IMPACT OF FLUCTUATIONS IN CRUDE OIL PRICES ON THE JORDANIAN PUBLIC BUDGET FOR THE PERIOD OF 1995-2013

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Abstract

This study aimed to identify the impact of fluctuations in crude oil prices on the Jordanian public budget for the period of 1995 to 2013. To achieve the objective of the study, the researcher used an econometric model of linear regression. This shows the relationship between the study variables using Variance Auto Regressive (VAR) method. To estimate the parameters, ordinary least squares (OLS) method was used. The results of the study showed that there is a statistically significant impact of crude oil prices on the Jordanian public budget deficit. This means that an increase in crude oil prices would result to an increase in Jordanian public budget deficit. The study recommended that crude oil and natural gas sector should grant special status through the development plan implemented. They should bring financial resources and human expertise and modern technology, whether from domestic or foreign sources. Also, they should expand in awarding contracts to foreign companies while maintaining the national rights on economic grounds. The technical and economic problems facing the crude oil sector should be treated. Finally, the latest technology available to increase its contribution to the GDP should be employed.

Introduction

Crude oil is an essential element in all processes and for various economic activities due to the significant role it plays in the operation of machinery and equipment. However, it helps to convert raw production materials to output in meeting different needs. In the economic sectors, petroleum products are used for its activities and operations or to transfer its output from manufacturers to market places. Thus, the market place might either be a local or a global place. Moreover, the courtiers and their

governments need oil or its products to provide local market to serve the citizens and meet their individual needs and investment. Consequently, as a result of economic transformation, policy, and the liberalization of the exchange rate and interests, there is an obsession that governments possess to use oil and oil products within the production processes. Here, there are fluctuations in oil prices resulting from inflation and high cost of extraction. Therefore, this contributes to increasing the risk of such Governments, since the Government of Jordan uses crude oil directly or indirectly for economic activities. Furthermore, the fluctuations in oil prices have a direct or indirect impact on the public's budget of the Government for preparation in terms of expenses resulting from the Government and due to the increased risks.

The Study Problem
Crude oil and its products is one of the basic inputs of all industrial and service companies operating in Jordan. Thus, as a result of daily fluctuations in oil prices, it has become necessary to identify the impact of such fluctuations on the income and expenditure of those companies in Jordan. The researcher will take the public sector as a case study. Subsequently, it is limited to the problem of the study in identifying whether uncertainty about the future direction of prices of petroleum products impact the Jordanian public budget, and its influence on the revenues and expenses of the Jordanian public budget.

The Study Importance.
1- Finding appropriate solutions to reduce the negative impact of crude oil prices fluctuation of the Jordanian public budget.
2- Supporting the Jordanian Library with specialized research in the field of crude oil and its products.
3- Open new horizons for researchers regarding these researches, as well as the use of applied research method on other sectors of the Jordanian economy.

The Study Objectives and Study Hypothesis
The objective of the study is summarized as identifying the impact of fluctuations in crude oil prices of the Jordanian public budget.
However, to achieve the study objectives, the researcher suggested one main hypothesis with two sub-hypotheses as follows:

Main Hypothesis
The fluctuation in crude oil prices has a positive impact on Jordanian public budget.

Two Sub-hypotheses

1- The fluctuation in crude oil prices has a positive impact on the revenues of Jordanian public budget.

2- The fluctuation in crude oil prices has a positive impact on the expenditures of Jordanian public budget.

Literature Review

- The Study of Hassan and Zaman (2013) entitled: "Effect of oil prices on trade balance: new insights into the cointegration relationship from Pakistan", investigated the impact of rising oil prices on the trade balance of Pakistan using ARDL approach. Furthermore, it also explored the causality direction between trade balance and oil price shocks in the context of Pakistan over a period of 1975 to 2010. The result shows that there is a negative significant relationship among oil prices, exchange rate, and trade balance in Pakistan, i.e., if there is a 1% increase in oil prices and exchange rate, the trade balance decreases by 0.382% and 0.342% respectively. This infers that oil prices and exchange rate induces trade imbalance in Pakistan. In addition, there is a positive relationship between output gap and trade balance. Therefore, this infers inefficient resource allocation and utilization in the production process. In the short run, there is a positive relationship among exchange rate, output gap, and trade balance in Pakistan. Thus, this shows that an increase in oil prices increases the net income flow in terms of huge cost payments for imports. In addition, it also increases the trade deficit in an economy. The result of Granger causality indicates that there is a unidirectional causality running from oil prices to trade imbalance.

