Interaction between Sharp Rise in Oil Prices and Economic Growth of Pakistan

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ABSTRACT
The oil is one of the most important factors which affect the economy of the world that’s why any variation in the oil prices brings a rapid change in all others macro-economic variables. This paper aims to determine the impact of high oil prices on economic growth of Pakistan. For this purpose a secondary data has been collected for the years from 1971 to 2013 of various reports of World Bank, Hydrocarbon Development Institute of Pakistan Reports and different websites etc. A linear regression model is applied to test the impact of independent variables (Oil Demand, Oil Supply, Oil Price, Public Sector Investment, Private Sector Investment and Trade Balance) on dependent variable (GDP Growth Rate). All variables are found non-stationary through applying ADF unit root test. It has been found that all independent variables excluding trade balance have significant impact on economic growth of Pakistan. It is suggested that Government should make proper plan for the equilibrium of oil demand and oil supply, also encourage private sector investment to give boost to its economic growth.

Keywords: Oil Prices, Private Sector Investment, Oil Consumption, Economic Growth

JEL Classification: C32, E24, Q43

INTRODUCTION
Increase in fuel prices has a serious impact on major economic variables like inflation rate, exchange rate, poverty, unemployment. The Estimation of increase in oil prices depends upon four main factors (i) oil price share in overall GDP (ii) fulfillment of requirements for oil import (iii) country own oil production (iv) public or private investment in oil sector. In Pakistan, almost the industrial sector is affected by increasing in oil prices. A sharp increase in population is a big barrier in fulfillment of oil market demand through indigenous sources. It is the reason; country needs to import oil from different oil producing countries on very high prices. On the other hand, a rapid increase in oil prices has also a positive effect on world economic growth. Sharp changes in international oil prices during last fifteen years have a strong effect on developing countries. Now days, oil is not only using a power source of transport sector. It is also becoming a big source of energy producing element for all developing economies. Pakistan total oil resource potential is 27 million barrels with production of 66032 barrels per day almost thirteen companies are involved in crude oil production. In Pakistan the oil prices are controlled by Oil and Gas Regulatory Authority (OGRA). There are different companies which providing petroleum services to the country and obtaining profit.

Relationship between Oil Prices and Economic Growth in Pakistan
After a period of drooping growth in last few years Pakistan economy has started increase in its economic growth for current fiscal year 2013-14. This increase has come through a significant or positive development in industrial, agriculture sector of the economy. Government is focusing to enhance the productivity by increasing credit from 380 billion which was 336 billion in last year only. The GDP growth rate has been accelerated to 4.14 percent in 2013-14 against the growth of 3.70 recorded in the same period in last year (Economic Survey of Pakistan, 2013-12).
Continuously increase in world economic growth is also a source of higher oil demand in the world which becomes a reason of high oil prices from 2003 the GDP of the world going extended continuously, which increase the per barrel price almost 25$ to 40$. Usually oil trade globally or its price paid in US $ fluctuation in US dollar value, effects oil price globally.

**Fuel Consumption by Sector in Pakistan**

In Pakistan, sector wise fuel consumption was estimated for the year 2012-13 shown in the Figure No. 1, describes the domestic consumption found 25.20%, Commercial 4.10%, Industrial 35.50%, transport 31.60%, Agriculture 1.60% while other includes government has 2.0%.

**Figure No. 2 Fuel Consumption by Sector (2012-13)**

Source: Hydrocarbon Development Institute of Pakistan

**Table No.1 Energy Consumption by Sector**

<table>
<thead>
<tr>
<th>Sector</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>ACGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>8,046,294</td>
<td>8,092,132</td>
<td>8,360,016</td>
<td>8,724,790</td>
<td>9,360,514</td>
<td>10,119,014</td>
<td>4.70%</td>
</tr>
<tr>
<td>Commercial</td>
<td>1,455,527</td>
<td>1,459,817</td>
<td>1,530,154</td>
<td>1,521,171</td>
<td>1,585,498</td>
<td>1,644,845</td>
<td>2.50%</td>
</tr>
<tr>
<td>Industrial</td>
<td>16,804,30</td>
<td>14,845,67</td>
<td>15,604,87</td>
<td>14,956,78</td>
<td>15,034,11</td>
<td>14,256,09</td>
<td>-3.20%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>803,837</td>
<td>789,008</td>
<td>849,595</td>
<td>772,930</td>
<td>720,393</td>
<td>659,986</td>
<td>-3.90%</td>
</tr>
</tbody>
</table>

