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Do the best-performing Serbian companies create value? For years since the onset of the 2008- crisis this has been rather rhetorical question. Fiscal consolidation is the big news, and the results are no more silent and below the surface. However, the real economy is still struggling with the heritage of a wrong economic model prevailing from 2000. At the moment when a new wave of the crisis is under way and the fourth industrial revolution is gathering pace, the former question gains in importance. This edition of *Ekonomika preduzeća* is the fifth odyssey towards the reindustrialization strategy framework under the common project financed by the Ministry of Education, Science, and Technological Development.

In the introductory paper, *D. Malinić*, *V. Milićević* and *M. Glišić* provide the answer to the previously raised question. The authors analyzed the 89 most profitable companies that generated more than 45% of total net income of the economy in 2013. The analysis of the structure of cumulative residual income reveals that 2/3 of 89 companies have positive residual income, which means that they create value. The rest of the profitable companies did not manage to bear up under a heavy burden of structural fractures of the economy.

In *Organization and management* section, *S. Janošević* and *V. Dženopoljac* examine rather complex relationship between intellectual capital and the market and financial performance of companies listed on the Belgrade Stock Exchange (BELEX) in Serbia. The authors demonstrated a positive relationship between human capital and market performance of companies. Additionally, a strong positive relation between human capital and ROE/ROA is detected, whereas no relationship has been detected between structural capital and market or financial performance, except in the case of employee productivity.

In the next paper in this section, *S. Aćimović* and *V. M. Mijušković* explore the possibilities of development and usage of specific IT solutions in procurement management on the precise example of companies in Serbia. Based on an empirical analysis conducted among 52 companies, the authors have concluded that the usage of procurement software in Serbia is far from reaching its full potential. The research results have indicated that the majority of small and middle-sized companies use non-specialized, generic software, while in-house procurement software is mostly used by big companies in Serbia.

In the first paper in section *Finance*, *J. Kočović, B. Paunović* and *M. Jovović* analyze the possibilities of creating optimal investment portfolio. The authors demonstrated that quantitative investment rules lead to the narrowing of an efficient set of insurer's investment opportunities and to a deterioration of risk-return trade-off of their investments. However, bearing in mind the low development level of domestic financial market, it is concluded that primary factors that determine investment decisions of the insurers in Serbia are not regulatory constraints, but the availability of financial instruments and trends in their prices and yields.

In the following paper in this section, *V. Kuč* provides an in-depth analysis of the financial structure of the largest companies in Serbia in the period after the outbreak of the Great Recession (2008-2014) based on the sample of 186 companies. The analysis shows that the great majority of companies in Serbia are undercapitalized and at high risk of bankruptcy. The financial structure of the largest companies is characterized by excessive indebtedness and unfavorable maturity structure with a trend towards further deterioration. The research also indicates that the largest enterprises in Serbia, on average, do not finance growth, but their survival.

The *Tax and Law* section in this edition starts with the debate on the coming Civil Code in Serbia. *J. Perović* and *Lj. Tomić* conclude that the Civil Code represents a continuation of the process of full harmonization with the worldwide accepted standards and European legal civilization, which can significantly contribute to the overall improvement of business environment in Serbia. However, they underline that the acceptance of uniform rules (by national legislator or by party autonomy) could not be taken per se as a guarantee for their successful implementation in practice.

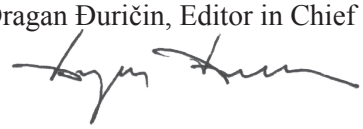
The second paper in this issue, written by *D. Lončar, V. Rajić* and *S. Milošević*, explore antimonopoly risks for companies operating in Serbia. Namely, the authors analyze antitrust regulatory framework and its possible implications on business operations. Besides that, the paper provides numerous real-life examples related to antimonopoly practice.

In *Transition and restructuring* section, *Đ. Kaličanin*, *M. Todorović* and *B. Tubin-Mitrović* deal with the efficiency of gas distribution sector in Serbia. The authors provided various recommendations regarding the unlocking of value potential for distribution system operators. They conclude that the main sources of value could be activated through merger transactions.

The last paper in this edition by *K. Radosavljević* in *Marketing* section represents the case study of plum production and sale in Serbia. The author reveals the presence of high share of natural consumption aimed to satisfy own needs in the case of family-owned businesses, with a low level of marketability and competitiveness. The small agricultural properties have scattered production, an insufficient sale structure, and the existing marketing channels fail to enable the realization of a safe placement of the seasonal products.

All the papers offer valuable recommendations based on empirical data, aimed at identifying weak points and key strengths of different industries' competitive position, for the purpose of creating a prudent and effective industrial policy platform.

Prof. Dragan Đuričin, Editor in Chief



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DO THE BEST-PERFORMING SERBIAN COMPANIES CREATE VALUE?*

Da li najbolja preduzeća u Srbiji kreiraju vrednost?

Abstract

All investors expect to earn a return on invested capital in accordance with investment risk. With respect to the degree of exposure to risk, shareholders are in the most unfavorable position in comparison to all other stakeholders. Given that shareholders' return is closely related to net income, as it represents the residual which remains after the interests of all other stakeholders have been meet, it is obvious that there is a risk that they might not get any return in situations where there is no income or it is not sufficient to compensate for the existing risks. In this context, from the perspective of value creation management the ultimate responsibility of a company's management is to create value for all stakeholders, including shareholders. With the aim of satisfying the interests of shareholders it is necessary to raise the performance threshold to the level of net income that would be sufficient to cover the opportunity costs of equity. Only then can we say that companies are really profitable and that each of them whose income exceeds this level (at which the total costs of capital are covered) creates value added.

The value creation imperative is of particular importance in the Serbian economy, considering that over the entire analyzed period, on average, 34.4% of companies reported losses, 8.4% of companies had income that was equal to zero, while only 57.2% of the total number of companies reported net income. In such circumstances, there is a tendency for every company that reports net income to be labeled as profitable. However, it makes perfect sense to raise the question as to whether all the companies which report net income create value. In this paper we analyze the 89 most profitable companies in terms of the amount of net income. The relevance of the research arises from the fact that these companies generated more than 45% of total net income of the economy in 2013. In the first part of the paper we present the business and financial profile of the Serbian economy in order to provide a general understanding of the financial problems faced by most companies. In the second part we explore the key determinants of profitability with a view to identifying the key value drivers and their impact on the level of profitability. In the third part of the paper the performance of the best Serbian companies is assessed from the standpoint of their ability to create returns to shareholders by applying residual income as the main criterion. Such an approach has enabled us to differentiate companies and sectors in terms of their capacity to create value added as well as to detect the companies that are responsible for the destruction of value.

Key words: *investors, value creation, income, risk, return, opportunity costs, cost of capital, financial leverage, residual income*

Sažetak

Svi investitori očekuju ukamaćenje uloženog kapitala u skladu sa rizikom ulaganja. U pogledu stepena izloženosti riziku vlasnici se nalaze u najnepovoljnijem položaju u odnosu na sve druge interesne grupe. Budući da se prinos vlasnika vezuje za neto dobitak, kao rezidual koji preostaje nakon podmirenja interesa svih drugih stejkholdera, očigledno je da postoji rizik da oni ostanu bez prinosa u situacijama kada dobitka nema ili kada on nije dovoljan da kompenzuje prisutne rizike. U tom kontekstu, upravljanje procesom kreiranja vrednosti predstavlja ultimativni zahtev menadžmentu da stvori vrednost za sve interesne grupe, uključujući i vlasnike. Uvažavanje interesa vlasnika zahteva podizanje praga uspešnosti na nivo neto dobitka koji je dovoljan da pokrije oportunitetne troškove vlasničkog kapitala. Tek tada možemo reći da su preduzeća uspešna i da svako od njih koje stvara dobitak preko tog nivoa (pokrića ukupnih troškova kapitala) stvara dodatu vrednost.

Imperativ stvaranja vrednosti ima poseban značaj u srpskoj privredi gde u proseku u celom analiziranom periodu 34,4% preduzeća iskazuje

* The authors gratefully acknowledge the financial support of the Ministry of Education, Science and Technology of the Republic of Serbia, Grant No 179050.

gubitke, 8,4% ima rezultat jednak nuli, dok samo 57,2% od ukupnog broja preduzeća posluje sa dobicima. U ovakvim okolnostima, postoji sklonost da se svako preduzeće koje iskazuje neto dobitak oceni kao uspešno. Međutim, pitanje koje se može opravdano postaviti je da li sva preduzeća koja iskazuju dobitke kreiraju vrednost. U ovom radu analiziramo 89 najuspešnijih preduzeća sa stanovišta visine neto dobitka. Relevantnost istraživanja određena je činjenicom da ova preduzeća ostvaruju više od 45% ukupnih neto dobitaka cele privrede u 2013. godini. U prvom delu rada prikazan je poslovno-finansijski profil srpske privrede, kako bi se stekla opšta predstava o finansijskim problemima sa kojima se suočava najveći broj preduzeća. U drugom delu rada istražene su ključne determinante profitabilnosti, kako bismo otkrili ključne pokretače vrednosti i njihov uticaj na visinu iskazane profitabilnosti. U trećem delu rada izvršena je procena uspešnosti najboljih srpskih preduzeća sa stanovišta njihove sposobnosti da stvaraju prinose za vlasnike, pri čemu smo kao kriterijum koristili rezidualni dobitak. Ovakav pristup omogućio nam je da diferenciramo preduzeća i sektore sa stanovišta njihove sposobnosti da stvaraju dodatu vrednost i da lociramo kompanije koje su odgovorne za uništavanje vrednosti.

Ključne reči: *investitori, kreiranje vrednosti, dobitak, rizik, prinos, oportunitetni troškovi, troškovi kapitala, finansijski leveridž, rezidualni dobitak*

Introduction

The Serbian economy is operating under very complex conditions. In the analyzed period business environment was characterized by low or negative GDP growth rates, high inflation rates until 2012, rising unemployment (greater than 20%), budget deficit, high level of debt, and high corruption levels. The above-mentioned trends negatively affect consumption and, consequently, economic activity of the national economy. A low level of competitiveness prevents the increase in exports which, along with reduced domestic demand, hinders the growth prospects.

The capital market is underdeveloped and completely marginalized. There is little hope that significant improvements could be made in this area, primarily due to the lack of institutional support and well-articulated strategy of development, as well as insufficient awareness of its importance for the functioning of the national economy. The absence of alternative sources of financing, such as long-term and short-term debt financing, distorts competition in the financial market, thus leading to an increase in the cost of capital. In this regard, perhaps most worrying is the fact that there is no understanding of the relationship between the corporatization of an economy and development of the capital market. Without a developed capital market, it cannot be expected that large joint-stock companies become a major factor of economic growth, since they raise capital mainly in the capital market. On the other hand, development of the capital market is not possible without financially strong joint-stock companies which, by issuing high-quality stocks and debt instruments in the primary market, provide securities that will be traded in the secondary market.

High key policy rates over a long period of time had an adverse impact on the cost of borrowed capital paid by companies. Even the economies which are far stronger than the Serbian economy would not be able to bear the financial expenses that in some years exceeded 20%. Such substantial costs of financing were largely responsible for very low or negative returns on equity, which prevented investors from achieving required returns [15, pp. 401-416]. A common practice according to which the returns to creditors are higher than the returns to shareholders cannot be economically viable in the long run, since shareholders bear greater risk than creditors. In order to obtain expensive loans, companies often overestimate their assets with the aim of providing the required collateral for debts and, by doing so, they create misleading perception of their financial position. Taking advantage of the lack of alternative sources of financing, credit institutions deliver better performance in the short term, but also expose themselves to the danger of suffering negative consequences of such behavior. The accumulation of non-performing loans in the banks' balance sheets leads to contamination of their assets. Inefficiencies in collateral management, on the one hand, and a significant decline in the value of collateral as soon as a company files for bankruptcy on the other, increase risk of loss. A lack of sources of financing that could be provided under acceptable terms causes a slowdown in growth and drop in economic activity.

In addition to the foregoing tendencies, there are also other negative phenomena that impacted on the creation of business environment. Let us mention the delay in the restructuring of public companies accompanied by poor-quality corporate governance and huge financial difficulties which had spillover effects on the rest of the economy [9, pp. 33-56], absence of significant investments in key

infrastructure sectors, such as telecommunications, energy and transport, which could invigorate other parts of the economy and considerably contribute to GDP growth [14, pp. 7-42], substantial subsidies to companies in restructuring which put a heavy burden on the budget and increase public debt, worsened conditions for doing business[1] (in terms of the time required to start a business, length of dealing with construction permits, registering property, protecting the interests of minority shareholders, paying taxes, resolving insolvency, etc.), low purchasing power which limits consumption and has negative effects on the level of economic activity, lack of foreign direct investments that could foster the growth of exports and GDP, and so on. The instability of regulations that is manifested in frequent changes in the most important laws (e.g. Law on Companies, Law on Accounting and Auditing, Law on the Capital Market, etc.) brings uncertainty and additionally discourages investors.

Numerous research studies have confirmed that the Serbian economy is fraught with losses and big structural disorders. This situation is an issue of great concern given that the economic activity should contribute to achieving the projected rates of GDP growth. The problem appears to be far more acute if we bear in mind that through defaulting on their obligations poorly performing companies also burden the healthy parts of the economy. In this paper we will first briefly present business and financial profile of the Serbian economy in order to gain an insight into the levels of operating and financial risks faced by Serbian companies. Then the analysis will be focused on the assessment of the performance of the most profitable companies in Serbia in terms of achieved net income.

Business and financial profile of the Serbian economy

The environment in which companies perform their activities in Serbia cannot be characterized as business-friendly. Also, the fact is that the great financial crisis has further hampered business operations. In the period from 2009 to 2013, there was a decrease in the number of companies (from 94,573 to 94,362), reduction in the number of employees of 7.6%, faster growth in liabilities (35.4%) than in net capital (28.1%), dramatic rise in cumulative losses amounting to 73.2%, with reported net losses being higher than reported net income in every year except in 2011 [16, pp. 323-347].

The consequences of huge structural disorders of the Serbian economy are reflected in failure to settle current liabilities on a regular basis (liquidity crisis), inability to pay interest and repay principal (solvency crisis), absence of expected returns to shareholders (profitability crisis), and decline in competitiveness of the Serbian economy (competitiveness crisis). These problems are so closely intertwined and need to be tackled at the same time in order to identify the underlying causes of poor performance of the Serbian economy. Key indicators of liquidity, solvency and efficiency are shown in Table 1.

Structural disorders are visible in every segment. Due to a constant threat of bankruptcy, illiquidity has often been viewed as the most urgent problem of the Serbian economy. Maturity mismatch between some items of assets and liabilities, as can be seen from the values of current ratio and quick ratio, makes it almost impossible to align cash inflows with cash outflows. This is further confirmed by the fact that the values of cash flow from operations (CFO) to current liabilities ratio are far away from its normal value of 0.4. If we take into consideration the research studies [3, pp. 384-401; 4, pp.61-66] that have shown that most of the companies with a value below 0.4 go bankrupt, we can gain a fairly clear idea of the gravity of illiquidity problem in the Serbian economy. In such circumstances, companies are forced to dump a great deal of burden of the financing of their business cycles onto suppliers. Small positive values of cash cycles (indicating that in the analyzed period a business cycle had to be financed by borrowing averagely about 19 days) are not a result of the efficient management of accounts receivable and inventory, but rather of an inappropriate delay in paying off accounts payable. Suppliers, mostly due to an inefficient collection of their own receivables,

1 There has been a significant progress in this segment, since in terms of the ease of doing business Serbia is now ranked in 59th place. See A World Bank Group Flagship Report, Doing Business 2016, Measuring Regulatory Quality and Efficiency, International Bank for Reconstruction and Development / The World Bank, Washington, 2016. p. 5. http://www.doingbusiness.org

Table 1: Indicators of financial positions

	Liquidity	Solvency	Efficiency	Investment Opportunities
	Current ratio	Fixed Asset Coverage Ratio	Fixed Asset Turnover	CAPEX Ratio
2009	0.97	0.65	0.67	(0.40)
2010	0.97	0.62	0.71	(29.12)
2011	0.96	0.66	0.71	14.24
2012	0.97	0.64	0.70	(9.13)
2013	0.92	0.62	0.68	45.39
	Quick ratio	Debt to Equity Ratio	Inventories Turnover	Internal Growth Rate
2009	0.60	1.59	4.33	(1.47)
2010	0.61	1.83	4.56	(1.76)
2011	0.60	1.51	4.68	0.15
2012	0.61	1.68	4.68	(1.84)
2013	0.60	1.73	4.59	1.11
	CFO/Current Liabilities	Interest Coverage Ratio	Receivables Turnover	Sustainable Growth Rate
2009	(0.00)	0.71	3.73	(3.66)
2010	(0.03)	0.77	3.82	(4.77)
2011	0.05	1.19	3.94	0.41
2012	(0.01)	0.76	4.06	(4.77)
2013	0.05	0.98	3.90	3.00
	Cash Cycles	Deficiency NWC (NWC/Total Asset)	Payables Turnover	Financial Leverage Effect
2009	18.61	16.32	2.23	(0.86)
2010	22.45	17.22	2.38	(0.60)
2011	22.57	16.42	2.46	0.45
2012	20.86	16.36	2.48	(0.53)
2013	12.09	17.84	2.27	(0.19)

Source: Author's calculation

cannot close their cash gap, which creates the need for short-term borrowing. Consequently, the illiquidity problem takes on the effect of spiral, which means that illiquidity is likely to hit even the healthy parts of the economy [11, pp. 41-62].

Illiquidity problems are closely followed by insolvency problems, revealing the magnitude of structural problems. Operating losses lead to a reduction in capital. In order to provide necessary sources of financing, companies are forced to use expensive loans, which results in an increase in their debt. Low level of interest coverage ratio (values are more than five times lower than the normal value) suggests that there are increased risks of failing to meet obligations to creditors. A significant deficiency in net working capital (NWC) confirms that a considerable portion of long-term assets and inventory (around 17%) was wrongly financed from short-term sources. Low values of turnover ratios point to the inefficient management of assets and liabilities, which further deepens liquidity and solvency problems. Under these circumstances, financial risks are growing.

Given the scarcity and high costs of external sources of financing as well as the lack of internally-generated sources of financing, the question arises as to how to fund new investments. In the conditions where there is a low volume of activity, profitable investments seem to be the only remedy that can create space for larger profit margins, which afterwards could be used to cover the costs of financing. However, low growth rates and low CAPEX ratio point to the impossibility of making serious investments. Financial leverage that we classified as an indicator of investment opportunities, which is a bit unusual, clearly reveals that the funding from borrowed sources is unsustainable under such circumstances, as it not only fails to contribute to the creation of value, but rather leads to its decrease.

Sustainable growth is possible only by maintaining a desired or target capital structure, which calls for some combination of internal and external sources of financing [12, pp. 98-119]. One of the key preconditions for this is profitability, since only profitable companies can generate internal sources of financing. Moreover, unprofitability causes problems with regard to liquidity, solvency and a fall in employment. Hence we could say that unprofitability and lack of competitiveness (which prevents companies from achieving a larger market share and high profit margins) are the greatest problems for the Serbian economy. With the aim of providing a general understanding of the profitability of Serbian economy we will present return on equity and key determinants of this performance indicator (see Figure 1).

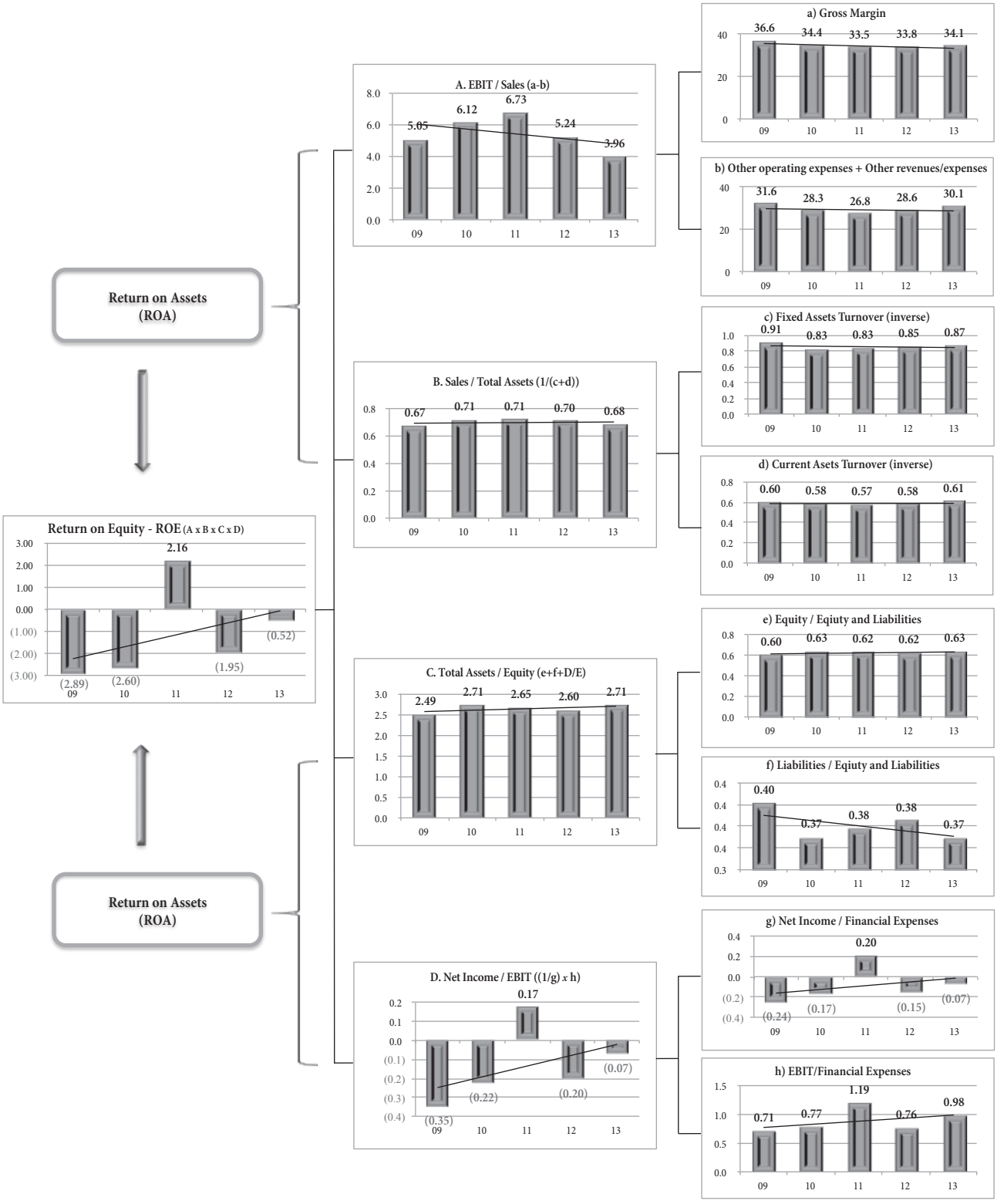
Profitability depends on numerous factors, such as investment attractiveness of a country (resource endowment, development level of financial and technological infrastructure, quality of institutional and regulatory framework, openness to international trade and access to markets), industry structure (intensity of competition, threat of new entrants, threat of substitute products, bargaining power of buyers and suppliers), and a company's characteristics (quality of organizational structure, product quality, relationships with suppliers, distributors and customers, availability of knowledge that allows a company to maintain the existing and gain new competitive advantages) [7, pp. 495-498]. However, profitability also depends on the management's ability to skillfully combine intangible, tangible and financial resources in order to gain competitive advantages which would enable it to, by seizing opportunities and avoiding threats, finally create shareholder value.

