for the Kingdom of Bahrain. The variables included are: real gross domestic product, real oil price, consumer price index (CPI), energy consumption, financial market share points and the percentage of the growth in dividend yield. The key findings shed the light on the importance of both energy and financial sectors in the long run of Bahrain's economic growth.

Figure 1: Bahrain's Fiscal Deficits



Our study contributes to the literature in the following important folds. First, as noted above, there are very few papers that specifically examine how natural resource dependence affects the relationship between financial development and economic growth. Thus, this paper contributes to the scant evidence on the effects of oil dependence on the relationship between financial development and economic growth.

Bahrain's Economy

Bahrain is the smallest country in the Arabic Gulf with a population of just over 1 million including around 50% expatriate citizens. It witnessed a prompt modernization and economic growth since the discovery of oil in 1932. Bahrain was among the first countries in the Middle East and North Africa region to build an industrial base and it has been the most attractive for foreign investors, including regional ones in its industrial development (Looney 1989).

It is worth to note that Bahrain's economic strength originates from regional oil wealth, though it is not any significant oil producing country or a member of the Organization

of Petroleum Exporting Countries (OPEC). It, however, hosts one of the largest oil refineries in the world – the BAPCO Sitrah Refinery with a processing capacity of 267,000 barrels of crude oil per day. About one-sixth of the crude oil processed at this refinery originates from Bahrain and the rest comes from Saudi Arabia, the largest oil producer in the world. A 54-kilometre long oil pipeline connects Bahrain to the Saudi off-shore oil facility Abu Saafa in the Persian Gulf. Most of the crude oil Bahrain receives from Abu Saafa is processed and then re-exported to Asian and North American markets.

Although diversification policy started to step up since late 70s, where the government paid some attention to attract financial and service institutions, in the late 1990's, Bahrain was the first state in the Arabic Gulf who initiated the official idea of diversifying the economy to prepare for the post-oil and post-gas period. Thus, serious actions have been taken and convert it to be the most diversified economy in the region. Bahrain has grown successfully over the past 10 years due to its liberal economic policies and the clear roadmap that aims to achieve prosperity for the society. However, Bahrain's oil and natural gas production and sales create about 85 % of the Bahraini government revenues. Oil is about 70 % of government revenues and about 60 % of export revenues, as reported by Bahrain's Economic Development Board (2017).[2]

Hikes in oil prices in early year of 2000 and till year 2009, Bahrain witnessed a durable growth in economy with a growth rate of 6.1%, where the assets of banks have increased from US$108 billion in 2009 to $241 billion (ISI Emerging Markets Blog, 2011).[3] In fact, most of the global banks and business firms, have no dearth of trust in the Bahraini financial system due to many regional, political and economic factors. As a result, although the market of Dubai has shaken during the financial crisis of 2009, Bahrain continued to boom and grow steadily. In year 2011, the economic base and financial backbone of Bahrain had clear drawbacks, where the stock markets went down 6-10%, hotel occupancy rates fell below 30%, and a 1.4% and 1.7% deficits in gross domestic products is projected for 2011 and 2012 respectively (Ameinfo.com, 2011).[4]

[2] For more information, visit http://bahrainedb.com/app/uploads/2017/06/BEQ-June-2017.pdf.
[3]For more information visit: https://www.isimarkets.com.
[4] Reports available at: https://ameinfo.com/

Aiming at reducing the reliance on oil revenues, the government of the Kingdom of Bahrain has strengthened the structural reforms to improve the infrastructure of the kingdom as well as the wellbeing of Bahraini citizens. Bahrain has also become an open-ended economy with liberalized trade and capital account. It has also become the hub of international affairs and the preferred destination for investors. At 25 % of GDP, financial developments have become the second largest component of the Bahraini economy.

In light of the above efforts, the aim of this paper is to examine the relationship between oil price, energy and financial market in the Kingdom of Bahrain, to check whether or not oil prices spikes and plunges are still having great impact on economic growth. In addition, we look at the relationship between energy consumption and economic growth, financial sector performance and economic growth and thus provide some policy implications. To do so, we use selected indicator variables that measure the performance of financial sector in Bahrain including the dividend yield and market share. Also, energy market variables are included to investigate the relationship between energy consumption (which is an indicator for industrial market) and economic growth taken into account the inflation and the fluctuations in oil prices. To our knowledge, literature has very limited such studies on the GCC countries in general, and on the Kingdom of Bahrain in specific.

