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THE ROLE OF INTEREST INCOME AND NON-INTEREST INCOME ON THE RELATIVE EFFICIENCY OF BANK REGIONS: THE CASE OF A LARGE SOUTH AFRICAN BANK

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Abstract. Data Envelopment Analysis (DEA) is used to estimate the technical, allocative and cost efficiency of the 37 regions of a large South African bank. Two models are applied to determine the effect of interest income and non-interest income on the various efficiency estimates. Malmquist DEA was used to determine the sources of efficiency change that took place during the period of the investigation. All the regions can increase their technical efficiency and allocative efficiency in order to become more cost efficient. The majority of the regions were operating at decreasing returns to scale meaning that they were operating at a scale that was too large. There is evidence that non-interest income can contribute toward an increase in efficiency.

JEL Classification: C50, C61, D24, G21, L21

Keywords: Data Envelopment Analysis, Efficiency, Malmquist

1. Introduction

Banks are regarded as managers of risks and one of the fundamental risks that are faced by all banks is the interest rate risk. A bank's asset and liability management committee (ALCO) is responsible for measuring and monitoring interest rate risk, and it recommends pricing, investment, funding and marketing strategies to achieve the desired trade-off between risk and expected return (Koch and MacDonald, 2003). In managing the interest rate risk the ALCO coordinates, or directs, changes in the maturities and types of bank assets and liabilities to sustain profitability in a changing economic environment (Falkena *et al*.,1987).

The profitability of a bank is thus determined, *inter alia,* by the amount of interest income generated by that bank. According to Faure (1999) banks facilitate

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the flow of funds from surplus economic units to deficit economic units by issuing financial liabilities that are acceptable as assets to the lenders and use the funds so obtained to acquire claims that reflect the requirements of the borrowers. In the economy banks thus borrow money from the surplus units and lend money to the deficit units.

The difference between the borrowing rate and the lending rate is known as the interest rate gap. The interest rate gap is a standard measure of the exposure to interest rate risk. The net interest income is the difference between the total interest income and the total interest expense. The net interest margin (NIM) is the difference between the amount of interest received from loans and investments and the amount of interest paid for deposits and other liabilities (money market loans, for example) divided by the volume of earning assets (Kelly, 1988). The greater the net interest margin, the higher the interest income a bank earns.

Over the past decade banks have experienced pressure on their profits. Various factors have contributed to this situation. According to Hawkins (2004) South African banks showed the lack of providing financial services to everyone, and according to Akinboade & Makina (2006) banks also demonstrated the inability to introduce new financial products. During 2000 the operating costs of banks outgrew income (Hawkins, 2004), while banks experienced an increase in staff costs (Department of Bank Supervision, 2002). According to Hawkins (2004) savings accounts were costly and customers were not paying fair prices for financial services.

To some extent this situation has forced banks to rethink their marketing strategy. Over the last several years there has been a change in the composition of bank income. In comparison to interest income, banks on average earn more non-interest income than before. According to the DI 200 Reports (Department of Bank Supervision) the amount of non-interest income matches that of interest income and in some cases even exceeds it. In order to maintain profitability and to ensure an acceptable return to shareholders, banks have diversified their services with various types of cross-selling, resulting in an increase in non-interest income.

Data Envelopment Analysis (DEA) has previously been used to study the performance of banks at both the firm/corporate level (e.g. Drake 2001; Devaney & Weber 2000; Berger & Humphrey 1997; Mendes & Rebello 1999; Resti 1997), van der Westhuizen (2008) and van der Westhuizen & Oberholzer (2009), and at the branch level (e.g. Sherman & Ladino 1995; Sherman & Gold 1985; Vassiloglou & Giokas 1990; Oral & Yolalan 1990, O'Donnell & van der Westhuizen 2002, van der Westhuizen & Oberholzer 2003), Oberholzer & van der Westhuizen (2004) and van der Westhuizen (2005).

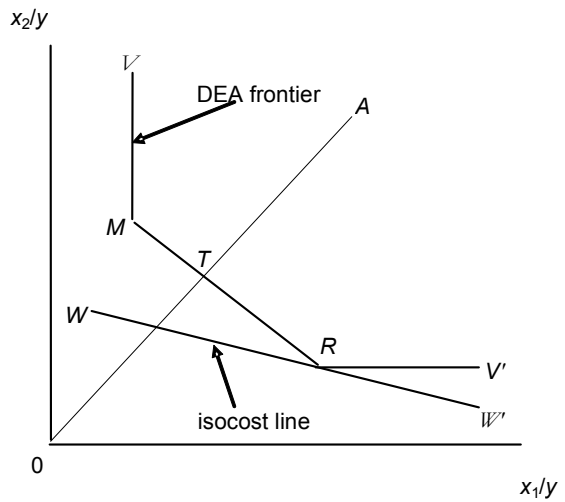
This paper attempts to answer the following two questions: Does the shift in composition of bank income has any effect on the relative efficiency of the regional offices of a bank, and what are the sources of efficiency change that do occur? In order to do this, Data Envelopment analysis (DEA) was used to estimate the technical efficiency, allocative efficiency and cost efficiency of a large South African bank, at the regional level. Two models were used to distinguish between the effects of the two different outputs, and a Malmquist DEA was executed to determine the sources of efficiency change that occurred under each model. The remainder of the paper is divided into the following sections. In Section 2 the DEA methodology is briefly described. In Section 3, the sources of efficiency change

are discussed and the data and model for the analyses are discussed in section 4. In Section 5, the DEA results are presented. The paper is concluded in Section 6.

2. DEA Methodology

Data Envelopment Analysis (DEA) can be used to estimate four main types of efficiency, namely technical, allocative, cost and scale efficiency. In practice the measurement of these efficiencies involves estimation of production frontiers. DEA effectively estimates the frontier by finding a set of linear segments that bound (or envelop) the observed data.

Figure 2: Two-input single-output DEA frontier



For example, assume the observed data comprises two-input single-output Firms M, R and A. The DEA estimate of the production frontier will be the piecewise linear surface VMRV' depicted in Fig. 2.

A firm is said to be technically efficient if it produces a given set of outputs using the smallest possible amount of inputs. Allocative efficiency reflects the ability of a firm to use the inputs in optimal proportions, given their respective prices. A firm is cost efficient if it is both technically and allocatively efficient. The firm is said to be scale efficient if it operates on a scale that maximises productivity.

Charnes *et al*. (1978) developed DEA as a linear programming technique to evaluate the efficiency of public sector non-profit organisations. According to Molyneux *et al*. (1996), Sherman and Gold (1985) were the first to apply DEA to banking.

The original model proposed by Charnes *et al*. (1978) and adopted by Sherman and Gold (1985) is formulated as follows:

Objective function

$$\max E_o = \frac{\sum_{i=1}^{k} u_i \psi_{io}}{\sum_{j=1}^{m} v_j x_{jo}}, \qquad \text{(i.e. maximise } \frac{\text{output index}}{\text{input index}} \text{)} \qquad (1)$$

where

o = the branch being assessed from the set of r = 1, 2, ..., n bank branches;
k = the number of outputs at the branches;
m = the number of inputs at the branches;
ψ_{ir} = observed output i at branch r;
x_{jr} = observed input j at branch r.

Constraints

$$\frac{\sum_{j-1}^{m} u_i \psi_{ir}}{\sum_{j=1}^{m} v_j x_{jr}} \leq 1 \; r = 1, ..., n \qquad \text{(boundary constraints)} \qquad (2)$$

$u_i, v_j > 0$, for $i = 1, ..., k$, and $j = 1, ..., m$ (non-negativity constraints) (3)

The above analysis is performed repetitively, with each bank branch in the objective function, producing efficiency ratings for each of the n branches. The solution sought is the set of (u_i, v_i) values that maximise the efficiency ratio E_o of the bank branch being rated, without resulting in an output/input ratio 1 when applied to each of the other branches in the data set. For a more detailed discussion on the DEA methodology, see Cronje, 2002.

3. Sources of efficiency change

Changes in efficiency can, inter alia, be the result of a change in technical efficiency, technical change, or a change in total factor productivity. One way to estimate these changes is with the aid of the Malmquist index. In this section these concepts are briefly reviewed. For a more detailed treatment, see for example, Coelli *et al*., (2005).

The Malmquist index can be explained in terms of distance functions. Distance functions are function representations of multiple-output, multiple-input technology, which require data only on input and output quantities (Färe *et al.,* 1994). It is thus not necessary to specify a behavioural objective, like cost minimisation or profit maximisation. Distance functions may be defined in terms of input distance functions, which means that the output vector is a given and the

input vector should be proportionally contracted, given the production technology. Output distance functions means that the input vector is given and the output vector should be proportionally expanded, given the production technology.

The Malmquist index is a 'primal' index of productivity change that does not require cost or revenue shares to aggregate inputs and outputs, yet is capable of measuring total factor productivity in a multiple-output setting (Färe *et al.,* 1994). The Malmquist TFP index measures the TFP change between two data points. This is done by calculating the ratio of the distances of each data point relative to a common technology. According to Coelli, (1998), the Malmquist (output-orientated) TFP change index between period s (the base period) and period t is given by

$$m_0(y_s, x_s, y_t, x_t) = \left[\frac{d_0^s(y_t, x_t)}{d_0^s(y_s, x_s)} x \frac{d_0^t(y_t, x_t)}{d_0^t(y_s, x_s)} \right]^{1/2} \quad (4)$$

where the notation $d_0^s(x_t, y_t)$ represents the distance from the period t observation to the period s technology. A value of M_0 greater than one will indicate positive TFP growth from period s to period t while a value less than one indicates a TFP decline. Note that equation 4 is, in fact, the geometric mean of two TFP indices. The first is evaluated with respect to period s technology and the second with respect to period t technology.

According to Färe *et al*., (1994) and Coelli (1998), an equivalent way of writing this productivity index is:

$$m_0(y_s, x_s, y_t, x_t) = \frac{d_0^t(y_t, x_t)}{d_0^s(y_s, x_s)} \left[\frac{d_0^s(y_t, x_t)}{d_0^t(y_t, x_t)} x \frac{d_0^s(y_s, x_s)}{d_0^t(y_s, x_s)} \right]^{1/2} \quad (5)$$

where the ratio outside the square brackets measures the change in relative efficiency (i.e., the change in how far observed production is from maximum potential output) between years t and s. The remaining part of the index in equation (5) is a measure of technical change. The geometric mean of the two ratios inside the brackets captures the shift in technology between the two periods t and s (Färe *et al.,*1994 and Coelli, 1998). This means that the two terms in equation (5) are a measure of:

$$\text{Efficiency change} = \frac{d_0^t(y_t, x_t)}{d_0^s(y_s, x_x)} \quad (6)$$

and

$$\text{Technical change} = \left[\frac{d_0^s(y_t, x_t)}{d_0^t(y_t, x_t)} x \frac{d_0^s(y_s, x_x)}{d_0^t(y_s, x_s)} \right]^{1/2} \quad (7)$$

Färe *et al*., (1994) define productivity growth as the product of efficiency change and technical change. Improvements in the efficiency-change component are considered to be evidence of catching up (to the frontier), while improvements in the technical-change component are considered to be evidence of innovation.

The required distances can be calculated, using DEA-like linear programs, provided that suitable panel data are available. Färe *et al*., (1994) assume a constant returns to scale (CRS) technology in their analysis.

4. Data and model

Monthly data covering a two years period were obtained from one of the largest banks in South Africa. Because of the confidentiality of the data, the name of the bank cannot be revealed. The descriptive statistics are presented in Table1.

Table 1: Descriptive statistics (monthly values in rand)

Variable	Mean	Std dev	Min	Max
Total deposits (R'000)	1914	971	643	5851
Total loans (R'000)	355	153	51	875
Interest income (R'000)	6387	2959	1933	19959
Non-interest income (R'000)	25527	10118	8660	57253
Operating expenditure (R'000)	1423	550	515	10111
Staff costs (R'000)	3100	794	1543	6907

The following models were specified:
Model 1 was specified to estimate the efficiency of the bank under the "traditional" function of a bank, namely to lend money in return for interest paid to the bank.

Outputs: model 1: y_1 = value of loans (rand)
y_2 = value of interest income (rand)

Model 2 was specified to estimate the efficiency of the bank under the "non-traditional" function of a bank, namely to lend money and in the process render a large number of services in return for non-interest income.

Outputs: model 2 y_1 = rand value of loans
y_2 = rand value of non-interest income

Inputs: model 1 and 2: x_1 = rand value of deposits
x_2 = rand value of total operating expenditure (excluding staff costs, interest paid and depreciation)
x_3 = rand value of staff costs.

Input prices: w_1 = (interest paid)/x_1
w_2 = production price index (Index P0142.1 by Statistics, South Africa)
w_3 = x_3/(number of staff)

Limited agreement exists in the banking literature on defining outputs, inputs and prices for the inputs. Up to five approaches have been suggested, of which the production approach and the intermediation approach (or variations of it) are the most commonly used ones. According to Berger *et al*. (1987), under the production approach, banks produce accounts of various sizes by processing deposits and loans, incurring capital and labour costs. Under this approach operating costs are specified in the cost function and number of accounts is used as the output metric, while average account sizes are specified to control for other account characteristics. Under the intermediation approach, banks intermediate deposited and purchased funds into loans and other assets. Under this approach total operating cost plus interest cost are specified and the output is specified in dollars.

Based on the stock measures of banking products, the role of deposits is a pivotal issue throughout the whole banking literature. On the one hand, it is argued that they are an input in the production of loans (intermediation or asset approach). Yet, other lines of reasoning (value-added approach, or user cost approach) suggest that deposits themselves are an output, involving the creation of value added, and for which the customers bear an opportunity-cost (Resti, 1997).

In this paper the intermediation approach is adopted. The main reason for using this approach is because the production approach requires the number of accounts and transactions processed (output measures under the production approach) that are not readily available. Measuring scale and technical efficiency using DEA requires data on output and input quantities, while measuring allocative and cost efficiency also requires data on input prices.

The inputs used for both models are to some extent similar to those used by Sherman and Gold (1985), Rangan *et al*. (1988), Aly *et al*. (1990), Elyasiani and Mehdian (1990 and 1992), Chen (1998) and Berger and Humphrey (1991). The outputs for model 1 correspond to some of outputs used by Charnes *et al.* (1990) and Yue (1992). The outputs for model 2 are a modified mixture of those used by Favero and Papi (1995) and Yue (1992). According to Favero and Papi (1995) non-interest income (y_2 in model 2) can be regarded as a proxy for various services provided by banks, which are usually neglected by a strict acceptance of the intermediation or asset approach.

5. Results

The software package DEAP Version 2.1 by Coelli (1996) is purpose-built to solve the DEA problem and has been used in this paper to generate measures of technical, and scale efficiency for each observation in the data set (i.e. for each region in each month).

The average efficiency estimates of all regions are presented in Table 2. From the results, under Model 1, it is clear that Region 26 had the highest average technical efficiency (te) estimate of 98.1%, while Region 23 had the highest average allocative efficiency (ae) estimate of 97.5%. Underr the same model, Region 4 and Region 25 both had the highest average cost efficiency (ce) estimate of 89.1%.

Table 2: Relative average efficiency estimates for all regions

Region	Model 1			Model 2		
	te	ae	ce	Te	ae	ce
1	0.670	0.636	***0.425***	0.755	0.664	***0.500***
2	***0.648***	0.830	0.539	0.700	0.855	0.600
3	0.854	***0.617***	0.526	0.908	***0.612***	0.554
4	0.949	0.939	**0.891**	0.952	0.939	**0.894**
5	0.824	0.856	0.705	0.847	0.856	0.726
6	0.697	0.809	0.564	0.704	0.823	0.580
7	0.749	0.723	0.538	0.717	0.880	0.630
8	0.751	0.743	0.556	0.715	0.879	0.628
9	0.814	0.851	0.693	0.718	0.912	0.655
10	0.916	0.729	0.668	0.873	0.769	0.670
11	0.737	0.751	0.552	0.675	0.807	0.544
12	0.772	0.689	0.531	0.799	0.727	0.580
13	0.781	0.754	0.586	0.780	0.770	0.600
14	0.882	0.882	0.777	0.924	0.851	0.787
15	0.918	0.936	0.857	0.895	0.948	0.848
16	0.755	0.929	0.704	0.771	**0.970**	0.748
17	0.855	0.942	0.809	0.844	0.965	0.816
18	0.773	0.805	0.618	0.875	0.748	0.656
19	0.841	0.781	0.660	0.809	0.836	0.681
20	0.767	0.903	0.697	0.840	0.932	0.787
21	0.832	0.759	0.634	0.886	0.785	0.697
22	0.749	0.741	0.554	0.763	0.748	0.570
23	0.850	**0.975**	0.829	0.877	**0.970**	0.851
24	0.728	0.681	0.494	0.800	0.690	0.551
25	0.959	0.929	**0.891**	0.971	0.921	**0.894**
26	**0.981**	0.906	0.890	**0.972**	0.911	0.885
27	0.771	0.903	0.698	0.753	0.951	0.717
28	0.811	0.796	0.644	0.896	0.876	0.786
29	0.753	0.768	0.575	0.849	0.753	0.640
30	0.792	0.868	0.690	0.873	0.910	0.797
31	0.871	0.881	0.771	0.912	0.916	0.839
32	0.739	0.811	0.598	0.709	0.926	0.657
33	0.754	0.917	0.689	0.726	0.924	0.667
34	0.700	0.925	0.646	***0.665***	0.936	0.621
35	0.774	0.853	0.660	0.683	0.944	0.645
36	0.742	0.720	0.534	0.882	0.713	0.632
37	0.921	0.931	0.858	0.921	0.932	0.859
Min	0.648	0.617	0.425	0.665	0.612	0.500
Max	0.981	0.975	0.891	0.972	0.970	0.894

Under Model 2, Region 26 had the highest average technical efficiency estimate of 97.2%, while Regions 16 and 23 had the highest average allocative efficiency

estimate of 97.0%. Two regions, namely Regions 4 and 25 shared the first place with the highest average cost efficiency estimate of 89.4%.

Under Model 1, the worst performers were, in the case of average technical efficiency, Region 2 with an efficiency estimate of 64.8%, and in the case of average allocative efficiency, Region 3 with an efficiency estimate of 61.7%. Region 1 was on average only 42.5% cost efficient under Model 1 and only 50.0% cost efficient under Model 2. Under Model 2 the worst performer in the case of average technical efficiency was Region 34 with an average technical efficiency of 66.5%. In the case of average allocative efficiency, Region 3 was only 61.2% efficient. Analysing the individual performance of the regions, we will start with the best performers in each of the three efficiency estimates, (technical, allocative and cost) and then move on to the worst performers. (Owing to space constraints, the results of certain regions will be discussed, but tables are not presented.)

Under both Models, (1 and 2), Region 26 was the best performer in technical efficiency (Table 3). From the efficiency estimates in Table 3 it can be seen that Region 26, under Model 1, was nine times fully technically efficient during the period under investigation. The average technical efficiency was 98.1% which means that on average, Region 26 could reduce its inputs by approximately 1.9% without any reduction in outputs.

Table 3: Relative efficiency estimates for region 26

Period	Model 1			Model 2		
	teE	ae	ce	te	ae	ce
1	1.000	0.896	0.896	1.000	0.896	0.896
2	0.992	0.811	0.804	0.993	0.810	0.804
3	0.967	0.799	0.772	0.966	0.799	0.772
4	1.000	0.912	0.912	1.000	0.912	0.912
5	1.000	0.940	0.940	1.000	0.940	0.940
6	1.000	1.000	1.000	1.000	1.000	1.000
7	1.000	0.926	0.926	0.995	0.931	0.926
8	1.000	0.907	0.907	1.000	0.907	0.907
9	0.993	0.876	0.870	0.987	0.882	0.870
10	0.953	0.976	0.930	0.949	0.980	0.930
11	1.000	1.000	1.000	1.000	1.000	1.000
12	0.933	0.649	0.605	0.936	0.647	0.605
13	0.983	0.963	0.947	0.974	0.971	0.946
14	0.954	0.780	0.744	0.938	0.793	0.744
15	0.967	0.961	0.929	0.979	0.946	0.926
16	0.980	0.890	0.873	0.990	0.885	0.876
17	0.954	0.896	0.855	0.947	0.901	0.853
18	1.000	0.938	0.938	0.954	0.966	0.922
19	1.000	0.989	0.989	0.992	0.975	0.967
20	0.944	0.948	0.896	0.937	0.954	0.894
21	0.994	0.914	0.908	0.913	0.972	0.887
22	0.971	0.968	0.939	0.927	0.974	0.903
Average	0.981	0.906	0.890	0.972	0.911	0.885
Min	0.933	0.649	0.605	0.913	0.647	0.605
Max	1.000	1.000	1.000	1.000	1.000	1.000

Compared to the efficiency estimates under Model 2, it can be seen that Region 26 was only six times fully technically efficient with an average technical efficiency of 97.2%. This means that Region 26 could reduce its inputs by approximately 2.8% without any reduction in outputs, indicating that using non-interest income as an output instead of interest income resulted in lower average technical efficiency and also reduced the number of times the region was fully technically efficient.

Turning to allocative efficiency, it can be seen that Region 26 was only two times fully allocatively efficient under both Model 1 and Model 2. Under Model 1, the average allocative efficiency was 90.6% and this means that Region 26 could increase its average allocative efficiency by 9.4% by changing its input mix. Under Model 2, the average allocative efficiency was 91.1%.

With regard to cost efficiency, Region 26 was only two times fully cost efficient under both Models. Under Model 1 the region had an average cost efficiency estimate of 89.0% and under Model 2, an average cost efficiency estimate of 88.5%, 0.5% lower than in the previous case. This means that Region 26 should increase its technical efficiency as well as its allocative efficiency in order to become more cost efficient.

Comparing the results from Model 1 to the results from Model 2, it is noted that there is a moderate decrease in average technical efficiency (0.9%), a moderate increase of 0.5% in the average allocative efficiency and a moderate decrease in the average cost efficiency (0.05%). The moderate decrease in average cost efficiency may be the result of the larger decrease in average technical efficiency, cancelling the smaller increase in average allocative efficiency. It is interesting to note that for the first twelve months, the cost efficiency in each month remained the same for each model. After that, with the exception of two periods, the cost efficiency declined, resulting in lower average cost efficiency.

The best performer in allocative efficiency under both Model 1 and Model 2 is Region 23 (Table 4). This means that this region was on average the best performer at allocating of its inputs in the production of services. The average allocative efficiency under Model 1 is 97.5% and under Model 2, it is 97.0%, indicating that Region 23 can, in the case of Model 1, increase its average allocative efficiency by approximately 2.5% and in the case of Model 2 by approximately 3.0% by changing its input mix.

It is important to note that Region 23 was at no time fully technically efficient or fully allocatively efficient or fully cost efficient. With regard to average technical efficiency, the region could reduce its inputs by approximately 15.0% in the case of Model 1 and by approximately 12.3% in the case of Model 2 without any reduction in output. Average cost efficiency could be increased by 17.1% and by 14.9% respectively if the region could improve its technical and allocative efficiency.

Table 4: Relative efficiency estimates for region 23

Period	Model 1			Model 2		
	te	ae	ce	te	ae	ce
1	0.832	0.983	0.817	0.837	0.988	0.827
2	0.769	0.920	0.708	0.770	0.945	0.728
3	0.766	0.983	0.753	0.779	0.993	0.773
4	0.846	0.917	0.776	0.862	0.921	0.793
5	0.761	0.973	0.741	0.822	0.944	0.776
6	0.832	0.984	0.819	0.870	0.975	0.848
7	0.834	0.988	0.824	0.849	0.995	0.845
8	0.818	0.983	0.805	0.874	0.968	0.846
9	0.811	0.967	0.784	0.847	0.957	0.810
10	0.883	0.998	0.881	0.908	0.999	0.907
11	0.830	0.991	0.823	0.884	0.969	0.857
12	0.830	0.991	0.822	0.883	0.972	0.858
13	0.893	0.995	0.889	0.908	0.998	0.906
14	0.818	0.932	0.763	0.856	0.917	0.785
15	0.886	0.996	0.883	0.926	0.986	0.913
16	0.868	0.980	0.851	0.932	0.946	0.881
17	0.883	0.994	0.877	0.937	0.970	0.908
18	0.932	0.982	0.915	0.947	0.983	0.931
19	0.932	0.988	0.922	0.945	0.984	0.930
20	0.833	0.993	0.828	0.867	0.975	0.845
21	0.932	0.946	0.882	0.926	0.963	0.892
22	0.904	0.970	0.877	0.868	0.993	0.862
Average	0.850	0.975	0.829	0.877	0.970	0.851
Min	0.761	0.917	0.708	0.770	0.917	0.728
Max	0.932	0.998	0.922	0.947	0.999	0.931

Comparing the cost efficiency estimates from Model 1 to that of Model 2, it is clear that during the whole period of the investigation Region 23 every month experienced an increase in cost efficiency. This resulted in a 2.2% increase in the average cost efficiency.

Region 4 and Region 25 had the highest average cost efficiency estimates, namely 89.1% in the case of Model 1 and 89.4% in the case of Model 2, which means that these two regions could increase their average cost efficiency by 10.9% 10.6% respectively. The other performances of these two regions were very similar (see Table 2). Both regions could decrease inputs without any reduction in output and both could increase allocative efficiency by changing the input mix. Region 4 was four times fully technically efficient under Model 1 and five times under Model 2. Under both models, the region was only fully allocatively efficient once and fully cost efficient once. Region 25 was fully technically efficient twice under Model 1 and four times under Model 2. As with Region 4, the region was under both models, fully allocatively efficient and fully cost efficient only once. The major difference between the two regions lies in the fact that in the case of Region 25 cost efficiency increased eighteen times between Model 1 and Model 2 during the period under investigation and in the case of Region 4, eight times. At other times there was a decrease in cost efficiency.

The following regions were the worst performers in each of the efficiency estimates: Region 2 (technical efficiency, Model 1), Region 3 (allocative efficiency, both models), Region 1 (cost efficiency, both models) and Region 34 (technical efficiency, Model 2). Region 2 (Model 1) had an average technical efficiency estimate of 64.8%, which increased by 5.2% to 70.0% under Model 2 (see Table 2). Region 2 could decrease its inputs by approximately 35.2% under Model 1 and by approximately 30.0% under Model 2 without any decrease in output. During the period of the investigation the region was never fully technically, allocatively or cost efficient. For each period there was an increase in cost efficiency, moving from Model 1 to Model 2.

The relative efficiency estimates for Region 3 (average, min and max) are presented in Table 5. This region was the worst performer in allocative efficiency under both models. Under Model 1 the region had an average allocative efficiency estimate of 61.7% and under Model 2, it was 61.2%. This region had an average technical efficiency estimate of 85.4% under Model 1 and 90.8% under Model 2.

