Consequences of The Foreign Bank Implantation in Developing Countries and Its Impact on the Local Bank Efficiency: Theoretical Analysis and Empirical Tests on International Data

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Abstract

The objective of this paper is to study the impact of the foreign bank entry on the domestic banks performance in developing countries. Using observations of 1770 active banks in 54 developing countries during the period 1993-2001, we find some interesting and unique findings on the question. Results of empirical tests suggest that the foreign banks are more efficient than the local banks in developing countries and that contrary to what is advanced by a large part of the literature, the foreign bank entry has a rather negative impact on the local bank efficiency. This result is very interesting: it put into question International Financial Institutions' recommendations made during last years in developing countries to encourage the foreign bank entry.

Keywords: Financial liberalization, Foreign bank entry, Domestic banks, Stochastic frontier efficiency, Bank efficiency, Developing countries

Introduction

Financial liberalization undertaken since the 80s has caused a radical change in the financial systems of developing countries. We perceive the implementation of a deregulation process aimed to establish a market-based regulation that can improve the use of the available funds. Thus, there has been two kind of liberalization. An external financial liberalization that aimed to abolish controls on inflows and outflows of foreign capital and to promote the presence of foreign banks, and a domestic liberalization that aimed to liberalize the interest rates and the conditions granting of credits; and to develop the capital markets.

The presence of foreign banks in developing countries is considered as part of the external financial liberalization. It is the result of the legal relaxation of the entry barriers that is intended to encourage the installation of foreign banks. This is a solution for a country that suffers from insufficient domestic savings to attract foreign capital required to finance economic growth.   The presence of foreign banks has been strengthened over the years in Poland where foreign banks came to control almost 80% of banking sector in 2000, in Lithuania where these banks control 88%, the rate is 46% and 53% for respectively Argentina and Mexico.

Several factors have contributed to this phenomenon, we mention in particular, the strategy adopted by these banks to monitor their prospects (multinationals) located in these countries, the Asian crises occurred in 1997-1998 and the privatization of public banks failing etc. Given this general trend, we wonder about the consequences of foreign competition on domestic banks in particular and the financial system of the host countries in general.

Literature

Several studies support a positive effect of foreign presence in the financial sector of the developing countries. Based on the SCP approach, Pagano M. (1993), Petersen MA and RG Rajan (1995), Guzman MG (2000), tend to explain the destabilization registered at credit markets and the emergence of systemic banking crises by the lack of real competition. Terrell H. (1986); Bhattacharaya J. (1993), McFadden (1994); R. Levine (1996); R. Kroszner (1998), the International Monetary Fund (IMF) (2000) World Bank (2001); S. Claessens and M. Jansen (2000); S. Claessens, et al (2001), Nikiel and Opiela (2002), Fries and Taci (2005), argue that the presence of foreign banks, which are generally more efficient than domestic banks, can ensure the transfer of banking expertise and technology required to improve efficiency of banks in the host country. Foreign banks are considered an effective way to support the consolidation of balance sheets of domestic banks inefficient. Foreign banks can contribute to improve the infrastructure of the financial system by encouraging the introduction of techniques developed in auditing, accounting, risk management, credit control and monitoring. From the macroeconomic side, the presence of foreign banks can improve banking regulations and ensure stable financing of economic activity for host countries. It could be considered as a mean for diversifying risk in the event of an economic downturn.

If these studies emphasize the benefits of foreign bank entry and can not conceive the development of local financial sector without foreign competition, further work on the contrary tend to highlight the adverse effects of foreign bank entry on the economy in general and on local banks in particular. Based on the results of empirical studies, these

researches demonstrate that increased competition following the entry of foreign banks, considered as more efficient than domestic banks, may cause harmful effects (Shaffer S. 1998, Cao M., and S. Shi 2000, Dell'Ariccia, G. 2000).

Kaminsky G. and Reinhart CM (1999), Rojas-Suarez L. (1998) studied financial crises observed in some countries. They showed that these crises tend to be preceded, generally, by financial liberalization. Similarly, in several cases, it is not obvious that entry of foreign banks has led to a significant variation in the level of efficiency for domestic banks of developing countries. It would instead lead to a high level of risk (significant volume of nonperforming loans). Based on the hypothesis of differential efficiency developed by Demsetz (1973), Mathieson D.J, and J. Roldos (2001) argue that this presence would tend to increase the monopoly power of certain foreign suppliers, which may be more efficient than local banks, thus promoting the formation of financial conglomerates which monitoring would be much more complicated for host countries . Also, foreign banks tend to offer products at low prices to select best clients of the local market. This new environment could push local banks failing to fund the riskier projects, previously rejected by the system. The rate of nonperforming loans would increase and the banking sector would be more vulnerable to crises. Berger A.N, and R. Deyoung (1997), Williamson and Mahar (1998) report that excessive risk-taking may neutralize the positive effects that can result from financial liberalization, such as improving the efficiency of banking and financial sector development, and thereby leading to a financial crisis. Empirical studies demonstrate the existence of a negative relationship between efficiency and non-performing loans (Note 1): increasing the volume of nonperforming loans would lead to deterioration in the level of cost efficiency. Deyoung .R, G. Whalen (1994) indicate that the increase of nonperforming loans would be preceded by deterioration in cost efficiency. In addition to that, a low level of efficiency would lead to deterioration in credit quality portfolio that would further reduce the efficiency of banks.