The trend in return on equity (ROE) clearly indicates that the Serbian economy is not profitable. Net losses were reported in four of the five observed years, while in 2011 (the only year in which there was net income) ROE amounted to only 2.2%. In general, we can conclude that unprofitability of the Serbian economy is a consequence of low profit margins, low levels of turnover ratios, growing debt and huge burden of financial expenses. The main causes of such trends can be discovered by disaggregating ROE to the level of drivers. *First,* due to low profit margins generated revenues do not suffice to cover exceptionally high financial expenses. The key reasons include technical and technological obsolescence of assets that cannot produce higher revenues as well as the lack of competitive products and pricing, which leads to a volume of activity that is not sufficient to cover both variable and fixed expenses (operating and financial). *Second,* when there are limitations on the revenue side, low profit margins could be increased through efficient cost management which involves the application of modern management techniques. Low profit margins (gross margin and EBIT margin) indicate that managers could not handle them well enough. *Third*, the efficiency of asset management is also at a very low level. This fact, among other things, reveals that the existing assets cannot produce adequate revenues and that there is an urgent need for new investments. Negative trends in this area are a matter of great concern. *Fourth,* return on assets – ROA (EBIT margin multiplied by asset turnover), as a test of efficiency in core business and measure of a company's ability to repay debts, confirms that the quality of operations management is quite unsatisfactory. *Fifth,* the level of indebtedness is increasing which, in combination with insufficient profitability, is a sure sign of serious financial difficulties. *Sixth,* a trend in interest burden confirms that borrowing is happening in the conditions where the costs of debt are higher than generated returns, which does not contribute to an increase in return of equity, but rather leads to its reduction. Negative financial leverage (the product of solvency ratio and interest burden), together with low values of ROA, determines the levels of ROE. The Serbian economy had a positive interest burden only in 2011, while the negative values of this ratio in all other years mean that shareholders did not get any return on their investment. The value of interest burden in 2011 amounted to only 0.17 (0.2), which implies that, in that year, from RSD 100 of EBIT (belonging to owners and creditors) only RSD 17 belonged to shareholders, whereas the rest went to creditors. Considering the fact that shareholders bear the greatest risk and, accordingly, expect to receive the highest returns, it becomes pretty clear to what extent the Serbian economy is inhibited by antagonisms and how much it is (un)attractive for investors.

Of course, based on all of the forgoing findings one certainly should not draw a conclusion that all companies

are in the same position. The fact is that in the analyzed period, on average, 34.4% of companies made losses, while 8.4% of companies reported net income which was equal to zero. Yet, it is also true that 57.2% of companies which reported positive net income did not manage to create the amounts of income that would exceed losses generated by the rest of the economy. This finding raises a provocative dilemma over the real profitability of the

Figure 1: Profitability analysis of the Serbian economy



Source: Author's calculation

Serbian companies that reported net income. It is of utmost importance to resolve this dilemma because there is a tendency that every company that reports net income is being automatically labeled as profitable. This practice is chiefly due to the fact that the opportunity costs of equity are ignored because they do not constitute an integral part of the financial statements that are subject to analysis, which means that we are faced with unsustainable situation where creditors' returns are greater than shareholders' returns. Performance standards must be elevated to a more demanding level, which implies that created return must be sufficient to ensure that shareholders get required returns from generated income.

Determinants of profitability as drivers of the value creation process

Profit generation is the main driving force in market-oriented economies. Therefore, profitability is quite often referred to as the supreme criterion when evaluating the performance of companies and national economies. The companies' ability to generate profits is a prerequisite for their functioning, since only by generating profit they can survive, i.e. maintain an adequate level of invested capital and, finally, ensure the healthiest source for funding their growth. Moreover, it is equally important to note that profit is a key variable in efficient allocation of capital, as its amount gives investors the signal indicating to what extent companies are attractive for new investments. The same holds true when considering the level of overall economic activity of national economies. Here the profit provides the basis for an increase in wealth of the whole society. The prospects of making profitable investments determine whether an economy is more or less attractive for foreign investment, either through the establishment of new or the takeover of existing companies. Furthermore, profitability is directly linked to economic development, growth rates and job growth, just as a lack of profitability causes the problems with liquidity, financial security and funding, which eventually cause the deterioration in companies' performance and reduction in employment.

In some of our earlier research studies we dealt with more detailed analysis of reduced profit potential of the whole economy and individual sectors [13, pp. 335-351; 15, pp. 401-416]. In this paper we explore the position of the most profitable companies according to the amount of net income. There is a need for this kind of analysis, if for no other reasons than because the companies which report income are very often easily proclaimed to be profitable, even though the opportunity costs of equity are commonly being ignored or overlooked, as they are not the part of the financial statements being subject to analysis. To overcome this problem, it is necessary to raise the criteria of profitability to a much higher level and to examine to what extent generated income can cover the required shareholders' returns. In this regard, our research was limited to a sample of 100 companies which, according to the Serbian Business Registers Agency, reported the highest amounts of net income in the period 2009-2013, but we were forced to exclude 10 companies due to the unavailability of financial statements for all years as well as the Share Fund (Akcijski fond), whose core business is substantially different in relation to the rest of analyzed companies. Also, owing to the problem of incompatibly of balance schemes caused by the new Law on Accounting, we were forced to close the observed period with 2013, instead of 2014.

A cursory glance at the summary income statement of the group of the best-performing Serbian companies in terms of the amount of net income (BC Group) reveals that there is an upward trend in operating income achieved by these companies in the sphere of the so-called 'core business', with the operating income in the last year of the observed period being more than four times higher compared to the first year. Bearing in mind the characteristics of internal and external environment of these companies, at the very beginning we can say that such results seem very encouraging. A similar trend continues when it comes to the companies' net income after taxes. In this regard, it should be particularly noted that a substantial increase in net income occurred at the end of 2010 (net income was three times higher relative to 2009), during 2011 and 2012 it continued to grow at a moderate pace, while the end of the analyzed period was marked by its re-intensification. Of course, if the sample of selected companies was decomposed by sectors, the picture of the performance

of these companies would be significantly different. We can notice that the worst performers are the companies from the energy sector, while the best performances are achieved by the companies coming from the processing sector, mining sector and telecommunications.

Naturally, such an analysis is far from being sufficient. It only gives a preliminary idea about the performance of BC Group. Below we will attempt to address the issues such as to what extent these companies are really profitable, what is their actual profit potential, which are the main determinants of their profitability, whether they create value, which are the major drivers and/or impediments in this process, and whether all that could lead to creating some important incentives for the remaining part of the economy which is, unfortunately, on the other end of the ladder of success.

Literature, indeed, abounds with various ways of presenting the determinants of profitability. For the purpose of this paper, we opted for the four-component disaggregation of ROE, considering that it best illustrates local business conditions and challenges faced by Serbian companies (see Table 2). At the same time this disaggregated version of ROE provides insight into the values of ROA, which are important for the examination of the effects of financial leverage and assessment of its impact on the companies' profit potential.

With a view to enabling better understanding of the conclusions that will be presented below, let us first clarify the displayed components of ROE. Solvency ratio is measured as the ratio of average assets to average equity. Asset turnover is defined as the ratio between revenues and average total assets. EBIT margin is the ratio of this concept of income to revenues, while interest burden is calculated as the ratio of net income to EBIT. Also, one can easily notice that the two central components of this formula make ROA. As far as ROA is concerned, note that it represents the return which depends on the companies' operating efficiency since EBIT is a concept of income that

Table 2: Key profitability indicators: Four-component disaggregation of ROE

	2009	2010	2011	2012	2013
Panel A. All sectors (BC Group)					
1. Solvency ratio (leverage)	1.61	1.70	1.55	1.72	1.67
2. Asset Turnover	0.56	0.62	0.50	0.55	0.59
3. EBIT Margin	7.83	12.69	13.09	13.84	12.97
4. Interest Burden	0.31	0.51	0.70	0.60	0.81
5. Return on Equity - ROE (1x2x3x4)	**2.19**	**6.82**	**7.10**	**7.86**	**10.35**
6. Return on Assets - ROA (2x3)	**4.38**	**7.87**	**6.55**	**7.61**	**7.65**
7. Effects of Financial Leverage	**Negative**	**Negative**	**Positive**	**Positive**	**Positive**
Panel B. All sectors (BC Group) except the energy sector					
1. Solvency ratio (leverage)	1.96	2.10	1.99	2.13	2.00
2. Asset Turnover	0.73	0.81	0.75	0.76	0.84
3. EBIT Margin	10.11	15.37	14.66	17.29	14.37
4. Interest Burden	0.36	0.56	0.67	0.64	0.82
5. Return on Equity - ROE (1x2x3x4)	**5.21**	**14.64**	**14.66**	**17.91**	**19.80**
6. Return on Assets - ROA (2x3)	**7.38**	**12.45**	**11.00**	**13.14**	**12.07**
7. Effects of Financial Leverage	**Negative**	**Positive**	**Positive**	**Positive**	**Positive**
Panel C. Energy sector					
1. Solvency ratio (leverage)	1.31	1.36	1.27	1.39	1.38
2. Asset Turnover	0.33	0.35	0.26	0.28	0.28
3. EBIT Margin	1.25	4.58	8.58	2.48	7.75
4. Interest Burden	(0.94)	0.04	0.83	(0.35)	0.73
5. Return on Equity - ROE (1x2x3x4)	**(0.51)**	**0.09**	**2.35**	**(0.34)**	**2.19**
6. Return on Assets - ROA (2x3)	**0.41**	**1.60**	**2.23**	**0.69**	**2.17**
7. Effects of Financial Leverage	**Negative**	**Negative**	**Positive**	**Negative**	**Positive**

eliminates the effects of financing. Therefore, the value of the central part of four-component ROE formula is, among other things, determined by the efficiency of operating activities or operational risk. On the other hand, the first and the forth component of ROE are directly related to debt. Theoretically speaking, in the absence of debt the first and the fourth component of ROE would be equal to 1, which means that there would be neither the financial risk, nor the effect of financial leverage. Obviously, in that case ROE and ROA would be equal. However, since the existence of debt seems to be a much more realistic option, the value of the first component will actually be greater than 1 (assets are greater than equity), just as the value of the last component must be less than 1 (interest expenses will absorb a portion of income). All things considered, it can be concluded that an increase in debt may result both in the increase and fall in the profitability of equity. Increase in profitability occurs if the product of solvency ratio and interest burden is greater than 1 [17, pp. 116-121]. In this case, there will be a positive impact of financial leverage that manifests itself in the increased returns to shareholders, which means that ROE is greater than ROA. Of course, in the opposite case debt increase inevitably triggers the fall in profitability and negative effect of financial leverage. Hence, borrowing limit is established when ROA is equal to the cost of debt. Then ROA is equal to ROE, which implies that borrowing up to that limit has positive effects, while exceeding of the limit entails negative effects of financial leverage.

After these initial remarks it is evident that the first and the fourth component of disaggregated ROE ought to be a particular focus of our attention. As regards BC Group, note that solvency ratio was less than 2 over the entire period, which points to the fact that these companies were predominantly financed from internal sources. Such results in general relieve pressures on the long-term financial stability of these companies, despite a slight increase in the share of borrowed capital in their financing in the analyzed period. However, despite a low level of leverage, the interest burden was very high at the beginning of the period, which might be explained by rather expensive borrowing. In that year, only every third RSD of EBIT went to shareholders, while the rest was seized by long-term and short-term creditors, which is quite disappointing performance. Fortunately, the values of interest burden ratio were recovering in all subsequent years, with the shareholders' share in achieved EBIT rising from 50% to almost 80%. We have to underline that this is happening in parallel with a slight rise in debt in all years. Along with these observations, it should be noted that the levels of asset turnover ratio are unacceptably low. In all years it ranged between 0.5 and 0.6, which is the reason why it could not give an expected impetus to profit potential. If we would like to briefly make a diagnosis of such a state, then we could freely say that the effect of rapid growth in profitability did not take place due to the low level of business activity, on the one hand, and the lack of efficiency in asset management of these companies, on the other. There is no need to waste words in trying to explain that our expectations regarding the performance of asset turnover ratio were significantly higher, bearing in mind the fact that the subject matter of our analysis is the group of best-performing companies in the Serbian economy. Unlike asset turnover, EBIT margins reached 13-14% that, given the insufficient amount of revenues resulting from a modest volume of activities, should not be taught as a bad result. The epilogue of all of the previous facts is that both rates of return recorded relatively low performance, especially in the first two years when the values of ROA were higher than the values of ROE. As a result, this group suffers the consequences of negative effect of financial leverage, which eventually leads to the shrinkage in shareholders' wealth. The signs of a timid recovery from all these tendencies became visible in 2011 and 2012, when ROE began to exceed ROA, while the difference was noticeably higher in the last observed year. Consequently, owing to the positive effect of financial leverage this group turned out to be marginally profitable in 2011 and 2012. Namely, it was as late as in the last analyzed year that more efficient use of borrowed capital and more significant effects of financial leverage started to show up.

Given that the structure of BC Group is very heterogeneous, we sought to discover the root causes of the above-mentioned low returns. Our analysis has shown that the companies from the so-called energy sector, taken cumulatively, recorded the biggest net losses in two of the

five observed years. Even in years when these companies reported net income, their performances were extremely disappointing. So, if we exclude the companies from the energy sector from the initial sample, we can notice that there has been a significant progress in terms of the profit potential of the remaining part of companies. If we take a closer look at the figures displayed in the central part of Table 2, we can easily perceive that the increase in profit potential of these companies is chiefly due to a substantial increase in EBIT margins (e.g. amounting to over 17% in 2012), slightly more efficient asset management and some feeble multiplier effect of asset turnover on the values of ROA. These improvements were accompanied by growing solvency ratio whose values were slowly attaining, in some years even exceeding, the level of 2. Such values are a consequence of the fact that borrowed capital gradually gained primacy over equity in the financing of this group of companies. At the same time, interest burden is slightly lower compared to the results obtained based on the whole sample. Thus, both returns are almost twice as high in all analyzed years, with the gap between them becoming even more pronounced, which means that these companies to a much greater extent exploited the effect of financial leverage to increase shareholders' wealth. The exception to this general pattern is the values of ROE and ROA in 2009, when this group of companies experienced the negative effect of financial leverage, which also serves as the best proof that even the leading Serbian companies did not manage to adequately tackle the numerous problems arising with the first waves of the Great Recession. Yet, here we should emphasize that even such performance levels of the observed group of companies were many times better compared to the performance of the rest of the economy which was much more severely hit by the economic crisis [16, pp. 323-347].

As we have already pointed out, the performance of companies from the energy sector significantly lags behind the performance of other companies in our sample. To tell the truth, these companies are, however, far less indebted. Still, the values of other determinants of profitability of equity are unacceptably low. First of all, we refer to asset turnover that during the recent years dropped even below 0.30. It cannot be expected that such a low level of asset turnover could in any way lead to accelerated growth of ROA, no matter how the trends in other determinants look like. More precisely, we can rather talk about the effect of deceleration in getting returns resulting from insufficient volume of activities, low operating efficiency and, obviously, the cumbersomeness of installed capacities in these companies. EBIT margins suffer the same fate, ranging between 1.25% and 8.5%, with their growth arising mainly as a result of the increase in interest expenses rather than of the growth in net income. In spite of the fact that these companies are less indebted, a more complete picture of their performance can be obtained only by including the indicator of interest burden in the analysis. We can see that there are really sharp fluctuations in this segment. In three of the five analyzed years interest burden was positive, but extremely unfavorable since practically the entire EBIT belonged to creditors. In 2009 and 2012 the values of this ratio were even negative, which means that generated EBIT did not suffice to cover creditors' claims, which had to be settled through reduction in equity. In other words, in these years the companies from the energy sector were actually "eating" their own substance, which explains why relying on borrowed capital has turned out to be very costly for these companies. Of course, the reasons for this state of affairs should be sought primarily in their less than modest profit potential. Besides all that, we may add some other reasons such as obsolete equipment, absence of strategic development and long-term investments, irrational cost management, burden of the social policy measures, and lack of competitiveness that has prevented this part of the economy from taking a more active role in international markets, which would enable it to increase its revenues, income and returns. In such circumstances, it can hardly be expected that in the period ahead ROE and ROA might exceed the existing limit of 2% and turn the negative effects of financial leverage into the positive ones. To be quite honest, during 2011 and 2013 the energy sector companies recorded a barely visible positive difference between the higher value of ROE and the lower value of ROA, but their levels were far from being satisfactory.

So, on the basis of the previous analysis we can conclude that, at the first glance, the level of BC Group's profitability

seems acceptable provided that we exclude the companies from the energy sector. This fact needs to be particularly pointed out because, in spite of very low profit potential of the economy as a whole and associated negative effects of financial leverage, we can get the impression that there is at least one healthy nucleus within the economy whose experiences could serve as a blueprint for restoring the health of the rest of the economy. However, regardless of the validity of these conclusions, our story must not end here. Namely, notwithstanding the fact that the companies in our sample have above-average profitability we still do not know whether they create value for their shareholders and to what extent. The answer to this question will tell us whether this group of companies will be able to retain the existing and attract new investors. If the answer is positive, they do not have to worry too much about their future. Otherwise, they will need to make serious cuts.

Value creation as a criterion of companies' profitability

The previous analysis has provided the insight into the accounting profitability of the companies that were included in our research. Unfortunately, accounting profit suffers from numerous flaws. One of them is related to the fact that its calculation does not take into account the total costs of a company's capital.[2] Namely, in the preparation of income statement accountants consider only interest expenses, while omitting the costs of equity. For this very reason, the profit reported in income statement cannot be an adequate measure of value creation and increase in shareholders' wealth. If it is not sufficient to cover the opportunity costs of equity, this means that a company has actually destroyed a portion of their wealth [20, p. 531]. In fact, the costs of equity reflect the profit which could be earned by shareholders if they invested their capital in another company with a comparable level of systematic risk. Even though they are not explicitly visible, they *de facto* exist and ought to be taken into account when assessing a company's performance, which can be achieved by deducting them from net income taken from the income statement. In the relevant literature the concept of income obtained in this way is known as residual income.[3] It is also referred to as abnormal earnings, since it represents the amount in excess of the profit which could be expected for taking the risk of investing in a company under normal circumstances [18, pp. 689-731; 6, pp. 689-731]. Just like economic value added (EVA®) it is considered as a measure of economic profit, i.e. created shareholder value.[4] Given that it reflects economic profitability, residual income is a true indicator of a company's profitability.

Table 3 paints a picture of the performance of the companies that the Business Registers Agency identified as the most profitable in 2013 with an aim of assessing whether they are really that successful [2]. It presents the data on cumulative residual income of these companies for the period from 2009 to 2013. It should be emphasized that the costs of equity were calculated separately for each company, after which they were summarized and included in Table 3. Also note that for the purpose of their calculation we applied the methodology based on the Capital Asset Pricing Model (CAPM), which was developed by Professor Damodaran. Unfortunately, due to limited space we are not in a position to provide more detailed presentation and analysis of this methodology, which we will discuss only briefly [5, pp. 211-246]. Let us start with risk-free return. It can be defined as the difference between the yield to maturity of long-term government bonds denominated in local currency and the country default spread which is based on sovereign rating issued by Moody's. Once the risk-free return has been determined, it is possible to estimate a company's required return on equity. It can be calculated by adding equity risk premium for a country multiplied

2 Of course, this is not the only flaw of the profit reported in accounting statements. There are also many others, but they will not be the subject of this paper.

3 In fact, the costs of equity should be deducted from comprehensive income, which apart from net income from income statement also includes other comprehensive income taken from the statement of changes in equity. See Penman, S. H., (2009), See Penman, S. H. (2009). *Financial statement analysis and security valuation*. New York: McGraw-Hill/Irwin, p. 153. Yet, due to the lack of data on other comprehensive income for the analyzed companies, in this paper we defined residual income as the difference between net income and costs of equity.

4 For more details about similarities and differences between residual income and economic value added (EVA®) see Stowe, J. D., Robinson, T. R., Henry, R. E., & Pinto, J. E. (2009). Residual income valuation. *In CFA Institute, Equity: CFA ® Program Curriculum*, Volume 4. Boston: Pearson CustomPulishnig, pp. 529-531.

by the levered beta of a company to risk-free return [8, pp. 435-452].[5] Note that Hamada equation is employed to lever beta coefficient. Also note that equity risk premium for a country is defined as the sum of equity risk premium for the mature markets and country default spread. A required return is then multiplied by the book value of equity to finally obtain a company's costs of equity expressed in monetary terms. The data which were used in these calculations are presented in Table 4.