- The Study of Le and Chang (2013) entitled: "Oil price shocks and trade imbalances", examined whether a large part of the variability of trade balances and their oil and non-oil components is associated with oil price fluctuations. Thus, this study gave the following conclusions: Firstly, oil exporters' improvements in trade balances seem to be associated with the rising oil revenues. Secondly, for an oil refinery economy like Singapore, oil price shocks seem to have negligible long-run impact on trade balances and their oil and non-oil components. Therefore, it may have a significant impact in the short run. Thirdly, for net oil importers, the impact of rising global oil prices on oil trade deficit depends on the unique nature of the demand for oil. If the economy is highly dependent on oil but has no ability to produce, its oil demand would be very inelastic. For net oil importing and major oil consumption, economies associated with high oil dependency like Japan, rising oil prices seem to heavily dampen the oil trade deficit which is likely to result in the overall trade deficit. However, the short run impact on the non-oil trade balance could be positive. This may eventually translate to a

favourable effect on the overall trade balance, if the shock of the oil price rise in the economy stems from the demand side.

- The Study of Kheireddine (2008) entitled: "The impact of oil price fluctuations on inflation and trade balance in Jordan", aimed to identify the impact of fluctuating oil prices on both inflation and trade balance of Jordan. Here, the researcher uses qualitative and quantitative analysis to study how variables influence the fluctuation of these prices on Jordanian trade deficit. Additionally, the researcher predicted the relationship between inflation rate and oil prices. Thus, the researcher found that the rate of inflation in Jordan is linked to the change in world crude oil prices. The researcher also found that the trade balance reacts to changes in crude oil prices. Furthermore, the study recommended that monetary policy makers must take into account the future impact of the current prices of crude oil during the formulation of monetary policy. However, measures should be taken to ease Jordan's crude oil import.

- The Study of Youngho and Thai-Ha (2011) entitled:" The impact of oil price fluctuations on stock markets in developed and emerging economies", examined the impact of stock market fluctuations in oil prices in both Japan and Malaysia through a monthly data analysis of financial markets for the period of 1986 to 2011. However, the results indicated that the stock market's reaction to the oil price shocks in the market, varies greatly from country to country. It has a positive impact on the fluctuation prices for crude oil on the Japanese stock market. In addition, it also has a negative impact on the stock market in Malaysia. Thus, the slowing stock market responds to shocks by increasing stock prices.

-The Study of James Jackson (2011) entitled:"The impact of crude oil prices on the U.S.A. trade deficit", shows that crude oil prices increased sharply between September 2011 and August 2012. Sometimes, crude oil increases up to more than $ 109 per barrel. Although this is still less than $ 140 per barrel, which is the price reached in 2008. Consequently, increasing energy costs was one of the factors that have helped to curb the rate of growth in the economy during the second half of 2011 and the first half of 2012. Thus, the overall market demand for crude oil is still highly resistant to changes in crude oil prices which reflect the unique nature of the demand for oil. In addition to that, demand for oil in the face of rising prices kept increasing. Thus, this reflects the increase in economic activity after the worst part of the recession in 2009. Furthermore, James Jackson noted that the impact of increasing energy import prices in 2011 and increasing energy prices for consumers, as well as some elements of the public pressure on Congress provides relief to families that are struggling to cover current expenses. Therefore, this provides an estimate of the initial impact of

fluctuations in crude oil prices on the nation's and on trade deficit, and also an increase in government spending.

