Comparative analysis of the efficiency indicators in sugar industry: evidence from Serbia

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Abstract

Rapid changes on the market accompanied with the rising of the prices of energy and raw materials, the emergence of new competitors, the impossibility of the collection of receivables, the impossibility of settling the obligations to suppliers and business partners are significant difficulties that companies must solve in order of further survival, growth and

development. For production companies it is very important to analyze the changes that occur in the field of income and costs. Adequate analysis can determine the change of the position of economic success of the enterprise in observed period and show the elements on which management should focus its efforts. The aim of this paper was to present financial performances of 4 top companies in Serbian sugar industry, in terms of profitability measured by indicators such BEP, ROA, ROE, efficiency, productivity, solvency and liquidity, where costs are seen as one of the most influencing source. Methodology used in this paper included Du Pont method, financial analysis of the official financial documentation from the factories and correlation using SPSS program, version 21.0. Findings are that efficiency was dropped during economic crisis and that there is positive correlation between certain indicators in sugar production in Serbia.

Keywords: Profitability. Efficiency indicators. Sugar production.

1. Introduction

The focus in achieving economic success in a market economy is on the rational use of production factors, capital use and speed of the flow of capital in the reproduction. Tendency is directed to accumulation for extended reproduction, constant investing and rational use of invested capital. Control of economic success is complete only if it is subjected to all kinds and forms of investment in reproduction (Jakovčević, 2007). Costs are one of the most important and influential elements of investment in modern business. As a value expression of spending of factors of production in the reproductive cycle, costs affect the most important economic indicators in the enterprise.

The success of the company can be analyzed through business reports, internal and external. External analysis of the report, particularly the balance sheet and income statement, a very important indicators can be determined, such as indebtedness, liquidity, utilization of the equipment, technical equipment, productivity, profitability, risk profile, etc. During analysis of the internal documents researcher can determine more detailed information about the company, such as capacity utilization, establishing the necessary structures of employment, cost impact, selling price, the impact of income and expenses on the profit, etc.

Economic score of the company business is expressed through profit or loss. Profit or loss, is determined as the difference between the income of the company and the costs that are incurred in the process of reproduction. From the expression for the calculation of profit it is obvious that the direct impact on business results have revenues and costs. Operating income, as the difference in operating income and expenses, a gain that was realized on regulated business funds used for activities. In this sense, the amount of the gain or loss is not as

significant for the analysis (used in horizontal analysis), while the far more important to put those gains in relation to the funds that are involved in its creation. Indicators of relative profitability are found trough relations between the two positions where the gain is in the numerator and in the denominator of some form of company's assets.

The aim of this paper was to present financial performances of 4 top companies in Serbian sugar industry, in terms of profitability measured by indicators such BEP, profit, ROA, ROE, efficiency, productivity, solvency and liquidity, where costs are seen as one of the most influencing source. Methodology used in this paper included Du Pont method, financial analysis of the official financial documentation from the factories and correlation using SPSS program, version 21.0.

2. Theoretical Background

Sugar beet production in Serbia has a long tradition. In addition to a long tradition, features of production of this crop had large variations in both, planted area and in yield. For example, in the last two and half decades, areas with sugar beet ranged between 40,000 and 94,000 acres. Sugar yield per hectare is also has a significant variation. In recent years, the yield is improved, reaching values of about 6 tons per hectare (Berber, 2011). Production of sugar beet in Serbia takes place on family farms, as well as in companies and cooperatives. Total area under sugar beet in Serbia, in the analyzed period, mostly increased to reach the maximum of almost 80 000 ha in 2007. In the last year of analysis, the harvested areas under this industrial culture were significantly reduced (to about 43 000 ha), due to deteriorated economic position of the farmers. The largest part of the total area is concentrated in the AP of Vojvodina, north part of the Republic of Serbia (reaching 96% in some years). Production of sugar beet was more than tripled, from about 1 to about 3 million tons, which was significantly contributed by the measures of agricultural policy – premiums for sugar beet production, subsidizing inputs, incentives to purchasing of machinery, etc (Božic, Munćan, Bogdanov, 2010, p. 446).

Although there are natural conditions for the production of this crop, the sugar production has not reached its maximum efficiency. One of the important factors of the non-competitiveness of sugar production in Serbia is a *transport*. Areas with the highest production of sugar are often away from the seat sugar, so the sugar beet is transported across 88 kilometers (on average). This points to the need for better organization of transport

because the costs involved are often over 8% of total costs (cost price). Also, some sugar factories in Vojvodina in the past (for example factory in city of Bač) stopped with the processing of sugar beet because, as a second problem, occurs uncertainty of the placement of this culture. Manufacturers imply an active role of the state policy in order to solve this problem (Roljević, Hamović & Sarić, 2009). As a possible solution there are introduced the quotas for export (preferential export) in the EU.

Also, it is important to emphasize that sugar refineries in Serbia are of medium size, and their daily capacity is about 5,000 tons, but the daily sugar beet supplies are small. With relatively short season/campaign of sugar beet processing (80-90 days), high costs of sugar beet transport and insufficient amounts for daily processing the utilization level of sugar refinery capacities is lower. Therefore, the fixed costs per unit of final product, or tons of sugar, are relatively high significantly increasing the cost of sugar produced in Serbia, or reducing its competitiveness in the international market. The sugar price level is additionally influenced by quality of sugar beet supplied, primarily, the percentage of dirt and contents of sucrose-digestion, the cost of transport of sugar beet to the processing capacity, other costs, e.g. fuel, lime stone, work, etc (Božic, Munćan, Bogdanov, 2010, p. 449).

