

THE IMPACT OF CAPITAL STRUCTURE ON STOCK PRICES IN SERBIA DURING THE GLOBAL FINANCIAL CRISIS

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Abstract—The financial market in Serbia has achieved rapid growth after the social and political changes in 2000. At that time, began reviving of the stock market, what has prompted investors to trade securities in the domestic financial market. The favorable business conditions and increased market demand, have caused rapid growth of the share prices. This positive trend was abruptly interrupted in 2008, with the beginning of the global financial crisis, when a decline was recorded in the Serbian financial market. Therefore the main objective of this paper is to consider changes in the financial markets of Serbia in the global financial crisis, through the analysis of changes of BELEX 15, the Belgrade Stock Exchange index in 2008, 2009 and 2010. The emphasis is on changing the profitability of enterprises, whose shares are located in the *index basket* of *Belex15*, impact of financial leverage on profitability and hence the movement of share prices of these companies.

Keywords—financial market, global financial crisis, ROA, ROE, BELEX 15, financial leverage.

I. INTRODUCTION

THE business activities of enterprises in Serbia in recent years has been marked by a sharp drop in profitability as a result of the constant problems in the functioning of the domestic economy and the crisis that has reached global proportions. Decline in profitability of domestic enterprises has led to a situation of chronic lack of cash, so the companies tried to solve this problem by taking a loan. Due to the unfavorable credit rating of Serbia, loans to companies in Serbia are much more expensive than in developed European countries. Already at the beginning of the crisis, Serbian companies were heavily indebted, and the additional intake of adverse credit during periods crisis only increased their unfavorable debt ratio. For a better representation of this situation, as a sample for analysis we selected companies with shares listed in the BELEX 15 index basket, as a representative group of companies. The paper will analyze their profitability for years 2008,

2009 and 2010, then the level of financial leverage of these companies and index BELEX 15, as a reflection of the market quotation of the shares of enterprises.

II. METHODOLOGY AND KEY INDICATORS

This research will be based on the analysis of business results of enterprises, through the monitoring of three important indicators: profitability of enterprises, the degree of financial leverage and the movement of the Belex 15 value in the three-year period. During this period, Serbia felt growing impact of the global economic crisis that has significantly slowed the growth and led to downturn in liquidity and profitability of many companies. Worsened business conditions have reduced the availability of capital, whose price has increased significantly, due to increasing demand and less supply. Investment „represent the condition of existence, growth and development, maintaining and improving the competitive advantage of the given subject.” [1] The problem of Serbian companies is further increased due to the fact that Serbia is still treated as risky country for investment, and therefore, because of the high risk premium, borrowing is more expensive than in developed countries. Enterprises that have already been burdened with debt, had to borrow further under less favorable conditions, thereby constantly increasing its exposure to financial risk. Decline in profitability, threatened liquidity and greater caution by investors caused the decrease in the value of share trading on the Belgrade Stock Exchange, which can best be seen by analyzing the movement of stock market indexes. [5]

Profitability is a key principle, which can lead entrepreneurs in the establishment and management of enterprise. Profitability shows how the management of company is able to, in accordance with their capabilities and market conditions, fertilize invested funds and create added value for shareholders. The two most important indicators of the success of this mission are return on assets and return on equity in the company. In

spite of possible deficiencies that may arise in determining these indicators, which concern respect and adequacy of accounting standards for a fair determination of income and expenditures, ROA and ROE do not lose their importance, and still are widely used in financial analysis. These indicators are calculated using the following formulas: [6]

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

$$ROE = \frac{\text{Net Income}}{\text{Equity}}$$

It is notable that ROA refers to the success of managing total assets, while ROE refers to the management of the company's own funds. Despite the fact that both

parameters are related to the earning capacity of enterprises, among them there is a clear connection and interdependence, as demonstrated by the following formula:

$$ROE = ROA \times \frac{\text{Total Assets}}{\text{Equity}}$$

This formula shows that the value of ROA directly affects the level of ROE, and that there is a positive correlation, i.e. with the increase in ROA, ROE also increases. ROE can also be decomposed into various ratios that reflect different aspects of a firm's performance and this type of setting return on equity is called the DuPont analysis:[25]

$$ROE = \frac{\text{Net income}}{\text{Pretax profit}} \times \frac{\text{Pretax profit}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