Now let us return to Table 3. It shows that the cumulative residual income of the analyzed companies was negative in each of the five years observed in our research. So, cumulatively speaking, the generated accounting profits of these companies were not sufficient to cover the opportunity costs of equity. This is a very worrisome revelation. It turns out that the companies which are considered to be the most profitable in the Serbian economy do not create value. As a matter of fact, the results from Table 3 suggest that they actually destroy the wealth of their owners. Yet, some conclusions that arise from this table are encouraging. First, we can notice that there was a significant reduction in cumulative residual loss of the observed companies in 2013 relative to the previous period in which it was quite stable. It is obvious that this trend came as a result of increased profitability, but also of a drop in the costs of equity. The data presented in Table 4 indicate that the reasons for decreasing costs of equity are to be sought primarily in lower risk-free return recorded in 2013. Second, a more thorough analysis of the structure of cumulative residual loss in 2013 reveals that 60 of 89 analyzed companies actually generated positive residual income. This finding is vividly represented by the whale curve of cumulative economic profitability in Figure 2. As can be seen from the figure, the cumulative residual income of the above-mentioned 60 companies reached RSD 80.2 billion. Unfortunately, it was nullified by the residual loss of remaining 29 companies, totaling to RSD 97.2 billion. Figure 3 shows that these value destroyers belong mainly to the energy sector. Cumulative residual loss of the companies from the energy sector amounted to alarming RSD 77.5 billion. However, the fact that all other sectors achieved positive economic profitability is positive sign. Most of the companies from these sectors were creating value, thus increasing the wealth of their shareholders. The companies from mining sector, processing industry and telecommunications had the leading role in this process with cumulative residual income amounting to RSD 23.2 billion, RSD 20.7 billion and RSD 8.9 billion, respectively. Cumulative residual income of all companies, excluding the ones from the energy sector, which reflects the total value created for their shareholders amounted to RSD 60.5 billion, which is quite acceptable result.

Table 3: Cumulative residual income of analyzed companies (in thousands of RSD)

Elements	2009	2010	2011	2012	2013
1. Cumulative net income	29,545,456	91,735,800	141,116,322	141,707,590	201,629,167
2. Cumulative cost of equity	175,618,526	233,998,746	321,098,110	279,714,482	218,617,969
3. Cumulative residual income (1 - 2)	(146,073,070)	(142,262,946)	(179,981,788)	(138,006,892)	(16,988,802)

Table 4: End of year data used in calculation of the costs of equity of analyzed companies

Elements	2009	2010	2011	2012	2013
1. Serbia's sovereign rating issued by Moody's	Ba3	Ba3	Ba2	Ba3	B1
2. Country default spread for Serbia	3.50%	3.25%	2.75%	3.25%	4.50%
3. Yield to maturity of the one-year zero-coupon government bond	10.50%	14.60%	13.00%	11.87%	8.89%
4. Risk-free return (3 - 2)	7.00%	11.35%	10.25%	8.62%	4.39%
5. Equity risk premium (ERP) for the mature markets	4.50%	5.00%	6.00%	5.80%	5.00%
6. ERP for Serbia (2 + 5)	8.00%	8.25%	8.75%	9.05%	9.50%

Sources: Damodaran Online, National Bank of Serbia, Ministry of Finance of the Republic of Serbia

5 Unlevered betas used in calculation of levered betas originate from Damodaran Online.

Figure 2: Cumulative residual income in 2013 (whale curve)

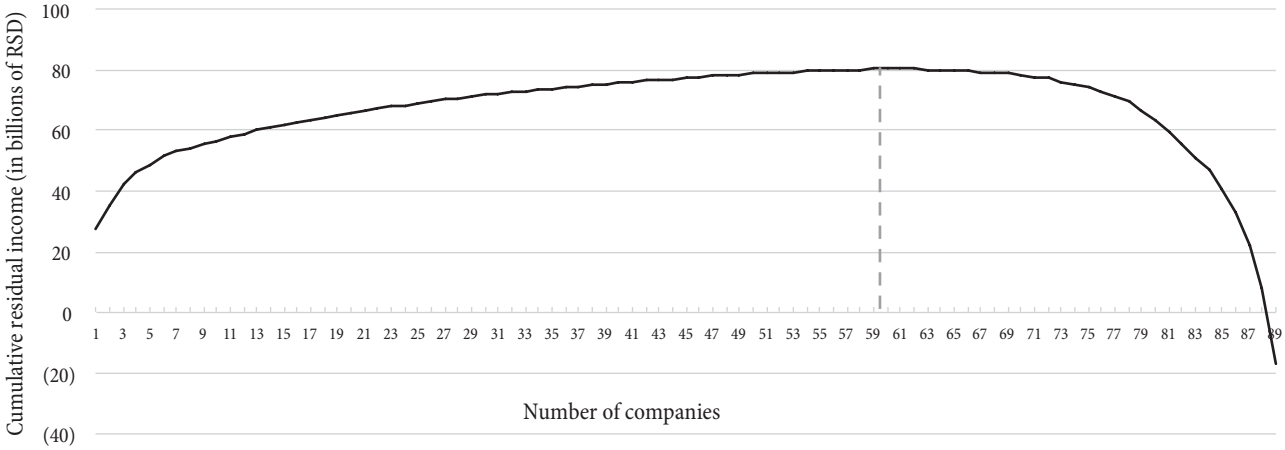
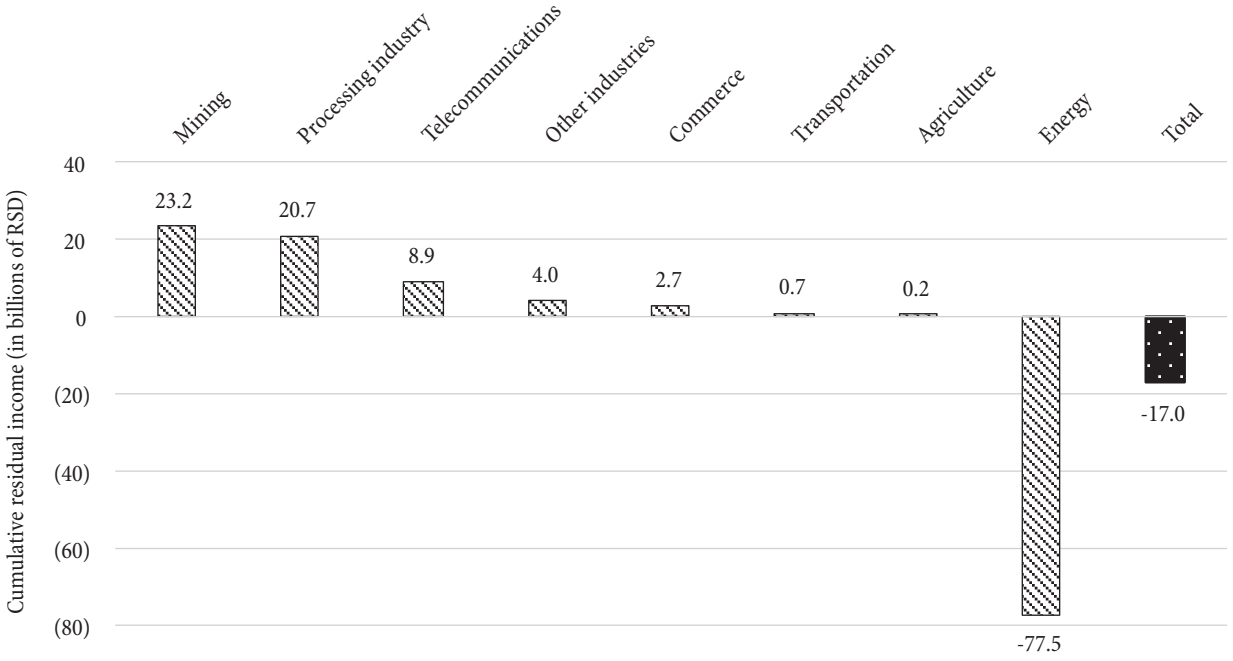


Figure 3: Sector analysis of cumulative residual income in 2013



A more detailed analysis of the economic profitability of observed companies is presented in Table 5. Panel A contains the data relating to all sectors. We can see that the return on equity of these companies was, on average, lower than the required return on equity, which led to cumulative residual losses in all analyzed years. The companies that do not belong to the energy sector are singled out in Panel B. They achieved positive economic profitability in 2012 and 2013. In 2013, the return on equity of this group of companies was by almost seven percentage points higher than the required return on equity, which is the reason behind the outstanding level of cumulative residual income of the mentioned RSD 60.5 billion. Panel C shows that this income was canceled out by the cumulative residual loss of the energy sector companies amounting to RSD 77.5 billion. We can also identify the cause of this loss. Namely, the companies from this sector recorded negative economic profitability in all observed years, even in 2013, mainly due to insufficient returns on equity. As in this paper we have already paid a great deal of attention to the lack of profitability of equity investment in the energy sector, the issue will not be further discussed here.

Hence, there is no doubt that, in absolute terms, the net income of all companies recognized as the best-performing in Serbia in 2013, seems really impressive. Still,

Table 5: Analysis of cumulative residual income

Elements	2009	2010	2011	2012	2013
Panel A. All sectors (BC Group)					
1. Return on equity – ROE	2.15%	6.79%	7.14%	7.75%	10.33%
2. Required return on equity	12.76%	17.32%	16.24%	15.30%	11.20%
3. Abnormal return on equity (1 – 2)	-10.61%	-10.53%	-9.11%	-7.55%	-0.87%
4. Cumulative equity*	1,376.4	1,351.0	1,976.7	1,828.0	1,951.2
5. Cumulative residual income* (3 × 4)	(146.1)	(142.3)	(180.0)	(138.0)	(17.0)
Panel B. All sectors (BC Group) except energy sector					
1. Return on equity - ROE	5.15%	14.64%	14.76%	17.96%	19.87%
2. Required return on equity	14.33%	19.09%	18.36%	17.50%	13.15%
3. Abnormal return on equity (1 – 2)	-9.19%	-4.44%	-3.60%	0.46%	6.72%
4. Cumulative equity*	646.3	622.4	763.6	808.5	899.5
5. Cumulative residual income* (3 × 4)	(59.4)	(27.7)	(27.5)	3.7	60.5
Panel C. Energy sector					
1. Return on equity - ROE	-0.51%	0.08%	2.34%	-0.34%	2.18%
2. Required return on equity	11.37%	15.81%	14.92%	13.56%	9.54%
3. Abnormal return on equity (1 – 2)	-11.87%	-15.73%	-12.57%	-13.90%	-7.36%
4. Cumulative equity*	730.2	728.6	1,213.0	1,019.4	1,051.7
5. Cumulative residual income* (3 × 4)	(86.7)	(114.6)	(152.5)	(141.7)	(77.5)

* in billions of RSD.

it must be admitted that in the case of some companies this income resulted exclusively from the huge amounts of capital deployed in their operations. And if so, the perception of performance fundamentally changes when, instead of absolute, we take into consideration relative indicators of profitability. The returns of these companies are too low to cover the costs of equity. Therefore, it's no wonder that such companies make residual losses and destroy the wealth of their shareholders. Our analysis has shown that they are concentrated mainly in the energy sector. Note that all of them belong to the group of public companies. The problems they face are nothing new. Some pertain to the government-controlled pricing policy which serves as an instrument of social policy [10, pp. 131-154]. Also, there are problems in the area of asset management which is inefficient, as evidenced by low levels of asset turnover. A particular problem is political interference in the business activities of such companies [10, pp. 131-154]. But if these companies are excluded from the study, our conclusions will be strikingly different. The remaining companies achieve positive residual income, which tells us that they have succeeded in creating value and increasing the wealth of their shareholders. We believe that these very companies form the healthy nucleus of the Serbian economy.

Conclusion

The Serbian economy, judging on the basis of the analysis of official financial statements, undoubtedly has serious financial and structural problems. A general conclusion could be that it is illiquid, insolvent, unprofitable and uncompetitive. The fact that, on average, only 57.2% of the total number of companies generate net income, speaks volumes in favor of the previous point. In such circumstances, among a large number of very serious problems, in this paper we decided to pay special attention to the following two. First, the long-lasting survival of numerous companies that constantly make losses is unreasonable and unsustainable in the long run, especially for a country that pledges to adhere to the principles of modern market economy. Due to their financial indiscipline, breaches of contracts, failure to meet their obligations, along with institutional tolerance towards such behavior, these companies jeopardize normal functioning of the healthy parts of the economy and contribute to the creation of an

unfavorable environment marked by growing uncertainty and rise in overall risks, which discourages investors. Second, a tendency to ignore this legacy (technical and technological obsolescence of available capacities, net working capital deficiency, inadequate profit potential, relatively high level of indebtedness, inability to repay debts and obligations as they fall due, etc.) casts doubt on the projections of significant GDP growth. It seems logical that there must be a high degree of correlation between upturn or downturn in economic activity and projected growth rates.

The analysis of the companies that reported the highest amounts of net income has given us a clearer view of the profitability of the Serbian economy. Bearing in mind that these companies are positioned as the most successful, it is realistic to expect that they could be regarded as the healthy nucleus of the Serbian economy and key drivers of its development. The analysis of key determinants of profitability of these companies has revealed that they exhibit significantly higher values (except for asset turnover) compared to the average values in the Serbian economy. Lower solvency ratio, much higher values of EBIT margin and normal values of interest burden (from which can be seen the participation of shareholders and creditors in the share of profits) result in significantly higher returns on equity. The financial strength of companies and their market positions have allowed them to borrow under more favorable terms, which resulted in a positive effect of financial leverage on the performance of BC Group in the last three years. Lower asset turnover in comparison to its average value at the level of the economy is quite understandable if we take into account the fact that BC Group also encompasses capital-intensive companies with valuable assets, which for different reasons fail to generate more revenues that would lead to greater turnover.

Despite the fact that the returns of BC Group are above average for the economy, they are not high enough to guarantee that the interests of all stakeholders will be meet. The perception of profitability dramatically changes if we raise the threshold for companies' performance to the level of income that would provide for the coverage of opportunity costs of equity. The insight into residual income of BC Group reveals very worrisome results, since at the level of the group it was negative in all analyzed years, which leads to a conclusion that the best companies in Serbia do not create value. Yet, a more thorough analysis, focusing on the monitoring of residual income at the level of individual companies as well as at the level of particular sectors to which they belong, give us reasons for some more optimistic conclusions. Namely, the analysis of the structure of cumulative residual income reveals that 60 of 89 companies have positive residual income, which means that they create value, while the remaining 29 companies have negative residual income that is at the same time greater than the sum of all positive residual incomes.

Responsibility for the reported net income at the level of BC Group is not divided equally between individual companies and sectors they belong to. After excluding 11 companies belonging to the energy sector from BC Group, the picture of performance significantly changes in such a way that almost all analyzed values increase in the case of BC Group without energy companies, or decrease as far as the companies from the energy sector are concerned. This leads to a significant increase in profitability of BC Group without energy sector companies, respectable values of ROE and ROA, and positive effect of financial leverage in four of the five analyzed years. Application of residual income, as a much stricter test of performance, enabled us to further differentiate the performance of individual companies and sectors. Most of the companies from BC Group without energy sector companies generated positive residual income, thus creating shareholder value added. The leaders are the companies from mining sector, processing industry and telecommunications. This gives us grounds to conclude that, despite the fact that there are companies which, regardless of reported net income, are not profitable in terms of the creation of value added, there are also companies that constitute the healthy nucleus of Serbian economy which can drive economic growth of the national economy.

The companies from the energy sector are primarily responsible for negative residual income. From a total of 11 companies and 5 analyzed years, only one company in one year recorded positive residual income. Moreover, the things become much clearer if we realize that all analyzed companies from this sector are public companies. Bearing

in mind the public importance of these companies, as well as the fact that the state holds ownership function, it becomes evident that the performances of these companies could and must be raised to a higher level. A key step consists of introducing fundamental changes in the state's attitude towards public companies, which will enable the improvement in corporate governance. To this end, it is necessary to increase accountability of the state as an owner, to separate the state's ownership function from its regulatory function, to regularly monitor performance of public companies, to engage professional managers, to strengthen financial and fiscal discipline, to increase transparency and provide a greater security to investors in mixed-ownership companies [9, pp. 54-55]. Enhancement of the performance of public companies requires the implementation of a wide range of different measures, tailor-made to the needs of each company. In this regard, it would be advisable to think of measures such as partial privatization with different dispersion of ownership, establishment of public-private partnerships, operational and financial restructuring, involvement of some companies in the capital market, etc.

Considering the forgoing findings, we can conclude that the ultimate goal of economic policy makers is to enable the development of stable business environment which will stimulate companies and investors to contribute to the growth of the national economy. Institutional protection of loss-making companies is a huge burden to the whole economy, moving it away from the market economy. The experiences of many countries have shown that the performance of public companies can be significantly improved, but with completely different and far more responsible approach from the one that has been used in Serbia. The existence of companies that have capacity to create value proves that it is possible to do business on a sound basis.

References

1. A World Bank Group Flagship Report, Doing Business 2016. (2016). *Measuring Regulatory Quality and Efficiency*. International Bank for Reconstruction and Development / The World Bank, Washington, http://www.doingbusiness.org.
2. Agencija za privredne registre. (2014), Sto naj... privrednih društava u Republici Srbiji u 2013. godini, http://www.apr.gov.rs/
3. Casey, C., & Bartczak, N. (1985). Using Operating Cash Flow Data to Predict Financial Distress: Some Extensions. *Journal of Accounting Research*, 23,1, 384-401.
4. Casey, C., & Bartezak, N. (1984). Cash Flow – Its Not the Bottom Line. *Harvard Business Review, July–August*, 61-66.
5. Damodaran, A. (2012). *Investment valuation: Tools and techniques for determining the value of any asset*. Hoboken: John Wiley & Sons.
6. Feltham, G. A., & Ohlson, J. A. (1995). Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research*, 11(2), 689-731.
7. Goddard, J., Tavakoli, M., & Wilson, J. (2009). Sources of Variation in Firm Profitability and Growth. *Journal of Business Research*, 62, 495-508.
8. Hamada, R. C. (1972). The effect of the firm's capital structure on the systematic risk of common stocks, *The Journal of Finance*, 27(2), 435-452.
9. Malinić, D. (2015). The Relevance of Positional Risks in Creating Development Strategy: The Case of Public Enterprises. *Ekonomika preduzeća, January-February*, 33-56.
10. Malinić, D. (2013). Finansijska (ne)moć javnih preduzeća, In *Računovodstveno regulatorno okruženje: podsticaj ili ograničenje privrednog rasta*, Savez računovođa i revizora Srbije, Zlatibor, 131-154.
11. Malinić, D. (2013). Insufficiency of Serbian Economy's Operating Performances: Manifestations, Causes and Main Guidelines of Recovery. *Ekonomika preduzeća, January-February*, 41-62.
12. Malinić, D., Denčić-Mihajlov, K., & Ljubenović, E. (2013). The Determinants of Capital Structure in Emerging Capital Markets: Evidence from Serbia. *European Research Studies*, XVI, 2, 98-119.
13. Malinić, D., & Milićević, V. (2011). Performance Evaluation of Real Sector in Serbia. *Ekonomika preduzeća, November-December*, 335-351.
14. Malinić, D., & Milićević, V. (2012). The Financial and Structural Capabilities of Key Infrastructure Sectors in Serbia. *Economic Annals, LVII*,195, 7-42.
15. Malinić, D., & Milićević, V. (2013). Effects of Changes in Foreign Exchange Rates on Performance in Serbia's Economy. *Ekonomika preduzeća, November-December*, 401-416.
16. Malinić, D., Milićević, V., & Glišić, M. (2014). Interdependence of Enterprise Size and Vitality in Serbian Economy. *Ekonomika preduzeća, November-December*, 323-347.
17. Malinić, D., Milićević, V., & Stevanović, N. (2015). *Upravljačko računovodstvo*, Beograd: Ekonomski fakultet.
18. Ohlson, J. A. (1995). Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research, 11(2)*, 661-687.
19. Penman, S. H. (2009). *Financial statement analysis and security valuation.* New York: McGraw-Hill/Irwin.
20. Stowe, J. D., Robinson, T. R., Henry, R. E., & Pinto, J. E. (2009). *Residual income valuation*, In CFA Institute, Equity: CFA® Program Curriculum, Volume 4. Boston: Pearson Custom Publishnig.

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THE IMPACT OF INTELLECTUAL CAPITAL ON COMPANIES' MARKET VALUE AND FINANCIAL PERFORMANCE*

Uticaj intelektualnog kapitala na tržišnu vrednost i finansijske performanse preduzeća

Abstract

Intellectual capital determines growth potential, affects above average returns, and is a source of competitive advantage for firms in an information economy. Thus, this study investigated the relationship between the intellectual capital and market and financial performance of companies listed on Belgrade Stock Exchange (BELEX) in Serbia. The research sample consisted of 42 enterprises that made *BELEXline* index. The period of the research covered five years (2010-2014). Two research hypotheses were tested and partially confirmed: the impact of the intellectual capital of Serbian listed firms on their market performance and on their financial performance. According to research results, human capital and physical capital positively affect market performance of companies. When analyzing financial performance, human capital significantly affects return on equity and return on assets, whereas structural capital affects neither market nor financial performance, except in the case of employee productivity. On the other hand, physical and financial capital of companies are less important for employee productivity, unlike the human and structural capital.

Key words: *intellectual capital, market performance, financial performance, Value Added Intellectual Coefficient, VAIC*

Sažetak

Intelektualni kapital određuje potencijal rasta, zaslužan je za stvaranje najvećeg dela dodate vrednosti preduzeća i predstavlja izvor konkurentske prednosti preduzeća informatičke privrede. Ovo je razlog zbog koga se ova studija bavi odnosom između intelektualnog kapitala i tržišnih i finansijskih performansi preduzeća listiranih na Beogradskoj berzi (BELEX) u Srbiji. Uzorak je činilo 42 preduzeća iz korpe indeksa *BELEXline*. Period za koji je rađena analiza je pet godina (2010-2014). U radu su testirane i delimično potvrđene dve istraživačke hipoteze i to o uticaju intelektualnog kapitala preduzeća u Srbiji na njihove tržišne performanse i finansijske performanse. Rezultati pokazuju da ljudski i fizički kapital pozitivno utiču na tržišne performanse preduzeća. Kada se analiziraju finansijske performanse, ljudski kapital značajno opredeljuje stopu prinosa na kapital i stopu prinosa na ukupnu aktivu, dok strukturni kapital ne utiče ni na tržišne ni na finansijske performanse, osim u slučaju produktivnosti zaposlenih. S druge strane, fizički i finansijski kapital imaju manji uticaj na produktivnost zaposlenih u odnosu na ljudski i strukturni kapital.

