

## THE IMPACT OF OIL PRICE FLUCTUATIONS ON MACRO-ECONOMIC VARIABLES OF DEMANDING AND SUPPLYING COUNTRIES

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### ABSTRACT

*The fluctuations in oil price during recent years and the recessions arising out of such fluctuations have encouraged researchers to conduct numerous studies especially on the effects of increase in oil price on economy. There has been a trend to use nonlinear relations since 1986 due to the negative fluctuations on oil price and asymmetric relation in such fluctuations. In this research, we study the asymmetric effects of oil price fluctuations on the production growth and inflation rate of the oil importing and exporting countries. For this purpose, panel data method has been used to study the data of the period from 1975 to 2000. The results show that the changes in oil price have significant and asymmetric effects on the growth rate of GDP and inflation rate of the above-mentioned countries.*

**Keywords:** GDP, GNP, Panel Data, Growth, Oil Price Fluctuations

**JEL Classification:** Q43, Q41, B22, C23, C82

### INTRODUCTION

Considerable economic fluctuations that happened because of two oil shocks in 1970s have caused several studies and researches on the effects of oil prices on economic activities and inflation. A major part of empirical studies focused on the linear relation between oil price shocks and deceleration of production growth (Hamilton, 1983; Rasche & Tatom, 1981; Hamilton, 1988). Most of these studies confirm that there is a negative linear relation between oil price and economic growth. However, as the shock of decrease in oil price in the mid-1980s led to no economic development in the USA, the studies were continued vastly focusing on the symmetric and asymmetric relation between oil price and economic production in the United States, and the nonlinear relation between oil price and economic growth were researched (Mork, 1989; Lee, Ni, & Ratti, 1995; Hamilton, 1996). According to these studies, it was found that the relation between the impact of increase in oil price on economic growth and that of decrease is asymmetric. In other words, the negative effects of increase in oil price in the oil importing countries especially industrialized importing countries is more effective than the positive effects of the decrease in such states.

This research aims to study the asymmetric relation between oil price shocks and economic growth, as well as the asymmetric relation of oil price shocks and inflation. For this purpose, ten oil-producing countries and ten oil-importing ones are sampled to study the effects of

increase and decrease in oil price on inflation and growth of both groups of consuming and producing countries. The following hypotheses are studied based on the above-mentioned facts:

1. Increase in oil price in both consuming and producing countries has a positive effect on inflation.
2. Increase and decrease in oil price has asymmetric effects on production growth and inflation of the selected oil-consuming and oil-producing countries.

To develop a model for the test of the above-mentioned hypotheses, panel data method and generalized method of moments (GMM) are applied.

In the first section, we review the previous studied on this issue, and in the second section, the theoretical framework for the study of the asymmetric relation of oil price shocks with economic growth and inflation is explained. The third chapter provides the research model, and in the fourth section, the obtained results are analyzed. Finally, in the fifth section, the conclusion has been provided.

## REVIEW OF LITERATURE

Few studies have been conducted on the asymmetric relation of oil price and its impacts on the growth of oil-importing countries. A major part of these studies has confirmed the relation between oil price and its impacts on the growth and inflation in oil-importing countries, and they introduce oil price shocks as the main factors of recession happened in 1970s. In this section, at first the empirical studies on the effect of oil price on the economy of the oil-importing countries are studied and then the impact of such a price on the oil-consuming ones.

Preliminary studies conducted on the oil-importing countries are mostly on the effects of oil price fluctuations on the economy of the United States. Hamilton (1983) used a VAR model and showed that oil price shocks were effective in the economy of the United States. His research showed that there was a significant relation between oil price shocks and real production in the USA, in such a way that massive increase in oil prices could cause decrease in real production growth.

The researches of Mork (1989) showed that increase in oil price had a considerably negative effect on the growth of gross national product of the USA; while, the decrease in oil price was led to no increase in economic growth. Mory (1993) confirmed the findings of Mork and showed that the increase in oil price had negative effect on the economy of the US. In contrast, the decrease in prices had no effect. Lee, Ni, and Ratti (1995) have also confirmed the asymmetric effects of oil price shocks on the gross national product of the US.

