THE IMPACT OF ASIAN FINANCIAL CRISIS ON BANK PERFORMANCE: EMPIRICAL EVIDENCE FORM THAILAND AND MALAYSIA

FADZLAN SUFIAN[1] and MUZAFAR SHAH HABIBULLAH[2]

Abstract

By using bank level data this paper examines how bank specific characteristics and the macro-economic environment affects the profitability of the Thailand and Malaysian banking sectors over the period 1992-2003. All the variables are significant although their impact is not always the same for Thailand and Malaysian banks. We find that liquidity is negatively related to Thailand banks' profitability, but not in Malaysia, while network embeddedness has negative relationship with Malaysian banks, but not Thailand banks. As for the impact of macro-economic indicators, we find that economic growth is positively related to Thailand banks' profitability only during the pre-crisis period. The impact of inflation is positive on Thailand banks' profitability during the crisis and post-crisis periods, while inflation is negatively related to Malaysian banks' profitability during the crisis period. We find that the Thailand banking sector has been relatively more profitable during the pre-crisis period, while the opposite is true for the Malaysian banking sector.

JEL classification: G21.

Keywords: Banks, Profitability, Financial Crisis, Malaysia, Thailand.

1. INTRODUCTION

The Asian financial crisis, which was initiated in Thailand in the middle of 1997, made the affected countries experience a significant depreciation in their currencies, depressed equity prices, and severe economic and financial

---

[1] Khazanah Research and Investment Strategy, Khazanah Nasional Berhad, Level 35, Tower 2, Petronas Twin Towers Kuala Lumpur City Centre, 50088 Kuala Lumpur, Malaysia. E-mail: fadzlan.sufian@khazanah.com.my; fsufian@gmail.com. Tel: 603-2034-0197, Fax: 603-2034-0035.

[2] Department of Economics, Faculty of Economics and Management, Universiti Putra Malaysia.

dislocations. Currency markets in emerging Asian economies recorded huge falls ranging from 34% in the Philippines and 49% in Thailand, while the equity markets also declined abruptly from 29% in Thailand to 50% in South Korea during the second half of 1997 (see Panels A and B of Table 1). As observed from Panel C of Table 1, economic growth in the region, which stood in the 6% to 8% neighbourhood prior to the crisis, fell into recession a year after the crisis hit the East Asian region.[3]

Table 1: ASEAN Countries Selected Macroeconomic Indicators

Panel A: **Exchange Rates - June 1997 to May 199**					
Country	US$ per 100 Local Currency 6/30/97	US$ per 100 Local Currency 6/30/97	% Δ 6/30/97 - 12/31/97	US$ per 100 Local Currency 5/8/98	% Δ 1/1/98 - 5/8/98	Cumulative % Δ 6/30/97 - 5/8/98
Thailand	4.05	2.08	-48.7	2.59	24.7	-36.0
Malaysia	39.53	45.70	-35.0	26.25	2.1	-33.6
Indonesia	0.04	0.02	-44.4	0.01	-53.0	-73.8
Philippines	3.79	2.51	-33.9	2.54	1.3	-33.0
South Korea	0.11	0.06	-47.7	0.07	21.9	-36.2
Taiwan	3.60	3.06	-14.8	3.10	1.2	-13.8
Singapore	69.93	59.44	-15.0	61.80	4.0	-11.6

Panel B: **Stock Markets - June 1997 to May 1998**					
Country	6/30/97	12/31/97	% Δ 6/30/97 - 12/31/97	5/8/98	% Δ 1/1/98 - 5/8/98	Cumulative % Δ 6/30/97 - 5/8/98
Thailand	527.3	372.7	-29.3	386.4	3.7	-26.7
Malaysia	1,077.3	594.4	-44.8	580.1	-2.4	-46.2
Indonesia	725.0	401.7[a]	-44.6	434.7	8.2	-40.0
Philippines	2,809.0	1,869.2[b]	-33.5	2,210.0	18.2	-21.3
South Korea	745.4	376.3[b]	-49.5	373.0	-0.9	-50.0
Taiwan	9,030.0	8,187.3	-9.3	8,210.8	0.3	-9.1
Singapore	1,988.0	1,529.8	-23.0	1,420.8	-7.1	-28.5

---

[3] Frankel and Rose (1996), Sachs et al. (1996), Kaminsky et al. (1998), Corsetti et al. (1999), Eichengreen and Rose (1998), Chinn (2000), Kaminsky and Reinhart (1998), Krugman (1999), Berg and Pattillo (1999), among others examined the causes of the Asian financial crisis.

Panel C: **Real GDP Growth**						
Country	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Thailand	9.3	9.2	5.9	-1.4	-10.5	4.4
Malaysia	9.2	9.8	10.0	7.3	-7.4	6.1
Indonesia	7.5	8.2	7.8	4.7	-13.0	0.3
Philippines	4.4	4.7	5.8	5.2	-0.6	3.4
South Korea	8.54	9.17	7.00	4.65	-6.85	9.49
Taiwan	7.90	5.00	7.27	6.79	3.31	6.60
Singapore	11.63	8.10	7.88	8.33	-1.33	7.15

Panel D: **Growth of Bank Credit to the Private Sector**				
Country	**1990-1994**	**1995**	**1996**	**End-1997**
Thailand	10.0	11.1	5.8	30-40
Malaysia	3.1	10.5	13.1	30-40
Indonesia	10.4	4.4	5.7	25-30
Philippines	10.7	27.4	31.5	15-20
South Korea	2.6	2.2	-0.6	15-25
Singapore	0.8	7.8	5.7	30-40

Source: Bloomberg, IMF, Bank of International Settlements, World Bank, World Economic Outlook (various issues).
Note: a – As at 12/30/97; b – As of 12/29/97.

Each of the ASEAN-4 economies experienced a credit boom in the 1990s (see Panel D of Table 1). The credit boom was fuelled in part by large net private capital inflows directed to the real estate and equities. As illustrated in Panel D of Table 1, exposure to the property sector accounted for roughly 25% to 40% of total bank loans in Thailand, Indonesia, Malaysia, and Singapore.[4] This overextension and concentration of credit left the ASEAN-4 economies vulnerable to a shift in cyclical credit conditions. When the shift came, the need to raise interest rates to control overheating and to defend the faltering exchange rates made property prices fall and non-performing loans escalate.

As each country had different economic structures, different economic

---

[4] Goldstein and Hawkins (1998) find that in Thailand, Indonesia, and Malaysia, this exposure was compounded by high (80% to 100%) loan to collateral ratios. Also, most of banks' exposure to the property market reflects exposure to property developers rather than to home-owners.

measures have been ensued. Thailand, who experienced a harsh stock market collapse, skyrocketing interest rates, and an abrupt depreciation of the Baht, asked the IMF for relief financing and took massive structural reshuffle as requested by the IMF. Although Malaysia also experienced depreciation of the Ringgit and a depressed stock market, the countermeasures for the crisis were quite different from Thailand's. Malaysia refused help from the IMF and reacted to the Asian financial crisis by adopting a strong capital control policy and a fixed exchange rate regime in order to stabilize the exchange rate and boost the financial sector. In essence, while Thailand and Malaysia showed similarities in the process of the financial crisis, clear differences are observed in counter economic measures to overcome the crisis.

It is reasonable to assume that these developments posed great challenges to banks operating in Thailand and Malaysia as the environments in which they operated changed rapidly, a fact that consequently had an impact on the determinants of profitability of the banks. As Golin (2001) points out adequate earnings are required in order for banks to maintain solvency, to survive, grow and prosper in a competitive environment. Given that the banking sector is the backbone of Thailand and Malaysia's financial systems and plays an important financial intermediary role, their health is very critical to the health of the general economy at large, as demonstrated during the Asian financial crisis, which left many financial institutions in distress.

Earlier studies by Rajan and Zingales (1998); Levine (1998); Levine and Zervos (1998); Cetorelli and Gambera (2001); Beck and Levine (2004) among others have documented positive relationship between the well being of the banking sector and the growth of the economy. Therefore, it is essential that managers of banks, the central banks, bankers associations, governments, and other financial authorities know the underlying factors that influence the financial sector's profitability. Nevertheless, knowledge of these factors would also be helpful to the bank managements and the regulatory authorities to formulate policies for the improved profitability of the Thailand and Malaysian banking sectors.