- The Study of Ahmed Al-Hitti and Bakhtiyar Mohammed (2011) entitled: "The Impact of Oil Revenues Fluctuations on Macroeconomic Indicators and Financial Markets Performance of Arab-Gulf Countries."

A case study of Arab-Gulf countries is important for the analysis of the relationship between crude oil price fluctuations and the functioning of financial markets and the necessary directions of depth analysis theory. Thus, the study is aimed at building pathways between low markets and theoretical reflection of crude oil fluctuations in financial market indicators. This assumes a positive relationship between fluctuations in crude oil markets and financial markets. The study included two frames: theoretical framework which includes the theory of economic fluctuations, and crude oil markets and their relationship with the financial markets. Furthermore, the study also included a practical framework, which entails the analysis of the relationship between crude oil price fluctuations and the relationship with financial markets performance indicators for the Arab Gulf States. The study recommended action to treat the constraints faced by financial markets as a lack of awareness of customers and inefficient management of institutions. Also, they recommended the need to examine the impact of fiscal and monetary policy affecting the performance of the financial market.

- The Study of Alhusaree (2010) entitled: "The impact of the budget deficit on interest rate in Jordan", aim to know the impact of Jordan's budget deficit during the period of 1996 to 2008 on the interest rate of Jordan. This study concluded that the impact of crowding out government as a borrower on the domestic market and the existence of a relationship is directly proportional to the public budget deficit and the interest rates. Thus, this leads to higher interest rates and the reluctance of the private sector to borrow money from commercial banks. As a result, it brings about a reduction in investment spending, while consumer spending increases due to the increase in GDP. Consequently, it also contributes to the rise in the interest rate and the study concluded that the efficiency of the Government remained low. Thus, this place a burden on the public budget, citizens, and investors alike. The study also showed that the interest rates in Jordanian economy are characterized to be inelastic because of the high levels of liquidity from global ratio, and the big size of reserves in banks.

- The Study of Al-Sous and Al-Halabi (2011) entitled: "The fiscal deficit and its impact on the Jordanian economy", aimed to identify the side of the public budget and reach a value of disability. However, this involves the analysis of the study data for the period of 1977 to 2006. The

result was to accept the hypothesis that the deficits have a significant impact on the Jordanian economy.

Jordanian Public Budget
The Concept of Public Deficit

The budget deficit is a common economic phenomenon which occurs generally at the level of different countries. Thus, budget deficit happens when government expenditures increases on revenues.

Financial thought scientists knew that the budget deficit is the inadequacy of estimated public revenue for the country to pay the estimated public expenditures (Tareq hzrshi, Baaz Alameen (2011)).

Jordanian Energy

Jordan relies entirely on imported crude oil and petroleum products to meet the needs of the energy required for economic and social growth. As a result, the government strives to reduce the country's dependence on imported energy. Hence, the search for new sources to tap into domestic energy sources includes:

1- Crude oil and natural gas.
2- Oil shale.
3- Renewable energy.

Furthermore, the Jordanian economy is suffering from the increasing cost of importing oil from abroad. Hence, this is where Jordan poor oil resources "The Hamza Field" in addition to "Risha," covers only 4% of annual energy consumption.

Jordanian Public Budget Deficit

As shown in table (1), the Jordanian public budget saw a deficit which is almost chronic during the past nineteen years, except the years 2002-2005 with external assistance. However, even without assistance, the public budget deficit is chronic, and the total public budget deficit is 79.3 million dinars in the year 1995. This increased to 188.4 million dinars in 2001, which grew at a rate of 27.3% annually during the period. Also, it then increased to 237.8% in the year 2008, which means an average growth of 3.4% only for the period of 2001 to 2008. Then, it increased to 2168.5 million JD in the year 2013 with foreign assistance. Thus, the total deficit has grown at a rate of 49.2% annually. In contrast, the total public revenues grew from 1571.9 million JD in the year 1995 to 1885.4 in the year 2001, and to 5093.7 million JD in the year 2008. Therefore, this means that there is a growth rate of 7.5% and 14.1% annually during the two periods of 1995-2001 and 2001-2008, respectively. In contrast, total public expenditure grew from 1651.2 million JD in the year 1995 to 2112.4 million JD in the year 2001; and then to 5431.9 million JD in the year 2008. Thus, this gives a

growth rate of 8.3% and 13.5% annually for the two periods (1995-2001and 2001-2008, respectively). However, the expansion deficit gap in that period increased energy consumption, and the fluctuations in crude oil prices affects public budget. Thus, this is illustrated in table (1).

