Role and Comparative Efficiency of European Banks in Serbia's Financial Sector[1]

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ABSTRACT – *This paper examines the cost efficiency of Serbian banks by the Stochastic Frontier Approach method for the 2003-2007 years and 33 banks sample. The results obtained are analysed in terms of the ownership structure of the studied banking system. A special attention is paid on the importance and cost-efficiency of foreign banks examined. It is found that state-owned banks are generally less performing in terms of cost-efficiency while European banks, playing the more and more important role and having an increasing share of the market, tend to be more efficient.*

KEY WORDS: cost efficiency, banking sector, Serbia, stochastic frontier approach

Introduction

The soundness and efficiency of banks are especially interesting to study in the current context of a financial crisis. In the present paper we would like to study the cost efficiency of the banking sector in Serbia by Stochastic Frontier Approach method considering the last changes in ownership structure, the growing role and the share of foreign banks in this system.

While speaking about Serbia we always have to remember the difficult path to stabilisation that this country has experienced and the present political issues. We have also to underline that in Serbia, and more generally in the Balkan countries, the banking sector is the major actor of the financial system[4]. Thus its overall efficiency is very important especially in regard of modern conjuncture and the global financial crisis in addition to the generally acknowledged role of banks to provide financial support for economic development and growth[5]. The particular reason for the investigation of European banks efficiency lies within of coarse continuing integration of the Serbian financial system into the European one and the proved dramatic increase of foreign participation in the banking sector. We must also take into consideration the general European influence upon the financial sector of Balkan countries: many different programs of partnership and aid are running, especially what concerns us – the banking regulation and standards. This tends to improve the overall efficiency of Serbian banking sector.

There is a number of recent studies investigating the relationship between relative cost efficiency of banks and their ownership in different countries, and in particular in transition economies (see, for example, Asaftei and Kumbhakar (2008), Fries and Taci (2005), Hasan and Marton (2003), Kraft et al. (2006), Kasman and Yildirim (2006), Weil (2003), etc.) Nevertheless, to our knowledge, none of such

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studies examines the Serbian banking system case. A single-country study has, as known, an advantage on cross-country analyses as it avoids environmental heterogeneity problem. Our sample covers all Serbian banks existing today for the purpose of understanding the role of foreign participation and, in particular, the importance and relative efficiency of European banks in Serbian banking sector.

The rest of the paper is organized as follows. In Section 2, the evolution and the last reforms of the banking sector in Serbia are described. In Section 3, we give a short description about the overall efficiency of Serbian banks. In Section 4, we present our econometric model and data choices. Finally, in Section 5, we report the results of the bank efficiency scores and compare them with the ownership structure of the banking sector to draw conclusions.

The evolution of Serbian banking system

Commercial banking sector in former Yugoslavia, unlike in the majority of other socialistic countries, was separated from central bank. In the period from middle sixties to late nineties, the banking system was based on quasi-market principles including some positive features like autonomy in decision making and leading of business policy. However, banking activities were subjected to interests of loaners instead to owners, implying low business efficiency and profitability.

After the overall reforms of Yugoslavian economy in 1989, the ownership of Yugoslavian banks was transferred from society[6] to firms. The government decided to convert deposits of large socially-owned firms to shares, organizing the banks as closely held companies. The process of transformation of existing large banks was followed with the establishment of new small banks in private ownership, often with doubtful credibility due to a soft supervision. Unfortunately, principles of banking business remained the same as they were before ownership transformation. After the disintegration of Yugoslavia, Serbian economy felt into a state of chaos, due to war, embargo and hyperinflation. Hyperinflation hardly damaged Serbian banking sector; households' savings in dinars, which in 1990 participated with 53% in banking credit potentials, was melted and loans to real sector became mostly disvalued.

After the monetary stabilization in 1994, changes in ownership structure of banks was related to restricting of intensive increase in demand of real sector for loans. The fear of the mistakes from the past fostered the Serbian government to impose new rules of borrowing to offset default risk on new loans and increasing demand for them. It forced the loaners to become shareholders by automatic conversion of 20% of loan to shares of lending bank. However, banking management was still substantially driven by political decisions rather than profitability principles. Until the reforms in 2001, Serbian banks remained insolvent, inefficient and non-profitable; i.e. percentage of interest paying asset in total asset of Serbian banks was only about 6% in 2000[7].

After the political changes in 2000, the new Serbian government defined and adopted Strategy of banking system restructuring in 2001. This strategy was followed with enhancement of regulatory requirements for work licenses, which forced small banks to merge with other banks. Reforms were implemented in few steps. Firstly, banks were imposed to detailed financial analysis in order to determine their solvency. Secondly, insolvent banks were closed, including four big state-owned banks which market share was over 56%. All these resulted in sharp fall in number of banks - from 86 in 2000 to 50 in 2002. This number could be even smaller, but during the 2001 five foreign banks got greenfield working licenses.