Ključne reči: *intelektualni kapital, tržišne performanse, finansijske performanse, koeficijent dodate vrednosti intelektualnog kapitala, VAIC*

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Introduction

Before the business model shifted towards gaining competitive advantage through adequate exploitation of intangible assets, the companies mainly focused on increasing their value and wealth by maximizing corporate performance through more efficient use of tangible resources. In the work of Adam Smith, Wealth of Nations, he glorified productivity and efficient use of physical assets. The productivity goals were mainly achieved through use of existing technology and division of labor. This approach to maximizing the productivity led theorists and practitioners of the 20th century to try to apply this in the field of scientific management and practice. The most famous examples were Frederick Taylor and Henry Ford. During this period, efficient, lean processes with cost-efficient overheads have become regarded as the quickest route to profits. In addition, the companies continue to pursue efficiency through lean and, therefore, they hope, productive, organizational structures. However, since the modern society is faced with scarcity of tangible resources, increased global competition, and more demanding customers, it is necessary to re-evaluate the principles introduced by Adam Smith and traditional economics. Even in the information era, the productivity still matters. It is just that our understanding of productivity, and how to achieve it, has changed and will change. Adam Smith realized that the factory model of business did not improve workers' knowledge and skills. On the other hand, the knowledge era gives people the opportunity to learn in exciting and unexpected ways. Physical labor is no longer as important as it used to be [16, p. 20-21]. Nowadays, enterprises tend to create value by focusing more on intangible aspects of their assets than simply applying the tangible resources. According to the data supplied by the World Bank [44], the global world wealth is constituted mainly of intangible resources, which account for 78% of this wealth. When viewing the intangible resources, World Bank defines these as the sum of raw labor, human capital, social capital, and other similar factors. The interesting point of the mentioned study is that the percentage of intangible capital ranges from 59% in low-income countries, to high-income OECD countries where intangibles account for 80% of national wealth. The most developed market economies base their competitiveness on knowledge, business innovations, strategies, on sophistication of their business model, and far less on natural resources and cheap labor. It is estimated that investments in intellectual assets among five OECD countries (USA, UK, Japan, Netherlands, Finland) each make up between 7.5% and 11.7% of gross domestic product [9; 22; 37]. This is particularly important for the Serbian economy, where corporate performance depends less on the knowledge and skills of employees and more on physical assets [29].

In contrast to tangible resources, which are represented by a physical objects and whose value can be measured with a reasonable level of certainty, intangible resources differ in terms that they are not visible, and relate to employee knowledge and skills, relationships with customers and other stakeholders, and components referring to organizational culture, intellectual property and brand equity. Various types of intangible resources make up the substance of intellectual capital (IC), which is a primary value driver in today's knowledge-based economy. New theories of strategic management, such as the resource-based view of the firm (RBV), the competence and capabilities-based outlook, and the knowledge-based premise, have contributed significantly to improving our understanding of the nature and importance of IC as a strategic resource [29].

This paper analyzes the current state of IC-related issues in the Serbian economy, specifically addressing the impact of IC and its components on market and financial performance. The paper uses 42 enterprises that were the members of *BELEXline* index at the Belgrade Stock Exchange in July 2015. The data regarding the analysis of market and financial performance were drawn from the official financial reports of these enterprises. The period that the research covers is five consecutive years, ranging from 2010 to 2014. The paper consists of the following sections. The first section after the introductory notes, relates to the presentation of basic conceptual frameworks regarding the understanding of IC. This section includes concept definitions and assessment of various approaches in terms of IC categorizations. The following section will deal with the literature review

of earlier empirical evidence regarding the IC's impact on market and financial performance. Afterwards, the paper presents the research methodology (description of the sample, development of research hypotheses, and presentation of used research variables). After presenting the research results and appropriate discussion, the paper ends with concluding remarks.

Intellectual capital: The what, why, and how

Intellectual capital in the knowledge economy represents the kind of assets with most potential for value creation, with predominant impact on firm's market value. With this in mind, one can say that investment volume in IC can be viewed as the leading indicator of firm's vitality and competitive advantage [26]. The first move towards understanding the concept of IC is giving a valid definition of the term itself. The terms that are most commonly used to describe the invisible assets, which create extra value in companies are intellectual capital, intangible assets, immaterial capital, intangible resources, intellectual property, invisible assets, immaterial values, and so on. No matter what the term is used, they point to similar contents and essence of these intangible assets of companies. The term "immaterial values" was mostly used by the researchers and organizations outside accounting systems of USA and Great Britain are used (like Germany, Sweden or France), and the term was used to describe non-monetary values that have no physical embodiment. The notion of this reflects the terms "intellectual capital" and "intangible assets". The differences among these three terms are only based on the areas of use and thus they are often presented as synonyms.

The modern management and accounting literature offers many different definitions and categorizations of intellectual capital. The following summarizations of various definitions and categorizations were given according to [14]. As is the case with terminology, there is vast array of different notions of IC and its nature. More or less every definition points towards the notion that IC represents non-monetary asset, which has no physical embodiment and possesses value and potential for generating benefits for the organization in the future. For example, Hall [21] defined IC as the sum of contemporary value drivers that have the ability to transform company's resources into assets with extra tangible value. Edvinsson [15] stated that IC is represented through relationships with clients and employees. Authors Davenport and Prusak [12] explained IC in relation to technology, technological change, and management of information technology in a company. According to them, a company that successfully uses technology to manage and analyze the data is a company that knows how to manage IC. Bontis [2] claimed that IC possessed the characteristics, which may cause market value increase. Stewart [41] defined IC as "collective brainpower" of a company. Sullivan [42] defined IC as company's knowledge, which can be converted into profit. Lev [32] defined IC as sum of certain resources that will assure future benefits for a company. Daum [11] stated that IC possessed the attributes, which can quickly realize economic benefits. In addition, he pointed out that these intangible resources were mutually interlinked. Mouritsen, Bukh, and Marr [35] stressed out that IC utilizes its employees, managers, clients, information technology, and knowledge. In addition, the authors pointed out that IC only represents the mechanism that connects various resources into production process of a company and thus is not able to operate independently. Andreou, Green, and Stankosky [1] revealed that companies that operated in information age needed to be intelligent in order to absorb the knowledge from the environment and to adequately value and manage IC. Hsu and Fang [23] viewed IC as the sum of employee skills, knowledge, intellectual property, culture, processes, corporate strategy, and networks. According to Huang and Wu [24], IC cannot be seen as static intellect, but rather as demanding set of dynamic intellect-creating activities. All of the mentioned IC definitions have one thing in common, and that is that IC represents company asset that is the most potent in terms of future value creation.

Another critical issue in the field of IC theory and practice is determining the adequate categorization of IC. In order to manage IC properly, one must understand its key elements and their characteristics. Therefore, it is very important to categorize assets like skills, knowledge, talent, enthusiasm, trademarks, patents, expertise, experience,

software, databases, management processes, corporate strategy, business plans, relations with stakeholders, brand, unique organizational practices, corporate culture, and so on. These various elements of IC are interrelated and linked to the various physical assets of a company; therefore, the components of IC cannot be valued and observed independently. The categorizations of IC evolved as the IC discipline evolved and many different, but with the similar idea in mind, categorizations emerged. Hall [21] was among the first authors that systematically categorized IC. He categorized IC into IC that cannot be separated from human resources, and IC that is possible to separate from human resources. IC that cannot be separated from human resources is human capital and it is based on different types of knowledge. On the other hand, the IC that cannot be viewed separately from human resources are organizational capital (like business norms, rules of conduct, databases, organizational routines, corporate culture and so on), technological capital (like patents, trademarks, copyright, intellectual property), and relational capital (reputation, brand, customer loyalty, long-term relationships with stakeholders, distribution channels and so forth). Sullivan [42] used the three-element IC classification, but pointed out that it is essential to have certain business processes in order to transform IC into intellectual property, thus acknowledging that IC creates value indirectly and in relation to an organization's strategy. On the other hand, authors including Petty and Guthrie [38] adopted an IC classification consisting of two elements: organizational (structural) and human capital. The important classification is the one given within the Guidelines for managing and reporting on intangibles [34], which includes human capital, structural capital, and relational capital as main constitutive elements of IC. The central part of human capital is knowledge. Besides knowledge, human capital also includes skills, creativity, talent, learning capacity, responsibility, dedication, motivation, and employees' enthusiasm. Structural capital incorporates managerial processes, strategy, business plans, software, databases, structure of an organization, its patents and trademarks, and every other organizational capacity that helps improve productivity of employees. Relational capital involves external relationships with various stakeholders and their image of company, like brand image or customer loyalty [27]. According to Inkinen [25], IC consists of several types of knowledge-based resources. In literature, there is a convergence towards three-dimensional categorization of IC, which includes human, organizational, and relation oriented resources. This categorization was established as an emergent standard and a starting point for building various IC measurement models. One of the categorizations of IC that come from the field of financial management was given by Damodaran [10, p. 407-456] and it is based on the IC's ability to generate cash flows. According to him, IC has three elements: IC that generates independent cash flows, IC that generates cash flows on the company level, and IC with potential for generating cash flows. The first category is made of trademarks, copyrights, licenses, and franchises. In cash flow sense, this type of IC is no different from tangible resources of a company. IC that generates cash flows on a company level consists of elements that cannot be separated from other company assets, but it is evident that they create increased value. This category consists of human capital elements (knowledge, skills, competencies, talent, enthusiasm, and the like), structural capital (organizational practices, management system, corporate culture), and relational capital (brand, relationships with stakeholders). The contribution of this type of IC is evident on the level of overall company results. IC with potential for creating cash flows is represented by those intangibles in a company that will eventually increase value. Examples of this IC category are patents and projects under development, natural reserves and so on.

Present study is one of the first to assess the IC of companies listed at the Belgrade Stock Exchange and one of the few empirical approaches to investigating the issue of IC in domestic literature. The results are original and valuable in at least three ways. Firstly, they validate the significant positive influence that human capital has on market and financial performance indicators of companies listed on Belgrade Stock Exchange. Secondly, it reveals that market performance is still more influenced by physical and financial capital, in comparison with IC. Thirdly, the research validates VAIC model's ability to assess the efficiency of IC's use by companies in Serbia.

Intellectual capital and performance; The review

The literature is quite rich with various empirical evidence on the relationship between IC and the financial and market performance of companies in different sectors of economy. The majority of these studies revealed a positive and strong impact of IC on financial and market performance of companies, but several of those, especially in developing economies did not reach the same conclusion. Bontis, Keow, and Richardson [3] investigated the relationship between IC and business performance in Malaysian industries and confirmed positive impact of IC within two industry sectors. On the other hand, Firer and Williams [18] found different relationship when investigated companies on stock exchange in Johannesburg. Their research revealed that the economy of South Africa was mainly relying on physical assets, and competitive advantage was achieved by adequately managing these resources. An interesting study conducted in Taiwan [5] found that IC contributed positively to market and financial performance. A study by Goh [20] investigated the level of IC efficiency in the banking sector of Malaysia. The results revealed that Malaysian banks were less efficient in using IC than foreign banks. In Egyptian software companies [39] human capital and selection of quality employees significantly influenced firm performance and export intensity. In a research conducted by Kujansivu and Lönnqvist [30] research sample included 20.000 entities and produced unsatisfactory results in terms of failing to validate IC's positive impact on performance in Finnish companies.

Erickson and Rothberg [17] investigated three US industries in the field of high technology for a period of eight years. The important conclusion was that IC, combined with proper knowledge management, is able to increase companies' market performance. Chiu, Chan, and Wu [6] investigated the companies listed at Hong Kong stock exchange and found positive impact of IC on profitability of businesses. In particular, structural capital played a notable part in enhancing corporate profitability, and showed increasing significance. However, empirical studies conducted in Serbia have somewhat different conclusions. Several distinct studies involved top hundred companies in regards with achieved net profit in 2010 and 2011, 300 top exporting companies, and 594 firms in ICT manufacturing industry [27; 29; 28]. The results of these research studies reveal that IC's impact on performance is either small or insignificant. Overall, these studies showed that physical capital was the main predictor of financial performance. It is interesting to note that a research study from Australia also concluded that financial performance of their companies were mostly affected by financial and physical capital, and less by IC [8]. Finally, research studies conducted in Spain and Greece failed to validate hypotheses that IC has positive and significant impact on financial performance [13; 33].

Presented research results involved the impact of IC on both financial and market performance of companies in various sectors and different economies in the world. It is evident that IC has stronger influence in more developed economies. In addition, this impact is even more significant in knowledge-intensive sectors (ICT, services, software, pharmaceuticals, and alike). However, there are only few studies covering developing economies. In addition, the studies that were implemented in Serbia did not cover the effects of IC on market performance of companies. This is why this paper has the main objective to determine whether market performance of Serbian listed companies is under significant influence of IC.

Data and methodology

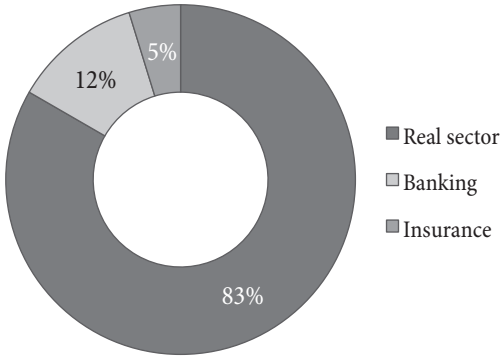
Sample description

The sample in our research included 42 enterprises, which were the part of the *BELEXline* market index on the date of revision made on July 24, 2015. The data about the market values and financial performance were downloaded on August 14, 2015. The data was gathered from the official financial statements of these enterprises during the period 2010–2014. The financial data can be found on the official website of the Belgrade stock exchange.[1] The *BELEXline* index is used as the measure of market activity on the Belgrade stock exchange in Serbia. The companies that make up the *BELEXline* index are those whose shares have the highest rate of trade on the Belgrade stock exchange. The research sample is heterogeneous and it is comprised

1 http://www.belex.rs/trgovanje/indeksi/belexline/korpa

of companies from the real sector, banking sector, and insurance. The sample description is given in the Figure 1.

Figure 1: The research sample structure



As we can see from the Figure 1, the majority of the research sample is consisted of enterprises that operate within the real sector of Serbian economy, which is 83%. On the other hand, banking sector accounts for 12% of enterprises in research sample, while only 3% of analyzed companies belong to insurance sector. In this sense, the ratio between real sector companies and financial sector companies is 83% to 17%.

VAIC method

The present empirical study of IC's impact on financial and market performance among Serbian listed companies used the method firstly presented by Ante Pulic from Intellectual Capital Research Center in Austria. The method aimed at measuring a company's efficient use of all resources that exist at company's disposal. This way the management can assess whether its corporate performance relies more on tangible or intangible elements of their business operations. The measure of this efficiency is called Value Added Intellectual Coefficient (VAIC) (Pulic, 1998; 2004). The main idea behind the VAIC model is that knowledge assets and human potential positively affect business success. However, the method also separates the impact of physical and financial performance by introducing the capital employed efficiency coefficient. Beside this element, the VAIC coefficient includes measures of human capital and structural capital efficiencies. In the following paragraphs, the VAIC model will be described in more detail.

Model of VAIC starts by determining company's overall value added (VA) from business operations. This measure is calculated by subtracting total expenses from sales revenues. The model omits human resources costs since they are seen as investment, not a cost and they are to be capitalized within the market value of a company. The method's primary objective is to assess individual contribution of each of the firm's resources (both tangible and intangible) to value creation. Thus, the VAIC calculation involves the following steps:

(1) Value added = Sales revenues – Total expenses (except human capital costs)
(2) Human capital efficiency (HCE) = Value added/ Human capital costs
(3) Structural capital efficiency (SCE) = Structural capital/Value added
(4) Intellectual capital efficiency (ICE) = Human capital efficiency + Structural capital efficiency
(5) Capital employed efficiency (CEE) = Value added/ Capital employed
(6) VAIC = Intellectual capital efficiency + Capital employed efficiency, or
(7) VAIC = efficient use of IC + efficient use of physical and financial capital

According to Pulic, IC is consisted of only human and structural capital. The model does not have the ability to include the effects of relational capital. When assessing HCE, the model uses annual employee wages and salaries in order to obtain human capital costs (equation 2). The model depicts relative contribution of employees to creation of added value in a company. The structural capital component of VAIC is calculated as in equation (3). However, this equation does not point to the calculation of structural capital. The structural capital is calculated by subtracting human capital costs from value added. In other words, this element represents everything invested in gaining value added, except from human capital costs (salaries and wages). Equations (2) and (3) point to the conclusion that efficiency in using structural capital is reciprocal to human capital efficiency. IC efficiency sums up both structural and human capital efficiencies in the model (equation (4). Physical and financial capital efficiencies are presented by the ratio between value added and net assets of a company, and their efficient use is labeled as capital employed efficiency (equation (5)). At the end, VAIC is

assessed as the sum of tangible and intangible capital of companies (equation (6)).

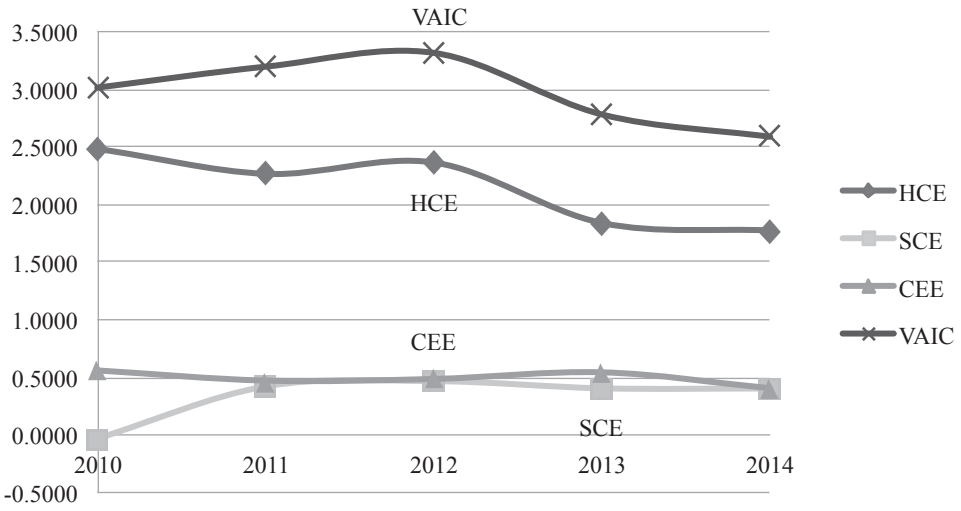
In its essence, the VAIC method expresses several important advantages for use. These advantages have been compiled according to [36]. First, the measurement method is easily comprehensive and easy to use in determining the contribution of IC to value creation in a company. By applying VAIC, various stakeholders are able to examine and assess overall resources and their value creation efficiency. Second, the data required in the model is easy to acquire since the main tool for this is using corporate financial reports. Third, VAIC is more objective and verifiable compared to other measurement models because the data used in its calculation had been previously audited [45]. Fourth, the VAIC method of assessing IC makes cross-organizational or cross-national comparison more feasible, unlike other measurement models, which require both financial and non-financial measures often including some subjective insights. These measures are naturally customized to individual organizations, and some of the measures especially non-financial measures are not always publicly available. This is why any comparative study on mentioned methods of measurement is not possible [43]. Finally, the enterprises can use this approach in terms of evaluating their own IC and organizational performance exclusive of the application of industry standards [31].

VAIC model suffers from several disadvantages. First, financial statements are used as the basis for its calculation. By doing so, the coefficient itself represents a measure of created value in the past, rather than company's future potential benefits. Besides this, VAIC model is unable to incorporate the synergy from combined exploitation of IC elements. Third, VAIC focuses on partial contribution to value creation done by its components. In practice, elements of IC interact among themselves so it is impossible to separate their individual contribution to corporate performance. Finally, the model fails to offer adequate analysis of the creation of added value for companies with negative equity and operating profit [6]. There are several important disadvantages when using VAIC. First, it is based on financial reports, which are indicators of past strategy. Second, VAIC does not take into account synergies that exist among the various components of VAIC. Third, the model does not extensively analyze the innovation capacity and relational capital of a firm. Often cited critical view of VAIC model was assessed by Ståhle *et al.* [40]. The authors stressed out several important problematic issues. First, the authors mentioned that VAIC model measures only operational efficiency of a company and that there is no explicit link with IC. For example, in case of human capital, the model only takes into account annual salaries, neglecting their knowledge, skills, motivation, experience or training. It is similar when analyzing structural capital, while there is no relational capital in the model. Additional issue is treating IC and performance linearly. The second problem lies in model's calculation steps. In case of human capital, the higher the HC, the higher human capital is. However, when computing the human capital efficiency (HCE = VA/HC), lower value for HC implies better human capital efficiency. In addition, the application of value added (VA) is problematic. VA is obtained by the following equation VA = OP + EC + A + D, where A and D are independent from the created value. At the same time, structural capital represents VA minus human capital costs (OP + A + D) and in this manner, VAIC is linearly linked with structural capital and at the end it is not possible to fully compare the capital-intensive industries with others, due to the differences in human capital costs. The mentioned issue is also that model does not take into account the holistic nature of intellectual capital. Despite its disadvantages, VAIC had become widely accepted by the academic and professional community as the good indicator IC's productive use. Moreover, the fact that UK's Department for Business, Innovation and Skills use VAIC as the indicator of IC's use in companies significantly contributes its validity [46].

VAIC is well suited for assessing relative contribution of IC to creating extra value in developing countries because its usage enables the efficiency of IC to be compared with the efficiency of tangible assets. The objective of this empirical study was to determine the impact of IC and its components on companies' market and financial performance.

Figure 2 illustrates the values of various VAIC components over the analyzed period of five years. The human capital component makes up the majority of VAIC

Figure 2: The values of VAIC during the analyzed period



index. On the other hand, it shows the steady decrease in value during the five-year period. Structural capital element demonstrates the growth in the same period, while physical and financial capital maintains the stability. However, since HCE is the primary building block of aggregated VAIC coefficient, it is expected that its value predominantly determines the value of VAIC. Therefore, VAIC shows the steady decrease over time.

