

Foreign Ownership and Cost Efficiency: Evidence on Polish and Czech Banks

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Abstract:

An increasing share of the banking sector is owned by foreign capital in most developed countries in transition. To analyze the consequences of this trend on the performance of the banking sector in these countries, this study conducts a comparative analysis of the performance of foreign-owned and domestic-owned banks operating in Poland and the Czech Republic. We use the Stochastic Frontier Analysis to compute cost efficiency scores. Following Mester [1996], financial capital is included in the cost frontier model to control for risk preferences. We found mixed evidence on the outperformance of foreign-owned banks. While the mean cost efficiency score is higher for foreign-owned banks, this efficiency gap is not significant if we take into account the scale of operations and the structure of activities.

Keywords: transition economies, banks, efficiency.

JEL Classification: C30, G21, P20.

1. Introduction

With the forthcoming privatization of the last big state-owned banks, the banking sector is almost about to become fully-owned by foreign investors in Poland and the Czech Republic, if we except minor banks. At the end of 1999, foreign investors already owned 60% of total banking assets in Poland. This evolution already concerns the most developed countries in transition, but it may also affect the other ones in the near future. This unusual market structure is the consequence of a double phenomenon: the will of the authorities to privatize major banks to improve the performance of the banking sector and the lack of domestic capital to buy these banks.

Whether this growing market share of foreign-owned banks will improve or not the performance of the banking sector is thus a major issue for these countries, as it influences the development of capital markets (Thakor [1998]) and the economy

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(Sussman [1993]). To provide elements about this issue, it is then helpful to analyze whether foreign-owned banks outperform domestic-owned banks. Despite the importance of this debate, no study was yet performed to deepen it. The general opinion is in favor of foreign-owned banks for two reasons. On the one hand, as there is a strong connection in transition countries between foreign and private ownership, foreign-owned banks may benefit from a better control from private shareholders, resulting in better incentives for managers. On the other hand, foreign shareholders, generally being foreign banks, may provide their know-how in organization and risk analysis.

However two strands of the empirical literature supply arguments in favor of a better performance of domestic-owned banks. Firstly, the literature devoted to the comparison of performance between domestic-owned and foreign-owned banks generally concludes to a dominance of domestic-owned banks (Berger et al. [1999]). This advantage may occur from organizational diseconomies to operate and monitor a bank from a distance that affect foreign-owned banks. It may also come from cultural barriers that may favor domestic-owned banks. In this way, a deeper explanation may be of the highest importance in countries in transition where most managers of foreign-owned banks come from abroad. As a consequence, foreign-owned banks' managers may suffer from a poorer knowledge of the behavior of borrowers. On the one side, they do not get used to countries where accounting information is uncertain and moral hazard behavior more common than in developed economies. On the other side, they own less information on the quality of borrowers. Consequently, foreign-owned banks may face more problems resulting from information asymmetries than domestic-owned banks.

Secondly, the question about the role of foreign ownership on performance can be linked to the analysis of the influence of private ownership, as most of domestic-owned banks are publicly-owned while all foreign-owned banks are privately-owned. Several studies have compared the performances of public and private companies in transition countries with various methodologies (Earle and Estrin [1996], Konings et al. [1996], Konings [1997], Estrin and Rosevear [1999]). However, they do not provide conclusive evidence in favor of a better performance of privately-owned companies in transition economies. Consequently, empirical literature provides strong evidence against the general opinion in favor of the better performance of foreign-owned banks in transition countries.

This paper aims to fill the gap in the literature about the comparative performance of domestic and foreign-owned banks in transition economies. To manage this question, we proceed to the estimation of cost efficiency scores for banks in the Czech Republic and Poland to analyze the influence of foreign ownership. We use the cost efficiency model to perform this estimation, following the Stochastic Frontier Approach.

Our aim here is the analysis of the differences in cost efficiency between domestic and foreign-owned banks in the Czech Republic and Poland to provide information on comparative managerial performance. However, a simple comparison of the mean efficiency scores obtained in the efficiency model would be misleading if we do not take into account bank characteristics which are not endogenous to bank managers' behavior. On the one hand, differences in risk preferences might explain discrepancies in efficiency (Hugues and Mester [1993], Mester [1996]). The degree of risk aversion has an impact on cost efficiency: a risk-averse bank may fund its loans with a higher ratio of equity to deposits than a risk-neutral bank. Thus, by not choosing the cost-minimizing level of equity, the risk-averse bank may appear less efficient than the risk neutral one. This issue is of considerable interest in transition countries, as there may exist differences in risk preferences of bank managers. Indeed, if bank managers from foreign-owned banks are more risk-averse than the domestic-owned banks' ones, their performance would be underestimated if equity is not controlled in the cost model.

