

## **Chapter 6: Conclusion and Implications**

### *6.1. Objective of the Study*

The **main aim** of this study is to examine closely the impact of oil price changes and oil price volatility on selected macroeconomic variables namely, economic activity, interest rates and the stock market. The impact of oil price changes for analysis of anticipated changes, while that of oil prices volatility are for analysis of unanticipated changes.

For this study, an 11-year period (1990:1 – 2000:12) raw data is obtained to represent the movements in each of the category. The natural logs of all data; Producer Price Index (PPI) for fuels in the Malaysian economy, Index of Industrial Production (IPI), 3-month Treasury Bills issued by Bank Negara Malaysia, are used. The proxy used to measure real stock returns is the continuously compounded returns on the Kuala Lumpur Composite Index (KLCD), discounted for inflation rate based on the Consumer Price Index (CPI) for Malaysia.

### *6.2. Summary of the Results*

The time series are tested for unit root and the oil price, industrial production and interest rates are found to be integrated of order one,  $I(1)$ . The real stock returns are stationary. Cointegration tests show that there are no long-term

relationships in the I(1) variables. As a result, VAR modeling is used for examining short-term dynamics. The optimal lag length of the VAR is (2) for the analysis of oil price changes. The IRF shows that oil price changes have a negative impact on industrial activity after a lag of 2 months. Generally, all three variables react negatively to oil price changes and the adjustment process is only expected to stabilize after 6-7 months. Most of the forecast error variance comes from the innovations in the variables themselves as shown by the VDC results.

In order to obtain the volatility variable of oil prices, a low-order GARCH(1,1) as suggested by Sadorsky(1999) is used estimate the process. Oil price volatility,  $v_t$  is then constructed based on the residuals of the model standardized by the conditional standard error. This series proxies the unanticipated component of oil price changes.

The estimated  $v_t$  is then included in the VAR model. The VAR(p) process selected using AIC is of lag length 3. By looking at the IRF, shocks derived from oil price volatility have a negative impact on industrial production, interest rates and the stock market. Industrial output and the financial markets, in the case of unexpected oil price shocks, take almost one year to adjust. The VDC confirms that most of the forecast variability of the macroeconomic variables comes from movements within the variable itself.

### *6.3. Implications of the Results of the Study*

It is interesting to observe that there is a statistical difference in the impact of oil price changes and oil price volatility. The latter, having more lasting effects than the former.

A positive change in oil prices have a negative impact on all the variables and adjustment is expected to be completed within 6-7 months. Oil price itself is expected to stabilize in about 6 months.

On the other hand, price volatility, which measures unexpected changes in oil prices, takes a slightly longer time of about 8 months to re-adjust itself completely. Its effects on the other variables take nearly up to a year before complement of adjustment.

The implication of this study is that the Malaysian economy takes a longer time to re-adjust itself to achieve a new equilibrium after the initial impact of an unexpected oil shock compared to an expected change in oil prices. As a further support to this finding, the results show that a higher proportion of the variance in forecast errors for the macroeconomic variables can be explained by expected oil price changes than their unexpected counterpart. This explains the longer adjustment period for an unanticipated oil price change.

#### *6.4. Recommendations for Future Research*

One of the limitations of this study is that it looks into a rather narrow choice of macroeconomic variables. Oil being an important commodity to a growing nation could be related to other sub-sectors of the economy like industrial employment, agriculture production/employment and other aggregate indicators like the inflation, balance of payments. More variables could perhaps be incorporated in the framework of analysis

Another area that needs to be addressed is in examining the *changes* in the short-run dynamics of oil price. As Malaysia is advancing towards an industrialized country with plans of attaining full industrialization, we can assume that the dependency on oil is expected to increase. How this would affect the impact on macroeconomic variables would make an interesting topic of discussion for policy makers.

Oil price may have an asymmetric effect on the Malaysian economy, as studies on other countries have shown. Therefore, it may also be worthwhile to examine how oil price hikes and oil price falls can affect the Malaysian macroeconomy, in a comparative framework.