Are Foreign Banks in Developing Countries More Productive? The Case of Taiwan

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Abstract The purpose of this study is to investigate the productivity changes of foreign and domestic banks in Taiwan, using the Malmquist index to estimate banks’ productivity. Pooling sample mean TFPCH is found to be 1.4514 over the period between 2002 and 2006, indicating that Taiwanese banks improved by an average of 45.14%, and this raises the question, are foreign banks in developing countries are more productive? The results of this study indicate that foreign banks are not always best for developing countries, but this does not support the “global advantage hypothesis,” neither does it support the “home field advantage hypothesis”.

Keywords: Malmquist index, home field advantage hypothesis, global advantage hypothesis

JEL Classification: G21, L25

1. Introduction

Are foreign banks always best? Many Taiwanese consumers consider that foreign banks can provide a better service than domestic banks. In particular, since foreign banks provide a great deal of know-how to domestic banks, and train a great many professional managers to help them, many consumers consider that foreign banks are the leaders in the Taiwanese financial market. Levine (1996) considers that the entry of foreign banks into the domestic economy has improved the quality and availability of financial services in the domestic financial market by increasing competition, and enabling a greater application of more modern banking skills and technology. Existing studies, which compare the performance and efficiency of foreign and domestic banks, show conflicting results. Claessens (2001) finds that foreign banks make higher profits than domestic banks in developing countries, but the opposite is the case in developed countries, which indicates that foreign banks have better technology than
domestic banks in developing countries. On the contrary, Berger et al. (2000) believe that foreign-owned financial institutions are less efficient than domestic institutions.1

When entering an emerging market, the experience of most foreign banks would increase competition for financial institutions in the home country, compelling domestic banks to operate more efficiently and, improvements in efficiency have indeed been reported, for instance in the Philippines (Unite and Sullivan, 2003), India (Sensarma, 2006), Turkey (Isik and Hassan, 2003), Poland (Havrylchyk, 2006), and Hungary (Sabi, 1996). Transnational studies, as in the case of Latin America, by Barajas et al. (2000) reveal that foreign banks are more productive than domestic banks. In summary, domestic banks have more advantages than foreign banks, such as asset size, market share and language, culture and regulations, but foreign banks have the advantage in terms of technology and international expertise. Berger et al. (2000) propose two alternative hypotheses to explain these results, namely the “home field advantage hypothesis” and the “global advantage hypothesis”. If the efficiency of the domestic bank is higher than that of the foreign bank, the former is supported and, if not, the latter is supported. The purpose of this study is compare the efficiency of domestic banks with that of foreign banks, and to test whether the home field advantage hypothesis or the global advantage hypothesis is prevalent in Taiwan.

Over the past 40 years, Taiwan has experienced a high level of economic development and domestic banks began to expand their international network in the 1970s. At the end of the 1980s, the government allowed new institutions to enter the individual financial markets in Taiwan. These mainly included banking, insurance, securities, and other financial service industries, and there was a gradual deregulation of finance and the economy. At the same time, Taiwan’s political, economic, social and financial structure significantly changed from being a controlled system into a liberalised, diverse and democratic one. Although, the state-owned banks achieved high profits, many consumers and researchers consider that they were less efficient before the 1990s because managers were not willing to change their operating methods. In addition, they enjoyed monopoly rents due to strong government protection. Thus, these deregulation policies were bound to make a more efficient financial market and provide enhanced financial technology. Foreign banks also played an important role in the deregulation process by contributing internationalisation, liberalisation, more efficient operating methods and many intangible assets to domestic banking.

Taiwan is still an emerging country, which indicates that the efficiency and/or profitability of foreign banks are generally more effective than those of domestic
banks. Past research neglects to compare the efficiency of domestic and foreign banks in Taiwan, but mainly investigates banking efficiency in general, based on Taiwan’s domestic banks, like Liao (2008), Shen(2005), Chen et al. (2004), Chen and Yeh (2000). This study is the first to investigate the productivity of domestic and foreign banks in the case of Taiwan. The remainder of the study is organised as follows. Section 2 briefly describes the Malmquist index and defines the input and output variables. Section 3 reports the results of the productivity change in foreign and domestic banks. Finally, conclusions are drawn by empirical results and suggestions are provided.