This paper seeks to examine the performance of the banking sectors of Thailand and Malaysia over the period 1992-2003, which is characterized by significant restructuring in each country's banking sectors. While there have been extensive literatures examining the profitability of financial sectors in developed countries, empirical works on factors that influence the performance of banks in developing economies are relatively scarce. Furthermore, at the present time, the impact of the Asian financial crisis on the performance of the Thailand and Malaysian banking sectors is completely missing in the literature.

This paper is structured as follows. The next section reviews the related studies in the literature, followed by a section that outlines the econometric framework. Section 4 reports the empirical findings. Finally, section 5 concludes and offers avenues for future research.

2. RELATED STUDIES

The empirical studies on the performance of banking sectors has focused on both the returns on assets, returns on equity, and net interest margins. It has traditionally explored the impact of bank specific factors such as risk, market power, size, and capitalization on bank performance. More recently, research has focused on the impact of macroeconomic factors on bank performance.

To date, empirical research has focused mainly on the U.S. banking system (Angbazo, 1997; DeYoung and Rice, 2004; Stiroh and Rumble, 2006; Bhuyan and Williams, 2006; Hirtle and Stiroh, 2007) and the banking systems in the western and in developed countries such as New Zealand (Ho and Tripe, 2002), Australia (Williams, 2003), UK (Kosmidou et al. 2008) and Greece (Pasiouras and Kosmidou, 2007; Kosmidou et al. 2007; Athanasoglou et al. 2007; Kosmidou and Zopounidis, 2008).

On the other hand, fewer studies have looked at bank performance in developing economies. Guru et al. (2002) examine the determinants of bank profitability in Malaysia. They employ a sample of 17 commercial banks during the 1986 to 1995 period. The profitability determinants were divided in two main categories, namely the internal determinants (liquidity, capital adequacy, and expenses management) and the external determinants (ownership, firm size, and economic conditions). The findings revealed that efficient expenses management was one of the most significant in explaining high bank profitability. Among the macro indicators, high interest ratio was associated with low bank profitability and inflation was found to have a positive effect on bank performance.

Heffernan and Fu (2008) examine the performance of different types of Chinese banks during the period 1999 and 2006. The results suggest that added economic value and net interest margin do better than the more conventional measures of profitability, namely return on average assets (ROAE) and return on average equity (ROAA). Some macroeconomic variables and financial ratios are significant with the expected signs. Though the type of bank is influential, the bank size is not. Neither the percentage of foreign ownership nor bank listings have a discernable effect.

Ben Naceur and Goaied (2008) examine the impact of bank characteristics, financial structure, and macroeconomic conditions on Tunisian banks' net-interest margin and profitability during the period 1980 to 2000. They suggest that banks that hold a relatively high amount of capital and higher overhead expenses tend to exhibit higher net-interest margin and profitability levels, while size is negatively related to bank profitability. During the period under study, they find that stock market development has a positive impact on banks' profitability. The empirical findings suggest that private banks are relatively more profitable than their state owned counterparts. The results suggest that macroeconomic conditions have no significant impact on Tunisian banks' profitability.

Ben Naceur and Omran (2008) examine the influence of regulations, concentration, financial and institutional development on commercial banks' margin and profitability in the Middle East and in North African countries (MENA). They find that bank specific characteristics, in particular bank capitalization and credit risk, have a positive and significant impact on banks' net interest margin, cost efficiency, and profitability. On the other hand, macroeconomic and financial development indicators have no significant impact on bank performance.

Molyneux and Thornton (1992) were the first to explore thoroughly the determinants of bank profitability on a set of countries. They use a sample of 18 European countries during the 1986-1989 period. They find a significant positive relationship between the return on equity and the level of interest rates in each country, bank concentration, and government ownership.

In a comprehensive study, Dermiguc-Kunt and Huizinga (1999) examine the determinants of bank interest margins and profitability using bank level data from 80 countries from 1988 to 1995. They find that a larger ratio of bank assets to GDP and a lower market concentration ratio lead to lower margins and profits. The findings also suggest that foreign banks have higher margins and profits than domestic banks in developing countries, while the opposite prevails in developed countries.

Dermiguc-Kunt and Huizinga (2001) present evidence on the impact of financial development and structure on bank profitability using bank level data for a large number of developed and developing countries over the 1990-1997 period. The paper finds that financial development has a very important impact on bank performance. They find that higher financial sector development is related to lower bank performance, due to tougher competition. On the other hand, stock market development leads to higher profitability and margin for banks, particularly at lower levels of financial development, suggesting complementariness between the banking sector and the stock market.

By using bank and country level data, Gelos (2006) investigates the determinants of bank interest margins in Latin America. The empirical findings suggest that spreads are large because of the relatively high interest rates, less efficient banks, and high reserve requirements.

More recently, Pasiouras and Kosmidou (2007) examine the performance of domestic and foreign commercial banks in 15 EU countries during the period 1995-2001. They find that profitability of both domestic and foreign banks is affected not only by bank specific characteristics, but also by financial market structure and macroeconomic conditions. The results suggest that all variables have significant relationship with bank profitability, although their impacts and relation is not always uniform for domestic and foreign banks.

3. DATA AND METHODOLOGY

We collected our bank specific variables from the financial statements of a sample of commercial banks operating in Thailand and Malaysia over the period 1992-2003 available in the Bankscope database of Bureau van Dijk's company. The macroeconomic variables are retrieved from the IMF Financial Statistics (IFS) database. Due to the consolidation and exit of banks during the past decade, the final estimation consists of 286 bank year observations comprised of 161 and 125 banks in Thailand and Malaysia respectively.

3.1 Performance measure

In the literature, bank profitability, typically measured by the return on assets (ROA) and/or the return on equity (ROE), is usually expressed as a function of internal and external determinants. Internal determinants are factors that are mainly influenced by a bank's management decisions and policy objectives. Such profitability determinants are the level of liquidity, provisioning policy, capital adequacy, expenses management, and bank size. On the other hand, the external determinants, both industry and macroeconomic related, are variables that reflect the economic and legal environments where the financial institution operates.

Following Pasiouras and Kosmidou (2007), Ben Naceur and Goaied (2008), and Kosmidou (2008) among others, the dependent variable used in this study is ROA. ROA shows the profit earned per dollar of assets and most importantly, reflects the management ability to utilize the bank's financial and real investment resources to generate profits (Hassan and

Bashir, 2003). For any bank, ROA depends on the bank's policy decisions as well as uncontrollable factors relating to the economy and the government regulations. Rivard and Thomas (1997) suggest that bank profitability is best measured by ROA, given that ROA is not distorted by high equity multipliers and ROA represents a better measure of the ability of the firm to generate returns on its portfolio of assets. ROE on the other hand, reflects how effectively a bank management utilizes its shareholders' funds. Since ROA tend to be lower for financial intermediaries, most banks utilize financial leverage heavily to increase ROE to competitive levels (Hassan and Bashir, 2003).

3.2 Internal determinants

Based on theory and the literature on bank profitability, we have selected several bank and industry specific attributes which may influence the profitability levels of a particular bank. We use an array of bank specific variables to control banks' production technologies, the input and product market share they are facing, and other factors that might confound the empirical relationship between bank characteristics and profitability.

The explanatory variables used to explain bank profitability are grouped under two main characteristics. The first represent bank specific attributes, while the second encompasses economic conditions during the period examined. The bank specific variables included in the regressions are LOANS/TA (total loans divided by total assets), LNTA (log of total assets), LLP/TL (loans loss provisions divided by total loans), NII/TA (non-interest income divided by total assets), NIE/TA (total overhead expenses divided by total assets), LNDEPO (log of total deposits), and EQASS (book value of stockholders' equity as a fraction of total assets).

The performance of the banking firms may also be affected by changes in credit risk (Cooper et al. 2003). The loans market, especially credit to households and firms is risky and has a greater expected return than other bank assets, such as government securities. In this vein, Miller and Noulas (1997) suggest that the more the banking firms are exposed to high risk loans, the higher the amount of non-performing loans will be and subsequently, the lower the profitability will be. Thus, one would expect a positive relationship between liquidity (LOANS/TA) and profitability (Bourke, 1989). However, Eichengreen and Gibson (2001) pointed out that the fewer the funds tied up in liquid investments, the higher we might expect profitability to be.

