Influence of Foreign Banks Entry into China on the Performance of Efficiency

In the Chinese Banking Industry

by

Xuefeng Zhang

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Saint Mary's University

Approved: Dr.J.Colin Dodds

Faculty Advisor

Approved: Dr. Francis Boabang

MFin Director

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Abstract

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With China's economic reform and opening up and deepening of financial liberalization, the entry of foreign banks into China's banking industry has continued to accelerate in speed and develop in depth. The study of the impact of foreign investment on China's banking sector operational efficiency will make a theoretical and practical difference on deepening the reform of the banking industry and improving the development of the banking industry.

This study carried out an analysis of the impact of foreign bank entry on the Chinese banking industry and described its positive and negative effects. It further selected the panel data from14 the banks that dominate the Chinese banking market from 1998 to 2007 to construct a panel data model. It then analyzed the impact mechanism of foreign bank entry on the efficiency of China's banking sector through regression analysis. With a comparative analysis and empirical research methods, this study examined the impact mechanism of foreign bank entry on the operational efficiency in banking sector.

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Chapter 1: Introduction

1.1 Purpose of Study

This study wants to analyze the impact of the entry of foreign banks into China on the performance of the Chinese banking industry. This research focuses on the following objectives to be carried out.

(1) To research the influence of foreign bank entry on the efficiency of the host banking system;

(2) To assess the index selection of operational efficiency in China's banking industry;

(3) To conduct the regression analysis by the selected index to find out the impact.

To study the impact of foreign bank entry into China on the efficiency in Chinese banking system, it is better to resolve the current troubles facing China's host banking industry, and help the Chinese banking industry to face the challenges brought on by the entry of foreign banks. Policy makers need to pay attention to the possible problems and to take effective measures to reduce the risks and improve the benefits. This is of great practical significance for the national economic security, political, and social stability.

1.2 Background

In past decades, the pace of financial globalization has been greatly accelerated. In the meanwhile, many emerging countries have loosened their restrictions on the issue of foreign bank entry, thereby raising their competitiveness in the banking industry, as Morgan and Strahan (2003). In the late 1990s, with the integration of international

economy, most foreign banks further extended their market into the new market countries. Consequently, the competition in these countries has become increasingly fierce. The act of a foreign bank entry has a deep influence on not just market composition and organizational structures, but bank operational efficiency. Bank operational efficiency is a crucial index which is used to assess bank operational performances. In order to raise such efficiency, it is indispensable to reduce financial risks and promote capital accumulation in the banking industry.

The history of foreign bank entry in China can date back to the reform and opening period. The first step of foreign bank entry was the establishment of a representative office in Beijing by the Japan Export-Import Bank in 1979. As the process of reform deepened and the bank expansion grew faster, various banking activities emerged. Since 1992, foreign financial institutions have opened in Fujian, Zhuhai, Hainan, Beijing and other regions, later in Nanjing, Guangzhou, Fuzhou and other cities.

After China formally joined the World Trade Organization (WTO) in 2010, it has made great progress in the development of banking industry, such as extending business areas, increasing market access and promoting institutional setting. By the end of 2006, the banking industry was completely opened in China. There were 195 branches of foreign banks in China, 14 of which were registered by local corporations with $100 billion assets in total. Until April 2008, there were 111 foreign bank branches and 235 representative offices of foreign banks in China. Meanwhile, as Shen et al (2009), 33 foreign banks were registered as locally incorporated banks. According to Techoegl (2011), the amount of non-performing loan of foreign banks reached 67.7 billion yuan,

which took up 1.03% of the total loans. Therefore, it is apparent that as foreign banks play an increasingly crucial role in China's banking system, the competition faced by domestic banks will become tougher and fiercer.

The foreign bank entry has brought opportunities and challenges to the banking industry in China. A good example is that Chinese commercial banks can be exposed to advanced management concepts and foreign operational modes, absorbing the advantages of risk management experience (Bonin and Huang, 2002). Also, the quality of China's banking assets and the capital adequacy ratio of Chinese banks can be significantly enhanced thanks to the mergers and acquisitions of foreign banks. Overall, it is conducive for China's banking industry to add additional branches in foreign countries, thereby expanding overseas business and raising their competitiveness in the global banking industry.

However, the entry of foreign banks can impose a negative influence on Chinese banking industry. First, the stability of Chinese financial market can be impaired. Since the financial system itself is not perfect and the supervision of banks is not strong enough, the competition between Chinese banks and foreign banks can affect the existing stability of China's financial markets, as Berger and Zhou (2009). Second, as an intermediary transfer of international capital flows, the chances are that foreign banks can contribute to an international financial crisis, which also brings potential risks to China's market. Third, the entry of foreign banks squeezed the space that Chinese banks operate in the market, posing a threat to the existence of Chinese banks and undermining the balance of the banking industry.

1.3 Research methods

This study will utilize comparative analysis and summation methods. There will be both horizontal and vertical contrasts in terms of the comparison in research methods, concepts and relevant theories. It will also combine theoretical research methods with empirical ones with an ample amount of data. This study will fully describe the theories of efficiency of banking systems and foreign bank entry, and illustrates the impact of such on bank operational efficiency.

Chapter 2: Literature Review

2.1 Emergence and development of foreign banks

2.1.1 Definition of foreign banks

In China, the Article II of "Regulations of the People's Republic of China Governing Financial Institutions with Foreign Capital" issued by Chinese State Council on April 1, 1994 provided that foreign bank is the foreign capital bank whose head office is in China; foreign banks branches in China; joint venture banks by the foreign financial institutions and Chinese companies and enterprises in China. Based on legislation, combined with the actual situation in China, this study argues that a foreign bank refers to the foreign bank branches set up by foreign financial institutions invested in China according to Chinese laws, the foreign banks and joint venture banks with legal personality (Detragiache et al, 2008).