Source: Hydrocarbon Development Institute of Pakistan
Transport & Other Consumption of Fuel

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>11,567,39</td>
<td>11,371,86</td>
<td>11,654,83</td>
<td>12,019,25</td>
<td>12,562,44</td>
<td>12,713,30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>735,712</td>
<td>786,045</td>
<td>768,531</td>
<td>846,857</td>
<td>763,183</td>
<td>791,598</td>
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<td>791,598</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>11,371,86</td>
<td>11,654,83</td>
<td>12,019,25</td>
<td>12,562,44</td>
<td>12,713,30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>735,712</td>
<td>786,045</td>
<td>768,531</td>
<td>846,857</td>
<td>763,183</td>
<td>791,598</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39,413,06</td>
<td>37,344,54</td>
<td>38,768,00</td>
<td>38,841,78</td>
<td>40,026,15</td>
<td>40,184,84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Hydrocarbon Development Institute of Pakistan

The above table presents the estimated fuel consumptions of major sectors of economy for the year 2007-13, the annual compound growth rate for each sector is calculated which describes 4.70% for Domestic Consumption, 2.50% for commercial, -3.20% for industrial and it is found negative because since six years Pakistan is facing high electricity shortfall that is dire need industries, similarly due to natural disasters and other factors affect agriculture which has -3.90%, transportation has 1.90% while the others have 1.50%.

Impact of highly oil prices on oil exporter and Importer countries

A rapid increase in oil price enhances the earning of exporting country which further increases the national income of the country. The increase in financial reserve helps to maintain balance of payment. On the Other hand Importer countries face a direct effect of income loss by paying huge amount of oil. Importer countries transfer the burden of heavy amount to the general public in shape of increase in oil prices.

Objectives of the Research

Main objectives of this research are as follows
1. To determine the impact of highly oil prices on economic growth
2. To give positive suggestions for development of energy sector.

Research Hypothesis

H1: The Rising oil prices have significant impact on economic growth.

REVIEW OF LITERATURE

Siddiqui (2014) indicated that investment level of any country have significant impact on its development, in addition an increase in international oil prices also have impact on GDP or stock market of the economy.

Muhammad (2013) described that oil price shock have a significant impact on economic growth and rising prices have different impact on oil importer and exporter countries while public or private sector investment enhanced the GDP rate of the economy.

Ansar and Asghar (2013) explained that oil was most important factor which effects country economy directly. They concluded that Pakistan is an oil importer country and paying its financial reserve to fulfill the oil market requirement which badly affect the stock exchange market of the country.

Muhammad et al (2013) described that increase in oil price, gold prices or foreign exchange rate may cause the inflation in the economy. The study determined that increase in these factor prices brought a rapid increase in inflation rate of the country.

Yusma et al (2013) described that the change in world oil prices brought change in the real GDP of Malaysia and increased the energy demand of the country. Different procedures were adopted to convert energy generating plans from oil to other energy producing sources. The different fuel policies were designed to control the need of oil market of the country.

Ahmad (2013) stated that developing country of the world like Pakistan; a main industrial sector is generally focusing on oil demand. A sharp increase in oil prices changed the production cost of the industrial product. Due to very fast increase in oil prices and energy consumption the industrial production decreased which ultimately increased the unemployment in Pakistan.

Jawad (2013) focused on the variable which cause the volatility in oil price and then analyzed that how much volatility or fluctuation comes through these variables. He concluded that oil price fluctuation...
has significant impact on all other segments of the economy or oil price volatility increased the uncertainty or unemployment in the country.

Monjazeb et al (2013) explained the significant impact of oil prices on economic growth. Different variable used to calculate the result. The Data of oil exporting countries used to found the result of oil price shock impact on economic growth. The results described that positive oil shock have positive impact and vice versa.

Kiani (2011) stated that due to continuous increase in energy consumption the Oil and Gas Regulatory Authority (OGRA) of Pakistan increasing the oil prices continuously. He also concluded that the change in crude oil price brought change in the real GDP of the economy.

