The Impact of Pre-crisis Financial Liberalization Policy on the Operations of Thai Domestic and Foreign Banks

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Abstract

After the break-out of the Asian financial crisis, all of the most seriously affected countries allowed foreign investors to play a greater role in their financial sector. However, so far almost all studies on the effects of the financial liberalization measures implemented in the pre-crises period focuses on domestic financial institutions, and there has been no empirical research on the effects of the liberalization measures on the activities of foreign banks. To clarify these effects we will use micro data from Thailand, and we will estimate foreign and domestic banks' translog cost functions. We will focus on the existence of economies of scale and economies of scope. In the first half of the 90's (1990-1995), we found economies of scale in the groups of domestic and foreign banks. However, for the same period, in the group of large foreign banks we found economies of scope only. Furthermore, in the second half (1993-1995) of the pre-crisis financial liberalization process, the implemented measures increased the magnitude of economies of scale in all groups, but the magnitude of economies of scope increased only in large foreign banks. Thailand's experience suggests that the authorities gave considerably more weight to obtaining cheap funds from abroad than to acquiring advanced financial know-how.

Keywords: Economies of scale; Economies of scope; Cost function; Foreign banks; Financial liberalization; Thailand

JEL classification codes: G21; G28

I. Introduction

Recently, especially after the break-out of the Asian financial crisis, several studies focused on Thailand's financial system and the effects of financial liberalization policy on it. Most of these studies use aggregated macro data, and the few available studies that use micro data focus on domestic financial institutions. The effects of Thai financial liberalization policy on foreign banks have not been analyzed thus far from the microeconomic perspective. For example, Okuda et al. (1997, 1999) examine the effects of Thai financial liberalization on domestic banks, but they do not discuss the effects on foreign banks[1].

However, after the Asian financial crisis, to address the financial sector problems, all seriously affected countries announced a new policy towards foreign banks aiming to increase their involvement in the local financial systems. To understand the behavior of foreign banks in these developing countries[2] we should analyze their market environment and the effects of implemented financial liberalization measures on their business activities. Thus, clarifying and understanding the precise nature of the effects of pre-crisis financial deregulation and liberalization policies on foreign banks is extremely important, both from an academic and policy perspective.

In many developing countries several regulations were imposed on financial institutions in order to help foster the domestic financial sector. Furthermore, the domestic financial market and the domestic banks were protected from competing with overseas financial markets and

foreign[3] banks. However, in the 80's many developing countries opted for implementing an export oriented industrialization policy, and in order to support this new course, governments commenced to deregulate their financial systems. In the late 80's and early 90's the scope of financial deregulation was widened and comprehensive financial liberalization polices were implemented in many Asian developing countries.

In Thailand two three-year financial system development plans were accomplished in the first half of the 90's. In 1990, the Thai Central Bank (Bank of Thailand) announced the "First Three-year Financial System Development Plan", which broadened the scope of former deregulation efforts (abolition of interest rate controls, liberalization of foreign exchange controls, expanding the scope of bank activities, etc.). In 1993, the "Second Three-year Financial System Development Plan" was announced, its major objectives were to extend financial services to rural areas, and to develop Bangkok into a regional financial center.

[Insert Table 1 about here]

The wide range of financial liberalization measures in Thailand (see Table 1) aimed to strengthen the degree of competition among financial institutions, as well as achieve a more efficient resource allocation, a higher degree of savings mobilization, a wider scope of banking operations, and internationalization of domestic financial markets[4]. In this framework, while several regulations and restrictions were relaxed or abolished, prudential regulations were

implemented and strengthened. Thai authorities expected that enhanced competition in the banking sector would lead to an improved resource allocation, more business opportunities, and a more competitive banking system, and this would have a positive effect on economic development.

Under the financial liberalization policy in the first half of the 90's, access of Thai domestic banks (and firms) to overseas financial markets started to increase on the one hand, while on the other foreign banks' market share in Thailand also showed an increasing trend.

The purpose of this paper is to discuss the effects of financial liberalization measures implemented in the first half of the 90's (1990-1995) on the operations of Thai domestic and foreign banks from a microeconomic perspective. The remainder of the paper is organized as follows. In section II we review the previous literature. In section III we briefly present the main characteristics of the Thai banking sector. In section IV using individual bank data, we outline the banks' cost and income structure, and discuss how their business operations have changed in the process of financial liberalization. We then model the production of banks and formally estimate the cost functions of domestic and foreign commercial banks operating in Thailand. In section V we present our results and report the scale and scope economy characteristics of different bank groups. Finally, in section VI we summarize our findings and derive policy implications for the Thai banking sector, especially for admission of foreign banks.

II. Review of Literature

The areas of banks' cost structure and changes in banks' operational efficiency have been widely researched (Berger et al. (1993, 1997), but the vast majority of these studies focus on banks operating in the US or in other developed countries. Several empirical studies on industrialized countries' banks, for instance, Jagtiani et al. (1996), Rezvanian et al. (1996), etc. found economies of scale and economies of scope.

Most of the available studies dealing with the efficiency performance of foreign banks in local financial markets focus on the US market. De Young et al. (1995) and Iftekhar et al. (1996) conclude that foreign banks are less efficient than US banks, and they sacrifice their profit in order to gain a market share in the US market.

In the process of financial liberalization, the financial markets and the operations of banks in developing countries have gone through significant changes. We should carefully examine to what extent the results of studies on developed countries are applicable to developing countries.

Surprisingly little academic research has been undertaken on the efficiency of banks operating in a developing country, thus the number of empirical studies is very limited. Among these studies, Okuda et al. (1997) using cross-sectional data, and Okuda et al. (1999) using panel data studied the effects of Thai financial liberalization policy on domestic banks. Moreover, Okuda (2000) compares the results of the financial liberalization policies

implemented in Thailand and the Philippines.

However, these papers studied the effects of financial liberalization on domestic banks only, foreign banks were not included. Moreover, the Okuda et al. (1999) study is subject to two limitations. Namely, it does not clarify the effects of different financial liberalization measures on banks' business activities, and does not distinguish between different periods in the process of financial liberalization.

The study by Indiastuti (1998) on the efficiency of commercial banks operating in Indonesia includes both domestic and foreign banks, and it compares the efficiency of different bank groups. The paper's main finding is that the group of large banks is the most efficient one in terms of cost.

Summarizing the results of the above mentioned empirical studies on the efficiency of banks operating in developing countries, we can say that economies of scale was observed in the Philippines, where financial liberalization began in the 80's. Thailand started its comprehensive financial liberalization policy only in the 90's, thus in the 80's economies of scale was not observed, but it was found in the 90's as the liberalization process progressed.