2.1.2 Characteristics of foreign banks in China

Currently, foreign banks in China showed the following characteristics:

(1) Expanding scale of assets

As of late April 2008, a total of 33 foreign banks were registered as the locally incorporated banks, and there were 111 foreign bank branches and 235 representative offices of foreign banks in China. Foreign banks' bad loan ratio was maintained at a low level (Shen et al, 2009). As reported in Chapter 1, for the second quarter of 2009, foreign banks non-performing loan was 67.7 billion yuan non-performing loans accounted for 1.03% of the total loans (Techoegl, 2011).

(2) A high degree of geographical concentration

Foreign banking institutions are largely concentrated in economic circles, the Yangtze River Delta, Pearl River Delta and Bohai Economic Circle. The financial center cities in these three economic circles (e.g., Shanghai) and the economically developed coastal cities, such as Beijing, Guangzhou, Shenzhen, Tianjin, Xiamen and Dalian, are important venues for business expansion of foreign banks. Indeed, this concentration of foreign banking institutions in those six cities account for 80% of the total foreign banking institutions in China and 90% of total assets (Wang, 2009).

(3) The rapid increase in branches

Since the first foreign bank to enter China in 1979, foreign banks in China have made great progress and the branches are increasing. Especially in 2006 for the implementation of WTO commitments, China fully opened the liberalization of financial markets, and officially opened the RMB business, the number of branches of foreign banks increased rapidly. As of the end of December 2007, there are a total of 14 banking institutions registered in China's foreign-owned and joint-venture corporation, comprising 19 branches and subsidiaries, 74 foreign banks in 22 countries and regions set up 200 branches and 79 sub-branches in 25 cities of China, 186 foreign banks in 42 countries and regions set up 242 representative offices in 24 cities of China (Wang, 2009).

(4) Source of funds and gradually expanded channels

Funding sources for Rmb business has expanded to the use of many channels, particularly since China’s WTO accession. Initially foreign banks funded mainly from

the Chinese RMB funds into banks. Foreign banks in 2001 from financial institutions into the capital accounted for 63% of funding sources. Since 2003, the Chinese banks credit expanded, and there appeared a significant reduction in the extent of surplus funds and the capital from the parents of foreign banks into banks sharply reduced. Meanwhile, as the foreign banks in China accelerated the speed of outlets, the ability of foreign banks for deposits in RMB enhanced. Since 2003, its absorption of the deposit has surpassed more than half of the RMB funding. Foreign banks RMB funds used for loans initially. Since 2003, its securities for investment and joint-line transactions began to increase the share capital. It is particularly worth mentioning that foreign banks for securities investment funds and domestic capital share are highly correlated with the market level of activity.

(5) Rapidly expanded business

In business, along with the gradual honoring of WTO commitments, the business scope of foreign banks operating in China has been expanded from the foreign exchange business to the RMB business. In 2006 the new business included the online banking, debt underwriting, corporate cash management, financial derivatives, and the individual business management. As of the end of September 2006, the number of cities for China's RMB business opened to foreign banks has reached 25, 111 foreign banks allowed to conduct RMB business (Real Time Economics, 2011).

From the thinking by foreign banks that have entered the Chinese market, the development strategy can be divided into four types: (i) carry out a comprehensive variety of banking services, including securities, insurance, fund business, in which

Citigroup, HSBC and Standard Chartered Bank are the representatives; (ii) the company's business and asset management as the main business, such as Deutsche Bank and Dutch bank; (iii) focus on developing retail banking business, the Bank of East Asia is the representative one; (iv) for the parent bank's global clients to expand business services in China, focusing on agency business, international settlement business.

The main business focus of foreign banks is in the "foreign-funded enterprises", especially the foreign-invested enterprises from their home. Foreign banks in China also regarded the Personal Financial Services as a focus, for the moment it is also focused on foreign exchange financing business.

The research on the foreign banks to enter the host country began in 1983. Kindleberger (1973), made his famous "follow the customer" theory that commercial banks set up branches overseas to establish their knowledge and information cross-border network resulting in obtaining the internalization advantages.

2.2 Impact of foreign bank entry on the efficiency in host banking system

2.2.1 To help the host country improve the efficiency in the banking system

Levine (1996) based on previous studies conducted a study argued that the foreign bank entry is combined with the new technology, better resource allocation and higher efficiency of banking system, and spread rapidly through competition and imitation. It helps improve the operational efficiency and financial stability of the banks in the host country, and increases the stability of the overall financial system.

Denizer (2000) after the study of the influence of foreign bank entry on domestic banking industry in Turkey between 1990-1997, found that, although the market share of foreign banks was only 3.5%-5%, the ratio of the domestic banks net interest income and total assets, general management costs and total assets, profits and total assets ratio, are closely related with their ownership share of foreign banks. Meanwhile the entry of foreign banks will intensify competition in its banking industry, making the level of profits and administrative costs to total assets ratio decreased.

Levine (2003) further found that the lower level of one unit each on the restrictions on foreign bank entry, the level of bank net interest margin decreased approximately 3% (only under the premise of bank variables), which also indicated that with the entry of foreign banks, the host country's banking system increased the level of competition, and efficiency was enhanced.

2.2.2 Uncertainty to improve the efficiency of the banking system in the host country

Nigh, D., Cho, K.R. and Krishnan, S (1986) studied the changes in the assets of foreign affiliates in the U.S. banking industry in 30 countries between 1976-1982 and pointed out that the host country in particular (Asian countries), restrictions on access exert a negative impact on the business of the U.S. banks in the U.S. banking industry.

Terrel (1986) analyzed the overall accounting data in the banking market from 14 developed countries (eight of which allow foreign banks to enter), and found that those nations that allow foreign banks to enter, have relatively low interest rates, pre-tax profit and operating costs. In other words, although the competition with foreign banks

will reduce the share and profits of local banks, they can improve the function of the banking market and improve overall social welfare.

Demirguc-Kunt and Detragiache (1998) studied the data for some emerging market countries using multiple logit models and found that the degree of foreign capital entry was negatively correlated with the banking crisis probability.

Barajas (2000) studied the situation in Colombia, and suggested that foreign bank entry will lead to a reduction in indirect financing costs in the financial intermediaries, accompanied by the markedly declined domestic banks' asset quality.

