

Evaluation of Latvian Commercial Banks Performance

Ingars ERINS

**Faculty of Computer Science and Information Technology, Institute of Applied Computer Systems, Riga
Technical University
1/4 Meža Str., Riga, LV-1048, Riga**

and

Jana ERINA

**Faculty of Engineering Economics and Management, Riga Technical University
6 Kanciema Str., Riga, LV-1048, Latvia**

ABSTRACT

The aim of this article is to assess performance efficiency of the Latvian commercial banks in the period from 2006 till 2012.

In order to achieve research results, the authors initially conducted content analysis of the scientific literature on the most frequently used methods of bank performance efficiency assessment. Having performed content analysis, it has been concluded that in the scientific literature bank performance is estimated using parametric and non-parametric methods. One of the most popular methods is Data Envelopment Analysis (DEA). Therefore, the authors analyzed the performance efficiency of the Latvian commercial banks on the basis of the data from Bankscope data base, primarily having determined bank financial indicators that are most frequently analyzed using DEA.

Assessing performance efficiency of the Latvian commercial banks, the authors have come to the conclusion that frequently large banks are comparatively a lot more efficient than small banks. One of the main reasons might be the fact that large banks have lower administrative expenses, and that gives them the opportunity to increase performance efficiency and competitiveness in comparison with small banks. The data obtained demonstrate that small banks need to look for new solutions to improve their performance efficiency.

Keywords: Banks, DEA, Performance, Latvia, CCR, BCC

1. INTRODUCTION

Banking system plays a vital role in the development of the national economy of any country; therefore, economic development of each country can be ensured providing the savings are effectively channeled for investment. Topicality of the transition economy is also attested by strategic investors, who pay more and more attention to bank performance efficiency and the measures to improve it [1]. Thus, the issues of bank performance efficiency are important considering not only macroeconomic, but also microeconomic aspects.

For example, Lensink and Hermes (2004) in their research discovered that the entrance of foreign banks to the local market is highly dependent on the level of development of the national

economy of each country in general and its banking sector in particular [2]. Rapid development of the banking sector of the European countries, which started after the expansion of the EU, proves the validity of this statement.

Bank performance efficiency assessment methods can be conditionally divided into two categories: parametric and non-parametric methods, which are based on Stochastic Frontier Approach (SFA) and Distribution Free Approach (DFA).

Data Envelopment Analysis (DEA) is a deterministic methodology, which allows determining relative performance that is based on input and output data. It is also called Decision Making Unit (DMU).

The research conducted and the available literature on bank performance efficiency assessment is mainly dedicated to the analysis of the USA and Asian country banks, comparatively less attention has been paid to the European country banks, and there are only few studies dedicated to the Latvian banks.

Using DEA method in the analysis of different countries it has been discovered that foreign banks work with lower performance efficiency than local banks [3; 4; 5]. In turn, the studies of other scientists demonstrate the opposite: foreign banks are more efficient than the local.

The goal of this article is to evaluate performance efficiency of the Latvian commercial banks in the reporting period of 2006 – 2012.

To achieve the goal, the following research methods were used: qualitative overview of the scientific literature on DEA, including the method monographic and descriptive method, as well as deterministic, nonparametric approach.

2. LITERATURE REVIEW

The issues of bank performance efficiency assessment not only form an inherent part of the daily operations of financial institutions, they also become particularly topical in the period of transition economy or on the onset of the financial crisis.

Bank performance efficiency assessment methods discussed in the scientific literature are mainly based on the assumption that all banks conduct their activities according to the same model, disregarding a range of influencing factors, such as economic

situation in a country and the market system within which the banks operate. For example, Dietsch and Lozano-Vivas (2000) consider that not including specific indicators of each country into the assessment of bank performance efficiency may give erroneous results [6]. Grigorian and Manole (2002) expressed similar views, stressing that comparing the performance efficiency of the banks across different states specific environment indicators of each country should be taken into account [2].

One of the first studies on non-parametric performance efficiency assessment method was performed in 1957. In this study technical production performance efficiency was determined using one input and output variable [7]. Slightly later this method was elaborated by Banker et al. (1984) and by Färe et al. (1985) [8; 9]. Only in 1978 Charnes et al. named the previously used non-parametric method such as CCR model [10]. The model of Banker et al. (1984) is called BCC in the scientific literature [8].

The principle of the CCR model is based on the performance efficiency assessment concept elaborated by Farrell (1957), which uses either many input variables and just one output variable, or many input and output variables [7]. Charnes et al. (1978) have applied linear combinations in this model, assuming that yield value is fixed [10]. BCC model, in its turn, is based on variable output indicators on the scale. The relative DMU performance efficiency mathematically is expressed as the ratio of the sum of the output variables and the sum of the input variables.