Economies of scope was found in the Philippines, but was not observed in Thailand. In the Philippines the financial liberalization measures were implemented earlier than in Thailand and because of this, the diversification of bank activities could reach a higher level there.

III. The Entry of Banks Into the Thai Financial Market

In the process of economic development of ASEAN countries (foreign-capital-led industrialization) foreign companies and foreign banks are playing a crucial role. Foreign banks have a comparative advantage on their domestic counterparts in capital strength, providing sophisticated financial services, having large overseas networks and connections with foreign companies. That is why foreign banks concentrate their business activities to provide advanced financial services and to offer large foreign-currency-dominated loans. On the contrary, domestic banks focus on local currency dealings and they concentrate on services requiring local information.

In fact, in Thailand foreign banks have a longer history than domestic banks[5]. Before the establishment of the first domestic bank (Siam Commercial Bank) in 1906, 3 European banks already operated in Bangkok. Until World War II foreign banks maintained their dominant role in the Thai financial sector. During the war all foreign banks (except the sole Japanese one) were forced to suspend operations, and as foreign banks withdrew, they were replaced by newly established domestic banks.

After the end of the war, the expelled foreign banks resumed their operations in Thailand and additional foreign and domestic banks were established. However, in 1955 the Thai government restricted the entry of new banks. Foreign banks were not allowed to enter if their countries

were already represented by banks in Thailand. Exceptions were only made where reciprocal agreements promised to be mutually beneficial[6]. This protection provided an opportunity for domestic banks to expand without serious competition and their number and operations soon surpassed those of their foreign counterparts, but foreign banks remained important players[7] of the Thai financial system.

The Thai government implemented some deregulation measures in the 80's (deregulation of interest rate control, expanding the scope of bank activities[8]), but the restrictions on the entry of foreign banks were not eased. In 1985, a US bank (Mercantile Bank) withdrew from Thailand and it was replaced by another US bank (Citibank). In 1988, the entry of Deutsche Bank, the first German bank to enter the Thai market, was approved.

In the second half of the 80's the strictly regulated foreign banks (entry restrictions, branching restrictions) were unable to provide all the necessary foreign capital to finance economic growth in Thailand. In order to obtain more funds from abroad, the Thai government instead of relaxing the entry restrictions on foreign banks, decided to establish an offshore financial market. With the creation of the Bangkok International Banking Facilities (BIBF), the Thai financial authorities not only intended to obtain more funds from abroad, but they also desired to contribute to the internationalization of the Thai financial markets, as Bangkok aspired to become a trade and investment gateway[9] for Indo-China.

The BIBF was launched in 1993 with 47 participating banks. All the 15 domestic banks and 12 foreign banks (all established foreign banks, except banks from Malaysia and Taiwan) obtained BIBF license. The other 20 BIBF members were new foreign banks. BIBF members were allowed to carry out foreign-currency-dominated lending (out-in) and other international and investment banking activities as well as "traditional" offshore banking (out-out).

In the following year, the Thai government announced that as a measure of relaxing market entry, 5-7 BIBF members could receive full banking license until 1997. This produced fierce competition among new foreign banks, and lead to an enormous inflow of short-term funds (see Figure1). As a result, these (out-in) short-term funds were channeled in part to finance real estate and stock purchases, producing sizable maturity mismatches and increased credit risks.

[Insert Figure 1 about here]

IV. Changes in Business Activities of Commercial Banks Operating in Thailand

1. Income and Cost Structure of Thai Commercial Banks

In order to capture the changes in business activities of commercial banks[10] operating in Thailand, we will examine and clarify the changes in the income and cost structures of domestic and foreign banks. We divided the foreign banks into 2 subgroups: banks headquartered in developed countries (these banks are the nine largest ones according to their asset size, so we

call them large foreign banks[11]), and other banks[12] (these banks are the five smallest ones according to their asset size, so we call them small foreign banks). We will explore how the implemented liberalization measures affected the bank activities, the banking products, the production factors, and the factor prices of each bank group.

In Thailand, commercial banks focused their activities on straight out lending businesses: interest income amounted to more than 80% in the case of domestic banks, and more than 70% in the case of foreign banks. However, during the period under review, in the case of foreign banks, the diversification of bank activities (consulting services, custody, etc.) progressed more noticeably than in the case of domestic banks (see Figure 2 and 3).

[Insert Figure 2 about here]

[Insert Figure 3 about here]

Looking at Figure 3, we can see that the rate of increase in foreign banks' non-interest income (fee-based income) surpassed the rate of increase in their interest income throughout the review period. In the case of domestic banks, there was only one year during the period examined when the rate of increase of their non-interest income slightly surpassed the rate of increase in their interest income. This indicates that there were no considerable changes in the income structure of domestic banks. In contrast, in the case of foreign banks there were clear changes in their income structure. That is, the share of non-interest income increased, though,

the rate of increase slowed slightly in the second half of the period under review.

The analysis of the structure of non-interest expenses shows that the share of personnel expenditures is the highest one, and it is following an increasing trend in all bank groups. At the same time, this share is lower in the case of foreign banks than their domestic counterparts. Moreover, the share of personnel expenses is the lowest one in the group of large foreign banks, and it follows an increasing trend together with equipment expenses. However, in the case of domestic banks there was no notable change in the share of equipment expenses during the period under review. As for the group of small foreign banks, the proportion of personnel and equipment expenses is higher than in the case of large foreign banks, but we cannot see clear changes in the cost structure of this group during the period examined.

The movements of factor prices are summarized in Table 2. Regarding the price of raised funds (average fund raising cost) (P_1), it is lower for foreign banks than for domestic banks. Taking a closer look at the subgroups of foreign banks, we can see that the group of large foreign banks has a lower fund raising cost than the group of small foreign banks. Foreign banks raise their funds mainly in overseas markets (in the countries where they are headquartered, in off-shore markets, etc.), not via their Thai branches, and this is reflected in their lower fund raising cost. Furthermore, after the BIBF was established the average fund raising cost fell in all groups.

[Insert Table 2 about here]

As for the price of physical capital (average equipment cost) (P_2), foreign banks are surpassing domestic banks, suggesting that the foreign banks invest relatively more in equipment than domestic banks. Although, the cost of capital includes rent, and foreign banks in many instances pay more rent than their domestic counterparts, because the latter own the buildings they reside in, foreign banks generally use newer equipment and more advanced technology than domestic banks.

The price of labor (average wages) (P_3) is also higher in foreign banks, and large foreign banks pay higher wages for their employees than do the small foreign banks. Furthermore, in the groups of domestic and large foreign banks, there is a rising trend in wages during the period under review.