Barth et al. (2001) showed that if a country's banking industry has less access restrictions on the foreign banks and domestic banks, then the net interest margin and indirect costs will be relatively low. In addition, they also found that if a country has relatively small constraints on foreign banks and bank capital, then the frequency of banking crisis will be greatly reduced. Foreign bank entry not only increased the number of competitors on the market, but also expanded the boundaries of the market, having a far-reaching impact on the market structure and organizational structure. The opening of the domestic financial market to foreign banks first is based on such a theory that benefits from entry outweigh its costs.

Lensink and Hermes (2004) further analyzed the impact of foreign bank entry on the banking industry in the host country in the short term, also analyzed the role of the level of economic development and other economic variables. They collected data from 48 countries between 1990-1995, after completing a series of econometric analysis, they found that the entry of foreign banks also brought short-term effects to the host banks: In

the economically backward countries, domestic banks operating costs will rise, while domestic banks will strive to pass on part of the loss of its customers, and ultimately spread income will rise, and the overall change of profits is not statistically significant. In developed countries, however, the entry of foreign banks led to a decline in the host banks' costs, spread income, profits, or is not statistically significant, that these economic variables do not change dramatically.

Uiboupin (2005), selected data from 319 banks for economies data in transition in Central and Eastern Europe in 1995-2001. The results were that: the entry of foreign banks significantly enhanced the market competition in the host country banking, mainly reflected the bank's pre-tax profits, non-interest income, average loan rates in the host country, and loan loss provisions were significantly decreased, while the general operating costs also increased, although the results were not statistically very significant. The development and improvement of the host country banking market was directly affecting the size of the domestic banks hardest hit. In the countries where bank market development has lagged behind, the bank's loan loss provisions and income decline were significantly higher than the relatively completed national banking market, and the latter bank saw no significant increase in operating costs; the size of host country bank itself was also a factor of its performance change as a large market of the bank's non-interest income and loan loss provisions decline were much smaller than small banks.

2.3 Relationship between the host open conditions and the efficiency gains

Brealey and Kaplanis (1996) found that the foreign direct investment through the U.S. manufacturing sector during the period of 1972 -1995 had a strong positive

correlation with the foreign direct investment in the banking industry. Their studies have shown that the number of foreign banks to enter has a positive relationship with the host country's GDP. Claessens and Glaessner (1998) through the studies of eight Asian countries and regions found that banking industry openness was significantly related to the efficiency of domestic banks. Limited openness reduced the role of promoting the development of the system, making the associated costs increased. Miller and Parkhe (1998) found that the bilateral trade has a direct investment influence on the U.S. and Japanese banks in the host country's banking industry. Goldberg and Johnson (1999) found that the foreign direct investment in the U.S. manufacturing sector during the period of 1973-1986 also had the same situation in the banking industry.

Focarelli and Pozzolo (2000) used more variables for the characterization of the host country market opportunities. Their model selected 143 banks from 28 countries as a sample where at least one shareholder in each bank was a foreign shareholder. In addition to describing the level of economic relations in the two countries (including non-financial sector, FDI, trade, geographic distance, etc.) and accessing to institutional banking restrictions in their model, they also included the variables to measure the economic growth prospects and degree of competition in the banking system of the host country. They found that foreign banks were most willing to enter a country with a higher expected rate of economic growth and where the banking industry was less efficient. They believed that the economic development prospects and the entry of foreign banks was negatively correlated with the host country's per capita GDP and inflation, but was positively related with the stock market capitalization of host country.

On the efficiency of the host country banking market, if the average cost of the host country's banking industry was higher, lower net interest margin, high cash flow (the symbol of inefficient use of capital), was usually the market of foreign banks were most willing to enter.

Montinola and Moreno (2001) by studying the Mexican banking industry openness and the trends in the efficiency of domestic banks DEA suggested that in the late 1990s. There appeared the rising levels of foreign bank entry due to the more restrictions, and the actual level of access was more limited. The results were the whole efficiency level of its banking industry did not appear to significantly improve.

Martines and Mody (2004) by studying the five countries in Latin America concluded that foreign bank entry accompanied with the improvement in concentration in domestic banking market, and degree of market concentration linked with greater market power and higher administrative costs and bank spreads. The results indicated that foreign bank entry did not produce the desired significant efficiency effect.

2.4 Impact of foreign bank entry on the stability of the host country banking system or financial security

Stiglitz (1993) argued that the introduction of foreign banks can bring high cost and competitive pressures to the domestic financial institutions. Foreign banks typically prefer doing business with large multinational corporations that the domestic enterprises find it difficult to enter. In addition, foreign banks are usually not sensitive with the wishes of the host government, resulting in the decline in host country's government-controlled financial ability. This may increase a country's financial system vulnerability.

However, Levine (1996) found that the crisis in Argentina and Mexico, and the Asian financial crisis, foreign banks were a stabilizing force of the overall credit flow. In 2001 he also proposed, from a more general perspective that the entry of foreign financial institutions improved the overall efficiency of the financial industry by promoting the improvement of the official and the private sector in financial infrastructure. They thus prepared the conditions for the development of financial intermediation and long-term economic growth.

Leung (2003) using survival test methods studied the time opportunity of the established branches by the foreign banks in China during the period 1985-1996 and found that bank size, degree of internationalization and increase in business opportunities in China and improvement of the political environment and other economic stability factors are the main reason affecting foreign bank entry in China.

2.5 Summary of research status

In the existing literature, most studies concluded that foreign bank entry has had a positive role in promoting, new financial technology and management philosophy that will enhance competition in the banking industry of host country, can improve the bank efficiency of the host country to promote the banking supervision, enhance the stability of the banking system. But some studies have found that foreign bank entry may make a lower level of bank profits in the host country, and has had uncertain impact of marginal interest and the bank's operating costs in the host country.

From the perspective of research methods, the large number of studies on foreign banks entry to the host country has focused on both theoretical and empirical analysis.