Clarke G, et al (2001) state that if the authorities of the developing countries consider the efficiency gain from the experience of industrialized countries, they may underestimate the potential risks associated with entry of foreign banks. Weller E.C, and A.S Hersh (2002) suggest that foreign banks well know their competitive advantage and they would be reluctant to diffuse their advantage management or technological know-how. Thus, the efficiency gain is therefore no guarantee for local banks following the entry of foreign banks. Hainz, C., and M. Schnitzer (2001) also argue that competition could be favourable to improve the efficiency of local banks but it might also have a negative impact on the stability of the banking system. Macroeconomic side, the dominance of foreign banks may expose the host country to the risk of decreasing financial resources. These banks may use the collected domestic savings to finance their activities elsewhere; they can slow economic growth if they decide to reduce the supply of credit in times of crisis for small and medium businesses affected by the problem of credit rationing.

Given the results of various empirical studies, there is no clear answer as to the positive effect of this presence. To fill the literature, our research refers to the hypothesis of differential efficiency developed by Demsetz (1973) and the results of Berger A. N and R. Deyoung (1997) which have demonstrated the negative impact of poor quality of credit portfolio on the efficiency of banks. We test the following hypothesis: the presence of foreign banks in developing countries will adversely affect the efficiency of domestic banks. The remainder of this paper is organized as follows. The second section presents our methodology. The third section presents the empirical results and the fourth is reserved for the discussion.

Methodology and Database

In this research we use the stochastic frontier approach to assess the level of banking efficiency. And according to most of the literature, we specify the banks' cost function as a Translog cost function. This functional form overcomes the restrictive assumptions imposed by the classical form of Cobb-Doglass and avoids the problem of multicollinearity that may arise from the use of Fourier flexible form. Its flexibility allows it to move closer to the real technology adopted by the bank.

Thus the cost function is as follows:

$$
\begin{aligned}
(\mathrm{Ln}\, \mathrm{CT})_{btc} = \alpha \; & + \left(\sum_{i=1}^{3} \beta_i\, \mathrm{Ln}\, w_i \right)_{btc} + \left(\frac{1}{2} \sum_{i=1}^{3} \sum_{j=1}^{3} \beta_{ij}\, \mathrm{Ln}\, w_i\, \mathrm{Ln}\, w_c \right)_{btc} + \left(\sum_{k=1}^{3} y_k\, \mathrm{Ln}\, y_k \right)_{btc} \\
& + \left(\frac{1}{2} \sum_{k=1}^{3} \sum_{m=1}^{3} y_{km}\, \mathrm{Ln}\, y_k\, \mathrm{Ln}\, y_m \right)_{btc} + \left(\sum_{i=1}^{3} \sum_{k=1}^{3} \lambda_{ik}\, \mathrm{Ln}\, w_i\, \mathrm{Ln}\, y_k \right)_{btc} + (\theta\, \mathrm{Ln}\, F)_{btc} \\
& + \frac{1}{2} (\gamma\, \mathrm{Ln}\, F\, \mathrm{Ln}\, F)_{btc} + \left(\sum_{k=1}^{3} \omega_k\, \mathrm{Ln}\, F\, \mathrm{Ln}\, y_k \right)_{btc} + \left(\sum_{i=1}^{3} \varphi_i\, \mathrm{Ln}\, F\, \mathrm{Ln}\, w_i \right)_{btc} + U_{btc} + V_{btc} \quad (1)
\end{aligned}
$$

b : Bank,   b : 1,…, 1799; t : Year, t : 1993,…,2001.; c: Country,   c : 1,…,54.

To define banking inputs and outputs, we refer to the intermediation approach. Accordingly, the outputs are total bank net loans (Y1), total investments (Y2) and total deposits (Y3). Regarding input prices, the price of labour (W1) is as defined by Tai-Hsin Huang, and Li-Chih Chiang (2007), Yildirim H.S, and G.C Philippatos (2007), Weill L. (2003); Bos J.W.B., and H. Schmiedel (2003); Altunbas et al (2000), the ratio of personnel expenses over total assets. The price of borrowed funds (W2) is defined as the ratio of interest expenses over funding, and the price of physical capital (W3) is constructed as depreciation over fixed assets.