Table 1: Growth rate of the Sugar Production in Serbia from 1993 to 2012

Market Year	Beet Sugar Production	Growth Rate
1993	300	NA
1994	135	-55.00 %
1995	225	66.67 %
1996	160	-28.89 %
1997	270	68.75 %
1998	270	0.00 %
1999	210	-22.22 %
2000	270	28.57 %
2001	175	-35.19 %
2002	210	20.00 %
2003	280	33.33 %
2004	225	-19.64 %
2005	435	93.33 %
2006	415	-4.60 %
2007	505	21.69 %
2008	465	-7.92 %
2009	340	-26.88 %
2010	400	17.65 %
2011	490	22.50 %
2012	400	-18.37 %

Source: United States Department of Agriculture

There is not undoubtedly a leader in the market, nor a sugar that stands out for its quality and profitability. Until now, all companies operating in Serbia primarily invested in sugar, not only reap profits. It is necessary to continue with the process of investing. Sugar industry of Serbia can produce almost 500,000 tons of sugar and most of it can be exported to the EU.

Table 2: Production and Processing of the Sugar Beet in 2012 in Serbia

Factory	*Planted (ha)*	*Processed (ha)*	*Yield (t/ha)*	*Sugar production (t)*
Kovacica	8.064	335.812	37.78	50.314
Pecinci	11.042	441.944	30.37	66.290
Vrbas	18.969	600.331	43.87	86.529
SUNOKO	**38.075**	**1.378.087**	**38.67**	**203.133**
Crveka	10.936	397.190	37.89	59.510
Zabalj	6.770	288.350	44.09	42.099
HELLENIC	**17.706**	**685.540**	**40.26**	**101.609**
TE-TO	**14.600**	**623.229**	**38.16**	**87.512**
TOTAL	**70.381**	**2.686.856**	**38.95**	**392.254**

Source: http://agroplus.rs/proizvodnja-i-prerada-secerne-repe-u-2012/

As we can see from table 2, the planted area with the sugar beet in 2012 in Serbia was 70.381 ha in total, in six factories in Serbia, where company Sunoko had the greatest part of 38.075ha. Yield in total was 38.95 tons per hectare, where the largest yield was accounted for the company Hellenic, 40.26 t/ha. Total sugar production was 392.254 tons, from which 180.000 tons are exported to the countries of EU (based on exportation quotas). The largest part of total production has company Sunoko with 203.133 tons, or 51.78% of the total production in Serbia. From table 2 we can also see that all sugar production is concentrated in three companies, Sunoko, Hellenic and Te-to, in total of six factories.

It can be noticed that the yields higher than those in Serbia were achieved in Hungary and Slovakia and in some years also in Turkey and Croatia. Other countries in the region achieved lower yields of sugar beet compared to those in Serbia (Figure 1).
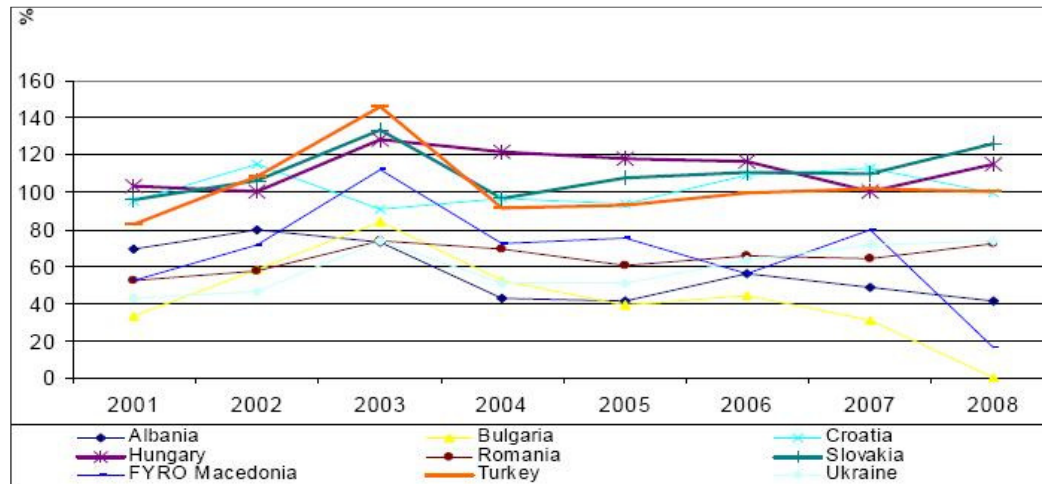
Figure 1: Yields of Sugar Beet in Serbia and in the Neighboring Countries
Source: Božic, Munćan, Bogdanov, 2010.

After the presentation of the current state of the sugar beet production in Serbia, some of the advantages of sugar production can be represented as follows (Berber, 2011):

- Sugar beet is one of the most rewarding crops because guarantees the highest profit per acre for the successful producers, provides assurance regarding the collection and stability in the business;

- Since the EU is committed, under an agreement with the WTO, for importing sugar from developing countries, the production of sugar is also a chance for Serbia because the total sugar consumption in Serbia per capita per year is around 25-30 kg, which means that the need for sugar per population in our country is about 240.000 tons per year, so a significant amount of sugar stays each year for export;

- In the neighborhood of Serbia without sugar industry are Bosnia and Macedonia, while in Hungary from 11 factories only is processing one, in Romania there are five, and in Italy from 17 in function are only four. This is an opportunity for Serbia to make long-term supply of neighboring countries with sugar.