Concerning profitability, the foreign banks are more profitable than domestic ones, but the gap between the two groups has started to shrink since 1993 (see Table 3). This reflects the fact that the existence of the BIBF made cheaper fund raising possible for domestic banks.

[Insert Table 3 about here]

Summarizing the main findings of the analysis above, we can say the following regarding foreign banks' operation in Thailand during the first half of the 90's. Foreign banks raise their funds cheaply in overseas financial markets and they invest actively in equipment and human

resources. Using advanced financial know-how and high-skilled professionals they earn high income not only in lending, but in fee-based businesses as well. However, since the BIBF was established, the gap in profitability between foreign and domestic banks has started to shrink.

2. Production Function and Cost Function of Banks

We saw that bank activities have changed during the process of Thai financial liberalization, and in order to capture these changes we will estimate the banks' cost functions, where we will focus on the scale and scope economy characteristics of domestic and foreign banks. The estimation method used in our study basically follows Kasuya (1986, 1993).

In this paper we adopt the intermediation approach, in which banks are considered as financial intermediaries. Alongside this assessment, we regard banks as multiproduct firms, they raise funds, use physical and human capital to produce traditional (lending) and non-traditional banking products (consulting services, custody, etc.). We assume that banks minimize their operating cost. A technically efficient bank's production function is:

$$F(Y_1, Y_2, Q_1, Q_2, Q_3) = 0 \qquad (1)$$

Here, Y_1 and Y_2 represent the banking products, Y_1 is the traditional lending business, Y_2 is the non-traditional banking services. Q_1 represents the raised funds, Q_2 represents the physical capital and Q_3 represents the human capital. Outputs are measured by revenue: Y_1 is revenue from loans, and Y_2 is revenue from fee-based businesses.

P_1, P_2, P_3 are factor prices. P_1 represents the price of raised funds, P_2 represents the price

of physical capital, and P_3 represents the price of labor[13]. The operational cost of the bank will be:

$$C= P_1Q_1 + P_2Q_2 + P_3Q_3 \quad (2)$$

3. Economies of Scale and Economies of Scope in the Banking Industry

To produce financial products (services), banks have to accumulate huge amounts of information, and to accomplish that banks have to bear large fixed costs. However, the acquired information to provide a certain financial service can be easily used for providing a different financial service, too. Thus, if a bank expands its production in this way, we suppose that we will observe economies of scope in the banking industry.

We assume that as a result of financial liberalization a competitive financial market[14] will develop, and economies of scale and scope will emerge in the Thai banking sector.

Economies of scale emerge when a proportional increase in inputs results in an increase in outputs by more than that proportion. Generally, if large fixed cost characterizes the production of an industry, expanding the magnitude of production will lower the average production cost.

$$C(nY_1, nY_2, P_1, P_2, P_3) < nC(Y_1, Y_2, P_1, P_2, P_3) \quad (3)$$

Economies of scope emerge when a production factor associated with the production of a given product is used in the production of another product without additional costs. When the total production cost for one company (bank) to produce multiple products is lower than those

that would be incurred by several single-product companies, the economic effect is called economies of scope. Banks can provide more than just one financial service, so this suggests that they can use the accumulated information to provide other banking services as well. We suppose that banks have several factors of production that can be utilized jointly, and in this way banks can save cost, so economies of scope will emerge in the process of joint production.

$$C(Y_1, Y_2, P_1, P_2, P_3) < C(Y_1, 0, P_1, P_2, P_3) + (0, Y_2, P_1, P_2, P_3) \qquad (4)$$

In Thailand restrictions on bank operations were lifted gradually, and as a result, banks started to diversify their business activities. However, to capture these changes, we should make an empirical analysis. We will clarify whether the implemented financial liberalization measures resulted in economies of scale and scope in the Thai banking sector.

4. Estimation of Cost Function

We use the following multiproduct translog cost function for estimation[15, 16]:

$$\ln C = \alpha_0 + \sum_{j}^{2} \alpha_j \ln Y_j + \sum_{l}^{3} \beta_l \ln P_l + \frac{1}{2} \sum_{j}^{2} \sum_{k}^{2} \delta_{jk} \ln Y_j \ln Y_k + \frac{1}{2} \sum_{l}^{3} \sum_{m}^{3} \gamma_{lm} \ln P_l \ln P_m + \varepsilon \qquad (5)$$

Where, $\ln C$ = total operating cost (natural logarithm)

Y_j = the jth output

P_l = the lth input price

ε = error term

In order to accept the estimation of equation (5) as a well-defined cost function, equation (5) must be symmetric in cross terms (5a) ($\delta_{jk} = \delta_{kj}$, $\gamma_{lm} = \gamma_{ml}$)[17], monotonic (positive marginal

cost) (5b) ($\alpha_j > 0, \beta_I > 0$)[18], linearly homogenous in all input prices (5c) ($\sum_I^3 \beta_I = 1, \sum_I^3 \gamma_{Im} = 0$) [19], and should satisfy conditions for second order (conditions for stability) (5d) $(\mathrm{Hp}\left[\frac{\partial^2 \mathrm{C}}{\partial \mathrm{P}_I \ \partial \mathrm{P}_m}\right] \leq 0)$[20].

Furthermore, to increase the degree of freedom as well as to simplify the estimation work[21], we assume the linear homogeneity of output on production cost (6).

$$\sum_{j=1}^{2} \delta_{jk} = 0 \qquad (6)$$

The total elasticity of scale on overall production is represented by the formula below (7). That is, economies of scale exist if the value of the formula below is strictly less than unity. Economies of scale will be tested by using F test for the hypothesis that the cost function exhibits constant return to scale ($\alpha_1 + \alpha_2 = 1$).

$$S_n = \frac{\partial \ln C}{\partial \ln Y_1} + \frac{\partial \ln C}{\partial \ln Y_2} = \alpha_1 + \delta_{11} \ln Y_1 + \delta_{12} \ln Y_2 + \alpha_2 + \delta_{12} \ln Y_1 + \delta_{22} \ln Y_2$$

$$= \alpha_1 + \alpha_2 \quad < 1 \qquad (7)$$

In order to determine the existence of economies of scope we can use the following complementarity of scope[22] (8), which is a sufficient condition for the economies of scope. That is, if the value of the formula below is strictly less than zero, then economies of scope exist. Actual estimation is conducted in the proximity of the mean values ($\ln Y_1 = \ln Y_2 = 0$). Economies of scope will be tested by using Wald test for the hypothesis that the cost function

satisfies $\delta_{12}+\alpha_1\alpha_2=0$.