The LNTA variable is included in the regression as a proxy of size to capture the possible cost advantages associated with size (economies of scale).

This variable controls for cost differences and product and risk diversification, according to the size of the bank. The first factor could lead to a positive relationship between size and bank profitability if there are significant economies of scale (Akhavein et al. 1997; Bourke, 1989; Molyneux and Thornton, 1992; Bikker and Hu, 2002; Goddard et al. 2004), while the second to a negative one, if increased diversification leads to lower credit risk and thus lower returns. Other researchers however, conclude that marginal cost savings can be achieved by increasing the size of the banking firm, especially as markets develop (Berger et al. 1987; Boyd and Runkle, 1993; Miller and Noulas, 1997; Athanasoglou et al. 2007). In essence, LNTA may lead to positive effects on bank profitability if there are significant economies of scale. On the other hand, if increased diversification leads to lower risks, the variable may exhibit negative effects.

The ratio of loan loss provisions to total loans (LLP/TL) is incorporated as an independent variable in the regression analysis as a proxy of credit risk. The coefficient of LLP/TL is expected to be negative because bad loans are expected to reduce profitability. In this direction, Miller and Noulas (1997) suggest that the greater the exposure of the financial institutions to high risk loans, the higher will be the accumulation of unpaid loans and the lower profitability will be. Miller and Noulas (1997) suggest that decline in loan loss provisions are in many instances the primary catalyst for increases in profit margins. Furthermore, Thakor (1987) suggests that the level of loan loss provisions is an indication of the bank's asset quality and signals changes in the future performance.

To recognize that financial institutions in recent years have increasingly been generating income from "off-balance sheet" business and fee income generally, the ratio of non-interest income over total assets (NII/TA) is entered in the regression analysis as a proxy of non-traditional activities. Non-interest income consists of commission, service charges, and fees, guarantee fees, net profit from sale of investment securities, and foreign exchange profit. The ratio is also included in the regression model as a proxy measure of bank diversification into non-traditional activities. The variable is expected to exhibit positive relationship with bank profitability.

The ratio of non-interest expenses to total assets (NIE/TA) is used to provide information on the variations of bank operating costs. The variable represents the total amount of wages and salaries, as well as the costs of running branch office facilities. For the most part, the literature argues that reduced expenses improve the efficiency and hence raise the profitability of a financial institution, implying a negative relationship between operating expenses ratio and profitability (Bourke, 1989). However, Molyneux and

Thornton (1992) observed a positive relationship, suggesting that high profits earned by banks may be appropriated in the form of higher payroll expenditures paid to more productive human capital.[5] In any case, it should be appealing to identify the dominant effect in a developing banking environment like Thailand and Malaysia.

The variable LNDEPO is included in the regression model as a proxy variable for network embeddedness. It is reasonable to assume that banks with large branch networks are able to attract more deposits, which is a cheaper source of funds. Earlier studies by Chu and Lim (1998) among others, points out that large banks may attract more deposits and loan transactions and, in the process, command larger interest rate spreads, while smaller banking groups with smaller depositors base might have to resort to purchasing funds in the inter-bank market, which is costlier. On the other hand, Randhawa and Lim (2005) suggests that small banks with their smaller depositors base, and thus lesser deposits to transform into loans, have attained higher efficiency levels compared to their larger counterparts. Furthermore, Reda and Isik (2008) suggest that deposits to assets ratio is negatively correlated with technical and scale efficiency of banks operating in the Egyptian banking sector.

EQASS is included in the regressions to examine the relationship between profitability and bank capitalization. Even though leverage (capitalization) has been demonstrated to be important in explaining the performance of financial institutions, its impact on bank profitability is ambiguous. As lower capital ratios suggest a relatively risky position, one might expect a negative coefficient on this variable (Berger, 1995). However, it could be the case that higher levels of equity decrease the cost of capital, leading to a positive impact on bank profitability (Molyneux, 1995). Moreover, an increase in capital may raise expected earnings by reducing the expected costs of financial distress, including bankruptcy (Berger, 1995).

3.3 External determinants

Bank profitability is sensitive to macroeconomic conditions despite the trend in the industry towards greater geographic diversification and larger use of financial engineering techniques to manage risk associated with business cycle forecasting. Generally, higher economic growth encourages bank

---

[5] A guess would be that such relationship is observed in developed banking systems, which hire high quality and therefore, high cost staff. Hence, providing that the high quality staff is sufficiently productive, such banks will not be disadvantaged from a relative point of view.

to lend more and permits them to charge higher margins, as well as improve the quality of their assets. Neely and Wheelock (1997) use per capita income and suggest that this variable exerts a strong positive effect on bank earnings. Dermiguc-Kunt and Huizinga (2001) and Bikker and Hu (2002) identify possible cyclical movements in bank profitability i.e. the extent to which bank profits are correlated with the business cycle. Their findings suggest that such correlation exists, although the variables used were not direct measures of the business cycle.

To measure the relationship between economic and market conditions and bank profitability, LNGDP (natural log of GDP), INFL (the inflation rate), DUMTRAN1 (dummy variable that takes a value of 1 for the first tranquil (pre-crisis) period, 0 otherwise), DUMCRIS (dummy variable that takes a value of 1 for the crisis period, 0 otherwise), and DUMTRAN2 (dummy variable that takes a value of 1 for the second tranquil (post-crisis) period, 0 otherwise) are used.

Bank performance is expected to be sensitive to macroeconomic control variables. The impact of macroeconomic variables on bank performance has recently been highlighted in the literature. We use the log of gross domestic product (GDP) as a control for cyclical output effects. The coefficient of the LNGDP variable is expected to be positive, as GDP growth slows down, in particular during recessions, credit quality tends to deteriorate and default rate to increase, thus reducing bank profitability.

We also account for macroeconomic risk by controlling for the rate of inflation (INFL). The extent to which inflation affects bank profitability depends on whether future movements in inflation are fully anticipated, which in turn depends on the ability of banks to accurately forecast its future movements. An inflation rate that is fully anticipated raises profits as banks can appropriately adjust interest rates in order to increase revenues, while an unanticipated change could raise costs due to imperfect interest rate adjustment (Perry, 1992). Earlier studies by, among others, Bourke (1989), Molyneux and Thornton (1992), Dermiguc-Kunt and Huizinga (1999) have found a positive relationship between inflation with bank performance.

Finally, DUMTRAN1, DUMCRIS, and DUMTRAN2 are introduced in regression models 2, 3, and 4 respectively to control the impact of the Asian financial crisis on the profitability of the Thailand and Malaysian banking sectors.

Table 2 lists the variables used to proxy profitability and its determinants. We also include the notation and the expected effect of the determinants according to the literature. Table 3 presents the summary statistics of the dependent and the explanatory variables.

Table 2: Descriptive of the Variables Used in the Regression Models

Variable	Description	Hypothesized Relationship with Profitability
Dependent ROA Independent	The return on average total assets of the bank in year *t*.	NA
Internal Factors		
LOANS/TA	A measure of liquidity, calculated as total loans/ total assets. The ratio indicates what percentage of the assets of the bank is tied up in loans in year *t*.	+/–
LNTA	The natural logarithm of the accounting value of the total assets of the bank in year *t*.	+/–
LLP/TL	Loan loss provisions/ total loans. An indicator of credit risk, which shows how much a bank is provisioning in year *t* relative to its total loans.	–
NII/TA	A measure of diversification and business mix, calculated as non-interest income/ total assets.	+
NIE/TA	Calculated as non-interest expense/ total assets and provides information on the efficiency of the management regarding expenses relative to the assets in year *t*. Higher ratios imply a less efficient management.	–
LNDEPO	LNDEP is a proxy measure of network embeddedness, calculated as the log of total deposits of bank *j* in year *t*.	+/–
EQASS	A measure of bank's capital strength in year *t*, calculated as equity/ total assets. High capital asset ratio is assumed to be indicator of low leverage and therefore lower risk.	+/–
External Factors		
LNGDP	Natural logarithm of gross domestic products.	+
INFL	The rate of inflation.	+
DUMTRAN1	Dummy variable that takes a value of 1 for the first tranquil (pre crisis) period, 0 otherwise.	+
DUMCRIS	Dummy variable that takes a value of 1 for the crisis period, 0 otherwise.	–
DUMTRAN2	Dummy variable that takes a value of 1 for the second tranquil (post crisis) period, 0 otherwise.	+

Note: The data for the calculation of banks' specific variables were obtained from Bankscope database. The macroeconomic data were obtained from International Monetary Fund (IMF) International Financial Statistics (IFS).