Moreover, several studies have been conducted on the impacts of oil price on the economy of other oil importing countries, especially industrialized ones. Hunt *et al* (2001) studied the effects of oil price shocks on the macro-economic variables such as inflation and production of industrialized countries using MULTIMOD, which is the IMF's multi-country model, and researched the role of monetary policies on production. According to these studies, there was a significant negative correlation between oil price and macro-economic indices such as production, unemployment, and real wages. Moreover, it was also found that there was an asymmetric relation between the changes in oil price and subsequent changes in production.

Several studies have been conducted on the oil-producing countries by Alotaibi (2003) and Boroujerdian (2007).

Alotaibi (2003) studied the asymmetric effects of oil price shock on the gross domestic product of the member states of Persian Gulf Cooperation Council for the period from 1960 to 2004. He used three methods for the calculation of oil price. The results of his research show that oil price shock has been positive and is not significant in some models. Moreover, the negative oil price shocks have dominance over positive shocks. In other words, a symmetric relation was confirmed.

Boroujerdian (2007) studied the asymmetric effects of oil price shocks on the economic growth of Iran for the period from 1959 to 2005 using the theories of economic growth and Mork oil price analysis. The results of this study show that oil income shocks have significant effects on the economic growth (excluding oil sector), while the effects of negative shocks are considerably more significant than that of positive shocks. In other words, production growth reacts strongly to the shocks reducing oil incomes.

### **Theoretical Framework**

To understand the effects of oil price shocks on the economic growth of and inflation in the oil importing countries, the economists such as Hamilton (1983), Brown and Yucel (2002) provided different causes. One of the best and most important causes is the effect supply-side, stating that the increase in oil price reduces the access to the factors of production. The transfer of income from oil importing countries to oil exporting ones and the effects of changes in real balance are other causes. However, the global oil market faced drop in price in 1980s and 1990s. During these two decades, it was expected that drop in oil prices would led to the economic growth and development of the affected countries according to the theories on the impacts of oil price on the economy of the oil importing countries. In practice, no economic development took place because of such a drop in price. Monetary policies, adjustment costs, inverse effects of uncertainty on investment, and asymmetry of oil products prices are the causes of such an asymmetry in the reaction of production to price shocks.

According to Tatom (1988 & 1993) and Beranke *et al* (1997), monetary policy is one of the channels, through which oil price shocks affects economy asymmetrically. Hence, in case of downward price stickiness nominally, the increase in oil price lead to a considerable decrease in GDP provided that monetary investors fail to stabilize nominal GDP by adopting an unexpected inflation policy. In contrast, although it is expected real wages are increased due to the decrease in oil price leading to the reduction of price level, this does not happen due to the downward stickiness of prices.

The second cause of asymmetric relation between oil price shock and macro-economic variables is called adjustment costs, which may slow down the growth of production due to intersectional imbalance, lack of coordination among enterprises facing changes in oil and energy price, or the ratio of fixed energy prices to production in capital stock.

According to Huntington (1998), when enterprises are not sure about the oil prices in the future, they decide about irreversible investments with delay, since the enterprise must determine the energy consumption of production at the time of calculating the capital when the ratio of energy to production is inserted in the capital stock.

Uncertainty about the oil prices in the future as well as increase or decrease in prices exists anyway. However, this uncertainty increases when the likelihood of increase in oil prices rises in the future.

Few studies have been conducted on the asymmetric effects of oil shocks on the macro-economic variables in the oil exporting countries. The problems of capital market have been suggested as a reason of the asymmetric relation between oil price shocks and macro-economic variables. The increase in oil incomes is one of the most important sources of the capital required for physical and social investments. However, the positive effects of such an increase may be appeared in economy gradually and with delay because of the limited economic capacities required for the absorption of additional incomes and converting them to physical capital as well as due to the requirement of time for adaption to new conditions.

In contrast, the decrease in oil prices in the oil exporting countries restricts the availability of capital goods and intermediate products because of decrease in incomes in such countries and loss of capital – production capacities of these countries.

Another reason of such an asymmetry is the increase in exchange rate after an oil shock in such countries; this is called Dutch disease. In the countries that depend on oil revenues, increase in oil exporting revenues raises exchange rate and improves production. On the one hand, an upturn in oil income improves the value of national currency, and it diminishes the negotiable nonpetroleum sector leading to economic problems. On the other hand, although the blockage of oil incomes can only defer the increase in the value of national currency, it cannot prevent such an increase. In case of a negative shock in oil price, exchange rate should be adjusted; but it is over-evaluated, and the losses to the market of non-petroleum exporting goods are not recouped. In such conditions, it is expected the negative shocks in oil prices to be more important than positive shocks.

