CAPITAL EFFICIENCY ANALYSIS OF SERBIAN COMPANIES

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Abstract:

The purpose of this paper is to give some insight into the level of capital adequacy and the efficiency of its use in companies in the Republic of Serbia. As no similar research has yet been conducted in this manner, we believe that certain benchmark in this field is necessary when analysing company's financial performance. In order to do so, financial statements for 53,996 companies have been examined and the main financial indicators have been calculated. Results indicate that total negative equity of sound companies is double in comparison to those in bankruptcy. General market conditions resulted in significant decrease of Return on Equity (ROE) and total revenue in the last four years (2008-2011). In the same period of time, private companies with small number of owners such as limited liability companies, general partnerships, and limited partnerships overperformed in comparison to other legal forms. In addition, indebted companies create much higher negative results than the sound ones create positive ones.

INTRODUCTION

The world economy has experienced constant growth over the last few decades. This is primarily the consequence of availability of a large amount of capital that has been invested. The relative ease of capital acquisition resulted in a decrease in interest rates. The rise of consumption was unsupported, as general wealth seemed bigger than it actually was. The creation of several asset bubbles followed, thus indicating the change in capital availability. Numerous authors have considered the role of rapid growth of emerging markets during these events and pointed out that their government's deficits contributed significantly to it (Dobbs et al. 2011). Regarding the deficit of the Republic of Serbia, it equalled EUR 14.7 billion in 2000, but it slowly decreased to 8.8 in 2007 and 2008. However, it reached a peak of EUR 14.7 billion in the third quarter of 2011. There seems to have been a high demand for

capital in the Republic of Serbia, which will probably increase in the years to follow as a result of the general market conditions. It will be useful to get a better insight into capitalization of Serbian companies since their performance contributes to the general wealth and level of investment, either on micro or macro level. Traditional belief that the increase of company's assets (capital) is the only sign of wealth is a common mistake. The size of the company cannot be viewed as the performance measure merely on the basis of the firm's capital structure decisions while expanding its asset volume. This means that the performance of the invested capital is also essential. (Muzir, 2011). Taking into consideration that competitiveness of business of domestic companies is on undesirable level, it can be presumed that the efficiency of use of the invested capital is also on the low level (Stanisavljev et al. 2012). The main goal of this paper is to provide additional information as to whether the capitalization of Serbian companies is

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sufficient and whether the capital is utilised in the efficient manner. The paper is structured in the following manner: we will first present the technique of selection of companies comprising research sample; after that, we will present methodology and implementation of the selected statistical methods; the final part of this paper we will present research results.

RESEARCH SAMPLE AND METHODOLOGY

In order to provide credible and adequate information, the use of a large sample of companies from all areas within the Republic of Serbia was compulsory. The research sample consisted of 53,996 companies that have complete annual financial statements that are publicly accessible. Financial statements for accounting periods of 2008, 2009, 2010 and 2011 have been acquired and analysed, for every company. Financial reports have been taken from the national agency with its basic function being registration of entities and tracking of their business activities on the territory of the Republic of Serbia.

Regarding the research methodology, main financial indicators have been calculated in order to grasp the reality of the current level of capital employment and its efficiency. Most commonly used and well-known financial indicators are Return on Equity (ROE) and Debt to Equity Ratio, and the focus will subsequently be on these two indicators. Additional statistical methods will be implemented in order to deepen the analysis of capital adequacy and efficiency.

The Spearman's Rho correlation will be calculated in order to determine the magnitude and direction of the correlation between debt to total assets ratio and total revenue, the two variables that are not normally distributed, as it will be later presented. This coefficient could be calculated either by using a statistical software package, or in the following manner (Myers and Well, 2003):

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \qquad (1)$$

where,

$$d_i = x_i - y_i$$

and n is the sample size, whereas raw scores Xi and Yi are converted to ranks xi and yi.

Additionally, in order to test the significance of the correlation of asymmetric data, the non-parametric statistical test (Friedman's two-way analysis of variance by ranks test) will be used. This tool is applied when the data are sufficiently extensive, such as social and economic data, and where normal distribution is more likely to be the exception than the rule (Friedman, 1939). Each set of values could be arranged or ranked instead of the original quantitative values in order to overcome this obstacle. In that way, ordinary analysis of variance and assumptions of normality could be avoided.