- Exports of sugar in the 2009 amounted to $ 134.222.174,00 or 182.091 tones of which about 99% were exported to EU countries because of the quota of 180.000 tons and preferential export of this amount. During seven months of 2010 it was exported sugar worth about $ 89 million, which is 140.526 tons in quantity. Countries where the export was made were Greece, Italy and Romania (about 60%), while the other volume were exported in the former Yugoslav republics.

Based on the advantages and opportunities in the production and export of sugar, it is necessary to determine the quality indicators of the economy. These indicators are in function of determining of those elements which have not been satisfactory and where it is needed to make changes and adjustments to make production process more efficient.

3. Methodology

Basic accounting measures of profitability are ROE (return on equity) and ROA (return on asset). Although at first appear to be very similar in terms of indicators, they do not represent entirely the same thing. Therefore it is necessary to study together, because it is the only way to obtain a complete picture of the profitability of the company (Bodie, Kane, Marcus, 2009). One of the most important indicators of profitability of the company's ROE (return on equity). It is a basic test of how effectively a company's management uses investors' money – ROE shows whether management is growing the company's value at an acceptable rate (Herciu, Ogrean, Belascu, 2011). Also, it measures the rate of return that the firm earns on stockholder's equity. Because only the stockholder's equity appears in the denominator, the ratio is influenced directly by the amount of debt a firm is using to finance assets reflecting the profitability of the firm by measuring the investors` return (Griffin, Mahon, 1997). ROE is calculated by taking the profit after tax and preference dividends of a given year and dividing it by the book value of equity (ordinary shares) at the beginning of the year. Average equity can also be used. Equity would consist of issued ordinary share capital plus the share premium and reserves (De Wet, Du Toit, 2007). Many professional investors look for a ROE of at least 15% (Griffin, Mahon, 1997). *ROE* measures the overall profitability of a firm, being a function of profit margin, asset turnover, and leverage. The first two components of equation 1 equal the return on assets or *ROA* (i.e., net income divided by total assets) (Zhao, Trejo-Pech, Weldon, 2012).

Another very important indicator of the profitability of company, which shows the different type of effectiveness of managers, is called ROA (return on assets). It is quotient of EBIT (earnings before interest and tax) to total assets of the company. Similarly to previous indicator, it should be at the highest possible level, because each company tends to drop as higher net profit from using its assets (Račić, Barjaktarović, Zeremski, 2011). *ROA* is performed by focusing on the return on net operating assets - measured as net operating income divided by net operating assets or total assets minus current liabilities (Zhao, Trejo-

Pech, Weldon, 2012). Only a few professional money managers will consider stocks with a ROA of less than 5% (Herciu, Ogrean, Belascu, 2011).

ROE and ROA as indicators of profitability have been analyzed in several researches during past period (Alarcón, Sánchez, 2013; Alavinasab, Davoudi, 2013; Heyder, Makus, Theuvsen, 2011; Erasmus, 2010; Brown, Caylor, 2009) which is also one of the reasons to perform this kind of analysis in our paper.

Next important indicator of the profitability is BEP or breakeven point, accounted trough Cost volume profit analysis. Cost-volume-profit (CVP) analysis is a technique that examines changes in profits in response to the changes in sales volumes, costs, and prices. Accountants often perform CVP analysis to plan future levels of operating activity and provide information about

- which products or services to emphasize;
- the volume of sales needed to achieve a targeted level of profit;
- the amount of revenue required to avoid losses;
- whether to increase fixed costs;
- how much to budget for discretionary expenditures; and
- whether fixed costs expose the organization to an unacceptable level of risk (Berber, Golić, 2011).

Efficiency is a partial indicator of quality of an economy, and it is determined by a relationship between produced and spent values. Quality of an economy increases when spent values decrease per unit of produced value. Increase of spent values per unit of produced value means decrease in quality of an economy. 'With the help of efficiency, one of economic goals of reproduction is quantified, which is demand for maximizing results with minimal investments. Other form of application of basic economic principle of reproduction is in achieving maximum profit rate (profit/engaged capital) (Jakovčević, 2006, p. 63). Based on information on achieved efficiency in a succession of periods, economic success rate in principle of efficiency can be followed. High level of achieved efficiency means high level of investment success in production processes in a company, i.e. income that is a condition for growth and development of a company. And vice versa, low level of efficiency causes low or negative economic success that can be seen in production, income and profit decrease, which later affects other elements of business, such is market position and the like. Economic sense of efficiency principle is in the tendency to achieve certain value with minimal spending of all

factors in reproduction. Depending on the size of coefficients that are calculated, business can be efficient, non-efficient or on the border of efficiency and that (Vujević, Balen, 2006):

- If income is greater than expenditure, then coefficient is bigger than 1 (E > 1 = business efficient).

- If expenditure is greater than income, then coefficient is less than 1 (E < 1 = business non-efficient).

- If income is equal to expenditure, then coefficient is (E = 1 = business efficient).

