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OIL PRICES AND THE WORLD ECONOMY: FOUR DECADES AFTER THE STAGFLATION

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Abstract

The oil price shock of 1970s created widespread high inflation in oil importing countries. The 450 percent rise in oil prices in early 1970s cause stagflation in oil importing countries. However, the adverse effects of oil price rise did not occur in 2007 – 2008 when oil prices reached as high as 140 US dollars in July 2008. Perhaps the Great Recession in that period modified the adverse effects of oil price rise. The significant oil price rise in 2007 – 2008 coincided with the global financial crises and recession leading to a fall in aggregate demand offsetting the effects of oil price rise on prices. The empirical results of this study show that oil price increase in early 1970s led to a higher inflation in US and depressed the world economy. However, the relationship between oil prices and the world economy has changed in recent periods and oil price rise do not systematically depress the world economic activity.

Keywords: Oil price shocks, global economy, recession, financial crises, stagflation

INTRODUCTION

The oil price shock of 1970s created widespread high inflation in oil importing countries. The nominal oil prices rose from 2 US dollars per barrel in 1970 to 11 US dollar in1974. The 450 percent rise in oil prices in early 1970s cause stagflation (a combination of inflation and stagnation) in oil importing countries. The average annual inflation rate 1973 to 1975 in US, UK, France and Japan was 8.8, 16.17, 10.5 and 12.23 respectively. The inflation rate for the same four countries in 1972, respectively were 3.2, 7.1, 5.3 and 4.6. At same time growth and employment rates of these four countries were adversely affected. However, the adverse effects of oil price rise did not occur in 2007 – 2008 when oil prices reached as high as 140 US dollars

in July 2008. Perhaps the Great Recession in that period modified the adverse effects of oil price rise.

There are several researchers who argue that the effects of oil price rise on inflation and unemployment in oil importing countries are different than early 1970s. The oil price shock in the 1970s caused the aggregate supply curve in oil importing countries to shift toward the left leading to inflation and unemployment. The rising cost of production due to oil price rise led to the leftward shift of the aggregate supply curve. However, the significant oil price rise in 2007 – 2008 coincided with the global financial crises and recession leading to a fall in aggregate demand offsetting the effects of oil price rise on prices.

The purpose of this paper to to investigate why oil price rises are no longer important in affecting output and prices in oil importing counties. Some graphical time series and the review of literature are presented in section 2. A theoretical model is developed in section 3. Some policy recommendations are suggested in section 4. Summary and conclusions are discussed in section 5.

RESEARCH METHODOLOGY

All the time-series data from this study are annual observations collected from US Department of Labour and OECD National Account data files. The oil prices were collected from the site http://www.macrotrends.net/1369/crude-oil-price-history-chart.

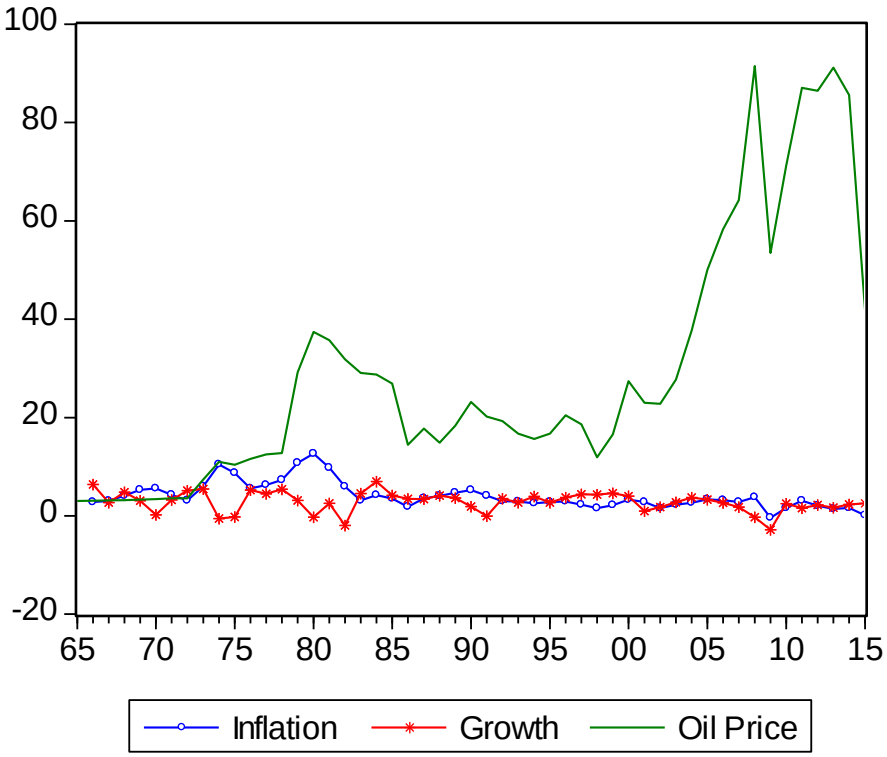
This study examines the extent to which the relationship between oil prices and the world economy has changed in recent periods and oil price rise do not systematically depress the world economic activity.