Table No. (1)
Jordanian public budget for the period of 1995 to 2013 (in Million JD)

Years	Domestic revenues to the Central Government	The total revenues of the Central Government with assistance	The total expenditures of the Central Government	The actual deficit For the public budget with assistance	*Europe Brent Spot Price FOB (Dollars per Barrel)
1995	1389.1	1571.9	1651.2	-79.3	17.02
1996	1430.1	1677.1	1725.7	48.6-	20.64
1997	1395	1574.9	1812.2	-237.3	19.11
1998	1496.5	1699.5	2010.1	-310.6	12.76
1999	1585.3	1783.8	1942.1	-93.6	17.9
2000	1560.7	1804.7	2102.7	-209.9	28.66
2001	1638.1	1885.1	2112.4	188.4-	24.46
2002	2136	3537.5	2343	1231.8	24.99
2003	2600.1	3964.5	3461.4	658.1	28.85
2004	3153.2	4326.2	3895.8	546	38.26
2005	3825.9	4938.1	3478.9	1572.6	54.57
2006	3164.4	3469	3800.4	46.1-	65.16
2007	3628.1	3971.5	4540.3	578.3-	72.44
2008	4375.4	5093.7	5431.9	237.8-	96.94
2009	4187.8	4521	6030.5	1472.48-	61.74
2010	4261.1	4662.8	5708	981.4-	79.61
2011	4198.9	5413.9	6796.6	1283.8-	111.26
2012	4727.3	5054.4	6862.1	1734.81-	111.63
2013	5119.1	5758.2	7926.7	2168.5-	108.56

Resources:
-http://www.mof.gov.jo (The Ministry of Finance)
-http://web.dos.gov.jo (Department of Statistics)
-http://www.cbj.gov.jo (The Central Bank of Jordan)
-Independent Statistics and Analysis U.S. Energy Information Administration (E.I.A)*.

As shown in table (1), the Jordanian public budget saw a deficit which is almost chronic during the past nineteen years, except for the years 2002-2005. Thus, with or without external assistance, the public budget deficit is chronic, and the total public budget deficit is 79.3 million dinars in the year 1995. However, it increased to 188.4 million dinars in 2001, where it grew at a rate of 27.3 % annually during the period. Consequently, it then increased to 237.8 in the year 2008, which gives an average growth of 3.4%

for only the period of 2001-2008. It then increased to 2168.5 million JD in the year 2013 with foreign assistance. Therefore, the total deficit has grown at a rate of 49.2% annually. In contrast, total public revenues grew from 1571.9 million JD in the year 1995 to 1885.4 in the year 2001. Furthermore, it grew to 5093.7 million JD in the year 2008, which means a growth rate of 7.5% and 14.1% annually during the two periods of 1995-2001 and 2001-2008, respectively. In contrast, total public expenditure grew from 1651.2 million JD in the year 1995 to 2112.4 million JD in the year 2001; and then to 5431.9 million JD in the year 2008. Thus, this gives a growth rate (8.3% and 13.5%) annually for the two periods (1995-2001 and 2001-2008, respectively). Therefore, this results to an expansion deficit gap during that period. Subsequently, the overall revenue increased from 5093.7 million JD in the year 2008, to 5758.2 million JD in the year 2013, at the growth rate of 3.6%. In contrast, public expenditure increased from 5431.9 million JD in the year 2008, to 7926.7 million JD in the year 2013, at a rate of 7.4% for the same comparison period.