On the other hand, differences in efficiency between domestic-owned and foreign-owned banks may come from discrepancies in size or in structure of activities. If, for instance, foreign-owned banks are smaller than domestic-owned banks, a better cost efficiency for foreign-owned banks may be the result of scale diseconomies rather than superior managerial performance. It can be argued that size and structure of activities are caused by management, as bank managers are responsible for the decisions of production. Nonetheless, the size and the structure of activities are not flexible in banking, as proven by the large fixed costs involved by banking activities. It would consequently not be relevant to study the performances of banks without including the size and the structure of activities in the analysis.

To take these elements into account, we employ a two-step approach to examine the relative cost efficiency of domestic-owned and foreign-owned banks using a

sample of 47 banks from Poland and the Czech Republic in 1997. In the first step, we compute the cost efficiency scores. Following Mester [1996], we include the level of equity in the estimation of the cost function model to control for risk preferences. In a second step, the efficiency scores are then utilized in a regression model to analyze the explanatory variables of the efficiency gap between both types of banks. We include variables for the size and the structure of activities to disentangle these influences from the impact of the nature of the ownership.

The paper is organized as follows. Main trends in Polish and Czech banking sectors are briefly presented in section 2. Methodology is described in section 3, followed by the data in section 4. Section 5 presents the results of the estimation of efficiency scores. Section 6 displays the regression of the efficiency scores. We finally provide some concluding remarks in section 7.

2. Banking industry in Poland and Czech Republic

2.1 Polish banking industry

Under central planning, banking system was dominated by a bank cumulating functions of central bank and supplier of credit to key industries. The state directed the distribution of funds throughout the economy without taking care of their productive use. Against this procedure, Poland decided in 1989 to separate this dominant bank into one central bank and nine state-owned regional commercial banks, every bank inheriting a part of the portfolio of major state-owned firms. However this reform did not resolve structural problems as bank managers of state-owned commercial banks continued to grant new loans to state-owned companies without taking care of real perspectives of repayment. Recession in Poland in 1991, following the shock therapy implemented in 1990, clearly highlighted this problem. Main state-owned companies were strongly affected by the fall of demand and the restructuring efforts. Consequently, their solvency fell so that amount of non-performing loans increased to 31% of total loans in 1993 (OECD [1996]).

In 1993, the Polish government decided to undertake the Enterprise and Bank Restructuring Program (EBRP) to stop the deterioration of the financial situation of

main state-owned banks and companies. In force until 1996, its aim was the recapitalization and the resolution of the problem of non-performing loans to allow the privatization of state-owned banks. The Polish State decided to proceed to a one-time recapitalization of the banks, based on the value of the portfolio of bad debts at the end of 1991. However this injection of capital was provided under the condition that banks undertook actions to resolve all their non-performing loans at the end of 1991. Banks were then empowered to negotiate workout agreements with problem debtors and force them on dissenting creditors. These agreements should have been based upon restructuring programs, involving the control of banks.

Nine main state-owned banks were concerned by this reform. Outcome of the restructuring program is generally considered as positive: the share of non-performing loans in loan portfolios of the eleven major banks was reduced from 27% in 1992 to 9% in 1996 (Palinski [1999]). Furthermore, Gray and Holle [1996] observed that banks were forced to develop the institutional capacity to deal with problem debtors by the implementation of workout teams.

In parallel with the implementation of the EBRP, the Polish government also set up the privatization of banks. Stated objective was the improvement of the capital standing and the management quality. In 1993, the privatization of the nine regional state-owned commercial banks was scheduled by the end of 1996, but it was finally delayed and only four regional banks were privatized at the end of 1997. This privatization process was also the opportunity for the entry of foreign banks on the Polish banking market, as the Polish authorities asked foreign banks to get involved in the capital of the newly privatized banks. This request was motivated on the one hand by the lack of sufficient domestic capital, on the other hand by the authorities' will to bring the know-how of foreign banks in Polish banks. The result of this process was the progressive dominance of foreign-owned banks on the banking market with a share of 60% of the banking assets already owned by foreign capital at the end of 1999.

In our analysis, as we adopted data from 1997, we have a mixed sample with a majority of domestic-owned banks still at this time, and foreign-owned banks either de novo of former state-owned banks.

2.2 Czech banking industry

As in Poland, the Czech authorities quickly decided after the collapse of the old regime to separate the activities of the former monobank cumulating the functions of central bank and commercial bank. The commercial activities were transferred to two banks. As the Polish evolution, the number of banks highly increased in the first years of transition, from 9 in 1989 to 52 in 1993, mainly because of the lack of constraining prudential regulation. Several foreign-owned banks were then created, all specialized also in investment banking and services to companies and high-revenue households. They were either created as subsidiaries or branches of foreign banks. However, after 1993, the Czech authorities decided to strengthen the prudential measures to avoid a mass bankruptcy of the banking system.