Whereas oil income forms an essential part of the income sources of the oil exporting countries, fluctuations in this sector have harmful effects in these countries. Fluctuations in prices cause uncertainty in the revenues of the governments and such an uncertainty appearing in form of fluctuations in government's expenditures affect the level of economic activities.

Budget is adjusted usually in an asymmetric manner. Rapid growth of public expenditures incurs mostly because of increase in oil prices. It reduces the quality of expenditures and increases in contrast the current credits. By decrease in oil incomes, a great part of the current expenditures spent for the inflexible salaries and wages of public servants are less adjusted. Therefore, it is required to reduce the costs and expenses of civil works. Due to the large number of unfinished projects and fixed investments that are not used efficiently because of the shortage of irrecoverable resources at the time of negative shocks, productivity drops. In general, it seems that upturn in oil incomes has no significant effect on the economic growth of the oil exporting countries, while oil recession has a significantly deterrent effect on growth.

## **METHODOLOGY**

### **Data and Statistics**

To study the asymmetric relation among the oil price shocks, economic growth, and inflation rate in the oil exporting countries and oil importing ones, two groups consisting of ten oil exporting countries (including Iran, Saudi Arabia, Venezuela, Kuwait, Nigeria, Algeria,

Mexico, Indonesia, Norway, and Canada) and ten oil importing ones (including USA, Japan, Italia, South Korea, Spain, France, Australia, Netherlands, and India) are selected for the period from 1975 to 2000. The data required for the calculation of the rate of economic growth and inflation rate, are extracted from the database of WDI, and those ones required for the calculation of oil price shocks are obtained from the statistics of the global price of crude oil published in the site of BP Plc. Mork's analysis method has been applied to separate the negative and positive shocks in oil prices. All data are real and estimated based on the data of the year 2000.

### Oil Price Analysis

The study of oil price behavior and its effects on macro-economic variables show that the changes in oil price in the different periods have no different effect on macro-economic variables. The different behaviors of oil price changes before and after 1986 and asymmetric reactions of the economic production indicator to oil price shocks in the economy of many countries encouraged economists to search for a different interpretation for the characteristics of oil and production in order to show the relation between these two variables. Mork has been one of the researchers, who introduced a new variable by the analysis of oil price. According to the method of Mork (1989),  $\Delta Oil_t$  indicates the quarter changes in real prices of oil, and it is calculated as the first difference of oil price (in log form):

$$\Delta oil_t^+ = \ln oil_t - \ln oil_{t-1}$$

Where,  $Oil_t$  is the real price of oil in dollar at period t. According to Mork, the positive rates of oil price are considered as positive shocks, and negative ones as negative shocks. These shocks are defined as follows:

$$\begin{aligned} \Delta oil_t^+ &= \Delta oil_t \quad \text{if } \Delta oil_t > 0, \text{ zero otherwise} \\ \Delta oil_t^- &= \Delta oil_t \quad \text{if } \Delta oil_t < 0, \text{ zero otherwise} \end{aligned}$$

To study the effects of the negative and positive shocks of oil price on the above-mentioned variables in both groups of importing and exporting countries, the generalized method of moments (GMM) in dynamic combinatorial model is used.

### The Explanation of the Model

Before the estimation of the model, the stationarity of the data must be assessed. According to Fisher's unit root test prescribed for the study of panel data, the stationarity of the data used in this research is approved. Therefore, spurious regression is rejected and the estimated regression is considered valid.

