THE EUROPEAN INTEGRATION PROCESS AND ITS EFFECTS ON BANKS EFFICIENCY: EVIDENCE FROM ROMANIA

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—Abstract —

The structure of the banking sector of the new EU member states has registered a definitive change as a result of the European integration process. In this context, the aim of our paper is to investigate if the evolution of the Romanian banks efficiency between 2002 and 2010 is in any way correlated with the European integration process. We chose this period as it provides with a before and after ascension look at the evolution of the efficiency of Romanian banks. Also, it allows us to study the relationship between EU integration and the efficiency of the banks in adverse conditions, like the ones determined by the financial and economic crisis which has started in 2007. In order to compound the efficiency of the banks we have used the Data Envelopment Analysis approach.

Key Words: *banking integration, efficiency, Data Envelopment Analysis, Romania*
JEL Classification: F15, G21, N24

1. INTRODUCTION

The European banking integration process represents one of the most important components of the European integration process, as the banking sector is the main channel through which the European economy is financed.

In the case of the new member states, at least in theory, the banking integration process determines beside a convergence of the nominal and real interest rates, an enhance of the overall financial intermediation activity.

In our opinion the enhancement of the overall banking efficiency is a process that should be visible both before and after the EU ascension. Still, the academic literature has mixed results regarding the enhancement of the overall banking efficiency in the case of the new member countries (Stavárek,2003; Havrylchyk, 2005; Stavárek,2005; Koutsomanoli-Filippaki et al.,2009). In this context, the aim of our paper is to investigate if the evolution of the Romanian banks efficiency between 2002 and 2010 is in any way correlated with the European integration process. We chose this period as it provides with a before and after ascension look at the evolution of the efficiency of Romanian banks. In order to achieve this we have employed a non-parametric approach represented by the Data Envelopment Analysis. This approach represents the best option taking into account that our sample of banks has registered a little variation during the analysed period and that this approach provides excellent results with just a small number of observations.

The reminder of the research is structured as follows: the second part is dedicated to a review of the relevant academic literature on this topic, the third part presents the methodology used, the forth part describes the data, the fifth part underlines the obtained empirical results, while the sixth part contains the concluding remarks.

2. LITERATURE REVIEW

The underling of the efficiency gains in the case of the new EU member states is important in order to underline the impact that the integration process has on the macroeconomic environment. In another train of thoughts there has been a large body of academic literature dedicated to the measurement of the banks efficiency. There have been several methodological approaches on the way banks efficiency has been measured in the academic literature. Most of the researches undertaken

on this theme have been written in the last two decades. The academic literature has been focused both on the case of the developed economies and on the case of the emerging economies. In the case of the studies focused on the developed economies, they analyse the influence that the market structure, the deregulation process, the globalisation process have on the estimated efficiency of the banks from these countries, while in the case of the emerging countries the researches are focused on the impact that the reform process, the privatisation of the state banks, the foreign direct investments and the European integration process has on the efficiency of the analysed banks (see Berger et Humphrey,1997; Casu et Girardone,2002; Casu et al.,2004; Stavárek2005; Yildirim et Philippatos,2007; Asaftei et Kumbhakar,2008; Koutsomanoli-Filippaki et al.,2009).

The large number of researches that are focused on the efficiency of banks and its determinants are the result of the transformation that took place in the financial sector, and especially in the banking sector, both financially and non-financially (Berger et Mester,2003). The enhancement of the overall performance of the banking sector represents a major interest point for the public authorities, since, especially in the case of the EU member countries the banking sector is the main channel through which the economy is financed. An efficient banking sector contributes to the lowering of the financing costs that must be paid by enterprises and households, improves the quality of the services and products offered and allows for an optimal allocation of resources in the economy that contributes to the achievement of a long term economic growth. Also, the additional profits obtained by the more efficient banking institutions can be used for the acquisition of equity and the formation of provisions in order to obtain a better protection against risks (Casu et al., 2004).

Despite the existence of such a large body of academic literature that is focused on the banks efficiency and its determinants, there are still very few studies focused exclusively on the case of Romania, and especially since it joined the European Union in 2007. Nevertheless, there are several researches that have studied the efficiency of the Romanian banks in the context of a comparative analysis which tries to underline the impact that different factors like the reform of the financial sector, the privatisation of the state banks or the improvement of the property rights has on the overall efficiency of the banks (see Grigorian and Manole, 2002; Weill, 2003; Fries and Taci, 2005; Havrylchyk, 2006; Yildirim and Philippatos, 2007; Koutsomanoli-Filippaki et al., 2009).

3. METHODOLOGY

We have chosen to use a non-parametric approach in order to estimate the efficiency of the Romanian banks during the analysed period, namely the Data Envelopment Analysis. This method has been developed by Charnes et al. (1978). Taking into account the volatility of the macroeconomic environment of the new EU member states and the small sample size that has been often available, many researches in the academic literature have used DEA in order to estimate the efficiency of the banks from these countries (Denizer et al.,2000; Grigorian et Manole,2002; Stavárek,2005; Toçi,2009).