(A) Tax burden (B) Interest burden (C) Margin (D) Turnover (E) Financial leverage

For the analysis in this paper special significance has ratio (E), which is called financial leverage. It shows the share of debt in total sources of funds in the company. Modern enterprise that wants to answer the growing demands of the market and increasing competition, often is not able to finance ambitious projects solely from its own funds. With decision to borrow, the company activated the financial risks in its business, which is measured by the degree of financial leverage. **Financial leverage** measures the effect of enterprise's business activities in the presence of fixed financial expenses. Leverage effect can be positive or negative, depending on whether the interest expenses are covered with EBIT (earning before interest and taxes), and strong or weak, depending on the participation of borrowed resources in total resources. [3] The degree of financial leverage can be calculated using the following formulas:

$$DFL = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$$

or

$$DFL = \frac{\% \text{ Change in Earning per Share}}{\% \text{ Change in EBIT}}$$

The high level of financial leverage indicates that a relatively small change in EBIT could result in significant changes in net income, which provides great opportunities to the company to achieve above-average yields through the use of financial leverage, but also there is the danger of erosion of net returns due to relatively small disturbances in the enterprise's business activities. The degree of financial leverage in this paper will be calculated using the following formula:

$$DFL = \frac{\text{Total Assets}}{\text{Equity}} = \frac{\text{Equity} + \text{Debt}}{\text{Equity}} = 1 + \frac{\text{Debt}}{\text{Equity}}$$

Comprehensive insight into the impact of financial leverage on the company can be taken only if compound

leverage factor (CLF) is computed. This indicator is calculated by multiplying two ratios: interest burden (B) and financial leverage (E) (CLF = Interest burden x Leverage) and its value indicates whether the impact of financial leverage on ROE is positive or negative. If the CLF > 1, the use of debt will increase ROE, but if the CLF < 1, the use of debt will decrease ROE. CLF will be greater than 1, if ROA > Interest rate on debt. For banks the leverage effect can't be understood in this way, because interest rates are part of regular banking business activities. In addition, capital of banks must be on mandatory level, which is calculated as *equity (capital) to risk weighted assets* ratio and it must be minimum 8% (Basel 2). Therefore, since the leverage is approximately reciprocal value of that amount, it would be optimal to be 12,5, i.e. the reciprocal value of the prescribed mandatory capital. In Serbia prescribed capital is 12%, so leverage may have maximum value of 8.33. These figures should not be taken as a rigid criterion, but only as a starting hypothesis, primarily because the capital adequacy ratio is not determined simply by calculating equity to assets ratio, but it is necessary to count capital by the Basel rules, as well as the risk-weighted assets, which is less than the total assets. Therefore leverage of banks is primarily viewed through adherence to the rules on mandatory capital. Banks in Serbia which capital at risk is over 12%, have additional opportunities to borrow in the market [4].

The sample on which the research conducted is the **BELEX 15** index basket, which includes 15 companies from different business areas, whose analysis can provide a fairly realistic picture of the situation in Serbian economy and business achievements of Serbian companies. Companies from the index basket of BELEX 15 are listed in the table below.