Table 3: Indicators of the Efficiency

INDICATORS	FORMULA	UNIT
BEP (Breakeven point)	$BEP = \dfrac{TF}{\%Mp} = \dfrac{TF}{(R-TV)/R}$	RSD
ROE (Return on equity)	$ROE = \dfrac{NetIncome}{Sales} \times \dfrac{Sales}{TotalAssets} \times \dfrac{TotalAssets}{TotalEquity}$ $EquityMultiplier = \dfrac{TotalAssets}{TotalEquity}$ $ROE = ROA \times EquityMultiplier = ROA \times (1 - debt/equity)$	%
ROA (Return on assets)	$ROA = \dfrac{NetIncome}{Sales} \times \dfrac{Sales}{TotalAssets}$	%
L (Liquidity)	$L - \dfrac{WA}{STL}$	ratio
S (Solvency)	$S = \dfrac{BA}{TD}$	ratio
E (Efficiency)	$E = \dfrac{R}{TC}$	ratio
P (Productivity)	$P = \dfrac{R}{Lf}$	RSD/worker

Source: Extension and adjustment of the methodology of Berber, Đuričić, Arsić, 2012 and Radošević, Pasula, Berber, Nešković, Nerandžić, 2013.
TF – total fixed costs;
TV – total variable costs;
R – revenue;
C – capital engaged;
TC – total costs;
%Mp – % of marginal profit;

Bp – business profit, without financial incomes and expenditures;
L – liquidity;
WA – working assets;
STL – short term liabilities;
S – solvency;
BA – business assets;
TD – total short term and long term debt;
Lf – labor force

Productivity is defined as the ratio of the amount and effects of any element which is involved in the production process. However, in practice it is usually only applied to the measurement of the labor force. Labor productivity is an indicator of business performance, which shows the effectiveness of the relationship between the amounts expressed in the amount of effects of the amount of the used human activity for its achievement. Labor productivity is actually measure of the efficient use of human labor (Vujević, Balen, 2006).

Corporate liquidity is a short-term characteristic that measures the ability of a firm to pay its obligations on time. Corporate solvency is the ability to cover debt obligations in the long run. Liquidity and solvency risks are closely related to cash flow uncertainty. Short-term shocks to cash flows, together with the availability of cash reserves, affect corporate liquidity. Uncertainty about average future profitability, together with financial leverage, generates solvency concerns. These relations indicate that firms enter financial distress in two ways: a firm can become illiquid after a negative short-term cash flow or it can become insolvent if the expected rate of cash flows decreases sufficiently (Gryglewicz, 2011). Liquidity is calculated as a relation between working assets and short time liabilities. On the other hand, solvency is calculated as business assets from financial documentation and total short term and long term debt. Those two indicators show the possibility of the firm to pay its debts in short and long term.

At the end, authors in this paper decided to present total operational costs related to the sugar production in mentioned factories. "Costs present a value expressed by expenditure on working instruments and labor which are the constituents of the cost price of output, and it is important to connect costs to calculations; i.e., the cost price of the output and the expenditures which are not part of cost price should not be considered as costs" (Jakovčević, 1995). Total costs are consisted from cost of material and raw material, costs of labor-work force, costs of depreciation of machines and equipment and costs of capital, which are considered as very important in agribusiness (Rodrigues, 2012). Also, the production costs management of any product should be designed to ensure that all items that comprise it are

contemplated. Sometimes it can be observed that over-order items can lead to financial spreadsheet to produce biased budget results that create myopia in relation to the actual product cost (De Oliveira, De Carvalho Almeida, De Souza, Da Silva Macedo, 2012).

To identify the relationship between efficiency indicators the correlation coefficient has been calculated. As the value approaches 1 the connection is very strong; as the value approaches 0 it is the weakest link. This kind of analysis has been made for 20 most profitable companies in the world in 2010 (Herciu, Ogrean, Belascu, 2011).

$$r = \frac{n \times \sum_{i=1}^{n} X_i Y_i - \sum_{i=1}^{n} X_i \times \sum_{i=1}^{n} Y_i}{\sqrt{n \times \sum_{i=1}^{n} X_i^2 - \left(\sum_{i=1}^{n} X_i\right)^2} \sqrt{n \times \sum_{i=1}^{n} Y_i^2 - \left(\sum_{i=1}^{n} Y_i\right)^2}} \tag{1}$$

Where:

n – number of the elements/index/variable

x, y – elements/indexes/variables to be considered (in our case indicators of efficiency)

Authors made analysis of efficiency indicators on the basis of financial statements of 4 biggest factories in sugar industry in Serbia for two years (from 2011 to 2012) using Excel program and SPSS Version 21.0.

4. Results and Discussions

Table 4 presents the indicators of efficiency for four producers in sugar industry in the Republic in Serbia in the period of two years, from the start of 2011 to end of 2012.

Table 4: Efficiency indicators for 4 biggest producers of sugar in Serbia

EI	C1 – Sunoko		C2 – Teto		C3 – Sajkaska		C4 - Crvenka	
	2011	2012	2011	2012	2011	2012	2011	2012
BEP	2807794	2644055	1570471	1823085	1629744	1316624	2200095	2348164
ROE	62,38	45,8	55,3	52,67	19,52	26,48	21,03	27,77
ROA	28,67	23,44	25,64	22,61	8,22	11,54	13,28	14,35
L	1,78	1,94	1,46	1,42	1,55	1,65	2,44	1,65
S	1,86	2,06	1,87	1,75	1,74	1,79	2,72	2,08
E	1,51	1,48	1,33	1,27	1,134	1,19	1,21	1,23
P	43129,8	43961,5	42051,9	42486,1	24706,4	21736,1	33386	29530,7