Rossi et al. (2005) analyzed performance efficiency of the banks of nine CEE countries in the period from 1995 to 2002 using the stochastic frontier analysis [11]. The obtained data demonstrated that banks with low cost performance efficiency show higher profitability. In contrast, Semih Yildirim and Philippatos (2007), Rossi et al. (2005) discovered that there is no strong correlation between performance efficiency and loan quality; however, performance efficiency is indeed influenced by external factors [12; 11].

Weill (2007) performing research from 1996 to 2000 on the banks of CEE and Western European countries using stochastic frontier approach has come to the conclusion that there are differences in performance efficiency of Western and CEE countries banks [13]. For example, the banks of the Czech Republic and Hungary are as efficient as the banks of Western European states, except the banks in Greece and Portugal. A more significant increase in performance efficiency has been observed in the banks of the CEE states rather than in the Western European banks. Differences in performance efficiency of the analyzed countries are explained by the fact that CEE banks have been influenced by the transition economy as well as government performance.

Semih Yildirim and Philippatos (2007) having analyzed performance efficiency of the banks of 12 CEE countries in the period from 1993 to 2000 have concluded that the banks of Poland and Slovenia operate most efficiently, whereas the banks of Russia and the Baltic States (Latvia, Lithuania and Estonia) are least efficient [12]. The authors have also discovered that higher performance efficiency is characteristic of larger banks and the banks that mainly concentrate on deposits; large proportion of bad loans and high concentration of banks decrease performance efficiency; higher performance efficiency is demonstrated by foreign banks rather than local [12]. Fang et al

(2011) have come to a similar conclusion that foreign banks work by far more efficiently than the local banks [14].

In the later studies on the CEE countries banks, it has been discovered that the banking sectors of the Czech Republic and Romania work most efficiently, and that performance efficiency has grown since these countries joined the EU [15].

Having analyzed scientific papers from several data bases on the research on bank performance efficiency assessment applying the DEA methodology within the period of 2005 – 2012, which was conducted in the USA and Asian countries, the authors have learned that the employees and capital are considered as input variables, while loans, profitability, and related revenues – as output variables [16; 17; 18; 19; 20; 21]. But having summarized the studies on the European states banks within the period of 2005 – 2012, the authors of the paper have noticed that labor and capital are most frequently used as the input variables, while deposits and net loans – as the output variables [22; 23; 24; 25; 12; 26].

Development of the Latvian Commercial Banking Sector

The development of the financial system in Latvia started in 1988, when the banking sector was reorganized [27]. A new dual financial system and the re-establishment of Latvia's independence promoted rapid development of the banking sector. Starting with 1992 till 1993, 61 banks in Latvia received a license for provision of financial services [28].

But according to the data of the Association of Commercial Banks of Latvia, in 4th quarter of 2012 in Latvia banking services were provided by 20 banks and 9 branches of foreign banks, as well as lending institutions or their branches registered in the countries of the European Economic Area, which submitted a respective application to the Financial and Capital Market Commission [28].

Assessing the development of the Latvian banking sector, the authors have concluded that the following financial performance criteria are considered as being the most important: changes in product and service sales volume, operating profit and revenues, as well as loan repayment rate and potential profit per share.

3. METHODOLOGY

Taking into consideration the results of the scientific paper analysis using NVivo software and the data available, in order to assess the performance efficiency of the Latvian commercial banks the authors have used two different approaches.

The 1st approach is based on two inputs (x_1 , x_2) and two outputs (y_1 , y_2), as it can be seen in Figure 1.

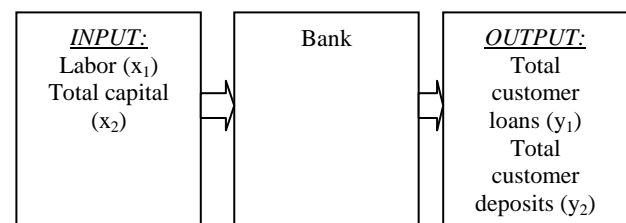


Figure 1 Variables for bank cost performance efficiency assessment (1st approach)

The results of the analysis summarized in Table 2 demonstrate that using BCC performance efficiency model, the most efficient performance was demonstrated by the following commercial banks: SEB bank, ABLV Bank, DNB bank and

Analyzing performance efficiency indicators of commercial banks according to the second approach, the authors used the data obtained from fourteen Latvian commercial banks to perform the estimates.

