

The Reform in Government Expenditure and the Standard of Living in Bahrain

Author 1* Fatema Alaali
American University of Bahrain
fatema.alaali@aubh.edu.bh

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Abstract

The drop of oil prices since the second half of 2014 have affected the credit risk and liquidity situation in Bahrain. Therefore, Bahrain have implemented substantial economic diversification in the economic structure including manufacturing, refining, tourism, trade and finance. With the recognition of the importance of governments expenditure restructuring, Bahrain government introduced number of initiatives such as streamlining government expenditure, increasing revenues, and redirecting government subsidies towards eligible citizens. Understanding the relationship between revenues, government spending and economic growth is an essential perception in evaluating the efficiency of government's strategy in managing its resources and the impact on the standard of living in any country. This study examines the relationship between total government expenditure as well as sectoral government spending (specifically education and health sectors), oil revenues and the economic growth of Bahrain using time series data over the period 1989-2015. To achieve this aim, the vector error correction model (VECM) is employed. In order to ensure the sustainability of resources and maintain economic growth, Bahrain should continue managing its expenditure, by cutting down expenses on certain sectors through privatization, and increasing spending on health and education sectors

Objective(s)

There were many trials since the seventies of the 20th century to shift the economy from oil sector to non-oil sectors such as manufacturing, finance and tourism. With all of the attempts to achieve economic diversification, oil sector remains the highest contributor to Bahrain GDP. Since the drop in oil prices at the end of 2014, Bahrain is facing the largest budget deficit among the rest of the GCC countries. Number of initiatives were introduced between the years 2015 and 2017 managed to reduce the budget deficit from -13% to -10.1% of GDP over the same period.¹ The initiatives taken over this period includes i) decreasing operational expenditure, ii) establishing optional retirement program for the public sector employees, iii) Balancing the water and electricity revenues and expenditure, iv) assigning cash subsidies to the needy citizens, v) boosting the effectiveness of government spending, and vi) increasing non-oil revenues.

As an attempt to investigate the long and short run impacts of the oil revenues and government expenditure on the economic growth of Bahrain, this study employs yearly data for oil and gas

¹ Fiscal Balance Program document https://www.mofne.gov.bh/fbp_en.pdf

revenues, total government expenditure and GDP growth and estimates the relationship between them using vector error correction model (VECM).

Methodology

In order to achieve the objective of this study, annual Gross Domestic Product of Bahrain (GDP) at constant prices is obtained from the World Bank Data and used as a measure for economic growth. Oil & Gas Revenues (Rev), Total Expenditure (Exp), Ministry of Health Expenditure (H-Exp) and Ministry of Education Expenditure (E-Exp) are obtained from the Ministry of Finance. The time period of the study is from 1989 to 2015. All the variables have been transformed using natural logarithm transformation. Table 1 presents the descriptive statistics of all the variables.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
GDP	6844.221	2546.688	3202.183	11572.71
Rev	1.085	0.844	0.242	2.662
Exp	1.451	1.002	0.496	3.545
H-Exp	0.107	0.073	0.035	0.263
E-Exp	0.147	0.087	0.058	0.327

Notes: GDP is the Gross Domestic Product, Rev is the Oil & Gas Revenue, Exp is the Total Expenditure, H-Exp is the Ministry of Health Expenditure and E-Exp is the Ministry of Education Expenditure. All the data are in millions of Bahraini Dinars.

The basic procedure for testing the variables includes three steps. The first step is to test the stationarity of the variables and examine their integration level. In order to do so, the Augmented Dickey and Fuller (Dickey & Fuller, 1979) ADF test, Phillips and Perron (Phillips & Perron, 1988) - PP and Kwiatkowski et al. (Kwiatkowski et al., 1992) - KPSS are employed.

After checking the stationarity of all the series and getting all the variables to be integrated of the same order, the second step is to investigate the presence of long run relationship between all the variables in each Model. To determine this relationship, Johansen Cointegration Test is used (Johansen & Juselius, 1990 and Johansen, 1991)

Finally, when getting all the variables to be integrated of order one, I(1) and cointegrated (joint movement in the long run), the short and long run relationships between Economic Growth, Revenues and Government Expenditure can be estimated. This can be done using the Vector Error Correction Model (VECM) that was developed by Engle & Yoo (1987). The VECM is used to allow for short-run adjustment dynamics and show the speed of this adjustment to the long-run equilibrium. In a VECM it does not matter if some of the variables are endogenous, because no contemporaneous terms appear in the equation

Model 1 is used to estimate the long and short run relationship between Bahrain economic growth, oil and gas revenues and total government expenditure.

Model 1:

$$\Delta \ln GDP_t = \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln Rev_{t-1} + \alpha_4 \ln Exp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} + \sum_{i=1}^2 \beta_{2i} \Delta \ln Rev_{t-1} + \sum_{i=1}^2 \beta_{3i} \Delta \ln Exp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \quad (1)$$

where Δ represents the first difference, $\ln GDP$ is the natural logarithm of gross domestic product, $\ln Rev$ is the natural logarithm of oil and gas revenues, $\ln Exp$ is the natural logarithm of total expenditure and ECT is the error correction term.