Source: Authors' research

From figure 2 we can see that BEP in the four biggest producers in sugar industry in Serbia had variation in given period, in C2 and C4 BEP increased and in C1 and C3 BEP decreased from 2011 to 2012. The reason of increased BEP in two companies is realted to the increase of fixed costs of the production (more income is needed for their cover). On the other hand, C1 and C3 had decrease in their fixed costs so those companies had also a decrease in BEP in 2012 compared to 2011.
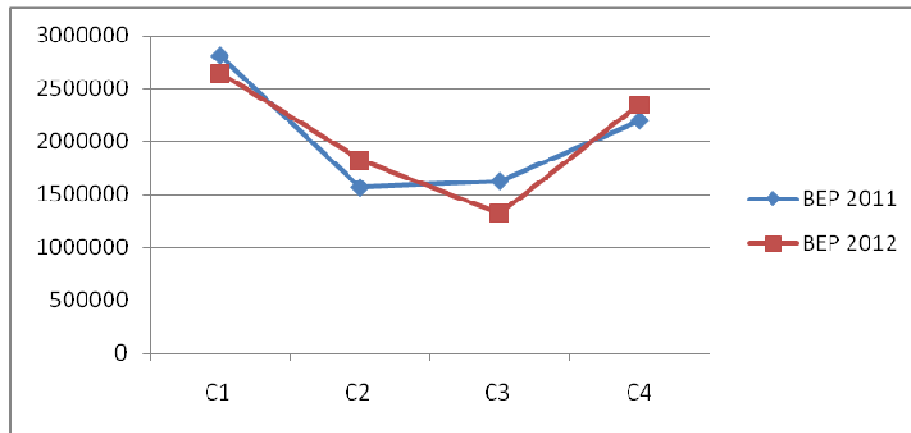

Figure 2: Breakeven point in two year period in sugar industry in Serbia
Source: Authors' research

Breakeven point depends on the size of the total income and costs, which, in turn, are caused by changes in production volume. The size of the total income is affected by the volume of production and sales price. Dynamics of production volume causes changes in the level and structure of costs, and they change as a result of economic output as the difference between total revenue and total costs. Profit varies in direct proportion to the change in total revenue, and in inverse proportion to the change in costs. To both elements of profit, total income and costs, a number of factors make influences, varying in the intensity and direction. These companies have achieved the positive breakeven point in the years 2011 and 2012, which means that all four companies have succeeded to manage the first and one of the most important parts of the business – to cover all cost, fixed and variable, and to produce profit.
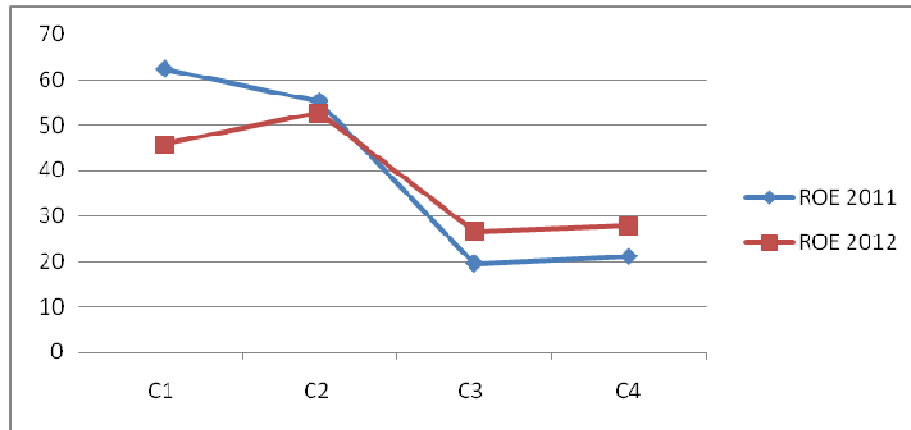
Figure 3: ROE for two year period in sugar indistry in Serbia
Source: Authors' research

In 2011 and 2012 all companies have a relatively high return on equity (Figure 3), but variance was large (from 62% to 19%). It is interesting to see that C1 and C2, companies with very high ROE in 2011 experienced a decrease in 2012, from 62.38% to 45.8% for C1 and from 55.3% to 52.67% for C2. The reasons for these decreases are in the decrease of net profit that is a starting point for analysis, and in the increase of capital, especially element of reserved capital and accumulation (retained earnings from past years). In case of C2 Company there were detected decreases in net profit and equity, which influenced a lower ROE. On the other hand, companies C3 and C4 had a lower percentage in comparison with C1 and C2, but those two companies experienced an increase in 2012 in term of ROE. Namely, C3 had an increase of net profit, around 80.000.000 RSD (Serbian dinar) and a decrease in equity in terms of decrease in retained profit (company made investments in machines and equipment). Company C4 had a low decrease in net profit, but also a decrease in equity, especially in the area of retained profit from the past years.

Earning ability of the asset is an important factor in monitoring of the business and adherence to the principles of safety. If the assets are not increased in the right way or there is a very small increase compared with the volume of the growth in financing in the company there could occur several problems that must be dealt very fast. However, profitability of investment is a very important factor in addition to permanently liquidity. If the company has an increase in profitability of assets and a decline in liquidity, which could be interpreted as a desire of the company to its estimated free cash assets invests in the way to comply with financial discipline. If the situation is such that, in terms of risk, management of the company

uses financial resources inappropriately then increase of profitability is irrelevant because a balance of funding is disrupted and liquid assets are brought into the hands of creditors.
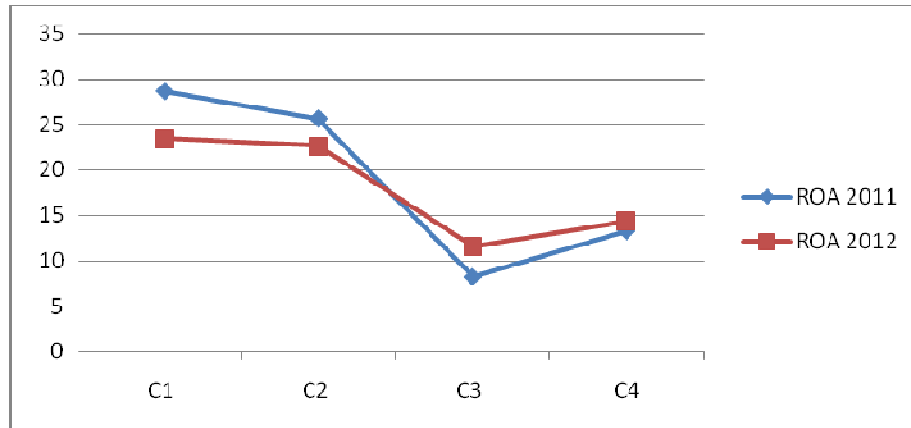