Table 5: Relative efficiency estimates for Region 3

Period	Model 1			Model 2		
	te	ae	ce	te	ae	ce
Average	0.854	0.617	0.526	0.908	0.612	0.554
Min	0.742	0.543	0.455	0.732	0.539	0.477
Max	1.000	0.711	0.619	1.000	0.685	0.685

These poor efficiency estimates resulted in average cost efficiency estimates of 52.6% and 55.4% respectively. Region 3 was fully technically efficient under Model 1 only once and under Model 2, four times. The region was never allocative or cost efficient. For each period there was an increase in cost efficiency, moving from Model 1 to Model 2.

Table 6: Relative efficiency estimates for Region 1

Period	Model 1			Model 2		
	te	ae	ce	te	ae	ce
Average	0.670	0.636	0.425	0.755	0.664	0.500
Min	0.550	0.540	0.336	0.646	0.547	0.398
Max	0.805	0.704	0.492	0.948	0.737	0.584

The worst performer in cost efficiency under both models is Region 1. The relative efficiency estimates for this region are presented in Table 6. It can be seen that this region had an average cost efficiency of 42.5% under Model 1 and an average cost efficiency of 50.0% under Model 2. This means that this region could on average double its cost efficiency if it could increase its average technical efficiency (67.0% under Model 1 and 75.5% under Model 2) as well as its allocative efficiency (63.6% under Model 1 and 66.4% under Model 2). This region could achieve a higher technical efficiency by reducing its inputs by approximately one-third under Model 1, and by 24.5% under Model 2.

By changing its input mix the region can improve its average allocative efficiency by 36.4% under Model 1 and by 33.6% under Model 2. This region was never fully technically, allocatively or cost efficient. Each month during the entire period of the

investigation, there was an improvement in cost efficiency, with an improvement of 7.5% in average cost efficiency, moving from Model 1 to Model 2. In a similar way there was also an improvement of 8.5% in average technical efficiency and improvement of 2.8% in average allocative efficiency.

It is apparent from Tables 2 to 6 that the efficiency estimates differ substantially across regions and over time. According to Balk (2001:160) productivity change was interpreted in the old days as completely due to and thus identical with technological change, but efficiency change is at least as important a factor, where efficiency appears to be a multi-faceted phenomenon. Therefore one usually distinguishes between technical efficiency and allocative efficiency.

Economists are interested in determining the reasons for these efficiency changes. In order to do this a Malmquist DEA was performed. For the Malmquist calculations, four distances are calculated for each region in each period. According to Coelli (2005:298) these are relative to:

- the previous period's CRS DEA frontier;
- the current period's CRS DEA frontier;
- the next period's CRS DEA frontier; and
- the current period's VRS frontier.

Malmquist indices are calculated relative to the previous year and are presented in Tables 7 to 12. The following four indices are presented for each period for Region 26. (The efficiency estimates for this region were presented in Table 3.) As all the indices are calculated relative to the previous year, the results begin with year 2.

- technical efficiency change - effch (relative to a CRS technology);
- technological change - techch;
- scale efficiency change - sech; and
- total factor productivity (TFP) change - tfpch.

(Owing to space constraints, the Malmquist index of efficiency changes for a random selected region (Region 26) as well as the Malmquist index summary of monthly means and the Malmquist index summary of firm means will be discussed.)

The Malmquist index of efficiency changes for Region 26 (the best performer in technical efficiency) is presented in Table 7. From the results (Model 1) it is clear that up to period 9, this region experienced no change in technical efficiency. This means that during these periods the region was technically efficient. Between period 10 and period 22 the region experienced mixed results with regard to changes in technical efficiency. On five occasions the region experienced positive change in technical efficiency indicating an improvement in technical efficiency. However, on eight occasions it experienced negative efficiency changes indicating a decrease in technical efficiency. Over the period under investigation the region experienced, on average, a decrease of .3% in technical efficiency. According to Balk (2001) a firm which operates on the boundary of a set of all feasible combinations of input and output quantities is called technically efficient, whereas a firm which operates in the interior of this set is called technically inefficient. Technical efficiency change thus means that the firm moves closer to or further away from the boundary.

With regard to technological change (Model 1), the results indicate that on

eleven occasions Region 26 experienced technological regress (negative technological change) and on nine occasions it experienced technological progress (positive technological change). Only once the region experienced optimal technological efficiency. Technological change means that the set of feasible combinations expands or contracts (Balk (2001). During the period of investigation the region experienced an average technological progress of 1.1%. Balk states (2001) that there is technological progress between periods t' and t if, given a certain input quantity vector, under the period t technology a firm is able to produce more than under the period t' technology.

In the case of the change in scale efficiency (Model 1), Region 26 experienced optimal scale efficiency on eight occasions, an increase in scale efficiency on five occasions and a decrease in scale efficiency on eight occasions. The region had an average scale efficiency of 99.7% indicating that it was operating only 0.3% short of optimal scale efficiency.

Turning to the change in total factor productivity, the region experienced an average increase of 0.7% in total factor productivity during the period under investigation. On ten occasions the region experienced a positive change in total factor productivity and on eleven occasions a decrease in total factor productivity.

Similar conclusions can be drawn for the results from Model 2. In the case of technical efficiency change, the region experienced on average a negative technical efficiency change of 0.4%. This means that the region was operating close to the boundary. On average the region experienced technological progress on eleven occasions and technological regress on ten occasions, resulting in the region operating at the technologically optimal point. On three occasions the region operated at the optimal point of scale efficiency, but on eleven occasions the region experienced a negative change in scale efficiency and on seven occasions a positive change in scale efficiency. With regard to total factor productivity, on nine occasions the region experienced a positive change in total factor productivity and on twelve occasions a negative change. This resulted in an average negative change of 0.4% in total factor productivity.

The Malmquist index summary of monthly means is presented in Table 8. In the case of Model 1 the highest positive technical efficiency change took place during period ten with a technical efficiency change amounting to 3.2%. The highest negative technical efficiency change of 3.3% took place during period 8. During the period under investigation the regions, on average, experienced negative technical efficiency change on twelve occasions, positive technical efficiency change on eight occasions and once the regions were operating at optimal technical efficiency (period 2).

Under Model 2 the regions experienced a similar situation. On average the regions experienced positive technical efficiency change on nine occasions, negative technical efficiency change on eleven occasions and once the regions were operating at optimal technical efficiency (period 14). The highest positive technical efficiency change (7.6%) was during period 2 and the highest negative technical efficiency change during period 3.

With regard to technological change, under both models the regions exhibit similar results. Under Model 1 the regions experienced technological progress on eleven occasions and under Model 2 technological progress on twelve occasions. Under Model 1 the regions experienced technological regress on ten occasions and under Model 2 on nine occasions. The highest technological progress (13.1%)

under Model 1 was during period 21 and under Model 2 during period 3 (15.4%).

Table 7: Malmquist index of efficiency changes – Region 26

Period	Model 1				Model 2			
	effch	techch	sech	tfpch	effch	techch	sech	tfpch
2	1.000	0.956	1.000	0.956	1.044	0.913	1.044	0.953
3	1.000	0.990	1.000	0.990	0.967	1.030	0.967	0.996
4	1.000	1.165	1.000	1.165	1.034	1.153	1.034	1.192
5	1.000	0.883	1.000	0.883	1.000	0.898	1.000	0.898
6	1.000	1.062	1.000	1.062	1.000	1.048	1.000	1.048
7	1.000	1.015	1.000	1.015	1.000	0.951	1.000	0.951
8	1.000	0.884	1.000	0.884	0.973	1.054	0.973	1.026
9	1.000	1.141	1.000	1.141	0.939	1.039	0.939	0.975
10	0.958	0.975	0.958	0.934	1.004	0.921	1.004	0.925
11	1.041	0.994	1.041	1.035	1.038	1.054	1.038	1.094
12	0.932	0.994	0.932	0.926	0.939	0.991	0.939	0.931
13	1.025	1.054	1.025	1.080	1.061	0.973	1.061	1.032
14	0.977	0.988	0.977	0.966	0.974	0.983	0.974	0.957
15	1.073	0.976	1.073	1.048	1.081	0.995	1.081	1.076
16	0.963	1.061	0.963	1.022	0.994	1.038	0.994	1.032
17	0.976	1.000	0.976	0.976	0.947	1.004	0.947	0.951
18	1.033	1.064	1.033	1.099	1.008	1.006	1.008	1.015
19	0.988	1.005	0.988	0.993	0.984	1.008	0.984	0.992
20	0.983	0.913	0.983	0.898	0.979	0.979	0.979	0.958
21	0.973	1.160	0.973	1.129	0.958	1.067	0.958	1.021
22	1.011	0.945	1.011	0.955	0.998	0.898	0.998	0.897
Average	0.997	1.011	0.997	1.007	0.996	1.000	0.996	0.996

In the case of the change in scale efficiency, the regions exhibit similar results under both models. Under Model 1, the regions experienced a positive change in scale efficiency on ten occasions and under Model 2 on nine occasions. Under Model 1, the regions experienced a negative change in scale efficiency on nine occasions and under Model 2 on twelve occasions. The highest positive change in scale efficiency (1.6%) under Model 1 was during period 22 and under model 2 it was during period 2 (3.4%). The highest negative change in scale efficiency (1.7%) under Model 1 was during period 21 and under Model 2 it was during period 3 (1.9%). It is interesting to note that under both models the highest positive change in scale efficiency was followed by the highest negative change in scale efficiency.

With regard to the change in total factor productivity, the highest positive change, under Model 1 was 14.7% and under Model 2 it was 13.8%. The highest negative change in total factor productivity under Model 1 was 15.2% and under Model 2 it was 15.7%. Again, interesting to note is that the highest positive change in total factor productivity is followed by the highest negative change in total factor productivity.

Table 8: Malmquist index summary of monthly means

Period	Model 1				Model 2			
	effch	techch	sech	tfpch	effch	techch	sech	tfpch
2	1.000	0.925	0.995	0.925	1.076	0.853	1.034	0.918
3	1.005	1.028	1.006	1.033	0.945	1.154	0.981	1.091
4	1.018	1.127	0.996	1.147	1.061	1.072	1.027	1.138
5	0.984	0.862	1.006	0.848	0.987	0.854	0.996	0.843
6	0.993	1.116	0.994	1.108	0.952	1.168	0.975	1.112
7	1.010	0.979	1.006	0.989	1.054	0.879	1.031	0.927
8	0.967	0.915	1.003	0.885	0.980	1.043	0.982	1.022
9	1.013	1.115	1.000	1.130	0.995	1.030	0.998	1.024
10	1.032	0.984	1.000	1.016	1.048	0.941	1.028	0.986
11	0.990	0.988	0.995	0.979	0.975	1.041	0.985	1.015
12	0.986	1.027	0.995	1.012	0.975	1.046	0.985	1.020
13	1.025	1.050	1.013	1.077	1.034	0.968	1.025	1.001
14	0.993	0.991	0.989	0.985	1.000	0.975	0.991	0.975
15	0.999	1.043	1.013	1.042	0.980	1.070	1.015	1.048
16	0.989	1.074	0.993	1.063	0.983	1.085	0.996	1.066
17	1.015	0.927	1.003	0.940	1.016	0.878	0.982	0.892
18	0.999	1.080	1.004	1.079	1.012	1.017	1.004	1.030
19	0.990	1.036	0.993	1.025	0.970	1.042	0.992	1.010
20	0.998	0.919	1.002	0.917	1.005	0.954	1.005	0.959
21	0.986	1.131	0.983	1.116	0.987	1.077	0.989	1.063
22	1.021	0.966	1.016	0.986	1.012	0.932	1.017	0.943
Average	1.001	1.011	1.000	1.011	1.002	1.000	1.002	1.001

The Malmquist index summary of region means is presented in Table 9. In the case of technical efficiency change, under both models, the number of positive changes exceeds the negative changes. There is a different situation in the case of technological change where, in the case of Model 1 the positive changes exceed the single negative change, but in the case of Model 2, the negative changes exceed the eleven positive changes. With regard to scale efficiency change, in the case of both models the positive changes exceed the negative changes. In the case of total factor productivity change, under Model 1 the positive changes exceed the single negative change, but under Model 2 the negative changes exceed the positive changes by one. On average the regions experienced positive change under both models. This means that in the case of technical efficiency change the regions were, under both models, moving toward the efficient frontier. This could imply that are able to reduce their inputs without any reduction in outputs or they were able to increase outputs without any additional inputs.

In the case of technological change (Model 1) the regions continuously moved toward producing more than producing under the previous period's technology. The regions were thus able to produce the maximum quantities of output that are producible from a given input quantity vector (Balk, 2001). This means that the regions were able to expand the set of feasible combinations. Unfortunately this was not the case under Model 2. According to Balk (2001) technical efficiency change and technological change are independent of each

other: there can be technological change without efficiency change, and efficiency change without technological change.

Table 9: Malmquist index summary of region means

Region	Model 1				Model 2			
	effch	techch	sech	tfpch	effch	techch	Sech	tfpch
1	1.000	1.014	1.003	1.014	0.997	0.998	1.010	0.995
2	1.005	1.009	1.002	1.014	1.008	0.998	1.011	1.006
3	0.990	1.009	0.997	0.999	1.000	0.992	1.000	0.992
4	1.000	1.011	1.000	1.011	1.000	1.011	1.000	1.011
5	0.999	1.006	0.996	1.005	1.005	0.996	1.001	1.001
6	1.000	1.010	0.999	1.010	1.002	1.000	0.999	1.002
7	0.999	1.017	1.001	1.016	0.995	1.001	1.002	0.996
8	1.000	1.011	0.999	1.011	0.996	0.995	1.002	0.991
9	0.998	1.009	1.000	1.007	0.991	0.998	0.997	0.988
10	1.000	1.008	1.000	1.008	1.008	0.996	1.001	1.004
11	0.999	1.010	0.999	1.008	0.999	0.997	0.999	0.996
12	0.998	1.010	1.002	1.008	1.000	0.998	1.004	0.998
13	1.001	1.010	1.000	1.011	1.003	0.995	0.998	0.998
14	1.004	1.011	1.002	1.015	1.016	0.997	1.012	1.013
15	1.002	1.015	1.002	1.016	1.004	1.002	1.003	1.006
16	1.001	1.014	1.000	1.015	0.999	1.007	1.001	1.006
17	1.000	1.023	1.000	1.023	1.002	1.018	1.002	1.021
18	1.004	1.008	1.002	1.012	1.004	0.993	1.001	0.997
19	1.002	1.011	1.000	1.014	1.005	0.990	0.999	0.995
20	1.006	1.000	1.000	1.006	1.004	0.992	1.001	0.996
21	1.002	1.014	1.002	1.016	1.008	1.003	1.008	1.011
22	1.001	1.010	1.000	1.010	1.002	0.999	0.998	1.001
23	0.998	1.008	1.000	1.006	0.999	1.001	1.000	1.000
24	1.003	1.011	1.001	1.014	1.007	0.996	1.005	1.003
25	0.996	1.009	0.996	1.005	1.002	1.001	1.002	1.003
26	0.996	1.008	0.996	1.004	0.996	0.998	0.996	0.994
27	1.004	0.997	1.000	1.001	1.006	0.994	1.000	0.999
28	1.004	1.020	1.001	1.025	1.001	0.997	1.001	0.999
29	1.003	1.010	1.000	1.014	1.004	0.997	1.000	1.002
30	1.006	1.008	1.001	1.015	1.002	0.992	1.001	0.993
31	1.000	1.004	1.000	1.004	1.000	0.999	1.000	0.999
32	1.003	1.009	1.000	1.011	1.000	1.000	0.999	1.000
33	0.996	1.020	0.999	1.016	0.996	1.024	1.000	1.020
34	0.993	1.008	1.001	1.002	0.995	1.003	0.998	0.998
35	0.996	1.014	1.001	1.010	0.990	1.000	0.999	0.990
36	1.007	1.012	1.000	1.019	1.012	1.000	1.003	1.011
37	1.007	1.015	1.007	1.022	1.006	1.009	1.006	1.015
Average	1.001	1.011	1.000	1.011	1.002	1.000	1.002	1.001

Analysing scale efficiency change, it is evident that the majority of the regions were operating at either positive scale efficiency change or at the optimal

point of scale efficiency. The combination of all the previously mentioned positive efficiency changes led to the positive change in total factor productivity by a large number of regions (Model 1). Despite the large number of positive efficiency changes under Model 2, about 50% of the regions experienced a decline in total factor productivity. The average improvement in total factor productivity under Model 1 was 1.1% while under Model 2 it was only 0.1%.

6. Conclusion

In the case of both models, all regions can, on average, increase their technical efficiency by decreasing their inputs without any decrease in output. They can also increase their allocative efficiency by changing their input mix. This can result in higher cost efficiency, where the maximum cost efficiency was only 89.1% in the case of Model 1 and 89.4% in the case of Model 2.

According to the results obtained in the various tables (including those not presented here) the following conclusions with respect to the role of interest income and non-interest income in the efficiency estimate of this bank can be made:

With respect to the average technical efficiency estimate for all the regions there has been an increase in average technical efficiency moving from Model 1 to Model 2. Twenty two (59%) out of the thirty seven regions experienced an increase in average technical efficiency over the period of the investigation, 14 regions (38%) experienced a decrease in average technical efficiency while only one region (3%) experienced no change in average technical efficiency.

In the case of average allocative efficiency twenty six regions (70%) out of the thirty seven regions experienced an increase in average allocative efficiency moving from Model 1 to Model 2. Nine regions (24%) experienced a decrease in average allocative efficiency while two regions (6%) experienced no change in average allocative efficiency.

In the case of average cost efficiency thirty regions (81%) out of the thirty seven regions experienced an increase in average cost efficiency while seven regions (19%) experienced a decrease in average cost efficiency, moving from Model 1 to Model 2.

According to the sources of efficiency change the regions, on average, experienced positive efficiency change. The number of regions that have experienced positive changes in technical efficiency exceeded the number of regions that have experienced negative changes (both models). In the case of Model 1 all the regions, except one, experienced technological progress, while in the case of Model 2, more than 50% of the regions experienced technological regress.

In the case of scale efficiency change, a large number of regions were either experiencing positive change in scale efficiency or were operating at optimum scale efficiency (both models). In the case of total factor productivity change all but one region experienced positive total factor productivity change (Model 1). In the case of Model 2 close to 50% experienced negative total factor productivity change.

It is clear that banks can become more efficient by the moving away from interest income to noninterest income as their main source of income. Banks should be moving away from the traditional role of intermediation (intermediation

approach) to a role of producing (production approach) various services. Interest income is single dimensional in the sense that the South African Reserve Bank sets the Repo rate and a fixed percentage is added to the Repo rate to arrive at the Prime overdraft rate. Noninterest income is multidimensional with various options available in rendering services to bank clients, e.g. selling a combination of services to their clients. In this process cross-selling is important as many clients are looking for one-stop banking services. However, it can take longer than two years (the period of the investigation) to see the results of this new approach to banking.

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LE NIVEAU DE LA CONCURRENCE AU SENEGAL: UNE ANALYSE SECTORIELLE

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Abstract. This paper estimates the markup ratios in whole economy and in several sectors in Senegal in order to measure the degree of competition. It is based on macroeconomic and panel data. The results based on macroeconomic data provide a markup estimated at 2.98 in other words the prices are about three times higher than the costs. While the estimates on data of panel evaluate the markup at 1.22; what contrasts with the markup obtained with the macroeconomic data. Nevertheless, these results reveal a weak degree of competition in Senegal. The service sectors in particular trade, transport are identified as sectors where competition could be reinforced.

JEL Classification: C20, D49

Keywords: Competition, markup, estimation

1. Introduction

De nos jours, l'amélioration de la concurrence sur les marchés des biens et services est une préoccupation croissante des politiques économiques. Dans les vingt dernières années, plusieurs travaux ont cherché, à travers la proposition de réformes pro concurrentielles adéquates, à établir les conditions qui favoriseraient la croissance économique et la création d'emplois. En effet, parmi les freins à la croissance, l'insuffisance relative de concurrence fait partie des facteurs régulièrement évoqués. Or, dans sa dimension commerciale et économique, la mondialisation se traduit par deux phénomènes liés. Il s'agit de la croissance des

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échanges internationaux structurée par la globalisation des firmes et la montée en puissance de nouveaux acteurs que sont les pays en développement (PED). Si ces deux processus ne sont pas nouveaux, leur originalité tient aujourd'hui à leur ampleur : d'une part, parce qu'ils impliquent des ajustements sectoriels dans un monde plus ouvert ; d'autre part, parce qu'ils engagent de nouveaux pays dont la taille est sans précédent (Asie). Dans cet environnement, le Sénégal est confronté à de nouveaux défis.

Cette étude s'inscrit dans cette nouvelle configuration en proposant d'estimer l'intensité de la concurrence. L'objectif visé est de voir s'il est nécessaire au Sénégal de mettre en œuvre des réformes structurelles pro-concurrentielles capables d'assurer le renforcement de la croissance. Cette mesure du degré de la concurrence est, en effet, évaluée à partir de l'estimation du facteur de marge (ou markup). Cet indicateur est défini comme le rapport entre le prix de vente et le coût marginal. Dès lors, une amélioration du niveau de la concurrence devrait assurer à terme plus de croissance et plus d'emplois.

Pour quantifier le degré de concurrence dans une économie ou dans des secteurs, on a recours à des indicateurs permettant de mesurer la concurrence dans un secteur donné ou dans une économie. Le markup, qui indique de combien le prix de vente excède le coût marginal de production, permet d'évaluer l'intensité de la concurrence. L'amélioration de la concurrence sur les marchés des biens et services doit être inscrite comme une préoccupation majeure des autorités en charge de la politique économique. La concurrence permet d'augmenter l'activité économique et de créer des emplois, en améliorant le pouvoir d'achat des consommateurs et en incitant les entreprises à plus d'innovation. D'où l'importance associée de la mise en place d'indicateurs permettant d'identifier clairement les secteurs de l'économie pour lesquels la concurrence pourrait être améliorée. Parmi ces indicateurs, le degré de concentration du secteur[1] et le niveau de réglementation (il peut être un obstacle à l'entrée de nouvelles firmes) sont couramment employés. Cependant, ils ne reflètent pas toujours un degré de concurrence très prononcé d'un secteur.

Le markup qui n'est pas directement observable peut être estimé économétriquement. La littérature s'est intéressée à cet indicateur depuis les travaux de Hall (1988) puis de Roeger (1995). De même, des travaux empiriques tels ceux de Hylleberg et Jørgensen (1998), Martins et al. (1996), Christopoulou et Vermeulen (2008) se sont intéressés à cette question. Ces auteurs ont proposé une méthodologie permettant d'évaluer le markup à partir de l'hypothèse de concurrence pure et parfaite qui correspond à un taux de markup nul. De plus, le coefficient liant le taux de croissance du résidu de Solow nominal au taux de croissance de la productivité nominale du capital est appelé l'indice de *Lerner*. Il permet au final d'obtenir le markup. Généralement, l'analyse de l'intensité de la concurrence à partir de l'estimation des facteurs de marge est complétée par une analyse des parts de marché des entreprises à partir des données relatives aux chiffres d'affaires.

Le reste de cet article s'articule comme suit. Dans la section 2, il est question de faire un bref survol de la littérature. Dans la troisième section, le cadre théorique qui s'appuie sur l'approche de Roeger est dérivé pour obtenir une forme

[1] On peut l'approcher par l'indice de concentration de Herfindahl

testable. La quatrième section analyse les résultats découlant des estimations économétriques et enfin on conclut en dernière section.

2. Le survol de la littérature

La théorie économique stipule qu'en situation de concurrence pure et parfaite, les entreprises doivent fixer le prix de vente de leurs produits au niveau du coût de production de la dernière unité produite : le prix est égal au coût marginal de production. Moins un secteur est concurrentiel, plus le prix peut s'éloigner du coût marginal de production. Le ratio entre le prix de vente et le coût marginal de production, appelé taux de marge ou markup, peut alors être utilisé pour apprécier l'intensité concurrentielle d'un secteur. Ainsi, un taux de markup élevé traduit des profits anormalement forts.

De plus, en économie industrielle, il existe plusieurs mesures telles que les ratios de concentration, ratios de rentabilités, etc. Un élément commun à ces critères est qu'ils sont statiques et rétroactifs. Ainsi, depuis quelques décennies, la littérature économique commence à s'intéresser à l'identification empirique de puissance du marché (market power) à l'instar de Schmalensee (1989) et de Bresnahan (1989). Cette littérature s'est concentrée, en particulier, sur l'identification des situations monopolistiques. En théorie, il est possible d'évaluer l'existence de situation monopolistique via le markup défini comme le ratio entre le prix de vente et le coût marginal de production.

Ainsi, au plan empirique, la mesure du taux de markup est une tâche difficile notamment lorsque l'analyse porte sur un niveau agrégé. En réalité, la littérature économique a donné peu de conseils sur la façon dont il faut établir des mesures appropriées et il existe peu de travaux dans ce sens (Geroski et al. (1995)). Le problème principal réside dans l'absence de données observables pour les coûts marginaux. Cependant, des mesures indirectes ont été développées notamment par Hall (1986,1988) et Bills (1987) en essayant d'exploiter les fluctuations à court terme de la production et les inputs sectoriels. La méthode proposée par Robert Hall est devenue populaire et a été intensivement appliquée dans la littérature empirique (Shapiro (1987), Domowitz et al. (1988), Caballero et Lyon (1990)). En effet, la méthode de Hall s'appuie sur l'idée de base développée par Solow (1957) sur la mesure de la productivité. Pour une entreprise qui cherche le progrès technique via la combinaison des facteurs travail et capital, une approximation raisonnable de son coût marginal est donnée par :

$$MC = \frac{W\Delta L + R\Delta K}{\Delta Q - \theta Q} \qquad (1)$$

Où Q est la valeur ajoutée réelle, W et R sont respectivement le taux de salaire et le prix du capital et q le taux du progrès technique. Le précédent ratio peut être réécrit comme suit :

$$\Delta q = \frac{WL}{MC \times Q}\Delta l + \frac{RK}{MC \times Q}\Delta k + \theta \quad (2)$$

Où les variables en minuscule indiquent la transformation logarithmique. D'autre part, sous les hypothèses de la concurrence pure et parfaite, de la présence des rendements d'échelle constants et la définition du taux de markup ($\mu = \frac{P}{MC}$), la précédente équation devient :

$$\Delta q = \mu\alpha\Delta l - (1-\mu\alpha)\Delta k + \theta \quad (3)$$

où $\alpha = \frac{WL}{PQ}$ est la part du travail dans la valeur ajoutée.

