# Chapter 4

## Empirical Results

This study will examine the economic impacts of major financial liberalization in Thailand during the period of 1985-1994. This study is to examine the degree of openness of each chronology of Thailand financial liberalization and speed of adjustment for fully of openness by apply ordinary least square (OLS) technique to set up the model for measure the openness of financial liberalization ($\psi$) by viewing the observed the average overnight interbank rate series plus one month forward premium rate, and average one month LIBOR.

The approach for measure the openness of financial liberalization ($\psi$) and speed of adjustment ($\Theta$) to foreign interest rates in each period;

$$i_t = d_0 + d_1(i_t{}^* + fw_t) + d_2 log\ y_t + d_3 log\ m_{t-1} + d_4 \pi_{t-1} + d_5 i_{t-1} + E_t$$

where $i_t$ is domestic interest rate was proxy by average overnight interbank rate

$I_t{}^*$ : foreign interest rate was proxy by average one month LIBOR

$fw_t$ : one month forward premium rate

$y_t$ : real GDP was proxy by monthly private investment index

$m_{t-1}$ : lagged money supply

$\pi_{t-1}$ : lagged inflation rate

$d_i$ : regression coefficients

$E_t$ : error term

and

$$\psi = d_1 + d_5,$$
$$\Theta = d_1 / (d_1 + d_5)$$
$$d_1 = \Theta\psi$$
$$d_5 = \psi(1 - \Theta)$$

where $\psi$ : degree of openness of the economy in the long term, is the sum of the parameters $d_1$ and $d_5$

$\Theta$ : speed of adjustment to foreign interest rates

The results of the study can presented by following the series of methodology, step as follow;

*4.1 Overall of Thailand Financial System During The Period 1985-1994.*

We will measure the overall of Thailand financial system by observed the openness of financial liberalization ($\psi$) and speed of adjustment ($\Theta$) to foreign interest rates with the whole period without braked by any policy. The results of this testing was effected by all type of financial liberalization during the period 1985-1994 which not specific the policies (see table 4.1) as follows:

The coefficient on foreign interest rate and lagged domestic interest rate are significant at 5 percent level and there was positive relationship, implying that the domestic interest rate are positively influenced by foreign interest rates. The coefficient on foreign interest rate describes 1 percent increases in foreign rate will result in an increase in domestic interest rate by 0.60 percent by holding real GDP, lagged money supply, lagged inflation and lagged domestic interest rate constant. In contrast, the coefficient on lagged domestic interest rate describes 1 percent increases in lagged domestic rate will result in an increase in domestic interest rate by 0.41 percent by holding real GDP, lagged money supply, lagged inflation and foreign interest rate constant. For coefficient on real GDP, lagged money supply and lagged inflation are all insignificant at 5 percent level, and there are unexpected signs on lagged money supply, lagged inflation and real GDP. However, the estimations in equation fit well that can interpreted the independent variables explains 84 percent of the variation dependent variable.

From the equation we can find speed of adjustment *($\Theta$)* to foreign interest can be derived by dividing $d_1$ by ($d_1 + d_5$), so we will get $\Theta$ by 0.60. However, adjustment is not instantaneous, with only 60 percent of the difference between domestic and foreign interest rate eliminated in each period, if it adjusted to foreign interest rate by 100 percent, it will need more 0.68 month. For $\psi$ measures the degree of openness of the economy in the long term is 1.01 which suggests that the financial system is fully open.

## Table 4.1: Whole Period

| Period | Foreign Interest Rate | Lagged Interest Rate | Real GDP | Lagged Money Supply | Lagged Inflation | R² | D.W. | No. of Observations | Speed of Adjustment (Θ) | Openness Coefficient Long run (ψ) | Short run | Timing for Fully Adjustment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985.01-1994.12 | 0.601 (7.079) | 0.409 (5.454) | -0.284 -(0.545) | -0.490 -(1.455) | -0.056 -(0.432) | 0.84 | 1.578 | 118 | 0.60 | 1.01 | 0.60 | 0.68 |

## Table 4.2: Foreign Exchange Policy

| Period | Foreign Interest Rate | Lagged Interest Rate | Real GDP | Lagged Money Supply | Lagged Inflation | R² | D.W. | No. of Observations | Speed of Adjustment (Θ) | Openness Coefficient Long run (ψ) | Short run | Timing for Fully Adjustment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985.01-1991.03 | 0.563 (8.050) | 0.469 (6.987) | -0.018 -(0.029) | -0.349 -(0.511) | -0.589 -(2.282) | 0.93 | 1.53 | 74 | 0.55 | 1.03 | 0.56 | 0.83 |
| 1991.04-1994.12 | 0.746 (2.588) | 0.299 (1.727) | -2.433 -(0.841) | 0.530 (0.256) | 0.034 (0.173) | 0.53 | 1.490 | 45 | 0.71 | 1.05 | 0.75 | 0.40 |

*4.2 Foreign exchange control policy.*

In this section, will measure the impact of foreign exchange control liberalization on structure of financial system i.e., the openness of financial liberalization ($\psi$) and speed for adjustment ($\Theta$) of domestic interest rate to foreign interest rates.