The empirical results for distinguishing between effects of oil price change on US inflation, US growth and world growth in two sub periods, 1965 – 1980 and 2007 - 2016, are based on Granger Causality, Vector Autoregression (VAR) and Ordinary Least Square.

SOME GRAPHICAL PRESENTATION AND REVIEW OF LITERATURE

In Figure 1 oil prices, US inflation and US growth rates are 1965 – 2015 are presented. Visual inspection of the graph indicates higher inflation and lower growth 1973 to 1975, when oil prices increased sharply. Similar development is observed in the early 1980s when oil prices rose as a result of political developments in the Middle East (Iranian Revolution in 1979 and Iraq invention of Kuwait in 1980). Subsequently, occurrence of inflation and stagnation was named stagflation. However, this development is not visually observed when oil prices rose significantly in 2007 – 2008.

Figure 1. Oil Price, US Growth and Inflation



Coefficients of correlation between oil price, US growth and US inflation in two sub-periods 1965 – 1980 and 2007 – 2015 are presented in Table 1. In the earlier period oil price rises were correlated negatively with US growth rate and positively with US inflation. However, in the latter period oil prise was still positively associated with US inflation but there was no negative correlation between US growth rate and oil price rise

Table 1. Coefficients of Correlation

Period	1966 - 1980	2007 - 2015
US Inflation	0.87	0.46
US Growth	-0.33	0.24

Note: The figures inside the table show correlation of oil price with either US inflation or US growth rate.

Hamilton (2011) argues that the recession of 2008 would not have occurred in the United States without a sharp increase in oil prices. Hamilton (2011) shows that, whether caused by regional Political disturbances or a rise in demand, oil price rises have share responsibility for the post-war recessions in the United States. In contrast, Barsky and Kilian (2004) maintain that disturbances in the international oil market, contrary to the common belief, have negligible

impacts on the macroeconomic activity within the US economy. The authors show that changes in oil prices cannot explain fluctuations of aggregate output and price level for the US economy. Hamilton (2009) argues that the price elasticity of demand for oil has is low, and it has become lower in recent periods. According to Hughes, Knittel and Sperling (2008) the short - run price elasticity of demand for gasoline was 0.21-0.34 in 1975-80 but declined to 0.034 and 0.077 over the period 2001-2006. This means that recently, a large increase in price was required to reduce the demand. However, with low elasticity of demand for gasoline, rising, prices lead to a larger expenditure on gasoline.

Kilian (2009) argued that although the relationship between oil prices and economic activity is reciprocal, but the cause and effect are not clear. In this paper, Kilian argues that historically, oil price fluctuations have been due to a combination of global aggregate demand shocks and precautionary demand shocks. The effects of supply shocks have been temporary. The precautionary demand for oil is as a result of uncertainty regarding availability of future supply of oil. The effects of political developments in oil-exporting countries on oil prises are a precautionary demand for oil to keep an uninterrupted future supply. This conflicts with the common belief that political crises in oil exporting counties affect the price of oil through shortage of the supply.

EMPIRICAL RESULTS

As a preliminary investigation, the Granger Causality (GC) results on the relationship between oil price inflation and growth in two sub periods 1965 – 1980 and 2007 – 2016are reported in tables 2 and 3.

Table 2. Granger Causality 1965 - 1980

	F Statistics	Probability
Oil price doesn't GC US inflation	4.69	0.04
Oil price doesn't GC world growth	2.86	0.25
Oil price doesn't GC US Growth	3.31	0.23
Oil price doesn't GC OECD growth	3.10	0.24

Table 3. Granger Causality 2007 - 2016

	F Statistics	Probability
Oil price doesn't GC US inflation	18.4	0.009
Oil price doesn't GC world growth	0.60	0.54
Oil price doesn't GC US Growth	0.17	0.84
Oil price doesn't GC OECD growth	0.36	0.96

Additional empirical results in the context of Vector Auto Regression (VAR) are presented in this section. The VAR technique is used to avoid questionable assumption of exogenous independent variables in an ordinary least square regression. In a reduced form VAR system, every variable is a function of its own lags and lags of other variables in the system. A first order two variables VAR system is presented in equations 1 and 2.