On the latter, there has been an emphasis on the use of statistical and measurement methods to build models for empirical research.

Chapter 3: Methodology

3.1 Evaluation index selection of operational efficiency

As mentioned in literature review above, the entry of foreign banks can exert some positive effects on bank operational efficiency. However, the actual impact that it may have still remains to be tested. This study will fully analyze the impact of the entry of foreign banks on the operational efficiency for Chinese banks in terms of income, costs, profits and management.

(1) Income

As Classens et al (2001) reported the entry of foreign bank can raise competition in the banking market in a host country and bring down the entire banking interest income. To better explain the effect of foreign bank entry on the income of Chinese banks, this thesis will use the interest income ratio (A1) = interest income / total assets, non-interest income ratio (A2) = non-interest income / total assets of two indicators.

(2) Cost

For foreign banks with strategic plans, problems such as service network and localization are unavoidable in the process of entry to Chinese market, which can result in a large amount of costs. To some extent, this can stimulate Chinese banks to further explore the development of hardware and software to deal with the loss of staff and customers. This paper will use the operating expenses ratio (A3) = operating expenses / operating income of the indicator to assess the impact of foreign bank entry on the cost in China.

(3) Profit

To reflect the profitability of banks, this study chooses the return on equity (A4) = net profit / equity and assets net profit margin (A5) = net profit / total assets of two indicators, which are the basic financial indicators to measure the efficiency of commercial banks. The two indicators can, from the perspective of capital and assets, objectively reflect the profitability of commercial banks.

(4) Management

This project will mainly study the risk and liquidity management. For risk management, the capital adequacy ratio indicator has been a major factor that affects the efficiency of banks as a measure of stability. According to the provisions of Basel II, the ratio of the bank capital adequacy ratio of core capital plus supplementary capital and the risk-weighted assets should be not less than 8%. Due to different criteria of risk weights and the limitations of sources of data, this study cannot obtain the bank's capital adequacy ratio for the past decade. Moreover, the non-performing loan ratio, the indicator of asset quality, is also a crucial financial indicator to measure the safety of bank. This study will use the NPL ratio (A6) = doubtful debts / loans to measure security.

In liquidity management, this study will use the liquidity ratio (A7) = total loans/total deposits of this indicator to determine the bank's liquidity. The specific indicators can be seen in Table 3-1.

Table 3-1 Variable definition table of the efficiency evaluation of banking industry

Efficiency	Content	Code
Income	interest income / total assets	A1
	non-interest income / total assets	A2
Cost	operating expenses / operating income	A3
Profit	net profit / equity	A4
	net profit / total assets	A5
Management	doubtful debts / loans	A6

3.2 Variable selection and data description

3.2.1 Variable selection

There are a few variables that are selected in this study:

(1) The variable to measure the degree of foreign bank entry

In order to objectively measure the level of foreign bank entry, this paper uses the ratio (Z) of the total assets of foreign banks to the total assets of gross domestic banks in China.

(2) The variable to describe the bank operational efficiency

This study uses seven indicator/variables to measure the operational efficiency of Chinese banks as the explanatory variables, the extent of foreign bank entry indicator (the share of assets of foreign banks) as an explanatory variable, the macroeconomic and

bank level indicators that influence the operating efficiency of China's banking industry as the control variables, to study the impact of foreign bank entry on the operational efficiency of the Chinese banking industry, as shown in Table 3-2.

Table 3-2 the variable selection of the impact model of foreign bank entry on the operational efficiency of China's banking industry

Explained variables	Explanatory variables	
Bank operational efficiency indicators	Financial variables	Macroeconomic variables
A1 = interest income / total assets	Z = the share of assets of foreign banks	X1 = GDP growth rate
A2 = non-interest income / total assets	Y1 = Total assets	X2 = CPI rate of change
A3 = operating expense ratio = operating expenses / operating income		X3 = banking market concentration
A4 = ROE = net profit / equity		
A5 = Net profit margin = assets / total assets		
A6 = NPL ratio = doubtful debts / loans		
A7 = liquidity ratio = loans / total deposits		

As stated by the theoretical analysis of factors that impact the banking operating efficiency(see Chapter 2), the macro-economic level factors affecting China's banking operational efficiency include GDP, inflation, banking market structure, respectively,

measured with GDP growth rate (X1), consumer prices index (X2) and the banking market concentration (X3). Bank-level influencing factors include the size of the main banks and asset security, which are assessed by total assets of banks (Y3) and the NPL ratio (A6).

3.2.2 Data description

This study selected 14 samples of domestic banks in the years between 1998 and 2007. This covered 90% of the overall share of the banking industry in terms of total assets, deposits, and loans.

The samples selected contain the largest 14 banks in China, including the China Industrial and Commercial Bank (ICBC), Bank of China (BOC), Bank of Communications (BC), China Industrial Bank (CIB), China Construction Bank (CCB), China Everbright Bank (CEB), Agricultural Bank of China (ABC), CITIC Industrial Bank (CITIC), Shenzhen Development Bank (SDB), Shanghai Pudong Development Bank (SPDB), etc. All the data were collected and calculated from "China's Financial Yearbook" and the "China Statistical Yearbook".

The sample period in this study was from 1998 to 2007. In the early years when foreign banks entered the Chinese market, the market access they had was through small regional businesses and their status was very low in the Chinese banking industry. China has come to open to foreign investment since 1992, when foreign financial institutions started their rapid development in China. From 1996, foreign banks entered a period of fast growth and began to possess shares in banks, making a significant difference on the efficiency of banking industry in China. According to the WTO accession agreement

(2006), China opened RMB business in foreign banks, while foreign banks and Chinese commercial banks had the same treatment. In order to illustrate how the foreign bank entry can affect Chinese banking business efficiency, this study conducts an empirical analysis with data selected between 1998 and 2007.

3.3 Establishment of regression equation

This study will use a regression analysis to study the relationship between the degree of foreign bank entry and the operational efficiency in Chinese banks. The variables selected include factors affecting the efficiency of banking, the degree of foreign bank entry and banking operational efficiency.