$$\frac{\partial^2 C}{\partial Y_1\,\partial Y_2} = \frac{C}{Y_1 Y_2}\left\{\frac{\partial^2 \ln C}{\partial \ln Y_1\,\partial \ln Y_2} + \frac{\partial \ln C}{\partial \ln Y_1}\cdot\frac{\partial \ln C}{\partial \ln Y_2}\right\}$$

$$= \frac{C}{Y_1 Y_2}\left\{\delta_{12}+(\alpha_1+\delta_{11}\ln Y_1+\delta_{12}\ln Y_2)(\alpha_2+\delta_{12}\ln Y_1+\delta_{22}\ln Y_2)\right\}$$

$$= \frac{C}{Y_1 Y_2}\left\{\delta_{12}+\alpha_1\alpha_2\right\} < 0 \quad [23] \qquad (8)$$

5. Data

Our sample covers the panel of all domestic and foreign commercial banks operating in Thailand over the 1990-1995 period. Data (see Table 4) used in the estimation were basically taken from various issues of the *Commercial Banks in Thailand* provided by the Bank of Thailand. The number of bank employees was taken from various issues of *Commercial Banks in Thailand* published by Bangkok Bank. We normalized all the data using GDP deflator, which was taken from the *International Financial Statistics Yearbook*. The value of individual variables used in our estimation was calculated as follows:

C = (Total cost) : Total interest expenses + Equipment expenses + Personnel expenses

Y_1 = (Interest income) : Income from loans and deposits

Y_2 = (Non-interest income) : Total non-interest income － Gain on exchange

P_1 = (Price of raised funds) : Total interest expenses／(Deposits + Due to financial institutions + Other liabilities payable on demand + Borrowings + Bank's liability under acceptances + Other liabilities)

P_2 = (Price of physical capital) : Equipment expenses／Fixed assets

P_3 = (Price of labor) : Personnel expenses／Number of employees

[Insert Table 4 about here]

V. Results of Estimation

The parameter values for the group-specific[24] cost functions are estimated for the domestic banks, foreign banks and large foreign banks, using the cost function and two of the share equations, employing the Seemingly Unrelated Regression (SUR) technique. The results of estimation for the 1990-1995 period are given in Table 5. Most of the estimates are statistically significant and carry their expected signs. The estimated parameter values are used to derive scale and scope economy measures for each bank group.

Looking at the results for domestic banks, we can identify economies of scale, but economies of scope was not found. Thus, if domestic banks expand their production, the increases in revenues will exceed the increases in costs. Increasing the revenues by 1% , costs will go up only by 0.97%.

Now if we look at the results for foreign banks, we can identify economies of scale, but economies of scope was not found. That is, if foreign banks expand their production, similarly to domestic banks, the increases in revenues will exceed the increases in costs. In the case of

foreign banks, increasing their revenues by 1% , their costs will go up only by 0.90%. Thus, in both bank groups, we found economies of scale, but economies of scope was not observed.

[Insert Table 5 about here]

On the contrary, in the case of large foreign banks, we found no existence of economies of scale (constant return to scale), but economies of scope was observed. That is, if large foreign banks expand their production in Thailand, the costs will increase proportionally with their revenues. In contrast, if these banks diversify their operations, their revenues will exceed their costs. All large foreign banks are from developed countries, thus by introducing new financial services available at home, but not available in Thailand, they can outperform domestic banks.

Our results reveal that in the case of large foreign banks there are economies of joint production between the intermediation and fee-based businesses, thus large foreign banks can realize cost advantages emerging from joint production. Regarding domestic banks, economies of scale works, thus they will prefer expanding their traditional business activities to diversifying their operations.

However, in the first half of the 90's there were two three-year financial system development plans implemented in Thailand. Thus, in order to clarify the effects of each phase of the financial liberalization process, we should re-estimate our cost function (5).

To verify that the liberalization measures implemented from 1993 to 1995 have increased the

magnitude of economies of scale, the change in the magnitude of economies of scale (the difference in the magnitude of economies of scale between the two sub-periods) must be less than zero (see Table 6). Similarly, to verify that the liberalization measures taken from 1993 to 1995 have increased the magnitude of economies of scope, the change in the magnitude of economies of scope must be less than zero.

[Insert Table 6 about here]

Looking at the results we can see that liberalization measures, which were implemented during the sub-period 1993-1995, have increased the magnitude of economies of scale in all groups, but the magnitude of economies of scope increased only in the group of large foreign banks.

VI. Concluding Remarks

In order to capture the effects of financial liberalization measures on the activities of Thai domestic and foreign banks we conducted an empirical analysis. We found economies of scale in the groups of domestic and foreign banks during the first half of the 90's. At the same time, in the case of large foreign banks we found only economies of scope. Thus, the implemented liberalization measures did not result in economies of scale in the group of large foreign banks. How can we explain these findings?

As for large foreign banks, companies from the same country are the most important customers in Thailand. Moreover, they raise funds mostly in overseas financial markets and thus the implemented liberalization measures did not affect their long-established business relationships.

Nevertheless, foreign banks raise their funds at a lower cost than domestic banks, so why did they not make use of this cost advantage to expand their lending businesses in Thailand?

Foreign banks have a comparative advantage on their domestic counterparts in capital strength and in having long-established business relationship with foreign companies. However, domestic banks have a comparative advantage on their foreign counterparts in collecting information on domestic businesses and firms. Thus, foreign banks, in order to expand, have to increase their lending to local customers as well. However, there is an information asymmetry between foreign banks and domestic firms. As for foreign banks, accumulating information on domestic firms takes time and the costs are high. Furthermore, the information disclosure practices in several developing countries are not transparent.

As an implication of our study, we suggest that, in order to increase the role of foreign banks in local financial systems, the information asymmetry between foreign banks and domestic firms should be lessened. As long as there is no progress in transparency of local information disclosure practices, foreign banks from developed countries, exploiting their advantage in

banking product innovation, can opt for increasing their activities in non-interest earning businesses, instead of expanding in traditional interest-earning businesses.

We found economies of scope in the group of large foreign banks for each interval under review, but in the group of domestic banks we did not find economies of scope at all. This indicates that the implemented liberalization measures aiming to extend the business diversification of domestic banks did not result in the expected effects. We believe that this was caused by an inconsistency between the two implemented three-year financial system development plans.

The adopted financial liberalization policies in ASEAN countries had two different aspects. On the one hand, governments intended to foster competition among banks, while on the other, they wanted to obtain more funds from abroad to sustain economic growth. In Thailand, the implemented liberalization measures resulted in huge foreign capital inflows, but one of the key elements of fostering competition among banks, namely the relaxation of entry restrictions, was not implemented until the end of 1996. In addition, when it came into effect, it only concerned the entry of foreign banks via the BIBF and no domestic bank was allowed to enter, and the branching restrictions on foreign banks remained in effect as well.