Research hypotheses and variables used

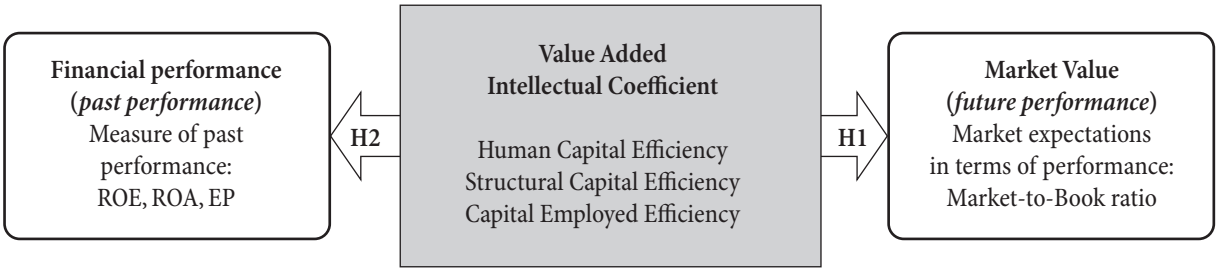
In order to assess the relationship between market and financial performance of listed companies on Belgrade Stock Exchange, the two main hypotheses are tested. The research hypotheses are developed in accordance to both theoretical concepts and previous empirical research in the field of intellectual capital. These hypotheses reflect the different approaches in terms of business operations of companies. The first approach attempts to assess the financial performance dependence on IC and its various components. On the other hand, the expected returns are also a determinant of company's performance, especially when analyzing the market performance. This is why the research tends to validate both sides, the past and future performance dependence on IC. When observing whether the IC mostly affects market or financial performance we can assess whether IC affects future expectations, existing performance or both. The approach is similar to the approach of Nimtrakoon [36]. As implemented by Figure 3 illustrates these assumed relationships that will be tested through the following research hypotheses.

Hypothesis 1: Companies with higher values of VAIC tend to have better market performance.

This hypothesis shows the reliance of market-to-book ratio, as one of the mostly used market performance indicators of listed companies, on VAIC components. More specifically, by testing this relationship the results will shed the light on whether future, expected, performance is affected by human, structural, or physical component of VAIC.

Hypothesis 2: Companies with higher values of VAIC tend to have better financial performance.

Figure 3: Research framework [Adapted from 36]



The second research hypothesis will show the intensity and nature of relationship between three measures of financial performance (return on equity, return on assets, and employee productivity) and components of VAIC coefficient. This hypothesis, if confirmed, will prove that Serbian listed companies still do not rely on IC.

To test these hypotheses, the appropriate variables must be defined in the research, both dependent and independent. The dependent variables (measuring companies' market and financial performance) applied in the specific research are:

- Market-to-book ratio, MB (market capitalization to book value of assets)
- Return on equity, ROE (the ratio between net profit and average stockholder equity's book value)
- Return on assets, ROA (obtained as pre-tax income divided by total assets)
- Employee productivity, EP (pre-tax income divided by number of employees)

The independent variables in the research are elements of VAIC (efficiencies of using human, structural, and physical and financial capital), calculated as described in equations (1)–(7). Finally, the control variables in the research model are firm size and leverage. As proxies for these control variables we use total assets and number of employees (for firm size), and ratio between total liabilities and total assets (for leverage).

Research results and discussion

Statistical analysis was implemented in causal and logical order and therefore enabled us to draw conclusions based on these results. Within Table 1, we can view values for descriptive statistics in regards to analyzed *BELEXline* companies. The data are given for each of the dependent and independent variable and entail values for minimum, maximum, mean, standard deviation, variance, kurtosis and skewness.

In case of research sample enterprises, there are significant variations in values, which are caused by variables' differences in calculation. In order to determine the appropriate correlation test for selected enterprises, we performed the tests that determine the type of data distribution in the sample (normality tests).The data in Table 2 shows the reliability of the research sample, in terms of valid input data. The basic normality tests used

Table 1: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Stat.	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EP	210	-770472,1	122404,3396	2247,583996	70952,1280694	-8,486	,168	84,653	,334
HCE	210	-1,9227	11,4337	2,146005	1,6678276	1,335	,168	4,570	,334
MB	210	,0000	3,6593	,667566	,6304153	2,033	,168	5,057	,334
CEE	210	-,1482	5,4324	,481658	,7335201	3,777	,168	17,288	,334
SCE	210	-19,9221	3,6829	,332589	1,5056989	-11,693	,168	158,414	,334
ROA	210	-,3626	,3533	,037454	,1046463	-,395	,168	2,533	,334
ROE	210	-8,1393	1,0139	-,014567	,6715863	-9,467	,168	106,822	,334
Valid N	210								

Table 2: Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
HCE	210	100,0%	0	0,0%	210	100,0%
SCE	210	100,0%	0	0,0%	210	100,0%
CEE	210	100,0%	0	0,0%	210	100,0%
MB	210	100,0%	0	0,0%	210	100,0%
ROE	210	100,0%	0	0,0%	210	100,0%
ROA	210	100,0%	0	0,0%	210	100,0%
EP	210	100,0%	0	0,0%	210	100,0%

for the needs of this research are Shapiro-Wilk test and Kolmogorov-Smirnov test. The results of these normality tests are given in Table 3.

The results of presented tests point to conclusion that analyzed variables are not normally distributed. (Sig. <0,05). The values of aggregated VAIC coefficient have identical characteristics of distribution as its constitutive elements. Thus, the data in the research sample is not normally distributed, which implies the necessity to perform non-parametric correlation analysis (Spearman correlation test).

Table 4 reveals the results of Spearman's correlation analysis. The results indicate that there is significant correlation between almost all of the VAIC components and selected measures of corporate performance. However, capital employed efficiency is an exception when analyzing its relationship with employee productivity. In addition, structural capital efficiency is significantly correlated with market performance, but this correlation only exists at the 0,05 level of significance. The following tables (5-8) present the results of the multiple regression analysis. We employed four different regression models in order to test if

Table 3: Normality tests

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HCE	,154	210	,000	,894	210	,000
SCE	,324	210	,000	,263	210	,000
CEE	,232	210	,000	,579	210	,000
MB	,161	210	,000	,802	210	,000
ROE	,355	210	,000	,283	210	,000
ROA	,176	210	,000	,928	210	,000
EP	,342	210	,000	,311	210	,000

a. Lilliefors Significance Correction

Table 4: Correlation analysis

		MB	ROE	ROA	EP	HCE	SCE	CEE
MB	Correlation Coefficient	1,000	,467**	,503**	,412**	,277**	,175*	,370**
	Sig. (2-tailed)	.	,000	,000	,000	,000	,011	,000
	N	210	210	210	210	210	210	210
ROE	Correlation Coefficient	,467**	1,000	,949**	,795**	,500**	,308**	,436**
	Sig. (2-tailed)	,000	.	,000	,000	,000	,000	,000
	N	210	210	210	210	210	210	210
ROA	Correlation Coefficient	,503**	,949**	1,000	,822**	,494**	,306**	,378**
	Sig. (2-tailed)	,000	,000	.	,000	,000	,000	,000
	N	210	210	210	210	210	210	210
EP	Correlation Coefficient	,412**	,795**	,822**	1,000	,696**	,480**	,118
	Sig. (2-tailed)	,000	,000	,000	.	,000	,000	,089
	N	210	210	210	210	210	210	210
HCE	Correlation Coefficient	,277**	,500**	,494**	,696**	1,000	,780**	,215**
	Sig. (2-tailed)	,000	,000	,000	,000	.	,000	,002
	N	210	210	210	210	210	210	210
SCE	Correlation Coefficient	,175*	,308**	,306**	,480**	,780**	1,000	-,005
	Sig. (2-tailed)	,011	,000	,000	,000	,000	.	,948
	N	210	210	210	210	210	210	210
CEE	Correlation Coefficient	,370**	,436**	,378**	,118	,215**	-,005	1,000
	Sig. (2-tailed)	,000	,000	,000	,089	,002	,948	.
	N	210	210	210	210	210	210	210

**. Correlation is significant at the 0,01 level (2-tailed)
*. Correlation is significant at the 0,05 level (2-tailed)

and in what way human capital efficiency, structural capital efficiency, and capital-employed efficiency determined the past (financial) and future (market) performance. The multiple regression equation applied in all of the regression models is as follows:

$$Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_p x_{ip} + \varepsilon_i ,$$
$$\text{for } i=1, 2, 3...n$$

In the presented model of multiple regression, Y_i is dependent variable, β_0, β_1, β_2 …β_p are regression coefficients, x_{i1}, x_{i2}... x_{ip} are independent variables, and ε_i represents the notation for the model deviations. The first regression model is presented in Table 5 and it sheds light on relationship between market-to-book ratio and relevant components of VAIC.

The results of the first regression model reveal that the model has medium validity since it can explain 22,2% of changes in dependent variable. In addition, the results of this regression indicate that human capital together with physical and financial capital has significant and positive impact on market performance. According to the results of the first regression model, the equation has the following elements:

Market performance = 0,597 + 0,085 x HCE + 0,29 x CEE +0,04 x Lev

Figures 4 and 5 display the slope of estimated regression curves for the first regression model. The curves represent only the statistically significant relationships. The conclusion is that financial and physical capital are more crucial determinants of market performance than human capital efficiency.

The second regression model, focused on establishing the relationship between return on equity and components of VAIC, is shown in Table 6. The model has R square of 0,853, which means that the model can describe 85,3% of changes in dependent variable.

In addition, the model validates the hypothesis that business performance (presented by return on equity) of Serbian listed companies is significantly influenced by VAIC, specifically by human and physical capital

Table 5: Regression model with market-to-book ratio as dependent variable

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,316[a]	,100	,087	,6024167	
2	,471[b]	,222	,199	,5641076	1,625

a. Predictors: (Constant), Leverage, Employees, Assets

b. Predictors: (Constant), Leverage, Employees, Assets, SCE, HCE, CEE

c. Dependent Variable: MB

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,597	,050		11,975	,000		
	Employees	1,847E-005	,000	,040	,475	,635	,621	1,609
	Assets	-6,604E-011	,000	-,063	-,753	,452	,621	1,610
	Leverage	,040	,008	,314	4,737	,000	,993	1,007
2	(Constant)	,335	,072		4,666	,000		
	Employees	-1,296E-005	,000	-,028	-,334	,738	,547	1,827
	Assets	-4,748E-011	,000	-,045	-,522	,602	,506	1,977
	Leverage	,017	,010	,135	1,687	,093	,600	1,667
	HCE	,085	,025	,226	3,401	,001	,869	1,150
	SCE	,002	,026	,005	,075	,941	,967	1,034
	CEE	,290	,071	,337	4,095	,000	,564	1,772

Figure 4: The relationship between market performance and human capital

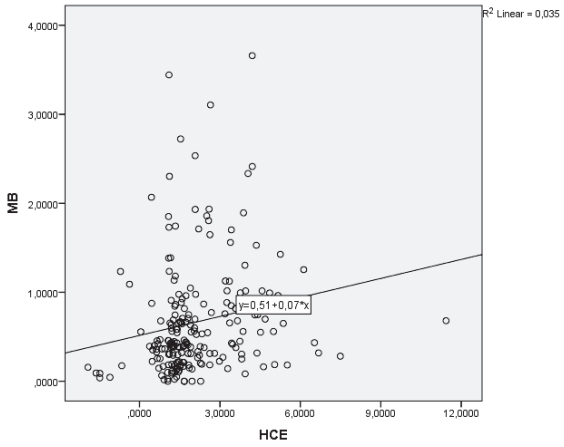
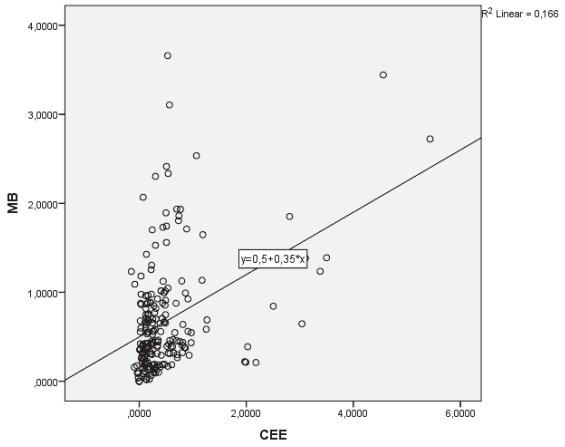


Figure 5: The relationship between market performance and capital employed



components. Therefore, we construct the second regression model as follows:

$$ROE = 0,153 + 0,024 \times HCE + 0,084 \times CEE + 0,0144 \times Assets - 0,125 \times Lev$$

Figures 6 and 7 present the slopes of estimated regression curves for individual independent variables in comparison to the dependent one. The conclusion is that financial and physical capital is slightly more important for return on equity than human capital efficiency, when observing separately.

Table 6: Regression model with ROE as dependent variable

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,919[a]	,844	,842	,2672369	
2	,923[b]	,853	,848	,2615952	1,984

a. Predictors: (Constant), Leverage, Employees, Assets

b. Predictors: (Constant), Leverage, Employees, Assets, SCE, HCE, CEE

c. Dependent Variable: ROE

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,153	,022		6,921	,000		
	Employees	3,808E-005	,000	,077	2,210	,028	,621	1,609
	Assets	9,995E-011	,000	,090	2,572	,011	,621	1,610
	Leverage	-,125	,004	-,918	-33,261	,000	,993	1,007
2	(Constant)	,080	,033		2,415	,017		
	Employees	2,862E-005	,000	,058	1,592	,113	,547	1,827
	Assets	1,071E-010	,000	,096	2,541	,012	,506	1,977
	Leverage	-,132	,005	-,968	-27,827	,000	,600	1,667
	HCE	,024	,012	,061	2,094	,038	,869	1,150
	SCE	-,006	,012	-,015	-,530	,597	,967	1,034
	CEE	,084	,033	-,092	2,553	,011	,564	1,772

a. Dependent Variable: ROE

Figure 6: The relationship between ROE and human capital

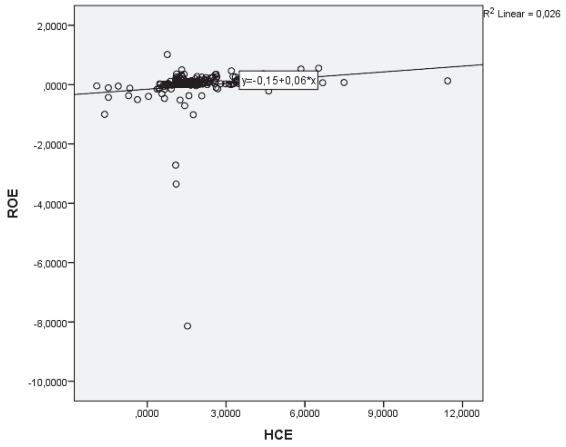


Figure 7: The relationship between ROE and capital employed

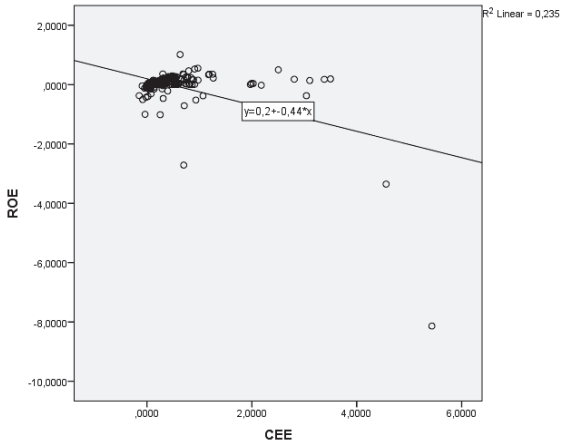


Table 7 depicts the results of the third regression model, which analyzes the impact of VAIC components on business performance presented by return on total assets of listed companies. Like the previous model, this regression model also shows that ROA is heavily influenced by human, physical, and financial components of VAIC. However, the regression model has medium validity since it can explain 26,1% of changes in the value of ROA.

The construction of the third regression model looks as follows:

ROA = 0,041 + 0,022 x HCE + 0,050 x CEE - 0,005 x Lev

Table 7: Regression model with ROA as dependent variable

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,244[a]	,060	,046	,1022147	
2	,511[b]	,261	,239	,0912620	1,780

a. Predictors: (Constant), Leverage, Employees, Assets

b. Predictors: (Constant), Leverage, Employees, Assets, SCE, HCE, CEE

c. Dependent Variable: ROA

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,041	,008		4,904	,000		
	Employees	4,372E-006	,000	,057	,663	,508	,621	1,609
	Assets	6,096E-012	,000	,035	,404	,687	,621	1,610
	Leverage	-,005	,001	-,236	-3,487	,001	,993	1,007
2	(Constant)	-,020	,012		-1,710	,089		
	Employees	5,069E-007	,000	,007	,081	,936	,547	1,827
	Assets	1,282E-012	,000	,007	,080	,936	,506	1,977
	Leverage	-,009	,002	-,410	-5,271	,000	,600	1,667
	HCE	,022	,004	,356	5,497	,000	,869	1,150
	SCE	,000	,004	,002	,035	,972	,967	1,034
	CEE	,050	,011	,349	4,352	,000	,564	1,772

a. Dependent Variable: ROA

Figure 8: Relationship between ROA and human capital

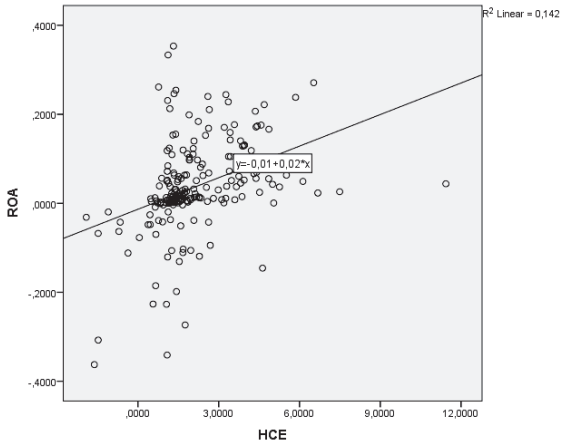
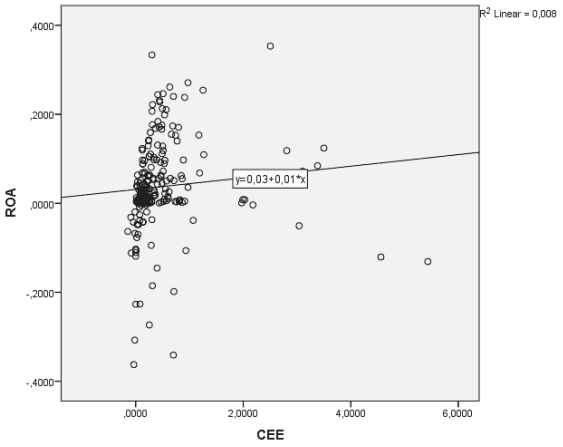


Figure 9: Relationship between ROA and capital employed



Figures 8 and 9 present the slopes of estimated regression curves for individual independent variables (HCE and CEE) in comparison to the dependent one (ROA). The conclusion is that financial and physical capital is far less important for return on assets than human capital efficiency.

The last regression model shows the nature of relationship between employee productivity and human, structural, and physical (with financial) performance (Table 8). The model manages to account for 23,6% of all the employee productivity alterations.

Table 8: Regression model with EP as dependent variable

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,161[a]	,026	,012	70536,9790481	
2	,486[b]	,236	,213	62925,6734007	2,067

a. Predictors: (Constant), Leverage, Employees, Assets

b. Predictors: (Constant), Leverage, Employees, Assets, SCE, HCE, CEE

c. Dependent Variable: EP

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1147,695	5838,449		-,197	,844		
	Employees	,717	4,548	,014	,158	,875	,621	1,609
	Assets	1,755E-005	,000	,149	1,712	,088	,621	1,610
	Leverage	-620,075	992,999	-,043	-,624	,533	,993	1,007
2	(Constant)	-44151,817	7997,979		-5,520	,000		
	Employees	3,006	4,324	,058	,695	,488	,547	1,827
	Assets	1,067E-006	,000	,009	,105	,916	,506	1,977
	Leverage	-839,169	1139,903	-,058	-,736	,462	,600	1,667
	HCE	20115,048	2799,258	,473	7,186	,000	,869	1,150
	SCE	-6487,307	2940,085	-,138	-2,207	,028	,967	1,034
	CEE	8834,692	7898,056	,091	1,119	,265	,564	1,772

a. Dependent Variable: EP

Figure 10: The relationship between EP and human capital

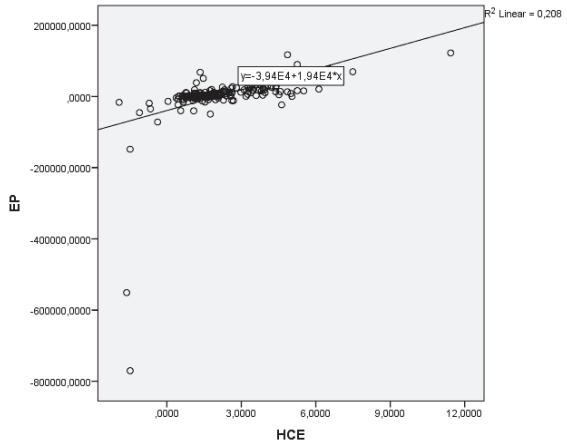
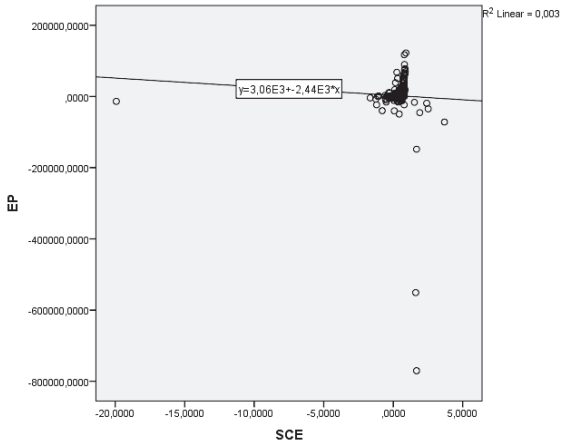


Figure 11: The relationship between EP and capital employed



Differently from the previous regression models, here the structural capital emerges as the determinant of employee productivity, together with human capital efficiency. Therefore, the employee productivity is affected by the investments in human capital. However, since the beta coefficient has negative value, the structural has significant but negative impact on productivity. This might mean that the listed companies do not invest properly in the elements of structural capital, or that these investments are not adequately capitalized. These conclusions lead to the following regression equation:

$$EP = -1147{,}695 + 20115{,}048 \times HCE - 6487{,}307 \times CEE$$

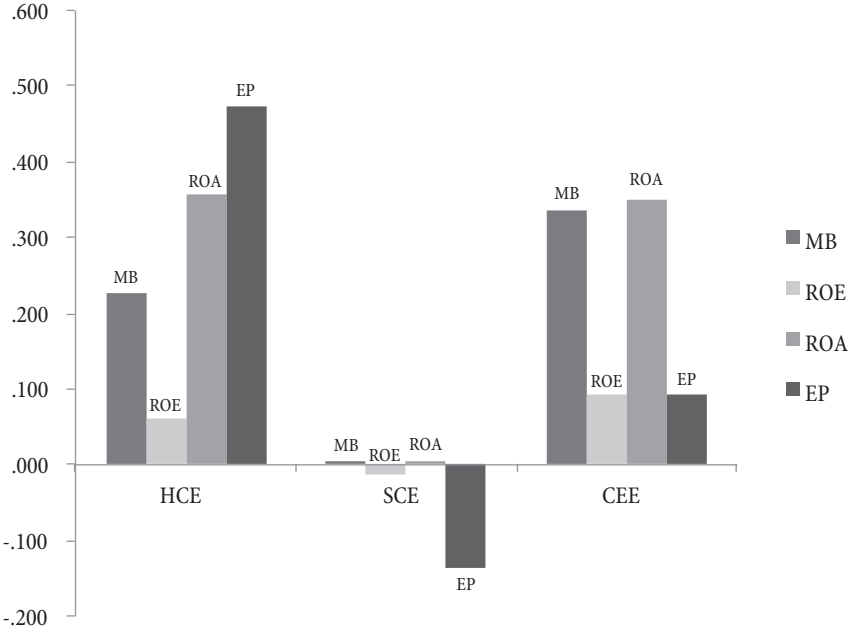
Figures 10 and 11 present the slopes of estimated regression curves for individual independent variables (HCE and SCE) in comparison to the dependent one (EP). The conclusion is that financial and physical capital is far less important for return on assets than human capital efficiency.