En soustrayant $\alpha(\Delta l - \Delta k)$ de part et d'autre de la précédente équation, on obtient le résidu de Solow donné par:

$$SR = \Delta q - \alpha\Delta l - (1-\alpha)\Delta k = (\mu - 1)\alpha(\Delta l - \Delta k) + \theta \quad (4)$$

En supposant que le taux de progrès technique suit un processus aléatoire défini comme suit :

$$\theta_t = \theta + \varepsilon_t$$

On obtient ainsi:

$$\Delta(q_t - k_t) = \mu\alpha_t\Delta(l_t - k_t) + \theta + \varepsilon_t \qquad (5)$$

Cette dernière équation ne peut pas être estimée directement comme annoncée par Hall. En effet, sous l'hypothèse de la concurrence pure et parfaite, le ratio travail/capital est corrélé avec le terme relatif à la productivité et par conséquent avec les erreurs. Dans ce cadre, les estimateurs issus de la technique des moindres carrés sont plus convergents. La correction qui est généralement apportée s'appuie sur la méthode des variables instrumentales (on remplace le ratio travail/capital par un vecteur d'instruments). Cependant, cette démarche est souvent critiquée (Caballero et Lyons (1989)) lorsque l'on travaille avec de petits échantillons. C'est dans ce sens que l'approche de Roeger est de plus en plus utilisée dans la littérature empirique. En effet, Roeger (1995) propose une autre façon d'estimer les taux de markup pour éviter les problèmes posés par la méthode de Hall.

Par ailleurs, d'autres travaux empiriques tels ceux de Hylleberg et Jørgensen (1998), de Oliveira et al. (1996), de Christopoulou et Vermeulen (2008) se sont penchés sur cette même question relative à l'estimation économétrique du markup. En effet, ces auteurs ont proposé une méthodologie permettant d'évaluer le markup à partir de l'hypothèse de concurrence pure et parfaite qui correspond à un taux de markup nul. De plus, l'approche de Roeger (1995) a été également intensivement utilisée dans la littérature empirique pour estimer les markups au niveau sectoriel. D'abord, Roeger (1995) a employé sa propre technique pour estimer les markups des industries manufacturières des Etats Unis sur la période 1984-1995. Oliveira Martins et al. (1996) ont estimé les mêmes taux et pour les mêmes industries dans 14 pays de l'OCDE sur la période 1970-1992. On peut également citer les travaux empiriques de Oliveira et Scarpetta (1999) sur les industries manufacturières des Etats-Unis, du Japon, de l'Allemagne, de la France et du Royaume Uni. Avec des données d'entreprises, Konings et al. (1995) estiment les taux de markup des industries manufacturières de la Bulgarie et de la Roumanie. Dans le même sillage, Konings et Vandenbussche (2005) ont eu recours à un panel de 4000 entreprises européennes et plus récemment Görg et Warzynski (2006) ont estimé les markups sur un panel d'entreprises manufacturières du Royaume Uni sur la période 1987-1997. S'agissant des travaux sur des pays africains, à notre connaissance, aucune étude n'est réalisée sur cette question.

3. Détermination de la forme testable : l'approche de Roeger

Soit une firme représentative achetant ses facteurs de production (K_t, L_t) dans un environnement concurrentiel pour produire un bien final. Elle écoule ce produit sur un marché de concurrence imparfaite selon un ratio, prix du bien (P_t) sur coût marginal (mc_t) donné par :

$$\mu_t = \frac{P_t}{mc_t} \qquad (6)$$

Si ce ratio (facteur de marge) est égal à l'unité, on dit qu'on est en présence d'une concurrence pure et parfaite. Lorsqu'il est supérieur à 1, il y a alors absence d'une pression compétitive.

Supposons également que la technologie soit caractérisée par l'indice des rendements d'échelle défini ci-après :

$$\lambda_t = \frac{AC_t}{mc_t} \qquad (7)$$

Où AC_t est le coût moyen défini par :

$$AC_t = \frac{W_t L_t + R_t K_t}{Q_t} \qquad (8)$$

Avec Q_t la valeur ajoutée réelle

En combinant ces trois précédentes équations, on a :

$$\frac{\mu_t}{\lambda_t} = \frac{P_t Q_t}{W_t L_t + R_t K} \qquad (9)$$

Après quelques manipulations algébriques, l'équation (4) devient :

$$\Delta y_t = \left(1 - \frac{\lambda_t}{\mu_t}\right)\Delta x_t - \frac{\lambda_t}{\mu_t}\left(\Delta\lambda_t - \Delta\mu_t\right) \qquad (10)$$

où

$$\Delta y_t = \left(\Delta q_t + \Delta p_t\right) - \alpha_t\left(\Delta l_t + \Delta w_t\right) - \left(1-\alpha_t\right)\left(\Delta k_t + \Delta r_t\right)$$

$$\Delta x_t = \left(\Delta q_t + \Delta p_t\right) - \left(\Delta k_t + \Delta r_t\right)$$

$$\alpha_t = \frac{W_t L_t}{P_t Q_t}$$

En particulier, en supposant que les rendements d'échelle (λ=1) et de facteur de marge ($\mu_t = \mu$) soient constants, la précédente équation se résume à :

$$\Delta y_t = \left(1 - \frac{1}{\mu}\right)\Delta x_t \qquad (11)$$

En ajoutant un terme d'erreur, on obtient une expression permettant de faire l'estimation :

$$\Delta y_t = B\Delta x_t + \varepsilon_t \qquad (12)$$

De plus, le coefficient brut associé à la variable exogène est appelé l'indice de Lerner (B) qui est lié au facteur de marge ou markup par la formule suivante :

$$\mu = \frac{1}{1 - B}$$

Le coût du capital est défini par la formule suivante :

$$R = \left(i - \pi_e + \delta \right) p_k$$

i : le taux d'intérêt nominal ;
π_t : le taux d'inflation anticipé obtenu en appliquant un filtre HP sur la série du déflateur du PIB ;
p_k : le déflateur du capital ;
δ : le taux de dépréciation du capital.

S'agissant de l'approche microéconomique, on peut retenir comme précédemment que les premiers travaux sur l'estimation des taux de marge sont dus à Hall (1986, 1988) puis ils sont étendus par Roeger (1995) qui propose une solution pour contourner le problème d'endogénéité inhérent à la spécification originale de Hall. Actuellement, la méthodologie de Roeger est la plus répandue pour l'estimation des taux de marges à partir de données sectorielles ou de données d'entreprises. Dans cette recherche, nous adoptons la démarche de Roeger à un large panel d'entreprises sénégalaises sur une période allant de 1997 à 2007.

Nous généralisons l'approche de Roeger précédemment au cas des données de panel. Ainsi, on a une spécification économétrique suivante qui tient compte des conditions d'identification :

$$\Delta y_{it} = B \Delta x_{it} + \varepsilon_{it} \quad (13)$$

Le recours aux données présente de multiples avantages. Dans un premier temps, le terme de droite Δy_{it} représente des variables nominales et non plus des variables réelles comme dans la méthode de Hall basée uniquement sur le résidu primal. Il n'est donc plus nécessaire de disposer des déflateurs des biens finaux, des salaires et des consommations intermédiaires, ces derniers étant généralement à la source d'erreurs de mesure qui peuvent affecter significativement les estimations économétriques. Ensuite, dû fait que toutes les variables sont exprimées en différence première, le modèle ainsi obtenu permet de contrôler pour les caractéristiques stables des entreprises non observées. Enfin, le problème redoutable de l'endogénéité est levé, ce qui soulage l'estimation de l'utilisation d'instruments et implique également l'éligibilité des moindres carrés ordinaires pour estimer le taux de marge.

4.1. Description des données utilisées

Les données utilisées proviennent des bilans annuels d'entreprises issues de la Banque de Données Economiques et Financières (BDEF) de l'Agence Nationale de la Statistique et de la Démographie (ANSD) et des données issues des Comptes Nationaux du Sénégal. Elles concernent l'ensemble des entreprises ayant vécu durant toute la période couverte par l'étude c'est-à-dire de 1997 à 2007. Les entreprises étudiées sont regroupées par secteur d'activité selon la nomenclature des quatre (04) macro-secteurs retenus par la BDEF. Il s'agit des Industries, des BTP, du Commerce et des Services. Après avoir construit les différentes variables nécessaires à cette étude et surtout celles entrant dans le calcul du coût d'usage du capital, nous avons éliminé les observations douteuses,

c'est-à-dire absentes sur des années ou dont les valeurs sont négatives alors qu'elles devaient être positives. Le panel ainsi obtenu est constitué de 249 entreprises observées sur toute la période 1997-2007. Ainsi, la répartition par type d'entreprise et sectorielle du panel est donnée par les tableaux.

Tableau 1: La répartition des entreprises de l'échantillon selon l'appartenance aux macro-secteurs

Macro-secteur	Part dans l'échantillon
Industries	29,72%
BTP	4,82%
Commerce	28,51%
Services	36,95%

Source : ANSD et calcul auteur

4.2. Le calcul du coût d'usage du capital

Le coût d'usage du capital cuk_{it} tel que donné par le programme d'optimisation de la firme[2] représentative est formulé comme suit :

$$CUK_{it} = \frac{p_{It}}{p_{st}}\left(1 - subv_{it}\right)\left[AI_{it}\left(\frac{B_{it}}{B_{it}+E_{it}}\right) + \frac{LD_{it}}{\left(1-\tau_t\right)}\left(\frac{E_{it}}{B_{it}+E_{it}}\right) - \frac{\left(1-\delta\right)}{\left(1-\tau_t\right)}\frac{\Delta p_{It+1}}{p_{It}} + \delta_{st}\right]$$

Où E_{it} : les capitaux propres ;

$subv_{it}$: les subventions d'investissement ;

$AI_{it} = \frac{i_{it}}{B_{it}}$: le taux d'intérêt apparent ;

i_{it} : les charges d'intérêt ;

B_{it} : les dettes financières;

LD_{it} : le taux d'escompte ;

τ_t : le taux de l'impôt sur les sociétés ;

p_{It}, p_{st} sont respectivement les déflateurs de l'investissement et de la valeur ajoutée du secteur correspondant ;

δ : le taux de dépréciation du capital fixé à 10%

5. Estimation

5.1. Approche macroéconomique

Avec la forme estimable obtenue dans la précédente section, l'investigation est menée dans une première phase au plan global puis élargie à quelques secteurs d'activité ayant une information statistique disponible. Les

[2] Pour plus de détails voir les annexes

données utilisées sont issues des Comptes Nationaux du Sénégal, des Statistiques Financières Internationales du FMI (2007) et la période couverte s'étend de 1980 à 2006. S'agissant du stock de capital, il est estimé par l'intermédiaire de la loi du mouvement du capital et l'utilisation des données issues des travaux de Nehru et Dhareswar (1993).

Rappelons que le markup indique de combien le prix de vente excède le coût marginal de production ; en d'autres termes il permet d'évaluer l'intensité de la concurrence. C'est pourquoi, son évaluation constitue un important indicateur permettant d'identifier clairement les secteurs de l'économie pour lesquels la concurrence pourrait être améliorée. S'agissant du cas du Sénégal, les résultats obtenus montrent que l'environnement économique est loin d'être concurrentiel. En effet, le facteur de marge de l'ensemble de l'économie sénégalaise se situe au dessus du seuil de la concurrence pure et parfaite et loin devant les valeurs issues des travaux réalisés dans les pays industrialisés. Le markup brut estimé au Sénégal est de l'ordre de 3,2 alors qu'en France[3], il est de 1,26, en Allemagne de 1,3 et en Italie 1,27.

Par ailleurs, l'on sait que le markup estimé s'appuie sur des données englobant les taxes nettes. Cette inclusion des taxes conduit généralement à une surestimation du facteur de marge d'où la correction apportée au markup brut par la formule suivante :

$$\mu = \frac{\mu_b}{1+\tau}$$

Où μ_b est le markup brut estimé et τ est le taux de taxation.

Une fois cette correction apportée, le markup est évalué à 2,98. En d'autres termes, au Sénégal, les profits apparaissent comme étant anormalement élevés : les prix de vente sont à peu près trois fois plus importants que les coûts. D'autre part, le niveau du markup obtenu au Sénégal révèle l'existence de secteurs dans lesquels il y a des efforts considérables à faire afin d'améliorer la concurrence. Cette politique visant à renforcer la concurrence permettrait d'avoir à terme plus de croissance économique et une augmentation substantielle de l'emploi. Dès lors, l'amélioration de la concurrence doit être une préoccupation majeure des autorités en charge des politiques économiques dans le sens où la concurrence permet, d'une part, d'augmenter l'activité économique et de créer des emplois en incitant les entreprises à plus d'innovation, et d'autre part, elle participe à l'amélioration du pouvoir d'achat des consommateurs.

En effet, cette insuffisance relative de la concurrence constitue un écueil à toute la politique de libéralisation entreprise par l'Etat du Sénégal. Depuis le début des années 80, notamment avec les lois 94-63 du 22 août 1994 sur les prix, la concurrence et le contentieux économique, 87-23 du 18/08/87 et 95-05 du 05/01/95 portant privatisation d'entreprises, le Sénégal a entrepris un vaste programme de réformes aussi bien conjoncturelles que structurelles. La libéralisation s'est traduite par le désengagement progressif de l'Etat du tissu productif du pays et la réduction *de facto* de son intervention aux secteurs dits sociaux comme l'éducation et la santé. Ainsi, l'Etat du Sénégal a adopté la stratégie qui s'appuie sur le renforcement de la concurrence. Avec cette stratégie, l'Etat a cherché à limiter son intervention dans la vie économique, le redressement

[3] Voir Bouis (2007)

des finances publiques, notamment la limitation des subventions et une plus grande participation de l'épargne privée dans les investissements productifs. Force est de constater que ces réformes, si elles ont permis d'installer le Sénégal sur un sentier de croissance relativement stable (le taux de croissance économique dépassant celui du croît démographique ; en moyenne, il est de 5%). Les résultats escomptés en terme de bien-être de la population ont été relativement faibles ; d'ailleurs, les estimations des markups sur deux sous périodes laissent entrevoir le même niveau (1980-1993,1995-2006) autrement dit une relative invariance de la concurrence suite à la mise en œuvre de tous les programmes. Ce qui laisse croire que leur impact a été relativement faible.

5.2. Approche microéconomique

S'agissant de l'évaluation du facteur de marge par l'intermédiaire des données de panel, les résultats économétriques montrent que tous les secteurs figurant dans notre échantillon sont caractérisés par des facteurs de marge supérieurs à l'unité. Son niveau pour l'ensemble des entreprises est de 1,22 ; ce qui contraste avec le markup obtenu avec les données macroéconomiques. Néanmoins, les résultats des estimations impliquent l'existence d'une insuffisance de la concurrence au Sénégal quelque soit la nature des données utilisées. D'autre part, le secteur des services notamment le commerce, le transport sont les segments où il y a moins de concurrence. Par contre, le secteur de l'agro-alimentaire enregistre un markup de 1,15 en deçà du niveau global. Ce qui témoigne d'un moindre degré de compétition. Ce constat découle des implications du processus de mondialisation amorcé depuis quelques décennies ; ainsi, le Sénégal est devenu de plus en plus un réceptacle des produits manufacturés provenant de la Chine.

Tableau 2 : Markups sectoriels

Secteur	B[4]	Ecart-type	N. Obs	R^2	Markup brut
Primaire (Pêche et Extractives)	0,19***	0,016	70	0,69	1,23
Secondaire	0,12***	0,004	680	0,56	1,14
Construction	0,11***	0,013	120	0,49	1,12
Services (le commerce y compris)	0,23***	0,005	1620	0,61	1,30
Estimations plus fines					
Agro-alimentaire	0,13***	0,009	190	0,56	1,15
Industries pétrochimiques	0,16***	0,017	250	0,68	1,19
Industries bois et papier	0,10***	0,015	100	0,60	1,11
Industries métallurgiques et métaux	0,05***	0,007	80	0,45	1,05
Autres industries	0,15***	0,008	60	0,53	1,18
Transports	0,26***	0,011	290	0,67	1,35
Construction	0,11***	0,013	120	0,49	1,12
Commerce	0,22***	0,006	710	0,66	1,28
Toutes les industries	0,18	0,003	2490	0,55	1,22

Source : Calculs de l'auteur

[4] *** : le coefficient est significatif au seuil de 1%.

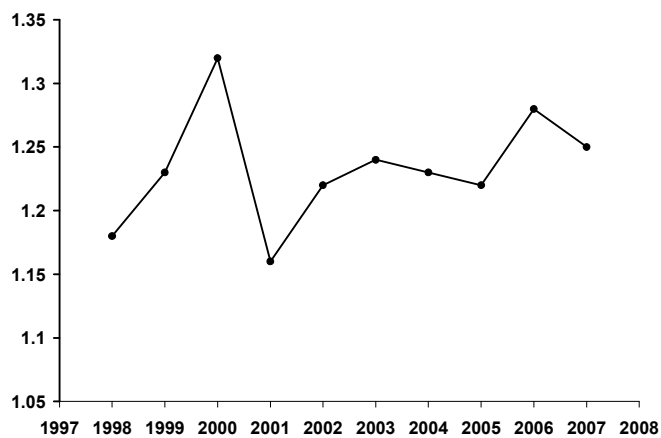
En tout état de cause, les autorités devront renforcer les réformes pro-concurrentielles dans ces dits secteurs afin de booster la croissance et par conséquent générer des emplois. En effet, l'appartenance à l'union monétaire ouest africaine doit être mise à profit pour faciliter les échanges commerciaux. Récemment, les travaux de Dramani (2010) ont montré que les chocs de politiques commerciales ont un effet significatif sur les économies de cette zone. D'autre part, les pays de cet espace présentent plus des caractéristiques communes en matière de politiques commerciales.

Pour analyser plus avant le rôle de la mondialisation sur le markup, il est important d'étudier l'évolution des markups durant dans la décennie 1998 et 2007. Cette période se caractérise en effet par la montée fulgurante de pays émergents (BRIC[5]) et un commercial mondial renforcé. Ces faits participent au renforcement de la concurrence. Ces effets pro-compétitifs devraient participer à la réduction du markup des entreprises au bénéfice des consommateurs. Pour cela, nous procédons à l'estimation du modèle suivant :

$$\Delta y_{it} = B\Delta x_{it} + \varepsilon_{it} \quad t \in [1998; 2007]$$

Les différents markups obtenus sont représentés sur la Figure 1. Le diagnostic de ce graphique révèle que les markups des entreprises croissent de manière importante. Ainsi, il semble que les entreprises du Sénégal ont anticipé la chute de leur pouvoir de marché en augmentant leurs marges. De 2001 à 2005, les facteurs de marge ont baissé par rapport ceux de la période précédente et ont stagné (le markup est passé en moyenne de 1,25 à 1,21). Il faut chercher les explications de cette baisse dans le renforcement de l'ouverture des marchés et un cadre économique plus propice. Depuis 2005, une légère hausse est notée. Cette situation découlerait d'un environnement macroéconomique plus difficile favorisant les grandes entreprises, ce qui renforce leur pouvoir de marché.

Figure 1 : Evolution du markup des entreprises



Source : Calcul de l'auteur

[5] BRIC : Brésil, Russie, Inde et Chine.

En général, l'analyse du degré de compétition est complétée par celle de la concentration. Pour cela, on introduit l'indice de Herfindahl-Hirschmann (IHH). Il permet de mesurer la concentration du marché. Il est obtenu en additionnant le carré des parts de marché de toutes les entreprises du secteur considéré. Ainsi, plus l'indice d'un secteur est fort, plus la production est concentrée. Mathématiquement, on a :

$$IHH = 1000\sum_{i=1}^{N} s_i^2$$

S_i : part de marché de l'entreprise i et N le nombre d'entreprise dans le secteur.

L'analyse du tableau n°3 révèle qu'au Sénégal, le degré de concentration est faible (IHH<1000). Cependant, il existe beaucoup de disparités entre les secteurs. Ainsi, le commerce, le transport, la construction constitue les segments les plus concentrés. Ce constat corrobore le principe de corrélation positive entre le markup et l'indice de concentration.

Tableau 3 : Indice de Herfindahl-Hirschmann (IHH)

Secteur	IHH
Primaire (Pêche et Extractives)	244,24
Secondaire	50,46
Construction	217,50
Services (le commerce y compris)	126,64
Sous-secteurs	
Agro-alimentaire	136,38
Industries pétrochimiques	192,01
Industries bois et papier	277,13
Industries métallurgiques et métaux	214,98
Autres industries	791,03
Transports	159,73
Construction	217,50
Commerce	240,29

Source : Calculs de l'auteur

D'autre part, lorsque l'analyse porte sur l'évolution de cet indice de concentration, il apparaît que la concentration a augmenté dans le temps avec le commerce et la construction, a stagné avec les autres industries et enfin elle a baissé avec la pêche et l'agro-alimentaire (figure 1). Toutefois, pour avoir une analyse plus rigoureuse, on procède à l'estimation de la relation suivante :

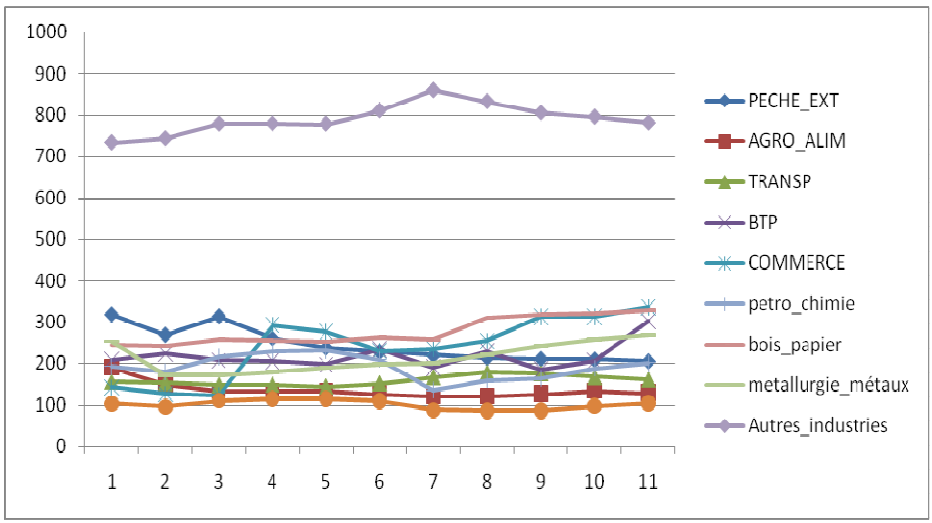
$$\log\left(IHH_{it}\right) = \alpha + \beta t + \varepsilon_{it}$$

Si $\beta \succ 0$ alors la concentration a augmenté dans le temps sinon elle a régressé.

Le modèle avec tendance est estimé pour l'indice de Herfindahl-Hirschmann sur les données en panel. Les résultats estimés sont statistiquement significatifs au seuil de 5% quelque soit le modèle (le modèle à effets aléatoires,

modèle à effets fixes). En conclusion, pendant la période 1997-2007, la concentration des entreprises a augmenté en moyenne de 1,2%.

Figure 2 : Evolution de l'indice de Herfindahl-Hirschmann



Source : Calculs de l'auteur

Tableau 3 : Résultats de la méthode SURE

Secteur	La méthode[6] des moindres carrés	Modèle à effets aléatoires	Modèle à effets fixes
Constante	5,24 (0,03)	5,24 (0,007)	5,24 (0,03)
Tendance	0,012(0,005)	0,012(0,0055)	0,012(0,0057)
Prob(F)	0,19	0,05	0,000
No.obs.	88	88	88

Source : Calculs de l'auteur

Dans un autre registre, les travaux empiriques ont montré que les estimations économétriques comportent plusieurs limites dans la mesure où elles tendent à surestimer le markup. C'est pourquoi, l'interprétation des résultats doit être effectuée avec beaucoup de prudence. Ainsi, les problèmes peuvent être regroupés en deux catégories:

- d'abord, l'évaluation du markup découle de l'hypothèse de rendements d'échelle constants, alors que dans la réalité, de nombreux secteurs se caractérisent par la présence de rendements croissants. Cet écart entre

[6] Les valeurs entre parenthèses sont les écart-types.

l'indice des rendements d'échelle théorique et empirique conduit généralement à des markups estimés élevés;

• l'intégration des subventions dans les prix de base de la production aboutit également à une surestimation du markup ;

Par ailleurs, il est également naturel de s'interroger sur un fait qui peut paraître anodin : plus de marge n'attire t-elle pas plus d'entreprises ? En effet, lorsque dans un secteur, les prix dépassent largement les coûts encourus alors les investisseurs ont tendance à y développer leurs activités jusqu'à ce que le niveau de saturation soit atteint pour qu'enfin une sélection naturelle puisse s'opérer. Cet argument pourrait dans une certaine mesure relativiser l'insuffisance relative de concurrence notée au Sénégal. Ce constat n'enlève en rien la nécessité de mettre en œuvre des politiques pro-concurrentielles telles plus d'ouverture du marché sénégalais, plus de facilité dans la création d'entreprises autochtones et étrangères.

6. Conclusion

Cette étude a tenté d'évaluer le degré de concurrence dans quelques secteurs d'activité de l'économie sénégalaise. En effet, la théorie économique stipule qu'en situation de concurrence pure et parfaite, les entreprises doivent fixer le prix de vente de leurs produits au niveau du coût de production de la dernière unité produite autrement dit le prix doit être égal au coût marginal de production, soit un facteur de marge égale à l'unité.

Les résultats issus des estimations révèlent que les prix au Sénégal sont globalement deux fois plus élevés que les coûts. Ce qui révèle une insuffisance relative de concurrence dans l'économie. Plus spécifiquement, le commerce et le transport sont les secteurs d'activités où il y a moins de concurrence. Autrement dit, s'il existe des secteurs d'activité à réformer au Sénégal au plan de la concurrence, il s'agit bien de ces derniers.

Ces réformes pro-concurrentielles devront passer par une grande ouverture de l'économie sénégalaise en facilitant l'installation de nouvelles entreprises autochtones et étrangères (amélioration du climat des affaires). Pour une plus grande réussite de ces politiques pro-concurrentielles, il est impératif de les faire précéder d'une préparation du secteur privé. Cela permettrait d'éviter l'effondrement du tissu économique et social du pays. Une piste à explorer pour accomplir une telle tâche pourrait résider dans le renforcement de la coopération entre le public et le privé afin d'éviter les phénomènes d'éviction (Partenariat Public-Privé). Tous ces facteurs combinés participeront à la création de plus de croissance et d'emplois pour ce pays qui s'est inscrit dans une stratégie de lutte contre la pauvreté.

Dans les futures investigations, on s'intéressera à cette même question en privilégiant l'évaluation de l'impact des chocs structurels, macroéconomiques et sectoriels en plus de l'accroissement de la pression concurrentielle. Il sera également question d'analyser les chocs structurels d'intégration ouest africaine de la mise en place du marché unique au lendemain de la dévaluation et la création de l'UEMOA. De façon générale, il s'agit de porter notre regard sur les implications du processus de mondialisation accompagné d'une hausse notoire des intensités d'importation et d'exportation dans l'ensemble des industries des pays. De plus, il est important d'évaluer les effets sur l'économie d'une diminution ou d'une augmentation du facteur de marge des secteurs à l'aide d'un modèle

macroéconomique tenant compte des spécificités de ces secteurs telles que la taille ou l'intensité capitalistique. Ce modèle peut être calibré selon les caractéristiques du Sénégal et l'avantage d'une telle démarche permet d'analyser et de mesurer les enchaînements économiques consécutifs à une baisse du markup. En effet, une diminution du facteur de marge entraîne une hausse de la demande du bien produit par le secteur provenant des consommateurs et des entreprises et, par ricochet, une baisse de la production et de l'emploi dans ce même secteur. Dès lors, une réforme visant la réduction du facteur de marge, entraîne toujours, au niveau macroéconomique, l'augmentation du potentiel de production et de création d'emplois. Cette démarche permet de quantifier cette augmentation du potentiel national de production mais aussi le nombre d'emplois créés. Cependant, l'ampleur de ces effets varie selon les caractéristiques du secteur réformé notamment sa taille, son intensité capitalistique ou son degré de complémentarité du bien produit par le secteur avec les biens du reste de l'économie.