Figure 4: ROA for two year period in sugar indistry in Serbia
Source: Authors' research

From figure 4 we can see the similar data as for ROE. C1 and C2, companies with very high ROA in 2011 experienced a decrease in 2012, from 28.67% to 23.44% for C1 and from 25.64% to 22.61% for C2. The reasons for these decreases in C1 company are in the decrease of net profit and in the increase of business assets, especially element of receivables and stocks (in the area of working assets) and fixed assets in terms of property, plant and equipment and long term financial placement (participation in the capital). In case of C2 company there were detected decreases in net profit and increase in business assets, especially element of receivables and cash (in the area of working assets) and fixed assets in terms of property, plant and equipment, which influenced a lower ROA. On the other hand, companies C3 and C4 had a lower percentage in comparison with C1 and C2, but those two companies experienced an increase in 2012 in term of ROA. Namely, C3 had an increase of net profit, around 80.000.000 RSD (Serbian dinar) and a decrease in business assets in terms of decrease in working assets (company made decrease in receivables, which is very important since receivables from customers are one of the leading problems in contemporary business). Company C4 had a low decrease in net profit, but also a decrease in business assets in terms of decrease in working assets (company made decrease in receivables, like C3, and this

decrease was for 41% which is a very good indicator that show that 41% of receivables related to the customers were collected).

From figure 5 we can see the trends of liquidity in mentioned companies. In 2012 compared to 2011 there were small changes in liquidity, especially in company C1 and C3 that succeeded to increase their liquidity, while company C2 remained almost the same coefficient. Only C4 company had a decrease in liquidity coefficient from 2.44 to 1.65 (a decrease of 32%). Since we analyzed only general coefficient of liquidity, for this company it will be necessary to explore other liquidity coefficients like coefficient of rigorous liquidity and current liquidity, which are more rigorous measures of liquidity.
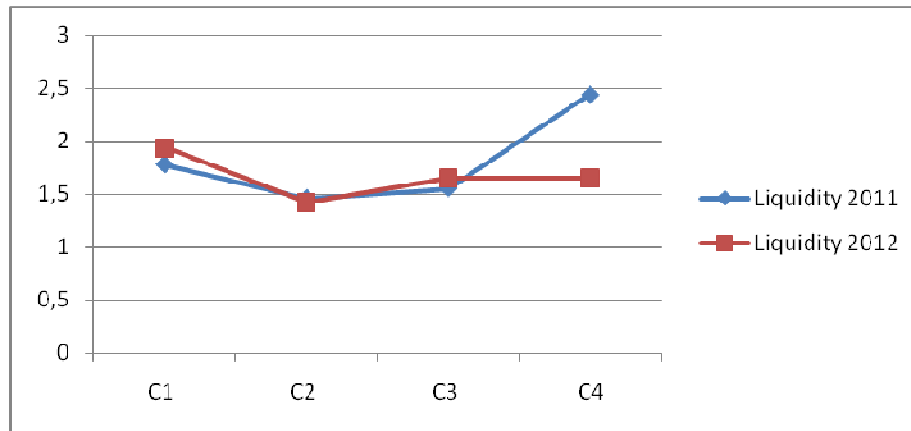

Figure 5: Liquidity for two year period in sugar indistry in Serbia
Source: Authors' research

What is more important to emphasize is the state that all companies are liquid, which is very hard to achieve in today's business, since the impossibility of the collection of receivables, the impossibility of settling the obligations to suppliers and business partners are significant difficulties that companies are faced to. Namely, the coefficient that is larger than 1.00 is a good indicator and, according to figure 5 and table 4, all companies are liquid. The increase in liquidity is primarily related to the decrease in short time liabilities, especially those that were related to the obligation of tax payment that company C1 paid in 2012, so amount of 171.271.000 dinars is no longer listed as short time liabilities, decrease in stocks and receivables and short time liabilities in C3. Company C4 experienced a decrease in liquidity primarily because of the significant decrease of all elements of working assets, especially stocks and receivables and an increase in short time liabilities, especially new short time financial loans.

Solvency ratio is very important in determining the efficiency of the company as it points on the ability of the company to pay all its liabilities, sooner or later, even from bankruptcy (liquidation) mass. The company is solvent, because this indicator has a value of over 1, and in the observed age ranges between 1.74 and 2.72, which means that if the companies cashed in all of his financial assets at book values, they could pay off all their debts. What is the solvency ratio is greater than one, the better the solvency of the company is. From figure 6 we can see that companies C1 and C3 enlarged its solvency, and that C2 and C4 decreased solvency.
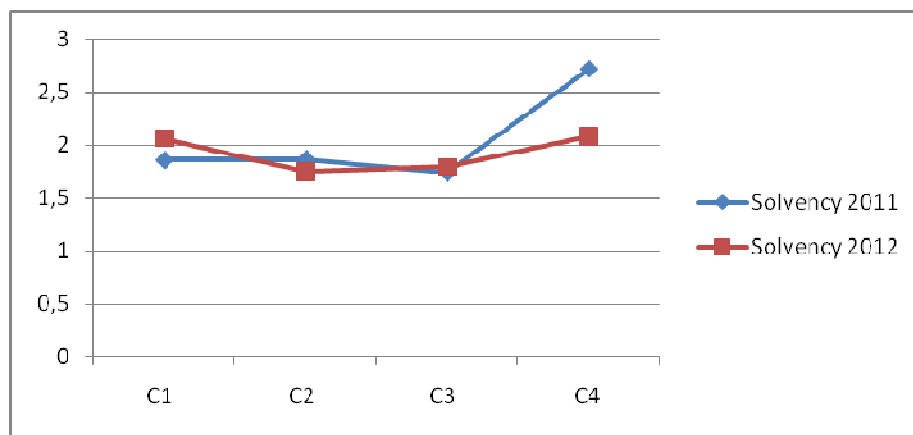