Next step in reforms started with adopting of the Strategy of banks privatization. The implementation of this Strategy was supported by a new legislation related to regulation liabilities to households due to old savings in foreign currency and liabilities to Paris and London Clubs. Government decided to convert all of those liabilities into public debt. As the result, Republic of Serbia became temporary owner

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[6] Socially-owned property was established in Yugoslavia as a substitute to state-owned property in order to move control of commercial business from government to workers
[7] Annual Report for 2000, National Bank of Serbia

in 16 banks (major owner in 11). According to Strategy, Republic of Serbia was supposed to sell its shares to the public. Also, issue of greenfield licences was interrupted.

Today, seven years after the beginning of reforms, we can characterize them as mostly successful. Some of the positive aspects include: closing of insolvent banks, increase of foreign ownership, introducing of new banking products and technologies as the consequence of foreign banking penetration, increase in number of employees, restoring of households' and firms' confidence, increase in competition, positive financial results of sector as a whole etc. Movements of some important indicators during the last five years are presented in table 1:

Table 1. General indicators of Serbian Banking

	dec 2003	dec 2004	dec 2005	dec 2006	dec 2007
Number of banks	47	43	40	37	35
Number of foreign banks	11	11	17	22	21
Number of employees	22,310	23,491	25,680	28,092	30,246
Total asset (million RSD)	367,486	516,869	775,413	1,169,271	1,561,822
Return on asset[8] (%)			1.13	1.70	1.70
Return on equity (%)			6.46	9.67	8.54
Interest rate spread (b.p.)	12.07	10.99	10.70	10.82	7.05

Source: National Bank of Serbia

However, the process of restructuring of Serbian banking system is still going on. The short to medium term priorities in Serbia include the completion of the privatization process for banks and insurance companies, a further reduction of bad loans, implementation of the central bank's Supervisory Development Plan and the establishment of a collateral registry to encourage corporate lending. Longer term challenges include further pension reforms, the development of non-banking financial services and greater availability of finance for the private sector.

Overall efficiency of Serbian banks

Positive effects of Serbian banking reforms significantly improved the efficiency of banking services market. Operational, informational and allocational efficiencies were simultaneously improved by increase in competition, introduction of new products, technologies and know-how, imposing of transparency, narrowing of interest rate spread, interruption of inefficient lending policy, etc. On the other side, the direction of changes in operational efficiency of banks as business systems is not so clear, according to different efficiency measures that can be applied. One of the most common measure of banking efficiency is the efficiency ratio, which can be calculated in few different ways:

- Non-interest expense divided by total revenue less interest expense
- Non-interest expense divided by net interest income before provision for loan losses
- Non-interest expense divided by revenue
- Operating expenses divided by net income from fees and interests

For all versions of the ratio, an increase means the company is losing a larger percentage of its income to expenses. If the efficiency ratio is getting lower, it is good for the bank and its shareholders. The fourth version of this ratio[9] is adopted as official indicator of banking operational efficiency by NBS. Efficiency ratio values for the last five years are presented in table 2.

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[8] In 2003 and 2004 banking sector booked loss
[9] Actually, NBS calculate this ratio reversibly and present it as operational expenses to net income from fees and interest cover ratio.

Table 2. Efficiency ratio of Serbian banking sector

	2003	2004	2005	2006	2007
Operating expenses[10] (in million RSD)	25,111	31,979	43,005	60,778	72,106
Net income from fees and interests (in million RSD)	31,074	37,837	53,123	70,423	90,854
Efficiency ratio	0.81	0.85	0.81	0.86	0.79

Source: National Bank of Serbia and author's calculations

We can see from the table that values varied over time without strict support of downward trend. According the NBS, high values of efficiency ratio are consequences of strong operational expansion during the previous years: "Despite strong operational expansion, banks managed to curtail growth in operational expenses so that income from purely banking operations amounted to 126% of operational expenses"[11].

Some other indicators, presented by Matić (2007), correspond to stagnation and even decreasing of banks' efficiency. She found that the ratio of total operating revenues to total assets felt from 0.19 in 2005 to 0.13 in 2007, while the ratio of net interest income to total operating assets felt from 0.05 to 0.04 for the same period. "Efficiency of total assets' use was largely influenced for sure by high rates of credit potentials' immobilization due to the required reserves", she concluded[12].

In the two next sections, we propose our estimation of the cost function of Serbian banks in order to evaluate the comparative efficiency of foreign owned banks with state-owned and private domestic banks in Serbia.

Econometric model and data

The objective of a bank, like of any firm, is to produce more outputs using less inputs. The frontier analyse represents a good instrument to estimate the relative efficiency of banks. Different economic efficiency concepts (based on profit or cost function) could be applied to banking data.[13] In this paper, bank efficiency is examined by studying a cost function as the data on output prices needed to estimating a profit function is not available. Here, cost efficiency is a measure of how close a bank's cost is to what a best-practice bank's cost would be for producing the same output bundle under the same conditions.