The results of the statistical analysis indicate that the research hypotheses are confirmed in all of the analyzed cases, except when it comes to the positive effect of structural capital on market performance. In addition, the structural capital component does not express any significant impact on financial performance as well, except when we analyze the employee productivity indicator.

Concluding remarks

In order to make adequate concluding remarks, we will make a brief comparison between research study undertaken among Serbian listed companies and similar studies worldwide. One such empirical study investigated the association between intellectual capital and corporate performance of companies listed on Malaysian stock exchange [19]. The study focused on discovering whether value creation efficiency, as measured by Value Added Intellectual Capital, could be explained by market valuation, profitability, and productivity. The findings revealed that these companies still depend very much on physical capital efficiency. The results also indicated that physical capital efficiency was the most significant variable related to profitability while human capital efficiency was of great importance in enhancing the productivity of the company. This study concluded that VAIC can explain profitability and productivity but fails to explain market valuation. Another study examined relationship between IC and organizational performance in firms in India [7]. The study revealed significant dependence of various organizational performance indicators on IC, especially on social capital (a form of structural capital), which includes knowledge tied up in relationships among employees, customers, suppliers, alliance partners and the like. This type of knowledge tends to lead to process and product innovations, better problem solving which tends to increase production and service delivery efficiencies as

Figure 12: The overview of VAIC impact on market and financial performance



well as customer satisfaction. Another study implemented by Calisir et al. [4] applied Value Added Intellectual Coefficient to compare listed companies on the Istanbul Stock Exchange (Turkey), in terms of intellectual capital efficiency and in terms of examining impact of VAIC and its components on company performance. The study revealed that as a whole, all of the companies in the sample had relatively higher human capital efficiency than structural and capital employed efficiencies. On the other side, the results of the study revealed that factors such as human capital efficiency, firm leverage, and firm size, predicted profitability well. Among them, human capital efficiency had the highest impact. In addition, capital employed efficiency was found to be a significant predictor of both productivity and return on equity, and the only determinant of market valuation was the firm size.

The results of the presented study implemented in Serbia, with the data from 42 companies listed on Belgrade Stock Exchange have several important conclusions. The information provided by Figure 12 illustrates these conclusions by addressing the market and financial performance dependence on various components of VAIC coefficient. The first obvious conclusion states that structural capital component represents the insignificant element of VAIC in terms of market performance and in terms of almost elements of financial performance. However, the structural capital efficiency tends to be significant when it comes to employee productivity, but this relationship is inverse, leading to conclusion that structural capital still does not nurture and support the everyday productivity of employees. This conclusion is important since companies could realize that their investments in elements of structural capital (such as customer databases, organizational structure, functional organization, procedures, rules of conduct and the like) are not fully capitalized through market and financial performance. The second important conclusion is that market performance (objectified through market-to-book ratio) is much more affected by the companies' financial and physical capital (presented by capital employed efficiency) than by human capital efficiency. However, the human capital efficiency still determines the productivity of employees in Serbia's listed companies. When it comes to financial performance, both capital employed and human capital are the important influencers, with capital employed efficiency being more significant one in case of return on equity and return on assets.

References

1. Andreou, A. N., Green, A., & Stankosky, M. (2007). A framework of intangible valuation areas and antecedents. *Journal of Intellectual Capital, 8(1),* 52-75.

2. Bontis, N. (1998). Intellectual capital - an exploratory study that develops measures and models. *Management Decision, 36(2),* 63-76.
3. Bontis, N., Keow, W. C.C., &Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital, 1(1)*, 85-100.
4. Calisir, F., Gumussoy, C. A., Bayraktaroglu, A. E., & Deniz, E. (2010). Intellectual capital in the quoted Turkish ITC sector. *Journal of Intellectual Capital, 11(4),* 537-553.
5. Chen, M., Cheng, S., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital, 6(2),* 159-176.
6. Chiu, S. K. W., Chan, K. H., & Wu, W. W. Y. (2011). Charting intellectual capital performance of the gateway to China. *Journal of Intellectual Capital, 12(2),* 249-276.
7. Choudhury, J., & Vanivihar, B. (2010). Performance impact of intellectual capital: a study of Indian IT sector. *International Journal of Business and Management, 5(9),* 72-80.
8. Clarke, M., Seng, D., & Whiting, R. H. (2011). Intellectual capital and firm performance in Australia. *Journal of Intellectual Capital, 12(4),* 505-530.
9. Corrado, C., Hulten, C., & Sichel, D. (2006).*Intangible Capital and Economic Growth*, Finance and Economics Discussion Series No. 24. Washington, DC: The Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board.
10. Damodaran, A. (2006). *Damodaran on Valuation - Security Analysis for Investment and Corporate Finance*. New Jersey: John Wiley & Sons, Inc.
11. Daum, J. H. (2002). *Intangible assets and value creation*. Chichester: Wiley.
12. Davenport, T. H., & Prusak, L. (1997). *Working knowledge - How organizations manage what they know*. Boston, MA: Harvard Business School Press.
13. Diez, J. M., Ochoa, M. L., Prieto, M. B., & Santidrian, A. (2010). Intellectual capital and value creation in Spanish firms. *Journal of Intellectual Capital, 11(3),* 348-367.
14. Dženopoljac, V. (2013). *The impact of firms' intangible assets on value creation process* (Unpublished PhD thesis). Kragujevac: University of Kragujevac, Faculty of Economics.
15. Edvinsson, L. (1997). Developing intellectual capital at Skandia. *Long Range Planning, 30(3),* 320-331.
16. Edvinsson, L. (2002).*Corporate longitude – discover your true position in the knowledge economy*. London: Pearson Education Limited.
17. Erickson, S.,& Rothberg, H. (2009). Intellectual capital in tech industries: a longitudinal study. *Electronic Journal of Knowledge Management, 7(5),* 559–566.
18. Firer, S. & Williams, M. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital, 4(3),* 348-360.
19. Gan, K., Saleh, Z. (2008). Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence. *Asian Journal of Business and Accounting, 1(1),* 113-130.
20. Goh, P. C. (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual Capital, 6(3),* 385-396.
21. Hall, R. (1992). The strategic analysis of intangible resources. *Strategic Management Journal,* 13(2), 135-144.
22. Hao, J. H., Manole, V., & Van Ark, B. (2009). Intangible capital and growth – an international comparison. Project title: Competitiveness, Innovation and Intangible Investments in Europe (7th Framework Program). Retrieved from http://www.ralfmartin.me.uk/pub/CoInvest/CoinvestProjects/D8_coinvest_217512 .pdf, accessed 16 June 2012
23. Hsu, Y. H., & Fang, W. (2009). Intellectual capital and new product development performance: The mediating role of organizational learning capability. *Technological Forecasting and Social Change, 76(5),* 664–677.
24. Huang, Y. C., & Wu, Y. C. J. (2010). Intellectual capital and knowledge productivity: The Taiwan biotech industry. *Management Decision, 48(4)*, 580-599.
25. Inkinen, H. (2015). Review of empirical research on intellectual capital and firm performance. *Journal of Intellectual Capital, 16(3),* 518-565.
26. Janošević, S. (2009). Nematerijalna aktiva i stvaranje vrednosti, *Ekonomika preduzeća, November-December,* 399-414.
27. Janošević, S., & Dženopoljac, V. (2011). Intellectual capital and financial performance of Serbian companies in the real sector. *SAE Journal of Business Economics and Management, 59(7-8),* 352-366.
28. Janošević, S., & Dženopoljac, V. (2014). The relevance of intellectual capital in Serbian ICT industry. *SAE Journal of Business Economics and Management, November-December,* 348-366.
29. Janošević, S., Dženopoljac, V., & Dimitrijević, S. (2013): Analysis of intellectual capital practices in Serbia. *Actual Problems of Economics, 6,* 548-562.
30. Kujansivu, P., & Lönnqvist, A. (2007). Investigating the value and efficiency of intellectual capital. *Journal of Intellectual Capital, 8(2),* 272–287.
31. Laing, G., Dunn, J., & Hughes-Lucas, S. (2010). Applying the VAICTM model to Australian hotels. *Journal of Intellectual Capital, 11(3),* 269-283.
32. Lev, B. (2001). *Intangibles: Management, measurement, and reporting*. Washington, D.C., USA: Brookings Institution Press.
33. Maditinos, D., Chatzoudes, D., Tsairidis, C., & Therious, G. (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of Intellectual Capital, 12(1),* 132-151.
34. MERITUM (2002). *Guidelines for managing and reporting on intangibles, measuring intangibles to understand and improve innovation management*. Madrid, Spain.
35. Mouritsen, J., Bukh, P. N., & Marr, B. (2004). Reporting on intellectual capital: why, what and how? *Measuring Business Excellence, 8(1),* 46-54.
36. Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance - Empirical evidence from the ASEAN. *Journal of Intellectual Capital, 16(3),* 1469-1930.
37. OECD (2011).*New sources of growth: intangible assets*. Retrieved from: http://www.oecd.org/dataoecd/60/40/46349020.pdf, accessed 16 June 2012.
38. Petty, R., & Guthrie, J. (2000). Intellectual capital literature review: measurement, reporting and management. *Journal of Intellectual Capital, 1(2),* 155–176.

39. Seleim, A., Ashour, A., & Bontis, N. (2007). Human capital and organizational performance: a study of Egyptian software companies. *Management Decision, 45(4),* 789-801.
40. Stahle, P., Stahle, S., & Aho, S. (2011). Value added intellectual coefficient (VAIC): a critical analysis. *Journal of Intellectual Capital, 12(4),* 531-551.
41. Stewart, T. A. (1998). *Intellectual capital - The new wealth of organizations*. London, UK: Nicolas Brealey Publishing.
42. Sullivan, P. H. (2000). *Value-driven intellectual capital: How to convert intangible corporate assets into market value*. New York, USA: Wiley.
43. Tan, H. P., Plowman, D. & Hancock, P. (2007). Intellectual capital and financial returns of companies. *Journal of Intellectual Capital, 8(1*), 76-95.
44. World Bank (2005). *Where is the wealth of nations? Measuring capital for the 21st century.* Retrieved from: https://openknowledge.worldbank.org/handle/10986/7505 Accessed 13 December 2015.
45. Young, C. S., Su, H. Y., Fang, S.C.,& Fang, S.R. (2009). Cross-country comparison of intellectual capital performance of commercial banks in Asian economics. *The Service Industries Journal, 29(11*), 1565-1579.
46. Zéghal, D. & Maaloul, A. (2010). Analyzing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual Capital*, *11(1),* 39-60.

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DEVELOPMENT AND SPECIFIC IT SOLUTIONS IN PROCUREMENT MANAGEMENT: THE CASE OF SERBIA

Razvoj i specifična IT rešenja pri upravljanju nabavkom - slučaj Srbije

Abstract

Modern IT solutions are becoming involved more and more in a variety of contemporary company business segments. Like other functions within the supply chain, managing procurement activities is becoming unthinkable without an adequate support of a certain software. That is precisely the starting point within the analysis in this paper, by which we want to test the influence of development and the usage of specific IT solutions on procurement management on the precise example of companies in Serbia. The entire paper is divided into two parts. Within the first part, we establish a theoretical review of key terms and elements connected to the usage of IT solutions in procurement. The focus in this part of the paper is the analysis of specific procurement software, both internal and external. The second part of the paper is dedicated to the empirical research connected to the main topic carried out for companies in Serbia. The aim of the paper is to empirically test the theoretical setting of this issue, and to find practical specifics which shall allow us see how the question of IT support in procurement is treated within the companies in Serbia and is there, and in what degree, space for its improvement.

Key words: *IT, procurement management, internal procurement software, external procurement software, Serbia*

Sažetak

Savremena IT rešenja postaju sve više uključena u brojne segmente poslovanja preduzeća današnjice. Poput ostalih funkcija unutar lanca snabdevanja, tako i upravljanje aktivnostima nabavke postaje nezamislivo bez adekvatne podrške odgovarajućih softvera. To je upravo polazište pri analizi u radu, kojom se želi ispitati uticaj razvoja i primene specifičnih IT rešenja na upravljanje nabavkom na konkretnom primeru preduzeća u Srbiji. Celokupan rad podeljen je u dva dela. U okviru prve celine, vrši se teorijski pregled ključnih pojmova i elemenata vezanih za primenu IT rešenja u nabavci. Fokus u ovom delu rada je na analizi specifičnih softvera nabavke, internog i eksternog tipa. Druga celina rada posvećena je empirijskom istraživanju vezanom za osnovnu temu, koje je sprovedeno za preduzeća u Srbiji. Cilj rada je da empirijskom proverom testiramo teorijske postavke ove problematike, kao i da pronađemo određene praktične specifičnosti koje će nam omogućiti da vidimo kako se pitanje IT podrške u nabavci tretira kod preduzeća u Srbiji i da li i u kojoj meri postoji prostor za njegovo unapređenje.

Ključne reči: *informacione tehnologije, upravljanje nabavkom, interni informacioni softver u nabavci, eksterni informacioni softver u nabavci, Srbija*

Introduction

We are witnesses that everyday advances and development within the field of creating sophisticated software and new solutions in information technologies (or shortly IT) are changing thoroughly the way people live, but also the way they do business. Besides the general impact on business, the mentioned advances have a specially significant influence on procurement, but also on supply chains, as a whole. Since we are talking about an enormous field for potential analysis, we must conclude that a serious number of papers and studies could be dedicated to this issue. However, bearing in mind the primary aim of this paper, we shall try to respond to ambitious requests set by this issue in the most systematic and thorough way. The questions we specifically address in the theoretical part of our paper refer to: the evolution of supply chains and procurement under the influence of IT solutions; internal and external procurement software. After the theoretical review of these questions, we perform a detailed analysis of the carried out empirical research within companies in Serbia, dealing with the specifics of IT solutions in managing procurement.

IT development and its impact on supply chain and procurement evolution

During the contemporary, turbulent business conditions, procurement managers expect effective solutions for business issues. However, organizations have not always been equipped with sophisticated software systems we know of today. See Table 1 for the demonstration of the evolution of procurement, but also the entire supply chain under the influence of IT solutions, starting from the 70's of the XX century up to now.

The early use of information technologies is associated with the field of finance and accounting. However, as can be seen in table 1, at the beginning of the 70's of the XX century IT solutions found their wider usage in procurement operations and distribution. Companies started implementing systems such as Materials resource planning (MRP) and Distribution requirements planning (DRP). These systems were used to improve planning and supply control in manufacturing (MRP systems) and distribution (DRP systems). Since these systems were primarily internally oriented, it was evident that the implementation of electronic base with suppliers and clients was necessary. Led by the efforts of sectors such as railways or fast moving consumer goods, a special system of Electronic data interchange (EDI) was developed as a solution to transfer information to mentioned groups during the 80's and the 90's of the XX century. Although the usage of early IT solutions brought about the efficiency improvements of procurement and the entire supply chain, intensive competition in the last two decades of the XX century forced companies to implement a detailed re-engineering of their business processes in order to become even more agile. During this period almost every big company carried out some kind of restructuring, while thousands of workers and managers were laid off,

Table 1: Evolution of procurement and the entire supply chain under the influence of IT solutions

IT solution	Time period	Focus	Primary system usage
MRP-DRP	70's of the XX century	Internal/supply management	Supply planning and control; efficient distribution orientation
EDI	80's of the XX century	External	Electronic order transfer
ERP	90's of the XX century	Internal	Integration of all business functions by processing and reporting
SRM and CRM	2000's	External	Management and interface control between buyers, suppliers and clients
Collaboration	2000's	External-internal	Introducing CPFR system which allows constant communication within the supply chain using RFID and POS systems
Advanced supply analytics and social networks	Intensively since 2009 up to now	External-internal	Supply analytics and computerized negotiations; Relationship building using social networks

Source: [6, p. 9]

in order to increase productivity and diminish costs. Simultaneously with this trend, companies have intensified the usage of IT solutions in order to surpass the lack of laid-off workers. So, during the 90's of the XX century the revolutionary enterprise resource planning systems (ERP systems) for company resource management were introduced. These systems have not lost their popularity till the present day. ERP systems have an integrating role of all business functions of planning and processing, as well as the task to avoid any interruption in data transfer, in order for the business decision to be better, and business more effective and efficient. The idea of this solution is that all company parts should have access and work with the same data. Precisely the procurement managers were in the center of this trend, and their main challenge was to develop precise data bases in order to improve the process of decision making [6, p. 12-16].

The following development step referred to the diffusion of systems based on the internet. Unfortunately, ERP systems were mainly of internal character and were missing the link with suppliers and clients. Surpassing this "communication gap" was enabled with the wider usage of the internet. Due to low costs, software providers developed systems which connected all mentioned entities. The connection with suppliers can be seen in the development of the supplier relationship management systems (SRM systems), while the relationship with the clients can be seen in the development of customer relationship management systems (CRM systems). SRM systems have the goal to strategically plan for, and manage all interactions with third party organizations that supply goods and/or services to an organization in order to maximize the value of those interactions. CRM systems refer to the approach to managing a company's interaction with current and future customers.

Today, at the middle of the second decade of the XXI century, software solutions are aimed to establish systems of collaborative planning, forecasting and replenishment (CPFR systems) between partners in procurement and entire supply chains, by using systems connected to the point of sales (POS systems), then systems of radio frequency identification (RFID systems) and similar systems for information diffusion. Finally, there are even newer applications such as software for following the product life cycle, auction optimization, as well as computerized models for negotiations, which shall be available to staff engaged in the procurement of the future. These very powerful tools shall be connected by networked mobile systems, devices such as IPad or IPod or powerful cell phones such as IPhone, Blackberry etc. Using such technical solutions, procurement managers can have an uninterrupted approach to information, at literary any moment. Connecting using social networks, blogs or cloud computing increases the availability of information and significantly improves partner relationships among different entities, which are oriented to cooperate [12, pp. 10-16].

Having explained the evolution path of procurement and the entire supply chain under the influence of IT solutions, it is necessary to also mention the *factors* which have helped the IT to make such an advance in this area. Summing up a greater number of relevant influences, see Table 2 for a summarized review of key factors which have contributed to the present situation.

Internal procurement software

The division onto internal and external types of information software follows the logic stated while analyzing the evolution of IT solutions, and their influence onto company procurement. Therefore, *internal software forms* refer to

Table 2: Relevant accelerating factors of IT usage in procurement management

Internal and external strategic integration
Globalization and communication
Data and information management
New business processes
Changes in legal systems
Strategic cost management

Source: [7, pp. 111-113]

solutions which are used within a company and are often customized (but that is not a permanent rule) to respond to its specific demands. If customization is used to a software solution, than this kind of software is usually marked as an *in-house* software and is thus very expensive to develop. Therefore, such solutions are exclusively used by more developed companies with sufficient funds, which can support high development prices. On the other hand, *external forms of software* serve to connect a greater number of entities, i.e. companies which naturally develop closer business cooperation. The precondition of their usage is the information empowerment and compatibility of every entity.

The most famous representatives of internal software which serve to manage resources of all company parts, including procurement, are certainly the ERP systems, which we have already mentioned. Due to their complexity and high importance, the focus of our analysis in this part shall, in a great deal, be on these software solutions. ERP software unites employees from different parts of the company, directing them to work together. Besides tracking and human resource connecting, the focus is also on processes, materials, equipment, money and technology, securing in that way the support for decision making. These elements are grouped by interfaces called *modules,* which represent specific parts or functions of a company.

ERP software can be designed in different forms, but they are usually developed with the focus on one of the four primary business processes: [4]

- *Product sales* (with the module for managing customer orders);
- *Production* (with the modules for execution and operation planning);
- *Supply* (with the module for procurement);
- *Financial transactions* (with the module for financial management).

ERP software facilitate the integration of mentioned processes by a unique data base for clients, products and suppliers. The information are inserted only once, using a standard template, diminishing the chance to insert wrong or semi-complete inputs.