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Annexe

Evaluation comptable du coût d'usage du capital

Soit une entreprise représentative dans un univers incertain. Dans cette partie, nous adoptons l'approche inter-temporelle déclinée dans Teurlai et Chartelain (2002). De plus, nous assumons que les dirigeants de cette entreprise cherchent à maximiser leur richesse ou valeur de marché de la firme. Cette dernière est obtenue à partir de la condition d'arbitrage qui postule que le rendement après impôt de l'action de la firme doit être égal à un investissement alternatif. Pour ce qui est du rendement d'une action, il dépend des éventuelles plus-values en capital et des dividendes versés par la firme et s'exprime mathématiquement comme suit:

$$\frac{E_t\left[V_{it+1} + D_{it+1}\right]}{V_{it}} = \rho_t$$

Avec ρ_t : taux de rendement nominal d'un actif sans risque entre la date t et t+1 ;

V_{it} : la valeur de marché de la firme i l'année t ;

$E_t\left[D_{it+1}\right]$: l'anticipation formée par la firme i, à la date t, de la valeur du dividende D à la date t+1.

Ainsi, le problème de la firme représentative se résume à la maximisation de sa valeur de marché:

$$\underset{\{K_{it},B_{it}\}}{Max}\ E_t\left[\sum_{t=0}^{+\infty}\left(\prod_{s=0}^{t-1}\beta_s\right)D_{it}\right]$$

$\beta_t=\frac{1}{1+\rho_t}$: le facteur d'actualisation entre deux périodes.

Par ailleurs, la valeur des dividendes à la date t s'exprime comme :

$$D_{it}=(1-\tau_t)\left[p_{it}F(K_{it},L_{it})-w_tL_{it}-i_{it-1}B_{it-1}\right]+\tau_t\delta p_{Ist-1}K_{it-1}+$$
$$B_{it}-B_{it-1}-(1-subv_{it})\,p_{Ist-1}\left[K_{it}-(1-\delta)K_{it-1}\right]$$

Avec L_{it} : les salariés de la firme i à la date t ;

w_t : le taux de salaire nominal ;

p_{Ist} : le prix sectoriel du bien d'équipement ;

p_{it} : le prix de la production de l'entreprise i l'année t ;

τ_t :le taux d'imposition des profits ;

B_{it} : le stock de dette de la firme i à la date t ;

i_{it} : le taux d'intérêt nominal de la dette ;

K_{it} : le stock de capital de la firme ;

$subv_{it}$: les subventions d'investissement ;

F : la fonction de production qui vérifie les hypothèses habituelles relatives à la productivité marginale du capital $(F_K\succ 0, F_{KK}\prec 0)$ et la condition d'Inada.

De plus, nous assumons que la dynamique du stock de capital est régie la loi du mouvement du capital qui s'exprime comme suit :

$$K_{it}=(1-\delta)K_{it-1}+I_{it}$$

I_{it} : l'investissement corporel de la firme i à la date t.

Dès lors, le programme de la firme devient :

$$\underset{\{K_{it},B_{it}\}}{Max}\ E_t\left[\sum_{t=0}^{+\infty}\lambda_t\left(\begin{array}{l}(1-\tau_t)\left[p_{it}F(K_{it},L_{it})-w_tL_{it}-i_{it-1}B_{it-1}\right]+\\ \tau_t\delta p_{Ist-1}K_{it-1}+B_{it}-B_{it-1}-(1-subv_{it})\,p_{Ist-1}\left[K_{it}-(1-\delta)K_{it-1}\right]\end{array}\right)\right]$$

Avec :

$$\lambda_t=\left(\prod_{s=0}^{t-1}\beta_s\right)$$

Les conditions de premier ordre par rapport aux variables de contrôle (B_{it} , K_{it}) donnent les équations suivantes :

$$1-\beta_t\left[1+E_t\left\{\left(1-\tau_{t+1}\right)\left(i_{it}+\frac{\partial i_{it}}{\partial B_{it}}B_{it}\right)\right\}\right]=0$$

ou :

$$\rho_t-\left(1-E_t\tau_{t+1}\right)=E_t\left[\left(1-\tau_{t+1}\right)\frac{B_{it}}{p_{Ist}K_{it}}\frac{\partial i_{it}}{\partial B_{it}}\right]\succ 0$$

$$\left(1-\tau_t\right)p_{It}F_K\left(K_{it},L_{it}\right)-\left(1-subv_{it}\right)p_{Ist}+\beta_t E_t\left[\left(1-subv_{it+1}\right)\left(1-\delta\right)p_{Ist}+\left(1-\tau_{t+1}\right)\frac{B_{it}^2}{p_{Ist}K_{it}}\frac{\partial i_{it}}{\partial B_{it}}\right]=0$$

ou :

$$F_K\left(K_{it},L_{it}\right)=CUK_{it}=\frac{p_{Ist}}{p_{It}}\frac{\left(1-subv_{it}\right)}{\left(1-\tau_t\right)}\left[1-c_1-c_2-c_3\right]$$

Avec :

$$c_1=\frac{\left(1-\delta\right)}{\left(1-\rho_t\right)}\frac{E_t\left[\left(1-subv_{it+1}\right)p_{Ist+1}\right]}{p_{It}\left(1-subv_{it}\right)},$$

$$c_2=\left[\rho_t-i_{it}\left(1-E_t\tau_{t+1}\right)\right]\frac{B_{it}}{p_{Ist}K_{it}\left(1-subv_{it}\right)}$$

$$c_3=\frac{\delta E_t\tau_{t+1}}{\left(1-subv_{it}\right)}$$

La condition de premier ordre relative à B_{it} indique que le choix du ratio d'endettement optimal (dette/capital) ne dépend pas de la politique d'investissement de l'entreprise mais plutôt des avantages fiscaux liés à une stratégie d'endettement. Après quelques manipulations, le coût d'usage du capital s'écrit comme suit :

$$CUK_{it}=\frac{p_{It}}{p_{st}}\left(1-subv_{it}\right)\left[AI_{it}\left(\frac{B_{it}}{B_{it}+E_{it}}\right)+\frac{LD_{it}}{\left(1-\tau_t\right)}\left(\frac{E_{it}}{B_{it}+E_{it}}\right)-\frac{\left(1-\delta\right)}{\left(1-\tau_t\right)}\frac{\Delta p_{It+1}}{p_{It}}+\delta_{st}\right]$$

En effet, cette équation est obtenue en suivant l'hypothèse de Hayashi (2000), qui postule que le taux de l'impôt sur les sociétés est constant.

THE PRACTICAL ADAPTATION AND SOME ECONOMIC ASPECTS OF THE INTERNATIONAL ACCOUNTING STANDARDS

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Abstract. This paper traces the benefits of international accounting standards – their contribution to harmonization and globalization. The differences between the national accounting rules and the international accounting standards are compared, measured and valued inside and outside of the European Union. Some economic characteristics of the international accounting harmonization are introduced, especially the influence of the standards on the division of labour, financial innovation, and transaction costs.

JEL Classification: M16, M 41, M 48

Keywords: accounting standards, national accounting rules, economics of standards, international accounting harmonization.

1. Introduction

Especially the multinational companies spend enormous money for preparing and auditing their accounting reports according to the different national regulations. For these multinational companies the aspects of maximizing the profit is significantly more important than the consideration of national interest or the geographical position. Because of this there is a demand for creating such accounting systems which are evaluating the holder's economic results equally.

Meanwhile the interpretation and adaptation of the financial information based on the different accounting methods are also expensive for the users of these reports. Therefore an authentic and standardized international account

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reporting system could form that business language, which would allow the comparison of the accounting information of each country. By cross-national comparisons are intended to analyze the impact of movement from cash to accrual accounting in East European Countries (Tudor, 2006).

According to the business practice it is obvious that the usage of international accounting principles leads to a reduction of the information asymmetry between the owners and the managers. By this information asymmetry are growing the costs of equities and are less accurate the economical and financial forecasts.

This requires the development and review of the national accounting rules, the separate validation of the tax and accounting regulation, the repeal of the subordinate role of accounting, issuing international standards with the help of practical and theoretical accounting experts and last, but not least the enhancement of the trueness and completeness of the international accounting standards.

International harmonization of accounting standards is an important topic in this globalising economy. Standard setters, company managers and researchers alike are interested in the evolution of global standards. All current indications are that harmonisation will come true, it is just a matter of how fast it will happen, who will set the global standards, and how they will set them. In the meantime, there are a myriad of open research question.

With increasing globalization of the marketplace, international investors need access to financial information based on harmonized accounting standards and procedures. Investors constantly face economic choices that require a comparison of financial information. Without harmonization in the underlying methodology of financial reports, real economic differences cannot be separated from alternative accounting standards and procedures. Harmonization is used as a reconciliation of different points of view, which is more practical than uniformity, which may impose one country's accounting point of view on all others. Organizations, private or public, need information to coordinate its various investments in different sectors of the economy. With the growth of international business transactions by private and public entities, organizations the need to coordinate different investment decisions has increased. A suitable accounting information system can help multinational enterprises accomplish their managerial functions on a global basis.

International accounting literature provides evidence that accounting quality has economic consequences, such as costs of capital (Leuz and Verrecchia, 2000), efficiency of capital allocation (Bushman and Piotroski, 2006) and international capital mobility (Guenther and Young, 2008). On 19 July 2002, the European Union (EU) Parliament passed a regulation that requires all companies listed in the EU to adopt International Financial Reporting Standards (IFRS) for fiscal years starting after 1 January 2005. Widespread adoption of IFRS will result in a fundamental change in the business environment, since prior to 2005, companies followed a variety of country-specific Generally Accepted Accounting Principles (GAAP).

The increased transparency promised by IFRS also could cause a similar increase in the efficiency of contracting between firms and lenders. In particular, timelier loss recognition in the financial statements triggers debt covenants violations more quickly after firms experience economic losses that decrease the

value of outstanding debt (Ball, 2004; Ball and Shivakumar 2005; Ball et al., 2006a).

Accounting theory argues that financial reporting reduces information asymmetry by disclosing relevant and timely information (e.g. Butter et al., 2007). Because there is considerable variation in accounting quality and economic efficiency across countries, international accounting systems provide an interesting setting to examine the economic consequences of financial reporting. The EU' s movement to IFRS may provide new insights as firms from different legal and accounting systems adopt a single accounting standard at the same time. Improvement in the information environment following change to IFRS is contingent on at least two factors, however. First, improvement is based upon the premise that change to IFRS constitutes change to a GAAP that induces higher quality financial reporting. For example, Barth et al. (2006) find that firms adopting IFRS have less earnings management, more timely loss recognition and more value relevance of earnings, all of which they interpret as evidence of higher accounting quality. Second, the accounting system is a complementary component of the country's overall institutional system (Ball et al., 2006b) and is also determined by firms' incentives for financial reporting. Li and Meeks 2006) provide the first investigation of the legal system's effect on a country's financial system. They find that common law countries have better accounting systems and better protection of investors than code law countries. Other factors associated with financial reporting quality include the tax system (Shleifer and Vishny,. 2003) ownership structure (Fearnley and Sunder, 2007; Ball and Lakshmann, 2005), the political system (Leuz et al., 2006), capital structure (Chatterjee, 2006) and capital market development (Botsari and Meeks, 2008). Therefore, controlling for these institutional and firm-level factors becomes an important task in the empirical research design. As a result of the interdependence between accounting standards and the country's institutional setting and firms' incentives, the economic consequences of changing accounting systems may vary across countries. Few papers have examined how these factors affect the economic consequences of changing accounting standards. For example Ormrod and Taylor (2006) find that accrual anomaly is more prevalent in common law countries. Hesser et al. (2006) find that accounting quality is associated with tax reporting incentives. Exploration of the interaction between these factors and accounting standards can provide insights into differences in the economic consequences of changing accounting principles across countries.

One study (Bradshaw et al., 2008) characterises of accounting amounts for businesses that adopted IFRS to a matched sample of companies that did not, and found that the former evidenced less earnings management, more timely loss recognition, and more value relevance of accounting amount than did the latter. They found, that IFRS adopters had a higher frequency of large negative net income and generally exhibited higher accounting quality in the post-adoption period than they did in the pre-adoption period. The results suggested an improvement in accounting quality associated with using IFRS.

Another study (Bradshaw et al., 2008) found that first time mandatory adopters experience statistically significant increases in market liquidity and value after IFRS reporting becomes mandatory. The effects were found to range in magnitude from 3 % to 6 % for market liquidity and from 2 % to 4 % for company by market capitalization to the value of its assets by their replacement value.

Daske et al. (2007) also found that the capital market benefits were present only in countries with strict enforcement and in countries where the institutional environment provided strong incentives for transparent filings. In the order IFRS adoption countries, market liquidity and value remained largely unchanged in the year of the mandate. In addition, the effects of mandatory adoption were stronger in countries that had larger differences between national GAAP and IFRS, or without a pre-existing convergence strategy toward IFRS reporting.

2. The practice of adapting the international accounting standards

The international accounting companies (KPMG-Analysis, 2009) carried out a research in over 60 countries in all continents in order to find the differences between the international and national accounting standards. In this paper I carry out some comparison, valuation and causal link study using the basic data of the research supplemented with the Hungarian accounting practices from my own researchers at the member companies of Budapest Stock Exchange in the year of 2009.

2.1. The accounting peculiarities of the member states of European Union

At first I have chosen the eligible countries inside the European Union according to the research. In the study sixteen international standards content and characteristic were compared with the international accounting rules and standards. Five from these standards (1, 7, 8, 14, and 25) plays crucial part in the comparison of the accounting reports. The IAS 2 standard is to prescribe the accounting treatment for inventories, the IAS 17, 36, 38 standards are in connection with tangible and intangible assets, the IFRS 7 is regarding to the disclosure and presentation of the financial instruments, the IAS 19, 37 contains the regulations in connection with the other liabilities and debtors, the IAS12 and IFRS 5 are details the special accounting practices, while IAS 27 and IFRS 3 is about the accounting of the Combinations by Contract, Alone or Involving Mutual Entities. Thus it can be concluded that the standards used in the sample are sufficiently represents all areas of accounting, particularly the rules about the set up of the accounting report. I have analysed the member states of the European Union separately because the previous regulations (e.g.: the 1606/2002 on the application of IAS), directives (e.g.:78/660/EEC, 83/349/EEC, 2006/43/EEC), communications (e.g.: COM/2003/283) and recommendations (e.g.: C/2000/3004) made by the EU were in order to implement the accounting harmonization and the common accounting principles. The researchers compared the international standards with the national accounting principles and rules per its components. They only declared them as harmonized, if they show a complete match. These specifications were made with all 16 standards in case of all countries. I hereby calculated the deviation between the international standards and the national regulations and principles in the eligible countries of the United Nations in percentages and summarised it in Figure 1.

- According to Figure 1 two opposite tendencies can be identified. In connection with the continental European countries the deviation from the international standards is greater than in case of the two island nations (Great Britain and Ireland). The greatest deviation from the international standards could be identified in the case of Luxembourg (over 80%). The Commission of the European Communities warned (e.g. the European

Court's C-115/05 judgement) its member nation to take provisions necessary to comply with Directive 2001/65/EC of the European Parliament regards the valuation rules for the annual and consolidated accounts of certain types of companies as well as of banks and other financial institutions. It is obvious that the Anglo-Saxon (or Anglo-American) accounting system differs from the continental European, Asian, Latin-American or any other countries of the world. In case of the Anglo-Saxon countries the stock exchange plays a significant influential role in the national accounting practice, but not performs a cardinal role in the regulation process. In Great Britain the company law contains the necessary accounting requirements not just in case of the Limited Liability Companies but also for stock exchange listed companies. Besides not just the whole accounting profession but also, in lesser extent, the stock exchange participates in developing the national accounting regulation system. The country established its own professional bodies responsible for the regulation of accounting. One of these bodies is ASB (Accounting Standards Board), which has the authorization for issuing National Accounting Standards. The Accounting regulation works the same in Ireland too. The law system of the Anglo-Saxon countries (common law) does not containing rules in connection with the behaviour of the companies or the preparation of the annual accounts. In such circumstances accounting doesn't have a subordinate role. Instead the practical and theoretical accounting professionals creating standards very similar to the international ones, since the international standards are having a major effect on their national standards. In such economic environment the adaptation and implementation of international accounting standards into the national account system is much easier and faster, than in the case of the Continental European countries introduced in the next paragraph.

The European Union countries have been divided into two groups depending on their finance, legal and tax systems. According to many researches, countries with a code-based legal system and with a business financing structure that is primarily based on banking, are characterized by a strong tax influence on accounting and therefore, by the presence of governmental rather than professional regulatory bodies. On the other hand, countries with a system based on common law and with a well-developed capital market have issued accounting rules independently from tax rules, under the auspices of professional bodies. Under these circumstances, we make the hypothesis that the investor-orientated legislation in common-law countries versus the creditor orientation of code-law countries will imply a higher value relevance of earnings than book value in common-law countries and vice versa. (Acre and Mora, 2002) The Netherlands, in spite of being a code-law country, has been typically included in the Anglo-American group due to the characteristics of its accounting system. So, for our purpose, we consider the UK and the Netherlands in the Anglo-American group and Belgium, France, Germany, Italy, Switzerland and Spain in the Continental group.

The classification of the national accounting systems it is possible to divide into two groups: those with significant equity markets and outside shareholders (the Anglo-Saxon model) and those with weak equity markets and few

shareholders (continental European model). Consolidated (group) accounts drawn up under UK, US or international accounting standards would typically fall into the former group, while examples of the latter would include individual French, German and Italian accounts (Soderstrom and Sun, 2007).

Most of the Continental European Union member countries law system is based on the principles of the Roman law (jus civile). The codification of the law characterizes these countries. In such legal environment the adaptation and implementation of international accounting standards into the national account system is much harder and takes longer time. Because of this and as the data of Figure 1 also shows us, the deviation from the international accounting standards are much bigger in these countries, although in a varying degree, than in the case of the island nations of the EU. Inside the accounting systems of the continental Europe we can differentiate three accounting cluster: Germanic, Latin and Scandinavian. The Germanic states (Austria, Germany, Hungary, Czech Republic) accounting system is in many ways differs from Anglo-Saxon and Scandinavian countries. For example the company and tax law in Germany plays a pivotal role on accounting. Also in Germany the Commercial Code contains the account reporting principles. Half of the German accounting principles differs from the international standards because their account law doesn't contains rules in connection with the effects of the exchange rates in case of the foreign based subsidiaries; the review of the value adjustment after the non tangible assets lifespan exceeds the 20 year limit; the publishing commitments in case of the change in the Capital and reserves; the financial instruments valuation at fair value; disclosure commitments in case of related undertakings and the rate of dividend per share. There is no consistency in the accounting of business combinations, in the case of the accounting of leases grouped by tax provisions, and also in the evaluation of the assets.

National General Accepted Accounting Principles (GAAP) in "code-law' countries were more frequently accused of abusing transparency due to legally imposed techniques such as statutory reserves, but failures even under "common-law' national GAAP' s have also been widely cited. But the IFRS-based financial reporting will ensure reasonable accomplishment of financial statement objectives. National GAAP' s have commonly been categorized as being designed for either code law or common law traditions, with most continental European GAAP' s and Japanese GAAP being examples of the former, and U.S., U.K. GAAP and IFRS (which was largely derived from U.S.,U.K. GAAP) being typical of the latter. There is notably, that countries moving from code-law-based GAAP to IFRS will experience a more substantial change in financial reporting standards than will those moving from common-law-based GAAP to IFRS. The International Accounting Standards Board (IASB) prefers less comprehensively prescribed guidance (using a principles-based approach) that does the Financial Accounting Standards Board (FASB) (using a rules-based approach).

The Hungarian accounting shows many similarities with the other continental, mainly Germanic, cluster members according to the place and classification. Our law system is similarly codified, so the accounting principles were also expressed by law. Since 1991 the interest of the owners and the creditors stands at the centre of the regulations also keeping the previous taxation goal. However the previously pivotal role of economic alignment and taxation is now gone. I will later discuss the classification of the individual standards, but

hereby, according to the information from the domestic stock exchange listed companies and from personal consultations I can declare that the Hungarian account regulation, the budget system, our accounting principles and evaluation methods constitutes a solid ground for the establishment of an IFRS financial statement. From the balance drawn up according to the national rules only some corrections (e.g. depreciation calculation after Value Adjustment, the decreasing the Revaluation reserve with calculated depreciation cost of the Asset, moving the accrual capital's consolidation margin to the profit reserve) and renames (reclassification of the Accruals and deferred income and the Prepayments and accrued income, the reclassification of the property rights and Payments on account in course of construction) will lead us to the IFRS balance sheet. In case of our Statement of revenue the reclassification of the given discounts and refunds as turnover lowering and the received discounts and refunds as material cost lowering elements, furthermore the reclassification of the extraordinary elements and the value of the Allocations for depreciation higher with value of the depreciation after the value adjustment also leads us to the IFRS balance sheet. By the time of the socialist economic system the Hungarian accounting principles always followed the Hungarian economic regulation system and the modifications of the taxation system in the 1980's as a chapter of the law on national finances. After 1991 accounting became an individual act considered the European rules (directives), and from 2001, after its re-codification, the international principles as well. The Commission review before the entering to the EU (2004) declared that the Hungarian national accounting rules are compatible with the accounting principles of the EU. Although some financial "scandals" (Postabank, Parmalat) derogated the faith towards accounting just like in the foreign countries, e.g. the USA (e.g. Enron), but besides these effects our accounting regulation is stable and reliable. Furthermore the national standards (leasing accounting, Inventories, Accounting policy regulations), developed in the last few years by the Ministry of Finance, can furthermore decrease the differences from the international standards.

The national regulations of the Latin cluster countries (Belgium, France, Italy, Portugal and Spain) shows several similarities with the Germanic cluster. Such as the pivotal role of the company and taxation law and also differs radically from the Anglo-Saxon characteristics. In France for example the codification rules are similar to the Napoleonic code (also in connection with accounting). In Italy, just like in other countries with conservative traditions, the accounting rules leaded the ventures to a minimized taxable profits and dividends. It is not unusual that the accounting information can serve for several different purposes (Management, Tax Authorities and Owners) simultaneously. The similarity between the national regulations of the countries in the Latin cluster also shows a minimum of 50%, but sometimes 80% (Spain) match to the international standards.

The EU states in the Scandinavian cluster (The Netherlands, Denmark, Sweden, Finland) also shows several conformity with the Anglo-Saxon countries but we can find some important Germanic effects as well, for example the importance of the tax legislation. Among the Scandinavian countries The Netherlands differs the least (only 15%) from the international standards. In Holland the impact of the micro-economical approach to the account is reasonable. Nevertheless the country also shows several similarities with the Anglo-Saxon characteristics. The pivotal role of the company law and the accounting profession

is also measurable here. The civil law contains the company law which is based on the principles of Roman law. In this respect it shows analogy with the continental European countries, except for the civil law which traditionally not plays the role of a detailed regulatory system. Other classification methods are also employed in the literature, for example Dragos (2006) showed in his research the hierarchical model using an original specification of the tree structure of the Nested Logit algorithm.

2.2. The accounting peculiarities of the countries outside of the European Union

After analysing the eligible EU countries, I present the differences between the accounting principles of the American, Asian and African nations, the European countries outside the EU and also in Australia and New-Zealand and the international accounting standards (Figure 2).

Besides Russia and Turkey the differences are less (it's not reaching the 50% mark) than in case of the EU member states. Among the European countries Switzerland follows the Germanic accounting principles and its difference from the international standards is nearly the same (62%).

Swiss accounting is among the most conservative and secretive in Europe and the world today. As in Germany, Swiss accounting practice is dominated by company lax and the tax regulations governing the accounting profession, which is small and still in the early stages of setting accounting standards. The legal requirements relating to accounting are modest and still permit the creation of secret reserves.

Norway's accounting principles reflecting Scandinavian effects and the deviation is similar to the Swedish. The Asian countries accounting rules follows the colonial specialities, so the impact of the colonizers is high. Thus in case Indonesia the Dutch, in case of India, Pakistan, Hong Kong and Malaysia the Anglo-Saxon and in the Philippines the Spanish and American impact is shown. In case of the Chinese accounting system it was both affected by western and the socialist Russian influence. A more micro-oriented decision-making approach is thus being encouraged that retains a measure of macroeconomic control – a difficult balance to strike given China's tradition of uniformity and detailed regulation. Moreover, this tradition appears to be consistent with established Chinese cultural values and hence will be difficult to change. The new accounting standards, structured as a basic standard and a series of specific standards, represent a major change of approach in Chinese accounting in that all enterprises are now required to comply with a unified set of accounting in that all enterprises are now required to comply with a unified set of accounting principles. In case of Japan we can notice both Germanic and American impact. Despite the significance of the stock market, the accounting tradition in Japan gives preference to the information needs and priorities of creditors and the tax authorities. The government has been a major influence on all aspects of accounting and the corporation tax law is another major, if not overriding, influence n income measurement practices in that corporate tax returns must be based on the annual accounts approved by shareholders. Government institutions are directly involved in accounting standard-setting. With accounting systems under the jurisdiction of two government institutions, there is no unified approach to regulation. In fact, a number of large listed corporations are obliged to prepare two sets of financial statements, one required by the commercial Code and the other by the Securities

and Exchange Law. The accounting profession is small and has lacked influence in the accounting standard-setting process, but it provides recommendations on the practical application of the legal accounting regulations (Radebaugh and Gray, 2007). However the Asian countries accounting systems are getting closer and closer to the Anglo-Saxon model.

The accounting in Argentina and Brazil follows the Latin rules and the difference is also similar (65%). As in France and Italy, the accounting tradition in Brazil gives preference to the information needs of creditors and the tax authorities. As in other Latin countries, the influences of government, company law, and the taxation regulations on accounting are fundamental importance. The accounting profession in Brazil is not as well developed as in the Anglo-Saxon countries, but the institute for Brazilian accountants issue accounting standards that form the basis of generally accepted accounting principles. The United States is famous for its accounting standards, which follows the Anglo-Saxon traditions and similarly to the British and Irish system it differs only in a small margin (15%) from the international standards. Mexico and Canada as former British possessions and members of the North American Free Trade Agreement (NAFTA) follows the Anglo-American (Anglo-Saxon) accounting principles. Australia and New-Zealand also as former British possessions follows the Anglo-Saxon accounting principles so the differences from the international accounting standards are rather small (15-25%).