After the model is provided and variables are defined, we estimate the model and analyze the obtained results. Considering the nature of the model and the dependent variable with lag of explanatory variables, it is preferred to use a GMM estimator based on dynamic panel data model. The intended model used for estimation can be formulated in general as follows:

$$4-3-1 \quad dy_{i,t} = \lambda dy_{i,t-1} + \sum \beta_{j1} p oil_{i,t-j} + \sum \beta_{k2} n oil_{i,t-k} + \gamma_{it} + \eta_i \quad |$$

$$(4-3-2) \quad d\pi_{i,t} = \lambda d\pi_{i,t-1} + \sum \beta_{j1} p oil_{i,t-j} + \sum \beta_{k2} n oil_{i,t-k} + \gamma_{it} + \eta_i$$

Where,  $Dy_{i,t}$  is the dependent variable (the growth of the GDP),

$$Dy_{i,t} = DLOG(GDP_{i,t})$$

$D\pi_{i,t}$  : dependent variable (inflation)

$$d\pi_{i,t} = DLOG(CPI_{i,t})$$

$\sum \beta_{j1} \text{poil}_{i,t-j}$  : the total lags in the positive oil price shocks

$\sum \beta_{k2} \text{noil}_{i,t-k}$  : the total lags in the negative oil price shocks

$\eta$  : the effects observed in each country

$\varepsilon$  : error term

Moreover, index I indicates the country and index t the time.

We present the following hypotheses:

- 1- There is no successive correlation among error terms.
- 2- The explanatory variables X are weakly exogenous.

The moment conditions are as follows:

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } s \geq 2: t = 3, \dots, t$$

$$E[X_{i,t-s}(\varepsilon_{i,t} \varepsilon_{i,t-1})] = 0 \quad \text{for } s \geq 2: t = 3, \dots, t$$

**Model Estimation and Providing the Results**

Considering the above-mentioned hypotheses and conditions, the model developed for the variables production growth and inflation in two samples has been estimated using GMM estimator. The results of the model, estimated based on GMM for the variables inflation and production growth in the samples of exporting and importing countries, have been provided in the tables 1 and 2.

**Table 1.** The Relation between the Production Growth and Negative and Positive Shocks in Oil Price (GMM Cross-Sectional Regression)

Description	Sample of the Oil Importing Countries			Sample of the Oil Exporting Countries		
	P-Value	T-Statistic	Coefficient	P-Value	T-Statistic	Coefficient
The Growth of the Dependent Variable (GDP) with one Lag	0.0000	18.00	0.21	0.0000	11.2	0.27
Positive Shock in Oil Price (Pos – Oilp)	0.0003	-3.7	0.004	0.0000	6.2	0.055

**Table 1.** The Relation between the Production Growth and Negative and Positive Shocks in Oil Price (GMM Cross-Sectional Regression) (Contd....)

Description	Sample of the Oil Importing Countries			Sample of the Oil Exporting Countries		
	P-Value	T-Statistic	Coefficient	P-Value	T-Statistic	Coefficient
Positive Shock in Oil Price with one Lag (Pos – Oilp)	0.0000	-14.7	-0.017	0.062	-1.9	- 0.011
Negative Shock in Oil Price (ng-oilp)	0.0000	-13.3	- 0.012	0.0075	- 2.7	- 0.035
Negative Shock in Oil Price with one Lag (ng – oilp)	0.0000	7.5	0.010	0.0002	- 3.8	- 0.03
Sargan Statistic	57			55		

**Reference:** Research Calculations

**Table 2.** The Relation between the Production Growth and Negative and Positive Shocks in Oil Price (GMM Cross-Sectional Regression)

Description	Sample of the Oil Importing Countries			Sample of the Oil Exporting Countries		
	P-Value	T-Statistic	Coefficient	P-Value	T-Statistic	Coefficient
The Growth of the Dependent Variable (GDP) with one Lag	0.0000	71.9	0.80	0.00	429.2	0.71
Positive Shock in Oil Price (Pos – Oilp)	0.0000	17	0.053	0.00	29.98	0.029
Positive Shock in Oil Price with one Lag (Pos – Oilp)	0.006	2.75	0.006	0.00	12.82	0.018
Negative Shock in Oil Price (ng-oilp)	0.008	2.7	0.009	0.00	58.08	0.095
Negative Shock in Oil Price with one Lag (ng – oilp)	0.000	- 7.7	- 0.033	0.00	64.30	0.115
Sargan Statistic	26			86		

**Reference:** Research Calculations

The estimation of models for the economic growth and inflation in the oil importing countries shows that all coefficients in both models are consistent with the theories and are statistically significant. To study the validity of the estimated results, we use the Sargan test to check for over-identifying restrictions. This test uses function  $\chi^2$  with the degree of freedom  $k-p$ , where  $p$  indicates the number of estimated parameters, and  $k$  is the number of categories. This is a standard test to study the validity of the restrictions imposed on the moments used in the estimation based on GMM. Under the null hypothesis, the moment restrictions are valid. Therefore, the validity of the results is approved for interpretation purposes.