Table 1. BELEX 15 Index Basket

Company	Symbol
AIK banka a.d., Niš	AIKB
NIS a.d., Novi Sad	NIIS
Komercijalna banka a.d., Beograd	KMBN
Imlek a.d., Beograd	IMLK
Soja protein a.d., Bečej	SJPT
Aerodrom Nikola Tesla a.d., Beograd	AERO
Energoprojekt holding a.d., Beograd	ENHL
Jubmes banka a.d., Beograd	JMBN
Agrobanka a.d., Beograd	AGBN
Metalac a.d., Gornji Milanovac	MTLC
Univerzal banka a.d., Beograd	UNBN
Jedinstvo Sevojno a.d., Sevojno	JESV
Alfa plam a.d., Vranje	ALFA
Tigar a.d., Piro	TIGR
Veterinarski zavod Subotica a.d., Subotica	VZAS

Source: Data from the official website [23]

BELEX 15 is the leading index of the Belgrade Stock Exchange (BELEX) with the purpose to closely describe movements of the most liquid Serbian shares. BELEX 15 is a free-float market capitalization weighted index, which is not adjusted for paid dividends and is not protected from dilution effect resulting from dividends payout. BELEX 15 is weighted only by free-float market capitalization. BELEX 15 consists of shares traded using the continuous trading method, which have satisfied criteria for inclusion into the index basket. The influence of the index components is limited to a maximum of 20% of the total market capitalization of the index on the revision date.

Index BELEX 15 is calculated by Laspeyer's formula: [24]

$$\text{BELEX 15 (t)} = \frac{\sum_{i=1}^n C(i, t) \times K(i, t) \times \text{FFc} \times A_i}{d(t)}$$

In the process of updating the index basket, divisor is calculated in the following way:

$$d(t) = \frac{\sum_{i=1}^n C_p(i, t) \times K_p(i, t) \times \text{FFc}(t) \times A_i(t)}{\sum_{i=1}^n C(i, t-1) \times K(i, t-1) \times \text{FFc}(t-1) \times A_i(t-1)} \times d(t-1) = \frac{\text{New index basket}}{\text{Old index basket}} \times (d-1)$$

In which:

BELEX 15 (t) - value of index of selected securities traded in the continuous method, in the moment *t*, rounded on two decimals;

n - number of issuers whose shares are in the index basket - selected securities remains unchanged from the moment of updating;

i - calculator, takes values from **1** to **15** representing certain issuer with shares in the index basket;

C (i,t) - price of shares of the issuer *i*, in the moment *t*, taken in real time from trading system;

K (i,t) - quantity of shares of the issuer *i*, in the moment *t*;

d (t) - value of divisor in the moment *t* ;

FFc (i,t) - free float factor of issuer *i*, in the moment *t* ;

A (i) - adjusting factor of the issuer *i* (weight).

In order to avoid deviation of the index value from real values, the divisor is adjusted because of a change of the index basket, as well as because of changes inside the components of the index basket. The adjustment of the divisor is carried out in such a way that the value of the index remains the same if the share prices from the index basket stay unchanged. [24]

The number of issuers with shares participating in the construction of the index basket is constant during the period between two index revisions. The index basket can have at least 7, and maximum 15 components, depending of the number of shares that have fulfilled **Rule 80** and the decision made by the Index Committee. **Rule 80** includes common shares traded by the

continuous trading method, which had minimum 80% of successful trading days (trading days with transactions) during each individual quarter, for previous two consecutive quarters [24].

Shares are excluded from index basket only on revision dates, when:

- Rule 80 was unfulfilled,
- issuer submitted request for exclusion from the regulated or unregulated market,
- procedure of bankruptcy or liquidation of issuer was initiated,
- in order to prevent the dominant weight of certain industrial sectors in the index basket, the number of shares from the same industrial sector in the index basket is limited. In that sense, an industrial sector is limited to 50% of the total number of issuers in the index basket [24].

III. ANALYSIS OF PROFITABILITY

It has already been pointed out that two key profitability indicators are ROA and ROE, and accordingly, the profitability of selected companies is precisely determined by using these indicators. The BELEX 15 index basket is characterized by significant heterogeneity, starting from the sectors in which a given enterprises operate. Accordingly, analysis of individual companies is gaining further importance, because analyzing profitability of enterprises, which represent a

particular economic sector, we can get the opportunity to create a realistic picture of the business performance of the sector. Averaging the values, we can't clearly see the situation, because the crisis is not equally reflected in all

sectors. Results obtained by calculating ROA and ROE indicators in the three-year period are presented in the tables below.