Kendall's coefficient of concordance will be used for normalisation of statistics of Friedman test. This coefficient ranges from 0 to 1, thus indicating whether there is an agreement between the evaluators or not. Kendall's W makes no assumptions regarding the nature of the probability distribution, and therefore can be used for any number of distinct outcomes (Kendall and Babington, 1939). This coefficient is calculated in the following manner:

$$W = \frac{12S}{m^2(n^3-n)} \qquad (2)$$

where,

$$S = \sum_{i=1}^{n}\left(R_i - \overline{R}\right)^2$$

$$\overline{R} = \frac{1}{2}m(n+1),$$

$$R_i = \sum_{j=1}^{m} r_{i,j}$$

and n is total objects, m number of judges and $r_{i,j}$ is given rank (Kendall and Babington, 1939).

RESULTS

RETURN ON EQUITY

For the purpose of calculating ROE (return on equity), companies with negative equity (13,246) have been excluded from the analysis. Additional consideration is related to the mathematical feature of ratio numbers. As the book value of equity approaches zero, ROE tends to +- infinity. Therefore, in order to visualize our sample data, we performed an outlier exclusion procedure with cut points established at -1 and 1. A total of 3,890 items was considered an outlier, so ROE values at the end of 2011 (36,860) along with the corresponding values

at the end of 2008 (40,883 - different accounts for companies in which equity turned negative during the observed three - year - period) were used as relevant data. The results are presented in the histogram graphs that follow.
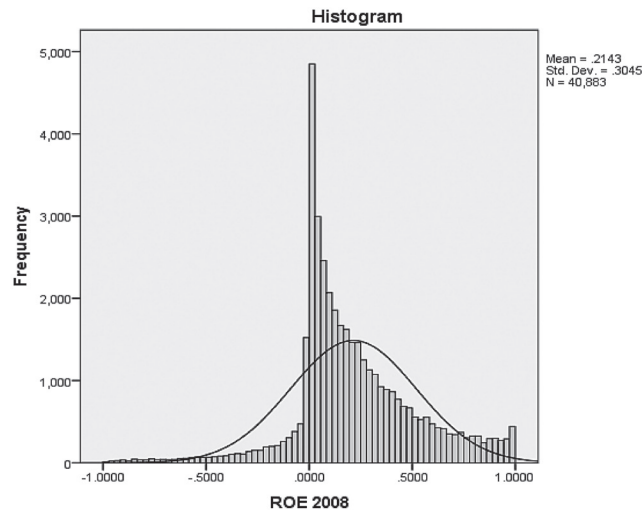

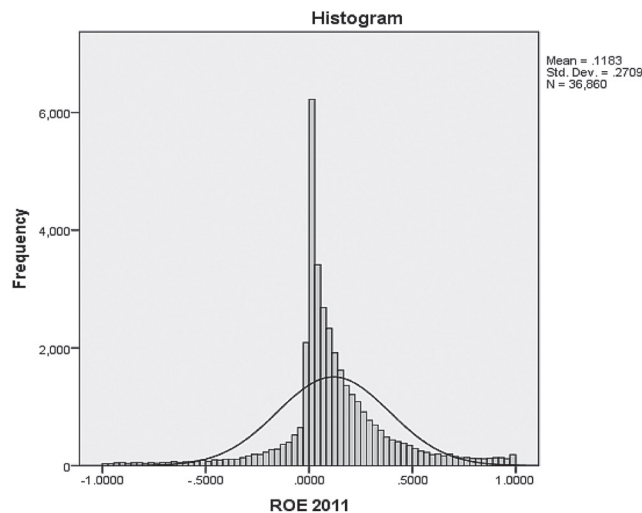Figure 1. ROE distribution in 2008.

Figure 2. ROE distribution in 2011.

As can be seen, even with the outliers being removed, distribution of ROE in both years (2011 and 2008) is still far from normal. In 2011, the distribution was highly leptokurtic with a kurtosis of 3.04 (SE = 0.02) and had a slight positive skew of 0.08 (SE = 0.01). In 2008, it had the corresponding kurtosis value of 1.21 (SE = 0.02) and a slight positive skew of 0.18 (SE = 0.01).

- Financial crisis made it difficult for the companies to earn excess returns (see difference in mean, kurtosis and skewness values);

- Psychological aspect makes companies, which *de facto* have minor negative financial result, eager to use accounting standards with the aim of breaking even;

- Corporate income tax deferral is lucrative even in countries like Serbia where corporate income tax rate is as low as 10%.