Figure 6: Solevncy for two year period in sugar indistry in Serbia
Source: Authors' research

Besides this, again, like in the case of liquidity, it is important to emphasize that all companies form sugar industry are very solvent, and that management policy in all companies are directed to the safety of the business, in means of carefully choices between profitability and safety, liquidity and solvency, which can be seen from the increase of liquidity and solvency in some companies accompanied with a decrease or little change in ROE and ROA. In companies C1 and C2 there were detected an increase in business assets and long term and short term liabilities, while in C3 and C4 companies there were found a decrease in business assets and in case of C3 a decrease in total liabilities, while company C4 enlarged its total liabilities and because of that experienced a significant decrease in solvency (from 2.72 to 2.08, or 23%).

Efficiency is a partial indicator of quality of an economy, and it is determined by a relationship between produced and spent values. Quality of an economy increases when spent values decrease per unit of produced value. Increase of spent values per unit of produced

value means decrease in quality of an economy. Based on information on achieved efficiency in a succession of periods, economic success rate in principle of efficiency can be followed. High level of achieved efficiency means high level of investment success in production processes in a company, i.e. income that is a condition for growth and development of a company. And vice versa, low level of efficiency causes low or negative economic success that can be seen in production, income and profit decrease, which later affects other elements of business, such is market position and the like (Berber, Đuričić, Arsić, 2012). In observed companies, there were changes in relations to the efficiency.
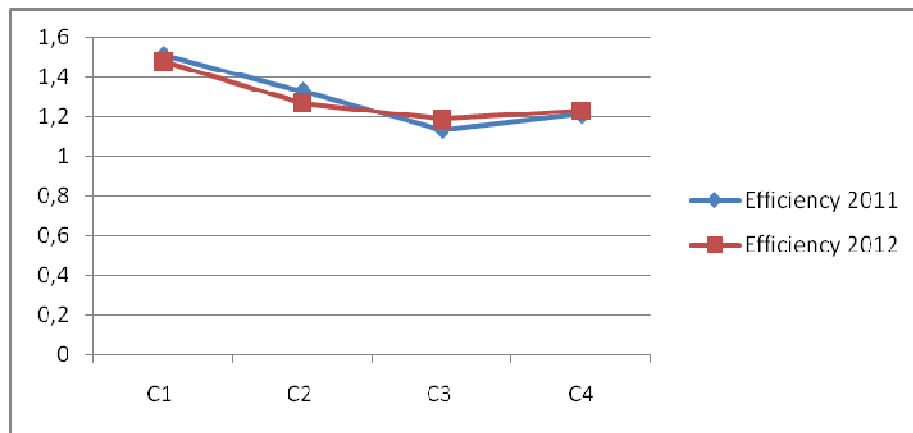

Figure 7: Efficiency for two year period in sugar indistry in Serbia
Source: Authors' research

In case of C1 company, there was found a decrease in efficiency, caused by a decrease in income and costs. But, since costs were decreasing in smaller percentage than income, the efficiency was decreased. Namely, this decrease is small, and company is efficient enough since its coefficient is higher than 1. Company C2 experienced a decrease in income, but an increase of costs that influenced a decrease in efficiency, while companies C3 and C4 had an increase of efficiency in 2012. In those two companies there were detected a decrease of income and costs, but costs were decreasing faster and in greater amount than income, so efficiency was enlarged. Figure 8 presents labor productivity in sugar factories in Serbia.
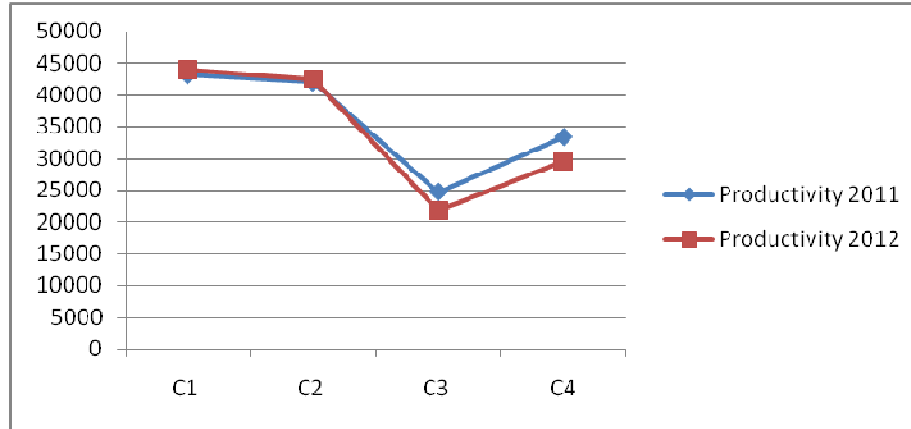
Figure 8: Productivity for two year period in sugar industry in Serbia
Source: Authors' research

According figure 8 we can conclude that all companies almost remained its productivity measured as relation between gathered income and number of employees. Productivity as partial indicator of efficiency of an economy is very significant, but in this paper only the basic calculation has been done, as a ratio between total income and number of workers. Companies that enlarged its labor productivity made that trough better organization of human resources and efficient use of them. In companies that had a lower level of productivity in 2012 there was a decrease in income (business revenue) so with almost the same organization and number of workers those companies experienced a lower level of productivity calculated as RSD of revenue per worker.