Table 2. ROA Values

Symbol	2008	2009	2010	% Change 08-09	% Change 09-10
AIKB	0,16	0,14	0,13	↓12,5	↓7
NIIS	-0,11	-1,17	0,35	↓963,6	↑129,9
KMBN	0,11	0,07	0,06	↓36,36	↓14,3
IMLK	0,099	0,09	0,12	↓9,1	↑33,3
SJPT	0,059	0,05	0,078	↓15,25	↑56
AERO	0,1	0,087	0,086	↓13	↓1,16
ENHL	0,08	0,07	0,09	↓12,5	↑28,6
JMBN	0,31	0,065	0,04	↓79	↓38,46
AGBN	0,035	0,077	0,065	↑120	↓15,58
MTLC	0,07	0,099	0,11	↑41,4	↑11,1
UNBN	0,16	0,03	0,059	↓81,25	↑96,7
JESV	0,387	0,31	0,27	↓19,98	↓12,9
ALFA	0,11	0,11	0,12	0	↑9,1
TIGR	0,06	0,04	0,019	↓33,3	↓52,5
VZAS	0,019	0,077	0,02	↑305,3	↓74

Source: Calculation based on the balance of the stock prospectus [7-21]

Table 3. ROE Values

Symbol	2008	2009	2010	% Change 08-09	% Change 09-10
AIKB	0,07	0,05	0,04	↓28,57	↓25
NIIS	-0,05	-0,26	0,09	↓420	↑134,6
KMBN	0,02	0,009	0,01	↓55	↑11,1
IMLK	0,06	0,05	0,07	↓16,7	↑40
SJPT	0,02	0,02	0,05	0	↑150
AERO	0,09	0,08	0,08	↓11,1	0
ENHL	0,05	0,04	0,08	↓20	↑100
JMBN	0,18	0,04	0,02	↓77,8	↓50
AGBN	0,01	0,02	0,015	↑100	↓25
MTLC	0,05	0,07	0,087	↑40	↑24,3
UNBN	0,04	0,006	0,01	↓85	↑66,7
JESV	0,23	0,18	0,19	↓21,7	↑5,5
ALFA	0,098	0,096	0,11	↓2	↑14,6
TIGR	0,04	0,028	0,013	↓30	↓53,57
VZAS	0,013	0,05	0,015	↑284,6	↓70

Source: Calculation based on the balance of the stock prospectus [7-21]

Analysis of the companies, which are taken as a sample, over a chosen period clearly showed instability and significant changes in profitability. The absolute majority of companies (73%) achieved a decrease in the amount of return on assets comparing years 2008 and 2009, as in the case of return on equity. Only Metalac and Veterinarski zavod (Veterinary Institute) have achieved higher yield, which can be explained by a consistent and effective business policy, which leads Metalac for years as one of the leaders of successful local companies, while the Veterinary Institute successfully

used the rise in food prices during that period to realize their goals. Banks in Serbia are still the main carriers of the financial system, so by analyzing their success we can see the overall situation in the financial system of Serbia. The fall of confidence in banks, slowed business activities and reduced number of successful projects have led to a sharp decline in bank profitability. Besides Agrobanka, all the other banks that we analyzed have achieved a significant drop in their profitability, comparing years 2008 and 2009. The banks themselves had problem to collect funds, and therefore problem to

offer soft loans to the local economy, which has experienced a strong blow. It has already been pointed out that banks are still the main source of lending funds to Serbian companies, and at the time of general recession and vulnerable liquidity, restriction on only source of quality lending further disabled Serbian companies to overcome the crisis effectively.