Lack of data for companies with negative equity, most of which also have negative net result, makes the data asymmetric. Due to this reason, we have applied nonparametric test in data analysis.

Using related-samples Friedman's two-way analysis of variance by ranks, we found a statistically significant difference in return on equity depending on the observed period, $\chi_3^2 = 9{,}185.73$, $p < 0.01$. Average ranks are as follows: year 2011- 2.16, year 2010 - 2.33, year 2009 - 2.49, year 2008 - 3.02. Kendall's coefficient of concordance of .08 indicated rather strong difference between the years.

	Area (major cities)			
	Belgrade	Novi Sad	Nis	Remaining area of the country
	Median	Median	Median	Median
ROE 2008	.1989	.1838	.1252	.1284
ROE 2011	.0788	.0812	.0567	.0655
ROE change %	-.11	-.09	-.07	-.06
Revenue change %	-.15	-.19	-.12	-.09

Table 1. Median values of ROE according to geographic area.

As can be seen in Table 1, the highest decrease of ROE was in the capital city of the Republic of Serbia. The value of median ROE dropped more remarkably for companies located in Belgrade (from 19.89% in 2008 to 7.88% in 2011) than for companies located outside of Belgrade (from 12.34% in 2008 to 6.55% in 2011). Even though the highest reduction of revenue was in Novi Sad, which leads to the assumption that Belgrade attracts higher amount of capital, efficiency of its use is lower than it used to be. Nevertheless, companies located in the capital still have had somewhat higher returns. Furthermore, we have calculated that the average change of ROE median in 2011 was cc. -.7. If we compare this result to Europe's median change of cc. +.03 for the same period, we can comprehend the current level of efficiency of capital use in the Republic of Serbia (The Data Page, 2012).

As will be pointed out in chapters that follow, company's legal form plays an important role in the analysis of its performance. Therefore, ROE medians have been analysed with respect to the legal form of the company.
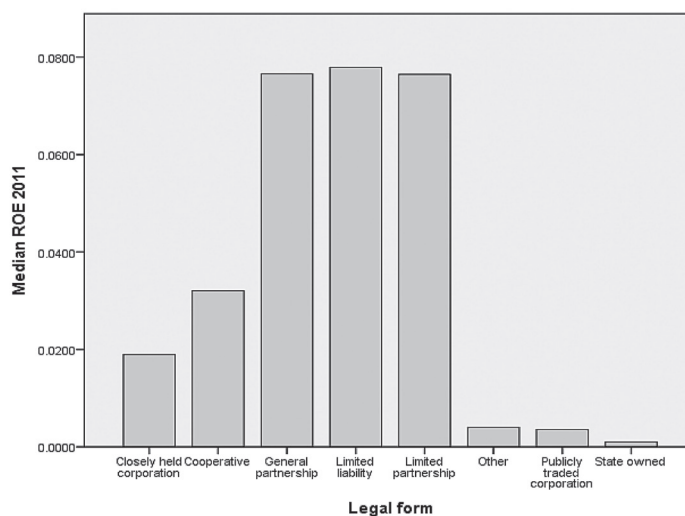
Figure 3. ROE median values depending on legal forms of sample companies.

It can be noticed that corporations are significantly inefficient compared to the limited liability companies, partnerships and limited partnerships. This is primarily due to the difference in the number of owners, and therefore the efficiency of quality control. Histogram of median values for legal forms is to be presented next. Connecting lines between the legal forms with no statistically significant difference in median value of ROE are coloured black.

Figure 4. Histogram of ROE medians depending on company's legal form.

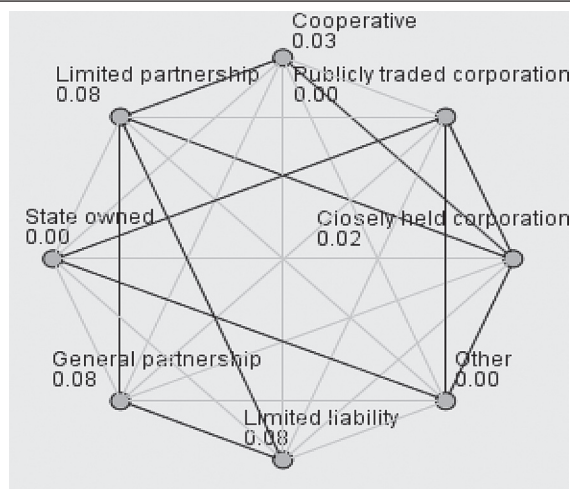If the company underperforms for a longer period of time, its liquidity and solvency are endangered and the company may be declared legally bankrupt.