2. Methodology

Firstly, the Malmquist index will be briefly described and secondly, the input-output items and the data source will be outlined.

2.1 Malmquist Index

The study follows Isik and Hassan (2003), using Farrell’s distance function and the definition of productivity by Fare et al. (1994) to specify the Malmquist total factor productivity change index (TFPCH), and decompose productivity into a catch-up effect (product of efficiency change, EFFCH) and a frontier-shift effect (technology change, TECHCH). The catch-up effect indicates how close a bank gets to an efficient frontier, and the frontier-shift effect indicates how much the benchmark production frontier shifts with each bank’s observed input mix:

$$\text{TFPCH}(t, t+1) = \frac{D^{VRS}_{t+1}(x_{t+1}, y_{t+1})}{D^{VRS}_{t}(x_{t}, y_{t})} \times \frac{D^{CRS}_{t+1}(x_{t+1}, y_{t+1}) / D^{VRS}_{t+1}(x_{t+1}, y_{t+1})}{D^{CRS}_{t}(x_{t}, y_{t}) / D^{VRS}_{t}(x_{t}, y_{t})}$$

$$\times \left[ \frac{D^{CRS}_{t+1}(x_{t+1}, y_{t+1})}{D^{CRS}_{t+1}(x_{t+1}, y_{t+1})} \times \frac{D^{CRS}_{t}(x_{t}, y_{t})}{D^{CRS}_{t}(x_{t}, y_{t})} \right]^{1/2}$$

A TFPCH index can attain a value greater than, equal to, or less than unity, depending upon whether the bank experiences productivity growth, stagnation or productivity decline, respectively between the period t and t+1. The catch-up (EFFCH) index takes a value greater than one for an efficiency increase, zero for no efficiency change, and
less than 1 for a decrease in efficiency. The frontier-shift (TECHCH) attains a value greater than one for technical progress, zero for technical stagnation, and less than one for technical regression. The EFFCH is also decomposed into a pure technical efficiency change (PECH) and a scale efficiency change (SECH), thus giving a variable return to scale (VRS), the TFPCH=TECHCH×PECH×SECH. In this study, DEAP 2.1 is used to measure a DEA-type Malmquist TFP index and analyse its component parts for domestic and foreign banks in Taiwan.

2.2 Input-Output Specifications

Most previous studies focus on the efficiency of the banking industry, but do not delve into the agreement as to the choice of the appropriate inputs and outputs. In general, the operating revenue of a bank is derived mainly from interest and non-interest related business. Previous studies often adopt input-output variables, and the input items often include operational expenses, interest expenses, whereas the output items include loans and discounts, interest income and investment. However, the balance sheet data of foreign banks is not so easy to obtain its, since there is a lack of variables with which to measure the efficiency of foreign banks. Thus, this study adopts the method of Lin et al. (2007) , which uses the output items of interest revenue and fee revenue, and the input items of interest expense and non-interest expense. The main source of the primary data for this study was the Taiwan Economics Journal (TEJ) and Central Bank of Republic of China published “Annual report of Bank Business Statistics”. The sample consists of 46 banks over the period between 2002 and 2006, having deleted those with only partial or no available data and those which are currently financially distressed. The remaining data is classified into 27 domestic banks and 19 foreign ones. Descriptive statistics of the output and input variables are provided in Table 1.

3. Empirical Results

The first section focuses on the applied Malmquist total factor productivity change index in order to examine productivity change, and the second focuses on comparing the efficiency of domestic and foreign banks.

3.1 Results of The Efficiency of Pooling Samples

In line with previous studies which de-compose the constituent component of productivity change, the study will use the abbreviated letters TFPCH (Malmquist
index of total factor productivity), TECHCH (technical change), EFFCH (efficiency change), PECH (pure technical efficiency change), and SECH (scale efficiency change) components. The total factor productivity change indexes of foreign and domestic banks are presented in Table 2. This demonstrates that the mean TFPCH and TECHCH are greater than one, indicating that banks have positive productivity growth and technical progress, and the mean EFFCH, PECH, and SECH are less than one, showing that they are unable to manage resourcing problems and that the banks’ scale is not located in the optimal size. The result of the SECH illustrates that the banks have not moved towards their optimal size, which implies that, if the regulator should encourage banks to merge with each other, this may make them fall into the optimal size.