The estimation results of the growth model shows that GDP as the dependent variable GDP (21 %) has the highest share in the production growth of the next year. The positive shock in oil price has negative effects on the economic growth of the same countries, in such a way that this type of shock reduces production in the same year, and has negative effects of the growth of the next year. In general, negative shock has decreasing effects on growth. Indeed, the fluctuation of oil price, whether in form of decrease or in form of increase, has negative effects on the economic growth of the oil importing countries.

In the estimated model of inflation, the dependent variable with one lag has the most significant role in the increase of inflation in the next year. A positive shock can cause an increase in inflation. In contrast, the decreasing oil price shock reduces inflation in the same countries. This type of oil price shock has an insignificant effect of the growth of GDP and inflation, while an increase in oil prices has been always more effective than the decrease of oil price is. In other words, the fluctuations in oil price have an asymmetric effect on the growth of GDP.

The results of the study conducted on the sample of the oil exporting countries show that all coefficients estimated for the model of growth and inflation are consistent with the theory, and all variables are significant at the significance level of one percent in the inflation model, and ten percent in the growth model. The results of the Sargan test indicate that the results of both models are valid for interpretation purposes.

The study of the estimated model of economic growth in the oil exporting countries shows that growth with one lag (27%) is the most effective factor affecting this variable. The relation between the positive shock in oil price and economic growth is generally positive, and the injection of such revenues in the first year causes an increase in the economic growth of these countries. However, the effects of such an increase on growth tend to become negative after one year, and economic growth is reduced to some extent. The negative shock in oil price has negative effects on the economic growth and this negative effect continues until the next year.

The estimation results of the model of inflation show that inflation with one lag (70%) has the most significant role in the increase in inflation of the next year. Moreover, both negative and positive shocks in oil price have positive and significant effects on the inflation rate in the studied oil exporting countries. This means that the fluctuation in oil prices, whether in increase form or in decrease form, causes that the growth rate of price indices increases in exporting countries.

In both models, the effects of negative shocks on the estimated variables have dominance over the effects of the positive shocks on the same variables. In other words, when oil price declines economic growth slows down. In contrast, when oil prices increase economic



growth goes up at first, and then it goes down a little after one year. However, the resultant of the effects of negative shocks on the economy of these countries is greater than that of the positive shocks. This may be due to the existence of Dutch disease in such countries.

In the following, we study the long-term relation between variables using the unit root test conducted on the non-estimated Engle-Granger co-integrating regression. For this purpose, the unit root test has been conducted on the residuals of the estimated models of economic growth and inflation as the variables of this research. According to the results of this test, the hypothesis stating that there is a long-term relation between the variables of both estimated models in the importing and exporting countries is not rejected.

Finally, the hypothesis of the existence of an asymmetric relation between oil price shocks and macro-economic variables is studied. To study the existence of the asymmetric effect of positive and negative shocks on the macro-economic variables including economic growth and inflation in the sampled countries, the usual asymmetry test has been applied. The null hypothesis in this test states that the coefficients of the positive and negative shocks in oil price as estimated in this model are identical. The null hypothesis can be formulated as follows:

$$H_0: \beta_{1j} = \beta_{2k} \quad j=1,2,3,\dots,n \quad k=1,2,3,\dots,m$$

Accordingly, the null hypothesis stating that there is symmetry among the coefficients of the positive and negative shocks in oil prices of the oil exporting countries at the level of 1 percent is rejected. In other words, oil price shocks have asymmetric effects not only on economic growth but also on inflation, in such a way that the negative shocks in oil price are in both models more effective.

The results of the asymmetry test show that the hypothesis stating that there is asymmetry in the effects of the oil price shocks on the economic growth and inflation of the oil importing countries is confirmed. In the estimated models of these two macro-economic variables, the positive shocks in oil price have more effects than the negative shocks do.

## **CONCLUSION**

In this research, we studied the effects of increasing and decreasing oil price shocks on two macro-economic variables economic growth and inflation in two groups of oil importing and exporting countries to find out if such effects are symmetric or asymmetric.

