Chapter 2
Review of literature

2.1 Introduction

The purpose of this chapter is to describe the background of the Thai economy as well as other developing countries in the Southeast Asia region. It also summarises the theoretical framework in the financial literature. This chapter is structured as follows: Section 2.2 describes the country classification of this study according to the World Bank's method. Section 2.3 presents the economic background of Thailand and other developing countries. Section 2.4 reviews the literature of the relationship between commercial banks' stock price and changes in money market interest rate and outlines the theoretical framework of this study. Section 2.5 briefs an overview of the interest risk management in financial institutions. Hypothesis formulation and chapter summary are provided in Sections 2.6 and 2.7.

2.2 Country classification

This study classifies countries in the Southeast Asia area into two groups according to the country classification of the World Bank (2006), which is based on the gross national income (hereafter called GNI) per capita by using the World Bank Atlas method[10] to calculate. The first group is countries with high income (more than USD$10,725) that are categorised as developed countries. The second group is countries that have middle income (between USD$876 and USD$10,725) that are labelled as developing countries. Table 2.1 shows two groups of countries according to their GNI per capita. The first group comprises Brunei and Singapore regarded as developed countries in the Southeast Asia region. The developing countries in this region are Indonesia, Malaysia, and Thailand (Human Development Report Office 2005). The GNI per capita of Thailand, for example, is USD$2,317.37 on the average between 1990 and 2009. This figure falls in the range of middle-income group, which is labelled as developing countries. Singapore, on the other hand, has the average GNI per capita USD$22,879.47 during the same period. Singapore, therefore, can be called as a developed country, as its GNI per capita is more than USD$10,725.

2.3 Economic background

This section summarises the economic background for all selected developing countries in the Southeast Asia region. It is divided into two sub-sections, which are Thailand and other two developing countries (Indonesia, and Malaysia).

[10] The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes by using a three-year moving average, price-adjusted conversion factor.

Table 2.1: Country classification

This table classifies countries, which will be employed in this study, according to the World Bank's country classification criterion, into two groups: developing and developed countries. It also shows the GNI per capita presented in the US dollar for each country in the Southeast Asia region between 1990 and 2009.

	High income group (Developed countries)		Middle income group (Developing countries)		
Years	Brunei	Singapore	Indonesia	Malaysia	Thailand
1990	12,540	11,200	590	2,260	1,410
1991	13,680	12,620	600	2,450	1,590
1992	15,270	14,600	660	2,730	1,780
1993	15,150	17,040	800	3,160	2,060
1994	15,200	20,380	900	3,580	2,350
1995	15,800	23,260	1,020	4,030	2,690
1996	16,310	25,130	1,120	4,480	2,920
1997	16,300	27,160	1,130	4,600	2,700
1998	14,460	23,490	680	3,630	2,050
1999	14,050	22,880	590	3,360	1,950
2000	14,670	22,960	580	3,450	1,960
2001	16,030	21,180	690	3,540	1,900
2002	17,060	20,970	740	3,780	1,900
2003	17,690	22,290	840	4,160	2,060
2004	19,810	24,870	1,020	4,740	2,360
2005	22,770	27,670	1,170	5,210	2,580
2006	27,050	30,360	1,300	5,710	2,860
2007	N/A	31,890	1,520	6,420	3,240
2008	N/A	34,760	1,880	7,250	3,670
2009	N/A	37,220	2,230	7,230	3,760

Note: N/A denotes Not Applicable
Source: World Bank (2010)

2.3.1 Thailand

This study focuses on Thailand and compares the Thai results with other developing countries in the Southeast Asia area, namely Indonesia and Malaysia. Thailand has undergone major changes in development of its monetary policy and credit ratings. The first period is between World War II and June 1997. During this period, a pegged exchange rate policy was adopted. The second regime is the monetary aggregates targeting policy, employed from July 1997 through May 2000. The target of this policy is domestic money supply. The aim was to ensure macroeconomic consistency as well as to reach the ultimate objectives of sustainable growth and price stability (Bank of Thailand 2006). After receiving the IMF official rescue programme, the Bank of Thailand (hereafter called BOT)[11] made an extensive reassessment of both domestic and external

[11] The BOT is the central bank of Thailand. Its responsibilities are formulating monetary policy, promoting monetary and financial institutions stability, supervising and providing banking facilities for financial institutions, managing international reserves, recommending economic policy to the government, and printing/issuing banknotes.

environments. The BOT concluded that the money supply targeting would be less effective than the targeting of inflation rate, along with 100 other countries around the globe, including Australia and South Korea. The inflation targeting policy, therefore, was adopted in May 2000, as shown in Table 2.2. The Monetary Policy Committees (hereafter called MPC)[12] was also first set up at the same time. The MPC has an authority to set the direction of monetary policy with price stability as the overriding objective (Bank of Thailand 2006). The MPC has a further power to refine the inflation-targeting framework to suit the Thai economy.