$$y_{t=} a_{10} + a_{11} y_{t-1} + a_{12} z_{t-1} + e_{1t} \quad (1)$$

$$z_{t=} a_{20} + a_{21} y_{t-1} + a_{22} z_{t-1} + e_{2t} \quad (2)$$

The coefficients of independent variables in a VAR system are economically meaningless. Econometricians employ impulse response function (IRF) and variance decomposition (VDC) in order to determine the responses of variables in a VAR system to a shock of a particular variable. The following VAR in 4 variables is presented in equation 3.

$$P_t = \text{f}\ (y_{tw}, y_{tus}, \rho_{us}) \quad (3)$$

Where, P_t, y_{tw}, y_{tus} and ρ_{us} respectively are logarithm of oil price, world growth, US growth and US inflation. The VAR system was estimated for two sub-periods 1965 to 1990 and 1990 to 2015.

The IRF derived from the VAR are presented in Figures 2 and 3. Figures 2 a and b, clearly show that oil price increase in early 1970s led to a higher inflation in US and depressed the world economy. These results are consistent with the effects of oil price shock (stagflation). The results in Figure 3b suggest that in the latter period, ending 2015, oil price rise caused inflation in US but did not adversely affect the world economy.

For further evidence in Table 4, regression results of US growth against US interest and oil price alter for two sub-periods 1965 – 1990 and 1990 – 2015 are reported. The regression results are supportive of previous observations that oil price changes affected the US economy in the earlier period but not in the latter period.

Table 4. Regression Results in Two sub-periods

Date	Constant	US interest rate	% change in oil price
1965 – 1990	4.48	-0.15	-0.07
		(-0.40)	(-1.99)
1990 – 2015	1.25	0.24	0.019
		(1.07)	(0.66)