In the groups of oil importing countries, the effects of negative shock or decrease in oil price has been more significant on the above-mentioned variables. This is perhaps because the increase in oil price raises the price of energy in the importing countries, and reduces the demands for energy accordingly. As a result, the real productivity of labor is reduced leading the unemployment of a part of workforce. Finally, the total supply, employment, and actual income are reduced, and in contrast, inflation goes up. Moreover, the increase in oil price causes contraction in energy-consuming sectors, and less energy-consuming sectors attract more attentions. This leads to the increase in demands for the devices and equipments with efficient energy use. However, the decrease in production is intensified due to the high rate of adjustment costs in short-term.

In contrast, these countries enjoy economic upturn arising out of the reduction of production costs, which is itself due to the decrease in the price of energy input at the time oil price goes

down on the one hand, and encounter the intersectional adjustment costs that leads to the increase in production costs on the other hand.

In other words, the increase in oil price has two negative impacts, and decrease in oil price one positive effect and one negative impact on the economy that neutralizes each other. Therefore, we observe here an asymmetry.

As regards negative shocks in oil price, it must be noted that increase in oil prices causes that price level goes up by affecting wage-price cycle and increasing production costs. When oil price goes down, production costs are reduced, and the productivity of workforce improves. Therefore, nominal wage is increased. Such an increase in nominal wages means the increase in production costs and no decrease in the cost price of the products, and even to some extent increase in prices.

The results of the study in the oil exporting countries show that negative shocks or decrease in oil price have significantly more effects on the studied variables. Moreover, the fluctuations in oil price, whether in form of decrease or increase, improve the growth rate of prices in the oil exporting countries. In this group of countries, the increase in oil prices and consequently the improvement of oil prices, public costs are increased, and this lead to the rise in monetary volume and inflation. Moreover, the increase in the budget of government, production is improved temporarily, which is not continuous. Indeed, the Dutch disease spreads in the economy of these countries along with the increase in oil incomes.

Moreover, the injection of the revenues earned from oil upturn in the oil exporting countries fuels total demands. As the total supply sector, which is the resultant of the internal sectors, is not able to meet such demands, it leads to inflation.

In contrast, as the great part of these incomes are spent for government and used as its current expenditures, the government cannot reduce the volume of such expenditures when oil price is decreased, since the current expenditures of government are in most cases the inflexible wages and salaries of the public servants. As a result, the government should reduce the costs of civil works. Therefore, one of the impacts of decrease in oil price is the recession in civil and developmental projects, which may be left incomplete, and lead to the increase in unemployment and as a result the decrease in growth and increase in inflation.

## REFERENCES

1. Arsalani, Ali. 2001. The Effects of Oil Price on the Macro-Economic Variables of Iran during the Period from 1970 to 2000. Unpublished Master's Dissertation submitted to the Faculty of Economics of Tehran University.
2. Boroujerdian, Sara .2007. A Study of the Impacts of Oil Price Shocks on Economic Growth. Unpublished Master's Dissertation submitted to the Faculty of Economics of Tehran University.
3. Hosseini, Fereydoun. 1996. A Study of the Relation of Oil Price with Economic Growth in OECD Countries. Unpublished Master's Dissertation submitted to the Faculty of Economics of Tehran University.
4. Derakhshan, Masoud. 2004. Oil Products and Risk Management in Oil Markets. International Energy Research Institute.
5. Sarzaim, Ali. Spring 2007. "A Study of the Effects of Oil Price Shocks on the Economic Variables using VAR Model". Energy Economy Studies Quarterly. 4<sup>th</sup> Year. No. 12.