4.2.1  Period I:  January 1985 - March 1991

This period is the period which has not implemented the foreign exchange control liberalization (see table 4.2).  The results of this period as follows:

The coefficient on foreign interest rate and lagged domestic interest rate are significant at 5 percent level and there was positive relationship, implying that the domestic interest rate are positively influenced by foreign interest rates and lagged domestic interest rate.  The coefficient on foreign interest rate describes 1 percent increases in foreign rate will result in an increase in domestic interest rate by 0.56 percent by holding real GDP, lagged money supply, lagged inflation and lagged domestic interest rate constant. Moreover, the coefficient on lagged domestic interest rate describes 1 percent increases in lagged domestic rate will result in an increase in domestic interest rate by 0.47 percent by holding real GDP, lagged money supply, lagged inflation and foreign interest rate constant.  For coefficient on real GDP, lagged money supply and lagged inflation are all insignificant at 5 percent level, and there are unexpected signs on lagged money supply, lagged inflation and real GDP.  The estimations in equation fit well that can interpreted the independent variables explains 93 percent of the variation dependent variable.

In the first period, we can find speed of adjustment ($\Theta$) to foreign interest by 0.55. However, adjustment is not instantaneous, with only 56 percent of the difference between domestic and foreign interest rate eliminated in each period, if it adjusted to foreign interest rate by 100 percent, it will need more 0.83 month.  For $\psi$ measures the degree of openness of the economy in the long term is 1.03 which mean fully opened.

## 4.2.2 Period II: April 1991 - December 1994

This period is the period after implementing the foreign exchange control liberalization. For the results of this period (see table 4.2):

The coefficient on foreign interest rate is significant at 5 percent level and there was positive relationship, implying that the domestic interest rate are positively influenced by foreign interest rates, describes 1 percent increases in foreign rate will result in an increase in domestic interest rate by 0.75 percent by holding real GDP, lagged money supply, lagged inflation and lagged domestic interest rate constant. In other way, the coefficient on lagged domestic interest rate describes 1 percent increases in lagged domestic rate will result in an increase in domestic interest rate by 0.30 percent by holding real GDP, lagged money supply, lagged inflation and foreign interest rate constant. For coefficient on real GDP, lagged money supply, lagged inflation and lagged domestic interest rate are all insignificant at 5 percent level, and there is the unexpected sign on real GDP. However, the estimations in equation is not fit well that can interpreted the independent variables explains only 53 percent of the variation dependent variable.

The equation showed the speed of adjustment ($\Theta$) to foreign interest by 0.71. However, adjustment is not instantaneous, with only 75 percent of the difference between domestic and foreign interest rate eliminated in each period, if it adjusted to foreign interest rate by 100 percent, it will need more 0.40 month. For $\psi$ measures the degree of openness of the economy in the long term is 1.05 which mean fully opened.

If we observe the structural change after liberalized foreign exchange control policy, we will found that in the second period more openness than first period compare with speed of adjustment or the other way, it suggested the domestic interest rate more closely linked to foreign interest rate after liberalized of foreign exchange policy. Moreover, the result for this period has not only effected by foreign exchange control liberalization, the others financial reforms may affect to the result, such as BIBFS policy. However, a Chow test cannot reject the hypothesis of all parameter in the equation stability for sample break at 1991.04 with 0.91 of F-distribution at 5 percent level of significant.

The observation for the real GDP was proxy by monthly private investment index showed high peak during the period 1987 through the last quarter of 1988 and slightly came down until the third quarter of 1992 and peak up again through third quarter of 1993. Money supply for the whole period presented slightly increase and more fluctuate movement during the second

period of 1990 through the end of 1994 which it is the same period of domestic interest rates has more fluctuation. And consumer price index change showed low level but more fluctuate change from 1989 through last quarter of 1993. Moreover, portfolio investment from 1990 through the end of period showed more fluctuation than previously which supported to domestic interest rate movement more fluctuation at the same time (see figure 1,2).

From the results, we may conclude that the Thai financial system is fully open as showed the significant level. The other hand, domestic and foreign financial markets will become increasingly closely linked. The liberalization of foreign exchange control is the policy that impact to domestic interest rates movement following to foreign interest rates.

However, the domestic interest rate adjustment is not wholly instantaneous, because of the existing restrictions on the capital account as well as transaction costs and information lag and take about 60-75 percent of the difference between domestic and foreign interest rate eliminated in each period, if it adjusted to foreign interest rate by 100 percent, it will need more 0.40-0.68 month.

More importantly, the methodology of this study has different from the Edwards and Khan approach, such as lagged inflation ($\pi_{t-1}$) used for this study and expected inflation ($\pi^e_t$) for the Edwards and Khan approach, and monthly data used for this study and quarterly data for the Edwards and Khan approach, the results which got from this study are the same of the results of the Edwards and Khan approach which can confirm that the Thailand financial system is fully open.

Nevertheless, we have conducted a study whether implementation of BIBFS have impacts on the interest rates, the BIBFS policy showed insignificant statistically which affect the structural determination of domestic interest rates (see Appendix IV). Plausible reason for this is that during that period, financial market was effected by external shock which are high volume capital inflows for invested in equity market, so that, they pressured the domestic interest rate came down (see figure 1-2), and also have affected to lower $R^2$ in the period after liberalizing foreign exchange control. On the other hand, more openness with high speed of adjustment, the internal and external shock can affected to the money market at a longer magnitude than previously.