According to Tai-Hsin Huang, and Li-Chih Chiang (2007), Bos J.W.B., and H. Schmiedel (2003) and Kraft E. et al. (2002), we take the real value of different variables in equation (1) of the cost function to overcome all problems related to money. Thus, we divide all variables by the index of consumer prices to offset the effect of general price increases in the prices of production factor. This technique is very interesting especially when the sample is composed of several countries as in the case of our research. In this case, the increase in the total cost may be due, other things being equal, to a misallocation of financial resources and not to a rapid increase in inputs prices.

The technical inefficiency due to excessive use of inputs to produce a given volume of output, and allocative inefficiency resulting from a bad choice of input combination, given their relative price in the market would be captured by the inefficiency term U_{btj}. The term V_{btj} is used to control both measurement errors and determinants of costs beyond the control of managers. This term can also capture the possibility for the bank to undergo a favourable (unfavourable) external shock which decreases (increases) the total cost of the bank.

To satisfy the economic characteristics of the cost function, we impose the following usual restrictions:

- $B_{ij} = \beta_{ji}$, $\gamma_{km} = \gamma_{mk}$; so that the cost function is symmetrical.

- $\sum_{i:1}^{3} \beta_i = 1$, $\sum_{i:1}^{3} \beta_{ij} = 0$, $\sum_{k:1}^{3} \lambda_{ik} = 0$, $\sum_{i:1}^{3} \varphi_i = 0 \ \forall \ i$; So that the function is linearly homogeneous of degree

1 in input prices. This restriction means that a proportional variation of all input price increases the total cost in the same proportion without altered the demand of inputs.

As Berger A.N, and L.J. Mester (2003), we will not include the equations regarding the input factors which represent the restrictions imposed by Shephard's lemma. Their inclusion requires an undesirable assumption related to the absence of the allocative inefficiency (no error related to changes in relative prices).

To ensure greater flexibility and exploit the information content of our panel, we use the model of Battese and Coelli (1992). It allows us to take into account the variability of cost inefficiency term in time for the case of an unbalanced panel. This is particularly important for our research, it allows us to study the trend of the efficiency of domestic banks over time, and thereby assess the impact of foreign banks entry on the efficiency of domestic banks.

Thus for a panel, Battese and Coelli (1992) define the inefficiency term as follows:

$$U_{btc} = U_{bc} * e^{-\eta(t-T)} \tag{2}$$

U_{btc}: the inefficiency term for bank b at time t in country c. It is positively identified with an independent distribution V_{btc} ;

U_{bc}: the specific levels of inefficiency of bank b at time t (last year). U_{bc} represents the deviation of the costs for firm b with respect to the efficiency frontier. It serves as a proxy for the technical and allocative inefficiency. It follows the normal distribution truncated at zero.

η: The term reflects changes in inefficiency over time. We note that inefficiency decreases with t if $\eta > 0$, it increases if $\eta < 0$ and is stable if $\eta = 0$.

V_{btc}: the usual error term that follows the normal distribution N $(0, \sigma_v^2)$, it is independent and identically distributed (iid).

The cost efficiency (CE) is defined as the ratio between the minimum cost (C^{min}), capable of producing vector output (Y) given the input price (W), and the observed cost, if cost inefficiency is eliminated (u = 0). It is defined as follows:

$$EC = \frac{C^{min}}{C^{obs}} = \frac{Exp(f(y,w)) * Exp(v)}{Exp(f(y,w)) * Exp(u) * Exp(v)} = Exp(-u) \Rightarrow EC = Exp(-u) \tag{3}$$

This research uses the conditional expectation as developed by Jondrow et al. (1982) to determine a reliable estimator of individual efficiency EC_{bt}.

The conditional expectation; $E\left(u_{btc} / \varepsilon_{btc}\right)$ where $\varepsilon_{btc} = v_{btc} + u_{btc}$, can be used as reliable estimator of U_{btc}, where ε_{btc} contains information on the component U_{btc}.

Thus, cost efficiency would be:

$$EC_{btc} = e^{-E\left(u_{btc} / \varepsilon_{btc}\right)} \qquad (5)$$

In the cost function, we introduce the ratio of equity defined as the ratio of equity over total assets (F) to control differences in risk preferences between banks at the cost minimization. According to Hughes J.P., and al (1997) (1996), Hughes J.P., and C.G Moon (1995), the bank would generally risk averse, it holds a significant share of equity in its liabilities to hedge the risk of insolvency. These funds are always a guarantee in case of an increase in the volume of non-performing loans, they would absorb losses from the deterioration of portfolio quality and to withstand any negative external shock, while respecting the prudential regulation imposed by the monetary authorities. Increased Equity reduces the probability of insolvency and bankruptcy risk.