At the end of the analysis, to identify the relationship between ROA and ROE the correlation coefficient has been calculated since those indicators are two the most mentioned in contemporary researches related to the efficiency of business systems, even in agriculture (Mishra, Harris, Erickson, Hallahan & Detre, 2012; Thim, Choong & Asri, 2012; Zhao, Trejo-Pech, & Weldon, 2012; Katchova & Enlow, 2013; Golas, Bieniasz & Czerwinska-Kayzer, 2013).

Table 5: Correlation between efficiency indicators in sugar industry in Serbia

Spearman's rho Correlations		ROE	ROA
ROE	Correlation Coefficient	1,000	,952[**]
	Sig. (2-tailed)	.	,000
ROA	Correlation Coefficient	**,952**[**]	1,000
	Sig. (2-tailed)	**,000**	.

Source: Authors' research
 **. Correlation is significant at the 0.01 level (2-tailed).

From table 5 and we can see that between ROA and ROS there is strong correlation (R=0.952; p<0.000), which was expected taking into consideration equation where ROE is influenced by the changes on ROA indicator, on one hand, and equity multiplier on the other hand. This correlation is calculated based on ROE and ROA for years, 2011 and 2012, in four companies (total of 6 factories) of sugar industry in Serbia.

5. Conclusions

Sugar beet production in Serbia has a long tradition. In addition to a long tradition, features of production of this crop had large variations in both, planted area and in yield. Production of sugar beet in Serbia takes place on family farms, as well as in companies and cooperatives. Total area under sugar beet in Serbia, in the analyzed period, mostly increased to reach the maximum of almost 80 000 ha in 2007. The largest part of the total area is concentrated in the AP of Vojvodina, north part of the Republic of Serbia. Production of sugar beet was more than tripled, from about 1 to about 3 million tons. With relatively short season/campaign of sugar beet processing, high costs of sugar beet transport and insufficient amounts for daily processing the utilization level of sugar refinery capacities is lower. The fixed costs per unit of final product, or tons of sugar, are relatively high significantly increasing the cost of sugar. Also, sugar industry of Serbia can produce almost 500,000 tons of sugar and most of it can be exported to the EU because of the existence of the quota of 180.000 tons and preferential export of this amount in EU. Sugar industry is definitely a development possibility of the Republic of Serbia.

This paper presented the methodology and the analysis by which it can be determined how much the company manufacturing in sugar industry effectively use its limited resources, and whether the management of the company has been successful when it comes to profit, return on equity and return to assets – the indicators which are very interesting in the first place for the owners of the capital. The companies' analysis of the spectrum of the most important indicators of successful business in the last 2 years was made. Based on the results of analysis and correlations coefficient calculated for the ROE and ROA, we can conclude:

- Companies in sugar industry of Serbia are successful in their goal of reaching profit, since all companies cover its fixed and variable costs of the production, and gain profit. Business revenue is enough for covering all costs. BEP analysis showed that in some companies there were changes from 2011 to 2012, but beside decrease of

revenue and increase of costs in some companies, all have reached BEP and by that, made possibilities for profit gaining.

- In case of ROE and ROA indicators, all companies had very satisfactory results, since all of them are in the line with theoretical background, were it has been stated that ROE and ROA should not be lower than 15%. Also, some changes have occurred in transition between 2011 and 2012, but generally speaking, sugar industry has satisfactory ROE and ROA indicators. Also, there was found very strong significant correlation between ROE and ROA in 2011 and 2012.

- All companies in sugar industry in Serbia are liquid, which is very hard to achieve in today's business, since the impossibility of the collection of receivables, the impossibility of settling the obligations to suppliers and business partners are significant difficulties that companies are faced to. Namely, the coefficient that is larger than 1.00 is a good indicator. The increase in liquidity is primarily related to the decrease in short time liabilities, especially those that were related to the obligation of tax payment, decrease in stocks and receivables and short time liabilities.

- Also, all companies form sugar industry are very solvent, which means that management policy in all companies is directed to the safety of the business, in means of carefully choices between profitability and safety, liquidity and solvency, which can be seen from the increase of liquidity and solvency in some companies accompanied with a decrease or little change in ROE and ROA. In companies there were detected an increase in business assets and long term and short term liabilities, while in others there were found a decrease in business assets.

- In case of efficiency, all companies are efficient in the use of their resources, and although there were some changes, positive and negative, we can state that sugar industry is efficient, but that continuing organizational and management efforts must be directed to the increase of the efficiency in next period. Also, it is important to emphasize that companies had very small changes in efficiency and that most of them almost retained the efficiency index from past year.

- At the end, we analyzed productivity but only as a relation between revenue and number of workers, since we could not reach the information about working hours (which is very complex since there are typical seasons for sugar processing during the year). We can conclude that all companies almost remained its productivity from 2011 to 2012. Companies that enlarged its labor productivity made that trough better

organization of human resources and efficient use of them. In companies that had a lower level of productivity in 2012 there was a decrease in income (business revenue) so with almost the same organization and number of workers those companies experienced a lower level of productivity calculated as RSD of revenue per worker.

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