2. Literature Review

As oil is the most traded commodity in the world wide due to its crucial role in production and economic growth, literature has paid great attention to study the relationship between oil prices and economies.

In fact, many empirical studies suggest that there is a linear negative relationship between oil prices and real activity in oil importing countries. Those studies include (Rasche and Tatom 1981), (Darby 1982), (Hamilton 1983), (Burbidge and Harrison 1984), and (Gisser and Goodwin 1986). The study conducted by (Hamilton 1983) identified a robust relationship between oil price increases and subsequent economic downturns for majority of the post- World War Two recessions in the United States (US) economy. Subsequently, a large literature has considered the oil price-economic growth nexus for a number of developed countries based on various theoretical

linkages. Studies linking oil prices to the macro-economy through the channels of labor market dispersion (Loungani 1986); (Finn 2000); (Davis and Haltiwanger 2001). Others have focused on investment uncertainty ((Bernanke 1983); (Dixit, Dixit et al. 1994); (Staff 2005), consumption smoothing in durable goods (Hamilton 2005); (Lee and Ni 2002) and the consequences for inflation (Pierce, Enzler et al. 1974); (Cavallo 2008) suggest that indirect transmission mechanisms may be the crucial means by which oil price shocks have macroeconomic consequences.

More recently, (Blanchard and Gali 2010) used a VAR model including GDP, oil prices, wages, and two other price indices, to argue that the effect of oil price shocks has reduced over time. (Hamilton 2009) deconstructs their arguments to show that past recessions would have been mild or have merely been slowdowns if oil prices had not risen. Furthermore, he argues that the large increase in the price of oil that climaxed in 2008 was a major factor in causing the 2008-2009 recession in the US. However, because it is hard to substitute other inputs for energy, the short-run elasticity of demand for oil and other forms of energy is low and the main short-run effects of oil prices are expected to be through reducing spending by consumers and firms on other goods, services, and inputs rather than through reducing the input of energy to production ((Hamilton 2009), (Edelstein and Kilian 2009)). Therefore, models using oil prices in place of energy quantities may not provide much evidence regarding the effects of energy use itself on economic growth. Although oil prices in literature entered into modelling using different ways, theoretical model in (Carruth, Hooker et al. 1998) and some of those in (Phelps 1994) imply that it is the level rather than the change in firms' input prices which matter.

With regards to the financial market, economists agreed that financial market development plays a very vital role in economic growth and development. However, the ongoing empirical research works concerning financial market development, its measures and impact on economic growth have not reached any consolidative consensus (agreement). (Levine, Loayza et al. 2000) examine the relationship between financial development and economic growth and the sources of growth in terms of private saving rates, physical capital accumulation, and total factor productivity using a pure cross-country instrumental variable procedure and a dynamic panel technique. The primary measure of financial intermediary development employed was private

credit, which measures the value of credits by financial intermediaries to the private sector divided by GDP, and alternative measures used are liquid liabilities and commercial-central Bank. The outcome of their study shows that financial intermediaries exert a large and positive impact on total factor productivity, which translate to overall GDP growth and that the long-run links between financial intermediary development and both physical capital growth and private savings rates are very weak. They concluded that higher levels of financial development lead to higher rates of economic growth, and total factor productivity.

(Erdal, Esengün et al. 2007) empirically examines the relationship between financial development and economic growth in Northern Cyprus by using Ordinary Least Square (OLS) Estimation Method. Annual growth rate of GDP was used as proxy for economic growth and the financial development variables used are; the ratio of domestic investments to GDP and ratio of deposit to GDP. Employing time series data from 1986-2004, the study found a negligible positive relationship between financial development and economic growth in Northern Cyprus. Although, Granger causality test showed that financial development does not cause economic growth, on the other hand there is evidence of causality from economic growth to the development of financial intermediaries. Their empirical finding shows that there is a causal relationship between annual growth rate of GDP and both the ratio of domestic investments to GDP and the ratio of loan to GDP. They concluded that, there is no evidence to support the view that financial development promotes economic growth in Northern Cyprus. By implication, financial development does not cause economic growth, rather, economic growth causes financial development.

More recently (Chortareas and Noikokyris 2014) investigated the effects of oil supply and demand shocks on U.S. dividend yield components, i.e. dividend growth, real interest rate, equity premium. Following disentangling methodology proposed by (Kilian and Park 2009), they showed that although positive relationship between oil price increase and dividend yield is evident, the persistence of relationship is highly dependent on the driving force of the oil price increase case of Singapore.