The sample we used contains 1799 banks operating in a period of nine years (1993-2001) in Latin American, African, European countries and Asian countries (Note 2). The choice of these countries is motivated by two main reasons. First, these countries have a presence of foreign banks for a long time. The basis of available data allows us to assess the impact of the foreign banks entry on the efficiency of domestic banks in several countries. The results achieved would be more conclusive. Second, this presence has not the same intensity for different countries. The specific data banks that we used are from the database "BankScope" while the macroeconomic data used in this research are provided by the annual publications of major International Financial Institutions (World Bank and International Monetary Fund).

Results

The results of estimating the Translog cost function (1) are presented in table 1. The results show that the estimated efficiency frontier is satisfactory. The majority of the coefficients of different variables is significant at 5% and presents the expected signs that characterize the banking cost function.

The positive sign of the coefficients for different price factor of production (Wi) is in line with the economic characteristics of a bank cost function. The sum of these coefficients is equal to 1 and shows that our function is linearly homogeneous of degree one in input prices. Thus, a proportional variation of all input price increases the total cost with the same proportion without altered the demand of inputs; the economic characteristics of the cost function are well respected.

Insert Table 1 Here.

The coefficient vector of bank output variables presents also the expected sign. The coefficients are positive and significant; a change in the volume of bank output would modify the total cost. The more the bank grants loans and moves towards investment activities not directly related to traditional banking activities, the more the structure of the total cost will change.

Estimating the efficiency frontier allows us to assess the level of efficiency of banks throughout the study period. This value represents the level of productive efficiency, which includes technical and allocative efficiencies and it is understood to be between 0 and 1. An efficiency score equal to 76% means that the bank may lower its total cost of production while producing the same level of production if it can improve its organizational structure and management technique. It is a summary measure that reflects the degree of waste in an organization.

The most interesting outcome of the estimated frontier cost efficiency (Table 1) is the term eta (η). The sign of the estimated coefficient of this term reflects the trend in the level of inefficiency during the study period (1993-2001). The table shows that the coefficient is significant and has a negative sign (-0.0061532) which indicates that the level of inefficiency has increased by about 0.0061 per year (about 0.054 during all the period). The banks had suffered a significant deterioration in their level of efficiency.

The first conclusion we can draw is that banks seem to have found it difficult to adjust to the new environment. Remember that the term estimated efficiency in this research reflects the bank's ability to achieve an economic goal: minimizing costs for a given level of output given the inputs available (quality and quantity). The degradation of the level of efficiency during the studied period suggests that banks have failed to effectively use the inputs in order to reduce production cost. Banks suffer from a managerial problem which was a major handicap to overcome difficulties generated by a new competitive environment characterized by the intensity of the problems of adverse selection and moral hazard. Accordingly, and as the period of study we have chosen is marked by a radical change in the structure of the banking market in the country of development, we can argue that external factors, including environmental variables could contribute to the deterioration in the level of efficiency of banks in these countries.

To better identify the variables that can positively or negatively affect the productive performance of these banks, we propose to estimate in a second stage of this research a model that directly linking the estimated level of efficiency of domestic banks with different variables.

The second conclusion we can draw is the effect of the foreign banks presence in developing countries. In these countries, we observed during this period the massive presence of foreign banks which coincides with a deteriorating level of domestic banks efficiency. This suggests that relaxation of barriers to entry contributes to this degradation.

Analysis of the level of domestic and foreign banks efficiency in developing countries confirms the thesis of efficiency differential between the two types of banks. All the empirical studies agree on the fact that foreign banks are more efficient than domestic banks in these countries. These banks would be characterized by a managerial advantage that will enable them to maximize output bank given the available inputs. In other words, this advantage would favour a high level of efficiency. Our results confirm this thesis. For example, in South Africa, the average level of efficiency is 76.15% for domestic banks while it is 92.03% for foreign banks. This difference could result in either significant positive effect on the efficiency of domestic banks (SCP approach advanced by Bain J. 1956), either instead of negative effect (Differential efficiency hypothesis developed by Demsetz 1973).

The efficiency average for domestic banks is 79.67% while for foreign banks it is 82.89%. The comparison means test (Note 3) shows that this difference is significant and demonstrates the superior level of efficiency for foreign banks. Thus, we suggest a priori that the effect of the foreign banks presence on the domestic banks efficiency in the host country is negative. According Dietsch M., and A. Lozano-Vivas (2000), the effect of increased competition would be largely conditioned by the magnitude of the difference in performance between banks. In other words, the structure of the banking system and the log-term viability of banks are affected by the performance gap between different market players. But as the primary results confirm the existence of a differential efficiency for foreign banks, we expect adverse effects of relaxation barriers entry on domestic banks.

To assess the effect of foreign presence, we specify a model based mainly on the work of Detragiache E. T. Tressel, and P. Gupta (2006); N. Hermes and R. Lensink (2004), Williams (2003, 1998); Cleassens S., et al (2001); Esho N. (2001), Weller (2000a), Barajas et al (2000), Demirgüç-Kunt A. and H. Huizinga (1999), Berger AN and TH Hannan (1998); Angbazo Lazarus (1997), Thomas SYH, and A. Saunders (1981). These authors explain the profitability of banks according to their characteristics and economic conditions in which they operate.