Table 3: Summary Statistic of Dependent and Explanatory Variables

	ROA	LOANS/TA	LNTA	LLP/TL	NII/TA	NIE/TA	LNDEPO	EQASS	LNGDP	INFL
Panel A: Thailand										
Mean	-0.007	0.795	12.338	-0.002	0.009	0.017	12.063	0.064	7.965	3.683
Min	-0.315	0.058	9.562	-3.852	-0.063	0.004	9.386	-0.066	7.733	0.700
Max	0.128	1.121	15.786	0.302	0.027	0.043	13.932	0.266	8.151	7.600
Std. Dev.	0.052	0.136	1.084	0.308	0.008	0.006	1.093	0.037	0.111	2.406
Panel B: Malaysia										
Mean	0.008	0.640	9.877	0.013	0.010	0.023	9.465	0.086	5.195	2.983
Min	-0.059	0.383	7.736	-0.001	0.001	0.002	7.494	0.037	4.839	1.200
Max	0.037	0.805	11.989	0.107	0.030	0.165	11.603	0.151	5.449	5.300
Std. Dev.	0.009	0.077	1.062	0.013	0.005	0.013	1.026	0.023	0.177	1.330

Note: The table presents the summary statistics of the variables used in the regression analysis.

3.4 Econometric specification

To test the relationship between bank profitability and the bank specific and macroeconomic determinants described earlier, we estimate a linear regression model in the following form:

$$y_{it} = b_{0it} + b_{ijt} X_{ijt} + b_{ejt} X_{ejt} + \varepsilon_{it} \tag{1}$$

where i refers to an individual bank; t refers to year; j refers to the country in which bank i operates; y_{jt} refers to the return on assets (ROA) and is the observation of a bank i in a particular year t; X_i represents the internal factors (determinants) of a bank; X_e represents the external factors (determinants) of a bank; ε_{it} is a normally distributed random variable disturbance term. We apply the least square method of fixed effects (FE) model, where the standard errors are calculated by using White's (1980) transformation to control cross section heteroscedasticity. The opportunity to use a fixed effects model rather than a random effects one, has been tested with the Hausman test.

Extending equation (1) to reflect the variables as described in Table 1, the baseline model is formulated as follows:

Table 4: Correlation Matrix for the Explanatory Variables

The notation used in the table below is defined as follows: LOANS/TA is used as a proxy measure of loans intensity, calculated as total loans divided by total assets; LNTA is a proxy measure of size, calculated as a natural logarithm of total bank assets; LLP/TL is a measure of bank risk calculated as the ratio of total loan loss provisions divided by total loans; NII/TA is a measure of bank diversification towards non interest income, calculated as total non-interest income divided by total assets; NIE/TA is a proxy measure for costs, calculated as non-interest expenses divided by total assets; LNDE-PO is a proxy measure of network embeddedness, calculated as the log of total deposits; EQASS is a measure of capitalization, calculated as book value of shareholders equity as a fraction of total assets; LNGDP is natural log of gross domestic products; DUMTRAN1 is a dummy variable that takes a value of 1 for the first tranquil (pre crisis) period, 0 otherwise; DUMCRIS is a dummy variable that takes a value of 1 for the crisis period, 0 otherwise; DUMTRAN2 is a dummy variable that takes a value of 1 for the second tranquil (post crisis) period, 0 otherwise.

	LOANS/TA	LNTA	LLP/TL	NII/TA	NIE/TA	LNDEPO	EQASS	LNGDP	INFL	DUMTRAN1	DUMCRIS	DUMTRAN2
LOANS/TA	1.000	0.514**	-0.005	-0.063	0.200**	0.510**	-0.254**	0.510**	0.384**	0.158**	0.085	-0.229**
LNTA		1.000	0.016	0.094	0.174**	0.096**	-0.349**	0.097**	-0.018	-0.208**	0.008	0.207**
LLP/TL			1.000	0.023	-0.007	-0.001	-0.004	-0.048	-0.085	0.512**	0.477**	0.149*
NII/TA				1.000	0.079	0.074	0.099	0.037	-0.026	0.045	-0.123**	0.051
NIE/TA					1.000	0.196**	-0.256**	0.287**	-0.029	-0.096	0.053	0.057
LNDEPO						1.000	-0.342**	0.074**	-0.039	-0.206**	-0.014	0.223**
EQASS							1.000	-0.311	-0.015	0.070	-0.081	-0.008
LNGDP								1.000	-0.056	-0.286**	-0.007	-0.299**
INFL									1.000	0.531**	0.357**	-0.082**
DUMTRAN1										1.000	-0.419**	-0.696**
DUMCRIS											1.000	-0.360**
DUMTRAN2												1.000

Note: The table presents the results from Spearman ρ correlation coefficients.

** and * indicates significance at 1% and 5% levels.

$$ROA_{jt} = \beta_0 + \beta_1 LOANS/TA_{jt} + \beta_2 LNTA_{jt} + \beta_3 LLP/TL_{jt} + \beta_4 NII/TA_{jt}$$
$$+ \beta_5 NIE/TA_{jt} + \beta_6 LNDEPO_{jt} + \beta_7 EQASS_{jt}$$
$$+ \beta_8 LNGDP_t + \beta_9 INFL_t$$
$$+ \beta_{10} DUMTRAN1 + \beta_{11} DUMCRIS + \beta_{12} DUMTRAN2$$
$$+ \varepsilon_{jt} \tag{2}$$

Table 4 provides information on the degree of correlation between the explanatory variables used in the multivariate regression analysis. The matrix shows that in general, the correlation between the bank specific variables is not strong suggesting that multicollinearity problems are not severe or nonexistent. Kennedy (2008) points out that multicollinearity becomes a problem when the correlation is above 0.70, which is not the case here.

4. EMPIRICAL FINDINGS

The regression results focusing on the relationship between bank profitability and the explanatory variables are presented in Table 5. To conserve space, the full regression results, which include both the bank and time specific fixed effects, are not reported in the paper. The model performs reasonably well with most variables remaining stable across the various regressions tested. The explanatory power of the models is reasonably high, while the F-statistics for all models is significant at the 1% level. The adjusted R^2 is also considerably higher than that obtained by Williams (2003), Staikouras and Wood (2003), and Kosmidou et al. (2007).

Concerning the liquidity results, LOANS/TA is negatively related to banks' profitability indicating a negative relationship between bank profitability and the level of liquid assets held by the bank. As higher figures of the ratio denote lower liquidity, the results imply that more (less) liquid banks tend to exhibit lower (higher) profitability levels. A plausible reason is the increased cost for screening and monitoring required by a higher proportion of loans in the banks' assets portfolio, since loans are the type of assets with the highest operational cost in a bank portfolio (Ben Naceur and Omran, 2008).