Two worrying evolutions incite the Czech central bank to implement measures in banking legislation. On the one hand, the new created banks suffered from a bad financial situation, due to weak level of capital and from the increasing competition resulting in risky portfolios of loans. On the other hand, the authorities realized the high level of the amount of non-performing loans owned by the major banks, coming from loans from the old regime but also from the loans granted in the first years of transition.

As far as minor banks are concerned, the Czech central bank decided in 1994 to harden the attribution of new banking licenses. A program for the improvement of the financial situation for small and medium banks was adopted in 1996 to prevent a mass bankruptcy of these establishments: 15 banks were targeted, for which authoritative measures such as the cancellation of the banking license or the obligation for the shareholders to increase the capital were adopted.

To resolve the problem of the increasing amount of non-performing loans, the Czech government decided in 1993 to transfer the main part of the non-performing loans from major banks to a special institution created in this aim, Konsolidacni Banka. This procedure cleaned the portfolio of loans of main Czech banks in the perspective of a privatization. However the privatization was not performed in the following years. A substantial part of the capital of the major Czech banks was sold, but the State still controlled these banks. The delay of privatization was mainly due to political reasons as the privatization presented the danger of increasing unemployment and as there was no consensus about the idea to sell major Czech banks to foreign

hands. The only public bank that was wholly privatized was the Zivnostenka Banka, sold to foreign investors in 1992.

Furthermore the difficulties of the Czech economy, accompanied by the inefficiencies of bank management partly due to the remaining links between major state-owned banks and state-owned firms, led to a share of 30% of non-performing loans in the total of loans in 1997 (CNB [1998]). The Czech government finally adopted a program for the privatization of banks in 1998: the 4 major banks are planned to be privatized before the end of 2000.

Therefore, as our study focuses on 1997, the delayed privatization of the banking sector leads to the fact that all foreign-owned banks from the Czech Republic are de novo banks, resulting from the creation of subsidiaries and branches by major western banks, if we except Zivnostenka Banka.

3. Methodology

We use the Stochastic Frontier Approach to estimate the cost efficiency scores (Aigner et al. [1977]), following Mester [1996], Allen and Rai [1996], Altunbas et al. [2000]. Cost efficiency measures how close a bank's cost is to what a best-practice bank's cost would be for producing the same bundle of outputs. It then provides information on wastes in the production process and on the optimality of the chosen mix of inputs. The stochastic cost frontier methodology² based on a multiproduct translog cost function is adopted to calculate cost efficiency scores for the 47 banks in our sample.

The basic model assumes that total cost deviates from the optimal cost by a random disturbance, v , and an inefficiency term, u . Thus the cost function is $TC = f(Y, P) + \varepsilon$ where TC represents total cost, Y is the vector of outputs, P the vector of input prices and ε the error term which is the sum of u and v . u is a one-sided component representing cost inefficiencies, meaning the degree of weakness of managerial performance. v is a two-sided component representing random disturbances, reflecting bad (good) luck or measurement errors. u and v are independently distributed. v is assumed to have a normal distribution with zero mean

and variance σ^2 . Several distributions have been proposed in the literature for the inefficiency component u : half-normal, truncated normal, gamma, exponential. Here we assume a gamma distribution for inefficiency terms following Greene [1990].

According to Jondrow et al. [1982], bank-specific estimates of inefficiency terms can be calculated by using the distribution of the inefficiency term conditional to the estimate of the composite error term. Greene [1990] has then provided the estimate of the cost inefficiency term with a gamma distribution.

We estimate a system of equations composed of a translog cost function and its associated input cost share equations, derived using Shepard's lemma. Estimation of this system adds degrees of freedom and results in more efficient estimates than just the single-equation cost function.

