CHAPTER 6

CONCLUSION

6.1 Summary

The objectives of the paper aim to investigate the quantitative responses of the macroeconomic variables and the responding of monetary policy to an oil price shock. As pointed out form the empirical evidence, the macroeconomy of oil-dependent and oil-importing countries have been highly influenced from oil price shocks. In regards to essential effects of oil prices on economic activities, the effects of the oil prices change will not play the same role as changed of other goods prices. Oil prices will directly drive up the production costs, and in turn, lead to more inflation. The interest rates are expected to increase for fighting inflation as a result. For the external view point, the high imports values of oil due to a high increase in oil prices will deteriorate the current account deficit, and in turn, the depreciation in exchange rates. Consequently, the policy formulated for stabilizing the macroeconomy in response to oil price shocks have been difficult, since oil price shocks reduce economic growth and increase inflation simultaneously. The high degree of responding to increase in inflation has sensitively to put downward pressure to economic growth. Therefore, the quantitative effects and the dynamic paths of macroeconomic variables should be taken when macroeconomic policy is implemented.

Although the analysis of the economic effects of oil price shocks on the macroeconomy or the oil price-macroeconomy relationships, have done by a numerous literature of oil macroeconomics, the research that suggests those effects by modeling a dynamic stochastic general equilibrium model based on the micro-foundation analysis are rarely found in Thailand, additionally, the effects of oil price shocks remain to be tackled. Therefore, this paper puts the effort to develop a small open economy dynamic macroeconomic model which can capture the relationships of

oil price shocks and macroeconomy. Based on the fundamental analysis, our model has potential to study the effects of oil price shocks from the structural analysis and deep parameters. The advantage of the study is that it provides the structural model for addressing the dynamic effects, as characterized in both magnitude and duration, of some macroeconomic variables in responding to oil price shocks.

The framework of the model used in this paper is based on the New Open Economy-Macroecomics (NOEM) initiated by Obstfeld, and Rogoff (1995, 2000). The model, in this paper, is closed to Svennsson (1998, 2000) but it is extended by adding capital stocks and energy input to the production function for analyzing the effects of oil price shocks on macroeconomic variables. The model also introduces the price stickiness occurring from the price setting assumption according to Calvo(1983), i.e., firms are assumed to receive an randomly signal which allows them to change their price. The price stickiness is introduced in order to model an economy with rigidities so as to capture real features of price adjustments and to study the effects of monetary policy. According to the role of oil as the productive input in the production function as presented in the theoretical framework chapter, the model can link relationships of oil prices to aggregate supply and aggregate demand. Therefore, our equilibrium model enables to assess qualitative and quantitative aspects in which the macroeconomic variables have responded to oil price shocks.

The monetary policy is based on the standard Taylor rule (Taylor (1993), i.e., the interest rate as the monetary policy instrument will be adjusted to respond to the deviation of the inflation rate from its target and the output gap. Finally, as the solution of the model cannot be characterized in the closed form, therefore, the model in this study is log-linearized approximation and is solved by standard algorithms for solving a linear approximation of a rational expectation model and the computer algorithm of Paul Soderlind (1999) is used for the simulation experiments.

As discussed in the previous chapter, this study does not attempt to estimate the model, therefore, the parameters of the model are selected according to the related literature, especially from the Bank of Thailand's papers, and to Thailand quarterly historical data. The data are stem from the NESDB and BOT between 1997Q1-2007Q4. Some of the parameters for the foreign country are estimated according to the U.S. data.

Due to the major objective to study oil prices -macroeconomy relationships, only one innovation generated from one-time 10 percent exogenous increase in oil prices is experimented. The model is related to Thailand's economy by comparing the predicted standard deviations generated form the model to those from the data. The macroeconomic variables are focused to aggregate demand, aggregate consumption, inflation, short term interest rate, energy consumption, capital stock, foreign bond holding, real exchange rate, and imported goods.

The model predicts that the standard deviations close to the data only for consumption, inflation, and interest rate. The other variables cannot replicate Thailand stylized fact. In addition, a pairwise correlation matrix of the variables generated from the model is also compared to that from the data. The predicted correlation matrix, as broadly stated, is over-predicted relative to the data. However, the directions of correlated variables predicted from the model are the same as those from the data.

According to those unnatural results generated from the model, the problem may come from the parameters setting, since the parameters are chosen from the relevant literature that do not have an exact structure as in this model. The next study in this field should be much concerned to this point. Another reason taken to account for these strange results may be that the sticky price setting assumption might not be suitable for our model.

We explore the dynamic responses of variables to an oil shock using the impulse response functions. The direction of the dynamic responses of all of the selected variables have broadly similar to those in others oil-macroeconomics research literature. The increase in prices of oil will contract the domestic output, aggregate demand, consumption expenditure, and savings, and put the upward pressure on consumer price index inflation and nominal interest rates, which those consequences are explained in the similar way as the explanation of consequences of negative supply shocks on the economic activity in numerous amount of economic literature. Quantitatively, responding to 10 percent increase in oil prices, aggregate output will decrease approximately by 3.0 percent within fourth to fifth quarter, inflation raises around 2.5 percent, and interest rate is put upward around 1.5 percent within the fourth quarter.

Experiments with various persistent coefficient of the oil price process, the adjustment weights on the past value of aggregate demand and aggregate supply are also explored. The results show that with the lower value of the persistent coefficient of oil prices, the response of macroeconomics variables will be more severe. The higher adjustment weight on the past value of aggregate demand affects much more in capital stock. Under the higher adjustment weight on the past value of aggregate supply, the model predicts the adverse effects for foreign asset holding and exchange rate, comparing to the base model.

6.2 Limitations and Suggestion

Although the parameterization is crucially important for quantitative analysis and the completion of the model, this study is not attempted to estimate parameters from the model. Parameters are selected and calibrated from the related literature. Parameterization, therefore, was not properly fitted to the real structure of the model. The next study can be directed at attending at this point using the popular estimation such as Bayesians, and Maximum Likelihood technique to estimate structural parameters or deep parameters of the model.

This study cannot account for the fiscal policy effects even though Thailand is one of the most countries in the world that the government has short run policy for stabilizing oil price shocks by using subsidization scheme. The discretionary fiscal policy will also influence the dynamic of interest rate and domestic aggregate output. However, the model discussed in this paper is characterized as the Ramsey model with infinitely time horizon, the implementation of the fiscal policy will be addressed by the Ricardian equivalence assumption. To a great extension, the next study should develop the model to the overlapping generation model which it is more suitable for studying the effects of both monetary policy and fiscal policies.

Additionally, numbers of literature from evidence in the U.S. suggest that the effects of oil prices will have a asymmetry response to economic activities. Another extension from this study is to study the asymmetry relationships between oil price shocks and macroeconomy. The increase in oil prices dampen economic activities by more than the reduction in oil prices boost it. The next extension of the

research can use the model to address those effects by detailing the firm problem into industry or sector levels.