6. Alotaibai B.(2003). Oil Price Fluctuations and the Gulf Cooperation Council (GCC). Degree of Doctor of Philosophy. Department of Economics in the Graduate School, Southern Illinois University Carbondale.
7. Bernanke, B., M. Gertler and M. Watson. (1997). Systematic Monetary Policy and the Effect of Oil Price Shocks, *Brookings Papers on Economic Activity* 1: pp91-142
8. Bernanke, B. (1983). Irreversibility, Uncertainty and Cyclical Investment. *Quarterly Journal of Economics*, 98(1): pp85-106
9. Bohi, Douglas R (1989). Energy Price Shocks and Performance. Resources for the future, Washington, D.C.
10. Bohi Douglas R (1991). On the Macroeconomic Effect of Energy Price Shocks. *Resources and Energy* 13(2):pp145-62
11. Brown, S. and M. Yucel. (1999). Oil Price and U.S. Aggregate Economic Activity: An Interpretative Study. Federal Reserve Bank of Dallas, Quarterly Review of Economics and Finance, Research Department, Working paper No. 0102
12. Cunado, J., F.P. De Garcia. (2003). Do Oil Price Shocks Matter? Evidence for Some European Countries. *Energy Economics* 25, pp 137-154
13. Cunado, J., De Garcia, F.P. (2004) Oil Price Economic Activity and Inflation: Evidence for Some Asian Countries. *The Quarterly Review of Economics and Finance*, 25:pp 137-154
14. Federer, J. Peter. (1996). Oil Price Volatility and the Macro economy: A Solution to the Asymmetry Puzzle. *Journal of Macroeconomics* 18:pp1-16
15. Gylfason, T. (2001). Nature, power and Growth. *Scottish Journal of Political Economy*, 48(5):pp 558-588
16. Hamilton, James D. (1983). Oil and the Macro economy Since World War II. *Journal of Political Economy*, 91:pp 28-248
17. Hamilton, James D. (1988). A Neoclassical Model of Unemployment and the Business Cycle. *Journal of Political Economy*, 96:pp593-617
18. Hamilton, James D. (1996). This is What Happened to the Oil Price- Macro economy Relationship. *Journal of Monetary Economics*, 38:pp15-220
19. Hamilton, James D. and Ana Maria Herrera (2000). Oil Shocks and Aggregate Macroeconomic Behavior: The Role of Monetary Policy. University of California San Diego, Xerox. (June)
20. Hooker, Mark. (1996). What Happened to the Oil Price- Macro economy Relationship? *Journal of Monetary Economics*, 38:pp 195-213
21. Hunt, B. & Izard, P. & Laxton, D. (2001). The Macroeconomic Effect of Higher Oil Price. IMF Working Paper 01/14. Research Department.
22. Huntington, Hilliard G. (2000). "Oil Price and U.S. Economic Performance: Where Does the Asymmetry Reside?" *The Energy Journal* 19(4): pp 107-123.
23. Khademvatani, Asgar. (2003). Crude Oil Price and Aggregate Economic Activity: Asymmetric or Symmetric Relationship: Evidence from Canada's Economy. Department of Economics. University of Calgary.

24. Lardic, S. and V.Mignon. (2006). Oil Price and Economic Activity: An Asymmetries Co integration Approach. *Energy Economics*:pp 1-9
25. Lee, Kiseok, Shawn Ni, and Ronald A. Ratti. (1995). Oil Shocks and the Macroeconomy: The Role of Price Variability. *The Energy Journal*, 16(40): pp39-56
26. Mehrana, M.(2007). The Asymmetric Relationship between Oil Revenues and Economic Activities: The Case of Oil- Exporting Countries. *Energy policy*.
27. Mork Knut Anton. (1989). Oil and the Macroeconomy When Prices Go up and Down: An Extension of Hamilton's Results. *Journal of political Economy* 97:pp 740-44
28. Mork Knut Anton.(1994). Business Cycle and Oil Market. *The Energy Journal* 15,pp 15-38
29. Mork Knut Anton and Hall Robert E. (1980).Energy Price, Inflation and Recession, 1974- 1975. *The Energy Journal*, 1(3): pp31-63
30. Mory, J.F.(1993). Oil price and Economic Activity:Is the Relationship Symmetric? *Energy Journal*,14(4):pp151-161
31. Rodriguez, R.J.and M. Sanchez. (2004). Oil Price Shocks and Real GDP Growth: Empirical Evidence for Some OECD Countries. *European Central Bank, Working paper*.
32. Shams. M., (1989). The impact of oil revenue on the OPEC economy. *Energy Economics* (October). Pp 242-246
33. Tatom, John A.(1988). Are the Macroeconomic Effect of oil price Changes Symmetric? *Carnegie- Rochester Conference Series on Public policy* 28:pp 325-68.
34. Tatom, J.A. (1993) Are There Useful Lessons From the 1990-1991 Oil Price Shocks? *Energy Journal* 14(4):pp 129-150.