BANKRUPTCY, RESTRUCTURING AND LIQUIDATION

As has been previously mentioned, almost one third of the sample companies have had negative equity. According to the traditionally established bankruptcy legislative, these companies should go to bankruptcy (restructuring or liquidation). The following table presents the performance of the companies with negative equity in 2011.

As can be seen from the table above, there is a total of 11,245 companies with the negative equity in the sample which are not legally involved in bankruptcy, reorganization or liquidation. In the aggregate, they have an annual net loss of RSD 103

Legal form			Net result 2011			
			Bankruptcy, restructuring or liquidation			
			No		Yes	
			Sum	Count	Sum	Count
Closely held corporation	Negative equity 2011	No	23,122,375	136	-504,309	7
		Yes	-3,653,543	27	-1,294,515	10
Cooperative	Negative equity 2011	No	1,253,042	957	-72,921	28
		Yes	-986,731	286	-455,300	55
General partnership	Negative equity 2011	No	925,836	1,068	-9,950	54
		Yes	-109,781	393	-88,788	58
Limited liability companies	Negative equity 2011	No	202,749,460	35,572	-40,07,123	983
		Yes	-83,808,999	10,206	-35,075,007	1,405
Limited partnership	Negative equity 2011	No	48,602	175	-2,425	6
		Yes	-16,771	66	-3,886	13
Other	Negative equity 2011	No	2,309,221	177	626,750	16
		Yes	-620,058	35	-995,404	23
Publicly traded corporation	Negative equity 2011	No	56,529,192	879	-9,882,043	176
		Yes	-12,289,192	174	-38,774,730	276
State owned	Negative equity 2011	No	-1,872,082	448	-691,562	68
		Yes	-2,440,287	58	-6,216,360	161
Total	Negative equity 2011	No	285,065,646	39,412	-14,543,583	1,338
		Yes	-103,925,362	11,245	-82,903,990	2,001

Table 2. Net result of companies with negative equity in 2011.

billion, compared to RSD 83 billion of net loss generated by companies involved in bankruptcy. In the Republic of Serbia, legal criteria for filing for bankruptcy are focused on liquidity, not on solvency. As a result, numerous companies make a large amount of losses, but nevertheless avoid legal action.

LEGAL FORMS AND INDUSTRIAL SECTORS

As can be seen from Table 1, there are significant differences in company's performance depending on the legal form. Therefore, we have calculated the most relevant indicators and analysed differences

Legal form	ROE change %	Net margin change %	Debt ratio change %	Revenue change %	Number of employees change %	Bankruptcy		Negative equity 2011	
						No	Yes	No	Yes
	Median	Median	Median	Median	Median	Row N %	Row N %	Row N %	Row N %
Closely held corporation	-.03	-.01	.04	-.13	-.20	90.6%	9.4%	79.4%	20.6%
Cooperative	-.01	.00	.02	-.15	.00	93.7%	6.3%	74.3%	25.7%
General partnership	-.08	-.01	.02	-.09	.00	92.9%	7.1%	71.3%	28.7%
Limited liability companies	-.09	-.01	.01	-.12	.00	95.0%	5.0%	75.9%	24.1%
Limited partnership	-.07	.00	.02	-.13	.00	92.7%	7.3%	69.6%	30.4%
Other	.00	-.01	.02	-.12	-.17	84.5%	15.5%	76.9%	23.1%
Publicly traded corporation	.00	-.01	.07	-.22	-.33	70.0%	30.0%	70.1%	29.9%
State owned	.00	.00	.08	.13	-.05	68.8%	31.2%	70.2%	29.8%

Table 3. Change of main financial indicators in percentage depending on legal form.

between medians across legal forms. Results are presented in the table that follows.

With respect to the legal form, private companies with small number of owners (limited liability companies, general partnerships and limited partnerships) have had the steepest drop, while state owned, publicly traded and cooperatives appear to be countercyclical. Median net margin of the state owned companies has slightly improved.