Since the share equations sum to unity, we solved the problem of singularity of the disturbance covariance matrix of the share equations by omitting one input cost share equation from the estimated system of equations. Standard symmetry constraints are imposed. Homogeneity conditions are imposed by normalizing total costs and price of labor by the price of borrowed funds. Thus, the complete model is the following:

$$\ln\left(\frac{TC}{w_3}\right) = \mathbf{b}_0 + \sum_m \mathbf{a}_m \ln y_m + \sum_n \mathbf{b}_n \ln\left(\frac{w_n}{w_3}\right) + \frac{1}{2} \sum_m \sum_j \mathbf{a}_{mj} \ln y_m \ln y_j \\ + \frac{1}{2} \sum_n \sum_k \mathbf{b}_{nk} \ln\left(\frac{w_n}{w_3}\right) \ln\left(\frac{w_k}{w_3}\right) + \sum_n \sum_m \mathbf{g}_{nm} \ln\left(\frac{w_n}{w_3}\right) \ln y_m + \ln EQUITY + COUNTRY + \mathbf{e}$$

$$S_n = \partial \ln\left(\frac{TC}{w_3}\right) / \partial \ln w_n = \mathbf{b}_n + \sum_k \mathbf{b}_{nk} \ln\left(\frac{w_k}{w_3}\right) + \sum_m \mathbf{g}_{nm} \ln y_m + \mathbf{h}_n$$

where TC total costs, y_m m^{th} bank output ($m=1,2$), w_n n^{th} input price ($n=1,2$), w_3 price of borrowed funds, $EQUITY$ total equity, $COUNTRY$ dummy variable for the country (0 if Czech, 1 if Polish), S_n input cost share³ ($n=1,2$), η_n error term (η_n independent from ε).

² See Kumbhakar and Lovell [2000] for further details on Stochastic Frontier Analysis.

³ S_n is equal to the expenses for the input n divided by total costs.

Our sample is composed of banks from two different countries. Therefore, we include a dummy variable to take the influence of environment into account in the estimations. The system of equations is estimated using Iterative Seemingly Unrelated Regression (ITSUR) estimation technique⁴.

For the definition of inputs and outputs, we adopt the intermediation approach proposed by Sealey and Lindley [1977] which assumes that the bank collects deposits to transform them, using labor and capital, in loans by opposition to the production approach which views the bank as using labor and capital to produce deposits and loans⁵. Two outputs are included: Y_1 = loans, Y_2 = investment assets⁶. Each of these was measured by the dollar volume that the bank held at the end of 1997. The inputs, whose prices are used to estimate the cost frontier, include labor, physical capital and borrowed funds. Following Altunbas et al. [2000], the price of labor, w_1 , is measured by the ratio of personnel expenses on total assets as data on the number of employees are not available. The price of physical capital, w_2 , is defined as the ratio of other non-interest expenses on fixed assets. The price of borrowed funds, w_3 , is measured by the ratio of paid interests paid on all funding. Total costs are the sum of personnel expenses, paid interests and other non-interest expenses.

Following Mester [1996] and Altunbas et al. [2000], we include the level of equity into the estimated cost function to control for differences in risk preferences. If managers from a bank are more risk-averse than the managers from the other ones, they can hold a higher level of equity than the cost-minimizing level. Consequently, by neglecting the level of equity, we may consider a bank as inefficient while it behaves optimally given the risk preferences of its managers. Hugues et al. [1995] tested and rejected the assumption of risk neutrality of bank managers. We then include the level of equity to take the differences in risk preferences into account. This variable is not introduced as an interactive variable in the model, because it

⁴ Kmenta and Gilbert [1968] proved that this procedure generates maximum likelihood estimates.

⁵ Two studies analyzed the influence of the choice of the treatment of deposits on efficiency results (Wheelock and Wilson [1995], Berger, Leusner and Mingo [1996]). Both concluded that the chosen approach has an impact on the levels of efficiency scores but does not imply strong modifications in their rankings.

⁶ This item includes the «other earning assets» in the IBCA terminology, which are all the other earning assets than loans.

would significantly reduce the degrees of freedom, due to the expansion of terms and the limited number of observations.

Berger and Mester [1997] provide two further reasons to include the level of equity into the estimation of the cost efficiency model. The first reason is that the bank insolvency risk depends on its equity available to absorb losses. Consequently, insolvency risk affects the bank costs through the risk premium the bank has to pay to borrow funds. This issue has a particular importance in transition economies where the insolvency risk of banks can be particularly high, with the high proportion of non-performing loans in loan portfolios. The second reason is based upon the fact that equity constitutes an alternative funding source for loans for banks. Even if deposits imply financial costs while equity does not, raising equity involves higher costs than raising deposits. As a result, omitting equity may favor the banks relying more on equity for the funding of loans if equity is more costly than deposits.

In spite of these arguments, the introduction of the equity variable in the cost function model is very scarce in the studies on banking efficiency. Only a few papers have proceeded to this improvement in cost efficiency estimations (Hugues and Mester [1995], Mester [1996], Berger and Mester [1997], Altunbas et al. [2000]). However the specific issues of banks in transition economies, with the possibility of differences of risk preferences between bank managers and the reality of bank insolvency risk, strongly require this inclusion, unless yielding a bias in efficiency scores.