It was compared our result with previous studies, Chen and Yen (2000) show a mean TFPCH of 1.013 and their technical efficiency change index is 0.998, so the variations in technical efficiency change are not large. The pooling sample mean TFPCH is 1.4514 between 2002 and 2006, indicating that Taiwanese banks improved by an average of 45.14%. This significant growth may be due to the fact that the regulator has been enforcing financial reform since 2001. The results of this study are also significantly greater than studies of other countries. For example, Howcroft and Ataullah (2006) found that productivity improved by 4.6% in India and 3.7% in Pakistan, and Isik and Hassan (2003) discovered that productivity improved by 7.1% in Turkey over the period between 1982 and 1990.

On the 11th December 2000 Business Week reported a news story indicating that Taiwan had a serious over-banking problem with a large amount of NPLs and predicted that, if the regulators did not do something to improve this situation, a financial crisis would occur in Taiwan. Therefore, since 2001 the regulators have required financial institutions to improve the quality of their assets, increase their capital adequacy and reduce the amount of their NPLs. Bank productivity decreased during 2002 and 2003, and 2003 and 2004, but the results of this study indicate a great rise in productivity during 2004 and 2005. The TFPCH value is 2.875, implying that banks were forced to improve their efficiency under highly competitive pressure from government supervision, the merger bandwagon, and the change in the financial environment. On the other hand, productivity growth was mainly due to the frontier-shift effect (TECHCH) rather than the catch-up effect (EFFCH), this result is consistent with that of Chen and Yeh (2000) and Chen et al. (2004), which implies that the Taiwanese banking industry ceaselessly innovated during 2002 and 2006, and it is suggested that banks improved their inefficiency problems during that time by
saving management costs or utilising more input resources.

3.2 Results of Comparing the Efficiency of Domestic and Foreign Banks

Table 3 illustrates that, when comparing the productivity change between domestic and foreign banks, the productivity of domestic banks is higher than that of foreign banks. The TFPCH is 1.462 and 1.4491 respectively, but this difference is not significantly large. The results indicate that productivity growth was due mainly to the frontier-shift effect (TECHCH) rather than other effects in both domestic and foreign banks. The foreign banks did not have a better technological advantage than domestic banks, implying that this result does not support the “global advantage hypothesis.” Through many time changes and evolutions since the 1990s, Taiwanese bank managers have worked hard to learn the technology, service skills and operating strategies of foreign banks. In particular, they have often imitated the operating models of foreign banks to improve themselves, and learned well to reform the banks’ operating systems, and have streamlined their organisational operations. Levine (1996) considers that the entry of foreign banks improved the quality and availability of financial services in the domestic financial market, as well as enabling a greater application of more modern banking skills and technology. Unite and Sullivan (2003) found that foreign competition compelled domestic banks to be more efficient in the Philippines’ banking market, and Taiwan’s domestic banks are now operating a similar model to foreign banks, which demonstrates that the technological difference is gradually decreasing, and that domestic banks are becoming more and more efficient in Taiwan.

On the other hand, the results demonstrate that foreign banks’ EFFCH and PECH are higher than those of domestic banks, although the difference is not significant. The results also indicate that foreign banks are able to master the disadvantages of the liability of being foreign. These results do not support the “home field advantage hypothesis,” whereby foreign banks entering the Taiwanese banking market for over 40 years have had to improve their disadvantage by employing large numbers of local workers and harmonising the cultural difference.

Why do consumers often believe that foreign banks are better? The technology and service skills of foreign banks often outran the domestic banks before deregulation, but now that domestic banks are improving, it is evident that the frontier-shift effect of domestic banks is higher than that of foreign banks. However, the catch-up effect of foreign banks is higher than that of domestic banks, which implies that domestic
and foreign banks have both improved the weaknesses in their operating models. This cannot confirm which hypothesis is supported, but it can confirm that foreign banks are not always the best in emerging countries, which supports the same results as were found in India (Sensarma, 2006).