A sample of 14 chosen (see Section 3.2 for the list) was domestic banks. From the longitudinal point of view, each individual is a time series, and this two-dimensional information can overcome the small sample size of any inherent defects, and increase the effectiveness of unbiased estimates.

Since the data contains time series, the time series must be stationary in terms of mean and variance. If the time series is non-stationary, the data must be transformed into a stationary time series prior to the model building, while maintaining the randomness of the original time series. In the economic sphere, most macroeconomic time series are non-stationary, generally through differential (once or twice) they are transformed into a smooth sequence. Prior to the differential, the purpose is to eliminate the time series heteroscedasticity.

3.4 Source of the model

The model selected was proposed by Claessens (2001). As this study has the objective of analyzing the impact of foreign bank entry on China's banking industry operational efficiency, which accounted for relatively large proportion in Chinese state-owned bank assets and has a certain monopoly, then the banking industry concentration index CR4 will be added.

The form of this model is:

$$\Delta Iti=\alpha i+\beta\Delta Zt+\gamma t\Delta xti+\delta\Delta Yt+\xi ti \quad 3.1$$

where, Iti is the efficiency variable of bank i at time t, Xti means the macroeconomic control variable, Yt is the bank-level control variable, Zt means the variable of the extent of foreign bank entry, β, γ, δ are the corresponding regression coefficients of variables, αi is the constant term, ξti is error term.

Given the differences between banks, this study applied the variable intercept model. Since the individual data sample is not available usually and the default variables may lead the changes in sectional time-series intercept, this study used the Hausman statistics test with the different regression equations. If the results H of the test statistics after test are greater than the critical value, such as $H>X_{0.05}^{2}(k)$, where k is the number of explanatory variables, the null hypothesis should be rejected. In that case, there are individual fixed effects in model. In the regression, the fixed effects model will be replaced by the following form:

$$\Delta I=\alpha iWjti+\beta\Delta Zt+\gamma t\Delta Xti+\delta\Delta Yt+\xi ti \quad 3.2$$

$$Wjti=1,\ I,\ j=1,2,\ldots,\ N$$

Wjti=0 other t=1,2,…, T: j=1,2,…, N

Wjti is the dummy variable that corresponds to each cross-sectional sample. The total number of the intercept is N. This model explains a common time-series data heteroscedasticity, the common intercept and change related issues by cross-sectional data. It will be used in the next chapter to conduct the empirical research.

Chapter 4: Empirical results and analysis

Based on the regression equation and Hansman test results, this study applied Panel Data modules in Eviews5.1 software, chose Fixed Effects in the Intercept of Pool Estimation, and conducted a regression analysis of the data.

4.1 Regression analysis of interest income rate

Based on the regression results in Table 4-1 it can be found that the goodness of fit $R^2 = 0.492$, so the equation fit is not high. The t-values of variable coefficients did not pass the 5% level t-value test, $t_{0.05}(140)=1.64$. It shows that between the extent of foreign bank entry and interest income neither has a significant correlation. This indicates that foreign bank entry has had no significant effect on interest income in the domestic commercial banks at this stage. There are two main reasons for this:

(l) Net interest income mainly depends on the interest rate differentials between deposits and loans. China has a more stringent control over interest rates. Commercial banks deposits and lending interest rates are essentially controlled by the central bank. Furthermore, bank loan investment and scale need to obey the state's macro regulation and control arrangements, making the exogenous interest income remains strong. Foreign banks that enter the Chinese market cannot directly compete in the financial markets. Thus, the phenomenon that the competition leads to declining interest rates on the banking market in China does not appear.

(2) Because of the network advantages of China's domestic banking deposits and habits of the masses, it leads to foreign banks will not have much impact on the current interest rate structure in China's banking industry.

Table 4-1 Regression results for interest rate income

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.066130	0.039652	1.667746	0.0981
Z	0.389365	0.121205	0.212455	0.0017
X1	-0.007077	0.067509	-0.104830	0.9167
X3	-0.073479	0.040873	-1.797734	0.0748
Cross-section fixed (dummy variables)				
R-squared	0.490737	Mean dependent var		0.017353
Adjusted R-squared	0.420494	S.D. dependent var		0.007761
S.E. of regression	0.005908	Akaike info criterion		-7.306169
Sum squared resid	0.004049	Schwarz criterion		-6.936726
Log likelihood	502.8602	F-statistic		6.986260
Durbin-Watson stat	1.930712	Prob (F-statistic)		0.000000

4.2 Regression analysis of non-interest income rate

The regression results on A2 non-interest rate are shown in Table 4-2. As can be seen from this table, in the regression results $R^2 = 0.81$, there is a high degree of fit with DW = 2.29, it passed the DW value testing, and the t statistic on the regression coefficient of the extent of foreign bank entry Z also passed the 5% level t-value test, showing that the non-interest rates within China's commercial banks there is a more significant positive correlation with the extent of foreign bank entry. When the extent of foreign bank entry increases one unit, the non-interest rate of China's banking industry there will be three percent increase.

Why foreign bank entry will lead China's non-interest income to be increased is mainly due to the following reasons.

Table 4-2 Regression results on non-interest rate

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.005986	0.000905	6.612939	0.000
Z	0.031760	0.043062	3.737541	0.000
X1	0.102570	0.121422	4.844741	0.0011
X3	-0.009091	0.023382	-2.388794	0.0015
Cross-section fixed (dummy variables)				
R-squared	0.812265	Mean dependent var	0.006691	
Adjusted R-squared	0.734042	S.D. dependent var	0.003518	
S.E. of regression	0.001814	Akaike info criterion	-9.538531	
Sum squared resid	0.000119	Schwarz criterion	-8.938149	
Log likelihood	264.0018	F-statistic	10.38396	
Durbin-Watson stat	2.295412	Prob (F-statistic)	0.000000	

(1) For developing countries, when foreign banks are at a competitive disadvantage in some areas with host banks, foreign banks usually use their strengths, and in their own leading-edge market, by raising product prices. A lack of network advantages and business resources are the general disadvantages for foreign banks operating in China, so they almost all focus on foreign operations, such as the emerging affluent clients on the quality. This combined with China's special interest rate control policy, foreign banks find it difficult to acquire advantages in the traditional deposit and

lending business, so they will use their own technological advantages to develop intermediary business, which has led to the intense competition among businesses in the Chinese banking market. China's domestic banks in order to gain the initiative in the next competition will vigorously develop a non-interest income path to gain profitability.