Table 2.2: A development of the Thai monetary policy
This table shows a development of the Thai monetary policy. There are three monetary policy regimes during the study period.

Periods	Monetary policies	Main targets
Before June 1997	Pegged exchange rate	Exchange rate
July 1997 – May 2000	Monetary aggregates targeting	Money supply
After May 2000	Inflation targeting	Inflation rate

Source: Bank of Thailand (2006)

In terms of credit ratings, Thailand has also experienced some significant changes. Table 2.3 shows the sovereign rating of Thailand from the Fitch Ratings Inc. This suggests that the recent history of the Thai economy could be partitioned into five sub-periods. The first period is before year 1999 (the sovereign rating is BB+). Then, from 1999 to 2002 is the second period (the credit rating is BBB-). The next period is between 2003 and 2004 (the sovereign rating is BBB). The fourth period is during 2005 and 2008 (the credit rating is BBB+). The last period is after year 2008 onward (the sovereign rating is BBB). During each monetary policy regime, the BOT may change interest rate to achieve each monetary policy objective. For example, an interest rate is adjusted to maintain inflation rate at the target value during the inflation targeting policy.

2.3.2 Other developing countries

As mentioned in the previous section, some developing countries in the Southeast Asia region also suffer from the Asian financial crisis in 1997 as much as Thailand. These countries are Indonesia and Malaysia. All of them also have a similar economy, when compared with Thailand.

Indonesia has a few changes in credit ratings from the Fitch Ratings Inc., as shown in Table 2.3. This suggests that the recent history of the Indonesian economy could be partitioned into six sub-periods. The first period is before year 1999 (the sovereign rating is BB-). Then, from 1999 to 2001 is the second period (the credit rating is B-). The next period is during the year 2002 (the sovereign rating is B). Between 2003 and 2004 is the fourth period (the credit rating is B+). The next period is during the year 2005 and 2007 (the sovereign rating is BB+). The last period is after year 2007 onward (the credit rating is BB). In term of sovereign rating from the Fitch Ratings Inc., Malaysia also has some changes, which could be partitioned into four periods as shown in Table 2.3. The

[12] The MPC's responsibilities involve forming judgements on the state of the economy, estimating forecasts of inflation rate, and making decisions on interest rate.

sovereign rating changes from BB- in 1998 to BBB in 1999, BB+ in 2002, and A- in 2004. When compared with Indonesia and Thailand, it suggests that Malaysia has recovered faster.

In term of the GNI per capita, Indonesia, Malaysia, and Thailand have USD$1,003, USD$4,288.50, and USD$2,389.50 on the average between 1990 and 2009 respectively, as shown in Table 2.1. It shows that Malaysia has the highest GNI per capita among other developing countries (Indonesia and Thailand) during 1990 to 2008 while Indonesia has the lowest GNI per capita.

Table 2.3: Sovereign rating of the Southeast Asian countries

This table shows the Fitch's sovereign rating of Thailand and other two developing countries (Indonesia and Malaysia) cover period from 1998 to 2009. The sovereign rating of BBB means that country has an adequate capacity to repay principal and interest. An unstable economic conditions could likely lead to reduce the payment ability. The BB rating also suggests that in the unstable economic conditions, country may have some problems that could lead to an inadequate capacity to repay principal and interest. A plus or minus signs also show the standing of issue within the sovereign rating class.

Years	Thailand	Indonesia	Malaysia
1998	BB+	BB-	BB-
1999	BBB-	B-	BBB
2000	BBB-	B-	BBB
2001	BBB-	B-	BBB
2002	BBB-	B	BB+
2003	BBB	B+	BB+
2004	BBB	B+	A-
2005	BBB+	BB-	A-
2006	BBB+	BB-	A-
2007	BBB+	BB-	A-
2008	BBB+	BB	A-
2009	BBB	BB	A-

Source: Fitch Ratings (2010)

2.4 Theoretical framework

According to the basic discounted cash flows model, the price of a financial asset is equal to the discounted value of cash flows to be derived from the financial asset as:

$$P = \sum_{i=1}^{T} \frac{CF_0 (1+D_i)^i}{(1+R)^i}, \square \qquad (2.1)$$

where P and R are firm's stock price and a nominal interest rate,
CF_0 is cash flows of firm measured at time zero, and
D_i is an expected future nominal profit of firm at time i; $i = 1, 2, \ldots, T$.