The next level of analysis refers to the industrial sector companies belong to. We have categorised the companies based on the sector in which they operate and presented the data in the following table.

You may notice that indebtedness increased the most in the following sectors: energy; accommodation, restaurants and bars and healthcare and social care; while the greatest decrease of ROE has involved the following sectors: construction; professional services and publishing, information and communication. Moreover, it would be interesting

to examine if there is any correlation between the main financial indicators and debt to equity ratio.

DEBT TO EQUITY RATIO

Debt to equity ratio represents an indicator that is frequently used in bankruptcy prediction models and estimation of company's solvency. By analysing the data presented in the table that follows, we stressed out that companies that perform reasonably well have debt to equity ratio between 0.1 and 0.6. After that point, the increase of debt to equity ratio and companies involved in bankruptcy (restructuring and liquidation) are positively correlated.

There also seems to be a correlation between income and indebtedness. Table 6 shows the correlation between the level of indebtedness (debt to total assets) and cumulative results. The latter is calculated as the sum of financial results in the period 2008 - 2011 and has been categorized by its volume.

Sector	ROE change %	Net margin change %	Debt ratio change %	Revenue change %	Number of employees change %	BRL			Negative equity 2011	
						Bankruptcy	Restructuring	Liquidation	No	Yes
	Median	Median	Median	Median	Median	Row Total N %	Row Total N %	Row Total N %	Row Total N %	Row Total N %
Accommodation, restaurants and bars	-4.88	-1.59	.06	-13.88	-.18	4.6%	1.5%	4.0%	58.1%	41.9%
Agriculture forestry and fishing	-2.38	-.23	.01	1.57	.00	6.6%	.7%	2.1%	76.5%	23.5%
Automotive parts	-8.99	-1.14	.01	-21.57	.00	1.2%	.1%	3.4%	78.5%	21.5%
Construction	-11.95	-1.63	.02	-34.37	-.13	3.9%	.4%	1.9%	75.6%	24.4%
Culture, arts and leisure	-1.52	-.58	.03	-11.06	-.01	.4%	.00%	4.0%	61.9%	38.1%
Education and training	-7.84	-1.10	.02	9.78	.00	.9%	.00%	3.4%	55.5%	44.5%
Energy	-.07	-.45	.06	32.44	.00	.8%	6.2%	.8%	73.1%	26.9%
Financial services and holding companies	-8.91	-6.52	.03	-31.31	.00	2.4%	4.7%	3.4%	80.8%	19.2%
Healthcare and social care	-.13	-.06	.09	-5.70	-.05	2.2%	18.5%	3.3%	62.0%	38.0%
Manufacturing	-6.03	-1.02	.01	-11.61	-.03	5.2%	.9%	2.6%	77.6%	22.4%
Mining	-2.43	-1.43	.02	-8.32	-.13	6.4%	3.5%	1.8%	71.9%	28.1%
Miscellaneous services	-8.35	-.76	.02	-8.33	.00	1.4%	.2%	2.3%	72.0%	28.0%
Multiple or unclassified	.00	-.44	.00	-30.62	.00	.0%	.00%	.00%	77.9%	22.1%
Professional services	-11.67	-1.65	.01	-8.68	.00	1.3%	.2%	2.4%	78.5%	21.5%
Publishing, information and communication	-8.95	-1.37	.02	-8.16	.00	1.3%	.2%	2.7%	75.7%	24.3%
Real estate	-3.17	-1.05	.02	-20.06	-.11	2.3%	.00%	4.5%	65.8%	34.2%
Retail	-7.76	-.52	.01	-8.43	.00	2.6%	.1%	3.5%	73.6%	26.4%
Transport and warehousing	-4.59	-.78	.01	2.26	.00	2.4%	.3%	1.7%	78.8%	21.2%
Water and waste processing	-.11	.08	.04	19.83	.00	1.8%	.2%	.8%	87.0%	13.0%
Wholesale	-9.28	-.91	.01	-15.72	.00	2.1%	.1%	3.4%	74.8%	25.2%

Table 4. Change of main financial indicators in percentage depending on industrial sector.

Cumulative result is inversely proportional to the degree of indebtedness; this is especially true for large companies. Moreover, the intensity of correlation between these two variables is rather moderate. It should be noted that the variability of cumulative result increases with the rise of indebtedness. This is because the indebted firms could be more successful or unsuccessful compared to the sound ones, but that does not mean that the level of positive or negative result will be the same. According to the results of the analysis, the loss they incur is much higher than the gain sound companies produce.