2.3. Evaluation of the certain accounting standards

After evaluating the individual countries and the group of countries, the author has analysed the average differences in case of the certain accounting standards and what the background causes of these differences are. I display these differences in separate Figures 3 in case of the EU member states (Figure 1) and the non EU countries (Figure 2). I observed that the biggest average difference is detectable in case of the IFRS 7 (until 2007 IAS 30, 32) standard both within and outside the EU (82% and 68%), which standard is in connection with the disclosure and presentation of the financial instruments. The researchers remarked that in this case the certain countries were not claimed the disclosure and presentation of the financial assets and obligations on their fair value in their financial report as regulated in the accounting standard. This remark also stands in the case of Hungary. Hungarian national accounting regulations make the evaluation at fair value possible, but not compulsory. According to accounting practitioners only a few business choose this option. The personal consultations shows that this is because the tax consequences of this new model. Another typical difference is in connection the IAS 37 Provisions, Contingent Liabilities and Contingent Assets standard (68% and 80%). Searching for the causes it turned out, that there are no national regulations in connection with the making of Provisions, furthermore it can be made in cases when there are no liabilities yet and there are no special rules of readjusting the Provisions. In case of the Hungarian regulation, the researcher found the two, previously mentioned differences. This is because our Act on account is not requires that the Provision could only originated from a previous events, furthermore Provisions can be made in advance in case of the periodically repetitive costs, and it also not using the Present Value. There is a significant difference in case of IFRS 5 (IAS 35 until 2005) Non-current Assets Held for Sale and Discontinued Operations standard

(65% and 55%). In the international accounting there are no regulations referring to the Discontinued Operations. Neither our national act on account orders the information needed in case of the presentation of the Assets destined for sale or used in Discontinued Operations. It only orders the holder to demonstrate its future goals in the annual report which contains all the Discontinued Operations and the Assets destined for sale.

In case of the non EU countries the difference in connection with the IAS 19 Employee Benefits standard is also typical (65%). In case of the related EU countries this ratio is only 45%. The researcher missed the readiness of the regulations in connection with the cost of providing employee benefits and the costs above the pension benefits. In case of Hungary only the first half of the sentence stands. In case of the termination benefits the Hungarian regulation tries to follow the international standards. But we only admit the benefit as severance pay, which the employee gets in case the employer terminates his or her labour relation before the retirement period.

The difference between the national regulations and IAS 36 Impairment of Assets standard exceeds the 50% both in case of the EU member and non EU countries. Because in the national regulations there is no detailed rules on the testing of the impairment of the assets and the accounting of the impairment is only made after it declared durable. The Hungarian national regulation also differs from this standard, while it's not mentioning the external or internal signs of the impairment and the readjustment of the impairment, so there are no precise instructions regarding when to evaluate the "reference" value. Furthermore the category is not refers to the accounting date, but it relates the market value on the date of making the balance sheet to the book value on the accounting day.

We can see a difference of 55% relating to the IAS 1 Presentation of Financial Statement only in the case of the EU member states. The separate listing of the changes in the Capital and reserves is not present in the member state's accounting statement. This deficiency is also mentioned in about Hungary. But in the notes on the accounts we must demonstrate the important changes in the Capital and reserves by entitlements. So in my opinion this should be considered not as a substantial, but a formal deficiency. Another 52% difference is stands within the EU in case of the IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors, and this stands also for Hungary, because it allows a broader interpretation of the unforeseeable event. Our act on account is not differentiates between accounting policy and accounting estimate. It considers the estimating as policy. The accounting policy contains rules relevant to stocktaking, money handling, evaluating, and net cost calculation. Furthermore all found errors must be corrected. In case of substantial error the corrected account must be represented. By contrast, the international regulations are not following this method.

Finally there are some smaller margin differences which affect mostly the EU member countries. Those standards are the IAS 24 Related Party Disclosures standard, which has an average deviation of 52%, and IAS 27 Consolidated and Separate Financial Statements standard with the average difference margin of 53%. The last deviation comes from the fact that there are no or just a small disclosure requirements in the national accounting regulations. The Hungarian act on accounting also misses the list of such events. However that kind of information must appear in the Notes on the account. In respect of the Consolidated and

Separate Financial Statements the requirements towards consolidation of the special activity companies is missing. This deficiency not affected Hungary.

In case of the other standards the differences are much lower. Especially among the non EU countries (the average deviation is around 5-35%), but in case of the EU member countries the margins are still lower than 50% (around 22-35%). The smallest deviation we can recognize among the non EU countries is in the case of the IAS 7 Statement of Cash Flow standard (5%), while in case of the EU member countries it's the IAS 12 Income Taxes standard (22%). According to Hungary there were differences in case of standards Business Combinations, IAS 7 Statement of Cash Flows and IAS 38 Intangible Assets.

The research recorded the following Notes according to the other standards.

- IAS 2 Inventories standard: In case of using LIFO asset-management and valuation method there were no disclosures of the related values at FIFO asset-management and valuation method (In case of Hungary it is not a problem because we use LIFO and average costing asset-management and valuation method),
- IAS 7 Statement of Cash Flow: The cash flow itself missing from some countries account regulation (Not in case of Hungary),
- IAS 14 Segment reporting: The segment reporting is not at all or just partly compulsory (In Hungary segment reporting is only mandatory for the stock exchange listed companies),
- IAS 17 Leases: The activation of the leases is missing or just partly done (In Hungary the leases must be shown only in case of tied and long term calls),
- IAS 38 Intangible Assets: The activation of Research and Development, Trademarks and Brand names (In case of Hungary the standard is consisted as harmonized).

3. Some economic aspects of the standardized international accounting system

Historically, standardization of the international accounting principles has tended to follow the integration of the markets served by the accounts. Standards in the area of information and communication technologies are claimed to bring a number of benefits for the organisations that adopt them (Bunduchi, 2005). For example, the move to unified national accounting in the US in the early 20th century followed the integration of the national economy. Similarly the present impetus for global accounting standards follows the accelerating integration of the world economy. Without the common accounting standards the cross-border portfolio and direct investment my be distorted, the cross-border monitoring of management by shareholders obstructed, and the cross-border contracting inhibited and the cost of these activities may be needlessly inflated by complex translation (Meeks and Swann, 2009).

The purpose of the use of international accounting standards is that a single set of standards which ensures similar transactions are treated the same by companies around the world, resulting in globally comparable financial statements. However, using the accounting standards consistently by firms we will find that they are changeable, because they are depend on the varying economic, political, and cultural conditions in one state. Additionally, studies of the properties of

accounting output find that similar standards are applied differently around the world (Whittington, 2008).

The first argument for the harmonization of accounting standards is the existence of the multinational companies, who invest enormous efforts into the preparation of their financial reports in order to comply with the national standards. For these companies life would be much easier if the same rules would be applied to their subsidiaries all around the world. On the other hand this would be profitable for the investors as well, as they could compare the enterprises' results without difficulties, which would spare both money and other resources for them. This would also lead to the reduction of the information diversity between managers and investors. The information diversity is a costly and can be blamed for the decrease of the managers' bonus, the increase of the equity's cost and the inaccuracy of the economical and the financial forecasts.

To sum up, according to studies regarding the adoption of IFRS, the companies that adopted IFRS needed to spend less time with earnings management and recognized loss more timely. These companies also experienced an improvement in their accounting quality. The adoption of IFRS also raised market liquidity and the value of the company. But we also have to add that these positive effects can be experienced mostly in those countries where the institutional background is appropriate. To be sure, arriving at accounting standards that promote a more faithful representation of economic reality is extremely challenging. Indeed, as some have argued, the economics of a transaction are often in the eye of the beholder (Zeff, 2006)

In order to promote the outcome, a standard-setter must explain its view of the economics of transactions in the objectives to the standards. If there are competing views about how to faithfully represent the economics of a transaction, then the standard should state whether there is more than one acceptable treatment and why that conclusion was reached. Preparers and auditors could then use this information to reconcile the economics of a transaction to their understanding of the objectives of the standard-setter.

Investors want to understand the fundamental judgments being made by preparers and external auditors. Under a more principles-based system, both preparers and auditors will increasingly be called upon to exercise sound judgment as a replacement for rigid adherence to the compliance process of a rules-based system. This is a positive development, as it will promote clear and understandable financial statements that faithfully reflect a company's economic condition. Yet at the same time, it is clear that a system which relies on judgment requires that those judgments be clearly communicated in order to ensure comparability.

No matter how similar the accounting standards in different countries are there will be slight or even bigger differences in the way they are applied by companies due to the differences in the economical, political and cultural environment. A good example for how cultural differences can affect accounting practices is that in the countries which are characterized with small power distance and weak uncertainty avoidance accounting measures are more likely to be used as an indicator of a manager's performance than as a measure of the effectiveness of policies and procedures prescribed for them. Various researches draw the conclusion that countries having different cultures have also different accounting rules and practices (Burgstahler et al., 2006).

In countries whose culture is characterized as small power distance and weak uncertainty avoidance, one would expect a greater tendency to use accounting measures as an indicator of the results of the manager's decisions. Thus, the profit of a profit centre is more likely to be used as a measure of manager performance than to indicate the effectiveness of policies and procedures prescribed for the manager. Likewise, cost is more likely to serve as an indicator for the results of decisions made by a cost centre manager. For example, a field study comparing companies in the US and Taiwan found that managers in many Taiwanese firms did not have the full range of general management skills because the boss virtually all of the decisions. Taiwan's strong uncertainty-avoidance and long-term orientation are consistent with this tendency toward centralization.

Germany's strong uncertainty-avoidance culture also suggests a tendency toward centralization. Evidence of such a tendency is provided by an automobile industry expert. „Of the top 100 managers (at Volkswagen) 50 are not used for making their own decisions or thinking on their own." (Lere, 2009). There is a significant body of evidence that identifiable differences in the dominant culture of countries do exist and that they are associated with differences in the typical accounting practices of countries.

Beside the cultural and the economic characteristics, there are also political and legal ones, which have an affect on the way how a country adopts IFRS. In this respect there is a huge difference between the code law and the common law countries as for the latter ones it is much easier to adopt a principle based system than for the earlier ones, who are rather used to precisely composed acts ruling all of the areas one can think of.

The application of international financial reporting standards will allow greater comparison of international financial results. More sources and reports will be available to a greater audience of analysts to follow trends in countries where previously due to different regulations and thus different reports these were less meaningful. The unified financial reporting system will probably lead to new types of analysis and data, furthermore with the possible integration of new indicators from the practice of certain countries.

New indicators also mean a redistribution and transformation of competencies within a management structure. The evaluation of effectiveness related to the managers' decisions could change the skills requirements needed to fill certain positions and also the tasks assigned to them thus leading to a different organizational culture.

With numerous affiliates, subsidiaries and foreign operations in different countries, multinational companies spend a lot of time and have to pay huge amounts of money for completing their consolidated financial reports. Each subsidiary of multinational corporations has to prepare their financial reports according to their country's national regulations and eventually they all have to reconcile their financials to IFRS or the accounting standards their parent company is using.

Adoption of IFRS may lead to less time being spent trying to be in line with all the strict rules and regulations that come with the national rules-based accounting. Western European and American multinational corporations have been often outsourcing their accounting tasks to lower cost countries. If a globally accepted financial reporting standard was available, it would be even more likely that companies would contract out their accounting tasks to lower cost countries.

Currently, the management of companies from developed countries might be concerned that they do not find the necessary accounting expertise in developing countries. With the adaptation of the worldwide accounting standards, companies could centralize accounting training and could easily set up centralized financial support centres. The number of shared (financial and administrative) service centres could increase considerably. This would benefit the multinational corporations and create a significant number of new jobs in developing countries. With globalization under way, accounting professionals could easily reallocate (especially in the European Union where there are no country borders anymore) to other countries as accounting and financial reporting would have a common language.

There are divergent views on how comparability should be achieved. Some believe that comparability is best achieved by limiting the application of judgment and selection amongst possible choices. Others believe that comparability may be achieved through disclosure of the judgments that were made and how they impact the financial results. The more comparability is mandated, the more rules will be required to enforce it. Striving to obtain complete comparability, under detailed rules-based regimes, often defeats the purpose because the real comparability is lost through the many bright lines and exceptions created by the rules themselves.

The use of IFRS will also simplify communication between lenders and investors and will increase the opportunities to attract international capital. It will create a greater access to foreign capital markets and investments, will facilitate capital acquisition, cross-border acquisitions, ventures. It will possibly provide greater reassurance for investors, credit rating agencies and lenders, giving companies access to lower-cost capital in the line with the lower risk, permitting in this way a more efficient capital allocation. Another related argument in favour of positive capital-market effects is that IFRS reduce the amount of reporting discretion relative to many local GAAP. Consistent with this argument, research results show that tightening the accounting standards can reduce the level of earnings management and improve reporting quality

On the basis of the standard reports the fiscal and the economic situation of the companies becomes more transparent and comparable among the different countries. The unified standards favour especially for the smaller investors' interest because it is the most difficult for them to examine and compare the data of the statements of different countries. The cost of acquiring the information will be much lower. This transparency and comparability boosts the process of international division of labour at a standard world-market too. So it will be much easier for investors to place their investment to the joined countries, and they can harness the comparative advantages of the international division of labour.

Nowadays, in many countries the accounting systems do not put the interests of the investors at the first place primarily, but the interests of the credit banks and tax aspects. The introduction of the IFRS helps countries to converge their accounting systems to the Anglo-Saxon model, where the report is made on the ground of the aspects of the investors. The standard system could help to spread the financial innovations in a wider environment, because the IFRS is similar to the Anglo-Saxon approach and it is the most efficient where there is a prosperous capital market. It would support the spread of the financial innovations worldwide and the unified attendance in the accounting systems.

Regarding the division of labour, an obvious advantage can be identified in the case of companies with global operations and foreign reporting requirements. Such benefits include the ability to streamline reporting and reduce related costs by developing common reporting systems and consistency statutory reporting. Such companies could develop regional financial centres, relocate finance resources depending on where they may be needed, and centralize training and development efforts.

In an increasingly global international environment a better developed international financial reporting system is becoming more important by the day. The advantages of more standardized national accounting rules and more comparable financial report are manifold. One of these advantages is the decreasing cost of capital. Investors may accept lower returns (interest on debt, dividends, and capital appreciation on equity) if on the other hand they only have to take lower risks. This is true if the international standards are properly enforced by the regulatory regime.

Concerning the increase in earnings, the strict application of international standards and the presence of incentives for transparent filings led to higher accounting quality, significant increase in market liquidity and capital market benefits, more timely loss recognition and more value relevance of accounting and more frequent large negative net incomes.

The transaction costs of investors decrease with the steps taken in the direction of a single presence of stock markets, the disappearance of different national regulations. The costs regarding accounting, auditing and international comparison will decrease with uniform reports instead of expertise needed for the summarization of several types of reports and comparisons. With the use of numerous different accounting and reporting standards, it is very difficult for companies to benchmark themselves against their competitors. The use of a global financial reporting standard would enable companies and investors to easily compare their company's performance to competitors.

Reporting according to IFRS provide much better access to world capital markets, which reduces the cost of capital. Investors cannot easily interpret the given countries' national financial reports. They are very reluctant to invest in companies without clear financials. It is high risk to invest in companies without easily accessible, clear financial reports. Investors expect higher returns from these companies, thus the cost of debt is higher for companies not preparing IFRS reports. IFRS would put the financial statements in a simple and understandable form for investors and other businesses interested in the firm. IFRS financial reports could have a positive effect on companies' credit ratings thus the cost of borrowing may be reduced. Also, IFRS are widely accepted as the financial reporting framework for companies who would like to get admitted to any of the world's stock exchanges. Since worldwide adoption of IFRS would create a common language for accounting, new capital markets would open to companies who have been reporting only in accordance with their national standards. One can easily say that companies have the opportunity to prepare their financials according to IFRS. However, small and middle size companies do not have enough funds and manpower to complete their financials both according to the national standards required by the law and according to IFRS, which would be desirable to enter the international capital markets.

International customer and supplier relationships could significantly improve with the increased transparency of companies' financial reports. Availability of internationally understood financial reports could open new markets to firms that have not been reporting in accordance with IFRS. Thus, companies may become more competitive on international markets.

Companies with foreign operations have to use different national accounting standards to complete their consolidated financial statements. Auditors (both internal and external auditors) have to be experts of each applicable national accounting standard or law of the multinational organizations' subsidiaries to be able to properly review and validate the accuracy of the company's financial reports. If IFRS was adopted world-wide, auditors could work more effectively with significantly less people. Also, smaller audit firms could review and validate the financial statements of multinational companies. Currently the big four audit firms (Deloitte, E & Y, KPMG, PWC) seem to be auditing most of the big internationally recognized corporations as they have operations (with the necessary expertise) in almost all countries around the world. I believe that IFRS could bring increased competition in the auditing field, which could reduce the unavoidable audit costs.

It seems to be apparent that the appropriate accounting standards contribute to the division of labour, to financial innovation and to the reduction of the transactional costs, the cost of capital and even to the increase of the enterprises' earnings.

Investors can reach to lower returns when the perceived risk of their investments is reduced. Risk is a function of many factors, but accounting risk refers to the risk in investing that derives from difficulties in understanding the accounting principles being applied by reporting companies, and the possibility that financial reporting standards may not be uniformly adhered to. Another aspect of accounting risk arises from the inability of users to process the information. If measurements and disclosures are of such complexity that the investors cannot understand this information when making decision, so they will perceive greater risk and should demand higher expected returns, therefore reaching a higher cost of capital too. This risk is originated from that the accounting directions are not clear and unified used by the different companies.

There is also risk based not on the underlying financial reporting principles, but on the confidence that the reporting entity has faithfully applied them. This depends on the investors' belief in the regulatory regime overseeing financial reporting (e.g. Security Exchange Commission – SEC – enforcement), and on the auditors' capabilities and willingness to enforce GAAP or IFRS rules. While auditors' honesty is challenged (such as Parmalat case had happened in Italy), the reluctance to confront clients opting for aggressive interpretations of accounting standards is more widely acknowledged. It is finding out, that the reducing accounting risk should have salutary effects on the cost of capital. A number of academic studies have investigated this premise, with overall positive, although there is not unanimous support for this proposition. Investor confidence in a given entity's financial reporting depends on more than the financial reporting standards it claims to subscribe to.

Tax system should be transparent and simple to enable accounting system in providing all the necessary information. For example, harmonization of Croatian tax systems opens up numerous opportunities to Croatia in achieving free

movement of capital and competitiveness on the European market. In every country accounting system and taxation are connected (Lutilsky, 2005).

4. Conclusion

Standardization of financial accounting has tended to follow the integration of the markets served by the accounts. The present impetus for global accounting standards follows the accelerating integration of the word economy. The global accounting standards would enable the world's stock markets to become more closely integrated. The more closely world's stock markets approach a single market, therefore, the lower should be the transaction costs for investors and the cost of capital for firms in that market. The differences in international reporting practice prior to IFRS constituted a palpable barrier to efficient international investment, monitoring and contracting. And the literature suggest that being confined to small segmented capital markets imposes a substantially larger cost of capital on firms and transaction costs on investors, which would inhibit much worthwhile investment. Although we do not have all elements for the cost-benefit calculation, the evidence points to substantial net gains for smaller economies which have joined to the IFRS regime. There is certainly empirical research evidence to support the notion that uniform financial reporting standards will increase market liquidity, decrease transaction costs for investors, lower cost of capital, and facilitate international capital formation and flow. And there is a sufficient basis to endorse IFRS and begin the challenging task of educating users, auditors, and regulators Educators and practicing accountants alike have significant roles to play in this exciting future.

International accounting standards create more transparency on the financial market. This provides investors more accurate information on company profiles. This way, even small investors (and not only professionals) will be able to get the information needed for their investment choices, thus they will be able to better compete on the market. More transparency will result in more international transactions that will have reduced costs because of the clear information provided by companies' reports. In case of consolidated accounts (when the company has foreign subsidiaries) bookkeeping will be facilitated and will also result in reduced transaction costs. No more adjustments will be needed in order to make financial reports of companies internationally comparable. Reduced costs will also result in more cross-listings and cross-border investments. International accounting standards also have a good effect on the division of labour. These standards and thus the less transaction costs will enable companies to be able to trade easier between each other. This will let them specialise in the field of their strengths and rather rely on suppliers that are also specialists in another field of their own than trying to produce the same product in-house, which will create a division of labour on the market. Accounting standards also provide information on company disclosure. Better transparency, by providing more information, and providing the accurate and understandable information will reduce the risk perceived by investors. The risk in question is the accounting risk that comes from the difficulties in understanding the accounting principles and standards applied by the firm, and also the inability of investors to process the information provided. By reduced risk investors will get lower returns from their investments that will result in lower cost of capital as well. Companies that are using IFRS face less earning management, more earnings and more value relevance of earnings. This can be due to the

easier flow of capital, the less costs attributable to the difficulties of adjusting the reports of companies from different accounting systems. Due to the decreasing costs of processing the information provided in financial reports the efficiency of stock markets will increase which will result in greater prices of stocks and thus greater capital income for enterprises. These all will provide space for more innovation on the financial markets because they could become more integrated, and more and new international transactions could be created. Due to accounting standards, the international flow of capital will be easier.

International accounting standards are also becoming more popular and tend towards integration as the global economy. The global standards have many benefits that are supported by many factors. However, there exist also some restraining factors. Due to the globalisation of the markets, international investors need access to financial information of companies that is easier by harmonized accounting standards. Many economic choices are done when investors realise their activities. These economic factors mostly favour international harmonization. Clear information is needed in order to facilitate investments in all sectors.

Culture can also be a determinant of international harmonization of accounting standards. For example, using Hofstede's cultural dimensions, we can find evidence in terms of international harmonization of accounting standards. For example, in small power distance and weak uncertainty avoidance countries, a greater tendency can be observed to use accounting measures as an indicator of the results of managers' decisions. Thus, profit will be rather used to indicate the good managerial performance. Strong uncertainty avoidance and long-term orientation will rather generate centralization of accounting standards. There exist differences in dominant culture of countries which will also result in differences in the accountancy too.

This requires the development and review of the national accounting rules, the separate validation of the tax and accounting regulation, the repeal of the subordinate role of accounting, issuing international standards with the help of practical and theoretical accounting experts.

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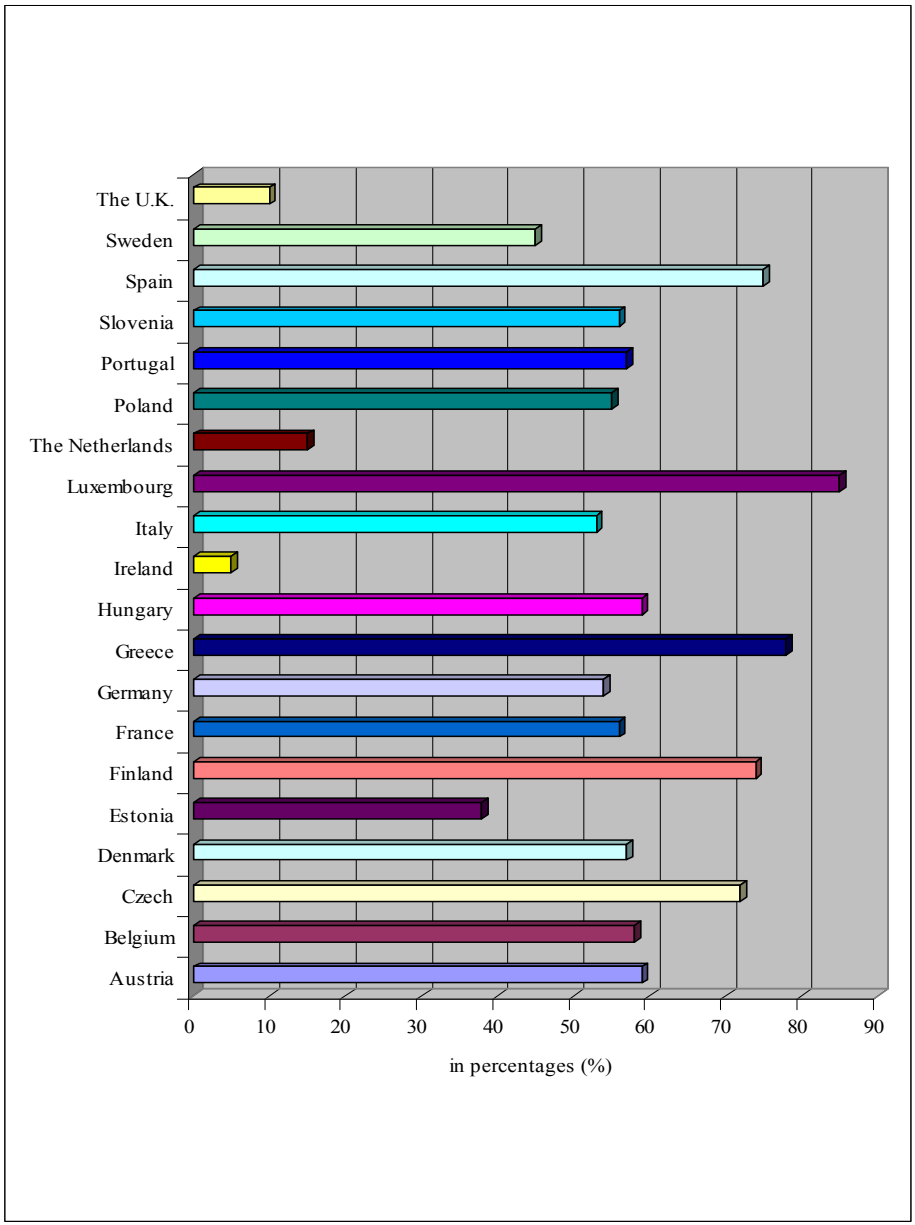
APPENDIX 1.