Already in 2010 it is evident that the financial recovery of the companies has began, because 60% of the analyzed companies has achieved growing return on assets, while the percentage of companies with growth of return on equity was noticeably smaller and it was 46.7%. It should be noted the case of Naftna industrija Srbije (NIS, Serbian Oil Industry), which has achieved an impressive increase of both profitability indicators (ROA 134.6%, ROE 129.9%). This was achieved as a result of privatization, changed management, business process improvement, but also because of its monopolistic position in the market. The situation in the banking industry has been slightly changed, because only two banks reported growth in return on assets in 2010, while growth of return on equity achieved only by Univerzalna banka (Universal Bank). There is an evident recovery of Komercijalna banka (Commercial Bank), as the leading domestic bank in Serbia. Despite decreasing ROE in two consecutive years, Commercial Bank has shown vitality in the years of crisis, surviving in the market and representing strong competition to foreign banks in Serbia.

IV. FINANCIAL LEVERAGE ANALYSIS

When a company borrows, it activates the effect of financial risk, which refers to the uncertainty of the expected net profit as return on equity. [2] The main reason for the activation of this risk are fixed financial costs, which remain unaffected by periodic fluctuations in EBIT. We have already mentioned that the effect of financial leverage can be positive or negative and the intensity of the effect of financial leverage increases with increasing share of debt in total funds. The degree of financial leverage is measured by assets to equity ratio. If the company finances its operations solely from its own resources, there is no financial risk. Moreover, if EBIT is negative, the degree of financial leverage will not be calculated. The degree of financial leverage for companies analyzed in this work are presented in the table below („-“ means negative EBIT).

The formula for ROE shows the dependence of return on equity of two factors: 1) return on assets and 2) assets to equity ratio (the degree of financial leverage), and therefore the change of any of these factors will affect the return on equity. Therefore, the degree of financial leverage has a direct impact on the movement of ROE. However, one should know that the degree of financial leverage, a priori, does not show its positive or negative effect on ROE, but only the intensity of influence. It is

useful to calculate compound leverage factor, whose value, as mentioned, shows that the financial leverage has a positive or negative impact on ROE. The compound leverage factor for companies analyzed in this work are presented in the table below.

Table 4. Degree of Financial Leverage (DFL)

Symbol	2008	2009	2010
AIKB	2,45	2,79	3,21
NIIS	2,3	-	3,77
KMBN	6,72	7,53	6,23
IMLK	1,7	1,75	1,81
SJPT	2,84	2,18	1,69
AERO	1,20	1,11	1,1
ENHL	1,62	1,93	1,18
JMBN	1,69	1,69	1,79
AGBN	2,59	3,58	4,22
MTLC	1,48	1,39	1,28
UNBN	4,31	5,22	5,44
JESV	1,72	1,75	1,45
ALFA	1,16	1,17	1,14
TIGR	-	-	1,51
VZAS	1,4	1,48	1,66

Source: Calculation based on the balance of the stock prospectus [6-20]

Table 5. Compound leverage factor (CLF)

Symbol	2008	2009	2010
NIIS	-3,7	-	1,7
IMLK	1,2	0,89	0,85
SJPT	0,6	0,76	0,83
AERO	1,08	1,3	1,18
ENHL	3,6	2,5	1,18
MTLC	44,3	4,67	4,6
JESV	1,89	2,2	2,3
ALFA	1,3	1,6	1,1
TIGR	-	-	2,4
VZAS	0,35	1,15	0,6

Source: Calculation based on the balance of the stock prospectus [7-21]

As regards banks, it must be pointed out that banks are highly capitalized in Serbia and they all have the amount of capital above the level of mandatory capital, which can be seen from their annual reports.