The model we specified is as follows:

$$Y_{btc} = f (Penet_{tc}, B_{btc}, M_{tc}, Inter) \ (3)$$

Where b, t, c represent respectively the bank b in year t and country c; b = 1, ...1799, N, t = 1, ..., 9 and c = 1, ..., 54.

Y_{btc}: the efficiency of domestic banks;

$Penet_{tc}$: the key variable of our research: "Presence of foreign banks.

B_{btc}: the characteristics of banks;

M_{tc}: The socio-economic and environmental characteristics that reflect the environment in which banks operate.

$Inter$: the interaction term: Penetration * Difference in performance between domestic and foreign banks.

Table 2 describes the results of five regressions for the model (3). We present the results of Tobit regression models where the dependent variable is the level of cost efficiency. Detailed independent variable definitions is given in the appendix

Insert Table 2 Here.

Discussion

The parameter of the "concentration (Conc)" variable is significant at the 1% in all regressions, although it has a positive sign. The concentration affects therefore positively the level of banks efficiency. More concentrated market may be benefit for banks. This may reflect the existence of economies of scale in banking. As our research measure concentration by the IC3, we deduce that the bank can reduce its operating costs by increases its size. The bank may achieve economies of scale if it can enhance its level of integration in the process of financing the economy. The most important conclusion we can draw from the positive sign of this variable is the confirmation of the Differential Efficiency Hypothesis developed by Demsetz (1973). This sign implies that the concentration is due to differential efficiency, and the most efficient banks come to dominate the less efficient banks. Competition, where it is not institutionally constrained, would be sufficient to let emerge the best units. The managerial advantage allows the

performing units to capture an interesting market share, they would benefit from cost savings and ensure sufficient profits to further consolidate their market position.

The parameter of our interest variable "Penetration of Foreign Banks (Penetrate)" is significantly negative in all regressions, the value taken by this ratio is on average (-0.05), implying an increase of level of foreign banks presence from 10 to 40% may result in loss of efficiency of 1.5% for domestic banks, and could result in increased total costs not justified by the increased volume of production (output) or change of production factors prices (inputs). Thus, the greater presence of foreign banks would cause greater loss in terms of cost control for domestic banks. These results therefore confirm our research hypothesis that the entry of foreign banks affects negatively the efficiency of domestic banks.

The entry of foreign banks would have negative effects on local banks. The increased competition fostered by the entry of new foreign units more efficient than local banks would lead them to pursue risky strategies. The decrease in profitability would force banks to compensate for the reduction of the margin of intermediation by increasing the volume of credits granted (quantity effect). This strategic choice may actually increase the volume of non-performing loans and their management costs accordingly. Banks with low efficiency in the developing countries would not have sufficient competence to adapt a new competitive environment. The relaxation of entry barriers may deteriorate the position of domestic banks and therefore their efficiency level may decrease.

Our results contradict those of studies conducted by N. Hermes and R. Lensink (2004); Unite A., and J. Sullivan (2003); Drakos K. (2003); Cleassens S., et al (2001), Barajas et al (2000), Denizer (1999), Demirgüç-Kunt, Huizinga (1999). These researches conclude that the penetration of foreign banks would improve the efficiency of local banks. But this result would very relative; it depends largely on the Proxy taken to assess the improvement of efficiency. In these studies, these authors have considered the decrease of the financial margin as an important sign that confirms the positive effect of the penetration of foreign banks. However, we suggest it is a biased interpretation of the margin decrease and shouldn't always be interpreted as a proxy for improved efficiency of local banks. The margin decrease has since been regarded as one of the factors determinants in the occurrence of latest banking crises(Note 4). Indeed, a decrease in financial margin may destabilize the banking sector especially when it is not accompanied by effective control of costs and this is the case of most banks in developing countries. The limitations of financial ratios in assessing the level of efficiency have contributed to these results, the current state of banking sectors clearly marked by a strong presence of foreign banks show that the foreign presence did not resulted in improved efficiency of domestic banks in developing countries. Also, their choice of samples may bias their results, Hermes N., and R. Lensink (2004); Cleassens S., et al (2001) for example, even they have used a very large sample, they have neglected the "country effect" in their regressions. The dependent variable considered in their models is that of domestic banks located in both developed and developing countries. This choice is very opened to criticism as the sample is not homogeneous.