Here, this paper follows the literature in analyzing the long run-relationship between the selected variable, we aim at investigating the impact of oil prices on economic

growth. In addition, we look at the causal linkage between energy consumption and economic growth, financial sector performance and economic growth and thus provide some policy implications. To do so, we use selected indicator variables that measure the performance of financial sector in Bahrain including the dividend yield and market share. Also, energy market variables are included to investigate the relationship between energy consumption (which is an indicator for industrial market) and economic growth taken into account the fluctuations in oil prices.

3. Data

This empirical analysis uses annual data that covers the period from 2006 till 2016 for the Kingdom of Bahrain. The dataset has been collected from two main sources named the World Indicators and the Central Bank of Bahrain (CBB). Although the period has been chosen on the basis of data availability, it is an interesting interval as it witnessed the main critical events of both upsurge and plunge in oil prices.

Given that the aim of this paper is investigating the relationship between energy market, oil prices, financial market and economic growth, the data include a wide range of information on many related indicators as shown and briefly explained below:

1. Real gross domestic product per capita (GDP): is a wide macroeconomic definition measure which represents the value of economic output for all good and services in an economy during a certain time period. Since this paper uses the real value of the GDP, thins implies that it has been adjusted for price changes (i.e., inflation or deflation). In another word, this adjustment has converted the measure of money-value that included in measuring the nominal GDP into an index for quantity of total output.
2. Consumer Price Index (CPI): a measures that shows the level of prices by accounting prices of a market basket of consumer goods and services purchased by households during a certain time. The CPI is a statistical estimate constructed using the prices of a sample of representative items whose prices are collected periodically. In this paper, the CPI has been used to convert the nominal GDP on Kingdom of Bahrain into a real GDP and thus, descriptive statistics gives an idea about the trend in the CPI among the years 2006 – 2015.

3. Energy consumption per capita (EC): which measures the aggregate consumption of energy including fossil and non-fossil fuels in a country, taking into account the number of total population in each year. This indeed includes the usage of energy by firms, industries, households and all other possible parties that may consume energy.
4. Real crude oil prices (ROP): the WTI crude oil prices are converted into real prices to account for inflation pressure.5
5. Market share points (MS): represents the percentage of an industry or market's total sales that is earned by a particular company over a specified time period. This metric is used to give a general idea of the size of a company in relation to its market and its competitors.
6. The percentage of the growth in dividend yield (DY): a measure of an investment's productivity, and some even view it like an "interest rate" earned on an investment. A security's dividend yield can also be a sign of the stability of a company and often supports a firm's share price. Normally, only profitable companies pay out dividends. Therefore, investors often view companies that have paid out significant dividends for an extended period of time as "safer" investments. Thus, should events occur which are detrimental to the share price, the allure of the dividend combined with the stability of the company can support the price somewhat.

More precisely, growth, inflation and energy market data are collected from World Indicator, while the last two financial variables are obtained from the Central Bank of Bahrain (CBB). The following table represents the statistics of the original data:

Table (1): Variables Descriptive Statistics

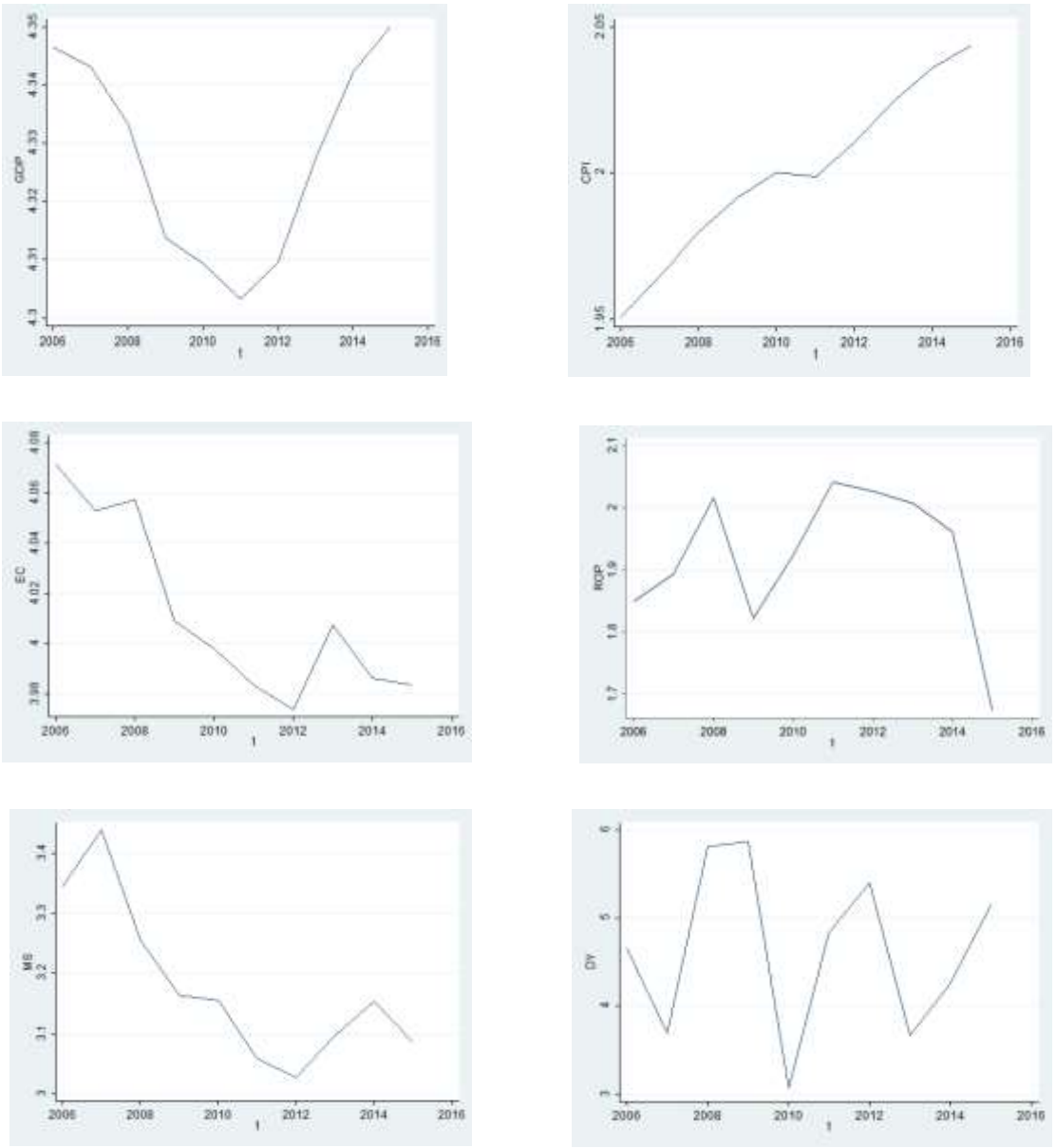
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Real GDP	10	4.327805	0.01761	4.303236	4.349946
CPI	10	1.999858	0.029924	1.95062	2.043604
EC	10	4.012318	0.035232	3.973914	4.071432

[5]Since the most traded oil is the West Texas Intermediate (WTI) which is also known as light sweet, this papers uses the WTI spot prices as the benchmark in oil pricing and thus it is deflated using the Consumer Price Index (CPI) of the United Statesobtained from the U.S. Energy Information Administration (EIA).

ROP	10	1.921123	0.115688	1.673523	2.04131
MS	10	3.178376	0.131883	3.027598	3.440164
DY	10	4.641	0.954201	3.07	5.86

Since the selected variables are available on annual basis for the Kingdom of Bahrain, (Denton 1971) Method is applied to interpolate these series into its quarterly values as used by IMF.

Figure 2: Plot of Time-series Variables



4. Model

In this paper we apply recent advances in time series techniques by estimating the cointegration relationship between the suggested variables as proposed by (Johansen 1988) and (Johansen and Juselius 1990).

To do so, the time series econometric procedures are used in order to examine the relationship between selective indicator variables with relates to energy market, other financial indicators and economic growth i.e. whether oil prices, financial variables and energy consumption will affect economic growth or is it economic growth drives the demand for more energy consumption in the economy while it cope with the fluctuations in oil prices by developing the financial sector. There are three steps involved in estimating the relationship between oil prices and economic growth. The first step is to test the stationarity of the series or their order of integration in all variables i.e. energy consumption, electricity consumption, energy prices, economic growth and the rest of variables. In this study, the Augmented Dickey Fuller (ADF) is utilized to investigate the order of integration. The second step is to examine the existence of a long run relationship between energy consumption, energy prices and economic growth, i.e. whether a linear combination of the series is stationary. This stationary linear combination of the variables converges to a long-run equilibrium over time and is known as the co-integrating equation. In this study, the Johansen test ((Johansen 1988, Johansen and Juselius 1990) are used to investigate the existence of long-run relationships between the variables. Although there exists a number of co-integration tests, such as the (Engle and Granger 1987) method and the (Stock and Watson 1988), Johansen's test has a number of desirable properties, including the fact that all test variables are treated as endogenous variables. Once the co-integration is confirmed in the model, the residuals from the equilibrium regression can be used to estimate the Vector Error Correction Model (VECM) in the third step, where the VECM equation can be written as follow:

