Chapter 3

Methods

3.1 Location

For the data which used is secondary data. Both of data money supply data and stock prices data of Thailand over the period of monthly from 1995 to 2006. The data are collected from:

- Bank of Thailand (BOT)
- Stock Exchange of Thailand (SET)

3.2 Methods

Three step for examine causality between M2 and SET index. The first step, conducts preliminary tests to determine whether the process is non-stationary or stationary.

3.2.1 Unit root test

Illustrating the behavior of the money supply (M2) and SET index. If linear times trend has no kinks, time-series model with no structural change, ADF tests, is complied for tests to determine whether the process is trend-stationary or difference-stationary.

Unit root tests no structural change: ADF tests

$$y_t = \mu_1 + \varphi_1 t + \rho y_{t-1} + \sum_{i=1}^{k} \gamma_i \Delta y_{t-i} + \varepsilon_t \qquad (7)$$

where y_t is either stock prices (ln(SET index)) or money supply (ln(M2)) , ε_t is a white noise series with mean zero and variance σ^2 and Δ is difference operator in the null hypothesis of unit root process (H_0), $\rho = 1$ and $\varphi_1 = 0$,and a stationary variable in the alternative hypothesis (H_a), $\rho < 1$,.

If the data are found to have the change in a drift term and a kink of a time trend in a linear, time-series model with a structural change is applied, developed by Perron (1989).

Unit root tests with structural change: Perron tests

$$y_t = \mu_1+\mu_2 DU_t+\mu_3 D(TB)_t+\sum_{i=1}^{k}\delta_i SD_{it}+\varphi_1 t+\varphi_2 DT_t+\rho y_{t-1}+\sum_{i=1}^{k}\gamma_i \Delta y_{t-i}+\varepsilon_t \quad (8)$$

where y_t is either stock prices (ln(SET index)) or money supply (ln(M2)), SD_{it} are centred seasonal dummies which sum to zero over a full year, $DU_t = 1$ if $t > T_B$ and 0 otherwise, $D(TB)_t = 1$ if $t = T_B + 1$ and 0 otherwise, $DT_t = 1$ if $t > T_B$ and 0 otherwise. This model allow a sudden change in the level followed by a shift in the slope of the trend function at a time TB ($1 < T_B < T$). The null hypothesis of unit root (H_0), $\rho = 1$ and $\varphi_1 = \varphi_2 = 0$, and the alternative of trend stationary (H_a), $\rho < 1$.

3.2.2 Cointegration test

Cointegration test based on a VAR approach initiated by Johanson test.

$$y_t = \mu_1 + \mu_2 DU_t + \mu_3 D(TB)_t + \delta SD_t + \varphi_1 t + \varphi_2 DT_t + \sum_{i=1}^{k} A_i y_{t-i} + \varepsilon_t \quad (9)$$

This equation is a version vector of (8) with the same trend structure.

Where $y_t \varepsilon$ {ln(SET index), ln(M2)} be a non-stationary vector I (1), $A_i = (\alpha_{i\cdot jl})$, j,l = 1,2 and i = 1,….,k. For VECM form can be written

$$\Delta y_t = \mu_1 + \mu_2 DU_t + \mu_3 D(TB)_t + \delta SD_t + \Pi y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \quad (10)$$

Where $\Gamma_i = (\gamma i,il)$, j,l = 1,2, i = 1,….,k, $\Pi = \alpha\beta'$, $\alpha = (\alpha 1,\alpha 2)'$ and $\beta = (\beta 1,\beta 2)'$

The null hypothesis is r = 0 that is no cointegration versus the hypothesis that present the cointegration, r > 0.

3.2.3 Granger causality test

After testing long-run relationship between money supply (M2) and stock prices (SET index), Granger causality tests between two variables are performed. The procedure used in the study for testing statistical causality between money supply (M2) and stock prices (SET index) is the "Granger-causality" that the dynamic relation between these two financial variables can be formulated in VAR model with the same trend structure of (8) as the following:

$$y_t = \mu_1 + \mu_2 DU_t + \mu_3 D(TB)_t + \delta SD_t + \sum_{i=1}^{k} A_i y_{t-i} + \varepsilon_t \qquad (11)$$

Where y_t ε {ln(SET index), ln(M2)} with null hypothesis is no Granger causality from money supply (M2) to stock prices (SET index). The same method for test Granger causality from stock prices (SET index) to money supply (M2).