The next important step is the choice of the Frontier efficiency method. There is no consensus on the "best" method to determine the cost efficiency. Both types of methods: parametric frontier methods (Stochastic Frontier Approach (SFA), Thick Frontier Approach (TFA), and Distribution Frontier Approach (DFA)) and non-parametric models (Data Envelopment Analyse (DEA) and Free Disposal Hull (FDH)) have their advantages and disadvantages.

The method to estimate the bank's efficiency used in this paper is the Stochastic Frontier Approach (SFA) chosen primarily for its wide use in application to the banking data in transition countries (see for example Asaftei and Kumbhakar (2008), Fries and Taci (2005), Hasan and Marton (2003), Kraft et al. (2006), etc.). The SFA consists in estimating of a cost function by imposing a restrictive functional form and by assuming that the random error is divided into two elements: the first one, the inefficiency term (u_{it}), is non-negative and follows asymmetric distribution and captures inefficiencies due to poor management, and the second one, the random term (v_{it}), follows symmetric distribution and reflects a "bad luck" phenomenon beyond the control of management:

$$lnC_{it}=f(w, y) + u_{it}+v_{it} \tag{1}$$

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[10] According to NBS, operating expenses consist in cost of wages and some other operational cost included in income statement position 'other operational expenses'.
[11] Report on Financial System 2007, National Bank of Serbia
[12] Matic, V. (2008), Serbian banking sector in 2007
[13] See Berger and Mester (1997) for the cost and profit efficiency concepts comparison.

where C_{it} denotes total costs, f represents functional form, w is the vector of input prices, y is the vector of output quantities.

In our study, the translog functional form (2) was adopted due to the short time series and its simplicity and large use among other works, even if we are aware that Fourier-flexible functional form could be used instead and seems to be more suitable for banking data.

$$\ln C_{it} = \alpha_0 + \sum_{m=1}^{M} \alpha_m \ln Y_{mit} + \sum_{n=1}^{N} \beta_n \ln W_{nit} + \frac{1}{2} \sum_{m=1}^{M} \sum_{p=1}^{P} \alpha_{mp} \ln Y_{mit} \ln Y_{pit}$$

$$+ \frac{1}{2} \sum_{n=1}^{N} \sum_{r=1}^{R} \beta_{nr} \ln W_{nit} \ln W_{rit} + \sum_{m=1}^{M} \sum_{n=1}^{N} \phi_{nm} \ln Y_{mit} \ln W_{nit} + u_{it} + v_{it} \qquad (2)$$

In the banking efficiency literature there is no agreement on the nature of banking inputs and outputs. We adopt here the intermediation approach[14] according to which banks use deposits or deposit costs and other operating costs (inputs) to create loans and other earning assets (outputs). Besides, the variables choice is largely influenced by data availability. For instance, as we do not dispose of data on employees' number, we use a commonly used approximation to estimate labor costs and other operating costs (the ratio of operating expenses to total assets). Table 3 lists the variables associated with the translog cost function specified here before.

Table 3. Definitions and descriptions of variables

Variable	Definition	Description
		Dependent Variable
C_{it}	Total costs	Interest, Fees and Commission Expenses + Other Operating Expenses
		Output Quantities
Y_{it}	Total loans	Loans to banks + Loans to clients
		Input Prices
$W1_{it}$	Operating cost ratio	Other operating expenses / Total Assets
$W2_{it}$	Funding cost ratio	Interest, Fees and Commission Expenses / (Liabilities to banks + Liabilities to Clients + Securities)

The data used in this paper come from National Bank of Serbia; they consist in banks balance sheets and income statements with the full cover of five years activity. All variables are deflated to 2003 prices using the retail prices index.

Our sample consists of 33 Serbian banks with their activity between 2003 and 2007 (National Bank of Greece was merged with Vojvodjanska banka in 2008, while Opportunity banka a.d. Novi Sad is excluded from the sample as disposing only one year data). This period was chosen because we consider that the highly volatile structure of the Serbian banking sector started to stabilize: we can see that the number of banks decreased significantly from 104 in 1998 then 87 in 2001 and to 38 in beginning 2006. Changes in the ownership structure continue and this fact represents a good opportunity to study the relative efficiency of different forms of Serbian banks.

Table 4. Number of banks by ownership category

At the end of the year:	2003	2004	2005	2006	2007
Total number of actives banks	47	43	40	37	35
In majority state ownership	17	14	11	8	8
In majority ownership of domestic private person	19	18	12	7	6
In majority foreign ownership	11	11	17	22	21

Source: National Bank of Serbia

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[14] The intermediation approach was proposed by Sealey and Lindley (1977) and is used by a number of recent efficiency studies (for example, by Berger and Mester (1977).