As some banks from the sample have a negative level of equity, we proceed to a transformation of the equity variable to get a positive value of the logarithmic expression of equity in the model: we add the absolute value of the minimum of the equity variable computed in the sample and the unity to each value of equity.

4. Data

We use unconsolidated accounting data from the "Bankscope" database of BVD-IBCA. The sample of banks includes 31 Polish banks (19 domestic-owned, 12 foreign-owned) and 16 Czech banks for 1997 banks (8 domestic-owned, 8 foreign-

owned). It is detailed in the Appendix⁷. The definition of a foreign-owned bank is based on the fact that the majority of shares is owned by foreign firms, or when a foreign firm has the relative majority of shares and the rest of shares is dispersed between several shareholders. To solve the problem of two banks, from which the ownership changed during the year 1997 from domestic to foreign hands, we decided to consider them as domestic-owned banks, as the changes in the organization take time to be implemented after an acquisition in banking.

The inputs and outputs are all measured in millions of dollars. Table 1 displays summary statistics for outputs, inputs, input prices and other characteristics. The mean domestic-owned bank is larger than the foreign-owned one: domestic-owned banks are approximately threefold bigger. This proportion is respected in the means of inputs and outputs.

The analysis of the shares of deposits and loans in total balance shows slight differences in structure of activities between domestic-owned and foreign-owned banks. Domestic-owned banks rely more on deposits for their funding (78.81% vs. 77.19%). Furthermore these banks focus more their activities on loans: the share of loans represents 43.61% of total assets for domestic-owned banks, while it is 41.36% of total assets for foreign-owned banks. Thus, there are quite significant discrepancies in the banking activities between domestic-owned and foreign-owned banks that may have some influence on the efficiency scores.

Prices of inputs differ between both types of banks. The mean prices of labor and borrowed funds are somewhat higher for domestic-owned banks. However the mean price of physical capital is largely higher for foreign-owned banks (1.88 vs. 0.82 for domestic-owned banks). Taking the chosen measures for input prices and the possibilities for input substitutability in banking into account, it tends to prove that domestic-owned banks prefer to use labor while foreign-owned banks substitute physical capital to labor. Besides, the gap in price of borrowed funds means that borrowed funds are more expensive for domestic-owned banks.

⁷ The banks from the sample represent 67.4% of total loans from Poland, 68.8% from Czech Republic.

TABLE 1
Descriptive statistics

	Domestic-owned banks		Foreign-owned banks	
	Mean	Std Dev.	Mean	Std Dev.
<i>Outputs</i>				
Loans	1286.5	1815.2	375.3	393.1
Investment assets	1213.4	2035.4	420.2	348.7
<i>Inputs</i>				
Personnel expenses	39.32	60.53	11.99	18.87
Other non interest expenses	32.40	50.29	13.34	22.23
Interest paid	226.08	338.56	65.80	68.98
<i>Input prices</i>				
Price of labor	0.0196	0.0102	0.0146	0.0114
Price of physical capital	0.8183	0.5499	1.8844	1.7192
Price of borrowed funds	0.1137	0.0832	0.0950	0.0246
<i>Other characteristics</i>				
Total assets	2781.7	4074.5	867.1	805.3
Total costs	324.72	457.54	79.28	100.67
Equity	202.47	277.99	66.17	67.16
Share of deposits (in %)	78.81	8.71	77.19	9.03
Share of loans (in %)	43.61	15.34	41.36	11.52

All values are in millions dollars, except where indicated.

5. The estimation of efficiency scores

This section presents the results of the estimation of efficiency scores. Table 2 reports the results for the ITSUR estimation of the cost function estimated jointly with both share equations. Based upon the individual t-statistics and the value of the adjusted R² statistic on the OLS equation, the fit of the equation is good.

TABLE 2
ITSUR estimation of cost function system

Parameter	Coefficient	t-value
Intercept	0.2096	0.153
ln Y1	0.9403***	3.044
ln Y2	0.3702	1.290
ln Y1 ln Y2	0.2203***	12.160
ln Y1 ln Y2	-0.2581***	-9.191
ln Y2 ln Y2	0.2687***	5.809
ln (w1/w3)	0.4923***	10.671
ln (w2/w3)	-0.1407	-1.147
ln (w1/w3) ln (w2/w3)	-0.0218***	-4.059
ln (w2/w3) ln (w2/w3)	0.0609***	4.078
ln (w1/w3) ln (w1/w3)	0.0636***	11.157
ln Y1 ln (w1/w3)	-0.0037	-0.700
ln Y1 ln (w2/w3)	0.0254***	5.818
ln Y2 ln (w1/w3)	-0.0103	-1.647
ln Y2 ln (w2/w3)	-0.0345***	-7.042
COUNTRY	0.0149	0.377
ln EQUITY	-0.0205*	-1.917

*, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level

Number of observations: 47 banks

Adjusted R² on OLS equation: 0.9928

Function converged at iteration: 66

Main descriptive statistics for the cost efficiency scores are presented in table 3. We observe that foreign-owned banks are more cost-efficient on average than domestic-owned banks, however this advantage is rather weak. The mean cost efficiency score is 0.8582 for foreign-owned banks, while it is 0.7992 for domestic-owned banks. The analysis of the dispersion of efficiency scores shows that there is no significant difference between both types of banks: the standard deviation of efficiency scores is 0.0671 for domestic-owned and 0.0841 for foreign-owned banks.

The whole distribution of efficiency scores provides interesting facts on the efficiency of Polish and Czech banks. On the one hand, the standard deviation of efficiency scores is very weak (0.0768) in comparison with the mean (0.8500). On the other hand, the range of efficiency scores is relatively low with scores included between 0.5730 and 0.9487. Furthermore, if we except the two most inefficient

observations⁸, the scores range from 0.7053 to 0.9487. In comparison with other studies on banking efficiency, this is a remarkable result as the dispersion of efficiency scores is generally higher. This exhibits the relative homogeneity of efficiency performances of Polish and Czech banks, if we compare their efficiency scores with those from western banks (Altunbas et al. [2000] for Japan, Berger [1993] for the US, Berg et al. [1993] for Nordic countries).

TABLE 3
Descriptive statistics for efficiency scores

Sample	N	Mean	Std Dev.	Minimum	Maximum
Domestic-owned banks	27	0.8440	0.0671	0.5730	0.9487
Foreign-owned banks	20	0.8582	0.0841	0.7053	0.9278
All banks	47	0.8500	0.0768	0.5730	0.9487

The comparison of these results with the literature on banking efficiency shows that the level of cost inefficiencies for Czech and Polish banks is very similar to the observed ones in other studies with this methodology. In their survey of the studies on banking efficiency, Berger and Humphrey [1997] observed a mean efficiency score of 84% for the works with the Stochastic Frontier Analysis. As the efficiency scores measure relative performance, this observation means that the dispersion in performance seems equal between banks in transition countries than in western countries.

This section has shown that foreign-owned banks have a higher mean efficiency level than domestic-owned banks. This conclusion suggests that foreign-owned banks are better-managed than domestic-owned banks. However this advantage in performance is rather weak. Furthermore we have observed in the section 4 the existence of discrepancies in terms of size and structure of activities between domestic-owned and foreign-owned banks. On the one hand, the average-sized domestic-owned bank is threefold bigger than foreign-owned one. On the other hand, the structure of activities is different between both types of banks, with larger shares of deposits and loans in total balance sheet for domestic-owned banks. Thus, the

⁸ These two cost-inefficient observations are the Czech banks Universal Banka (0.5729) and Ceska

higher mean efficiency for foreign-owned banks may not come from a better management, but from these differences in size or activities. Consequently, we analyze more deeply the role of ownership on this efficiency gap in the next section.

6. What explains differences in efficiency between foreign-owned and domestic-owned banks?

6.1 Tests

The main result of the section 5 is the outperformance of foreign-owned banks on domestic-owned banks in Poland and the Czech Republic. This efficiency gap could be misleading, if bank characteristics being exogenous to bank managers decisions that are not controlled for in the efficiency model are correlated with foreign ownership. We have included the level of equity and a dummy variable for the country in the estimation of efficiency scores to take the influence of risk preferences and the environment into account. Nevertheless, other factors -at least partly- out of the control of bank managers have an impact on the efficiency scores.

We then proceed to regressions on efficiency scores. The first aim is to confirm the observed difference by analyzing if the origin of the ownership has a positive influence on the efficiency. The second aim is to provide evidence on the sources of these differences. Indeed the advantage in favor of foreign-owned banks may come from differences in size or in structure of activities instead of better management. As explained in the introduction, bank managers are responsible of the decisions of production and the size of the bank. Nonetheless, the size and the structure of activities are not flexible in banking: for instance, to be implied or not in retail banking is a decision involving large fixed costs, that restrict exit. Consequently, we analyze the influence of management by including explanatory variables for the size and the structure of activities in the regression of efficiency scores.