The relationship between size (LNTA) and bank profitability is negative, a fact that supports the results of Spathis et al. (2002) and Kosmidou (2008). Moreover, researchers have previously concluded that marginal cost savings can be achieved by increasing the size of the banking firm, especially as markets develop (Berger et al. 1987; Boyd and Runkle, 1993; Miller and Noulas,

Table 5: Multivariate Regressions Results - All Banks

$$ROA_{jt} = \beta_0 + \beta_1 LOANS/TA_{jt} + \beta_2 LNTA_{jt} + \beta_3 LLP/TL_{jt} + \beta_4 NII/TA_{jt}$$
$$+ \beta_5 NIE/TA_{jt} + \beta_6 LNDEPO_{jt} + \beta_7 EQASS_{jt}$$
$$+ \beta_8 LNGDP_t + \beta_9 INFL_t$$
$$+ \beta_{10} DUMTRAN1 + \beta_{11} DUMCRIS + \beta_{12} DUMTRAN2$$
$$+ \varepsilon_{jt}$$

The notation used in the table below is defined as follows: LOANS/TA is used as a proxy measure of loans intensity, calculated as total loans divided by total assets; LNTA is a proxy measure of size, calculated as a natural logarithm of total bank assets; LLP/TL is a measure of bank risk calculated as the ratio of total loan loss provisions divided by total loans; NII/TA is a measure of bank diversification towards non interest income, calculated as total non-interest income divided by total assets; NIE/TA is a proxy measure for costs, calculated as non-interest expenses divided by total assets; LNDEPO is a proxy measure of network embeddedness, calculated as the log of total deposits; EQASS is a measure of capitalization, calculated as book value of shareholders equity as a fraction of total assets; LNGDP is natural log of gross domestic products; DUMTRAN1 is a dummy variable that takes a value of 1 for the first tranquil (pre crisis) period, 0 otherwise; DUMCRIS is a dummy variable that takes a value of 1 for the crisis period, 0 otherwise; DUMTRAN2 is a dummy variable that takes a value of 1 for the second tranquil (post crisis) period, 0 otherwise.

	(1)	(2)	(3)	(4)
CONSTANT	-0.063	-0.315	-0.122	0.009
	(-0.413)	(-1.534)	(-1.041)	(0.058)
Bank Characteristics				
LOANS/TA	-0.078**	-0.067**	-0.068*	-0.079**
	(-2.129)	(-1.988)	(-1.884)	(-2.106)
LNTA	-0.027*	-0.016	-0.014	-0.026
	(-1.710)	(-1.051)	(-0.903)	(-1.626)
LLP/TL	0.020	0.017	0.019	0.021
	(1.364)	(1.348)	(1.477)	(1.434)
NII/TA	2.330***	2.142***	2.001531***	2.285***
	(2.819)	(2.707)	(2.748)	(2.941)
NIE/TA	-0.990***	-0.794***	-0.842***	-1.016***
	(-8.588)	(-7.069)	(-9.062)	(-7.719)
LNDEPO	0.004	0.008	0.000	0.001
	(0.218)	(0.524)	(0.055)	(0.052)
EQASS	0.347**	0.292**	0.314**	0.358**
	(2.360)	(2.111)	(2.059)	(2.290)
Economic Conditions				
LNGDP	0.051	0.062	0.042	0.043
	(1.224)	(1.654)	(1.501)	(1.162)

INFL	0.001 (0.797)	0.000 (0.378)	0.004** (2.328)	0.003** (2.394)
DUMTRAN1		0.024*** (3.598)		
DUMCRIS			-0.027*** (-3.200)	
DUMTRAN2				0.010 (0.732)
R^2	0.533	0.562	0.573	0.535
Adjusted R^2	0.463	0.495	0.507	0.464
Durbin-Watson stat	1.697	1.820	1.846	1.700
F-statistic	7.655***	8.369***	8.730***	7.502***
No. of Observations	286	286	286	286

Values in parentheses are t-statistics.

***, **, and * indicates significance at 1, 5, and 10% levels.

1997; Athanasoglou et al. 2007). Eichengreen and Gibson (2001) suggest that the effect of a growing bank's size on profitability may be positive up to a certain limit. Beyond this point the effect of size could be negative due to bureaucratic and other reasons. Hence, the size-profitability relationship may be expected to be non-linear. However, the results need to be interpreted with caution as the coefficient of the variable is small and is only statistically significant at the 10% level. However, when we control the Asian financial crisis periods, it can be observed from Table 5 that the coefficient of the LN-TA variable looses its explanatory power.

Income diversification makes a significant contribution to the profitability of banks in Thailand and Malaysia, as the relatively high coefficient of the non-interest income to total assets ratio (NII/TA) shows. The results imply that banks, which derived a higher proportion of their income from non-interest sources, such as fee-based services, tend to report a higher level of profitability. The empirical findings support earlier studies by, among others, Canals (1993). To recap, Canals (1993) suggests that revenues generated from new business units have contributed significantly to the improvement of bank performance. On the other hand, Stiroh and Rumble (2006) find that diversification benefits of the U.S. financial holding companies are offset by the increased exposure to non-interest activities, which are much more volatile, but not necessarily more profitable, than interest generating activities.

Referring to the impact of overhead costs on ROA, the coefficient of NIE/TA has consistently exhibited a negative and statistically significant impact on bank profitability, whether we control for the Asian financial crisis periods or not. The results imply that an increase (decrease) in these expenses reduces (increases) the profits of banks operating in the Thailand and Malaysian banking sectors. Guru et al. (2002), Pasiouras and Kosmidou (2007), and Kosmidou (2008) among others also found poor expenses management to be among the main contributors to poor profitability. Thus, efficient cost management is a prerequisite for the improved profitability of the Thailand and Malaysian banking sectors. Furthermore, it could be argued that the Thailand and Malaysian banking systems have not reached the maturity level required to link quality effects pending from increased spending to higher bank profitability.

As expected, the empirical findings suggest that EQASS exhibits positive relationship with bank profitability and is statistically significant at the 1% level. The result is consistent with previous studies (Isik and Hassan, 2003; Staikouras and Wood, 2003; Goddard et al. 2004; Pasiouras and Kosmidou, 2007; Kosmidou, 2008) supporting the argument that well-capitalized banks face lower costs if they go bankrupt, thus their cost of funding lowers or they have lower needs for external funding, resulting in higher profitability. Nevertheless, a strong capital structure is essential for financial institutions in emerging economies because it provides additional strength to withstand financial crises as well as increased safety for depositors during unstable macroeconomic conditions.

The results of the impact of GDP growth on ROA is consistent with the results of Hassan and Bashir (2003), Pasiouras and Kosmidou (2007), and Kosmidou (2008) and supports the argument of positive association between economic growth and the performance of the banking sector. However, the coefficient of the variable is not statistically significant at any conventional level, which is in line with the earlier finding by Ben Naceur and Omran (2008). The empirical findings seem to suggest that the impact of inflation (INFL) is positively related to Thailand and Malaysian banks' profitability and is statistically significant in regression models 3 and 4, implying that the levels of inflation were anticipated by banks in both banking sectors, particularly during the crisis and post-crisis periods. This gave them the opportunity to adjust the interest rates accordingly, and consequently, to earn higher profits.

It is observed from column 2 of Table 5 that DUMTRAN1 entered the regression model with a positive sign and is statistically significant at the 1% level. The empirical findings suggest that banks have been relatively more

profitable during the pre-crisis period compared to the crisis and post-crisis periods. It is also observed from column 3 of Table 5 that the coefficient of DUMCRIS is negative and is statistically significant at the 1% level, supporting the notion that the Asian financial crisis exerts an adverse impact on the profitability of banks in Thailand and Malaysia.

4.1 Robustness checks

In order to check the robustness of the results, we have performed a number of sensitivity analyses. First, we perform a similar regression model by having only Thailand banks in the sample. The results are presented in Table 6. The empirical findings suggest that the level of capitalization and income diversification have positive impacts on Thailand banks' profitability, while Thailand banks with high liquidity levels and overhead costs reports lower profitability. It is also worth noting that the coefficient of EQASS loses its explanatory power in regression models 2 and 3 implying that the level of capitalization is not economically significant in explaining the profitability of Thailand banks during the pre-crisis and crisis periods.

It is also interesting to note that economic growth is positively related to the profitability of Thailand banks only during the pre-crisis period, while the level of inflation has positive impact on Thailand banks' profitability during the crisis and post-crisis periods. It can be observed from column 2 of Table 6 that the Thailand banking sector has been relatively more profitable during the pre-crisis period compared to the crisis and post-crisis periods. As expected, the empirical findings presented in column 3 of Table 6 seem to suggest that the Thailand banking sector has been adversely impacted by the Asian financial crisis.