We have chosen to use DEA in our research because of several reasons. First, as we have mention earlier, DEA can perform well with just a small number of observations, this being very important to us since we wanted to estimate the efficiency separately for each year, in order to underline the effect that the European integration process has on the performance of the Romanian banks. From this point of view our database is far more complex than in the case of the most other researches on this theme. Second, DEA does not need an explicit functional form on the data and the analysis can be performed well despite the assorted size of the banking institutions from our sample.

Regarding the way efficiency are estimated there are two approaches, namely the input orientated approach that assumes constant returns to scale (CRS) that was introduced by Charnes et al. (1978) and the input orientated approach that assumes variables returns to scale that was introduced by Banker et al. (1984). Taking into account the assorted size of the banks from our sample we consider that the best approach is to use the VRS model.

We will present in the following paragraphs a short description of the Data Envelopment Analysis. Assume that there is data on K inputs and M outputs for each of N banks. For i bank these are represented by the vectors x_i and y_i, respectively. Let us call the K x N input matrix – X, and the M x N output matrix – Y. To measure the cost efficiency for each bank we calculate a ratio of all outputs over all inputs, such as $(u^{|}y_i/v^{|}x_i)$ where u is an M x 1 vector of output weights and v is a K x 1 vector of input weights. To select optimal weights we specify the following mathematical programming problem:

$$\max_{u,v}(u^{|}y_i/v^{|}x_i),$$

$u'y_j/v'x_j \leq 1, \quad j = 1,2,...,N,$
$u,v \geq 0$

The above formulation has a problem of infinite solutions and therefore we impose the constraint $v'x_i = 1$, which leads to:

$\max_{\mu,\rho}(u'y_i/v'x_i)$,
$\rho'x_i = 1,$
$\mu'y_i - \rho'x_j \leq 0, \quad j = 1,2,...,N,$
$\mu, \rho \geq 0,$

where we change notation from u and v to μ and ρ, respectively, in order to reflect transformation.

Using the duality in linear programming, an equivalent envelopment form of this problem can be derived:

$\min_{\theta,\lambda}\theta$,
$-y_i + Y\lambda \geq 0,$
$\theta x_i - X\lambda \geq 0,$
$\lambda \geq 0,$

where θ is a scalar and λ is a vector of N x 1 constants. The value of θ obtained will be the efficiency score for the i bank, which will range between 0 and 1. It should be noted that the problem should be solved N times, one for each bank.

4. DATA

The data collected for our analysis was for the period 2002-2010. The financial indicators used in our research as inputs and outputs were obtained from Bankscope a Bureau van Dijk database and the annual reports of the banks from our sample. The banks from our sample own over 80% of the total assets from the Romanian banking system making our study one of the most comprehensive and up-to-date research on this theme. In order to ensure the comparability of data we have excluded from our panel the banks that are not involved in universal banking activities (e.g. Raiffeisen Banca pentru Locuințe, BCR Banca pentru Locuințe, Porsche Bank) and also the banks for which the full dataset was not available.

As mentioned earlier we have chosen to use in our research the intermediation approach, specifying three inputs (loans, fixed assets, deposits) and two outputs (loans and net interest income) for each of the bank from our sample. Namely the variables in our research are:

- *labour (lab)*, which is expressed as the total expenses with the employees, their salaries and bonuses;
- *fixed assets (fix),* expressed as their book value;
- *deposits (dep)*, express as the book value of the total deposits granted;
- *loans (lon)*, which are expressed as the difference between total loans and the amount of the loan loss provisions;
- *net interests (net)*, expressed as the differences between total interested earned and total interested paid.

Table 1 - Summary statistics for the inputs and outputs used in our research for the period 2002-2010

	2002				2003				2004			
	mean	**st.dev.**	**min**	**max**	**mean**	**st.dev.**	**min**	**max**	**mean**	**st.dev.**	**min**	**max**
lab	71.1	149.3	0.4	689.3	73.4	154.0	0.5	710.7	77.4	155.4	0.7	754.1
fix	195.2	432.6	0.4	1808.6	201.3	446.0	0.5	1864.6	184.6	403.9	0.9	1777.8
dep	1898.6	3393.4	16.0	15344.2	1957.4	3498.4	16.5	15818.8	2534.5	4512.0	29.1	21081.0
lon	1076.2	1913.1	12.5	8101.5	1109.5	1972.3	12.9	8352.1	1411.4	2510.0	24.1	10760.3
net	125.9	249.9	0.7	1116.3	129.8	257.7	0.8	1150.9	164.1	320.0	1.5	1451.0
	2005				**2006**				**2007**			
lab	95.5	181.9	1.2	886.1	119.2	196.2	2.0	922.1	160.7	254.2	4.3	1193.6
fix	193.3	401.4	1.1	1822.7	215.0	389.6	2.2	1666.7	248.6	401.4	4.1	1644.4
dep	3477.3	6082.3	56.1	27908.9	4802.9	8382.7	85.7	37795.7	7528.4	11741.2	100.1	52667.1
lon	2033.2	3640.2	39.3	16329.9	3381.9	6004.2	59.3	25418.3	5729.6	8661.3	74.8	37607.0
net	168.4	294.7	3.3	1214.1	230.2	392.9	4.2	1686.3	292.1	467.0	4.8	1962.9
	2008				**2009**				**2010**			
lab	185.6	244.1	6.2	1051.0	185.3	232.1	5.6	921.7	242.6	247.1	8.8	873.7
fix	273.6	416.7	5.0	1720.5	266.3	415.2	4.2	1726.6	352.5	462.0	4.2	1693.9
dep	9373.9	13286.9	132.1	55580.9	10024.1	13479.4	155.8	56751.7	13100.3	15354.4	155.8	59652.3
lon	7527.7	10697.3	85.6	45521.6	7559.9	11106.3	75.7	47367.2	9971.4	12620.9	116.7	47393.7
net	409.9	679.8	6.3	3040.4	515.9	838.7	5.2	3838.3	707.8	966.4	5.2	3749.8