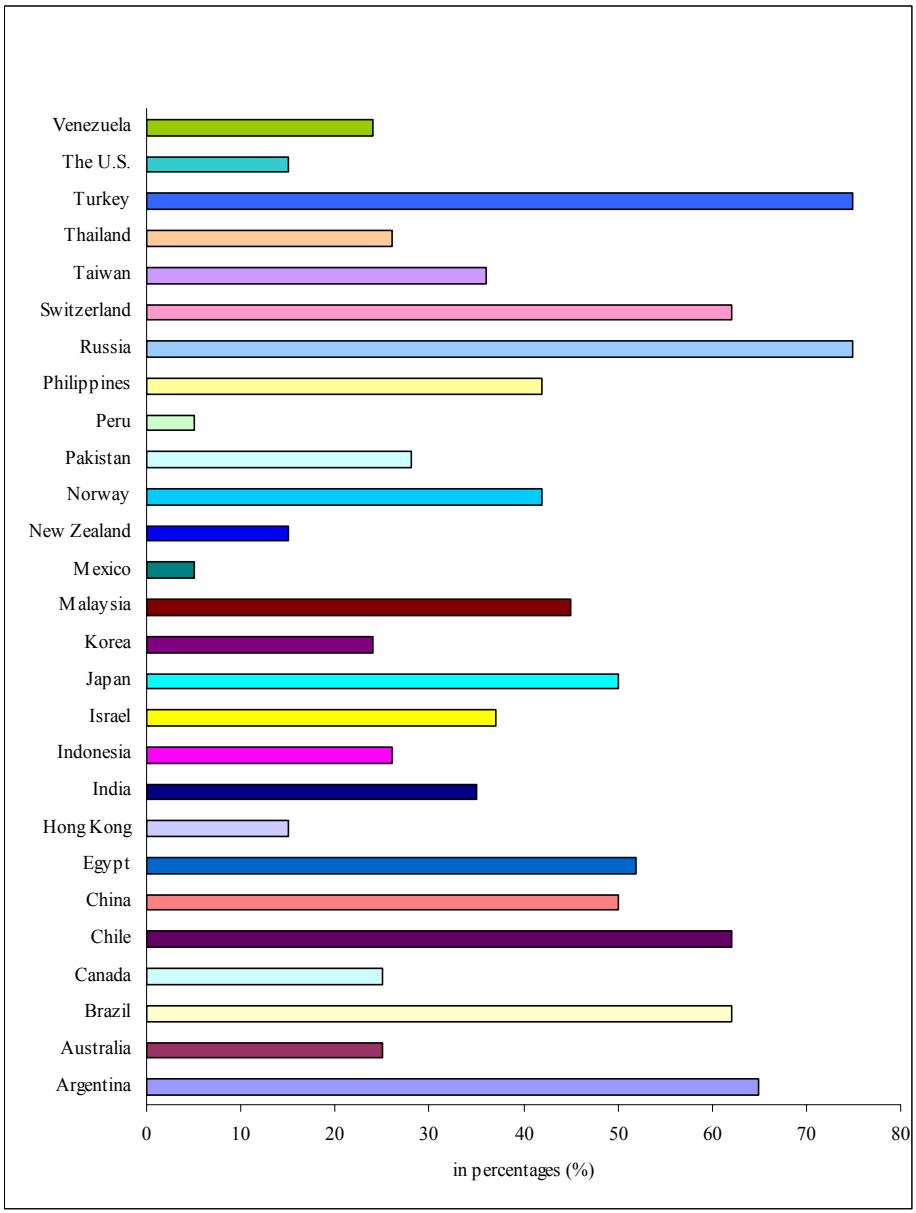
Figure 1: National accounting rules differences from IFRS in the EU



Source : Author's own construction

APPENDIX 2.

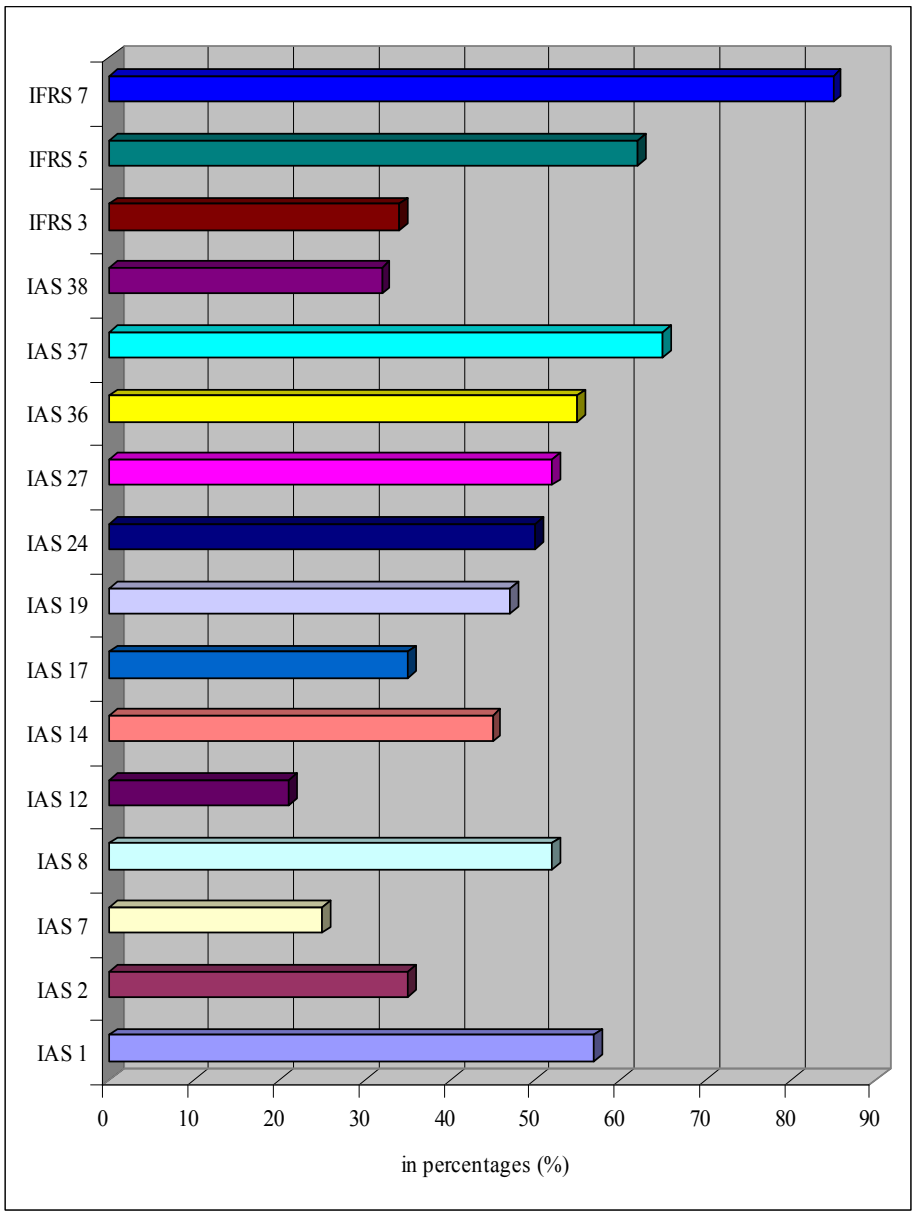
Figure 2: National accounting rules differences from IFRS outside of the EU



Source : Author's own construction

APPENDIX 3.

Figure 3: National accounting rules differences from IFRS by standards



Source : Author's own construction

THE TWO-TIER SYSTEM OF CORPORATE GOVERNANCE IN THE REPUBLIC OF MACEDONIA

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Abstract. Corporate governance is one of the least professionally studied issues in the Republic of Macedonia, although it has had crucial influence on the way how the national economy has functioned for the last two decades. Now days managers, researchers and government consider corporate governance as one of the most important and complex issues. This can be addressed to the standardization of the corporate governance regulations and practices in countries all over the world but also to the great privatization wave which has lasted almost permanently since the independence of the country. The Republic of Macedonia excepts both systems of corporate governance, that is the one-tier system of corporate governance and the two-tier system of corporate governance. The owners of the company decide which system they are going to implement. The corporation itself can change the system of corporate governance, which is from the one-tier to the two-tier system and vice versa by changing its statute. The one-ltier system of corporate governance is characterized by the governing of only one organ, the board of directors who is appointed by the shareholder and should protect their rights and interests in the corporation. The two-tier system on the other hand includes a governing and a supervision organ with shared responsibilities. The overall objective of this paper is to analyze the two-level system of corporate governance in the Republic of Macedonia.

JEL Classification: G30, G34, G38

Keywords: corporation, corporate governance, managerial board, supervisory board.

1. Introduction

The phrase corporate governance came into prominent use in the 1980s, and is often used narrowly to refer to the mechanisms and rules that govern

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relationships among direct corporate participants in publicly-traded firms, especially shareholders, directors, managers, and sometimes employees. But, historically, questions about social control over corporate behavior have been quite important. Since the corporate form first emerged as the dominant way to organize big business enterprises in the second half of the nineteenth century, policy concerns about corporations have, at various times, focused on antitrust, consumer protection, pollution control, worker and-or investor protection, corporate involvement in the political process, and corporate contributions of resources to charitable causes. The term 'corporate governance' refers to the legal rules, institutional arrangements, and practices that determine who controls business corporations, and who gets the benefits that flow from them. Corporate governance issues include how major policy decisions are made in business corporations, how various stakeholders can influence the process, who is held accountable for performance, and what performance standards are applied (Smelser and Baltes, 2004).

Over the past decade, there has been an increased interest in corporate governance. This can partly be attributed to a rising number of corporate crises and failures. Events such as the *Exxon Valdez* disaster, where an entire ecosystem was threatened, or the Ford Pinto scandal (where the organization decided to put profit ahead of human safety by not recalling cars despite their known defects) have sparked discussions about the role of large corporations in society and raised questions about their ethical standards, management decisions and corporate governance practices. Corporate failures such as Enron and WorldCom in the United States and HIH Insurance, Ansett and Pan Pharmaceuticals in Australia have raised concerns over the effectiveness of corporate governance and corporate accountability. (Bonn, Fisher, 2005).

There is much evidence of exponential growth in research on corporate governance in the last five years. Increasing research interest and activity has occurred not only in the United States where the subject is well established as a significant focus of business research, but also there is growing interest across Europe, and indications the subject is being taken up more actively throughout the industrial world. As in any comparatively new or under-researched area in the social sciences, the sudden minor explosion of interest has been accompanied by a good deal of doctrinal dispute over definitions of what are appropriate governance issues, how they might be researched, how results might be verified, and theory expounded (Clarke, 1998).

Unfortunately, most studies of corporate governance are largely ethnocentric and predominantly Anglo-American .In the few comparative international corporate governance studies that do exist, the research examines only two or three countries; antecedents are not explored; and the focus is usually on one stakeholder group in isolation of other groups. However, recent corporate governance research demonstrates that country level data influence governance practices much more than do firm- or even industry-level data. Furthermore, recent international studies demonstrate that corporate governance affects hostile takeover activity, firm market value and corporate corruption activity. Unfortunately, the antecedents of corporate governance legitimacy are much less studied and, hence, much less understood (Judge, Douglas and Kutan, 2008). There are many different definitions of corporate governance but they all have as their fundamental meaning the following ideas: systems of control within the company, relationships

between the companies' board/shareholders/stakeholders, the company being managed in the interest of shareholders/stakeholders (Hussain and Mallin, 2002).

Corporate governance refers to the way that companies are governed or run. Corporate governance is important because it refers to the governance of what is arguably the most important institution of the capitalist economy (Bevir, 2007).

Corporate governance describes all the influences affecting the institutional processes, including those for appointing the controllers and/or regulators, involved in organizing the production and sale of goods and services. Described in this way, corporate governance includes all types of firms whether or not they are incorporated under civil law (Turnbull, 1997).

Whether implicit or explicit, much of what is discussed in corporate governance has a moral aspect. This can be seen both directly and indirectly in issues such as Corporate Social Responsibility (CSR), reforms to increase transparency and accountability, the prevention of fraud, the discussions of directors' responsibilities, the rights of shareholders and stakeholders, and ultimately the fundamental questions concerning to whom corporations have obligations and for whose benefit they function (West, 2009).

Corporate governance mechanisms are economic and legal institutions that can be altered through the political process— sometimes for the better. One could take a view that we should not worry about governance reform, since, in the long run, product market competition would force firms to minimize costs, and as part of this cost minimization to adopt rules, including corporate governance mechanisms, enabling them to raise external capital at the lowest cost (Frederikslust et al., 2008).

Good corporate governance helps to prevent corporate scandals, fraud, and potential civil and criminal liability of the organization. It is also good business. A good corporate governance image enhances the reputation of the organization and makes it more attractive to customers, investors, suppliers and, in the case of nonprofit organizations, contributors. There is some evidence that good corporate governance produces direct economic benefit to the organization. One study, conducted at Georgia State University and published in December 2004, found that public companies with independent boards of directors have higher returns on equity, higher profit margins, larger dividend yields, and larger stock repurchases. This study was consistent with another study of 250 companies by the MIT Sloan School of Management which concluded that, on average, businesses with superior information technology (IT) governance practices generate 25 percent greater profits than firms with poor governance, given the same strategic objectives (Lipman and Lipman, 2006). Hilb (2006) makes a distinction between traditional corporate governance and new corporate governance (see table 1).

Table 1: Differences between traditional and new corporate governance

Dimension	Traditional corporate governance	New corporate governance
Situational Implementation	No difference between national, industry and corporate culture	Implementation appropriate to the specific context of each firm (Keep it situational)
Strategic Direction	Strategic development is not a function of the supervisory board	Strategic development is a central function of the supervisory board (Keep it strategic)
Integrated Board Management	Only isolated nomination and remuneration committees in publicly listed companies	Integrated and targeted selection, appraisal, compensation and development of the supervisory and managing boards (Keep it integrated)
Holistic Monitoring	Controlling the financial dimension only	Holistic monitoring of results from the perspectives of shareholders, clients, employees and the public (Keep it controlled)

Source: Hilb, 2006

The most widely accepted statement of good corporate governance practices are those established by the Organization for Economic Cooperation and development:

- *The rights of the shareholders*. The corporate governance framework should protect shareholder's rights.
- *The equitable treatment of shareholders*. The corporate governance framework should ensure the equitable treatment of all shareholders, including minority and foreign shareholders. All shareholders should have the opportunity to obtain effective redress for violation of their rights.
- *The role of stakeholders in corporate governance*. The corporate governance framework should recognize the rights of stakeholders as established by law and encourage active cooperation between corporations and stakeholders in creating wealth, jobs, and the sustainability of financially sound enterprises.
- *Disclosure and transparency*. The corporate governance framework should ensure that timely and accurate disclosure is made on all material matters regarding the corporation, including the financial situation, performance, ownership and governance of the company.

- *The responsibilities of the board*. The corporate governance framework should ensure the strategic guidance of the company, the effective monitoring of management by the board, and the board's accountability to the company and the shareholders.

Companies with good corporate governance are likely to have liquid secondary markets for their shares because good governance improves financial and operational transparency, which ultimately reduces information asymmetries between the insiders and outside owners/liquidity providers. Liquidity providers are therefore likely to post smaller spreads and larger depths for stocks of these companies (Chung, Elder and Kim, 2010).

Internationally, many corporate governance guidelines and codes of best practices have been published by supra-national agencies (e.g. the Commonwealth Guidelines (CACG, 1999); the OECD (1999) Principles; the World Bank Framework for Implementation, 1999), national regulatory bodies (e.g. the French Vienot Commission's Recommendations (AFG-ASFFI, 1998 and amended 2001); the German Code (GPCG, 2000); the Japanese Principles (CGFJ, 1997 and revised 2001); the UK Combined Code of Best Practice (CCGUK, 2000)), and non-regulatory institutions (e.g. the CalPERS (1997 and revised 1999) Principles and Guidelines; the TIAACREFF (2000) policy statement; the European Shareholders Association's Guidelines (ESA, 2000); the International Corporate Governance Network's Statement (ICGN, 1999); the Business Roundtable (1997) Statement). Following the latest corporate scandals including Enron, World.com and the like, many of these codes have been revised in the last few years (Ho, 2005).

2. Main features of corporate governance in the Republic of Macedonia

Since the independence of the Republic of Macedonia one of the priorities in the field of the countries economic development has been the establishment of a proper enviorenment for the development of business. Therefore one of the highest priorities has been first of all draftin a legal framework which would clearly define the grounds on which companies operate and establish internal and external relationships.

The first Company Law was enacted in 1996,but due to the inability of this law to correspond whith the daily needs and operations of the companies there was an eminent need for a new and improved law. Therefore in 2004 the new l company law was inacted. This law includes all types of business entities in the territory of the Republic of Macedonia.

The Company Law of 2004 is in fact the main legal framework that regulates ussues regarding corporate governance in The Republic of Macedonia. But besides thia law other laws and codes such as the Securities Law and the Corporate Governance Code constitute the legal framework on Corporate Governance in Macedonia. The table 2 is a summary of the Macedonian corporate governance legal framework.

Table 2: The Macedonian corporate governance legal framework (IFC,2007)

Law/Regulation	Applicable to	Explanations
Company Law	All commercial entities	Regulates company forms and legal capacities
Securities Law	Joint stock companies and limited partnerships by shares, which have issued securities that were publicly offered	Regulates the manners of securities issuance and trading
Law on takeovers	All public joint stock companies	Regulates takeovers, and in particular minority shareholders protection
Corporate governance code	Joint stock companies on the Macedonian Stock Exchange's super listing, but other joint stock companies are not excluded	Complements the Company Law and the Securities Law
Other regulations (bankruptcy, taxes, etc.)	All commercial entities	Regulate company-specific situations
Listing Rules of the Macedonian Stock Exchange	All joint stock companies, listed on the Macedonian Stock Exchange	Regulates companies' access to and participation in the stock exchange

The Corporate governance code for public joint stock companies in the Republic of Macedonia determines the main principles of corporate governance such as:

- ✓ The management body (the management board or the board of directors) and the supervisory board are responsible for the corporate governance structure of the company;
- ✓ All shareholders possessing the same type and class of shares are treated equally.
- ✓ Family members of the individuals who are authorized to represent the company and their representatives can not be appointed as proxies.
- ✓ Procedures for the general meeting of shareholders allow for equitable treatment of all shareholders. The company's procedures do not make it unduly difficult or expensive for shareholders to cast votes.
- ✓ Changes in the capital equity structure are made in a manner that ensures equitable treatment of shareholders, through the respect of pre-emptive rights in the case of new share issues.
- ✓ The company takes into consideration the interests of the company's stakeholders and has a code of conduct that regulates the company's relationship with its stakeholders.
- ✓ The company ensures the timely and accurate disclosure of all material matters regarding the corporation, including its financial situation, performance, ownership and corporate governance.

- ✓ The board of directors or the supervisory board is responsible for the strategic guidance of the company, the effective monitoring of management, and the board's accountability to the company and the shareholders.
- ✓ The management body or the supervisory board is composed in such a way that it provides independent, autonomous, and free expression of attitudes and opinions of the members.
- ✓ The board of directors or the supervisory board has a chairman who ensures that the board of directors or the supervisory board functions properly.
- ✓ The board of directors or the supervisory board is assisted by an internal legal counsel.
- ✓ The board of directors or the supervisory board considers whether to appoint a selection and nomination committee, an audit committee and a remuneration committee.
- ✓ The executive members of the board of directors or members of the management board are responsible for achieving the company's aims, strategy, and results.
- ✓ The executive members of the board of directors or members of the management board are responsible for complying with all laws and regulations, for managing the risks associated with the company activities and for financing the company.
- ✓ Any conflict of interest or potential conflicts of interest between the company and members of the management body or supervisory board are avoided.

The Company Law in the Republic of Macedonia recognizes both the one-tire and the two-tire system for corporate governance. But, the corporation itself can change the system of corporate governance that is from the one-tire to the two-tire system and vice versa by changing its statute. The one-level system of corporate governance is characterized by the governing of only one organ, the board of directors who is appointed by the shareholder and should protect their rights and interests in the corporation. The two-level system on the other hand includes a governing and a supervision organ with shared responsibilities.

Several key features distinguish Macedonia's corporate governance framework (The World Bank, 2005):

- ✓ Privatization in the 1990s left the legacy of companies largely controlled by managers, with the formal and informal support of employees.
- ✓ There is limited foreign investment, and no domestic institutional investors.
- ✓ The 2004 Company Law improved shareholder rights in a number of areas.
- ✓ Awareness of the importance of good corporate governance has greatly increased in recent years, with the activities of the USAID-funded Corporate Governance and Company Law project.The Macedonian Securities Commission (MSEC) and the Macedonia Stock Exchange (MSE) have played important roles in promoting minority protection and corporate governance reform. The MSE sponsored the translation of the OECD White Paper on Corporate Governance in South East Europe in 2004 while the recently established Macedonian Corporate Governance

Council hosted the OECD regional corporate governance roundtable in June 2004.

- ✓ The shareholder rights group Akcioner also plays an important role, drawing attention and media scrutiny to corporate governance abuses, and supporting the claims of minority shareholders.
- ✓ Two important institutions (the MSEC and the court (company) registrars) have historically had weak authority and limited resources; A new registration law is being drafted that will abolish the court registration of commercial legal entities in September of this year and that will introduce a one-stop-shop registration facility by the end of this year.
- ✓ Macedonia has established the goal of joining the European Union, and is gradually moving to adopt the acquis communitarian with the transposition of EU company law directives and OECD standards.

3. The two level system of corporate governance in the Republic of Macedonia

According to the two-level system of corporate governance the company has two governing bodies: the supervisory board and the managerial board. The supervisory board is the body the powers of which relate to the supervision over the company's operations and in particular to the operations of the management bodie. The members of the supervisory board are elected by the general meeting of shareholders. When electing the members of the supervisory board, it should be specified which members are elected as independent members of the supervisory board. If the supervisory board has up to four members, at least one of them must be an independent member. If the supervisory board has more than four members, at least one quarter of its members must be independent members of the supervisory board. As an independent member of the supervisory board can be considered a person who:

- ✓ Has not had any material interest or business relation with the company directly as a business partner, a member of the management body, supervisory body or an officer of the company within the five preceding years;
- ✓ Has not within the five preceding years received and does not receive from the company any additional income to his salary;
- ✓ Is not a relative of any of the members of the management body, supervisory board or the officers of the company; and
- ✓ Is not a shareholder who owns more than one tenth of the shares in the company or who represents a shareholder who owns more than one tenth of the shares in the company.

The supervisory board of the companies in the Republic of Macedonia must have at least three members bout no more that eleven members. A research conducted by Deloite Touche Tohmatsku Emerging Markets Ltd @ Overseas strategic Consulting Ltd in cooperation with the Ministry of economy and members of the Macedonian Corporate Governance Council in 2004 showed that most companies with a two level system of corporate governance in the Republic of Macedonia have between three and seven members of the supervisory board (see figure 1).

Figure 1 : Size of supervisory board in the Republic of Macedonia

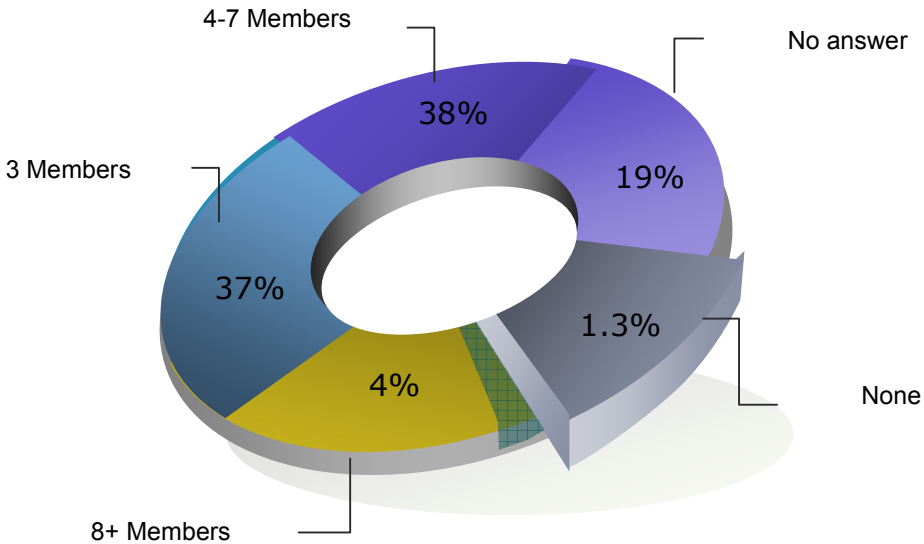
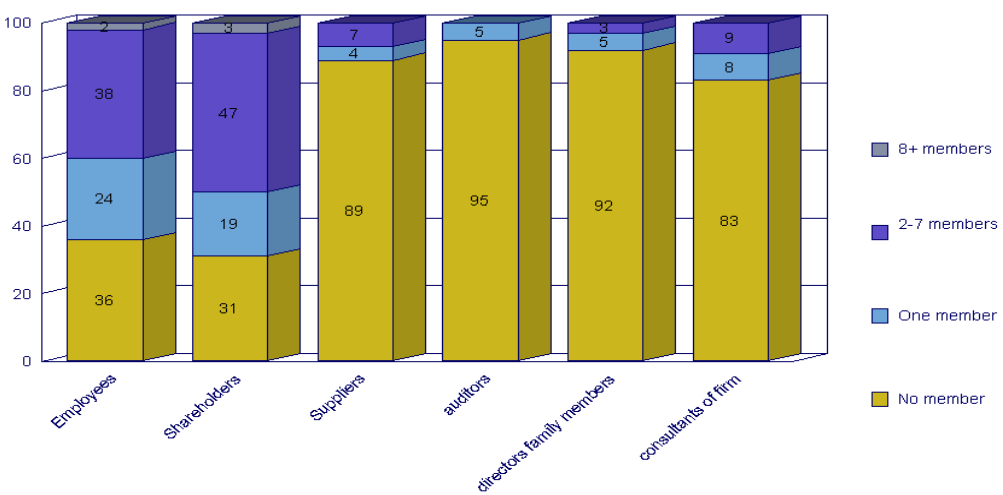


Figure 2 : The main characteristics of the supervisory board members in the republic of Macedonia



The same survey can be used in order to determine some of the main characteristics of the supervisory board members in the republic of Macedonia (figure 2).

According to article 380 of the Company Law the supervisory board has the following authorizations:

- ✓ Supervise the management of the company performed by the management board.
- ✓ Inspect and verify the books and documents of the company, as well as its assets, in particular the petty cash of the company and its securities and goods. The supervisory board may oblige certain members of the board, the certified auditor and/or experts, to carry out certain expert matters related to supervision.
- ✓ Represent the company in relations with members of the management board.

The supervisory board elects the president of the supervisory board from among its members, with a majority of votes from the total number of members of the supervisory board and has the right and power to dismiss the president at any time and elect a new one.If, for any reason, the president of the supervisory board is not able to exercise his functions, and/or if he is absent, the meetings of the supervisory board are be chaired by a member of the supervisory board elected by a majority of votes of the present members of the supervisory board.

The members of the management board are elected by the supervisory board. According to the Company law of Macedonia the management board of a company must have at least three but no more than eleven members in cases when the charter capital of the company is at least 150.000 EUR in denar counter valute. In companies with a charter capital of less than 150,000 EUR in denar counter value, a manager may be elected instead of a management board, having all the rights and liabilities of the management board. One of the members of the management board is elected as president but the supervisory board may dismiss the president of the management board and appoint a new one, at any time.

The management board has a duty to manage the company, and within such scope, it is be personally responsible for conducting the operations of the company. It has the broadest authorizations in managing the company, or in undertaking all matters related to the management of the operations and day-to-day activities of the company, and in acting, in all circumstances, on behalf of the company, within the scope of operations of the company, except for authorizations explicitly granted to the general meeting of shareholders and the supervisory board. Besides this the management board has the right to appoint managers who conduct the day-to-day management of the company, in accordance with the resolutions, instructions and orders of the management board.