Jamali et al (2011) explained that the international crude oil prices have a serious impact on Pakistan economy. They explained that different variable i.e. GDP, inflation rate, poverty are related with each other and affected by rising oil prices in the developing countries.

Zaman et al (2011) described the oil need and usage by different sectors of the economy during past years and oil consumption generally used in transportation, power generation and industry. He concluded that oil demand by different sectors made a significant impact on economic growth.

RESEARCH METHODOLOGY

Theoretical Framework

Above theoretical framework describes the relationship between Oil prices and GDP of the country. Oil Demand, Oil Supply, Oil Prices, Public Sector Investment, Private Sector Investment and Trade balances are taken as independent variable and GDP is taken as dependent variable. Both public and private investment generate the demand of petroleum products for attaining market access and development of corporate sector while trade balance encourage investments in different sector of economy that ultimately increase the economic growth of the country. The secondary data from 1971 to 2013 have been collected from different research articles, website, and Energy Year Book 2013 by Hydrocarbon Development Institute of Pakistan, World Bank and used for further calculations.

Research Model

A linear regression technique has designed to attain the objective of the paper which correlated the relationship among the variables. Therefore, a Single Linear Regression Model has been designed for data analysis (Jawad, 2013).

\[ Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \]

\[ GDP=\alpha+\beta_1 OLD+\beta_2 OLS+\beta_3 OPF+\beta_4 PSI+\beta_5 PRSI+\beta_6 TB+ e \]
Whereas,
OLD = Oil Demand
OLS = Oil Supply
OPF = Oil Price Fluctuation
PSI = Public Sector Investment
PRSI = Private Sector investment
TB = Trade Balance
GDP = Gross Domestic Product Growth Rate
e = Error term

EMPIRICAL RESULTS & DISCUSSION
Unit Root Test Results
Augmented Dickey Fuller (ADF) test has used to test the stationary among the selected variables. A time series data from 1971 to 2013 has been tested at both first and second difference levels. The ADF test comprises on three different kinds of situations for each time series. First, a random selection process includes intercept or constant and trends. Second, a random selection process includes intercept or constant but with not trend. While third, a random selection process that includes lag length. There is a trend in demand of oil, supply of oil and the oil prices. It is also anticipated a trend in public sector investment, private sector investment, trade balance and GDP of Pakistan.

Table No. 2: ADF Test Statistics Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF Test Statistics</th>
<th>Probability</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Demand</td>
<td>-1.6842</td>
<td>0.7322</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Oil Demand</td>
<td>-3.6021</td>
<td>0.0505</td>
<td>I(1)</td>
</tr>
<tr>
<td>Oil Supply</td>
<td>-2.0852</td>
<td>0.5583</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Oil Supply</td>
<td>-5.1086</td>
<td>0.0010</td>
<td>I(1)</td>
</tr>
<tr>
<td>Oil Price</td>
<td>-2.1391</td>
<td>0.5470</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Oil Price</td>
<td>-6.8095</td>
<td>0.0000</td>
<td>I(1)</td>
</tr>
<tr>
<td>Trade Balance</td>
<td>-1.5005</td>
<td>0.8389</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Trade Balance</td>
<td>-7.6643</td>
<td>0.0000</td>
<td>I(1)</td>
</tr>
<tr>
<td>Public Sector Investment</td>
<td>-5.4632</td>
<td>0.0006</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Public Sector Investment</td>
<td>-4.3790</td>
<td>0.0012</td>
<td>I(1)</td>
</tr>
<tr>
<td>Private Sector Investment</td>
<td>-2.7078</td>
<td>0.4232</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ Private Sector Investment</td>
<td>-7.6293</td>
<td>0.0000</td>
<td>I(1)</td>
</tr>
<tr>
<td>GDP</td>
<td>1.0882</td>
<td>0.9992</td>
<td>I(0)</td>
</tr>
<tr>
<td>∆ GDP</td>
<td>-4.5361</td>
<td>0.0057</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: Authors’ Calculation
The above Table No. 2 shows that all variables included Oil demand, Oil Supply, Oil Price, Trade Balance, Public Sector Investment and Private Sector Investment have a unit root in their level while stationary at first level difference.