$$\Delta \boldsymbol{Z_t} = \boldsymbol{\mu} + \sum_{i=1}^{k} \boldsymbol{\Gamma_i}\, \Delta \boldsymbol{Z_{t-i}} + \boldsymbol{\alpha}\, \boldsymbol{\beta}'\, \boldsymbol{Z_{t-1}} + \boldsymbol{\varepsilon_t} \qquad \textbf{(1)}$$

Where Δ is the first difference notation, Z_t is an integrated vector of order one and sized by $k \times 1$, μ is $k \times 1$ constant vector representing a linear trend in a system, k is

a lag structure, and ε_t is a $k \times 1$ Gaussian white noise residual vector. Γ_i is a *(k x k)* matrix and indicates short term adjustments among variables among *p* equations at the *i* lag. Two matrices, α and β are of dimension *k x r*, where α denotes the speed of adjustment (loading), β represents the cointegrating vectors. Precisely, $\alpha\, \beta'\, Z_{t-1}$ is the error correction term ECT_{t-1}, which is one period lag of the residual term (disequilibrium) from the long run relationship. The above equation can be estimated by the usual Ordinary Least Square (OLS) method if all its terms are I (1) and therefore standard hypothesis testing using t-ratios and related diagnostic tests can be conducted on the error term. Theoretically, the coefficient of the one period lag of the disequilibrium term should be negative (i.e. $\pi < 0$) and significant if the disequilibrium is to be corrected in subsequent period and long run equilibrium restored. In this light, the coefficient of the error term represents the speed of adjustment to the long run equilibrium i.e. it shows by how much any deviation from the long run relationship is corrected in each period.

5. Empirical work and Results

6.1 Denton (1971) Interpolation method

Since the selected variables are available on annual basis for the Kingdom of Bahrain, (Denton 1971) Method is applied to interpolate these series into its quarterly values as used by IMF.

Basically, (Denton 1971) Least Square formulation was developed to eliminate the "step problem" that arises when related series, with imperfect coverage, are used to interpolate low frequency GDP data.[6] The step problem occurs when the Benchmark to indicator (BI) ratio changes dramatically from year, given that the indicator or related series that is used in the distribution process grows at different rate from the benchmark. Step problems are most evident in simple pro-rata distribution techniques which is implemented as follows:

$$\boldsymbol{X_{q,\beta}} = \boldsymbol{I_{q,\beta}} \left[\frac{\boldsymbol{A_\beta}}{\sum_q \boldsymbol{I_{q,\beta}}}\right] \quad \textbf{(2)}$$

[6] For more information, refer to Serju, P. (2004). Estimating quarterly, expenditure-based GDP for Jamaica: a general Kalman filter approach, Working Paper.

$X_{q,\beta}$ is the level of the quarterly national accounts estimate for quarter q of year β. $I_{q,\beta}$ is the level of the indicator in quarter q of year β and A_β is the level of the annual data for year β. The expression $\left[\frac{A_\beta}{\sum_q I_{q,\beta}}\right]$ is the annual BI ratio. With pro-rata distribution, there will be a distinct jump in adjacent $X_{q,\beta}$ where $I_{q,\beta}$ and A_β grows at different rates, such that the compensating adjustment in quarterly estimates from one distinct year to the next will be put into the first quarter of each year, while other quarterly growth rates are left unchanged. The significance of the step problem depends on size of the variation in the annual BI ratio. To maintain simplicity, we outline only the basic version of the Denton Least square method (the Proportional Denton Technique or PDT). This method involves solving the following optimization problems:

$$\Delta y_t = C + \sum_{i=0}^{p} \alpha_i \, \Delta y_{t-i} + \sum_{i=0}^{p} \sum_{j=1}^{k} \beta_i \, x_{t-i}, j + u_t \qquad \textbf{(3)}$$

$$\left(X_1 \ldots\ldots\ldots X_{4\beta}^{min} \ldots\ldots\ldots X_T\right) \sum_{t=2}^{T} \left[\frac{X_t}{I_t} - \frac{X_{t-1}}{I_{t-1}}\right]^2 \qquad \textbf{(4)}$$

under the restriction that, for the flow series,

$$\sum_{t=2}^{T} X_t = A_{y,y} \in \{1 \ldots\ldots\ldots \beta\}^4 \qquad \textbf{(5)}$$

where t is time.[7] Intuitively, the PDT implicitly constructs from the annual observed BI ratios a time series of quarterly BI ratios that is as smooth as possible. Enhancements to the PDT improve the ability of the technique to extrapolate based on available indicators when there are no available annual benchmarks.