Simplifying Equation (2.1) to a single period model can help to illustrate the possible relationship between interest rate and firm's stock price. The discounted cash flows model becomes:

$$\Delta P = \frac{CF(1+\Delta D)}{(1+\Delta R)}. \square \tag{2.2}$$

One way to look at the transmission mechanism on the asset price channel is to assume that firm's stock price (P) are a function of cash flows (CF), the expected future nominal profit (D), and the nominal interest rate (R):

$$P = f(CF, D, R),$$

where D is a function of R and an uncertainty of nominal interest rate (σ_R): $D = f(R, \sigma_R)$.

Any change in monetary policy directly affects R and σ_R. In this study, we assume that D will be dependent only on σ_R: $D = f(\sigma_R)$. Normal investors, for example, are risk averse as such they might use the rate of return to estimate firm profitability (D). During a volatile market condition, any change in nominal interest rate (ΔR) that reduces σ_R would increase D under this assumption. If ΔD is greater than ΔR, P would increase as well. This suggests that there is a positive relationship between changes in interest rate and firms' stock price (see Hafer 1986; Mukherjee & Naka 1995; Maysami & Koh 2000). However, if any change in nominal interest rate (ΔR) during normal market conditions that decreases D more than ΔR it will increase σ_R, which could reduce the ability of firm to increase its D. It implies that P would decrease, resulting in a negative relationship (see Pearce & Roley 1985; Hardouvelis 1987; Thorbecke & Alami 1992; Thorbecke 1997).

Given that either a positive or a negative relationship can be identified in the theory, this study also reviews the empirical evidence of previous studies. Several studies find a negative relationship between firms' stock returns and unexpected changes in money market interest rate. According to Bulmash and Trivoli's (1991) and DeFina's (1991) arguments, an unexpected rise in interest rate (or ΔR in Equation (2.2)) directly affects firms' stock returns, causing their price (or P in Equation (2.2)) to decline generally. This implies that P reacts negatively to an increase in R. Whenever an interest rate rises, many investors tend to switch out of firms' common stock, causing the stock price to fall. Spyrou (2001), for example, examines the relationship between an inflation rate and stock return in Greece between January 1990 and June 2000. The results show that this relationship seems to be significantly negative. This relationship also has been proven by several studies (see Fama & Schwert 1977; Rogalski & Vinso 1977; Fama 1981; James, Koreisha & Patrtch 1985; Marshall 1992).

As previously mentioned in Chapter 1 (see Section 1.1), examining the impacts of changes in interest rate on bank stock return, therefore, could provide an important indicator of banking health and it is a topic of much interest to policy makers. Flannery and James (1984) measure the effect of changes in interest rate on commercial banks' stock returns. They find that stock returns of commercial banks respond negatively to unexpected changes in interest rate.13 This finding is similar to those of Lynge and Zumwalt (1980), Booth and Officer (1985), Mitchell (1989), Bae (1990), Yourougou

[13] Chen and Chan (1989) also illustrate that the interest rate factor is generally a significant variable in explaining financial institutions' stock returns variations.

(1990), Kwan (1991), Allen and Jagtiani (1997), Choi and Elyasiani (1997), Dinenis and Staikouras (1998), Benink and Wolff (2000), and Jianpin and Wang (2000).

The above studies generally emphasise the US. Some studies, however, focus on the Asia Pacific region, as shown in Table 2.4. Faff and Howard (1999), for example, study the interest rate risk of the Australian financial sector during the period of regulatory change (or from January 1978 to December 1992). Their results show that stock returns of commercial banks have significantly negative sensitivities to unexpected changes in interest rate from January 1978 to November 1983. Ryan and Worthington (2004) also find that a short-term interest rate and the Australian commercial banks' stock returns have a significantly negative relationship during the period of March 1996 to February 2001. This relationship is also similar to Hahm's (2004) and Awirothananon's (2008, 2009) studies.

Table 2.4: Summary of literature

This table summarises the related literature on the relationship between changes in interest rate and commercial banks' stock returns in the Asia Pacific region.