Although it significantly helps business, the very task to implement ERP systems has often shown in practice as "strategically capital and over-demanding" for the company. The basic problem with the implementation of ERP systems is their very intrinsic complexity, so the managers must have detailed information on every process, before the implementation starts. The best way to start the process is to use some form of *process charts*. [14, p. 78] A process chart is a graphical and symbolic representation of the processing activities performed on the work piece. Despite its complexity, the process of implementing ERP software can generally be divided into four phases or steps: [14, pp. 80-82]

- *Determining current processes*. Teams for the implementation of ERP software document all current processes by using a greater number of process charts and similar tools.
- *Devising improved processes.* Teams must have a clear picture of current system lacks, in order to design its improvements.
- *Designing the ERP system/software*. It is often an iterative process, within which implementation teams collaborate in order to respond to a great number of demands.
- *Solving any issues which occur during implementation and final system starting.* The obvious dangers which occur while transferring from the old to the new ERP system are usually connected to the lack of company readiness to adjust to changes. That can result in difficult software functioning when specific activities are performed.

Concentrating on procurement, we point out that the main precondition to use ERP software within this set of business activities is to have a reliable *data base*. The mentioned data bases are called *data warehouses* in the advanced version. The difference between these two terms lies in the fact that data warehouses represent consolidated bases separated from other bases in the organization [3, pp. 242-246]. The specifics of data bases used to coordinate activities of procurement refer to special information which are inserted in them.

See Table 3 for some typical information contained within the data bases important for procurement activities.

Finally, besides integral software solutions which cover the system as a whole, where we have ERP software

Table 3: Data most often found in data bases needed for procurement management

A unique identification number of the part/resource which is used within a company
Detailed specifications and demands concerning every company resource
Basic data on the supplier (name, address, company headquarters, tax identification number, etc.)
Information on previous procurement
Detailed production plans
Structured resource list necessary to make every product
Foreseen demand for every company product
Position and state of product on stock
Forthcoming deliveries and order review

Source: [3, pp. 248-251]

as the main representative, it is important to point out the role of individual tools such as the user-friendly software of the MS Office package, firstly Excel. However, no tool, not even Excel, has such a comprehensive approach to management, of not just procurement but all company activities, as does the ERP software. Therefore, in our analysis this software is dominantly positioned, with full justification.

External procurement software

Up to now, we have mainly been analyzing software procurement elements with internal usage, i.e the usage within an individual company. However, the procurement activities can not only be limited to one entity, i.e. company but in its everyday functioning they demand a practically constant contact with external partners. Thereby, we refer to activities such as: order specification, supplier terms arrangement, production timetable scheduling, delivery documenting, as well as any other activity which demands communication with an external entity. Traditionally, information exchange has been performing slowly and imprecise due to mistakes while processing data, followed by over-exceeding in using time of the employees, while the entire process of communication was rather expensive and unpredictable. Today, the advances within the field of information technology have significantly made quicker and easier the process of external communication, especially with the development of the internet and its possibilities.

If the milestone in the development of internal procurement software is said to be the usage of ERP systems, than the usage of EDI technology is the same thing, just in external communication. Therefore, we dedicate our full attention to EDI technology in this part of the analysis. EDI technology can be defined as a communication standard, which assumes that the users on remote locations, using different systems, can transfer without problems information between different computers. Despite being introduced in the 80's of the XX century, we can clearly say that EDI has experienced its full affirmation only today. Key components of the EDI system assume: [5, pp. 66-80]

- Standard form (the so-called EDI standards)- including the basic rules of formatting, agreed between network users;
- The capability to translate (the so-called EDI software)- converting data bases specific for the company into standard EDI transfer format;
- The broadcasting service (the so-called EDI network)- which has the task to transfer documents. This way a bond is formed between two computers, which can even be a telephone line, in the simplest form.

Continuing, we shall try to explain through a practical example a specific use of EDI technology in the activities of company procurement. When the buyer and the supplier are to connect using EDI technology there occurs a typical procedure of activities. This procedure starts, when the supply management system of the acquiring company follows the material usage by RFID or similar technology. When the supplies of certain goods fall beneath a pre-defined level, the computer recognizes the need to order additional goods and automatically fills out the order form. EDI software for translating converts the order into the EDI format and sends it to the supplier. The supplier

receives an order on its computer, and converts it into its EDI format, while the buyer is automatically sent an order receipt. The data on goods order is sent to the supplier, i.e. to its various folders: the accounting folder, the supply folder, the invoice folder etc. After the supplier unifies its delivery, it generates the needed, accompanying documents and sends them to the buyer. When the goods reach the buyer and it accepts it, the receipt is placed into the folder with confirmed arrived orders. Based on the buyer confirmation, the supplier sends an invoice, which is converted into its format and stored along with the receipt and the order. Under the assumption that there are no additional data, a payment permit is electronically generated, and the payment is carried out using the money transfer from the buyer's account to the supplier's account. In the last instance, the supplier receives generated information that the goods have been paid for, while the folder with the given transaction closes at that instant [5, pp. 81-83].

At the beginning of this part of the analysis we have pointed out the fact that even though the EDI technology has been in use since the 80's of the XX century, it has gained its full affirmation just in the beginning of the second decade of the XXI century. The reason for this is that the beginning modes of EDI system demanded a much greater company investment in the corresponding hardware and software. This has been a particularly demanding request for small suppliers which perceived this expense as a great one. Therefore, EDI was not considered to be an interactive system. Today, with the serious presence of the internet in the lives and business of people, all has been changed. The advantages brought by the expansion of the internet refer to omnipresence, low costs and almost a universal character concerning compatibility. In order for the advantages of the internet to live up to their full potential, companies usually obtain e-procurement tools, used by buyers in order to harmonize the processes and increase technology efficiency [2, p. 99].

Specific IT solutions in procurement management: The case of Serbia

Several times we have pointed out that the adequate management of the logistics segment of procurement activities is becoming more and more a "powerful weapon" in the hands of company management in achieving the desired competitive advantage on the market. Numerous examples of globally successful companies only confirm this statement. Therefore, it would be logical to conclude that the company management in Serbia correctly perceives the total procurement importance, and the importance of its adequate management. Namely, regardless of the relatively unfavorable economic situation within the country, due to the wide availability of global knowledge which is being virally distributed, company management in Serbia should be aware of these trends and use the advantages of adequate procurement management, among which is certainly the use of modern IT developments. However, in a great extent that is not the case.

In some of our earlier papers, we have pointed out that, unfortunately, a great number of companies in Serbia still does not realize enough the potential of adequate management and procurement activity optimization and mostly regards it through the specter of operative importance [11, pp. 133-142], [1, pp. 171-184]. Of course, that is not the case with all companies, but the impression is that the number of positive examples is still small to make a conclusion that there is a "critical mass" which would value procurement adequately. Mentioned, earlier performed analyses, have dominantly relied on available, secondary data, due to a justified impossibility to realize the research at the given moment in another form. Therefore, a need arose to carry out a primary research of the present state concerning this issue, with the focus on IT solutions given in the form of procurement software. Precisely, that was the starting point while formulating the total idea concerning the empirical research presented in the following part of the paper.

Research methodology

The subject of the empirical research was a detailed analysis of the current way IT support is organized and carried out for the procurement activities within companies doing business in Serbia. The mentioned research aimed to determine the way Serbian companies organized procurement activities concerning IT solutions, i.e. what was the information support to procurement activities.

Besides the numerous useful information about the status and treatment of IT activities, while managing procurement within Serbian companies, the mentioned empirical research also aimed to test the basic hypothesis, which was our starting point:

H1: *In case of using software packages as information support to procurement activities in Serbian companies, generic software is more used by small companies, while the in-house software has big companies as predominant users.*

The hypothesis set in this manner was based on the previously stated theoretical explanation of generic/in-house software and their specifics concerning the price demands. Gathering data for the empirical research on the specifics of IT solutions while managing procurement in Serbian companies was carried out using the *survey method*. Namely, for the needs of research and gathering data a special, adjusted questionnaire was formed, set on a link of an adequate internet page. See Table 4 for an example of statements used in the research survey.

The link with the questionnaire was distributed on-line to the e-mail addresses of chosen convenient sample members, formed from professionals exclusively or at least dominantly involved in procurement activities within the companies which do business in Serbia. Involvement in procurement activities was the main criterion for forming the used convenient sample. The dominant, and not exclusive involvement in the procurement activities arose only in justified cases (for example, when the company was too small to have procurement activities as a separate group). Besides the questionnaire, a cover letter was also sent explaining the way the questionnaire should be filled out. The sample members were asked to read with attention the statements in the questionnaire, and based on their own opinion, to express the degree in which they agreed/disagreed with each of those statements. The degree of agreement/disagreement was measured by a classical five-degree Likert scale, where the sample members had available answers from 1 to 5 for every statement. For every statement the sample members had to click on one of the offered numbers, while the interpretation of the alternative answers was the following: *I completely disagree* (1); *I partially disagree* (2); *I am not sure* (3); *I partially agree* (4); *I completely agree* (5). Besides the answers connected to the statements, it was necessary for every sample member to fill in the general data on his/her company (the size and general business area) as well as personal data (gender, level of education, age, years of work, type of job engagement and the company managerial level) given in the form of standard offered options. While creating the questionnaire in the application *Google disk,* an option was set that the questionnaire could not be sent back unless completely filled out. In that manner, we have achieved a significant effect- all filled out and sent questionnaires contained all the answers, so the issue of missing data which would cause problems in the following phase of the statistical analysis of the obtained results was surpassed. The data obtained using the mentioned on-line survey were used both to test the basic hypothesis of the paper and also to perform a wider analysis of procurement treatment by companies in Serbia.

The following step in the analysis was to implement the chosen statistical methods and techniques onto

Table 4: The example of the used statements in the questionnaire aimed at researching the IT support in procurement management

d1	In my company, as an assistance in the realization of the procurement activities, we use a specific software (*Excel, ERP etc.).*	1	2	3	4	5
d2	The software used in my company to realize procurement activities can be used without modifications in other companies as well.	1	2	3	4	5
d3	The software used in my company to realize procurement activities has been ordered and designed especially for the needs of my company.	1	2	3	4	5
d4	My company mutually obtains and uses software for aiding in performing procurement activities with some other company.	1	2	3	4	5
d5	My company regularly invests in the modernization of existent and the procurement of new software solutions in order to increase efficiency in the realization of the procurement activities.	1	2	3	4	5
d6	The usage of software allows my company to monitor procurement costs and control them.	1	2	3	4	5

collected data. Of course, before that we performed the coding, categorization and systematization of collected data. The stated activities were performed using a specialized statistical software *Statistical Package for Social Sciences (SPSS),* version 22.0 [8]. The first analysis referred to the structure and specifics of the very sample, according to company size and general business area, as well as according to gender, level of education, age, years of work, type of job engagement and the company managerial level of the sample members. In order to test and confirm the reliability of the measuring scale given within the questionnaire, we used the Cronbach's Alpha coefficient [9]. Testing this coefficient gave us the value of 0.721, which confirmed that the questionnaire was a completely reliable instrument. After this, we carried out the second analysis- the descriptive statistical analysis. To be precise, we tested the variable (statement) expressiveness given in the survey by the measures of central tendency (the mean) and the measures of dispersion (standard deviation). Finally, since the next step in the analysis assumed the usage of a chosen, non-parametric test, it was first necessary to determine whether its usage was needed. Besides the sample size, the distribution normality is one of the determining factors when selecting a statistical test (parametric or non-parametric). Therefore, we tested the normality using *Kolmogorov-Smirnov* test [13]. Casting away the assumption on distribution normality for the answers obtained to given statements needed to test the set hypothesis, and due to a relatively small sample size (n=52) conditions were created to use a non-parametric statistical test. Finally, we used the Spearman test for the basic hypothesis testing [10]. For testing the stated hypothesis we used the following two statements:

d2	The software used in my company to realize procurement activities can be used without modifications in other companies as well.
d3	The software used in my company to realize procurement activities has been ordered and designed especially for the needs of my company.

For the mentioned statements we tested the interdependence with the variable *company size* (small/big). The results of this test are given in the following part of the paper dealing with the integral empirical research results.

The research was carried out during a period of one month, from 30th September 2014 until 30th October 2014 by sending a request by e-mail to potential participants to fill out the on-line questionnaire, which we have already explained. This period was estimated as convenient since the majority of employees by that moment had already finished with their annual holidays, so the possibility for them to be on the job was bigger, and also the possibility to answer the questionnaire.

During that period, with the time space of 10 days, twice in total, potential participants were sent a reminder in form of an e-mail to fill out the questionnaire. The questionnaire was sent to e-mail addresses of 96 companies, i.e. 96 employees of those companies. Those e-mail addresses are the addresses of particular individuals which are exclusively, or at least dominantly, in charge of procurement activities. The needed e-mail addresses were obtained by desk research: searching through business social networks (for example *linkedin*), browsing internet presentation of company sites and, in a minor part, by personal contact. Since the research focused on the judgement of the current state of a specific procurement aspect in those companies, it was sufficient for every company to have one respondent which deals with procurement more or less dominantly. In order to secure company differentiation within the sample, a request for filling out the questionnaire was sent to the e-mail addresses of companies with a wide specter of general business area. No economic branch, as part of the sent questionnaires, nor in the sample, is present more than around 15%, which secures that no business area has a dominant influence and in that way disturbs the correctness of the conclusions.

Research results

Out of 96 companies (individuals) which were sent the link with the questionnaire via e-mail, 52 of them responded, which means that the feedback was 54% of companies (individuals). That is absolutely considered a high response rate with the realization of similar on-line research. All companies in which the sample members work, except one which has monetary intermediation as a general business area, belong to the private sector.

Table 5: The sample structure according to gender, age, level of education and the years of work

Characteristics of analysis		Frequency	% of the sample	% cumulative
Gender	male	22	42	42
	female	30	58	100
	Total	*52*	*100*	-
Age	18-25	2	4	4
	26-35	34	65	69
	36-45	7	13	82
	46-55	5	10	92
	more than 55 years of life	4	8	100
	Total	*52*	*100*	-
Level of education	Secondary school	9	17	17
	High school	4	8	25
	BSc studies	24	46	71
	Msc studies	15	29	100
	Total	*52*	*100*	-
Years of work	Up to 2 years	13	25	25
	From 3 to 5 years	15	29	54
	From 6 to 15 years	10	19	73
	From 16 to 25 years	7	13	86
	From 26 to 30 years	4	8	94
	31 years and more	3	6	100
	Total	*52*	*100*	-

If we treat the aspect of *company size* from which the sample members come from, we can conclude that the sample includes 15 big companies (or 29% of the sample), 17 middle companies (or 33% of the sample) and 20 small companies (or 38% of the sample). If the *general business area* is analyzed, we can conclude that the sample includes 17 production companies (or 33% of the sample) and 35 service companies (or the 67% of the sample). Focusing on the characteristics of the very participants in the sample, see Table 5 where we jointly present data concerning their *gender, age, level of education and years of work*.

For the review of the analyzed sample structure according to *type of job engagement and the company managerial level* see Table 6.

The results of the descriptive statistical analysis of the sample are given within Table 7.

Analyzing the survey questions, we can see that the statement d1 had the biggest expressiveness (M=4,42), followed by the statement d6 (M=4,13), while the least expressiveness was noted for the statement d4 (M=1,73). The interpretation of such shown expressiveness goes as follows: there was the highest concordance degree between

Table 6: The sample structure according to type of job engagement and the company managerial level

Characteristics of analysis		Frequency	% of the sample	% cumulative
Type of job engagement	Procurement activities only	29	56	56
	Procurement but also other activities	23	44	100
	Total	*52*	*100*	-
The company managerial level	First line manager	22	42	42
	Middle manager	21	41	83
	Top manager	9	17	100
	Total	*52*	*100*	-

Table 7: Descriptive statistical analysis for the given sample

Statements	N	Min	Max	M	Sd
d1- In my company, as an assistance in the realization of the procurement activities, we use a specific software (*Excel, ERP etc.).*	52	1.00	5.00	4.4231	1.09089
d2- The software used in my company to realize procurement activities can be used without modifications in other companies as well.	52	1.00	5.00	3.5000	1.35038
d3- The software used in my company to realize procurement activities has been ordered and designed especially for the needs of my company.	52	1.00	5.00	2.7885	1.49950
d4- My company mutually obtains and uses software for aiding in performing procurement activities with some other company.	52	1.00	5.00	1.7308	1.13958
d5- My company regularly invests in the modernization of existent and the procurement of new software solutions in order to increase efficiency in the realization of the procurement activities.	52	1.00	5.00	3.2115	1.49950
d6- The usage of software allows my company to follow procurement costs and control them.	52	1.00	5.00	4.1346	1.18865

N-number of sample members, Min- minimum, Max-maximum, M-mean, Sd- standard deviation

the participants about the fact that certain software were used as help in the process of procurement activity realization and that these software were useful since they enabled tracing and control of procurement costs. That was the situation with the majority of companies of the sample members. On the other hand, the lowest concordance degree was achieved concerning the issue of procurement software supply and its usage within some other company, which means that this activity in the majority of companies of the sample members was still performed individually.

Spearman test was used as a basis to test the main paper hypothesis. In order to test this hypothesis it was necessary to carry out a correlation analysis using the Spearman coefficient. This coefficient was used to measure the degree of rank correlation of the two variables (statements). Since it was our primary interest to determine the relationship between the variables (statements) d2 *The software used in my company to realize procurement activities can be used without modifications in other companies as well* and d3 *The software used in my company to realize procurement activities has been ordered and designed especially for the needs of my company* with the variable *company size,* this coefficient imposed itself as one of the better solutions of this dilemma. Namely, company size represents a variable measured on an ordinary scale, and the good feature of the Spearman coefficient is that it can only be applied to categorical variables (differing from Pearson coefficient, which is applicable only to metric variables). For the results of the Spearman test see Table 8.

Based on the given results, a statistically significant negative correlation was determined between the statement d2 and *company size* (rs=-0,545). That practically suggested that the bigger the company was, the less chances it had to use a generic software in the realization of procurement activities. On the other hand, a statistically significant positive correlation was determined between the statement d3 and *company size* (rs=0,530). That suggested that with

Table 8: The results of the Spearman test

		Statement d2	Statement d3	Company size
Statement d2	*Spearman* correlation coefficient	1.000	-.179	-.545**
	P value	.	.204	.000
Statement d3	*Spearman* correlation coefficient	-.179	1.000	.530**
	P value	.204	.	.000
Company size	*Spearman* correlation coefficient	-.545**	.530**	1.000
	P value	.000	.000	.

**statistical significance at the level of 0.01

the increase of company size its chances to use an in-house procurement software grew. Finally, that way we saw that the implementation of the Spearman test confirmed our basic hypothesis.

Besides the carried out analysis and tested hypothesis, the research results also indicated the following: companies included in the research mainly used some form of information support (an adequate software) while managing procurement activities. Also, there was a dominant concordance that the stated software enabled procurement costs tracing and helped control them. However, we can conclude that the usage of mentioned software was far from their usage potential. Namely, most companies used non-specialized, generic software (for example, Excel) which besides procurement activities, could and usually was used for multiple other purposes. Although that meant that the multi-functionality of the software was used in that way, due to the absence of their specialization, sub-optimal results were achieved concerning procurement management. The reason to use generic in stead of in-house software had to do in a great deal with the practical dimension- the majority of companies did not have sufficient financial funds needed to obtain personalized software packages. Finally, although the dominant part of the companies invested regularly in maintaining and renewing the personal information capacities which served as aid to procurement activities, the supply of software in cooperation with other companies was not a usual activity of the analyzed companies. Since we already stated that the future of procurement software usage was it's integration between different participants in the supply chain, more attention should be paid to this trend in Serbian business practice from now on.

Research limitations

Carrying out any empirical research is almost impossible to be realized in ideal conditions. Therefore, it is always important to point out the limiting factors which influence the plausibility degree of the drawn conclusions connected to the main research questions. In that manner, we obtain a realistic picture of the phenomena or the analyzed issue. Focusing our attention to the limitations of the empirical research dealing with determining the specifics of IT solutions as a support to procurement management within Serbian companies we point out the following few limitations that we have identified:

a) The time frame of the carried out research. The analysis of the specifics of IT solutions as support to managing procurement within companies in Serbia has been carried out within a research defined for an exact time period- a month's period of surveying. In that manner, we obtained only the current image, i.e. the picture of present treatment of procurement activities within companies included in this research. Thereby, we eliminated the possibility to determine with certainty the development path of that process, i.e. to determine how shall the relationship towards the specific logistics group (IT segment) of procurement activities and the perception of their importance change in future.

b) Difficulties in operative realization of the research. The realization of the stated research has once again shown the insufficient openness of the professional community towards research efforts of the participants of the academic community. Namely, on one hand, there is an evident lack of interest among companies to participate in practical research, considering them not important due to the lack of perception on (in)direct use of their implementation. On the other hand, the communication with the company representatives had shown evident reluctance, even fear, to give answers to survey questions, even before a questionnaire could be seen, usually considering the questions might endanger the principal of business information secrecy.

c) The research form. The problem connected to the previous discussion is certainly connected to the form of the very research. Namely, by sending a link with the questionnaire to be filled out on-line, excludes the possibility for the researcher to directly communicate with the participants and to additionally explain, at any moment, any dilemmas that might occur. However, since the questions were set rather explicitly and since it was always possible to communicate via e-mail if any dilemmas occurred, a much greater limitation of this research form is *the limited extent of gathered information.*

Besides all stated limitations, we consider that the correctness of our conclusions can not be questioned,

nor can the general research results. Stating the previous limitations, we do not intend to say that there are no other limitations, just that we have pointed out the most important ones in our opinion.

Conclusion

Using modern information technologies represents one of the leading trends in managing contemporary procurement. The analysis carried out within the theoretical part of this paper clearly made a difference between systems which could be used within one and more different companies. Although the internet potentials are growing daily and achieving long term consequences, their full integration has still not been achieved. However, all experts in the field agree that integration is the certain future, and that it is only a matter of time when the unification of internal and external procurement software, but also the management of all company interest groups, shall occur.