6.2 Unit root Test

Many economic and financial time series exhibit trending behavior or non-stationary in the mean. Leading examples are asset prices, exchange rates and the levels of macroeconomic aggregates like real GDP. An important econometric task is determining the most appropriate form of the trend in the data. Two common trend removal or de-trending procedures are first differencing and time-trend regression. First differencing is appropriate for I(1) time series and time-trend regression is appropriate for trend stationary I(0) time series. Unit root tests can be used to determine if trending

[7] (t = 4y - 3) is equal to the first quarter of year y, and t = 4y the fourth quarter of year y. Similarly, t = 1 is equal to the first quarter of year 1.

data should be first differenced or regressed on deterministic functions of time to render the data stationary. Moreover, economic and finance theory often suggests the existence of long-run equilibrium relationships among non-stationary time series variables. If these variables are I(1), then cointegration techniques can be used to model these long-run relations. Hence, pre-testing for unit roots is often a first step in the cointegration modeling as discussed above. Finally, a common trading strategy in finance involves exploiting mean-reverting behavior among the prices of pairs of assets. Unit root tests can be used to determine which pairs of assets appear to exhibit mean-reverting behavior.

Thus, in this paper, conducting stationary test is essential for identifying the order of integration of the proposed variables before testing for any causality or long-run relationship(s). The most popular tests in literature is the Augmented Dickey and Fuller (ADF) test which is an augmented version of the original Dickey-Fuller test (Dickey and Fuller 1979). In 1984, the very same statisticians expanded their basic autoregressive unit root test (the Dickey-Fuller test) to accommodate more complex models with unknown orders (the augmented Dickey-Fuller test). This has been employed in this study to verify the order of integration, Id, for each variable. The ADF testing procedure tests the unit root hypothesis as following:

$$\Delta y_t = \theta_0 + \gamma_0\, t + \gamma_1\, y_{t-1} + \sum_{i=0}^{p} \theta_i\, \Delta\, y_{t-1} + \tau_t \qquad \textbf{(6)}$$

where $y_t$is the variable in period t; Δy_{t-1} is the y_{t-1}- y_{t-2}; the i.i.d. disturbance τ_t has mean 0 and variance 1; t the linear time trend and p is the lag order. In order to test the null hypothesis for the presence of a unit root in y_t, we conducted the hypothesis testing that γ1= 0 in Equation (6). If γ1 is significantly less than zero, the null hypothesis of a unit root is rejected. Results of ADF are obtained for both level and first differenced variables as a treatment for non-stationary data as below in Table (2).

Accordingly, the results shown in Table (2), it is revealed that all variables are roughly non stationary at level and integrated of order one- I(1).

Table (2): Results of unit root test

Variable	ADF	
	Level	*Differenced*
Real GDP	0.337	-1.917**
EC	-1.293	-1.965**
ROP	-0.491	-1.975**
MS	-1.52	-2.364**
DY	-0.016	-10.052***

Notes: The regression includes an intercept and trend. All variables are in natural logarithms, while the lag length determined by Akaike Information Criteria and are in parentheses. ** , and *** indicates significance at the 5% level and 1% level, respectively. The nulls for the unit root.

6.3 Selection of lag length for the Vector Autoregressive Regression (VAR) model

In literature, it is common to start regressing the VAR model using 4 lags for annual data and then obtain the results of testing the usage of lags in order to obtain the optimal lag length, k. Here, the lag tests are done using Akaike (AIC), Hannan and Quinn (HQIC), and Schwarz's Bayesian (SBIC) information criteria are used to build a decision.[8]

Table (3): Optimal Lag Selection Results

lags	Test				
	LR	df	AIC	HQIC	SBIC
1	.	36.000	-340.539	-345.541	-341.789
2	119.33*	36.000	-360.428	-375.429*	-375.898
3	47.865	36.000	-368.405*	-373.407	-379.655*
4	37.458	36.000	-364.648	-369.65	-361.677

Notes: LR is the likelihood-ratio, AIC, HQIC and SBIC stand for Akaike, Hannan and Quinn and Schwarz's Bayesian information criteria, respectively. In the case of conflicting results, we use the results that is common between more than one type of tests.