Secondly, we repeat equation (2) on the Malaysian banking sector. The results are presented in Table 7. Similar to the baseline regression models, the empirical findings suggest that the level of capitalization and income diversification have positive impacts on Malaysian banks' profitability, while Malaysian banks with high overhead costs tend to be relatively less profitable. The results also suggest that network embeddedness (LNDEP) has negative relationship with Malaysian banks' profitability levels suggesting that banks with wide branch networks tend to be relatively less profitable. The empirical findings support earlier findings by, among others, Randhawa and Lim (2005) and Sufian (2007) who have found that small banks have exhibited higher efficiency levels compared to their large bank counterparts. However, it is worth mentioning that the coefficient of the variable loses its explanatory power in regression models 3 and 4 implying that network em-

Table 6: Multivariate Regressions Results - Thailand

$$ROA_{jt} = \beta_0 + \beta_1 LOANS/TA_{jt} + \beta_2 LNTA_{jt} + \beta_3 LLP/TL_{jt} + \beta_4 NII/TA_{jt}$$
$$+ \beta_5 NIE/TA_{jt} + \beta_6 LNDEPO_{jt} + \beta_7 EQASS_{jt}$$
$$+ \beta_8 LNGDP_t + \beta_9 INFL_t$$
$$+ \beta_{10} DUMTRAN1 + \beta_{11} DUMCRIS + \beta_{12} DUMTRAN2$$
$$+ \varepsilon_{jt}$$

The notation used in the table below is defined as follows: LOANS/TA is used as a proxy measure of loans intensity, calculated as total loans divided by total assets; LNTA is a proxy measure of size, calculated as a natural logarithm of total bank assets; LLP/TL is a measure of bank risk calculated as the ratio of total loan loss provisions divided by total loans; NII/TA is a measure of bank diversification towards non interest income, calculated as total non-interest income divided by total assets; NIE/TA is a proxy measure for cost, calculated as non-interest expenses divided by total assets; LNDEPO is a proxy measure of network embeddedness, calculated as the log of total deposits; EQASS is a measure of capitalization, calculated as book value of shareholders equity as a fraction of total assets; LNGDP is natural log of gross domestic products; DUMTRAN1 is a dummy variable that takes a value of 1 for the first tranquil (pre crisis) period, 0 otherwise; DUMCRIS is a dummy variable that takes a value of 1 for the crisis period, 0 otherwise; DUMTRAN2 is a dummy variable that takes a value of 1 for the second tranquil (post crisis) period, 0 otherwise.

	(1)	(2)	(3)	(4)
CONSTANT	-0.140	-0.446	-0.068	0.060
	(-0.657)	(-1.527)	(-0.424)	(0.187)
Bank Characteristics				
LOANS/TA	-0.096*	-0.087*	-0.077	-0.093*
	(-1.934)	(-1.803)	(-1.573)	(-1.788)
LNTA	-0.026	-0.016	-0.013	-0.027
	(-1.471)	(-0.974)	(-0.746)	(-1.442)
LLP/TL	0.026	0.017	0.019	0.028
	(1.391)	(1.014)	(1.225)	(1.476)
NII/TA	2.556***	2.366***	2.082***	2.450***
	(3.045)	(3.026)	(2.736)	(3.054)
NIE/TA	-0.910***	-0.719***	-0.740***	-0.947***
	(-8.194)	(-4.236)	(-4.084)	(-8.491)
LNDEPO	-0.014	0.000	0.003	-0.015
	(-0.561)	(0.014)	(0.157)	(-0.662)
EQASS	0.420*	0.231	0.253	0.458*
	(1.921)	(0.985)	(1.284)	(1.846)
Economic Conditions				
LNGDP	0.086	0.084*	0.026	0.059
	(1.597)	(1.708)	(0.716)	(1.022)

INFL	0.001	0.000	0.006*	0.004*
	(0.608)	(0.077)	(1.817)	(1.732)
DUMTRAN1		0.033***		
		(3.203)		
DUMCRIS			-0.043***	
			(-3.728)	
DUMTRAN2				0.020
				(0.682)
R^2	0.554	0.580	0.594	0.557
Adjusted R^2	0.475	0.502	0.519	0.475
Durbin-Watson stat	1.713	1.829	1.870	1.736
F-statistic	7.053***	7.459***	7.923***	6.809***
No. of Observations	161	161	161	161

Values in parentheses are t-statistics.

***, **, and * indicates significance at 1, 5, and 10% levels.

beddedness has no statistically significant impact on Malaysian banks' profitability during the crisis and post-crisis periods.

It is also observed from Table 7 that credit risk (LLP/TL) exhibits negative relationship with the profitability of Malaysian banks, suggesting that Malaysian banks with higher credit risks tend to exhibit lower profitability levels. The empirical findings imply that Malaysian banks should focus more on credit risk management, which has been proven to be problematic in the recent past. Serious banking problems have arisen from the failure of financial institutions to recognize impaired assets and create reserves for writing off these assets. An immense help towards smoothing these anomalies would be provided by improving the transparency of the financial system, which in turn will assist financial institutions to evaluate credit risk more effectively and avoid problems associated with hazardous exposure.

The impact of economic growth is always positively related to Malaysian banks' profitability levels, while the level of inflation exhibits negative impact on the profitability of Malaysian banks during the crisis period. The results imply that the level of inflation is unanticipated by Malaysian banks during the crisis period. This does not allow bank managements the opportunity to adjust the interest rates accordingly and consequently to earn lower profitability. It is observed from column 2 of Table 6 that the Malaysian banking sector has been relatively less profitable during the pre-crisis period

Table 7: Multivariate Regressions Results - Malaysia

$$ROA_{jt} = \beta_0 + \beta_1 LOANS/TA_{jt} + \beta_2 LNTA_{jt} + \beta_3 LLP/TL_{jt} + \beta_4 NII/TA_{jt}$$
$$+ \beta_5 NIE/TA_{jt} + \beta_6 LNDEPO_{jt} + \beta_7 EQASS_{jt}$$
$$+ \beta_8 LNGDP_t + \beta_9 INFL_t$$
$$+ \beta_{10} DUMTRAN1 + \beta_{11} DUMCRIS + \beta_{12} DUMTRAN2$$
$$+ \varepsilon_{jt}$$

The notation used in the table below is defined as follows: LOANS/TA is used as a proxy measure of loans intensity, calculated as total loans divided by total assets; LNTA is a proxy measure of size, calculated as a natural logarithm of total bank assets; LLP/TL is a measure of bank risk calculated as the ratio of total loan loss provisions divided by total loans; NII/TA is a measure of bank diversification towards non interest income, calculated as total non-interest income divided by total assets; NIE/TA is a proxy measure for cost, calculated as non-interest expenses divided by total assets; LNDEPO is a proxy measure of network embeddedness, calculated as the log of total deposits; EQASS is a measure of capitalization, calculated as book value of shareholders equity as a fraction of total assets; LNGDP is natural log of gross domestic products; DUMTRAN1 is a dummy variable that takes a value of 1 for the first tranquil (pre crisis) period, 0 otherwise; DUMCRIS is a dummy variable that takes a value of 1 for the crisis period, 0 otherwise; DUMTRAN2 is a dummy variable that takes a value of 1 for the second tranquil (post crisis) period, 0 otherwise.

	(1)	(2)	(3)	(4)
CONSTANT	-0.035*	-0.010	-0.019	-0.037*
	(-1.937)	(-1.350)	(-1.558)	(-1.915)
Bank Characteristics				
LOANS/TA	0.001	0.000	0.002	0.002
	(0.256)	(0.079)	(0.309)	(0.348)
LNTA	0.001	0.000	-0.000	0.000
	(0.297)	(0.091)	(-0.122)	(0.200)
LLP/TL	-0.573***	-0.601***	-0.591***	-0.570***
	(-14.77)	(-17.39)	(-17.35)	(-13.06)
NII/TA	0.475***	0.488***	0.501***	0.480***
	(3.762)	(4.043)	(3.899)	(3.676)
NIE/TA	-0.155*	-0.191**	-0.158**	-0.144*
	(-1.952)	(-2.397)	(-1.990)	(-1.960)
LNDEPO	-0.005**	-0.006***	-0.003	-0.004
	(-2.416)	(-2.804)	(-1.207)	(-1.554)
EQASS	0.052**	0.031	0.042	0.056**
	(2.083)	(1.017)	(1.630)	(2.102)
Economic Conditions				
LNGDP	0.016**	0.015**	0.013**	0.015**
	(2.133)	(2.539)	(2.483)	(2.274)

INFL	-0.000 (-0.597)	-0.000 (-0.616)	-0.000** (-2.120)	-0.000 (-0.781)
DUMTRAN1		-0.003** (-2.336)		
DUMCRIS			0.002*** (3.215)	
DUMTRAN2				-0.001 (-0.578)
R^2	0.819	0.824	0.826	0.819
Adjusted R^2	0.782	0.786	0.788	0.780
Durbin-Watson stat	1.922	1.877	1.916	1.926
F-statistic	22.218***	21.791***	22.029***	21.090***
No. of Observations	125	125	125	125

Values in parentheses are t-statistics.