SMP Bank. At the same time, PrivatBank, ALTUM, Trust Commercial Bank, Baltic International Bank (0.5% MP). Performance efficiency problems were identified in the performance of other banks (research period 2006, from 2010 till 2012).

In order to assess performance efficiency of the Latvian commercial banks, the authors have initially analyzed the input and output variables applying the CCR model (see Table 3).

Table 3

Performance Efficiency of the Latvian Commercial Banks Based on CCR Model (2nd approach)

| Banks | Efficiency by years | | | | | | | |
|---------------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Mean |
| Swedbank | 1.000 | 1.000 | 0.957 | 0.939 | 0.904 | 0.970 | 0.877 | 0.950 |
| SEB bank | 1.000 | 0.989 | 0.946 | 0.965 | 0.901 | 0.930 | 1.000 | 0.961 |
| ABLV Bank | 1.000 | 1.000 | 0.985 | 1.000 | 1.000 | 1.000 | 0.985 | 0.996 |
| DNB bank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Rietumu Bank | 0.914 | 0.899 | 0.842 | 0.891 | 0.992 | 0.950 | 1.000 | 0.927 |
| Norvik Bank | 0.914 | 0.897 | 0.821 | 1.000 | 0.962 | 0.946 | 1.000 | 0.934 |
| PrivatBank | 1.000 | 0.977 | 1.000 | 1.000 | 0.896 | 0.951 | 0.968 | 0.970 |
| ALTUM | 0.894 | 0.993 | 1.000 | 0.902 | 1.000 | 1.000 | 0.490 | 0.897 |
| Baltikums Bank | 0.720 | 0.828 | 0.813 | 0.828 | 0.873 | 0.975 | 0.993 | 0.861 |
| Trust Commercial Bank | 1.000 | 0.903 | 0.863 | 0.926 | 0.898 | 0.908 | 0.920 | 0.917 |
| Expobank | 0.985 | 1.000 | 0.966 | 0.964 | 1.000 | 0.897 | 0.878 | 0.956 |
| Baltic International Bank | 0.947 | 0.910 | 1.000 | 1.000 | 0.903 | 0.939 | 0.969 | 0.953 |
| SMP Bank | 0.981 | 0.996 | 0.968 | 0.999 | 0.974 | 1.000 | 1.000 | 0.988 |
| Bank M2M Europe | 0.751 | 0.750 | 0.662 | 1.000 | 0.954 | 0.050 | 0.048 | 0.602 |

Having employed the second approach to commercial bank performance efficiency assessment, the authors concluded that in 2006 highest efficiency was demonstrated by the banks – market leaders (Swedbank – 24% MP, SEB bank, ABLV Bank and DNB bank) and smaller banks (PrivatBank and Trust Commercial Bank). However, the situation started to change in 2007, when performance efficiency of SEB bank, PrivatBank and Trust Commercial Bank dropped, the improvement was

observed at Expobank (1.7% MP). Stable high performance efficiency in the period from 2008 to 2012 was maintained by DNB bank, whereas other banks went through the growing and falling stages.

The findings obtained using the DEA BCC model approach are summarized and presented in Table 4.

Table 4

Performance Efficiency of the Latvian Commercial Banks Based on BCC Model (2nd approach)

| Banks | Efficiency by years | | | | | | | |
|---------------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Mean |
| Swedbank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| SEB Bank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| ABLV Bank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| DNB Bank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Rietumu Bank | 1.000 | 1.000 | 1.000 | 0.891 | 1.000 | 1.000 | 1.000 | 0.984 |
| Norvik bank | 0.915 | 0.897 | 0.893 | 1.000 | 0.985 | 1.000 | 1.000 | 0.956 |
| PrivatBank | 1.000 | 0.994 | 1.000 | 1.000 | 0.904 | 0.953 | 0.968 | 0.974 |
| ALTUM | 0.895 | 1.000 | 1.000 | 0.905 | 1.000 | 1.000 | 0.509 | 0.901 |
| Baltikums Bank | 0.865 | 0.901 | 0.847 | 0.877 | 1.000 | 0.987 | 0.998 | 0.925 |
| Trust Commercial Bank | 1.000 | 0.910 | 0.865 | 0.927 | 0.899 | 0.926 | 0.925 | 0.922 |
| Expobank | 0.989 | 1.000 | 1.000 | 0.978 | 1.000 | 0.909 | 0.887 | 0.966 |
| Baltic International Bank | 0.999 | 0.956 | 1.000 | 1.000 | 0.958 | 0.951 | 0.979 | 0.978 |
| SMP Bank | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Bank M2M Europe | 0.867 | 0.795 | 0.788 | 1.000 | 1.000 | 1.000 | 1.000 | 0.921 |

The results of the assessment of performance efficiency of the Latvian commercial banks using BCC approach demonstrated that such banks as Swedbank, SEB bank, ABLV Bank, DNB Bank and SMP Bank remained efficient in the research period,

whereas the performance of other banks was characterized by increase and reduction of performance efficiency indicators.