Empirical Study
Data
   For the purpose of estimation and analysis of the econometric model of the data for variables that are described in the regression equations for the period (1995-2013), the researchers rely on secondary sources of data collection such as books, periodicals, theses, and websites.

Estimation and Analysis of the Econometric Model
   To measure the impact of fluctuations in crude oil prices on the Jordanian public budget for the period (1995-2013), the researcher used an econometric model as follows:

$$D_i = \gamma_0 + \gamma_1 X_i + \varepsilon_i \qquad \text{....... (1)}$$

   Where:

D_i: The public budget deficit, or public revenues, or public expenditures.

X_i: Crude oil prices.

ε_i: Random error term.

γ_0: constant.

γ_1: coefficient.

   To analyze the econometric model shown in the model (1), the researcher used Variance Autoregressive (VAR) method. Also, to estimate the parameters of the econometric model previously, the researcher used the ordinary least squares (OLS) method for this purpose. Consequently, to verify the validity of the econometric model, we should use an econometric and statistics tests before estimating the model parameters, as follows:

Unit Root Test of Stationary

The test makes use of Augment Dickey and Fuller (ADF) method. Hence, this test can be illustrated through the following model (relationship):

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum \lambda \Delta Y_{t-1} + \varepsilon_t \qquad \text{...... (2)}$$

Where:

Δ: The first difference.

With the adoption of time-series data for the period (2013-1995), the results of Augment Dickey - Fuller (ADF) test were obtained in the Level and First Difference for the variables of the study (D, D_{REV}, D_{EXP}, and X). Thus, this is illustrated in table (2) below.

Table (2)

Test results of Augment Dickey-fuller (ADF) at Level and the First Difference for the variables of the study (X, D)

Variables		Level			First Difference		
		Without Intercept and trend	Intercept and trend	Intercept	Without Intercept and trend	Intercept and trend	Intercept
D		-1.88	-1.50	-1.41	-3.99***	-4.66***	-3.54***
D_{REV}		-1.92	-1.67	-1.64	-3.56***	-4.52***	-4.05***
D_{EXP}		-1.85	-2.67	-1.51	-3.01***	-4.15***	-4.45***
X		-0.99	-1.99	-2.25	-3.45***	-4.47***	-4.87***
Critical values	1%	-2.84	-4.14	-3.98	-2.84	-4.14	-3.98
	5%	-1.97	-3.68	-3.28	-3.68	-3.28	5%

(***) indicates that the results test are significant at 1% level.

It was illustrated from the results given in table (2), that the study variables (D, D_{REV}, D_{EXP}, and X) is non-stationary at the various levels. However, at all significant levels, they become stationary variables, when taking the first difference. Thus, this gives the possibility of using the Variance Autoregressive (VAR) method in the study.

Co-integration Test

To verify the existence of equilibrium and at least one long run relationship between time-series data, the methodology of Johansen and Juselius cointegration (JJ) was used. Thus, this is one of the most common tests employed in modern economic studies.

Table (3) shows the JJ co-integration test results:

Table (3)
Johansen and Juselius (JJ) test results for co-integration

Null hypothesis	Eigen Value	Likelihood Ratio	Critical values (CV)	
			1%	5%
R = 0	0.95	96.17***	74.15	66.24
R ≤ 1	0.77	59.89***	39.55	45.14
R ≤ 2	0.46	14.71	21.84	35.65
R ≤ 3	0.35	4.14	10.14	12.65

It was illustrated from the results given in table (3), that there is long run bidirectional between the variables. Therefore, this means that the co-integration is a second degree I (2), and the Likelihood Ratio supports this value which is greater than the critical values at significant level. However, the two null hypothesis will be rejected (R = 0, R ≤ 1). This means that there is Long-Run equilibrium relationship.

Causality Test

Causality test is used to determine the type of causal relationship between the variables. Therefore, it is usually in a one-way or two-way direction. Also, there is no causal relationship between the study variables. For this purpose, Sims Test has been used which depends on (F) statistics test.