The solution proposed by some International Financial Institutions - IMF and World Bank, for developing countries remains very critical. The entry of foreign banks in banking markets experiencing a financial repression could be beneficial for these banks. These can take advantage of new operating conditions for banking which are not the same as those existing in their origin countries. The competition is less intense and prospects for expansion are very favourable. These banks may, for example, still use their financial products widely consumed in their country and who still remain underdeveloped and fairly traded in host countries. The interest of these banks would always maximize their returns without considering the negative consequences that may reduce the efficiency and stability of local banks. Detragiache E., et al (2006) show that the relationship between the presence of foreign banks in poor countries and improving the cost efficiency of local banks, measured by the variation of the ratio "total operating costs reported to total assets" wouldn't be robust. The favourable change in the level of efficiency of domestic banks following the penetration of foreign banks wouldn't have robust justification.

Improving the efficiency of domestic banks in developing countries could be promoted by internal factors. The parameters of the financial Disintermediation "Disinter" variable and the real interest rate "RealInterate" variable have significant and positive sign in all regressions which confirms our hypothesis.

Thus, the higher the ratio of financial disintermediation was, the greater the level of efficiency would be improved. This result shows that the financing bye the stock market value and banks would be complementary and not substitutes. The intensification of competition between these two modes of financing may lead banks to increase efforts in monitoring and controlling their cost structure, they would be forced to lower their lending rates and provide favourable conditions for borrower. Thus, the monetary authorities have an interest to further encourage financing by the stock market value, which offers a better alternative for financing the economy and can promote constructive competition and non-destructive as that which may be caused by the entry of foreign banks.

The parameter of the variable real interest rate "RealInterate" is significant and positive, suggesting that an increased level of real interest rates may positively affect the efficiency of banks in the developing countries. The explanation that we can suggest is that the transition from an economy characterized by financial repression to a market economy can improve the banks efficiency.

The fixing of interest rates by banking authorities tends to restrict the development of financial intermediation, especially when it is accompanied by a credit control policy. Banks would be forced in this case to finance productive sectors and activities at low rates of return through very low interest rates often known by preferential interest rates. State intervention in the financing system of the economy can increase the cost of the process of financial intermediation and promote the misallocation of national savings; lending decisions would be guided more by political factors then by considerations of profitability and efficiency.

The parameter of the economic development variable "GDP per capita" has significant negative sign. According to some previous studies (e.g. Dietsch, A. Lozano-Vivas 2000) the economic development would affect positively the cost of banks. More developed economies, plus financial and operating costs would be high when offered financial products and services. In this context, banks are required to improve the quality of their services offered by the installation of Automated Teller Machine "ATMs" and the expansion of branch networks. These efforts are supporting the banks significant operating costs that can negatively affect their cost structure and reduce their level efficiency.

The estimated coefficient of the variable size "Ln Size" has a positive sign and it's significant at 1%. This confirms our prediction about the sign of this variable and supports the positive effect of size on the banks efficiency. This result confirms our discussion for the variable "concentration" and proves the presence of economies of scale in banking sector. An increase in the size and the degree of integration into the economy would enable the bank to amortize its operating costs on a large number of operations, thus would result in a decrease in unit cost and the bank would be able to set prices competitive. Banks have an interest to increase the volume of their activities to realize economies of scale.

Thus we can conclude that banks in developing countries suffer from the problem of size. Their sizes disable it to invest in new technologies and banking techniques necessary to diversify their risks and reduce their total costs. The size would be a factor which may handicap domestic banks to compete with foreign banks.

For the variable "other non earning assets (OtherActNPro)", the parameter is significantly negative at the 1%. This result provides evidence for negative consequences of financial repression. This variable includes cash and the assets that banks must hold with the Central Bank as reserves. These assets bear banks different costs: financial costs associated with their remuneration and opportunity costs which are often high due to idle capital that can be utilized in financing activities banking generating added value (lending and detention of securities). Thus, for a given bank, gradually as the share of its non earning assets in its employment increases, total cost increase and its level of efficiency would deteriorate further.

The parameter of the interaction term between "the degree of penetration of foreign banks" and "efficiency gap between foreign and domestic banks (PDEM) confirms well our research hypothesis, it's significant and has negative sign at the 1%. This result clearly indicates that the penetration of foreign banks may have significant adverse effects on the efficiency of domestic banks especially when the difference between their level efficiency is significant. The magnitude of this effect is more important than the variable "penetration" considered separately in the regressions. The result of the third regression confirms the hypothesis. The coefficient of interaction term "penetration" and "efficiency gap between the average level of efficiency of foreign banks and the efficiency of each bank b (noted PDEb) is also significant at the 1 % and has negative sign. The magnitude of this effect, according to the results shown in Table (2) is greater than the effect of the variable "penetration" taken separately in the regressions.