(2) In the banking industry, non-interest income is primarily gained through investment in securities and the intermediary business. It should be said that foreign banks in carrying out these operations have unmatched knowledge and technology advantages. Consequently, the Chinese banks should not undertake or carry out such operations, but this is not reality. On the one hand, foreign banks in developing intermediary business have spill-over effects, which will bring models to the attention of Chinese banks. Their experience, expertise and knowledge are public, so the Chinese banks can immediately use this for business development and operations. On the other hand, more importantly, China's non-interest banking business (mainly deposit and loan business, in addition to all other business) is currently in the explosive stage of development, as the market is very broad.

4.3 Regression analysis of operating expenses rate

The regression results on A3 operating expense ratio are shown in Table 4-3.

From Table 4-3, it can be seen that $R^2 = 0.71$, so there appears a high degree of fit for the equation, and DW = 2.37, so it passed the test. From the regression coefficients it can be seen that the Z value of the coefficient of the entry of foreign capital is negative

and its t-value also passed the 5% level t-value test. Therefore, the extent of foreign bank entry was negatively correlated with China's commercial banks operating expense ratio.

It can be seen that foreign bank entry indeed forced China's commercial banks to come out from the "quiet life", because the entry of foreign banks increased competition in the domestic banking industry. This would make China's commercial banks reduce their respective operating costs, and improve their management efficiency, thereby enhancing their competitiveness.

Table 4-3 Regression results of the operating expense ratio

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.295902	0.012531	23.61440	0.0000
Z	-2.216965	1.101034	-.0113557	0.0049
X1	-1.866544	2.271953	-1.821559	0.0191
Y1	6.48E-07	1.70E-06	1.381473	0.0061
Cross-section fixed (dummy variables)				
R-squared	0.710518	Mean dependent var	0.288401	
Adjusted R-squared	0.525249	S.D. dependent var	0.061266	
S.E. of regression	0.42214	Akaike info criterion	-3.201403	
Sum squared resid	0.044550	Schwarz criterion	-2.498061	
Log likelihood	84.22947	F-statistic	5.835068	
Durbin-Watson stat	2.378344	Prob (F-statistic)	0.001337	

4.4 Regression analysis of ROE

The regression results on A4 ROE are shown in Table 4-4. From the table, it can be seen that the fit for the equation is relatively high, and it is statistically significant. Meanwhile, the share of foreign production coefficient t-value of Z also passed the 5% level t-value test, which can explain that between the return on equity and foreign banks, there existed a relatively significant degree of negative correlation, meaning that the entry of foreign banks is for each additional unit, could make the commercial banks return on equity will be reduced 0.027669 units. This can clearly explain that the entry of foreign banks to a large extent undermined the monopoly power of banks in China, their profitability declined markedly.

Table 4-4 Regression results on return on net assets

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.003515	0.000682	5.153969	0.0000
Z	-0.027669	0.109270	-3.253215	0.0000
X1	-0.017019	0.139759	-5.121773	0.0032
X2	0.037630	0.061326	0.613602	0.0005
Y1	-3.72E-08	7.07E-08	-0.525991	0.0020
Cross-section fixed (dummy variables)				
R-squared	0.710123	Mean dependent var		0.003608
Adjusted R-squared	0.635704	S.D. dependent var		0.002349
S.E. of regression	0.001764	Akaike info criterion		-9.587114
Sum squared resid	0.000118	Schwarz criterion		-8.936108

Log likelihood	286.4392	F-statistic	6.498036
Durbin-Watson stat	1.603008	Prob (F-statistic)	0.000657

4.5 Regression analysis of return of net worth

The regression results on A5 asset margin are shown in Table 4-5. From this table, it can be seen that for the asset margin there was a more significant negative correlation with the extent of foreign bank entry, China's commercial banks asset margin was reduced by 0.317907 units, indicating the entry of foreign banks does weaken the monopoly power of Chinese banking, and makes their profitability declined.

It also examines the market competition effect of the foreign bank entry. Compared with ROE, the extent of foreign bank entry has a relatively larger impact on the net return on assets of China's commercial banks. In addition, from the coefficient Xl, it can be seen that China's GDP rate of change has a greater impact on the net interest margin of China's commercial banks, and China's GDP has growth per unit. The net profit margin of China's commercial banks will increase the assets of 3.97321 units.

Table 4-5 Regression results for asset margin

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.082349	0.019255	4.276695	0.0001
Z	-0.317907	3.102022	3.134069	0.0006
X1	3.971321	3.983686	2.996896	0.0055
X2	-1.753115	1.754600	-1.999153	0.0034
Y1	-1.13E-07	7.31E-06	-2.015432	0.0078

Cross-section fixed (dummy variables)			
R-squared	0.678461	Mean dependent var	0.099967
Adjusted R-squared	0.526623	S.D. dependent var	0.069730
S.E. of regression	0.047976	Akaike info criterion	-2.975025
Sum squared resid	0.082862	Schwarz criterion	-2.312030
Log likelihood	98.32567	F-statistic	4.468318
Durbin-Watson stat	2.593511	Prob (F-statistic)	0.000079

4.6 Regression analysis of NPL provision rate

The regression results on A6 NPL ratio are shown in Table 4-6. It can be seen that $R^2 = 0.54$, the fit is not high, and the share of foreign assets did not pass the t-test, so the NPL ratio A6 has no obvious correlation with the extent of foreign bank entry. After 1998, due to the Southeast Asian financial crisis and the accelerated pace of China's WTO accession, the financial regulatory authorities had to strengthen the banking industry's risk prevention capability, strengthened and refined the asset risk reserve system. Indeed the whole industry risk reserve rate has increased. In addition, the indicators are also subject to other control variables, which have a negative correlation with GDP growth.