Based on the results of performance efficiency analysis of the Latvian commercial banks, the authors determined the total

commercial banks performance efficiency according to general efficiency formula (1) in Methodology.

Latvian commercial banks performance efficiency indicators are summarized in Table 5.

Table 5

Total Performance Efficiency of the Latvian Commercial Banks

| Banks | 1st approach | 2nd approach |
|---------------------------|--------------------------------|--------------------------------|
| Swedbank | N/a | 0.950 |
| SEB bank | 0.847 | 0.961 |
| ABLV Bank | 1.000 | 0.996 |
| DNB bank | 0.958 | 1.000 |
| Rietumu Bank | N/a | 0.942 |
| Norvik Bank | N/a | 0.977 |
| PrivatBank | 0.947 | 0.996 |
| ALTUM | 0.969 | 0.996 |
| Baltikums Bank | N/a | 0.931 |
| Trust Commercial Bank | 0.741 | 0.995 |
| Expobank | N/a | 0.990 |
| Baltic International Bank | 0.766 | 0.974 |
| SMP Bank | 0.755 | 0.988 |
| Bank M2M Europe | N/a | 0.654 |

Using two approaches to estimating performance efficiency at the Latvian commercial banks, the authors conclude that the majority of Latvian commercial banks have to look for new solutions with an aim to increase their performance efficiency. The authors also conclude that in order to obtain objective results on bank performance efficiency, it is necessary to use the first approach, as there are considerable differences in the results obtained using the two approaches to data analysis, as well as these approaches are based on several studies conducted abroad, but the 2nd approach has been developed only by one author.

Having obtained the given research results, the authors have attested the results of research conducted abroad [14], for example, the conclusion that banks – market leaders perform more efficiently. In the context of Latvia, these are DNB bank with a market share in terms of assets 9.51% and ABLV Bank with the market share of 12.28% (based on Bankscope data for 2012).

5. CONCLUSIONS

Within the framework of the research on the performance efficiency of the Latvian commercial banks, the authors mainly considered bank customers as lenders and debtors.

Employing two types of models within DEA approach – BCC and CCR, as a result of analysis the existing performance efficiency problems persisting in the Latvian commercial banking sector have been identified.

In the course of research the authors have come to the conclusion that the highest performance efficiency is demonstrated by the banks – market leaders, while comparatively smaller banks are inefficient with few exceptions. It has also been concluded that performance efficiency of the majority of banks is variable, which is reflected by growing and falling phases.

The research performed has provided information on the performance efficiency rate of the banks operating in Latvia, which allows making decisions considering future perspectives

of each bank not only from the standpoint of a shareholder, but also from the standpoint of a client and bank personnel.

Taking into consideration how important the efficiently developed banking system is, especially in the states with a high competitive dynamics as Latvia, the banks should change the present strategy to constantly improve their performance efficiency rate.

The authors believe that it would be required to perform additional investigations applying other input and output data, which could influence the bank economic indicators as well.

6. REFERENCES

- [1] A. N. Berger, I. Hasan, & M. Zhou, “The effects of focus versus diversification on bank performance: Evidence from Chinese banks”, **Journal of Banking & Finance**, Vol. 34, No. 7, 2010, pp. 1417-1435.
- [2] R. Lensink, & N. Hermes, “The short-term effects of foreign bank entry on domestic bank behaviour: Does economic development matter?”, **Journal of Banking & Finance**, Vol. 28, No. 3, 2004, pp. 553-568.
- [3] D. A. Grigorian, & V. Manole, “Determinants of commercial bank performance in transition: An application of data envelopment analysis”, **International Monetary Fund**, No.2002-2146, 2002.
- [4] I. Hasan, & K. Marton, “Development and efficiency of the banking sector in a transitional economy: Hungarian experience”, **Journal of Banking & Finance**, Vol. 27, No. 12, 2003, pp. 2249-2271.
- [5] O. T. San, L. L. Theng, & T. B. Heng, “A Comparison on Efficiency of Domestic and Foreign Banks in Malaysia: A DEA Approach”, **Business Management Dynamics**, Vol. 1, No. 4, 2011, pp. 33-49.
- [6] M. Dietsch, & A. Lozano-Vivas, “How the environment determines banking efficiency: A comparison between French and Spanish industries”, **Journal of Banking & Finance**, Vol. 24, No. 6, 2000, pp. 985-1004.