The explained variable is the cost efficiency score in percentage (EFFC). We include in the regression a dummy variable for the nature of the ownership (F): 0 if the bank is

domestic-owned, 1 if it is foreign-owned. Discrepancies in efficiency may result of differences in the nature of activities. Indeed, foreign banks may be more involved in investment banking. Thus, we take the impact of mix of inputs and outputs into account by introducing two variables in the regressions: the share of loans in total assets (SHRLOAN) and the share of deposits in total balance sheet (SHRDEP). The scale of operations may also induce differences in efficiency. Therefore, we include the size (ASSETS), measured by the total of balance sheet. Accordingly, the tested equation is the following one :

$$EFFC = b_0 + b_1 F + b_2 ASSETS + b_3 SHRDEP + b_4 SHRLOAN$$

We limit the number of explanatory variables to four variables to preserve the quality of regression, due to the limited number of observations.

6.2 Results

The empirical results of the regressions are shown in table 4. Based upon the individual t statistics and the value of the R^2 statistic, the fit of the equation appears to be reasonably good.

The main conclusion is the fact that the coefficient of the foreign ownership dummy (F) is not significant. Consequently, the foreign ownership does not result in significantly higher cost efficiency for banks. Indeed the higher mean efficiency score for foreign-owned banks observed in the previous section is not significant when taking size and structure of activities into account. This result is rather surprising as there is a general opinion in favor of the outperformance of foreign-owned banks. As explained above, this advantage should result from their better control from private shareholders but also from their comparative advantage in banking know-how provided by their mother companies. Nevertheless it has been suggested that foreign-owned banks suffer from a lower knowledge of the economic and legal environment. Foreign managers that often manage foreign-owned banks may have a longer experiment of banking in a market economy, but they suffer from a poorer information on local companies. As they have a lower information on credit quality of borrowers, foreign-owned banks may cope with more adverse selection problems than domestic-owned banks. Furthermore they may be less experimented also to hazard

moral problems in countries in transition in which western standards of contracting rules are not respected: accounting information is uncertain, leading to misevaluation of collateral and equity values. Thus, the comparative advantage of foreign-owned banks with better shareholder control and banking know-how is offset by a weaker knowledge of local customers.

Furthermore, the general opinion in favor of foreign-owned banks is mainly based upon a better performance in profit, which was not directly measured here. Indeed, the cost efficiency is a main component of the profit performance – higher the cost efficiency better the profit performance will be. However the better performance in profitability for foreign-owned banks may come from a better revenue efficiency, meaning a better ability for the choice and the pricing of outputs, resulting in higher profits. It may also come from a lower level of loan-loss provisions, burdening the profit, for foreign-owned banks, as these banks have not inherited from large portfolios of bad debts. Consequently, foreign-owned banks may outperform domestic-owned banks but only in profit efficiency because of higher revenue efficiency.

The coefficient of the share of loans in total assets is significantly positive at the 1 percent level. Allen and Rai [1996] found the same sign for banks from a sample of 15 developed countries, while Berger and Mester [1997] on US banks and Altunbas et al. [2000] on Japanese banks observed a negative sign. The observed positive relation may occur from the fact that loans are less costly to produce than investment assets. However this assumption seems rather surprising, as loans involve more operating costs than investment assets. Nevertheless, this cost hierarchy may not be true in transition countries when not taking loan quality into account. Indeed, it has been argued that many banks in transition countries do not proceed to a satisfactory evaluation of loan quality. Then, by not including loan quality, our estimated scores give an advantage to banks that save money on the evaluation of credits. They would suffer from repayment problems in the future, but on a short-term basis they reduce costs and are then considered as cost-efficient. Thus, the positive relation between the share of loans and the cost efficiency may stem from the fact that a substantial part of loans in the countries of our sample is granted unless the banks proceed to a satisfactory evaluation of credit files, resulting in lower operating costs for the loan activity.

The coefficient of the share of deposits in total balance sheet is significantly negative at the 1 percent model. Allen and Rai [1996] and Altunbas et al. [2000] found a positive sign, while Berger and Mester [1997] do not observe any significant relation. Our result may stem from the fact that deposits require more costs than market resources. Indeed in spite of their lower financial costs, they imply more operating costs than market resources.

The coefficient of the size variable is not significant, which means that there is no clear relationship between the size and the cost efficiency for Polish and Czech banks. This issue is connected with the debate on the scale economies in banking: empirical literature on economies of scale in banking does not provide clear results. Nonetheless, Berger et al. [1999] mentioned that medium-sized banks are generally observed as slightly more efficient than large and small banks in the U.S. Consequently, our result may come from the non-linear relationship between cost efficiency and size.

TABLE 4
Ordinary least squares regressions

Variable	Coefficient	Standard error	t-value
Constant	92.053***	5.942	0.0001
Foreign Dummy	0.845	2.156	0.6971
Share of Loans	22.216***	7.661	0.0059
Share of Deposits	-20.885***	7.569	0.0085
Assets	-0.458 ^E -6	0.34 ^E -6	-1.354

*, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level

N: 47 banks

Adjusted R²: 0.2067

To check the robustness of the results of the tests, we computed the same regression on our sample of banks from which we subtracted the two less efficient observations: the sign and the significativity of the variables were not affected.