During the considered years, the ownership structure of Serbian banking sector remarkably changed: from the clear domination of state-owned banks to the domination of foreign-owned banks. It is known[15] that the competition in the Serbian banking sector during this period was working well, but it still needs to be preserved and/or regulated because of current consolidation trend.

As one should make an assumption on the distribution form of inefficiency term (u_{it}), we compare two possibilities: half-normal distribution and truncated normal distribution. The Log likelihood ratio (LR) statistics leads us to accept the null hypothesis that the half-normal distribution is adequate as well as whether efficiency assumed to be time-invariant or time-varying. Indeed, here after we are using the results of our translog specification assuming a half-normal distribution of inefficiency term.

To obtain our results we use the high quoted T. Coelli software Frontier 4.1 with it's guide Coelli (2005).The program's outcomes are inefficiency scores for each bank. A perfectly efficient bank has a cost efficiency estimate equal to one. For a given bank, more important is the deviation from one, less efficient this bank is. Compared to the ownership structure, these scores will allow us to draw conclusions, first, as to if the ownership has an impact on the bank efficiency and, second, as to if the foreign, which are mostly European, banks are more efficient that the public ones or the private Serbian banks.

Analysis of efficiency results

One of the first results obtained from the estimation of banks' cost efficiencies is that state-owned banks are globally less efficient than private domestic and private foreign-owned banks. These results are robust independently of database sample. The gap between the efficiency of private domestic and foreign banks is rather narrow. The explanation we can give for it is that most of domestic banks benefited from the foreign expertise and knowledge, for example, from European partnership programs. Moreover, the number of domestic private banks dropped more than by half to the end of analysed period which makes the conclusion difficult to draw.

The average cost inefficiency of Serbian banks for the whole accounted period is estimated to be 28.21% above the best-practice score. During the period the average cost-efficiency of Serbian banks was instable, as we mentioned above.

Table 5. Cost inefficiency estimates by categories of ownership

Categories of ownership	Cost inefficiency estimates (%)
State-owned[16]	35.14
Domestic Private	28.28
Foreign	24.72
– by country of origin (number of banks; part of total assets of banking sector):	
– Hungary (1; 2,7%)	10.86
– Greece[17] (5; 22%)	18.19
– France (2; 6%)	20.14
– Cyprus (1; 1,1%)	24.25
– Austria (4; 23%)	26.25
– Germany (2; 5%)	27.46
– Italia (3; 185)	33.27
– Belgium (1; 0,7%)	33.33
– Slovenia (1; 1,4%)	35.14

Source: author's calculations, National Bank of Serbia, Bankscope database

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[15] Müller-Jentsch D. (2007)

[16] We consider as state-owned banks whereby the Republic of Serbia is the largest, direct or indirect, shareholder.

[17] We consider AIK banka a.d. Nis to be of Greek origin as Agricultural Bank of Greece has the largest part in its capital (20,83%).

Table 5 illustrates our estimation of the cost inefficiency structure by categories of ownership. It appears from the obtained estimates that state-owned banks in terms of cost efficiency seem to be less performing.

Analysing the foreign participation in Serbian banking sector, first of all, we find that all foreign banks are European with a numerous and important in terms of market share Greek, Austrian and Italian presence. Table 5 demonstrates the cost inefficiencies estimators of foreign banks ranged by their average score. As anticipated, European banks show, in terms of cost efficiency, a relatively better performance.

These results are to be taken with caution. We calculated score as simple average, but regarding the prevalent share of foreign banks (81% in 2007) in total assets, effective influence of foreign banks on overall efficiency could be underestimated. Also, the banking system of Serbia is still in a stabilizing process and had experienced several banking reforms and ownership reorganizations. For example, some foreign participants entered Serbian market in difficult conditions when they needed to reorganize the purchased actives.

Conclusion

Stochastic Frontier Approach and analysis of the ownership structure, with mentioned caution, authorize us to come to the conclusion of the important role played by European banks in Serbian banking sector. The importance of this role can be appreciated at two levels: firstly, because of their big share of domestic market, and secondly, because of their influence over general concurrence due to their relative better cost efficiency. State banks seem to be less efficient than private banks what corresponds to theoretical predictions.

In the present work, we have used one of possible and rather simple specification due to data specificity. It is our first attempt to apply the cost efficiency frontier method to the case of Serbian banks in order to evaluate the relative efficiency of European actors compare to national ones. To complete this work the next step would be to proceed to a comparative analysis of cost efficiency of banks in other countries of Balkan region. It would be interesting to examine the impact of European banks on the Balkan's banking systems in the long run. The principle issue is to analyse whether the presence of European banks is beneficial to the overall efficiency and soundness of the domestic banking system.

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