Upon having obtained prior approval by the supervisory board the managerial board may decide on issues, such as:

- ✓ Closure (termination) and/or transfer of the business and/or any part thereof, contributing to more than 10% of the revenue of the company;
- ✓ Decrease and/or expansion of the scope of operations of the company;
- ✓ Essential internal organizational changes in the company, set out by a bylaw/ regulation of the company;
- ✓ Establishing long-term cooperation with other companies, being of essential importance for the company and/or its termination;

- ✓ Founding and termination of a trade company participating to more than one-tenth of the charter capital of the company; and
- ✓ Founding and termination of branch offices of the company.

In the Republic of Macedonia the members of the managerial board are the representers of the company, but upon approval by the supervisory board they may appoint one manager to represent the company.

6. Conclusions

This paper represents a general overview of the two level system of corporate governance in the Republic of Macedonia. The main features of corporate governance in Macedonia in general and the main features of the two level system of corporate governance in particular have been analysed as part of this paper. The main conclusion would be that even besides the legal framework that regulates corporate governance in Macedonia and the many "soft laws" that the corporations thrive to respect, still the general framework from the practical functioning of corporations point of view, must be improved and some of the weaknesses that can be seen from this paper must be removed in order to create a better environment for the corporations.

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EMPLOYED OR UNEMPLOYED? AN EMPIRICAL ANALYSIS OF ROMANIAN LABOR MARKET

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Abstract. The aim of this paper is to determine in which way gender, age and educational level influence the probability of a person to find a job or to be re-employed. The empirical investigation was made only for a Romanian county, because the great volume of data made it impossible to achieve them for the entire country. The results of the study show that the employment probability increases with 1.6 for the men registered as unemployed compared to women with the same status, on the labor market of Gorj County. For the age variable, the employment probability increases with 1.06 at its change with one unit (year). As for the educational level variable, the employment probability increases with 1.25 at the change with one unit of the educational level of the persons registered in the analyzed database.

JEL Classification: C41, J64, J21, J23

Keywords: unemployment, education, gender, age, odds ratio, logistic regression.

1. Introduction

The aim of this study is to determine to what extent gender, age and educational level influence the probability of a person to find a job or to be re-employed. As a methodology I used the logistic regression. Gender, age and educational level are independent (factorial) variables in the model, and the dependent variable has been called „status" in the study, the binary qualitative variable that takes values 1 for a person become employed and 0 for a person unemployed at the end of the analyzed period. The purpose of this study was to determine the probability of the persons from the database studied to be employed or unemployed at the end of the period subject to analysis, probability estimated

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according to independent variables gender, age and educational level. Statistical data were obtained from the National Agency of Unemployment Bucharest. At the beginning I wanted to determine to what extent gender, age and educational level influence the probability of a person to find a job or to be re-employed for the entire country. Although I filed an application to NAE in order to obtain data for the whole country, due to the great volume of data I we received only the database for Gorj County.

In recent years, various econometric models and techniques for modeling the probability of employment and duration of unemployment gained popularity among the economic researchers. Richard Berthoud (2003) in the chapter "Disadvantaging Characteristics" of his monograph called "Multiple Disadvantage in Employment" analyzes the influence of independent variables age, family status, educational level, health and ethnic background on the probability of subjects from Great Britain to find a job or to be re-employed. Alba Ramirez (1998) in his paper "Re-Employment Probabilities of Young Workers in Spain" inquires into the influence of gender, urban/rural area and educational level on the probability of young workers from Spain to become employed. Using nonparametric and parametric estimation techniques Tansel and Tasci (2005) found out that age has a negative effect on the probability of employment in Turkey. A negative effect of age for the probability of employment/reemployment was also showed by Kupets (2006) for Ukraine. Gonzalo and Saarela (2000) analyzed the influence of gender variable for the probability of employment in Finland and found out significant differences especially for subjects under 30 years. Regarding the education variable, Lauer (2005) studied the impact of educational level for the unemployment risk in France and Germany. Olliakainen (2003) demonstrated that education level has a positive impact in reducing the duration of unemployment in Finland. In contrast, Kettunen (1997) demonstrated that additional education level increases the probability of employment/reemployment, for lowest levels of education, but for highest level he found out a negative correlation between education and probability of employment/reemployment. Tansel and Tasci (2005) showed that educated individuals have a higher probability to find a new job in Turkey. Same results were obtained by Kupets and Nivorozhkin (2006) for Ukraine and Sweden. In contrast, Stetsenko (2003) found out a negative impact of education level for the employment/reemployment probability for Kyiv. Imbens and Lynch (2006) analyzed the determinants of employment/re-employment probabilities of young workers from the US and found out that business cycle has a considerable influence for the employment/reemployment probability.

Similar studies were done by Meghir and Ioannides (1989) for Greece, Tunali and Asaad (1992) for Egypt, Denise Britz do Nascimento Silva, Matias de Lima Luis Borges de Melo (2002) for Brasil, Shettle (2001) for US, Trickey, Kellard, Walker, Ashworth, and Smith (1998), for UK, Knuth and Kalina (2000) for Germany. For Romania, Dănăcică and Babucea (2007) analyzed the effects of gender, age and educational level for the duration of unemployment, for the same Gorj County. Unfortunately there are none of similar studies analyzing the variables that influence the probability of employment and their impact for Romania.

The paper is organized as follows: (1) Introduction, (2) Database description, (3) Methodology and empirical results and (4) Conclusions.

2. Database description

The database has individual information about all the subjects registered at the National Agency of Employment Bucharest during January 1, 2002 - August 31, 2006. The sample contains 80961 registrations, with information concerning the date of unemployment end, gender, age, educational level and the reason of unemployment leaving for each registered person. Because NAE Romania does not allow disclosure of personal information concerning the persons registered as unemployed, the database contains an identification number for every registered person.

Of 80961 persons registered in the database of Gorj County as unemployed, during 1.01.2002-31.08.2006, 19369 persons found a job, until August 31, 2006; the reason for their unemployment leaving was filled in the database with "employed". The average duration of unemployment until finding a job is of 6 months, the median of 2 months, the maximum value of 57 months and the minimum value of 0 months. Of these 6390 persons (33%) are women and 12979 (67%) are men. If the percentage difference between the male unemployment and the female unemployment registered in the database is of 17.8%, the percentage difference between the number of men who become employed and the number of women in the same situation is of 34%, which shows that although there are more unemployed men, and on the average they stay unemployed about one more week than women, however they are preferred by employers. As concerns the distribution on age groups, most of them (30.1%) belong to the 25-34 year-old age group, followed by the 15-24 year-old age group with 25.7%, 35-44 group with 25.4%, 45-54 group with 17.5% and 55-64 year-old age group with 1.3%. 0.4% of the employed are without education, 44.7% of the employed have an educational level of up to 10 grades, 37.4% are high school graduates, 8.6% of the employed graduated from vocational or foremen schools and 8.9% of the employed are university education graduates. Table 1 presents the bi-dimensional distribution of employees by gender and age variables.

Table 1: Employees' distribution by gender and age

Gender	Age					Total
	15-24	25-34	35-44	45-54	55-64	
Female	1772	1914	1705	982	17	6390
Male	3210	3918	3215	2398	238	12979
Total	4982	5832	4920	3380	255	19369

Table 2 shows the distribution of persons who became employed, by gender and educational level.

Table 2: Employees' distribution by gender and educational level

Gender	Groups by educational level					Total
	0	1	2	3	4	
Female	36	2700	2198	504	952	6390
Male	48	5950	5051	1158	772	12979
Total	84	8650	7249	1662	1724	19369

We can notice in table 2 that the number of men who became employed is almost double compared to the number of women for a low and average educational level (this type of jobs implies hard physical work, therefore women are disqualified), 2.29 times higher for the men who are post high school and foremen school graduates compared to women with the same educational level, and 2.03 times higher for men with university education compared to women who are university education graduates.

Table 3 shows the distribution of persons who became employed, by gender and educational level variables.

Table 3: Employees' distribution by gender and duration of unemployment (months)

Gender	Months										Total
	0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48	48-54	over 54	
Female	4633	1028	193	154	121	74	73	66	43	5	6390
Male	9665	1615	412	421	284	196	165	122	77	22	12979
	14298	2643	605	575	405	270	238	188	120	27	19369

We can notice in table 3 that the weight of women who become employed within 6 months from the date of unemployment is of 23.91%, compared to 49.90% men who become employed within the first 6 months from the date of registration at NAE. After a period of 6-12 months the weight of women who become employed is of 5.30% compared to 8.33% men; as time range increases, differences between men and women fade away.

Table 4: Employees' distribution by age and amount of time spent unemployed (months)

Age	Months										Total
	0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48	48-54	over 54	
15-24	4335	219	136	93	60	44	32	43	15	5	4982
25-34	4223	762	192	198	154	97	89	56	54	7	5832
35-44	3255	1004	158	166	100	73	64	61	29	10	4920
45-54	2293	627	115	107	81	52	50	28	22	5	3380
55-64	192	31	4	11	10	4	3	-	-	-	255
Total	14298	2643	605	575	405	270	238	188	120	27	19369

We can notice in the above table that 73.81% persons became employed within the first 6 months from the date of unemployment, 13.65% became employed after 6-12 months, the rest of 12.54% becoming employed after the first year from the date of unemployment. The percent of the persons employed decreases as the unemployment duration increases, the conclusion that can be drawn is that the more the duration of unemployment increases, the smaller the chance to find a job. Also, the proportion of persons who find a job within the first six months from the date of unemployment is high for the young age groups, 15-24

years and 25-34 years, as they are preferred by certain employers from specific departments of the labour market.

Table 5: Employees' distribution by educational level and duration of unemployment (months)

Educational level	Months										Total
	0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-48	48-54	Over 54	
University education	1396	114	10	12	4	4	5	10	5	2	1562
College	158	2	1	1	-	-	-	-	-	-	162
Post high school	418	40	8	7	8	6	8	4	2	2	503
Foremen school	844	125	44	59	34	24	13	8	8		1159
Speciality high school	2657	634	87	77	68	35	35	41	23	8	3665
Theoretical high school	2786	301	142	145	109	44	25	15	12	5	3584
Vocational school	3113	740	109	127	97	98	97	83	41	6	4511
Apprenticeship complementary education	842	78	31	16	11	10	-	1	3	-	992
Special education	15	1	-	-	-	-	-	-	-	-	16
Secondary school	1850	555	148	111	61	42	47	23	24	4	2865
Unfinished secondary school	167	41	14	16	11	7	7	2	1	-	266
Without education	52	12	11	4	2		1	1	1	-	84
Total	14298	2643	605	575	405	270	238	188	120	27	19369

As for the educational level variable, one can see in the above table that the greatest chance to become employed belongs to the persons with university educational level, compared to the persons without education or with lower education level.

3. Methodology and empirical results

As methodology, in order to determine the probability of the persons from the studied database to be employed or unemployed at the end of the period subject to analysis, probability estimated according to the independent variables gender, age and educational level, I used the *logistic regression*.

Unlike the multiple linear regressions where, based on several independent variables, a numeric dependent variable can be predicted, the logistic regression gives the possibility to predict a dichotomic nominal variable. The method of linear regression implies that both the factorial variables and the endogenous variable should be of a continuous type; by contrast, the logistic regression allows working with other types of variables.

The logistic regression model describes the relation between a dichotomic nominal variable *Y*, that takes the values 1 (success) and 0 (failure), and *k* factorial variables $x_1, x_2, x_3 .....x_k$. Factorial variables can be quantitative (numeric) or categorical. Since *Y* is a binary variable, it has a Bernoulli type distribution, with the parameter $p = P(Y = 1)$, where *p* is the probability of success for the given values $x_1, x_2, x_3 .....x_k$ of factorial variables. The average of Bernoulli type variables is given by:

$$E[y] = P(Y = 1) = p \qquad (1)$$

The logistic regression model is defined as follows: assuming that $Y_1 .....Y_n$ are independent Bernoulli variables, and be p_i the average of values Y_i, then $p_i = E[Y_i] = P(Y_i = 1)$. The value p_i can be expressed according to the factorial variables $x_{i1}, x_{i2}, x_{i3} .....x_{ik}$ thus:

$$p_i = \frac{1}{1 + \exp(-\beta_0 - \sum_{j=1}^{k} \beta_j x_{ij})} \qquad (2)$$

If we apply the logit transformation to the relation (2) we obtain a linear type connection between p_i and the factorial variables, as follows:

$$\log it(p_i) = \log(\frac{p_i}{1 - p_i}) = \beta_0 + \sum_{j=1}^{k} \beta_j x_{i,j} \qquad (3)$$

The 3rd equation is also known as a logit shape of the model. Logit (p_i) is the "odds" logarithm for success, for given values of the factorial variables $x_{i1}, x_{i2}, x_{i3} .....x_{ik}$.

The result of the logistic regression is also an equation, that predicts the best a binary effect variable (status, employed/unemployed), based on one or several variables that can be quantitative (age, educational level), or binary (gender). Instead of working with probabilities, (that may range between 0 and 1), the logistic regression works with the natural logarithm of the quota (odds), that can take any value, positive or negative. The equation of the logistic regression can be expressed as follows:

$$\ln(oddsY) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n \qquad (4)$$

A detailed presentation of logistic regression methodology and of the issues raised by its use was performed by Amemiya, T. (1985), Balakrishnan, N. (1991), Hosmer, David W., Stanley Lemeshow (2000), Agresti, Alan (2002) and Green, William H. (2003).

In my study, the factorial variables are: *gender*, alternative qualitative variable (male/female), encoded in the analysis with 1 (male) and 0 (female); *age*, quantitative variable, divided in five intervals, 15-24, 25-34, 35-44, 45-54, 55-64, in accordance with the Statistical Yearbook of Romania and *educational level*,

qualitative variable in the database received from NAE Bucharest, but changed into numeric variable, in compliance with the regulations of Romanian Ministry of Education. The dependent variable *status* (person's status at the end of the analysed period), is a dichotomic nominal variable that takes the values:

$$status = \begin{cases} 1, \text{ if the person found a job} \\ 0, \text{is the person is still unemployed} \end{cases}$$

The regression equation is:

$$\ln(odds\ statut) = \beta_0 + \beta_1 gender + \beta_2 age + \beta_3 educational\ level \qquad (5)$$

where β_1 *and* β_2 are regression coefficients calculated using the statistics program SPSS 10.0, and which in reality are natural logarithm of „odd ratio" and of each variable and β_0 is the constant, representing the natural logarithm of odds status for subjects who have zero values of all factorial variables (gender, age, educational level in this case). The method selected for the binary logistic regression was the Enter method, analysing simultaneously the factorial variables.

Table 6 shows the results of the Omnibus test for the model coefficients. The results of the test χ^2 and of the likelihood rate -2LL recorded in step 1 compared to the initial step 0 allow us to reject the null hypothesis ($H_0 : \beta_i = 0$) and to accept the alternative hypothesis.

Table 6: Results of the Omnibus test for regression coefficients

	Chi-square	df	Sig.
Step	1367.716	3	.000
Block	1367.716	3	.000
Model	1367.716	3	.000

Table 7 shows the results of Hosmer & Lemenshow test. The Hosmer & Lemenshow test divides subjects at deciles level, based on the estimated probabilities, applying in the next step the test χ^2 on the frequencies noticed. The values p=0.0000 are calculated according to the distribution χ^2 with 3 degrees of freedom and indicate that the logistic model is valid from a statistical point of view, therefore the null hypothesis can be rejected.

Table 7: Hosmer and Lemeshow test

Step	Chi-square	Df	Sig.
1	427.732	8	.000

Table 8 shows the estimated values of regression coefficients of the model of binary logistic regression. Sig. values, equal to zero, show us that all the three

factorial variables of the regression model are significant from statistical point of view and they influence the dependent variable of status. Similarly, the Wald test values show us that the regression parameters β_i are different from zero. Therefore the null hypothesis is rejected.

The estimated levels of the regression coefficients β_i are marked with *B* and *Exp (B)* represents „odds ratio" (OR) for each factorial variable, which is e^{β_i}. Odds ratio is the estimation of a probability of a subject to remain unemployed (0), at a change with one unit of factorial variables (when it is numeric, such as age in our case). Therefore we shall have the logistic regression equation:

$$\ln(odds\,statut) = -1.986 + 0.472(gender) + 0.66(age) + 0.223(ed.level) \qquad (6)$$

Table 8: Variables in the logistic regression equation

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
							Lower	Upper
GENDER	0.472	0.017	734.1	1	0.000	1.603	1.549	1.659
AGE LEVEL	0.066	0.007	83.35	1	0.000	1.068	1.053	1.083
ED_LEVEL	0.223	0.009	589.4	1	0.000	1.250	1.227	1.272
Constant	-1.986	0.027	5233	1	0.000	0.137	-	-

These estimated values of the regression coefficients show us the relation between factorial variables and the dependent variable "*status"*, the more it increases (or decreases, if the coefficient sign is negative) the determined value log odds of the variable of *status=1* at a change with one unit of one of the factorial variables; the influence of the other factorial is considered to be constant.

From table 8 one can notice that the employment probability increases with 1.6 for the male subjects registered in the database subject to analysis. In the period analyzed in the database there were registered 33270 female unemployed and 47691 male unemployed persons. Among them, at the end of the spell 6390 women (19.21%) and 12979 men (27.21%) found a job. Although there are a much greater number of men registered as unemployed in the analysed database, the number of those who manage to find a job is higher compared to women, which indicates that although there are more unemployed men, however they are preferred by employers.

We can also notice that the employment probability increases with 1.06 at the change with one unit (year) of the age variable. Of 25776 subjects aged between 15-24 years, 4 982 subjects found a job in the analyzed period, representing 19,33%, of 21138 unemployed aged between 25-34 years, 5832 became employed, representing 27,59%, of 18225 unemployed aged between 35-44 years, 4920 became employed, representing 27%, of 14452 unemployed subjects aged between 45-54 years, 23,39 % became employed and of 1370 unemployed aged between 55-64 years, 18,61% became employed. We can notice that persons aged between 24-54 years have the best chance to find a job. These are either university graduates that after a short duration of unemployment find the desired job, or experienced persons that are voluntarily unemployed

because of dissatisfactions at the old job or are laid off, but they can find a job since they are favored because of their experience.

As for the educational level variable, the employment probability increases with 1.25 at its change with one unit. Indeed, the higher the educational level, the higher the subject's employment probability. I have detailed the analysis by taking into account the variants (male/female) and the variation intervals (age and educational level) corresponding to factorial variables.

Table 9: Estimate values of the regression model variables

Variables	B	S.E.	Wald	df	Sig.	Exp B	95.0% C.I. for EXP(B)	
							Lower	Upper
GENDER (M)	-0.508	0.018	828.5	1	.000	0.602	0.581	0.623
AGE			685.0	4	.000			
AGE 15-24	0.262	0.072	13.12	1	.000	1.300	1.128	1.498
AGE 25-34	0.745	0.072	105.9	1	.000	2.107	1.828	2.428
AGE 35-44	0.754	0.073	107.2	1	.000	2.125	1.842	2.450
AGE 45-54	0.509	0.073	48.84	1	.000	1.664	1.443	1.919
ED_LEVEL			670.7	4	.000	-	-	-
ED_LEVEL 0	-1.029	0.124	69.22	1	.000	0.357	0.280	0.455
ED_LEVEL 1	-0.758	0.033	540.2	1	.000	0.469	0.440	0.499
ED_LEVEL 2	-0.540	0.033	264.3	1	.000	0.583	0.546	0.622
ED_LEVEL 3	-0.339	0.043	61.33	1	.000	0.713	0.655	0.776
Constant	-0.919	0.076	146.4	1	.000	0.399	-	-

We can notice that Wald test values and *Sig*. values show us that we can reject the null hypothesis, the model is valid, the factorial variables influence the "status" dependent variable, and the regression parameters are different from zero.

For the *gender* variable, the reference group are men (male), the negative value of coefficient *B* showing that the employment probability decreases with 0.602 for the female subjects, compared to the male subjects from the analysed database.

For the *age* variable, the reference group is the last one, 55-64 years; the employment probability increases with 1.3 for the age group of 15-24 years, compared to the group of 55-64 years, with 2.107 for the group of 25-34 years, compared to the specified group, with 2.125 for the group of 35-44 years, compared to the last age group, and with 1.664 for the group of 45-54, compared to the group of 55-64 years.

As for the *educational level* variable, the reference group is group 4, university education level. In the case of group 0- without education- the regression coefficient is negative, showing that the employment probability decreases with 0.280 for the persons who belong to the same educational level compared to the persons with university education, in the case of group 1 –employment probability decreases with 0.444 compared to the last same educational level, in the case of group 2 the employment probability decreases with 0.546 and of group 3 with 0.655 compared to the same group – the one with superior education. Of 520 unemployed without education registered in the analyzed database, 84 found a job representing 16.15%, of 40863 unemployed with education level 1-unfinished secondary school, secondary school, vocational school and apprenticeship

complementary education and special education, 8650 persons became employed, representing 21.17%, of 28555 unemployed with the educational level 2 - theoretical high school, specialty high school, 25.39% became employed, of 5838 unemployed belonging to the educational level 3 - foremen school and post high school, 28.47% became employed, and of 5185 persons belonging to the educational level 4 – college or university – 33.25 % of them became employed. We can notice that as the educational level is higher, the better the chance of the unemployed to become employed, as there is a direct, positive correlation between the educational level variable and the "status" dependent variable.

4. Conclusions

The purpose of this study is to determine the probability of the persons from the analyzed database to become employed or unemployed at the end of the period subject to analysis, probability estimated according to the independent variables gender, age and educational level. The statistical data were obtained from the National Agency for Employment Bucharest, and they provide information on the subjects registered as unemployed during January 1, 2002-August 31, 2006. The sample includes 80961 records, with information concerning the date of unemployment beginning and end, gender, age, educational level and the reason of unemployment leaving for each registered person. As methodology I used the binary logistic regression. The results of the study show that the employment probability increases with 1.6 for the men registered as unemployed compared to women with the same status. In the period analyzed in the database there were registered 33270 female unemployed and 47691 male unemployed persons. Among them, at the end of the spell 6390 women (19.21%) and 12979 men (27.21%) found a job. Although there are a much greater number of men registered as unemployed in the analyzed database, the number of those who manage to find a job is higher compared to women, which indicates that although there are more unemployed men, however they are preferred by employers. For the age variable, the employment probability increases with 1.06 at its change with one unit (year). By age groups, the employment probability increases with 1.3 for the age group of 15-24 years, compared to the group of 55-64 years, with 2.107 for the group of 25-34 years, compared to the specified group, with 2.125 for the group of 35-44 years, compared to the last age group, and with 1.664 for the group of 45-54, compared to the group of 55-64 years. As for the educational level variable, the employment probability increases with 1.25 at its change with one unit. Indeed, the higher the educational level, the higher the subject's employment probability. The most disadvantaged educational groups proved to be the persons without education, the persons with unfinished secondary school, vocational school and apprenticeship complementary education and special education and the theoretical high school graduates.

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SIX SIGMA AS A RESPONSE TO BUSINESS CHALLENGES: CAN EXPERIENCES FROM SLOVENIA HELP ROMANIA?

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Abstract. The research presents the business challenges and potential responses of manufacturing companies in the transition country of Slovenia. The experiences, risks and benefits of Six Sigma use in Slovenia are studied and relations to the Romanian economy are discussed. The use of Six Sigma can present an effective response to challenges in both countries, including some crucial details at its implementation, such as; employing a top-down strategy, top management involvement and participation, employee education and the organisational and cultural aspect supported by an understanding of Six Sigma. These are detected as the key elements of successful implementation of Six Sigma in Slovenia. Based on the experiences from Slovenia and the common transition history of both countries, recommendations for Romania were developed.

JEL Classification: M 11

Keywords: Six Sigma implementation, transition economies, risk management, manufacturing companies, Slovenia, Romania.

1. Introduction

Today's global market is very competitive. To survive, organizations need to deliver products and services of high quality to achieve customer satisfaction and to achieve business growth (Gošnik, 2008, 2009). In an attempt to manage these challenges, industry leaders have embraced the Six Sigma business strategy as a framework and solution for pursuing continuous improvements in processes, increasing customer satisfaction and also organizational profit (Kumar et al., 2008). Six Sigma is a business management strategy, a methodology and a set of tools (most frequently used are DMAIC tools - Define, Measure, Analyse, Improve, Control, and DFSS - Design For Six Sigma), which help us to reduce quality problems to less than 3.4 defects per million or better. It was initially

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implemented by Motorola, and is in use in many sectors of industry and services. Implementation of Six Sigma in the company is an act of process innovation and can be an effective methodology also for small and middle-sized organizations and plays a major role in the continual improvement based on the ISO 9001:2000 or TQM requirements.

Six Sigma has been very successful in integrating both the human aspects (culture change, training, customer focus, etc.) and the process aspects (process stability, variation reduction, capability, etc.) of continuous improvement. Six Sigma methodologies (DMAIC) link the tools and techniques in a sequential manner, and it creates a powerful infrastructure for the training of Six Sigma personnel; champions, master black belts, black belts, green belts (Pyzdek, 2000; 2008), and involves changing major business value streams that cut across organisational barriers. The understanding of markets, operations, measures used and creativity to maximise value and performance are the core elements of the Six Sigma approach (Pande et al., 2000).

Discussion about Six Sigma activity and its impact on organizations in developed economies is commonplace. However, despite numerous papers written about Six Sigma, (Antony, 2004; Antony 2007; Antony and Banuelas, 2002; Snee, 2004; Antony et al., 2005; Antony and Fergusson, 2004; Kumar et al., 2009; Noble, 2007; Lee Mortimer, 2006; Antony et al., 2008; Johannsen and Leist, 2009; Nakhai and Neves, 2009; McAdam et al., 2009; Aboelmaged, 2010), the challenges facing organizations in emerging economies in Central and Eastern Europe are given little attention. In an ever-increasing competitive environment, a strong focus on best practices for successful Six Sigma implementation in transition countries is required.

For many companies, the question is not whether or not to implement Six Sigma, but how to implement it. Implementation of Six Sigma within the company is related with many risks which have to be considered at the start-up stage of Six Sigma implementation (Banuelas and Antony, 2002; Antony, 2004; Gošnik and Hohnjec, 2009).

Several risks might be crucial for the organizations entering into the Six Sigma initiative, such as (Keller, 2003); (1) not such strong relationships with customers because of the past not so open-to-market orientation; (2) a lot of hierarchy in management organization; (3) slow internal communication and decision making; a focus more on efficiency and less on innovations which are often the domain of small (4) specialized organizations which fight for every day survival; (5) senior management influence, senior management barriers, and a strong, hard–to-change culture. Although there are also “start-up” costs to the deployment including training, leadership alignment and customer focus, a properly designed and deployed Six Sigma program should provide cost benefits rather quickly (Keller, 2003).