V. ANALYSIS OF BELEX 15 INDEX MOVEMENT

The BELEX 15 index basket included shares of some of the most successful companies in Serbia, and therefore this index is a remarkable indicator of the current situation in Serbian economy. Its changes observed during the three-year period, perfect show stages through which the domestic economy has passed. Following chart clearly shows that changes. From the chart we can see that BELEX 15 suffered a huge decline in 2008, when its value in January 2008

was even four times higher than value from December. The trend of constant and significant decline in the value of this index has continued through 2009, when in April 2009 index reached a lowest value in its history, and then BELEX 15 was 379.43, which is 6 times less than in the beginning of 2008. All this shows that the global financial crisis has definitely spilled over to the Serbian capital market. BELEX 15 has achieved the gradual recovery of its values during the second half of 2009 and throughout 2010, with occasional fluctuations, but it is noticeable that the value of this index throughout the observation period was not even close to the values from the beginning of 2008. Although 2012 is not included in the analysis, however, we point out, for a clearer insight into the current situation, that in this year BELEX 15 did not achieve a particularly high amount. The maximum amount during the first months of 2012 did not exceed a value of 570, which indicates that complete recovery has not yet occurred and that the crisis is very much present in the domestic financial market.

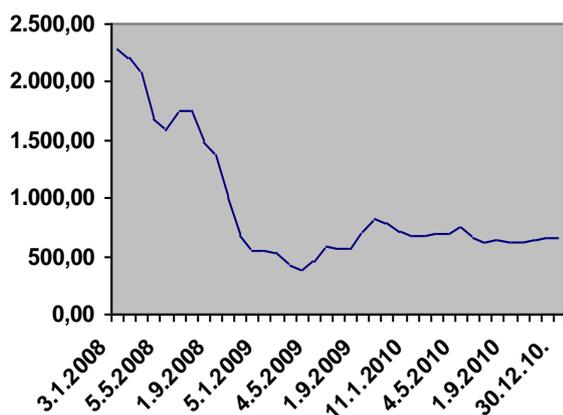


Fig. 1. BELEX 15 (2008-2010)
 Source: Data from the official website [22]

VI. CONCLUSION

Using the analysis conducted in this study, it has been observed that the global financial crisis has had a major impact on the operations of observed companies. This influence is primarily reflected in a significant decrease in profitability of most companies during 2009, while 2010 was a year of gradual recovery. It is clear that the conditions in the global market were very deteriorated, and therefore the possibility of successful operations was limited. Enterprises in Serbia during the entire observation period was exposed to significant level of financial risk due to high indebtedness. Consequently, there has been a high degree of financial leverage, which had a major impact on the profitability of enterprises. Using comprehensive analysis, due to calculation of compound leverage factor, we found that the average effect of financial leverage was positive for the profitability of enterprises, since the value of compound

leverage factor had an average value greater than 1. It is important to note that, given the circumstances in which they operated, companies in Serbia have been successful in this period, because companies had a positive net operating result during a substantial portion of the period.

The problems with which companies in Serbia have confronted during the period was high indebtedness and unfavorable loans. We have already underlined that Serbia has a low credit rating, which affects the banks to charge high risk premium. This situation has very unfavorable effect on the ability of companies in Serbia to be competitive in world market. Another disadvantage of Serbian companies is the lack of efficient financial markets, which would provide an additional opportunity to enterprises in raising funds. The positive thing is that the banks in Serbia showed the stability and strength during the crisis because they have managed to preserve their revenues and to be highly capitalized, which helped a lot to Serbian economy during the crisis and still give some sort of security to companies, as major users of bank loans.

Decline in profitability has caused negative changes in stock markets. It is notable that this made a huge drop of the index value during the years of crisis. It has been observed that BELEX 15 suffered a huge decline in 2008, when its value in January 2008 was even four times higher than value from December. Given that stock prices depend on the profitability of enterprises, and on the other side, return on capital directly depends on the degree of financial leverage, it is clear that indebtedness affects the movement of stock prices and stock exchange indexes. In this case, high indebtedness has affected a significant decrease of the net profit, which caused the drop in stock prices in the market. However, it should be noted that this was not the only factor that influenced the decline in activity in stock markets. Lack of money and lack of investors confidence in domestic financial markets also had a big impact, but also the profitability and indebtedness can not be excluded as very important factors.

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