The sample used cover the period 2006 - 2015 due to the availability of data. Since the default maximum number of lags is four for annual data as discussed above. Although the results shown in the table above are conflicting, the choice done based on AIC

[8] In cointegration analysis and causality testing, if the chosen lag is less than the true lag length, this can cause bias due to omission of relevant lags.

results as suggested by (Pesaran and Pesaran 1997). In fact, both Akaike's information criterion (AIC), and Schwarz's Bayesian information criterion (SBIC) have provided identical selection of lag 3. The likelihood-ratio (LR) and Hannan and Quinn information criterion (HQIC) lag-order selections are 2.

5.4 Cointegration Test

Since the series are stationary at the same level I(1), then it is possible to find linear combination(s) of the variables to be stationary at the zero level I (0), which means that the data are cointegrated. It is also possible to have more than one linear combination, and so more than cointegration relationship between the variables exists. Johansen and Juselius (1990) provided two likelihood ratio tests to obtain the number of cointegrated vectors, which are insignificantly different from unity.

$$\lambda_{trace}\, r = T \sum_{i=r}^{n} ln\left(1 - \hat{\lambda}_i\right) \qquad \textbf{(7)}$$

$$\lambda_{max}\,(r, r+1) = -T\; ln\left(1 - \widehat{\lambda_{r+1}}\right) \qquad \textbf{(8)}$$

Where, $\hat{\lambda}_i$ equals the estimated eigenvalue of the characteristic roots, r = 0,1,2,..,T= number of observations. The null hypothesis of the trace test is to test if the number of distinct cointegrated vectors is less or equal *r* against the alternative.

Table (4): Results of Johansen's Cointegration Test

Trend: constant		Observations = 37		
Sample: 2006q4 - 2015q4		lags = 3		
maximum rank	LL	eigenvalue	trace statistic	5% critical value
0	468.33589		72.6961	47.21
1	489.93799	0.68891	29.4919*	29.68
2	500.39737	0.43185	8.5731	15.41
3	504.22234	0.18678	0.9232	3.76
4	504.68394	0.02464		

The table above represents the results obtained from applying Johansen (1988) test (Johansen 1988) in order to test for the existence of r = 4 cointegration relationships among the five variables of the model. The test starts in general by testing for no-cointegration among the suggested variables where r = 0. If the model is rejected, then

a test for r = 1 is performed and so on until r = 4. Reduced-rank regression has been used to form a likelihood ratio test of that hypothesis on the basis of the so-called trace statistic. The results of testing for the number of cointegrating vectors are shown on the fourth column of reveal that the null hypothesis of no cointegration can be rejected at the 1% and 5% significance level, where it cannot be rejected at r= 1. These findings suggest the existence of one cointegration vector in the system of economic growth of Kingdom of Bahrain. Hence, a cointegration rank of one is imposed on the VAR and the coefficients of the long-run relationship is estimated using VECM.

6.5 Long-run relationship

On the basis of the results obtained above, restrictions have been imposed on estimating the following long run relationship:

$$GDP = \underset{(0.000)}{0.0721\ EC} + \underset{(0.0450)}{0.178\ MS} + \underset{(0.002)}{0.152\ DY} + \underset{(0.050)}{0.022ROP}$$

Following (Johansen and Juselius 1990), the normalized cointegrating equation above shows that, in the long run, there is a clear and reliable positive relationship between economic growth and energy consumption, suggest that energy consumption stimulates economic growth in the Kingdom of Bahrain. In addition, both financial market variables have positive linkage with economic growth in the long-run. However, real oil prices have very low significant impact on the economic growth in the long-run. Given the fact that our model is log-linear model, we can interpret the coefficients of the long run equation as long run elasticities. Meaning each coefficient of the variables measures the contribution of each variable to the real GDP. For instance, a 1% increase in energy consumption will result in almost 7% increase in real GDP if all other variables being not changing. By this standard, we can regard market share and dividend yield contributions as the most significant in the future economic growth followed by energy consumption while oil prices seems to have very low impact on economic growth. More clearly, a decrease of 1% in real oil prices negatively affect the level of economic growth by 2.2 %, which explains the slowdown of economic growth in Bahrain since the plunge of oil prices in June 2014. Looking at the variables that tackle the performance of the financial market, it is clear that these two variables are not only significant in the long-run relationship, but also have considerable impact on

the economic growth. In the long-run, both market share and dividend yield have positive and significant impact on the economic growth in the Kingdom of Bahrain. Precisely, an increase in the market share by 1% increases the economic growth by 17.8%, where an increase of 1% in the dividend yield will increase the economic growth by 15%.