Author(s)	Period of study	Countries	Data frequency	Results
Faff and Howard (1999)	Jan 78 – Nov 83 Feb 84 – Sep 87 Nov 87 – Dec 92	Australia	Monthly	Significantly negative Negative Positive
Hahm (2004)	Mar 90 – Dec 93 Jan 94 – Nov 97	Korea	Monthly	Positive Significantly negative
Aggarwal, Jeon and Zhao (2005)	Sep 76 – Dec 81 Jan 82 – Dec 88 Jan 89 – Jun 93	Korea	Monthly	Significantly negative Positive Significantly positive
Faff, Hodgson and Kremmer (2005)	Jan 78 – Nov 83 Dec 83 – Dec 89 Jan 90 – Dec 98	Australia	Monthly	Significantly positive Positive Significantly negative
Awirothananon (2008)	Oct 93 – May 08 Stable conditions Volatile conditions	Malaysia	Monthly	 Positive Significantly negative
Awirothananon and Cheung (2008a)	Oct 93 – May 08 Stable conditions Volatile conditions	Thailand	Monthly	 Negative Significantly positive
Awirothananon and Cheung (2008b)	Oct 93 – May 08 Stable conditions Volatile conditions	Hong Kong	Monthly	 Positive Negative
Awirothananon (2009)	Oct 93 – May 08 Stable conditions Volatile conditions	Australia	Monthly	 Positive Significantly negative

A positive relationship between changes in interest rate and stock returns of commercial banks, however, is reported in some studies. Aggarwal, Jeon and Zhao (2005), for instance, show that unexpected changes in interest rate affect the Korean commercial banks' stock returns positively and significantly between January 1989 and June 1993. During this period, commercial banks are capable of managing the impacts of changes in

generally confirm that the relationship is different across sub-periods. This study, hence, will hypothesise that different regimes could induce this relationship to change.[15] The relationship, for example, may be negative during normal market conditions while in volatile market conditions, its relationship may be positive. However, when a change in R induces an even larger change in D (in Equation (2.2)) P will rise when R increases. This study hypothesises as follows:

Hypothesis 1: *The response of commercial bank stock index return to changes in inter-bank rate in volatile market conditions is different from that in normal market conditions.*

2.6.2 The magnitude of response

The discussion of interest rate risk management in Section 2.5 leads to a prediction that large commercial banks are less interest rate sensitive due to, for example, the sophistication of their information and risk management systems (e.g., better hedging techniques and portfolio management). This suggests that the magnitude of response of commercial bank stock index return would be similar to those of large commercial banks' stock returns because the commercial bank stock index will be dominated by large commercial banks as their weight on the stock index[16] is relatively more significant. This study, hence, hypothesises that the responses of commercial bank stock index return would be smaller during volatile market conditions than that in normal market condition. The hypothesis of this study is:

Hypothesis 2: *The magnitude of response of commercial bank stock index return is smaller in volatile market conditions than in normal market conditions.*

2.7 Chapter summary

In summary, this study describes the economic background of the Southeast Asian countries. These countries are Indonesia, Malaysia, and Thailand. These countries are classified as developing countries, according to the World Bank's country classification. The hypothesis formulation is also discussed.

This chapter has further reviewed the existing financial theories and literatures related to the relationship between commercial banks' stock returns and unexpected changes in interest rate. The earlier literature shows the different evidence of a relationship between

[15] The detail of testing this hypothesis in term of the MS model is presented in Chapter 3 (Section 3.4).

[16] The stock index is a market capitalisation weighted price index. The calculation is

$$\text{Stock Index} = \frac{\sum_{i=1}^{n} P_{it} Q_{it}}{\sum_{i=1}^{n} P_{i0} Q_{i0}} \cdot 100 \text{ ,}$$

where P_{it} and Q_{it} are current market stock price and current number of shares of common stock i at time t,
P_{i0} and Q_{i0} are market stock price and number of shares of common stock i at the based date, and
n is number of common stocks in the stock market.

financial institutions' stock returns and unexpected changes in money market interest rate in many countries, especially in the US. Many studies find a negative relationship while some studies report a positive relationship. To account for this difference, this study intends to apply an empirical model that allows for regime varying (or the Markov switching model) to study this relationship in the Thai and other developing countries context. The result of this study will provide some explanations about this relationship in term of regime switching for the Southeast Asia region.