Source: author calculation.

The variables in our research are expressed in millions of RON. We have subtracted from the total loans the loan loss provisions in order to ensure the

comparability of the data. This approach has been used previously in the academic literature in similar researches (see Grigorian et Manole,2002; Stavárek,2005).

The descriptive statistics of the inputs and outputs used in our research for the analysed period 2002-2010 are presented in table 1.

5. EMPIRICAL RESULTS

In order to analyse the performance of the Romanian banks between 2002 and 2010 we have calculated their efficiency using Data Envelopment Analysis. For a better underling of the evolutions in this period we have used, as mentioned earlier, the efficiency scores obtained through the usage of the VRS model.

Table 2 summarises the results for the efficiencies estimated using DEA. In regard to the overall mean efficiency of the banks from our sample we have discovered that is slightly lower than in the case of previous researches (Grigorian et Manole,2002; Stavárek,2005). This can be attributed to the fact that our sample of banks is much larger than the one from previous studies and includes also a series of smaller banks. Another aspect that we must take into consideration is that our analysed period is different and also covers the first effects of the financial and economic turbulences that have started in 2007 globally.

Table 2 – Descriptive statistics of efficiency scores obtained in the case of the Romanian banks for the period 2002-2010

	No. DMUs	No. Effic. DMUs	average	med	st.dev.	min	max
2002	21	11	0.891	1.000	0.168	0.387	1.000
2003	22	13	0.890	1.000	0.170	0.430	1.000
2004	25	13	0.887	1.000	0.180	0.342	1.000
2005	26	12	0.885	0.958	0.183	0.279	1.000
2006	25	11	0.893	0.974	0.132	0.626	1.000
2007	25	11	0.893	0.954	0.127	0.627	1.000
2008	25	15	0.892	1.000	0.157	0.557	1.000
2009	25	12	0.863	0.968	0.178	0.420	1.000
2010	17	8	0.857	0.978	0.211	0.337	1.000

Source: author calculation.

Based on the obtained results, we can observe that during the analysed period the overall average estimated efficiency has registered a slight increase, at least until 2007 and the start of the global financial crisis and the economic downturn. Also, at the start of the analysed period we have observed a decrease of the overall average estimated efficiency from 2003 to 2005.

Table 3 –Evolution of the indicators for the Romanian banking sector between 2002 and 2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bank nonperforming loans to total gross loans (%)	8.7%	8.3%	8.1%	2.6%	2.8%	4.0%	6.5%	15.3%	17.5%
Strength of legal rights index (0 worst -10 best)	7	8	8	8	8	8	9	9	9
Private bureau coverage (% of adults)	0.0%	0.0%	0.0%	0.0%	1.0%	5.5%	10.9%	24.7%	30.2%
Time to resolve insolvency (years)	4.6	4.6	4.6	4.6	4.6	3.6	3.6	3.6	3.6
Recovery rate (cents on the dollar)	6.9	6.9	6.9	6.9	17.5	19.9	28.9	29.5	28.5

Source: World Bank Database (databank.worldbank.org/).

We can also observe that during the analysed period 2002-2010 all the indicator regarding the activity of the Romanian banks have registered an improvement, except for the ratio of the non-performing loans. In this case the impact of the global financial crisis started in 2007 and the economic downturn that followed determined an increase of the number of bad debtors. This evolution has been also underline in the estimated efficiency of the banks, that has registered only a slight increase for the period 2007-2010.

Also, we can underline the fact that the early decrease of the banks efficiency during the analysed period is the result of the hyperextension of the credits, that has started in 2002. This credit expansion wave has been carried out in an environment still unsecured, as showed in table 3, thus, the banks have registered in these first few years a decrease of their overall performance.

6. CONCLUDING REMARKS

Taking into account the obtained results we can state that the ascension process to full time membership of the European Union had an overall positive impact on the estimated efficiency of the Romanian banks.

The undertaken reforms in order to adjusted the macroeconomic environment to the nominal convergence criteria, the legislative reform meant to align the juridical framework with the *acquise comunitare* and the privatisation of the state owned banks have contributed to the enhancement of the Romanian banks performance at least until 2007.

Nevertheless we must underline that the global financial crisis and the economic downturned that followed had a negative impact on the overall efficiency of the Romanian banks, but still, the impact has been less negative than anticipated.

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