Furthermore, we found that, after the establishment of the BIBF (1993), the magnitude of economies of scale increased in all bank groups. This fact indicates that banks could make use

of the cost-cutting effect of the BIBF, and domestic banks instead of making efforts to introduce new financial services, that is to diversify their business activities, they could thrive just by expanding their traditional interest-earning businesses (see Table 7).

[Insert Table 7 about here]

Yet, another implication of our study is that during the financial liberalization process, together with relaxing the restrictions on obtaining funds from abroad, financial authorities should encourage the diversification of bank activities. We further suggest that, in order to foster business diversification of domestic banks, it is important to ensure channels through which they can acquire advanced financial technology, know-how and expertise. To accomplish this, a better policy option would have been to give more room to foreign players, by allowing foreign investors to increase their local involvement (for example, permitting to take higher stakes in domestic banks, establishing joint venture banks, etc.). Unfortunately, Thai authorities failed to adopt a flexible framework to the admission of foreign banks, the authorities allowed banks to enter only via the BIBF.

Moreover, the volume of cross-border lending to emerging markets often falls in crisis periods. However, foreign banks with local (brick-and-mortar) presence are more likely to maintain their business relationship with local borrowers than those foreign banks, which are only engaged in offshore lending and have no physical presence in the local market (for

example, new foreign banks participating in BIBF).

Nevertheless, the decisions to establish an offshore market and admit foreign banks only via the BIBF, suggests that the Thai authorities gave considerably more weight to obtaining funds from abroad, than to acquiring advanced financial know-how. Thus we believe that the establishment of the BIBF was not properly positioned in the process of financial liberalization.

Financial authorities should strike a balance between obtaining funds from abroad and introducing advanced financial know-how. Regulators should also create an environment, in which the level of banking technology and the information production capabilities of domestic banks will increase, and banks are stimulated to produce a variety of information-intensive financial assets and services.

Thailand's experience reveals that if the financial liberalization process comes with one-sided introduction of foreign banks (providers of cheap funds only), the intended effects of financial liberalization measures on bank activities will be distorted. Thus, under these circumstances (weak competitive pressures on banks and easy access to cheap off-shore funds) domestic banks will not concentrate on improving the availability and quality of financial services, but they will focus on exploiting profit chances.

Demand for financial services tends to increase as economies expand and societies become wealthier. The Thai economy grew remarkably in the first half of the 90's (for example, 11.2 %

in 1990 and 8.8 % in 1995). Unfortunately, the domestic banks could not make use of this opportunity to upgrade and diversify their business activities.

In this analysis we supposed that no X-inefficiency exists in the banking sector. As a further step, however, a cost function approach that considers X-inefficiencies will be useful to confirm the results of our study.

In our empirical research we investigated the effects of financial liberalization measures on Thai domestic and foreign banks during the first half of the 90's, a period which is characterized by an acceleration of liberalization measures. We found that the effects of implemented financial liberalization measures on bank activities were uneven across bank groups. Our results regarding domestic banks are similar to Okuda et al. (1997, 1999), that is, we found economies of scale, but economies of scope was not present in this group. A similar study focusing on foreign banks operating in other emerging markets will be useful to confirm the robustness of our results regarding foreign banks.

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Table 1. Chronology of Major Financial Liberalization Measures in Thailand

Abolition of interest rate control	
1990 March	Abolishing interest rate ceiling on commercial banks' time deposits of less than 1 year.
1992 January	Abolishing interest rate ceiling on commercial banks' saving deposits.
1992 June	Abolishing ceiling on commercial banks' lending rates.
Foreign exchange liberalization	
1990 May	Thailand formally accepted obligations under Article VIII of the IMF's Articles of Agreement.
1991 April	Allowing freer outflows of capital for overseas investment, repatriation of dividends and proceeds from sale of stocks by foreigners; Resident individuals or juristic entities were allowed to open foreign currency accounts.
1992 May	Further liberalization of exchange controls (Allowing exporters to be paid in baht from non-resident baht accounts without prior approval from the Bank of Thailand (BOT); allowing exporters to use foreign currencies from exports to repay foreign debts without prior approval from the BOT, etc.).
Expanding the scope of activities of commercial banks	
1992 March	Allowing commercial banks to operate: as selling agents for debt instruments issued by the government and state enterprises; information service; financial consulting service.
1992 June	Allowing commercial banks to operate the following (fee-based) businesses: arranging, underwriting, and dealing in debt instruments; representative of secured debenture holder; trustee of mutual funds; securities registrar; selling agent for investment units.
Prudential regulations	
1993 January	Imposing the BIS capital adequacy standard on commercial banks (minimum capital-to-risk-asset ratio for domestic banks 7% and 6% for foreign banks).
1993 June	Commercial banks given BIBF (Bangkok International Banking Facilities) licenses were required to increase their provisions for possible loan losses (50% →75%); Thai Rating and Information Service (TRIS) was established.
1993 Dec.	Increasing the minimum capital-to-risk-asset ratio from 7% to 7.5% for domestic banks and 6% to 6.5% for foreign banks.
1995 March	Commercial banks have to submit the details of risk and their management on the trading of foreign currencies and their derivatives.
1995 Dec.	Commercial banks given BIBF licenses were required to increase their provisions for possible loan losses (75%→100%).
Deregulation of asset management	
1990 Nov.	Branch-opening requirement for commercial banks to hold government bonds as a minimum proportion of total deposits was reduced from 16% to 9.5%.
1991 May	Increasing the minimum amount of assets that each foreign bank branch must maintain in Thailand from 5 million baht to 125 million baht.
1991 Sept.	Branch-opening requirement for commercial banks to hold eligible securities as a minimum proportion of total deposits was reduced from 9.5% to 8%.
1992 January	Relaxing rural credit requirements (broadening the definition of rural credit, etc.).
1993 May	Abolishing branch-opening requirement for commercial banks to hold eligible securities as a minimum proportion of total deposits.
Deregulation of entry	
1993 March	Establishing the BIBF (47 units).
1996 Nov.	7 foreign BIBF units were upgraded into full bank branches.
1996 Dec.	BIBF licenses were granted to 7 new foreign commercial banks.
1997 Nov.	Allowing foreign investors to take majority stakes and management control for up to 10 years in locally incorporated financial institutions.