- [7] M. J. Farrell, "The measurement of productive efficiency", **Journal of the Royal Statistical Society, Series A (General)**, Vol. 120, No. 3, 1957, pp. 253-290.
- [8] R. D. Banker, A. Charnes, & W. W. Cooper, W. W., "Some models for estimating technical and scale inefficiencies in data envelopment analysis", **Management science**, Vol. 30, No. 9, 1984, pp. 1078-1092.
- [9] R. Färe, S. Grosskopf, & C. K. Lovell (Eds.), **The Measurements of Efficiency of Production**, Vol. 6, Kluwer Academic Pub, 1985.
- [10] A. Charnes, W. W. Cooper, & E. Rhodes, "Measuring the efficiency of decision making units", **European journal of operational research**, Vol. 2, No. 6, 1978, pp. 429-444.
- [11] S. P. Rossi, M. Schwaiger, & G. Winkler, **Managerial behavior and cost/profit efficiency in the banking sectors of Central and Eastern European countries**, Oesterr Nationalbank, 2005.
- [12] H. Semih Yildirim, & G. C. Philippatos, "Efficiency of banks: recent evidence from the transition economies of Europe, 1993–2000", **European Journal of Finance**, Vol. 13, No. 2, 2007, pp. 123-143.
- [13] L. Weill, "Is there a gap in bank efficiency between CEE and Western European countries?", **Comparative Economic Studies**, Vol. 49, No. 1, 2007, pp. 101-127.
- [14] Y. Fang, I. Hasan, & K. Marton, "Bank efficiency in transition economies: recent evidence from South-Eastern Europe", **Bank of Finland Research Discussion Paper**, Vol. 5, 2011.
- [15] A. M. Andries, "The determinants of bank efficiency and productivity growth in the Central and Eastern European banking systems", **Eastern European Economics**, Vol. 49, No. 6, 2011, pp. 38-59.
- [16] M. Ariff, & L. Can, "Cost and profit efficiency of Chinese banks: a non-parametric analysis", **China Economic Review**, Vol. 19, No. 2, 2008, pp. 260-273.
- [17] X. Chen, M. Skully, & K. Brown, "Banking efficiency in China: Application of DEA to pre-and post-deregulation eras: 1993–2000", **China Economic Review**, Vol. 16, No. 3, 2005, pp. 229-245.
- [18] N. Thoraneenitiyan, & N. K. Avkiran, "Measuring the impact of restructuring and country-specific factors on the efficiency of post-crisis East Asian banking systems: Integrating DEA with SFA", **Socio-Economic Planning Sciences**, Vol. 43, No. 4, 2009, pp. 240-252.
- [19] F. Sufian, "Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia", **Research in International Business and Finance**, Vol. 23, No. 1, 2009, pp. 54-77.
- [20] S. C. Ray, & A. Das, "Distribution of cost and profit efficiency: Evidence from Indian banking", **European Journal of Operational Research**, Vol. 201, No. 1, 2010, pp. 297-307.
- [21] A. Azadeh, S. F. Ghaderi, M. Mirjalili, & M. Moghaddam, "A DEA approach for ranking and optimisation of technical and management efficiency of a large bank based on financial indicators", **International Journal of Operational Research**, Vol. 9, No. 2, 2010, pp. 160-187.
- [22] A. S. Camanho, & R. G. Dyson, "Cost efficiency measurement with price uncertainty: a DEA application to bank branch assessments", **European Journal of Operational Research**, Vol. 161, No. 2, 2005, pp. 432-446.
- [23] O. Havrylchyk, "Efficiency of the Polish banking industry: Foreign versus domestic banks", **Journal of Banking & Finance**, Vol. 30, No. 7, 2006, pp. 1975-1996.
- [24] B. Casu, & C. Girardone, "Bank Competition, Concentration and Efficiency in the Single European Market", **The Manchester School**, Vol. 74, No. 4, 2006, pp. 441-468.
- [25] S. Fries, & A. Taci, "Cost efficiency of banks in transition: Evidence from 289 banks in 15 post-communist countries", **Journal of Banking and Finance**, Vol. 29, No. 1, 2005, pp. 55-81.
- [26] C. Siriopoulos, & P. Tziogkidis, "How do Greek banking institutions react after significant events?—A DEA approach", **Omega**, Vol. 38, No. 5, 2010, pp. 294-308.
- [27] **The Bank of Latvia**. Retrieved from www.bank.lv
- [28] **The Association of Latvian Commercial Banks**. Indices of bank activities [Data file]. Retrieved from <http://www.bankasoc.lv/lv/statistika/>