Thus, this section showed that foreign ownership is not associated with higher cost efficiency for Czech and Polish banks. The advantage in cost efficiency we observed in the previous section was not robust when estimating regressions taking size and structure of activities into account.

7. Concluding remarks

The research presented here has analyzed the influence of the nature of the ownership on the cost efficiency of banks in Poland and the Czech Republic. This is a issue of considerable interest, due to the increasing involvement of foreign capital in banking sectors from transition economies.

We found mixed evidence on the positive influence of foreign ownership on cost efficiency in both transition countries. On the one hand, foreign-owned banks outperform domestic-owned banks. We observed a higher mean efficiency score for foreign-owned banks, which does not result from differences in risk preferences between both types of banks. On the other hand, the regression of cost efficiency scores on size and parameters for the structure of activities next to a variable for the nature of ownership leads to the non-significantness of this latter variable.

Foreign-owned banks were expected to outperform domestic-owned banks as they benefit from a better control from private shareholders, as foreign ownership and private ownership are generally linked in transition countries, and also from a transfer of banking know-how, as many mother companies are banks. However, it appears that this comparative advantage is offset by the home field advantage of domestic-owned banks. We suggest that this advantage may come from a better knowledge of local customers. Indeed, foreign managers often managing foreign-owned banks have a poorer information on local borrowers than domestic managers, resulting in more adverse selection for foreign-owned banks. Moreover, they are less experimented to hazard moral problems in countries in transition: the uncertainty of accounting information - higher than in Western countries - leads to misevaluation of collateral and equity values. Consequently, these problems can result in higher costs for foreign-owned banks, that offset their lower costs coming from their comparative advantages.

A promising extension would be to analyze the revenue and profit efficiency of domestic and foreign-owned banks from transition economies. Indeed, foreign-owned banks may benefit from a better allocative efficiency in outputs, meaning their choice of provided outputs and pricing is more optimal. Then, in spite of a better cost efficiency, foreign-owned banks may outperform domestic-owned banks in terms of profitability. This extension would however need information on output prices.

Another enlargement of our analysis would be the inclusion of the quality of outputs in the estimation of efficiency scores. Indeed Mester [1996, p.1026] observes that “banks scrimping on credit evaluations or producing excessively risky loans might be labeled as efficient when compared to banks spending resources to ensure their loans are of higher quality”. Consequently, controlling the quality of outputs may improve the estimation of efficiency scores. This point is of a major interest for banks in transition economies, due to the high level of non-performing loans in most of them. Nevertheless, this interesting extension requires micro-data on volume of non-performing loans, which were not available for our study.

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Appendix : The sample of banks

Czech banks: Bank Austria CR, Ceska Exportni Banka, Ceska Sporitelna, Citibank, Credit Lyonnais Bank Praha, Ceskoslovenska Obchodni Banka (CSOB), Hypo-Bank CZ., Interbanka, Investicni a Postovni Banka (IPB), Komerčni Banka, Pragobanka, Société Générale Banka, Union Banka, Universal Banka, Vereinsbank CZ, Zivnostenska Banka.

Polish banks: AmerBank-Bank Amerykanski w Polsce, Bank Creditanstalt, Bank Gospodarki Zywnosciowej (BGZ), Bank Handlowy W Warszawie (BHW), Bank Inicjatyw Spoeczno-Ekonomicznych, Bank Ochrony Srodowiska (BOS), Bank Pocztowy, Bank Przemyslowo-Handlowy (BPH), Bank Rozwoju Eksportu (BRE), Bank Slaski, Bank Staropolski w Poznaniu, Bank Unii Gospodarczej, Bank Zachodni, Cuprum-Bank, Deutsche Bank Polska, Gornoslaski Bank Gospodarczy, Gospodarczy Bank Poludniowo – Zachodni we Wroclawiu, Gospodarczy Bank Wielkopolski, Hypo-Bank Polska, Invest-Bank Powszechny Bank Budowlany w Poznaniu, Kredyt Bank PBI, Pierwszy Polsko-Amerykanski Bank, Polski Bank Rozwoju, Powszechna Kasa Oszczednosci Bank Panst (PKO BP), Powszechny Bank Gospodarczy, Powszechny Bank Kredytowy w Warszawie, Prosper Bank, Rabobank Polska, Raiffeisen Centrobank, Vereinsbank Polska, Wielkopolski Bank Kredytowy.