On the other hand, many benefits of Six Sigma have been a topic of numerous studies in developed countries and are extensively reported in literature by many authors (Hendricks and Kelbaugh, 1998; Harry, 1998; Hahn et al., 2003; Robinson, 2005; Kumar et al., 2008; Gutierrez et al., 2009; Johannsen and Leist, 2009; Kumar at al., 2009; Aboelmaged, 2010; Barnes and Walker, 2010). The Six Sigma approach has made a substantial impact on many organizations, resulting in the enhancement of performance and a vast improvement in business profits,

employee morale, quality of products and customer loyalty (Snee, 2004; Antony et al., 2005; Kumar et al., 2007).

Recent empirical studies (Snee, 2004; Kumar et al., 2008, Kumar, 2007; Gošnik and Hohnjec, 2009; Gošnik, 2009) have revealed that strong leadership and undying commitment from top-level management are critical to the success of Six Sigma implementation within the company. Snee and Hoerl (2003) suggest also that the greatest barrier to implementation in organizations to date has been the way the major Six Sigma training providers have structured their offerings. Waxer (2004) looked at four major requirements for successfully implementing Six Sigma within any organization, regardless of the size of the organization: (1) management team buy-in and support; (2) education and training; (3) resource commitment; (4) link to compensation.

The first step after Six Sigma implementation is the establishment of a cross-functional team including the top management (Davis, 2003). The responsibility of the management project team or steering committee is to identify, prioritise, select, monitor and evaluate Six Sigma projects (Banuelas et al., 2006). Top management helping the company strategy is included in Six Sigma projects, and supports project management by removing the obstacles and barriers more effectively (Kelly, 2002). This top-down approach to select projects has three main advantages. First, the projects would fit with the business strategy. Second, it is more structural and managerial and finally, it has the benefit of Six Sigma projects with management support (Harry and Schroeder, 2000; Klefsjo et al., 2001), Six Sigma methodology is a top-down, rather than bottom-up approach.

2. Research objectives and methodology

The purpose of this research is to develop a better understanding of Six Sigma implementation in transition countries by analysing best practices of Six Sigma implementation in Slovenia and to establish a basis for knowledge and experiences transfer in other similar transition economies, such as that of Romania.

A substantial number of studies is concerned with the transition process and model transfer, but none of them have studied Six Sigma in transition countries. In their studies, a number of authors (Nuti, 2003; Blejer, 2001; Lang and Pawlowsky, 2001; Hancock, 2000; Derleth, 2000; Schönfeld, 2000; Dolenc, 2009; Stubelj, 2010) have revealed that direct transfer of models and methods of developed economies to transition economies is neither possible nor recommendable. Therefore, common practices and models transferred between similar transition countries, such as between Slovenia and Romania, are more appropriate.

A survey research methodology was devised after considering the presented problem. Survey research is a popular and common strategy in operations management research (Banuelas et al, 2006). It allows the collection of a large amount of data from a sizeable population in a highly economical way. Based most often on a questionnaire, these data are standardised, allowing easy comparison. In addition, the survey method is generally perceived as authoritative because it is easily understood. A survey research approach gives us more control over the research process than, for example, in a case study, although a survey is more time consuming.

The study is structured as follows: the conceptual basis that guides the study is first established and then is tested empirically on a sample of organizations in Slovenia. The research was divided into three phases:

(1) A wide-ranging analysis was conducted of the existent literature about quality management and especially about the Six Sigma methodology;
(2) Based on the literature and authors experiences, a questionnaire was designed in order to investigate the Six Sigma practice in Slovenia, and was later sent by mail to the quality managers participating in Six Sigma projects in Slovenia. The items in the questionnaire were designed according to similar studies (Banuelas et al., 2006), with binary 'yes' or 'no' questions and Likert scales (Black, 1999) ranging from 'strongly disagree' to 'strongly agree'.
(3) Analysis of the survey research results and discussion with directions for future work.

Finally, the results are discussed and related to what extent Six Sigma practice can support Six Sigma implementation in Romania. The research also points out the main limitations of the study and indicates possible future lines of research. In order to do this effectively, the general objective is further divided into a number of specific research questions (RQ) as follows:

RQ1: What are the challenges of Slovenian manufacturing organizations and what are the possible responses?
RQ2: To what extent are Slovenian manufacturing organizations implementing Six Sigma?
RQ3: What are the common reasons for or against implementing Six Sigma in an organization?
RQ4: What benefits have been brought to Slovenian manufacturing organizations by Six Sigma?
RQ5: What are the detected key factors for the successful implementation of Six Sigma in the transition country of Slovenia and what can be the Six Sigma recommendations for Romania?

The questionnaire was e-mailed in 2008 to 100 manufacturing companies in Slovenia. The e-mail addresses were taken from the database of the Slovenian Six Sigma academy and from available public databases. Because the extent of Six Sigma methodology was not known in Slovenia before this study, a wider number of companies from different branches was included in the research. (Table1).

The questionnaire consisted of the following parts:

a. General information about the company, employees and their competences.
b. Challenges of Slovenian manufacturing companies and potential responses in the future.
c. Experiences of Slovenian manufacturing companies with Six Sigma methodology.
d. Critical success factors for Six Sigma implementation in Slovenian manufacturing companies.

Table 1: Sample data

Sample	Number	Percent (%)
e-mail	100	100
Response e-mail	21	21
Companies		
Companies implementing Six Sigma	8	38
Non-Six Sigma companies	13	62
Total	21	100
Number of employees in companies		
50 to 100	3	14
101 to 500	9	43
501 to 2000	7	33.5
more than 2000	2	9.5
Industrial sector – manufacturing companies		
Automotive	5	23
Electro	2	9.5
Chemical	4	19
Mechanical engineering	7	34.5
Telecommunications	3	14
Participants - position of all respondents in the company		
MBB	1	7.8
BB	2	15.3
GB	8	61.6
YB	2	15.3
Implemented Six Sigma projects within the company		
Fewer than 10	4	50
From 10 to 20	2	25
Between 21 and 30	1	12.5
More than 30	1	12.5

Source: Authors

From 100 questionnaires e-mailed, 21 totally completed questionnaires were returned in three months' time. This represents a response rate of 21 percent. An important limitation of this study is the response rate; however, the response rate is similar to other surveys on Six Sigma, ranging from 8.5 to 14 percent (Antony et al., 2005; Banuelas et al., 2006; Dusharme, 2006).

According to the data gathered, the questionnaires were completed by Six Sigma master black belts (MBB), black belts (BB), green belts (GB) and yellow belts (YB). In the companies where no Six Sigma methodology had yet been implemented, participants were quality managers working in the field of quality management in manufacturing companies.

Only eight out of 21 companies were actively involved in the Six Sigma programme. These companies are the focus of our research. It clearly shows that Six Sigma is a relatively new methodology in Slovenian manufacturing companies.

2.1. Sample characteristics

Number of employees and position of participants: The majority of the organizations had between 100 and 500 employees (43 percent), 33.5 percent of the organizations had from 501 to 2000 employees and 14% of the responding organizations had up to 100 employees. Only 9.5% of the organizations had over 2000 employees. The questionnaires were completed by Six Sigma master black belts (MBB), black belts (BB), green belts (GB) and yellow belts (YB). In the organizations where no Six Sigma methodology had yet been implemented, participants were quality managers who work in the field of quality management in the manufacturing organizations.

Industrial sectors: The organizations which participated in this study are from the following industries: mechanical engineering (34.5 percent), automotive (23 percent), electro (9.5 percent), chemical (19 percent) and telecommunications (14 percent).

Status of Six Sigma and other quality initiatives of organizations: Only eight out of the 21 organizations (38%) were actively involved in the Six Sigma programme. Forty-nine percent of the organizations have been using Six Sigma for less than one year, 38 percent of the organizations have been using Six Sigma for one to three years and 13% of the organizations have been using Six Sigma for more than three years. It clearly shows us that Six Sigma is a relatively new methodology in Slovenian manufacturing organizations.

2.2. Limitations and future research

The research is limited by the number of Six Sigma organizations in Slovenia. Also, the number of educated Six Sigma BG, BB, MBB in Slovenia is limited. The authors also believe that the bigger sample of the research might affect the results of this study. The authors will take the results of this survey into account for further studies and some further periodical comparison studies. The study is limited to the manufacturing organizations in Slovenia, but the results may be generalized for economies similar to that of Slovenia. The study does not present a comparison between industrial and service sectors, because there are not enough service organizations that have already implemented Six Sigma. Future studies in transition countries such as Romania would be very interesting. Also, periodic studies and cyclic comparison studies would help us to develop common practice of Six Sigma use in transition countries with an aim to exchange best practices and to empower data, experiences, knowledge and innovation transfer between countries.

3. Six Sigma in Slovenia - today's challenges and future priorities

Analysis of the current challenges of Slovenian manufacturing organizations (those which both use and do not use Six Sigma) shows us that they detect the biggest opportunity in the field of how to satisfy customer expectations considering individual needs. Respondents were asked what the biggest challenges in their business were. The results are shown in Table 2.

On the global market they face global competition and they are often challenged on how to use employees' potential and internal know-how, as well as how to empower existing knowledge to ensure further existence. Also many of the other challenges detected and expressed can be more or less directly related with customers.

Table 2: Today's challenges of manufacturing organizations in Slovenia

Today's challenges	*Ave.*	*Std. Dev.*
Customer individualization	4.11	1.25
Much more intensive competition	4.00	0.76
Using the potential of employees	3.94	0.95
Decreasing loyalty of customers	3.83	0.79
Global expansion of the market	3.77	0.58
Managing increasing pressure on costs	3.72	0.98
Development of new distribution channels	3.72	0.68
Reduction of production cycles	3.55	0.35
Managing and increasing R&D costs	3.33	0.69
Tendency to business concentration	3.33	0.95
Increased transparency of costs	3.27	0.53

Source: Authors

Respondents were asked what the main focus in future to cope with those challenges would be. Future priorities responding to these challenges show us that many of the Slovenian manufacturing organizations see an opportunity in focusing on the quality of their products (4.42 out of 5), increasing the flexibility of employees (4.07 of 5) and in the high reliability of deliveries (3.85 of 5). All related objectives can be managed and achieved with the support of Six Sigma (Table 3).

Table 3: Priority focus of manufacturing organisations in Slovenia

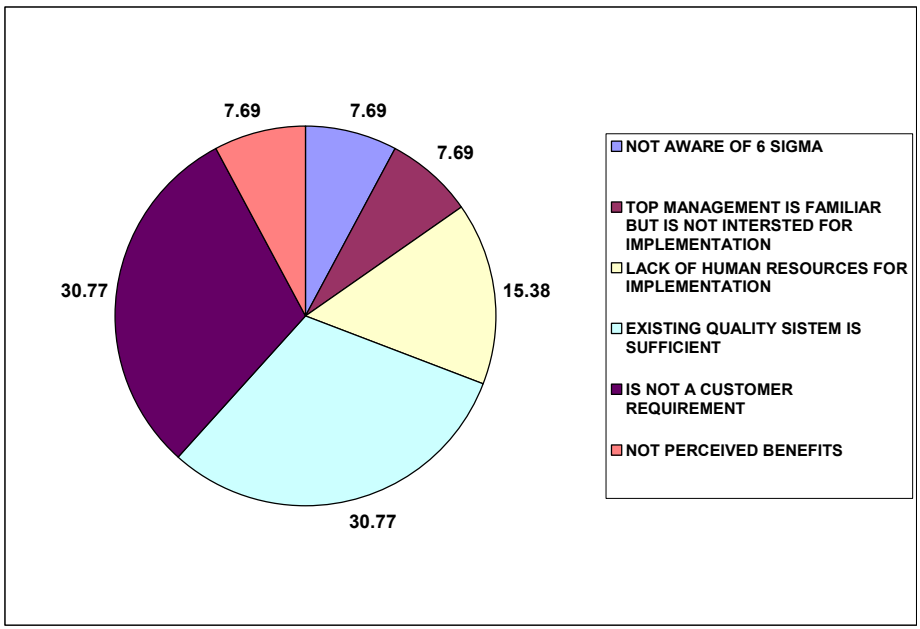
Priority focus	*Ave.*	*Std. Dev.*
High product quality	4.42	0.69
Flexibility of employees	4.07	1.15
High reliability of deliveries	3.85	1.13
Production process transparency	3.64	0.79
Process information support	3.57	0.69
Optimization of process variation	3.35	0.64
Shortening of cycle times	3.35	0.76
Optimization of supporting staff	3.14	0.95
Optimization of non-added value activities	2.92	0.53

Note: Ave.—average according to five-level Likert scale was used. (1—we will not focus on this at all, 5—we will focus extremely strongly); Std. Dev.—standard deviation.
Source: Authors

Many of the other answers are directed towards managing all kinds of processes in organizations (product development, productions, delivery) as well as related with quality aspects of any product and orientation to customer needs. Detailed analysis shows that Six Sigma organizations see the biggest priority focus much more on high quality of the product and high reliability of deliveries, while on the other hand non-Six Sigma organizations (N=13) focus more on product quality and on the flexibility of employees. That can be related to the fact that those organizations have not implemented Six Sigma and, therefore, up to today have used more rigid standard quality tools, such as ISO and the Deming cycle, and also see additional opportunities to direct their employees in the new field of using quality tools such as Six Sigma.

Few big manufacturing organizations in Slovenia have already implemented Six Sigma and many of them have not. One of the questions in this research dealt with the reasons that manufacturing organizations in Slovenia are not implementing Six Sigma. A questionnaire was designed and this issue was researched (Table 4).

Table 4: Reasons for not implementing Six Sigma in Slovenia (%)



Source: Authors

The most important reason is that manufacturing organizations in Slovenia are satisfied with the existing quality system they have (30.77 percent); further on the results show that top management is not interested in implementing Six Sigma (30.77 percent) and the third most common reason presents an answer that there is a lack of human resources in the organization (15.38 percent) who would support implementation. Only 7.69 percent of the organizations are not even familiar with Six Sigma.

Respondents in Slovenian manufacturing organizations which have already implemented Six Sigma methodology were asked which motivation the organization had for Six Sigma implementation. Factors which affect motivation for the organizations were defined upon the study of literature and previous research (Antony, 2004). The higher the score is, the more important the motivation factor (see Table 5).

Table 5: Reason for Six Sigma implementation in Slovenia

Reason for Six Sigma implementation	*Ave.*	*Std. Dev.*
To reduce variation in our processes.	4.57	0.79
To achieve positive financial effects.	4.57	0.63
To increase customer satisfaction.	4.28	0.69
To reduce all kinds of costs.	4.28	0.76
To change the culture and thinking within the organization.	3.57	0.79
To decrease the service call rate (SCR)	3.57	0.79
To increase market share.	3.42	0.53
To achieve further growth of the organization.	3.00	0.82

Note: Ave.—average according to five-stage Likert scale was used to evaluate each of the pre-defined motivation factors (1—was not motivation at all, 5—was a very high motivation impact factor for Six Sigma implementation in the organization); Std. Dev. —standard deviation.
Source: Authors

Results of the respondents can be related with the early stage of Six Sigma implementation in Slovenian organizations, where analysis shows that 49 per cent of the organizations use Six Sigma for up to one year and even 87 per cent of the organizations use Six Sigma from one to three years. In this early stage of implementation, it is reasonable that the first projects (usually pilot projects) are oriented to customer benefit, strategy and finance, because they are usually used to demonstrate the best effects for a later stage or further projects. In addition, they are much more oriented to quick wins with a high probability of success. The respondents were asked to rate the benefits that Six Sigma had brought to their organizations since implementation (Table 6).

Table 6: Key benefits to business from Six Sigma use in Slovenia

Benefits to business	*YB Ave.*	*GB Ave.*	*BB Ave.*	*MBB Ave.*	*Total Ave.*
Reduction in process variability	5.00	4.25	4.66	4.50	4.46
Reduction in COPQ	5.00	4.12	3.66	4.50	4.20
Increase of profitability	3.50	3.87	4.33	4.50	4.00
Reduction of operational costs	4.00	4.00	3.66	4.50	4.00
Increase in productivity	4.50	3.75	4.00	4.50	4.00
Reduction of customer complaints	4.00	3.75	3.30	4.50	3.80
Reduction in cycle time	3.50	3.30	4.33	4.50	3.73
Reduced control and inspection	3.50	3.00	2.00	3.00	2.86
Improved sales	2.50	2.30	3.00	3.00	2.60

Note: Ave.—average according to five-stage Likert scale (1—no benefit from Six Sigma implementation, 5—significant benefit from Six Sigma implementation); YB—Six Sigma yellow belt; GB—Six Sigma green belt; BB—Six Sigma black belt; MBB—Six Sigma master black belt.
Source: Authors

The areas that have experienced the greatest benefits are a reduction in process variability, a reduction in COPQ (costs of pure quality), an increase in profitability, a reduction of operational costs, an increase of productivity, etc. Overall, these scores show us that participating organizations perceive a benefit in their processes.

The respondents were asked to rank pre-defined factors. The factors were defined based on existing literature of Six Sigma (Antony et al., 2005). The 11 identified critical success factors were the following: linking Six Sigma to customers; linking Six Sigma to the business strategy; linking Six Sigma to employees; linking Six Sigma to suppliers; management involvement and participation; organizational infrastructure; understanding Six Sigma methodology; project management skills; project prioritisation and selection; training and cultural change. Table 7 shows the ranking of essential success factors for the successful implementation of Six Sigma in manufacturing organizations in Slovenia (Table 7).

Table 7: Critical success factors for successful implementation of Six Sigma

Success factor	*Ave.*	*Std. Dev.*
Top management support	4.93	0.26
Understanding Six sigma	4.56	0.52
Six Sigma training	4.68	0.46
Organizational infrastructure	4.31	0.90
Cultural change	4.31	0.56
Linking Six Sigma to employees	4.25	0.68
Six Sigma project prioritisation and selection	4.18	0.52
Six Sigma project management skills	3.93	0.83
Linking Six Sigma to business strategy	3.93	0.92
Linking Six Sigma to customers	3.62	0.92
Linking Six Sigma to suppliers	3.31	1.10

Note: Ave.—average according to 5-stage Likert scale was used (1—factor is not important, 2—factor is important, 3—factor is more important, 4—factor is very important 5—factor is extremely important and crucial); Std. Dev.—standard deviation.
Source: Authors

Table 7 shows that management involvement and participation, Six Sigma training, understanding Six Sigma methodology and organizational infrastructure are the most important factors for successful implementation. Following those are cultural change, linking Six Sigma to employees, Six Sigma prioritisation and project selection, Six Sigma management skills, and linking to business strategy.

4. Recommendations to Romanian manufacturing companies

Slovenia and Romania are both transition economies with many similarities. The institutional phase of the socio-political transition has finished but the socio-economic transition has not yet been completed. Implementation of much needed organizational changes, such as Six Sigma, requires time and support from top management. This is related to top management priorities and long-term organizational objectives. Many organizations in transition have not yet consolidated their ownership and management buy-outs are often a top priority. In

this aspect they have both experienced similar challenges of the external environment in their recent history (the last two decades) such as; increased competition and globalisation, changes in the national economy, deregulation of the local market, changes in ownership structures, threat of bankruptcy. These facts present a strong basis for future company reactions and opportunities for knowledge and experiences transfer between companies in post-transition countries such as Slovenia and Romania.

On the other hand, many previously successful organizations have closed because they were not oriented toward the end customer, their business processes were not optimised at the time of entering the global market and consequently their products were not meeting market expectations on the highly competitive global market. Their growth in the past was not based on research and development of new innovative processes, products and services but more on quick wins and short-term objective orientation. Many of these companies have already faced a need for further growth based on process innovations and optimisation of different fields of business activities and are thinking about delivering growth by implementing Six Sigma methodology, which can also be considered as a process innovation. Slovenian and Romanian manufacturing companies are also strongly characterized by their positions in the supply chain of companies in EU and on dependent economies. Many Slovenian as well as Romanian manufacturing organisations are holding their position as a supplier of assembly parts for automotive and other engineering companies. Also they are often playing the role of a producer of parts and assemblies and do not to a large extent deal with research and development of final products, which is often an action of our customer companies (for example: automotive industry, tool production industries, etc). From this aspect our success is still limited by the success of final products and the success of the end user. In this regard, manufacturing companies in both countries have a limited influence in the supply chain and are often limited by achieving efficiency in production processes, where the Six Sigma methodology DMAIC takes place. Considering the fact that Slovenian and Romanian manufacturing companies are often limited by low and middle positioned product brand names, and considering the fact that we are often limited by manufacturing of low added value, our only opportunity is process optimisation and innovation, which can be assisted with the help of Six Sigma.

Because of all the similarities between Slovenia and Romania, the case of Six Sigma use in Slovenia has some potential value for Romania, too. All similarities and start up positions direct us to a better understanding of the importance of this research of Six Sigma in Slovenia for Romania, and help us to develop recommendations for Six Sigma implementation in companies in Romania and to empower a proactive approach and initiatives of managers regarding Six Sigma implementation.

The following recommendations can be given to Romanian managers based on Slovene experiences**:**

Our recommendation for Romania is that Six Sigma implementation should be started at the level of top management and a top-down approach should be used. Six Sigma is a management philosophy, vision, methodology and religion which first must be supported by top management. A bottom-up approach can result in a lack of management support, low management commitment, definition and selection of wrong priorities and Six Sigma projects to be done, failure of the

business strategy and can result in employee and customer disappointment. On the other hand, the recommended top-down strategy for Six Sigma implementation helps us to define top priority problems, focus on them with top management support and empower employees to implement changes in the processes, optimisations and innovations in the company with the support of top management.

The use of ISO standards or TQM can support Six Sigma. As experiences from Slovenia show us, 100% of the companies which use Six Sigma in Slovenia already use ISO standards, project management or TQM. Six Sigma is merely an upgrade. Many improvements within the company can be achieved with the use of ISO, TQM, 20 Keys and similar tools. Six Sigma is much more sophisticated and is an upgrade of all existing tools and methods used in the company. Our recommendation is that companies in Romania which decide to implement Six Sigma should first implement ISO standards and project management practice.

Once objectives to be achieved with the support of Six Sigma have been carefully planned, our suggestion for Romania is that top management is the first and main facilitator of the Six Sigma initiative within the company. Their understanding of Six Sigma and thus related objectives support structures, processes and rules within the company. Employees will appreciate the support of top management, which is detected also from the research in Slovenia presented in this paper.

Top management personnel first have to be educated and professionally trained in the field of Six Sigma (champions, black belts and master black belts). Six Sigma training has to be done by Six Sigma professionals. Trainings can be performed within a single company or there can be an open training on the market, where future Six Sigma experts can meet other candidates and practices.

An additional recommendation is that companies in Romania first educate at least one Six Sigma master black belt, rather than train many Six Sigma yellow and green belts. The role of a Six Sigma master black belt can be crucial for successful Six Sigma implementation by giving know-how support and consulting to the Six Sigma green and yellow belts.

It is strongly recommended that Six Sigma implementation in Romania follow a well prepared plan for Six Sigma implementation which will integrate all levels of management, including top, middle and operational managers. Six Sigma does not start and finish solely with education, but it needs the support of structures, systems and rules for Six Sigma project detection, selection and progress measurement.

It is also recommended that companies in Romania during Six Sigma implementation establish a permanent structure or department of trained Six Sigma experts within the company. Many practices show that successful Six Sigma implementation includes Six Sigma education with practical project implementation during Six Sigma training, which requires time. Therefore, Six Sigma personnel who attend Six Sigma trainings need to be integrated in the company within the structure which will enable them to educate themselves and perform Six Sigma projects at the same time.

Six Sigma will cross the boundaries of a single company and will, for example, affect the processes at its suppliers. Regarding the discussed position of Slovenian and Romanian manufacturing companies within the supply chain, we strongly depend on our customers (companies), subcontractors and suppliers. Six Sigma implementation in the global environment has to include also our suppliers

and subcontractors by detecting common interests, detection of potential problems in future Six Sigma steps which will be performed, and has to consider also cultural, political and process barriers of our cooperation with global customers and suppliers.

Based on the objectives and successful education of Six Sigma project managers within the company, Six Sigma indicators which will help us to detect the progress of Six Sigma implementation also need to be developed. This can not be done without the support of top management within the company, as is shown by the research in Slovenia. We recommend that companies adopt the business score card and also include some Six Sigma parameters.

During and after their implementation, Six Sigma projects require the support of an internal, full-time Six Sigma master black belt or Six Sigma black belt who will support full- or part-time Six Sigma green and yellow belts with their project's implementation. The main role of Six Sigma (green belt, yellow belt) project managers is to focus on defined problem solving using the DMAIC (Define-Measure-Analyse-Improve-Control) methodology and a specific set of tools and techniques with speed. Every single employee at the different levels of an organisation has to execute his tasks in order to improve success and efficiency.

The results of Six Sigma implementation show up very quickly in financial results and savings, as shown especially by the experiences from Slovenia, also because the first Six Sigma projects during Six Sigma education are oriented to quick wins and fully demonstrate the potential of Six Sigma. Six Sigma affects our customers and suppliers, too. If we have acted properly, the changed philosophy will overwhelm all employees within the company, empower them to innovate, and focus on problems and the customer's benefit. (Example: Six Sigma can reduce defects per million opportunities from 58,000 to 5,800 in two years' time. On the other hand, our objectives are much higher; Six Sigma is equal to 3.4 defects per million opportunities.)

5. Conclusion

Six Sigma has become a part of the business strategy of many organizations in the world. Its importance is growing everyday also in transition countries, which are in the global supply chain often positioned as a supplier of semi-products and assemblies rather than final products. In the transition country of Slovenia, Six Sigma is a rapidly emerging methodology, and with time will become a more often used methodology also in Romania.

The results of the survey show us that the most common reasons for Six Sigma implementation in Slovene manufacturing organizations have been: (1 and 2) "to reduce variation in our processes" and "to achieve positive financial effects", mean score 4.57 of 5; (3 and 4) "to increase customer satisfaction" and "to reduce all kinds of costs", mean score 4.28; (5 and 6) "to change the culture and thinking within the organization" and "to decrease TCS and SCR", mean score 3.57; (7) "to increase market share", mean score 3.420; and finally (8) "to achieve further growth of the organization", mean score 3.00.

Slovenian manufacturing organizations implement the Six Sigma methodology because of customer requirements related to product quality. The higher the priority of customer focus, the more it is likely that organizations are oriented to Six Sigma implementation. Top management commitment is a crucial factor of Six Sigma implementation in Slovenian manufacturing organizations. The

higher the top management commitment and support, the more successful the Six Sigma implementation within the organization is.

This can be related to the early stage of Six Sigma implementation in Slovenian organizations, where analysis shows that 49 per cent of the organizations use Six Sigma for up to one year and even 87 per cent of the organizations use Six Sigma from one to three years. In this early stage of implementation, it is reasonable that the first projects (usually pilot projects) are oriented to customer benefit, strategy and finance, because they are usually used to demonstrate the best effects for a later stage of further projects. In addition, they are much more oriented to quick wins with a high probability of success.

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