Regression Analysis Results
The following Table No. 3 describes the results of regression analysis of the variables includes Oil Demand, Oil Supply, Oil Prices, Trade Balance, Public Section Investment and Private Sector Investment as independent variables having impact on economic growth of Pakistan.

Table No. 3: Regression Analysis Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t. Statistics</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>10.4671</td>
<td>0.7026</td>
<td>15.9634</td>
<td>0.0000</td>
</tr>
<tr>
<td>Oil Price Fluctuation</td>
<td>0.1753</td>
<td>0.2375</td>
<td>0.6221</td>
<td>0.5230</td>
</tr>
<tr>
<td>Oil Demand</td>
<td>0.1890</td>
<td>0.2491</td>
<td>0.6634</td>
<td>0.5621</td>
</tr>
<tr>
<td>Oil Supply</td>
<td>0.2049</td>
<td>0.1903</td>
<td>0.6930</td>
<td>0.5984</td>
</tr>
</tbody>
</table>
### Public Sector Investment
0.2165 0.1826 0.9439 0.3668

### Private Sector Investment
0.1478 0.1341 1.8301 0.0856

### Trade Balance
-0.0003 0.0000 -2.4004 0.0501

**Dependent Variable: Gross Domestic Product Rate**

<table>
<thead>
<tr>
<th>R-Square: 0.8957</th>
</tr>
</thead>
</table>

| F-Statistics: 421.4633 |

Source: Authors’ Calculation

The value of constant is found 10.4671 which mean if all independent variables remain same the change in GDP is 10.4671. The coefficient of Oil Price Fluctuation has the value of 0.1753 describe the positive impact on GDP that one unit change in Oil Price Fluctuation brings 17.53% change in economic growth of the country. Similarly, the coefficient of Oil Demand and Oil supply are found 0.1890 and 0.2049 respectively showing positive impact on GDP state that one unit change in oil demand and oil supply bring 18.9% and 20.49% change in economic growth of Pakistan. The coefficient value of Public Sector Investment is found 0.2165 presents that one unit change in Public Sector Investment can bring change in economic growth of Pakistan by 21.65% while Private Sector Investment is estimated 0.1478 having significant impact on economic growth of Pakistan and one unit change in Private Sector Investment would bring change in GDP of Pakistan by 14.78%. The regression results also present a negative impact of Trade Balance on country economic growth, the coefficient value of trade balance is found -0.0003 showing one unit change in trade balance would bring a negative change in GDP of Pakistan by almost negative 0%. The value of R-Square is found 0.8957 states that all independent variables having significant effect on GDP of Pakistan by 89.57% while the rest of done by other variables.

**Conclusion**

A rise in oil prices since early 1980s have captured a mind of researchers to investigate the impact of rising oil prices on economic growth of the country. The purpose of this paper is to determine the impact of oil prices on economic growth of Pakistan. It is concluded that the time series data from 1971 to 2013 of independent variables include Oil Demand, Oil Supply, Oil Price, Public Sector Investment, Private Sector Investment and Trade Balance are stationary at first difference level and no variable is found stationary at level after using ADF test. The overall results of regression analysis find out the oil price fluctuation and other independent variables seriously affect the economic growth of Pakistan. The value of R² states that all selected independent variables effect the GDP of the country by 89.57% significantly. A sharp rise in oil prices is not good sign for the development of any country which ultimately produce other economic diseases like inflation, unemployment, poverty, industrial devastation and destruction of social sector.

**Policy Implications**

- Government should provide subsides on the prices on oil commodities.
- Alternative energy programs should be applied.
- A serious work should be done on managing oil demand and oil supply through efficient management.
- There is a dire need of tax rationalization on petroleum products in order to reduce the unbalance in the pattern of consumptions.
- The government of Pakistan should work to boost its exports to counter rising oil prices which ultimately improve the balance of payment.
- Pakistan needs to promote its indigenous energy resources specially coal etc.
- The government should diversify the country’s energy mix to reduce the risk of oil price fluctuation in the global market.
REFERENCES
Zaman, UzBedi., Farooq, Muhammad. and Ullah, Sami. (2011). Sectoral oil Consumption and economic growth in Pakistan and ECM approach. American journal of scientific and industrial research,