To examine the relationship between sectoral government expenditure and economic growth, Model 2 estimates the long and short relationships between economic growth and ministry of health expenditure.

Model 2:

$$\Delta \ln GDP_t = \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln HExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} + \sum_{i=1}^2 \beta_{3i} \Delta \ln HExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \quad (2)$$

where $\ln HExp$ is the natural logarithm of ministry of health expenditure.

Model 3 examines the short and long run relationship between Bahrain economic growth and ministry of education appending.

Model 3:

$$\Delta \ln GDP_t = \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln EExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} + \sum_{i=1}^2 \beta_{3i} \Delta \ln EExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \quad (3)$$

where $\ln EExp$ is the natural logarithm of ministry of education expenditure and ECT is the error correction term. The Akaike Information Criteria (AIC) is used to select the appropriate lag length.

Results/Findings

Model 1 Estimation Results:

Table 2 presents the results of estimating Eq. (1) using VECM approach. The results show that oil and gas revenues have a significant positive impact on the economic growth of Bahrain whereas the government expenditure has a significant negative impact on Bahrain economic growth. The error correction term is negative and significant.

Table 2: VECM Results – Model 1

Long-run relationship			
$\ln GDP$	1		
$\ln Rev$	0.844*** (0.104)		
$\ln Exp$	-0.544*** (0.135)		
constant	-16.931*** (0.869)		
Short-run relationships	$\Delta \ln GDP$	$\Delta \ln Rev$	$\Delta \ln Exp$
$\Delta \ln GDP_{t-1}$	0.261 (0.195)	2.590 (1.93)	0.2663 (0.587)
$\Delta \ln Rev_{t-1}$	-0.070** (0.028)	-0.032 (0.280)	-0.126 (0.085)
$\Delta \ln Exp_{t-1}$	0.085 (0.082)	0.566 (0.812)	0.099 (0.247)
ECT	-0.116*** (0.041)	0.478 (0.403)	-0.210* (0.122)

Notes: $\ln GDP$ is the natural logarithm of Gross Domestic Product, $\ln Rev$ is the natural logarithm of Oil & Gas Revenue, $\ln Exp$ is the natural logarithm of Total Expenditure and ECT is the error correction term. numbers between brackets are std. errors. *, **, *** present 10%, 5% and 1% level of significance, respectively.

Model 2 Estimation Results:

Table 3 reports the results of estimating Eq. (3) using the VECM approach. The results show that government expenditure on health has a long run positive impact on economic growth that is significant at 10% level of significance.

Table 3: VECM Results – Model 2

Long-run relationship		
$\ln GDP$	1	
$\ln H-Exp$	0.365*	
	(0.199)	
constant	17.229***	
	(3.627)	
Short-run relationships		
	$\Delta \ln GDP$	$\Delta \ln H - Exp$
ECT	-0.037***	-0.053 ***
	(0.003)	(0.009)

Notes: $\ln GDP$ is the natural logarithm of Gross Domestic Product, $\ln H-Exp$ is the natural logarithm of Ministry of Health Expenditure and ECT is the error correction term. numbers between brackets are std. errors. *, **, *** present 10%, 5% and 1% level of significance, respectively.

Model 3 Estimation Results:

Eq. (3) estimation results are presented in Table 4. The results indicate that government spending on education has a positive and highly significant impact on Bahrain economic growth.

Table 4: VECM Results – Model 3

Long-run relationship		
$\ln GDP$	1	
$\ln E-Exp$	0.576***	
	(0.0519)	
constant	11.71	
Short-run relationships		
	$\Delta \ln GDP$	$\Delta \ln E - Exp$
ECT	-0.117***	0.169
	(0.051)	(0.107)

Notes: $\ln GDP$ is the natural logarithm of Gross Domestic Product, $\ln E-Exp$ is the natural logarithm of Ministry of Education Expenditure and ECT is the error correction term. numbers between brackets are std. errors. *, **, *** present 10%, 5% and 1% level of significance, respectively.

Implications

The results imply that for Bahrain to maintain long run economic growth, there should be a strategic plan to invest in its human capital through raising the quality and quantity of education. This will lead to productivity growth through education's impact on innovation and creativity as well as the adaptation to any changes in economic situations. High quality education will allow people to participate actively in their societies. Moreover, an individual with a better health will enjoy more of productive years. So, one of Bahrain's channels to achieve sustainable economic growth is through redistributing its government expenditure to fulfill the requirements of education and health sectors.

References

- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(366a), 427-431.
- Engle, R. F., & Yoo, B. S. (1987). Forecasting and testing in co-integrated systems. *Journal of econometrics*, 35(1), 143-159.
- Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of econometrics*, 39(1-2), 199-211.
- Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?. *Journal of econometrics*, 54(1-3), 159-178.
- Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: journal of the Econometric Society*, 1551-1580.
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2), 169-210.
- Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346.