Table 4-6 Regression results of the NPL ratio

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0.037385	0.009687	3.859104	0.0004
Z	0.064228	0.460835	4.139373	0.8899

X1	-1.315632	1.299428	-2.012470	0.0076
X3	0.053597	0.250223	0.214195	0.8315
Cross-section fixed (dummy variables)				
R-squared	0.542863	Mean dependent var	0.029327	
Adjusted R-squared	0.355320	S.D. dependent var	0.025095	
S.E. of regression	0.020150	Akaike info criterion	-4.725917	
Sum squared resid	0.015834	Schwarz criterion	-4.111078	
Log likelihood	149.3257	F-statistic	5.894602	
Durbin-Watson stat	2.552565	Prob (F-statistic)	0.003423	

4.7 Regression analysis of liquidity ratio

The regression results on A7 liquidity ratio are shown in Table 4-7. It can be seen $R^2 = 0.35$, this equation was not significant, and the regression coefficient did not pass the t-value testing, indicating that foreign bank entry has had no significant impact on Chinese banks' liquidity ratio (loan-deposit ratio). This is not surprising before December 2006, China had not yet fully opened RMB deposit and loan business. Even during the period of 1998-2007, it only gradually opened RMB deposit and loan business in the 25 pilot cities. As a result, foreign bank entry has no significant correlation with the Chinese banking industry to carry out deposit and loan business, and has no significant effect on the liquidity of domestic banks.

Table 4-7 Regression results on the liquidity ratio

Variable	Coefficient	Std. Error	t-statistic	Prob.

C	0.717151	0.010442	68.67915	0.0000
Z	0.715972	1.203308	0.595834	0.5546
X3	0.319806	0.510258	0.626752	0.5344
Cross-section fixed (dummy variables)				
R-squared	0.351627	Mean dependent var	0.716650	
Adjusted R-squared	0.108487	S.D. dependent var	0.078712	
S.E. of regression	0.074320	Akaike info criterion	-2.125912	
Sum squared resid	0.220940	Schwarz criterion	-1.547240	
Log likelihood	75.52554	F-statistic	1.446193	
Durbin-Watson stat	2.663247	Prob (F-statistic)	0.173465	

Through the use of panel data from 14 commercial banks in China during the period of 1998-2007, this study conducted the theoretical and empirical analysis on the impact of foreign bank entry on the China's banking industry, and it also obtained the following results:

(1) Foreign bank entry has no significant impact on the Chinese banking industry's income (measure of interest rate and the rate of non-interest income), while it has a significant positive impact on the non-interest rate, indicating the entry of foreign banks promotes China's banking industry is constantly changing the existing business model to improve the financial innovation and service capabilities, thereby increasing the proportion of non-interest income.

(2) Foreign bank entry results in a significant negative impact on the Chinese banking industry's profit (measure of return on equity and assets, net profit margin),

indicating that the entry of foreign banks indeed brings the impact to the China's banking industry. Foreign banks with the efficient and quality services, at least in middle and other local market businesses bring considerable pressure to commercial banks in China.

(3) In the aspect of Chinese banking industry costs for foreign bank entry (measure of operating expense ratio), the operating expense rate has a significant negative correlation with the extent of foreign investment entry, indicating that the entry of foreign banks increased competition in the banking industry, prompting domestic banks industry had to constantly reduce operating costs to improve market competitiveness.

(4) Foreign bank entry has no significant impact on the Chinese banking industry management (provision shall measure the rate and the existence of non-performing loan ratio), indicating that foreign banks have no greater impact on the deposit and lending business of China's banking industry.

From the above results it can be seen that the performance in terms of market competition with foreign banks has had spillover effects. Financial stability and the absorption effect of the China's banks have been more evident.

Chapter 5: Conclusion

This study from the theoretical and empirical aspects investigated the impact of foreign bank entry on the operational efficiency in China's banking sector.

(1) It introduced the history of the entry of foreign banks and the development characteristics of foreign banks in China. It also analyzed the impact of foreign bank entry on the efficiency in China's banking sector from both positive and negative aspects. The positive effects include transferring advanced technology to the Chinese banks, investing competition, promoting China's banking product diversification, and further enhancing domestic banks property reforms and so on. The negative effects include increasing competition in Chinese banking market and the fact it brought new problems for China's financial regulators.

(2) In the aspect of the data on China's banking sector, it identified seven variables including interest income / total assets, non-interest income / total assets, operating expense ratio, return on equity, assets, net profit margin, NPL ratio and liquidity ratio. In addition, it established a panel data model was used for empirical analysis to obtain the regression results.

(3) From the aspect of foreign bank entry on the Chinese banking income, its impact on interest rates was not significant. Nevertheless, it had a significant positive impact on non-interest rate factors, such as encouraging China's banking sectors to promote the existing business model, enhancing the financial innovation and service capabilities, and increasing the proportion of non-interest income. From the aspect of the

impact foreign bank entry on the Chinese banking sector profits, there was a significant negative impact. From the aspect of this impact on the Chinese banking industry costs, operating expenses rate, has a significant negative correlation with the extent of foreign investment. From the above results, it can be seen that the market competition among foreign banks, technical spillover and financial stability effect and the absorption effect in China's banking industry are now more evident in the performance of the banking sector in China.

References

Barajas, A. et al. (2000). The Impact of Liberalization and Foreign Investment in Columbia's Financial Sector. Journal of Development Economics, (63), 157-196.

Barth, J., Caprio, G. and Levine, R. (2001). Banking Systems around the Globe: Do Regulation and Ownership Affect Performance and Stability? Forthcoming in Mishkin, Frederic ed., Prudential Regulation and Supervision What Works and What Doesn‘t,(National Bureau of Economic Research, Boston,MA), 25-46.