Conclusion

According to our results mentioned above, we can say that the relaxation of entry barriers can not be considered as an adequate solution for the developing countries. It has unanimously been suggested in the literature that foreign banks are generally more efficient than domestic banks. This result is also supported by our findings, the level of efficiency calculated by the stochastic frontier approach (SFA) shows that foreign banks are characterized by an efficiency advantage in developing countries. The banking authorities of these countries look for a synergistic effect that may result from the presence of entities more efficient. Increased competition would encourage local banks to improve their productive efficiency to ensure their survival. But the result is disappointing: this difference does not favour an improvement, but rather a deterioration in the efficiency level. It seems that local banks would be unable to withstand the fierce competition by the presence of foreign banks which are comparatively more efficient. The

most efficient banks would be able to attract good customers and gain an interesting share of the market. This confirms the differential efficiency hypothesis advanced by Demsetz (1973). Thus, the higher the efficiency gaps between foreign and domestic banks, the greater the deterioration in the efficiency of local banks. The local banking sector would be dominated by foreign financial institutions. The banking authorities in this case lose their control over the banking sector and therefore on how to finance their economy. The difference in performance between the two categories of banks can greatly reduce the viability of less efficient banks and would determine the future structure of local banking system.

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Notes

Note 1. Wheelock D.C., and P.W. Wilson (1995); Becher D. R., R.   De Young and T. Lutton 1995); Barr R., T. Siems (1994); Berger A.N., and D.B. Humphrey (1992).

Note 2. Table 1 presents for each country the number of domestic and foreign banks.

Note 3. This test is very appropriate for bivariate analysis which includes a non-metric variables and a metric variable. In our research, we adopted the Mean comparison test for independent samples because our non-metric variable (property) divides the sample in only two groups: Domestic and Foreign. This type of test, called T-test, help us to know if the differences between the means of two groups (foreign and domestic banks) are too important to be due to random sampling errors.

Note 4. Plihon D. (1999) suggests that the decrease of banks profitability can largely promote the emergence of banking crisis. The unfavourable change in the intermediation margin, which appears as a major reason for the decrease, can destabilize banks and can lead to banking and financial crisis. Other researches have focused on other factors that reduce the margin and promote the emergence of crises. Demirguç-Kunt A. and E. Detragiache (1998), Chang R. and A. Velasco (1998) emphasized that the decline in franchise value can be regarded as a source of banks fragility. Miotti L., and D. Plihon (2001) and Weller EC (2001a, b) suggested that an increase in excessive risk taking can also promote the emergence of crises.

Table 1. Results of estimating the Translog cost function (1)

	Ct	Coef.	Standard deviation
α	cons	*3.241702	0.0730994
β_1	Ln w1	*0.6990907	0.0159149
β_2	Ln w2	*0.2547115	0.0152015
β_3	Ln w3	*0.0461978	0.0123666
β_{11}	Ln w1 Ln w1	*0.0706395	0.00258
β_{22}	Ln w2 Ln w2	*0.0577779	0.0015678
β_{33}	Ln w3 Ln w3	*0.0101936	0.0016546
β_{12}	Ln w1 Ln w2	*-0.0591119	0.0019255
β_{13}	Ln w1 Ln w3	*-0.0115276	0.0014297
β_{23}	Ln w2 Ln w3	0.001334	0.0016739
γ_1	Ln y1	*0.2323391	0.0137326
γ_2	Ln y2	*0.4619395	0.0162547
γ_3	Ln y3	*0.0562963	0.0209873
γ_{11}	Ln y1 Ln y1	*0.0193039	0.0004893
γ_{22}	Ln y2 Ln y2	*0.0223309	0.000653
γ_{33}	Ln y3 Ln y3	*0.0725645	0.0027427
γ_{13}	Ln y1 Ln y3	*-0.010052	0.0009178
γ_{12}	Ln y1 Ln y2	*-0.0058112	0.001453
γ_{23}	Ln y2 Ln y3	*-0.033541	0.0018072
λ_{11}	Ln w1 Ln y1	*0.0089687	0.0018274
λ_{12}	Ln w1 Ln y2	*0.0222985	0.0024399
λ_{13}	Ln w1 Ln y3	*-0.0431019	0.0030886
λ_{21}	Ln w2 Ln y1	*0.0092012	0.0014838
λ_{22}	Ln w2 Ln y2	*-0.0329901	0.0022004
λ_{23}	Ln w2 Ln y3	*0.0387643	0.0023381
λ_{31}	Ln w3 Ln y1	*-0.0069778	0.0015019
λ_{32}	Ln w3 Ln y2	*0.0070624	0.0019402
λ_{33}	Ln w3 Ln y3	-0.0032253	0.0024627
θ	Ln f	-0.0413468	0.0226637
γ	Ln f Ln f	*-0.0030463	0.0009237
ω_1	Ln f Ln y1	*-0.0116918	0.0023447
ω_2	Ln f Ln y2	-0.0015591	0.0019096
ω_3	Ln f Ln y3	*0.0177041	0.0033904
φ_1	Ln f Ln w1	*0.0286391	0.0033366
φ_2	Ln f Ln w2	*-0.0306424	0.0031012
φ_3	Ln f Ln w3	0.0020033	0.0021534
η	eta	**-0.0061532	0.0034881
σ^2		15.03918	47.50802
$\delta = \sigma_u^2/\sigma^2$		0.9974282	0.0081219
σ_u^2		15.00051	47.50799
σ_v^2		0.0386781	0.0005942