4. Conclusions

The purpose of this study is to compare the efficiency of domestic banks with that of foreign banks, and to test whether or not the home field advantage hypothesis and global advantage hypothesis are supported in Taiwan. The findings present that the pooling sample mean TFPCH was 1.4514 over the period between 2002 and 2006, indicating that Taiwanese banks improved their performance by an average of 45.14% during this time. Since 2001, when the regulator required the banks to improve the quality of their assets, to increase their capital adequacy and reduce the amount of their NPLs, the productivity of banks has significantly grown. This productivity growth is mainly due to the frontier-shift effect (TECHCH) rather than the catch-up effect (EFFCH) and, thus, it is suggested that banks improved their inefficiency problem by saving costs in management or by utilising more input resources.

Are foreign banks in developing countries more productive? The results of this study find that they are not, in line with the results found in India (Sensarma, 2006). Overall, it is concluded that the competition of foreign banks compel domestic banks to be more efficient but, although foreign banks may have higher productivity in the primary stage, domestic banks learn from foreign banks and imitate their operating skills following a time variance. Thus, the productivity of domestic banks will improve, and the advantages of foreign banks may gradually disappear. In particular, this result occurs easily in both rapidly developed and close developed countries.

Endnotes

* Corresponding address: No.43, Sec.4, Keelung Road, Taipei City, 106, Taiwan, ROC. Tel: +886-2-2730-1095, E-mail: sheng0916tw@gmail.com. The author gratefully acknowledges helpful comments from Dr. Fung-Shyung Shiau and anonymous referees, which improved the quality of the paper. Any errors that remain are author own.

1. Hansen and Hunter (1996), Mahajan et al. (1996), Sathye (2001), Williams (1998) both found that the efficiency of domestic banks more than foreign banks, their study
case in developed countries, for example, Mahajan et al. (1996) with Unite States, Williams (1998) with Australian.

2. Lin et al. (2007) used that the output items include interest revenue, noninterest revenue, and pre-tax revenue, and the input items include interest expense and noninterest expense.


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Table 1 Summary Statistics (Unit: million TWD)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output items</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest income</td>
<td>12553.77</td>
<td>15254.8</td>
</tr>
<tr>
<td>Fee income</td>
<td>1597.857</td>
<td>2447.454</td>
</tr>
<tr>
<td><strong>Input items</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest expense</td>
<td>6065.202</td>
<td>9079.867</td>
</tr>
<tr>
<td>Non-Interest expense</td>
<td>4796.708</td>
<td>5548.714</td>
</tr>
</tbody>
</table>

Note: The sample consists of 46 banks over the period between 2002 and 2006. The sample is classified into 27 domestic banks and 19 foreign ones.

Table 2 Results of Total Factor Productivity Change

<table>
<thead>
<tr>
<th></th>
<th>Average annual change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EFFCH</td>
</tr>
<tr>
<td>2002-03</td>
<td>0.831</td>
</tr>
<tr>
<td>2003-04</td>
<td>1.081</td>
</tr>
<tr>
<td>2004-05</td>
<td>0.428</td>
</tr>
<tr>
<td>2005-06</td>
<td>1.009</td>
</tr>
<tr>
<td><strong>Pooling</strong></td>
<td>0.8262</td>
</tr>
</tbody>
</table>

Note: The “Pooling” indicates the average the entire sample value. The TFPCH indicates the total factor productivity index, the catch-up indicates the bank efficiency change, EFFCH, Frontier-shift indicates the technology change, THCH, the PECH is pure technical efficiency change, and SECH is scale efficiency change.

Table 3 Results of Compared with Productivity Change

<table>
<thead>
<tr>
<th></th>
<th>Average annual change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EFFCH</td>
</tr>
<tr>
<td>Domestic</td>
<td>0.8015</td>
</tr>
<tr>
<td>Foreign</td>
<td>0.8445</td>
</tr>
<tr>
<td>T value</td>
<td>-0.956</td>
</tr>
<tr>
<td>F value</td>
<td>0.914</td>
</tr>
<tr>
<td>Z-statistic</td>
<td>-1.305</td>
</tr>
</tbody>
</table>

Note: * significant level at $\alpha=0.1$, **at $\alpha=0.05$ and ***at $\alpha=0.01$. The mean test employed in table are Independent sample T test, one-way ANOVE test with F-statistics, MWW-Z refer to Mann-Whitney-Wilcoxon Test with Z-statistic.