(Source*: Financial Institutions and Markets in Thailand* (1998))

Figure 1

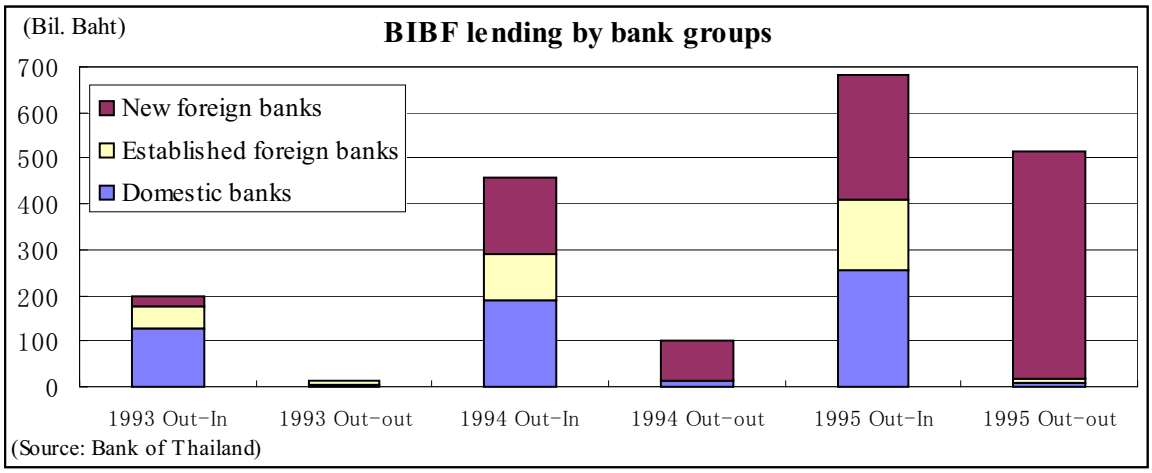
(Bil. Baht)
BIBF lending by bank groups
700
600
500
400
300
200
100
0
New foreign banks
Established foreign banks
Domestic banks
1993 Out-In
1993 Out-out
1994 Out-In
1994 Out-out
1995 Out-In
1995 Out-out
(Source: Bank of Thailand)

Figure 2

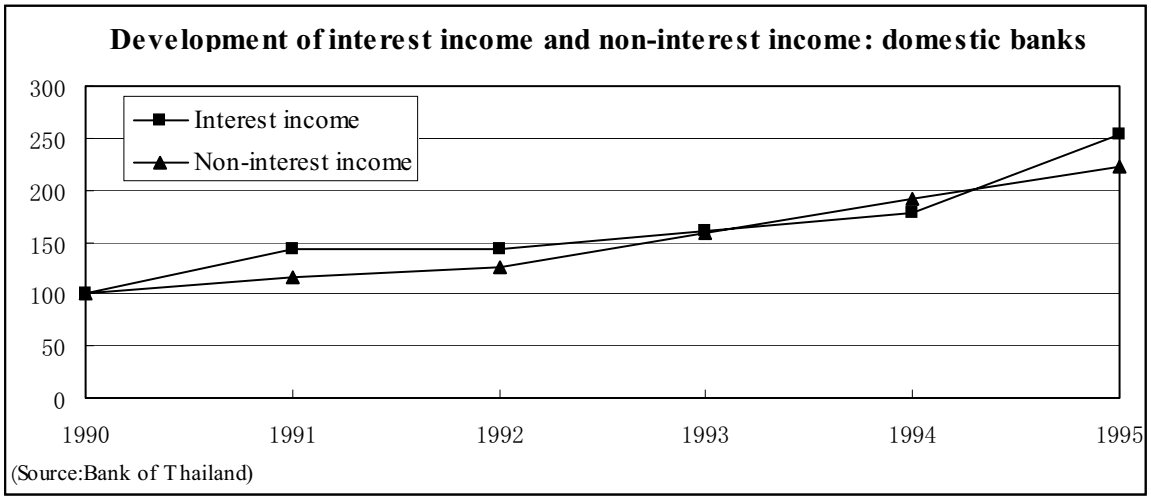
Development of interest income and non-interest income: domestic banks
300
250
200
150
100
50
0
Interest income
Non-interest income
1990
1991
1992
1993
1994
1995
(Source:Bank of Thailand)

Figure 3

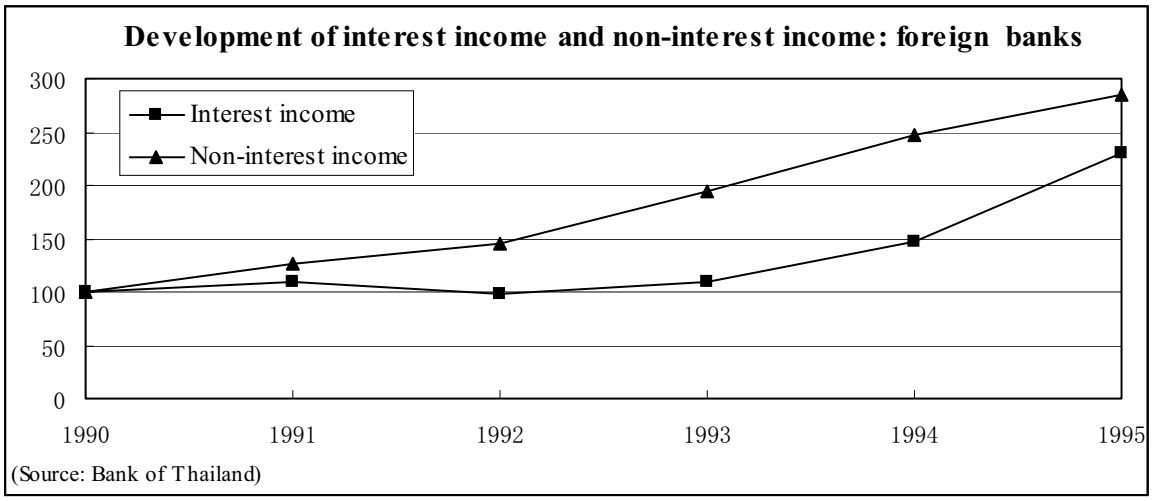
Development of interest income and non-interest income: foreign banks
300
250
200
150
100
50
0
Interest income
Non-interest income
1990
1991
1992
1993
1994
1995
(Source: Bank of Thailand)

Table 2. Changes in Factor Prices

Price of raised funds (Total interest expenses/Total liabilities) (P_1) (%)

Year	Domestic banks	Foreign banks	Large foreign banks	Small foreign banks
1990	8.85	7.50	7.40	7.70
1991	10.72	7.60	7.20	8.20
1992	8.08	5.80	5.70	5.90
1993	7.37	4.60	4.40	5.00
1994	6.31	4.80	4.40	5.70
1995	8.20	7.80	6.60	10.01

Price of physical capital (Equipment expenses/Fixed Assets) (P_2) (%)