***, **, and * indicates significance at 1, 5, and 10% levels.

compared to the crisis and post-crisis periods. On the other hand, the empirical findings presented in column 3 of Table 6 seem to suggest that the Asian financial crisis period is positively related to the Malaysian banking sector's profitability.

5. CONCLUDING REMARKS

The Asian financial crisis has had a profound negative impact on the Thailand and Malaysian banking sectors. The sharp decline in the domestic currency had damaging effects on the leading banks' balance sheets. Moreover, banks' revenue shrink as banks could not pass on higher rates to distressed corporate borrowers, subsequently resulting in negative interest rate spreads, reducing banks' net income, and damaging their capital adequacy.

For the reasons mentioned above, this paper analyzed how bank specific characteristics and the macroeconomic conditions affected the profitability of banks operating in Thailand and Malaysia. By using an unbalanced bank level panel data, this study seeks to examine factors that influence the profitability of commercial banks operating in the Thailand and Malaysian banking sectors. We cover the period between 1992 and 2003 and control for a wide array of macroeconomic and bank specific characteristics.

The empirical findings of this study suggest that all the variables are significant although their impact is not always the same for Thailand and Malaysian banks. We find that liquidity is negatively related to Thailand banks' profitability, but not in Malaysia, while network embeddedness has negative relationship with Malaysian banks, but not with Thailand banks. As for the impact of macroeconomic indicators, we find that economic growth is positively related to Thailand banks' profitability only during the pre-crisis period. The impact of inflation is positively related with Thailand banks' profitability during the crisis and post-crisis periods, while inflation is negatively related with Malaysian banks' profitability during the crisis period. We find that the Thailand banking sector has been relatively more profitable during the pre-crisis period, while the opposite is true for the Malaysian banking sector.

The findings of this study have considerable policy relevance. It could be argued that if a bank is profitable, it will be able to offer new products and services. To this end, the role of technology advancement is particularly important, given that a bank with relatively more advanced technology may have an advantage over its peers. The continued success of the Thailand and Malaysian banking sectors depends on their efficiency, profitability, and competitiveness. Furthermore, in view of the increasing competition attributed to the more liberalized banking sector, bank managements as well as the policymakers will be more inclined to find ways to obtain the optimal utilization of capacities as well as making the best use of their resources, so that these resources are not wasted during the production of banking products and services.

Moreover, the ability to maximize risk adjusted returns on investment and to sustain stable and competitive returns is an important element in ensuring the competitiveness of the Thailand and Malaysian banking sectors. Thus, from the regulatory perspective, the performance of a bank will be based on its efficiency and profitability. The policy direction will be to enhance the resilience and efficiency of the financial institutions with the aim of intensifying the robustness and stability of the banking sector.

Future research could include more variables such as taxation and regulation indicators, exchange rates as well as indicators of the quality of the offered services. Another possible extension could be the examination of differences in the determinants of profitability between small and large or high and low profitability banks. In terms of methodology, a statistical cost accounting and frontier techniques could also be used.

References

Akhavein J., A.N. Berger and D.B. Humphrey, 1997, "The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function", *Review of Industrial Organization*, Vol. 12, No. 1, pp. 95-139.

Angbazo L., 1997, "Commercial Bank Net Interest Margins, Default Risk, Interest Rate Risk, and Off Balance Sheet Banking", *Journal of Banking and Finance*, Vol. 21, pp. 55-87.

Athanasoglou P.P., S.N. Brissimis and M.D. Delis, 2007, "Bank Specific, Industry Specific and Macroeconomic Determinants of Bank Profitability", forthcoming in *Journal of International Financial Markets, Institutions and Money*.

Beck T. and R. Levine, 2004, "Stock Markets, Banks and Growth: Panel Evidence", *Journal of Banking and Finance*, Vol. 28, No. 3, pp. 423-442.

Ben Naceur S. and M. Goaied, 2008, "The Determinants of Commercial Bank Interest Margin and Profitability: Evidence from Tunisia", *Frontiers in Finance and Economics*, Vol. 5, No. 1, pp. 106-130.

Ben Naceur S. and M. Omran M., 2008, "The Effects of Bank Regulations, Competition and Financial Reforms on Mena Banks' Profitability", Working Paper, Economic Research Forum.

Berg A. and C. Pattillo, 1999, "Predicting Currency Crises: The Indicators and an Alternative", *Journal of International Money and Finance*, Vol. 18, pp. 561-586.

Berger A.N., G.A. Hanweck and D.B. Humphrey, 1987, "Competitive Viability in Banking: Scale Scope and Product Mix Economies", *Journal of Monetary Economics*, Vol. 20, No. 3, pp. 501-520.

Berger A.N., 1995, "The Relationship Between Capital and Earnings in Banking", *Journal of Money, Credit and Banking*, Vol. 27, pp. 432-456.

Bhuyan R. and D.L. Williams, 2006, "Operating Performance of the US Commercial Banks after IPOs: An Empirical Evidence", *Journal of Commercial Banking and Finance*, Vol. 5, No. 1-2, pp. 68-95.

Bikker J. and H. Hu, 2002, "Cyclical Patterns in Profits, Provisioning and Lending of Banks and Procyclicality of the New Basel Capital Requirements", *BNL Quarterly Review*, Vol. 221, pp. 143-175.

Bourke P., 1989, "Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia", *Journal of Banking and Finance*, Vol. 13, pp. 65-79.

Boyd J. and D. Runkle, 1993, "Size and Performance of Banking Firms: Testing the Predictions Theory", *Journal of Monetary Economics*, Vol. 31, pp. 47-67.

Canals J., 1993, *Competitive Strategies in European Banking*, Oxford University Press.

Cetorelli N. and M. Gambera, 2001, "Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data", *Journal of Finance*, Vol. 56, No. 2, pp. 617-648.

Chinn M.D., 2000, "Before the Fall: Were East Asian Currencies Overvalued?", *Emerging Markets Review*, Vol. 1, No. 2.

Chu S.F. and G.H. Lim, 1998, "Share Performance and Profit Efficiency of Banks in an Oligopolistic Market: Evidence from Singapore", *Journal of Multinational Financial Management*, Vol. 8, No. 2-3, 155-168.

Cooper M., W. Jasckson and G. Patterson, 2003, "Evidence of Predictability in the Cross Section of Bank Returns", *Journal of Banking and Finance*, Vol. 27, No. 5, pp. 817-850.

Corsetti G., P. Pesenti, and N. Roubini, 1999, "What Caused the Asian Currency and Financial Crisis?", Japan and the World Economy, Vol. 11, No. 3, pp. 305-373.

Dermiguc Kunt A. and H. Huizinga, 1999, "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence", *World Bank Economic Review*, Vol. 13, pp. 379-408.

Dermiguc Kunt, A. and H. Huizinga, 2001, "Financial Structure and Bank Profitability", in Dermiguc Kunt A. and R. Levine (Eds.), *Financial Structure and Economic Growth: A Cross Country Comparison of Banks, Markets and Development*, MIT Press: Cambridge, MA.

De Young R. and T. Rice, 2004, "Non-Interest Income and Financial Performance at US Commercial Banks", *Financial Review*, Vol. 39, No. 1, pp. 101-127.

Eichengreen B. and H.D. Gibson, 2001, "Greek Banking at the Dawn of the New Millennium", *CEPR Discussion Papers*, No. 2791.

Eichengreen B. and A.K. Rose, 1998, "Staying Afloat when the Wind Shifts: External Factors and Emerging Market Banking Crises", *NBER Working Papers*, No. 6370.

Frankel J.A. and A.K. Rose, 1996, "Currency Crashes in Emerging Markets: Empirical Indicators", *CIDER Working Papers*, No. C96-062.