Debt ratio 2008	Net equity 2008	Cumulative earnings 2008-2011	Revenue change %	Net margin 2008	Net margin change %	Row Total N %		
	Median	Median	Median	Median	Median	Bank-ruptcy	Restruc-turing	Liquida-tion
Debt ratio between 0 and .1	2,284.5	78.00	-2.76	.0427	-1.93	1.0%	.00%	3.3%
Debt ratio between .1 and .2	5,978	1,105	-4.13	.0685	-3.38	.9%	.3%	2.2%
Debt ratio between .2 and .3	5,600.5	1,451.5	-2.10	.0569	-2.56	1.3%	.3%	1.7%
Debt ratio between .3 and .4	5,583	1,330.5	-4.66	.0452	-2.03	.9%	.1%	1.8%
Debt ratio between .4 and .5	5,453.5	1,317	-5.74	.0411	-1.78	1.6%	.4%	1.8%
Debt ratio between .5 and .6	4,474.5	1,247.5	-6.66	.0347	-1.28	2.0%	.3%	1.5%
Debt ratio between .6 and .7	3,419	944	-8.35	.0280	-1.15	1.9%	.3%	1.8%
Debt ratio between .7 and .8	2,322	774	-11.24	.0228	-.76	2.3%	.4%	1.7%
Debt ratio between .8 and .9	1,347	432	-18.15	.0166	-.58	3.1%	.3%	2.0%
Debt ratio between .9 and 1	440	124.5	-27.52	.0088	-.32	4.8%	.4%	2.6%
Debt ratio more than 1	-717	-579.5	-31.44	-.1147	1.83	5.9%	1.2%	6.0%

Table 5. Change of main financial indicators in percentage depending on level of debt to equity ratio.

	Spearman's Rho	Sig. (2-tailed)
Revenues 2008 < 3733	-.28	.00
3733 <= Revenues 2008 < 22000	-.31	.00
22000 <= Revenues 2008	-.36	.00
All companies	-.30	.00

Table 6. Correlation between total result and indebtedness.

CONCLUSIONS

The findings of this research show that the capitalization of companies in the Republic of Serbia is on somewhat low level, where almost one- third of the companies from the sample have negative equity. Average change of ROE median in 2011 was cc. -.7, compared to Europe's median change of cc. +.03. According to our findings, corporations are significantly inefficient compared to limited liability companies, partnerships and limited partnerships. Likewise, there is an increase of general indebtedness in sample companies, with the positive change of debt to equity ratio for cc. +3%. Furthermore, cumulative results are inversely proportional to the degree of indebtedness. This leads to the conclusion that, although companies within the Republic of Serbia have sufficient capital, the already invested capital is used inefficiently, thus destroying the invested value, which leads to further de-capitalisation, and ultimately to bankruptcy.

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ANALIZA EFIKASNOSTI KAPITALA U KOMPANIJAMA U SRBIJI

Rezime:

Svrha ovog rada je da pruži uvid u nivo adekvatnosti kapitala i efikasnost njegovog korišćenja u kompanijama u Republici Srbiji. S obzirom na to da do sada nije sprovedeno nijedno slično istraživanje na ovaj način, verujemo da je neophodno da postoji određeni benchmark (referentna tačka ili standard uspešnosti) prilikom ispitivanja finansijskog učinka kompanije.Kako bismo to postigli, ispitali smo finansijske izveštaje u 53,996 kompanija i glavni finansijski pokazatelji su izračunati.Rezultati pokazuju da je ukupan negativni kapital u finansijski stabilnim kompanijama duplo veći u odnosu na kompanije pod stečajem. Opšti uslovi na tržištu doveli su do značajnog pada u vrednosti prinosa na akcijski kapital (ROE) i ukupnih prihoda tokom protekle četiri godine(2008-2011). Tokom tog istog perioda, privatne kompanije sa malim brojem vlasnika poput kompanija sa ograničenom odgovornošću, društva sa neograničenom odgovornošću i društva sa ograničenom odgovornošću zabeležile su veći učinak u odnosu na ostale pravne oblike. Takođe, negativni rezultati koje beleže zadužene kompanije mnogo su veći od pozitivnih rezlutata u finansijski stabilnim kompanijama.