Year	Domestic banks	Foreign banks	Large foreign banks	Small foreign banks
1990	22.66	87.84	75.87	109.38
1991	21.60	96.61	74.46	136.47
1992	20.47	98.51	90.12	113.61
1993	18.28	105.62	75.07	160.61
1994	14.27	82.78	61.73	120.66
1995	13.18	66.55	53.68	89.72

Price of labor (Personnel expenses/Number of employees) (P_3) (Mil. Baht)

Year	Domestic banks	Foreign banks	Large foreign banks	Small foreign banks
1990	0.15	0.40	0.43	0.34
1991	0.16	0.38	0.45	0.26
1992	0.18	0.41	0.49	0.28
1993	0.19	0.47	0.56	0.32
1994	0.21	0.49	0.59	0.32
1995	0.22	0.60	0.67	0.46

(Source: Own calculations)

Table 3. Ratio of Profit (net profit/total assets) (%)

Year	Domestic banks	Foreign banks	Large foreign banks	Small foreign banks
1990	0.96	2.32	2.29	2.61
1991	0.95	2.85	2.79	3.66
1992	1.29	2.65	2.61	3.22
1993	1.54	2.79	2.76	3.33
1994	1.75	2.36	2.38	1.85
1995	1.71	2.21	2.24	1.67

(Source: Own calculations)

Table 4. Basic Statistics

Domestic banks

Variable	Mean	Standard deviation	Minimum	Maximum
Total operating cost (C)	13819.82	13289.65	644.40	62380.90
Interest income (Y_1)	16550.82	16982.86	618.50	80383.36
Non-interest income (Y_2)	1383.54	1613.37	62.30	7655.72
Raised funds (Q_1)[25]	36562.42	37917.37	1209.30	186413.59
Physical capital (Q_2)	3694.55	4300.35	96.00	19366.43
Number of employees (Q_3)	7415.07	6590.56	446.00	26310.00
Price of raised funds (P_1)	0.08	0.01	0.05	0.12
Price of physical capital (P_2)	0.12	0.06	0.06	0.36
Price of labor (P_3)	0.18	0.04	0.11	0.32

Foreign banks

Variable	Mean	Standard deviation	Minimum	Maximum
Total operating cost (C)	717.94	760.39	49.58	3113.99
Interest income (Y_1)	938.25	984.97	60.20	4337.41
Non-interest income (Y_2)	175.29	232.49	3.10	1481.22
Raised funds (Q_1)	9489.25	10818.03	342.64	42941.41
Physical capital (Q_2)	69.54	94.67	1.05	656.75
Number of employees (Q_3)	186.06	176.34	46.00	1075.00
Price of raised funds (P_1)	0.07	0.02	0.02	0.23
Price of physical capital (P_2)	0.89	0.65	0.09	3.66
Price of labor (P_3)	0.46	0.19	0.18	1.09

(Note) (1) Raised funds (Q_1), physical capital (Q_2) and number of employees (Q_3) were calculated as averages of previous year-end and actual year-end figures.

Table 5. Results of Estimation

Variable	Parameter	Group	Domestic banks	Foreign banks	Large foreign banks
Intercept	α_0	estimated value	0.00	-0.02	-0.06
		t-value	0.30	-0.78	-1.64*
$ln Y_1$	α_1	estimated value	0.93	0.75	0.72
		t-value	42.47***	17.74***	13.90***
$ln Y_2$	α_2	estimated value	0.04	0.15	0.22
		t-value	1.79*	4.57***	4.51***
$ln P_1$	β_1	estimated value	0.85	0.75	0.78
		t-value	275.47***	64.71***	63.10***
$ln P_2$	β_2	estimated value	0.04	0.06	0.06
		t-value	29.39***	13.10***	8.03***
$(ln Y_1 - ln Y_2)^2$	$1/2\,\delta_{11}$	estimated value	-0.08	0.04	0.26
		t-value	-1.18	0.51	1.92**
$(ln P_1)^2$	$1/2\gamma_{11}$	estimated value	0.08	0.09	0.14
		t-value	7.40***	3.72***	4.72***
$(ln P_2)^2$	$1/2\gamma_{22}$	estimated value	0.01	0.01	-0.004
		t-value	3.75***	2.11**	-0.36
$ln P_1 ln P_2$	γ_{12}	estimated value	-0.02	-0.02	-0.006
		t-value	-4.53***	-2.17**	-0.45
Economies of scale		estimated value	0.97	0.90	0.94
		p-value	0.00+++	0.00+++	0.13
Economies of scope		estimated value	0.20	0.03	-0.36
		p-value	0.15	0.86	0.05++
No. of obs.			270	252	162
R^2			0.99	0.96	0.91

(Note) (1) Economies of scale: $\alpha_1 + \alpha_2 < 1$

Economies of scope: $\delta_{12} + \alpha_1 \alpha_2 < 0$ ($\delta_{12} = -\delta_{11}$)

(Note) (2) The p-value for economies of scale shows the p-value of F test, the p-value for economies of scope shows the p-value of Wald test.

(Note) (3) *, **, *** and +, ++, +++ represent significance at 10%, 5% and 1% significance level.

Table 6. Results of Estimation

Parameter	Group	Domestic banks		Foreign banks		Large foreign banks	
		1990-92	**1993-95**	**1990-92**	**1993-95**	**1990-92**	**1993-95**
α_0	estimated value	0.01	-0.01	0.00	-0.02	-0.02	-0.06
	t-value	1.13	-0.01	0.12	-0.45	-0.69	-1.00
α_1	estimated value	0.97	0.88	0.79	0.74	0.79	0.70
	t-value	31.79***	27.11***	15.75***	12.03***	16.23***	7.83***
α_2	estimated value	0.01	0.09	0.12	0.15	0.10	0.18
	t-value	0.46	3.29***	3.17***	3.09***	1.78*	2.59***
β_1	estimated value	0.86	0.83	0.76	0.74	0.77	0.79
	t-value	237.66***	167.57***	51.37***	42.17***	49.82***	32.37***
β_2	estimated value	0.03	0.04	0.06	0.07	0.06	0.07
	t-value	20.69***	21.86***	12.16***	7.25***	8.81***	4.64***
$1/2\,\delta_{11}$	estimated value	-0.21	-0.02	-0.06	0.03	0.10	0.33
	t-value	-2.36**	-0.21	-0.59	0.31	0.78	1.60*
$1/2\gamma_{11}$	estimated value	0.05	0.09	0.05	0.13	0.08	0.09
	t-value	4.17***	4.33***	1.64*	3.14***	2.12**	1.32
$1/2\gamma_{22}$	estimated value	0.01	0.01	0.01	0.01	0.01	0.03
	t-value	2.90***	2.27**	2.00**	1.35	1.76*	1.16
γ_{12}	estimated value	-0.01	-0.02	-0.01	-0.03	-0.03	-0.07
	t-value	-1.88*	-2.55***	-0.61	-1.91*	-1.92*	-2.39**
Economies of scale	estimated value	0.98	0.97	0.91	0.89	0.89	0.88
	p-value	0.10+	0.06+	0.00+++	0.00+++	0.06+	0.10+
Economies of scope	estimated value	0.44	0.14	0.21	0.04	-0.12	-0.54
	p-value	0.19	0.58	0.29	0.82	0.10+	0.04++
No. of observations		135	135	126	126	81	81
R^2		0.99	0.99	0.97	0.94	0.95	0.89
Change in the magnitude of economies of scale		-0.01		-0.02		-0.01	
Change in the magnitude of economies of scope		—		—		-0.42	