N.obs = 10429

N. group = 1799

Log Likelihood = 536.23508

Table (2): Results of regression model (3)

Independent variables	Coefficient				
	(1)	(2)	(3)	(4)	(5)
Const	.7363884*	.7909375*	.7575874*	.7445453*	.7831008*
	(.0091323)	(.0062285)	(.0028469)	(.0100747)	(.0035063)
Conc	.3210172*	.0172481*	.01005*	.3183897*	.0209496*
	(.0156127)	(.0042362)	(.0044909)	(.0156296)	(..0043517)
Penetrat	-.024739***	-.055474***	-.0744225*	-.0161373***	-.0268937*
	(.0151161)	(.0039731)	(.0036345)	(.0157408)	(.003191)
Disinter	.0140763*	.0029077*	.0015358*	.0000581*	1.27e-06***
	(.0051677)	(.0015355)	(.001243)	(4.71e-06)	(1.27e-06)
RealInterate	.000058*	3.70e-06*	8.39e-07*	.014216*	.000471***
	(4.71e-06)	(1.33e-06)	(1.12e-06)	(.0051578)	(.0013087)
Ln Size		.0003217			
		(.0004235)			
PDEM		-.9123045*			
		(.0748827)			
PDEb			-1.022378*		
			(.0241624)		
GDP per capita				-2.53e-06**	
				(1.36e-06)	
OtherActNPro					-.0037085*
					(.0002585)
N.Observations	6980	5161	5161	6980	5458

* Variable significant at 1%,** Variable significant at 5%, *** Variable significant at 10%, Standard deviation in parentheses

Table 3. Independent variable

Variable	Definition
Conc	Banking sector concentration measured by The three banks concentration ratio. It's defined as the market share (expressed as a percentage) of the three largest banks in banking sector: Sum of the three largest bank's assets to the sum of all bank's assets.
Penetrat	Market share of foreign banks: foreign bank assets to total bank assets in each country
Disinter	Disintermediation variable: Market capitalization to total domestic credit granted by banking system.
RealInterate	Real interest rate : Nominal interest rate minus rate of inflation
Ln size	The log of asset size
PDEM	Interaction term : Penetrat*average efficiency gap Where Average efficiency gap : Average efficiency of foreign banks –Average efficiency of domestic banks
PDEb	Interaction term : Penetrat*average efficiency gap (b) Where Average efficiency gap : Average efficiency of foreign banks –efficiency of bank (b)
GDP per capita	Real GDP per capita
OtherActNPro	other non earning assets to total asset

Table 4. Number of domestic and foreign banks in domestic banking : 1993-2001

Continent	Countries	Total number of commercial banks	Number of Domestic banks	Number of Foreign banks
Latin American (13 countries)	Argentina	98	80	18
	Bolivia	16	14	2
	Brazil	159	130	29
	Chile	34	25	9
	Colombia	30	24	6
	Costa Rica	27	26	1
	Ecuador	40	39	1
	Jamaica	12	9	3
	Mexico	40	25	15
	Paraguay	27	21	6
	Peru	27	20	7
	Uruguay	21	9	12
	Venezuela	46	41	5
Africa (8 countries)	Algeria	6	5	1
	Botswana	6	1	5
	Egypt	30	23	7
	Morocco	13	9	4
	Nigeria	46	42	4
	South Africa	33	26	7
	Tunisia	12	7	5
	Zimbabwe	9	5	4
Europe (16 countries)	Armenia	7	6	1
	Austria	33	22	11
	Bulgaria	18	12	6
	Croatia	40	28	12
	Cyrus	17	12	5
	Estonia	8	5	3
	Hungary	34	10	24
	Latvia	25	18	7
	Lithuania	15	7	8
	Malta	10	5	5
	Poland	59	23	36
	Russia	112	103	9
	Slovakia	21	14	7
	Slovenia	23	20	3
	Turkey	61	59	2
	Ukraine	38	32	6
Asia (17 countries)	Bahrain	9	5	4
	China	41	39	2
	India	63	60	3
	Indonesia	105	82	23
	Jordan	11	9	2
	Lebanon	70	55	15
	Malaysia	52	40	12
	Nepal	9	7	2
	Pakistan	23	23	0
	Philippines	41	34	7
	Qatar	5	5	0
	Saudi Arabia	10	7	3
	Singapore	21	16	5
	South Korea	53	49	4
	Syria	1	1	0
	Thailand	16	10	6
	Vietnam	16	15	1
	TOTAL	1799	1414	385

* A foreign bank is defined to have at least 50 percent foreign ownership.