Our next empirical analysis would therefore involve the estimation of the Vector Error Correction Model, in order to investigate the speed of adjustment for any deviation from the long run path.

6.6 VECM

The empirical investigation in this paper proceeded estimating a VECM model for the suggested set of variables to report the corresponding equation of economic growth model. Since Johansen's maximum likelihood estimation procedure is employed with one cointegrating vector, the correction term reflects the influence of deviation of the relationship among the variables from long-run and short-run economic growth equilibrium are presented below:

Table (5) Results of VECM

	Δ GDP	Std. Err.	*Probability*
constant	-0.008	0.003	0.828
Δ GDP_t-1	0.289**	1.487	0.038
Δ GDP_t-2	0.066*	1.435	0.096
Δ EC_t-1	0.079**	1.084	0.046
Δ EC_t-2	0.083	1.181	0.147
Δ MS_t-1	0.065*	0.386	0.090
Δ MS_t-2	0.066	0.407	0.105
Δ DY_t-1	0.048**	0.057	0.040
Δ DY_t-2	0.062	0.055	0.261
Δ ROP_t-1	0.065**	0.0455	0.015
Δ ROP_t-2	0.009**	0.0517	0.018
ECM_t-1	-0.045***	0.195	0.000

Statistical tests	
R ^2	0.67
Adjusted R ^2	0.55

Although the estimate coefficient of the error correction term (-0.045) is showing that the adjustment of dis-equilibrium in economic growth equation is very slow for

Bahrain, it is statistically significantly different from zero and with appropriate negative sign. This suggests the validity of the long run equilibrium relationship among the variables in the equation. In other words, it shows that 4.5% (error correction term -0.045) of the deviation of the real GDP from its long run equilibrium level is corrected each quarter. The estimated results in the ECM also show that short-run changes in most lagged variables affect the economic growth. All variables are significantly effective and have clear impact on the GDP.

6. Concluding Remarks and Policy Implications

The paper studies the relationship between oil prices and economic growth in the Kingdom of Bahrain over the period of 2006-2016. To this purpose, the study incorporate a number of effective variables to overcome the problem of omitted variables in such models. These variables are critical for both oil and financial market to allow for investigating the long run relationship among them. In fact, variables are: real GDP, CPI, real oil price, energy consumption, market share and dividend yield of the market in Bahrain. The time series of the model have been examined the in terms of stationarity, using ADF test. This was followed by applying the Johansen cointegration test and the estimation of the long run cointegrating vectors, followed by an Error Correction Model is used to examine the short run analysis. It is found that the variables of the model were characterized by a unit root at level, but, the hypothesis of non stationarity was rejected at first difference. In this study the Johansen's cointegration test is used to examine the cointegrating relationship between the real GDP, oil price, energy consumption, market share and dividend yield of the country, while inflation was ineffective and thus removed from the cointegration equation. According to tables 4, both the maximum eigenvalue tests and the trace tests indicate that there is one cointegrating equation at 5% significant level among the real GDP, real oil price, energy consumption, market share and dividend yield in the sample.

Since the long-run cointegrating relation is found among the variables, the long run vector coefficients indicate that 1% increase in the level of international oil prices causes the level of RGDP of Bahrain to increase by 2.2%. At the same time, increasing energy consumption by 1% affect the economic growth positively with around 7.2% growth in the real GDP of Bahrain. On the other hand, both market shares and dividend

yields are not only significant in the long-run relationship, but also have considerable impact on the economic growth. In the long-run, both market share and dividend yield have positive and significant impact on the economic growth in the Kingdom of Bahrain. Precisely, an increase in the market share by 1% increases the economic growth by 17.8%, where an increase of 1% in the dividend yield will increase the economic growth by 15%. These results reveal that the real GDP of Bahrain is elastic to changes in both oil and non-oil sectors (elastic). The estimated coefficients for the error correction terms is - 0.045, suggesting that suggests that the Bahrain economy 4.5% movement back towards equilibrium following a back towards long run equilibrium, after the shock of oil price. Finally, Bahrain should depend on policies that focus not only on the energy market, but also non-oil market, especially that the long run analysis shows that non- oil sector has more impact on economic growth of Bahrain in the long-run.

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