Gelos, G., 2006, "Banking Spreads in Latin America", *IMF Working Papers*, No. 06/44.

Goddard J., P. Molyneux and J. Wilson, 2004, "Dynamic of Growth and Profitability in Banking", *Journal of Money, Credit and Banking*, Vol. 36, pp. 1069-1090.

Goldstein M. and J. Hawkins, 1998, "The Origin of the Asian Financial Turmoil", *Reserve Bank of Australia Research Discussion Papers*, No. rdp9805.

Golin J., 2001, *The Bank Credit Analysis Handbook: A Guide for Analysts, Bankers and Investors*, John Wiley and Sons: New York.

Guru B.K., J. Staunton and B. Balashanmugam, 2002, "Determinants of Commercial Bank Profitability in Malaysia", *Multimedia University Working Papers*.

Hassan M.K. and A.H.M. Bashir, 2003, "Determinants of Islamic Banking Profitability", Paper Presented at the 10th ERF Annual Conference.

Heffernan S. and M. Fu, 2008, "The Determinants of Bank Performance in China", *EMG Working Paper Series*.

Hirtle B.J. and K.J. Stiroh, 2007, "The Return to Retail and the Performance of US Banks", *Journal of Banking and Finance*, Vol. 31, No. 4, pp. 1101-1133.

Ho M.T. and D. Tripe, 2002, "Factors Influencing the Performance of Foreign Owned Banks in New Zealand", *Journal of International Financial Markets, Institutions and Money*, Vol. 12, pp. 341-357.

Isik I. and M.K. Hassan, 2003, "Efficiency, Ownership and Market Structure, Corporate Control and Governance in the Turkish Banking Industry", *Journal of Business Finance and Accounting*, Vol. 30, No. 9-10, pp. 1363-1421.

Kaminsky G.L. and C.M. Reinhart, 1998, "Financial Crises in Asia and Latin America: Then and Now", *American Economic Review*, Vol. 88, No. 2, pp. 444-448.

Kaminsky G.L., S. Lizondo and C.M. Reinhart, 1998, "Leading Indicators of Currency Crises", *IMF Staff Papers*, Vol. 45, No. 1, pp. 1-48.

Kennedy P., 2008, *A Guide to Econometrics*, Blackwell Publishing: Malden, Massachusetts.

Kosmidou K., 2008, "The Determinants of Banks' Profits in Greece during the Period of EU Financial Integration", *Managerial Finance*, Vol. 34, No. 3, pp. 146-159.

Kosmidou K.and C. Zopounidis, 2008, "Measurement of Bank Performance in Greece", *South Eastern Europe Journal of Economics*, Vol. 6, No. 1, pp. 79-95.

Kosmidou K., F. Pasiouras and A. Tsaklanganos, 2007, "Domestic and Multinational Determinants of Foreign Bank Profits: The Case of Greek Banks Operating Abroad", *Journal of Multinational Financial Management*, Vol. 17, No. 1, pp. 1-15.

Kosmidou K., S. Tanna and F. Pasiouras, 2007, "Determinants of Profitability of Domestic UK Commercial Banks: Panel Evidence from the Period 1995-2002," Applied *Research Working Paper Series*, Coventry University Business School.

Krugman P. (Ed.), 1999, *Currency Crises*, NBER Conference Report Series.

Levine R. and S. Zervos, 1998, "Stock Markets, Banks, and Economic Growth", *American Economic Review*, Vol. 88, No. 3, pp. 537-558.

Levine R., 1998, "The Legal Environment, Banks, and Long Run Economic Growth", *Journal of Money, Credit and Banking*, Vol. 30, No. 3, pp. 596-613.

Miller S.M. and A. Noulas, 1997, "Portfolio Mix and Large Bank Profitability in the USA", *Applied Economics*, Vol. 29, No. 4, pp. 505-512.

Molyneux P. and J. Thornton, 1992, "Determinants of European Bank Profitability: A Note", *Journal of Banking and Finance*, Vol. 16, No. 6, pp. 1173-1178.

Molyneux P., 1995, "Market Structure and Performance in European Banking", *Applied Economics*, Vol. 27, No. 2, pp. 155-159.

Neely M. and D. Wheelock, 1997, "Why Does Bank Performance Vary Across States?", *Federal Reserve Bank of St. Louis Review*, March/April, pp. 27-38.

Pasiouras F. and K. Kosmidou, 2007, "Factors Influencing the Profitability of Domestic and Foreign Commercial Banks in the European Union", *Research in International Business and Finance*, Vol. 21, No. 2, pp. 223-237.

Perry P., 1992, "Do Banks Gain or Lose from Inflation", *Journal of Retail Banking*, Vol. 14, No. 2, pp. 25-40.

Rajan R.G and L. Zingales, 1998, "Financial Dependence and Growth", *American Economic Review*, Vol. 88, No. 3, pp. 559-586.

Randhawa D.S. and G.H. Lim, 2005, "Competition, Liberalization and Efficiency: Evidence from a Two Stage Banking Models on Banks in Hong Kong and Singapore", *Managerial Finance*, Vol. 31, No. 1, pp. 52-77.

Reda M. and I. Isik, 2008, "Efficiency and Productivity Change of Egyptian Commercial Banks (1995-2003)", Paper Presented at 13th ERF Annual Conference.

Rivard R.J. and C.R. Thomas, 1997, "The Effect of Interstate Banking on Large Bank Holding Company Profitability and Risk", *Journal of Economics and Business*, Vol. 49, No. 1, pp. 61-76.

Sachs J.A., A. Tornell and A. Velaso, 1996, "Financial Crises in Emerging Markets: The Lessons from 1995", *NBER Working Papers*, No. 5576.

Spathis C., K. Kosmidou and M. Doumpos, 2002, "Assessing Profitability Factors in the Greek Banking System: A Multicriteria Methodology", *International Transactions in Operational Research*, Vol. 9, No. 5, pp. 517-530.

Staikouras C. and G. Wood, 2003, "The Determinants of Bank Profitability in Europe", Paper Presented at the European Applied Business Research Conference, Venice, 9-13 June.

Stiroh K.J. and A. Rumble, 2006, "The Dark Side of Diversification: The Case of US Financial Holding Companies", *Journal of Banking and Finance*, Vol. 30, No. 8, pp. 2131-2161.

Sufian F., 2007, "Trends in the Efficiency of Singapore's Commercial Banking Groups: A Non-Stochastic Frontier DEA Window Analysis Approach", *International Journal of Productivity and Performance Management*, Vol. 56, No. 2, pp. 99-136.

Thakor, A., 1987, "Asset Writedowns: Managerial Incentives and Security Returns: Discussion", *Journal of Finance*, Vol. 42, No. 3, pp. 661-663.

White H.J., 1980, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica*, Vol. 48, No. 4, pp. 817-838.

Williams B., 2003, "Domestic and International Determinants of Bank Profits: Foreign Banks in Australia", *Journal of Banking and Finance*, Vol. 27, No. 6, pp. 1185-1210.

Résumé

En utilisant les données bancaires, cet article analyse dans quelle mesure les caractéristiques spécifiques bancaires ainsi que l'environnement macro-économique affectent la rentabilité des secteurs bancaires de la Thaïlande et de la Malaise au cours de la période 1992-2003. Toutes les variables sont significatives même si leur impact n'est pas toujours identique pour les banques de la Thaïlande et de la Malaise. Nous observons que la liquidité est négativement liée à la rentabilité des banques de Thaïlande, mais pas en Malaise, alors que l'enchâssement du réseau a une relation négative avec les banques de la Malaise, mais pas avec les banques de la Thaïlande. Pour ce qui concerne l'impact des indicateurs macro-économiques, nous observons que la croissance économique est positivement liée à la rentabilité des banques de la Thaïlande seulement pendant la période précédant la crise. L'impact de l'inflation est positif sur la rentabilité des banques de la Thaïlande pendant la crise et la période postcrise, tandis que l'inflation est négativement liée à la rentabilité des banques de la Malaise au cours de la période de crise. Nous constatons que le secteur bancaire de la Thaïlande a été relativement plus rentable au cours de la période précédant la crise, alors que l'inverse est vrai pour le secteur bancaire de la Malaise.