(Note) (1) Economies of scale: $\alpha_1+\alpha_2<1$
Economies of scope: $\delta_{12}+\alpha_1\alpha_2<0$ ($\delta_{12}=-\delta_{11}$)

(Note) (2) The p-value for economies of scale shows the p-value of F test, the p-value for economies of scope shows the p-value of Wald test.

(Note) (3) $^{*},^{**},^{***}$and $^{+},^{++},^{+++}$ represent significance at 10%, 5% and 1% significance level.

Table 7. Development of Average Fund Raising Cost and Yield on Government Bonds (%)

Year	Domestic banks	Foreign banks	Large foreign banks	Small foreign banks	Yield on government bonds
1990	8.85	7.50	7.40	7.70	10.75
1991	10.72	7.60	7.20	8.20	10.75
1992	8.08	5.80	5.70	5.90	10.75
1993	7.37	4.60	4.40	5.00	10.75
1994	6.31	4.80	4.40	5.70	10.75
1995	8.20	7.80	6.60	10.01	10.75

(Source: Own calculations and *Commercial Banks in Thailand*, Bangkok Bank)

Footnotes

[1] Because of differences in management strategies, knowledge of the local market, clientele, organizational forms, access to international markets, etc. the effects of implemented liberalization measures on domestic and foreign banks may differ.

[2] Most of the studies dealing with the operations of foreign banks in local financial markets focus on the US market. De Young et al. (1995), and Iftekhar et al. (1996) conclude that foreign banks are less efficient than US banks. Claessens et al. (1998) examined the behavior of banks in 80 countries, and foreign banks were found to operate with higher interest rate margins and earn higher profits in developing countries than their domestic counterparts, while the opposite was true for developed countries.

[3] In 1955 the Thai government restricted the entry of new banks. Moreover, in 1964 foreign banks were banned to open additional branches. See section III for a more detailed discussion.

[4] See Vichyanond (2000) for a more detailed discussion.

[5] See Chaiyasoot (1993).

[6] This kind of foreign bank entry was the entry of Bank of Tokyo in 1962, and the entry of Chase Manhattan Bank in 1964.

[7] Several studies point out that, the domestic banks in developing countries are poor long-term fund providers and they do not have reliable monitoring and efficient fund managing ability. On the other hand, as the foreign banks also provide funds and they also offer financial services, the domestic banks have to compete with foreign banks in several fields. As a result of this kind of competition the price of financial services will be lowered and consumer surplus will be higher. In this way, the operations of foreign banks affect the efficiency of the entire financial system.

[8] In 1987, the list of authorized (fee-based) businesses for commercial banks was broadened to include: custodial service, loan syndication, advisory service regarding mergers and acquisitions and feasibility study.

[9] See Tazaka (1996) for a more detailed discussion.

[10] There was no change in the number of domestic (15) and foreign (14) banks during the period under review. In Thailand, the US was represented by 3 banks, Japan and the UK by 2 banks each, France, Germany, China, India, Malaysia, Singapore, and Taiwan by 1 bank each.

[11] We suppose that the business opportunities of banks from developed countries and banks from the neighboring countries differ significantly. Regarding banks from developed countries, together with banks, multinational companies from the same country are also present in Thailand, and these companies are natural business partners of these banks. However, regarding banks from the neighboring countries, the number of firms coming from the same country is very limited.

[12] Security Pacific Asian Bank was bought up by ABN-AMRO (Netherlands) in 1994, but this bank

originally was Bank of Canton (China), thus we put it into the group of other banks.

[13] See section IV. 5 for a more detailed explanation.

[14] In case of non-competitive markets, saved costs likely would be used as fringe benefits, not for increasing banks' cost efficiency.

[15] In this method we suppose that banks use all their inputs efficiently (no X-inefficiency exists) and all banks use the same production technology.

[16] A translog function requires the approximation of the underlying cost function to be made at a local point, which in our case, is taken at the median point of all variables. Thus, all variables are normalized at their sample means.

[17] In order for equation (5) to be a second-derivative cost function, the symmetry of the interaction terms is required.

[18] In order to satisfy the conditions for the marginal cost of outputs, $(\partial C/\partial Y_j) > 0$, and the marginal cost of production factor prices, $(\partial C/\partial P_l) > 0$, they should be satisfied by the marginal cost at least at the approximate points of $Y_j=1$ and $P_l=1$.

[19] In order to satisfy that the change in production factor price unit will not affect production technology, these equations are required.

[20] In order for equation (5) to represent the cost function indicating the minimized cost associated with a given production technology, this condition needs to be satisfied.

[21] The model to be estimated consists of two share equations and the translog cost function itself. The inclusion of the share equations in the estimation increases the efficiency of the estimated parameters since many additional observations are added without adding any additional unknown parameters. The model includes only two share equations because the sum of the shares is one and, therefore, only two shares are independent. Constraints for symmetry and linear homogeneity in factor prices and output are imposed on the model before estimation. The cost share, which is observable, represents the proportion of total costs that is attributed to input *l*. The cost share equations are derived from the translog cost function:

$$\frac{\partial \ln C}{\partial \ln P_l} = \frac{P_l Q_l}{C} = \text{Share}_l = \beta_l + \sum_m \gamma_{lm} \ln P_m .$$

[22] This method follows Kasuya (1993).

[23] Since $C/\ Y_1 Y_2 > 0$ (property of cost function), it is clear that $\{\delta_{12} + \alpha_1 \alpha_2\} < 0$. The existence of economies of scope will be judged by this formula.

[24] The null hypothesis that all coefficients are identical between domestic and foreign banks was rejected. Given the dissimilarity in the cost structures of domestic and foreign banks, the cost functions should be estimated separately.