Note: Figures in brackets are "t" statistics

Figure 2a. Response of US inflation to a Shock of Oil Price 1965-1990

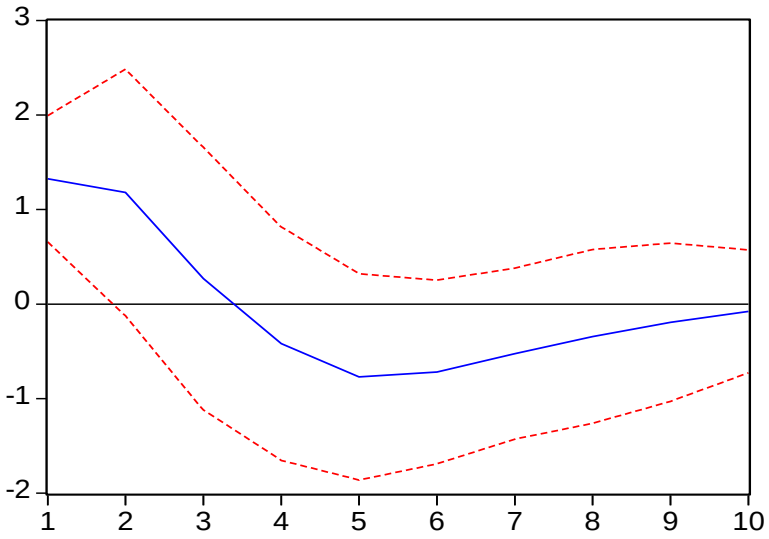


Figure 2b. Response of World Growth to a Shock of Oil Price 1965-199

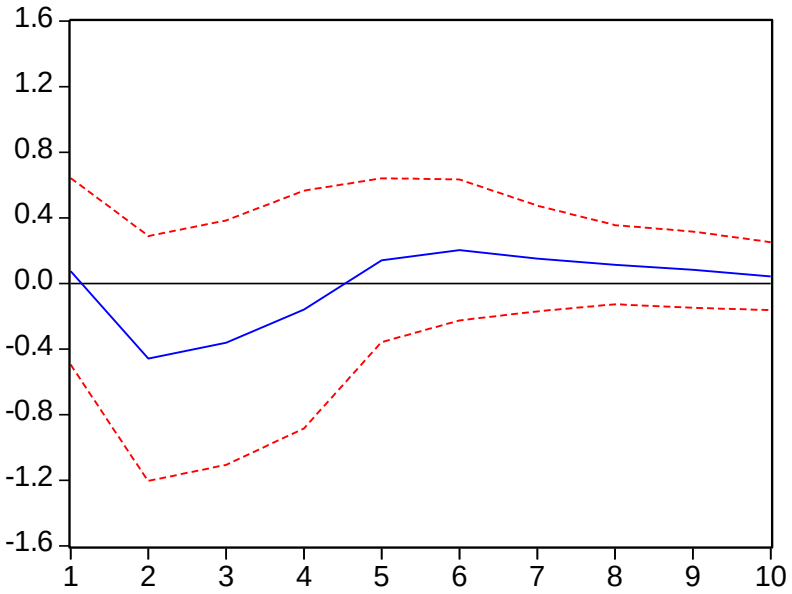


Figure 3a. Response of US inflation to a Shock of Oil Price 1990-2015

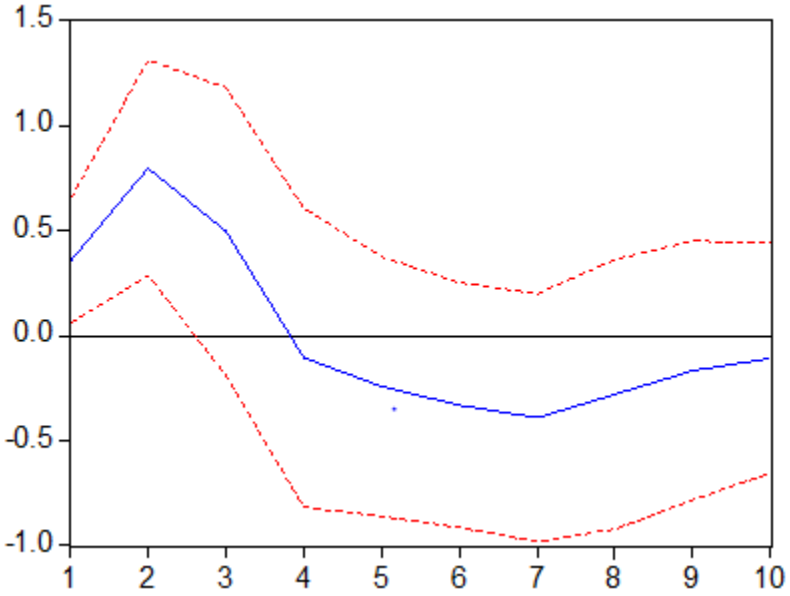
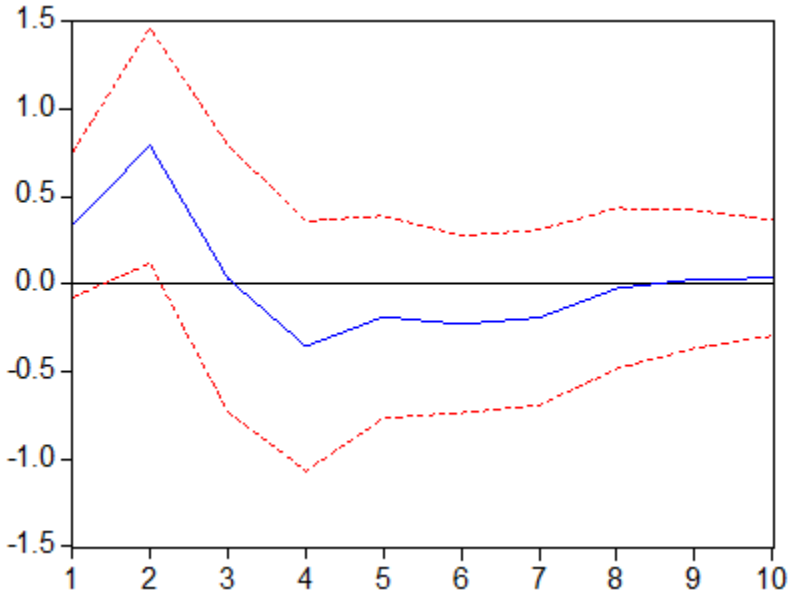


Figure 3b. Response of World Growth to a Shock of Oil Price 1990-2015



SUMMARY AND CONCLUSION

The oil price shock of 1970s created high inflation and stagnation in oil importing countries. There are several studies arguing that the recent effects of oil price rise on inflation and unemployment in oil importing countries are not as same as early 1970s. The oil price shock in the 1970s caused the aggregate supply curve in oil importing countries to shift to the left leading to inflation and unemployment. The rising cost of production due to oil price rise led to the

leftward shift of the aggregate supply curve. However, the significant oil price rise in 2007 – 2008 coincided with the global financial crises and recession causing a fall in aggregate demand offsetting the effects of oil price rise on output and prices. The empirical results from this study based on Granger Causality, Impulse response functions and OLS are supportive of the view that oil price rises no longer cause stagnation in oil importing countries.

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