Table (4) shows the Sims Test results for causality between crude oil price fluctuations (X), the Jordanian revenue D_{REV}, expenditure D_{EXP}, and the public budget deficit (D).

Table (4)
Sims Test Results for Causality

The function form	The relationship Direction	R^2 Unrestricted	R^2 Restricted	$F_{cal.}$
D= f(X)	X→D	0.90	0.88	20.16*
X= f(D)	D→X	0.70	0.54	1.25
D_{REV} =f(X)	X→D	0.86	0.64	22.32*
X= f(D_{REV})	D→X	0.80	0.61	2.41
D_{EXP}=f(X)	X→D	0.87	0.65	24.54*
X= f(D_{REV})	D→X	0.79	0.60	1.85

It was illustrated from the results in table (4) that the direction of causality is from crude oil prices (X) to all three Jordanian public budgets. Hence, this means that a causal relationship between the variables is in a

one-way direction that confirms that the values (F) calculated in both cases are significant at 5% significant level.

The Results Estimation

After verification of the three tests (Unit Root Test of Stationary, Co-integration Test, and Causality Test), it became possible to apply the ordinary least squares (OLS) method to estimate the parameters of the econometric model of the study shown in the model (1).

Table (5) shows the estimation results of the study model parameters as follows:

Table (5)
The estimation results of the study model parameters using (OLS) method

Variables	D	t-test	Sig.
Constant (γ_0)	3608.554	1.811	0.144
X	1.049	20.938	0.000
F	35.214	-	0.000
D.W.	2.01	-	-

It was illustrated from the results in table (5) as follow:

1- Validity and significant of the model. Thus, this is supported by the (F) calculated value (35.214), as well as the value of the statistical significance (0.000) which is less than the significant level (5%). This means that we can measure the impact of fluctuating crude oil prices on the Jordanian budget deficit on one hand, and it is possible to adopt this model for predicting the Jordanian public budget deficit on the other hand.

2- Invariance of the significant regression coefficient (γ_1) for crude oil prices, which is supported by (0.000) statistical significance value (Sig.) is less than the significant level (5%). This means that there is a statistically significant impact of fluctuations in crude oil prices on the public budget deficit in Jordan.

Results and Recommendations
Results

The results of estimation and analysis of the econometric model for the study are as follows:

1- The decrease in crude oil prices will expose public revenues to decline. Thus, this will increase the public budget deficit, and bring the unexpected return of the world's crude oil prices to previous high levels.

2- Increasing crude oil prices rates will lead to increased rates of public expenditure, which will increase the Jordanian public budget deficit.

3- The study variables (D, D_{REV}, D_{EXP}, and X) are stationary when taking the first difference (I (1)), at 1% significant level.

4- There are two long run Co-integration between the variables, which implies that the Co-integration is a second degree (I(2)). Also, this means there is a Long-Run equilibrium relationship.

5- The one way direction of causality is from the fluctuations in crude oil prices to the fluctuations in public budget deficit, which are usually in the same direction.

6- There is a statistically significant impact of crude oil prices on the Jordanian public budget deficit. However, this means that increasing crude oil prices would contribute to an increase in Jordanian public budget deficit.

7- The applicability of the econometric model of the study that verified its suitability for the purposes of forecasting the public budget deficit is caused by increasing crude oil prices in Jordan.

Recommendations

From the results of the study, some recommendations have been suggested which includes the following:

1- Grant special status for the crude oil and natural gas sector through the implementation of a time-bound plan. Financial resources and human expertise and modern technology should be provided, whether from domestic or foreign sources. In addition, there should be an expansion in awarding contracts to foreign companies while maintaining the national rights on an economic ground.

2- Treating technical and economic problems facing the crude oil sector, and offering the latest available technology to increase its contribution to the GDP.

3- Establishing effective banking device; take a course to avoid the crisis; increasing crude oil prices; and encourage the facilitation of foreign capital movement.

Acknowledgement

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