Berger, A.N., Hasan, I. and Zhou, M. (2009). Bank ownership and efficiency in China: What will happen in the world’s largest nation? Journal of Banking & Finance, 33(1), 113-130

Bonin, J.P. and Huang, Y. (2002). Foreign Entry into Chinese Banking: Does WTO Membership Threaten Domestic Banks? The World Economy, 25(8), 1077-1093.

Brealey, R.A. and Kaplanis, E.C. (1996). The Determination of Foreign Banking Location. Journal of International Money and Finance, 577-597.

Classens, S. and Glaessner, T. (1998). The Internationalization of Financial Services in Asia Working Papers-Domestic finance1 Saving, financial system, stock markets, No.1911.World Bank, Washington, D.C., United States, 110-125.

Clarke, G., Cull, R., Peria, M.S.M. and Sanchez, S.M. (2003). Foreign Bank Entry: Experience, Implications for Developing Economies, and Agenda for Further Research. World Bank Res Obs, 18(1), 25-59.

Classens, S., Demirgüc-kunt, A., and Huizinga, H. (2001). How Does Foreign Entry Affect Domestic Banking Markets? Journal of Banking & Finance, 25, 891-911.

Demirguc-Kunt and Detragiache. (1998). The Determinants of Banking Crises in Developing and Developed Countries. Staff Papers, IMF, (1):57-63.

Denizer, C.A., Dinc, M. and Tarimcilar, M. (2000). Measuring Banking Efficiency in the Pre-and Post-Liberalization Environment: Evidence from the Turkish Banking System. The World Bank WPNo:2476.

Detragiache, E., Tressel, T. and Gupta, P. (2008). Foreign Banks in Poor Countries: Theory and Evidence. The Journal of Finance, 63(5), 2123-2161.

Domanski, D. (2005). Foreign Banks in Emerging Market Economies: Changing Players, Changing Issues. BIS Quarterly Review.

Focarelli, D. and Pozzolo, A. (2000). The Determinants of Cross-Border Shareholding: An Analysis with Bank-Level Data from OECD Countries. Paper presented at the Federal Reserve Bank of Chicago Bank Structure Conference, 226-230.

Goldberg, L.G. and Johnson, D. (1999).The determinants of US banking activity abroad. Journal of International Money and Finance, 9(2), 123-137.

Gormley, T.A. (2010). The impact of foreign bank entry in emerging markets: Evidence from India. Journal of Financial Intermediation, 19(1), 26-51.

Kindleberger (1983). International Banks as Leaders or Followers of International Business. Journal of Banking and Finance, 5831-5951.

Lensink, R. and Hermes, N. (2004).The Short-term Effects of Foreign Bank Entry on Domestic Bank Behavior: Does Economic Development Matter? Journal of Banking & Finance, (3), 553-568.

Leung, M.K., Rigby, D. and Young, T. (2003). Entry of foreign banks in the People's Republic of China: a survival analysis. Applied Economics, 35(1), 21-31.

Levine, R. (1996). Foreign banks, financial development and economic growth. International financial markets: harmonization versus competition. Edited by C.E. Barfield: Washington DC: AEI Press, 224-277.

Levine, R. (1996). Foreign Bank, Financial Development, and Economic Growth. In E.B. Clande, (Ed), International Financial Markets, AEI Press, Washington,D C., 24-36.

Levine, R. (2003). Bank-based or Market-based financial Systems: Which is better? Journal of Financial Intermediation, (11):121-139.

Leung, M.K., Rigby, D. and Young, T. (2003).Entry of foreign Banks in the People's Republic of China A Survival Analysis. Applied Economics, 35(1), 21-31.

Martines, P.M.S. and Mody. A. (2004). How Foreign Participation and Market Concentration Impact Bank Sp reads: Evidence from Latin America Policy Research Working Papers Series No.3210, World Bank, Washington, D.C., United States, 126-159.

Miller, S.R. and Parkhe, A. (1998). Patterns in the Expansion of US Banks' Foreign Operations. Journal of International Business Studies, 359-399.

Montinola, G. and Moreno, R. (2001). The Political Economy of Foreign Countries. Lexington Books, Lexington, MA. Bank Entry and its Impacts: Theory and a Case Study Pacific Basin Working Paper Series No101-11, 38-88.

Morgan, D. and Strahan, P. (2003). Foreign Bank Entry and Business Volatility: Evidence from U.S. States and Other Countries. NBER Working Paper No.9710.

Nigh, D., Cho, K.R. and Krishnan, S. (1986). The Role of Location-Related Factors in U.S.Banking Involvement Abroad: An Empirical Analysis. Journal of International Business Studies, 59-72.

Real Time Economics (2011). Foreign Banks Bet on China [online], available at: http://blogs.wsj.com/chinarealtime/2011/05/16/foreign-banks-bet-on-china/ [Accessed: September 3, 2011]

Shen, C.H., Lu, C.H. and Wu, M.W. (2009). Impact of Foreign Bank Entry on the Performance of Chinese Banks. China & World Economy, 17(3), 102-121.

Stiglitz, J.E. (1993).The Role of the State in Financial Market. In Proceedings of the World Bank Annual Conference on Development Economics, 19-52.

Techoegl, A.E. (2011). Who Owns the Major US Subsidiaries of Foreign Banks? A Note [online], available at: http://fic.wharton.upenn.edu/fic/papers/03/0311.pdf [Accessed: September 3, 2011]

Terrel, H. (1986). The Role of Foreign Banks in Domestic Banking Markets.Cheng,H. (Ed),Financial Policy and Reform in Pacific–Rim Countries. Lexington Books, Lexington, MA., 21-35.

Uiboupin, J. (2005). Short-term effects of foreign bank entry on bank performance in selected CEE countries. Bank of Estonia Working Papers, (4):69-72.

Wang, X.T. (2011). Foreign banks 'confident' about Chinese market [online], available at: http://www.chinadaily.com.cn/cndy/2011-06/23/content_12756247.htm [September 3, 2011]

Wang, Z.H. (2009). Foreign banks expand in China [online], available at: http://www.chinadaily.com.cn/business/2009-01/08/content_7377338.htm [Accessed: September 3, 2011]