As for the conclusions drawn from the empirical analysis in Serbia, the companies included in the research mainly used some form of information support (an adequate software) while managing procurement activities. Also, there was a majority concordance that the given software facilitates procurement costs tracking and controlling. However, we also concluded that the usage of procurement software is far from its potential. Namely, the majority of companies (small and middle) used non-specialized, generic software (for example, Excel), which besides procurement activities can be put to many other purposes. It has been proven that in-house software were mostly used by big companies in Serbia.

Finally, although the dominant part of the companies included in the research in Serbia regularly invested in maintenance and renewal of personal information capacities which serve as support to procurement activities, software procurement in cooperation with other companies was not an often activity with analyzed companies. Since it was already stated that the future of procurement software usage was it's integration between different participants in the supply chain, more attention should be paid to this trend in Serbian business practice.

References

1. Aćimović, S., & Mijušković, V. (2011, September). Efficient procurement management as a source of competitive advantage in turbulent market conditions, in M. Jovičić (Chair), EACES workshop: *Market failures and the role of institutions*. Symposium conducted at the meeting of EACES members, Miločer, Crna Gora.
2. Antonette, G., Sawchuk, C., & Giunipero, L. (2002). *Purchasing plus, 2nd edition*. New York: JGC Enterprises.
3. Bozarth, C., & Handfield, R. (2004). *Operations and supply chain management*. Upper Saddle River, New Jersey: Prentice Hall.
4. Chopra, S., & Meindl, P. (2004). Information technology and the supply chain in *Supply Chain management: Strategy, planning and operation*. Upper Saddle River, New Jersey: Prentice Hall.
5. Cole, S., Woodring, S., Chun, H., & Gatoff, J. (1999). *Dynamic Trading Networks*. Cambridge, UK: The Forester group Institute.
6. Giunipero, L., & Carter P. (2009). *The role of optimization in strategic sourcing*. Arizona, USA: CAPS research.
7. Handfield, R., & Nichols, L. (2003). *Supply chain redesign*. Upper Saddle River, New Jersey: Prentice Hall.
8. IBM (2015), available at: http://www-01.ibm.com/software/analytics/spss/, accessed 30/8/2015.
9. Laerd statistics (2015), available at: https://statistics.laerd.com/spss-tutorials/cronbachs-alpha-using-spss-statistics.php, accessed 30/8/2015.
10. Laerd (2015), available at: https://statistics.laerd.com/statistical-guides/spearmans-rank-order-correlation-statistical-guide.php, accessed 30/8/2015.
11. Mijušković, V. (2011). Alternativne procedure i važni aspekti menadžmenta nabavke. *Montenegrin Journal of Economics*, 7(1), 133-142.
12. Standley, D. (2010). Take to the clouds. *Inside Supply Management*, 7, 10-16.
13. Tools for science, available at: http://www.physics.csbsju.edu/stats/KS-test.html, accessed 30/8/2015.
14. Waters, D. (2002). *Operations management, 2nd edition*. London: FT Prentice Hall.

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POSSIBILITIES OF CREATING OPTIMAL INVESTMENT PORTFOLIO OF INSURANCE COMPANIES IN SERBIA*

Mogućnosti kreiranja optimalnog investicionog portfolija osiguravajućih kompanija u Srbiji

Abstract

Owing the time gap between the premium collection and the benefit payments, insurance companies invest temporarily free funds of technical reserves and thus fulfill an important role of institutional investors. The paper deals with the analysis of the investment possibilities of insurance companies in Serbia in terms of the existing regulatory constraints and the financial market development level. The optimal portfolio of assets used to cover technical reserves of non-life insurers is constructed on the basis of the Markowitz portfolio theory. The results of the research support the hypothesis that quantitative investment rules lead to a narrowing of an efficient set of insurer's investment opportunities and to a deterioration of risk-return trade-off of their investments. Recommendations for improving the investment performance of non-life insurers are generated through the analysis of real investment portfolio at the level of the entire insurance sector, as well as of a specific insurance company. It is concluded that the availability of financial instruments and trends in their prices and yields primarily determine investment decisions of insurers in Serbia.

Key words: *investments, technical reserves, risk, return, investment portfolio*

Sažetak

Zahvaljujući vremenskoj nepodudarnosti između naplata premija i isplata naknada za štete, osiguravajuće kompanije ulažu privremeno slobodna sredstva tehničkih rezervi i time ostvaruju važnu ulogu institucionalnih investitora. U radu se analiziraju mogućnosti investiranja osiguravajućih kompanija u Srbiji pri postojećim regulatornim ograničenjima i stepenu razvijenosti finansijskog tržišta. Na osnovama Markovićeve portfolio teorije, konstruisan je optimalan portfolio imovine koja služi za pokriće tehničkih rezervi neživotnih osiguravača. Rezultati istraživanja dokazuju hipotezu da kvantitativna ograničenja investicija dovode do sužavanja efikasnog skupa investicionih mogućnosti osiguravača i pogoršanja odnosa prinosa i rizika njihovih investicija. Kroz analizu realnog investicionog portfolija na nivou celokupnog sektora osiguranja, kao i konkretne osiguravajuće kompanije, generisane su preporuke za poboljšanje investicionih performansi neživotnih osiguravača. Zaključuje se da raspoloživost finansijskih instrumenata i kretanja njihovih cena i prinosa primarno opredeljuju investicione odluke osiguravača u Srbiji.

Ključne reči: *investicije, tehničke rezerve, rizik, prinos, investicioni portfolio*

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Introduction

Insurance companies are specific market participants whose activity differs from the activity of other economic entities. As opposed to other types of business in which an enterprise usually makes certain investments in the process of production of goods (services) and only after that realizes financial effects of the sale of such goods to customers, the policyholder in insurance "credits" the insurer, paying him in advance premium for the insurance service. The realization of insurance service is conditioned by the probability of the realization of insured risk. A mismatch between cash inflows and outflows in the insurance allows the insurer to dispose temporarily free funds, which form the technical reserves, and to achieve extra yield through their investments, in addition to profit from insurance business. Insurance companies transform passive funds, obtained on the basis of a large number of smaller amounts of insurance premiums, into the active capital invested on financial markets. The concentration of these funds in the form of technical reserves ensures that insurance companies have an important place among institutional investors. Investing of temporarily free technical reserve funds is usually strictly regulated by the state, since the policyholders, receiving compensation from these reserves in the event of the insured risk realization, are objectively deprived of the opportunity to control how efficiently and safely insurance companies invest these funds.

Bearing in mind the stochastic character of insured risks and, consequently, of insurance indemnities, as contractual obligations of insurers, it is very important to create such an investment portfolio that will provide the best balance between the risks taken and the return that can be achieved, while respecting current investment rules at the same time. Therefore, this paper deals with the possibilities of investing funds of insurance companies in Serbia under the existing limiting factors. The aim of the paper is to create an optimal investment portfolio of non-life insurers, taking into account the nature of their liabilities to policyholders, the regulatory constraints in effect, but also the level of development of the domestic financial market.

The first section of the paper explaines the main funding sources of insurance companies, after which specific factors that determine the structure of their investment portfolio will be elaborated. A review of results of previous studies of investment regulation effects on insurers` investment performance is followed by description of the methodology and data used in this study. Derived hypothetical optimal portfolio in the spirit of the *Markowitz* portfolio theory, which could be achieved in Serbia assuming investing in securities only, as well as the average real investment portfolio of insurers on the domestic insurance market will be presented in the sequel. Investment portfolio of a specific insurance company will also be discussed for comparison with the previous two and drawing recommendations for optimization of the investment portfolio of insurance companies in our country.

Insurance companies` funding sources

A specific manner of the insurance mechanism functioning allows insurance companies to initially collect and accumulate premiums from policyholders, while compensation payments are realized subsequently, after the actual occurrence of an insured event. Payment of sums insured in life insurance can occur after ten or more years from the contract conclusion while the periods of realization of the risks covered by non-life insurance are considerably shorter, usually up to one year. In any case there is a time gap between the inflows of premiums and outflows from compensations during which the insurance company has at its disposal certain funds that can be used to achieve additional return through their investment. Thus, investment opportunities of insurers are influenced by the very nature of insurance business.

The significance of an insurance company on the financial market depends on its investment potential. Insurer`s investment potential includes the total funds that are temporarily available and as such can be invested to earn yield, but considering the safety of investments, since most of that funds should cover future liabilities to policyholders. Therefore, insurance company can invest only a portion of available funds relating to the insurance fund (external capital) and guarantee reserves (equity).

Prior to its use for payments of insurance indemnities, temporarily released funds represent technical reserves, or insurance fund. Depending on the amount and timing of insurance indemnities, technical reserves condition significant changes in insurer`s investment potential. As regards the own capital which represents a guarantee reserve or available solvency margin, it is rarely and shortly used for covering insurance liabilities, and for this reason legal restrictions on its investing are not necessary. Equity is used for covering insurance liabilities only in the case of shortcomings of technical reserves. Its volume can be planned with a high degree of probability and in a much lesser extent impacts the changes in investment potential.

Investment potential of the insurance company is an integral part of its financial potential. It represents the portion of financial potential remaining after deduction of the insurance expenses, borrowed funds and the insurance indemnities. If these deductibles are increased to a greater extent than the amount of guarantee and technical reserves, that will result in the investment potential reduction, despite the growing financial potential of the insurer. Investment potential is a variable affected by a number of factors from which the most important are the volume of collected premiums, the structure of the insurance portfolio, the operating loss or profit, legislation relating to the formation and investment of insurance funds, duration of insurance contracts and the amount of own capital.

Insurance companies` investment portfolio structure

The three most important directions of insurance companies` investments are investing in real estate directly or approving mortgage loans, buying securities and depositing funds with banks and other financial institutions [17, p. 328]. The proportions of specified investment forms within the insurers` assets are conditioned by several factors, such as the purpose of insurance business, the level of financial market developmet, the type of insurance that the concrete company deals with and the legal framework.

Each investment of an insurance company must meet two basic principles: providing a high level of protection against risks underwritten and achieving a high return on funds invested. The overall insurer`s investment policy is based on the principles of safety, profitability and liquidity. However, the purpose of the insurance business determines the relative importance, i.e. priorities among these principles. Due to its basic function of ensuring policyholders` security, each insurance company must primarily take into account the safety principle when making investment decisions. Consequently, the primary direction of placing technical reserve funds of insurance companies should be conditionally risky assets, in the sense of government bonds, long-term bonds of state companies and bank deposits. In addition, the principle of safety is achieved through the diversification and dispersion of investments, as well as maintaining solvency margin at the prescribed level when investing the funds in order to prevent possible erosion of the company's capital [15, p. 14].

To what extent will the insurance company really be able to realize its function of institutional investor primarily depends on the depth and breadth of the financial market. Insurer`s ability to directly and indirectly meet the expectations of shareholders, supervisors, policyholders and other stakeholders through the investment activities is limited if the offer of financial instruments is scarce. In terms of underdeveloped capital market, insurance companies mainly appear on the money market, which adversely affects their investment profitability, particularly in case of life insurers, whose liabilities require high-quality long-term investments [16, p. 147].

Types of assets in which insurance companies invest their funds, as well as the maturity of these placements, are determined by the properties of funding sources and liabilities, in terms of their predictability and duration. In this respect, there is a significant difference between companies engaged in life and non-life insurance. The premium, as the most important source of financing, is known upon the conclusion of the contract in both types of insurance. However, the ability to predict future liabilities to policyholders in terms of their amount and timing is considerably higher in life insurance. Sums insured in this type of insurance are predetermined and fixed, while the indemnity in non-life insurance depends on many factors. Likewise, the moment of occurrence of the insured event is relatively predictable or even

defined within the life insurance contract whereas in non-life insurance it is quite uncertain if and when will the damage occur. Ultimately the difference in the maturity of funding sources and liabilities stems from the fact that contracts in non-life insurance usually cover a period of one year, while the contracts in life insurance refer to multi-year periods.

Following explained features of funding sources and liabilities, companies dealing with life insurance have a notably wider range of investment opportunities and a longer investment horizon as opposed to non-life insurers. Based on the investment portfolio of life insurers in developed countries, it can be argued that those companies hold most of their assets in bonds, as securities characterized by lower yields and lower risk relative to equity instruments. In order to maximize safety of investments and to achieve certain tax reliefs, these companies are particularly interested in investing in government bonds. Due to yield stability, real estate also represents an attractive investment alternative for life insurers. Non-life insurers, on the other hand, hold relatively larger share of their assets in cash, cash equivalents and short-term securities (primarily commercial papers and treasury bills). In addition, these companies invest relatively more in shares thus achieving protection against the inflation risk in the so-called long-tail lines of business (see Table 1).

Finally, the structure of the investment portfolio of insurance companies is determined by the legislation, which is primarily related to investment of technical reserves (particularly of the mathematical reserve immanent to life insurance). The goal of the legislator is to preserve the real value of insurance funds in contemporary unstable investment environment and rapid changes in the value of money, as well as to maintain the insurer`s ability to settle its liabilities to policyholders at any given time. Thereby there are two alternative approaches of the regulator. "Prudent person rules" are qualitative standards requiring from investors to act with caution and to follow the general principles of the investment portfolio diversification and asset-liability matching. "Quantitative portfolio regulations", on the other hand, impose explicit limits on holdings of assets with relatively volatile nominal returns, low liquidity or high credit risk [6, p. 20].

Literature review

Optimization of investment portfolio of insurance companies is based on modern portfolio theory and asset-liability management principles, but respecting relatively larger number of limitations in relation to other types of investors. In an effort to exploit as much as possible the potential of insurance for encouraging the economic development of the country, the way in which investment regulations impact behaviour of insurance companies as institutional investors has become an area that has gained increasing attention [25, p. 4]. Therefore, the effects of investment regulations on the structure and performance of insurers` investment portfolios are examined through theoretical and empirical researches.

Table 1: Life and non-life insurers' portfolio allocation in selected OECD countries (in %)

Country	Life insurance			Non-life insurance		
	Bonds	Shares	Other	Bonds	Shares	Other
Austria	72.9	9.5	17.5	29.3	41.2	27.2
France	75.9	19.5	4.6	60.1	25.8	14.1
Germany	38.7	3.7	57.6	38.5	10.2	51.3
Italy	89.6	4.0	6.4	77.7	6.8	15.5
Japan	68.4	7.0	24.6	35.5	25.4	39.1
Spain	75.1	3.4	21.5	50.9	12.0	37.1
Switzerland	62.3	1.9	35.8	37.3	3.8	58.9
United Kingdom	60.9	14.5	24.6	36.8	9.2	54.0
United States	74.0	3.8	22.2	63.7	23.9	12.4

Source: [24, pp. 27-28]

Still in 1968, *Lawrence D. Jones* [14] analyzed the impact of internal investment objectives and external restrictions on insurers` investment decisions. The effect of statutory investment rules in the form of limiting investment risk taking was identified on the aggregate database of life insurance companies in the United States from the period 1946-1964 and it was concluded that the proportion of shares in insurers` investment portfolio would be considerable higher in the absence of such restrictions. Although *Hershman* [12] pointed out that the effective impact of statutory limits is smaller, since most insurers in the practice invest in risky forms of assets to a much lesser extent than is permissible, he noted that the requirements for technical reserve coverage discourage investment in equity and thus limit yielding possibilities of insurers. Ussing regression analysis on the data of 55 US life insurance companies during the period 1988-1995, *Henebry & Diamond* [11] proved a significant decline in the share of stocks and mortgages in the investment portfolio of these companies as a result of artificial non-market restrictions imposed by regulators.

The *European Commission* [9] generally argues against the quantitative regulatory rules for institutional investors stressing that they lead to a sub-optimal return and risk taking. More precisely, quantitative rules impede appreciation of liabilities duration when making investment decisions, hamper the use of appropriate techniques of immunization and asset-liability matching, force selection of portfolio that is below the efficient frontier, limit the use of financial derivatives for risk hedging and with excessive focus on individual risky assets underestimate the possibilities to reduce overall risk of the portfolio through diversification. Due to their rigidity, they can not fast enough adapt to changes in macroeconomic conditions and trends on financial and real estate markets [6, p. 167]. On the example of the OECD countries over the period 1980-1995, *Davis* [5] has shown that life insurers in countries applying the "prudent person rules" on average realized higher investment returns compared with those whose investments are subject to quantitative rules. Through a panel data econometric model, *Bijapur et al.* [3] proved in the case of life insurers from seven EU countries observed over the period 1995-2004 that explicit limits on investments constrain portfolio diversification and distort portfolio choice, thus imposing a cost for insurance companies (and their customers) in terms of risk-adjusted returns.

Observing the investment portfolio structure of life insurers in developing countries, *Kong & Singh* [18] identified a strong bias for fixed income securities since most regulators explicitly restrict the proportion of investments in shares, real estate and international instruments. The authors emphasize that such a stringent investment guidelines not only restrict asset allocation, but also may be counterproductive, leading to increased exposure to interest rate risk. Similarly, the results of research conducted on the example of the insurance sector in China show that investment rules constrain investment opportunities for insurance companies and potentially reduce their investment performance [10]. Although similar studies have not been conducted for insurance companies operating in Serbia, *Beronja* [2] proved in the case of voluntary pension funds that the investment restrictions imposed by domestic regulator cause the efficient frontier shift and lead to the investment portfolio sub-optimality.

Data and methodology of analysis

The research hypothesis according to which investment restrictions adopted by the regulator lead to a narrowing of the efficient set of investment opportunities and to a worsening of risk-return trade-off for insurance companies in Serbia is formulated on the basis of previous research results. However, bearing in mind the low development level of the financial market, it can be assumed that primary factors that determine investment decisions of the insurers in Serbia are not regulatory constraints, but the availability of financial instruments and trends in their prices and yields.

The mean-variance analysis of *H. Markowitz* [19] represents a methodological framework for testing the first hypothesis. In general, the overriding investment goal is to achieve an optimal trade-off between risk and return, by allocation of the portfolio to appropriately diversified combinations of assets [5, p. 4]. The *Markowitz* portfolio

selection model includes the identification of available risk-return combinations from a set of risky assets, construction of the optimal portfolio of risky assets and, then, the selection of the complete portfolio by combining a risk-free assets and optimal risky portfolio [4, p. 240]. Within this process it is necessary at first to derive the minimum-variance frontier of risky assets that presents the lowest possible level of risk that may be taken at a given level of expected return of the portfolio. Part of this hypothetical boundary above the global minimum variance portfolio is the efficient frontier of risky assets at which it is not possible to increase return without increasing risk, or to reduce risk without reducing return. Theoretically, the optimal risky portfolio is located in the tangency point of the capital allocation line (CAL) with the highest slope (showing all possible combinations of risk and return as a result of the distribution of the entire portfolio between a particular risky portfolio and the risk-free assets) to the efficient frontier. Finally, a selection of the complete portfolio is conditioned by the objectives and preferences of investors as well as the constraints they encounter.

The subject of optimization in this paper is a portfolio made up of assets used to cover technical reserves of non-life insurance companies in Serbia. It is assumed that the coverage of technical reserves is complete. The minimum variance frontier is carried out on the basis of available historical data on risky assets returns, by solving quadratic programming problem with an objective function:

$$\min \sigma_p^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j Cov_{ij},\ i \neq j \quad (1)$$

while satisfying a set of linear constraints:

$$\begin{gathered} \sum_{i=1}^{n} w_i = 1 \\ w_i \geq 0, i = 1,2,..., n \\ E(r_p) = r_p^D \end{gathered} \quad (2)$$

where:

σ_p^2- portfolio variance,

w_i, w_j - weights of individual securities,

σ_i^2- variance of the rate of return on individual securities,

Cov_{ij}- covariance of returns on two securities,

$E(r_p)$- expected return of the portfolio,

r_p^D- given expected return of the portfolio,

n - number of securities observed.

The model further assumes that insurance companies cannot perform "short sales" which is why the negative values of weights of individual securities are not permitted. Solutions to the problem are weights w_i, $i = 1,...,n$ at which the lowest level of portfolio variance for a given expected return of the portfolio is achieved. Portfolio optimization criterion can be the Sharpe ratio maximization, so that the objective function (1) is replaced by the expression (3):

$$\max S_p = \frac{E(r_p) - r_f}{\sigma_p} \quad (3)$$

where:

S_p- Sharpe ratio,

r_f- risk-free rate of return,

$E(r_p) - r_f$- portfolio risk premium.

Calculated weights of individual securities determine the optimal risky portfolio offering the highest yield per unit of risk, i.e. having the highest reward-to-variability-ratio, which is the slope of the capital allocation line. Given the optimal risky portfolio and the CAL generated by the combination of this portfolio and the risk-free assets, the individual investor's degree of risk aversion could be used in order to find the optimal complete portfolio in the absence of other constraints [4, p. 238].

In order to take into account investment rules that apply to insurance companies in the construction of their investment portfolio, it is necessary to introduce additional restrictions into formulated algorithm of quadratic programming. Types of assets that may serve to cover technical reserves of insurers in Serbia and limitations on the overall and individual investments in those types which are considered risky are defined within the current law [13, article 131] and subordinate legislation [7, article 3] (see Table 2).

Having regard to the outlined investment rules, data availability and general characteristics of the investment portfolio of non-life insurers, the hypothetical risky portfolio can be composed exclusively of shares subject to trading on the regulated market. Since their total share in relation to technical reserves cannot be greater than 25%, shares issued by a single issuer cannot participate

Table 2: Types of assets that may serve to cover the technical reserves of insurance companies in Serbia

Types of assets		Limitations in relation to technical reserves	
		Individual investments	Total investments
Securities issued by (or guaranteed by) a state, EU or OECD member states, or their central banks		Without limitations	
Securities issued by the international financial organizations whose member is the Republic of Serbia		Without limitations	
Securities issued by (or guaranteed by) the autonomous provinces and local government units		≤ 35%	≤ 10%
Debt securities traded within the organized stock market in the country		≤ 35%	≤ 5%
Debt securities not traded within the organized stock market, provided that they are issued by a domestic legal entity		≤ 3%	≤ 0.5%
Shares traded within the organized stock market in the country		≤ 25%	≤ 5%
Shares not traded within the organized stock market, provided that they are issued by a domestic legal entity		≤ 5%	≤ 1%
Equity shares in companies based in the Republic of Serbia		≤ 5%	≤ 1%
Investment units of investment funds (only for life insurance linked with units of investment funds)		≤ 100%	≤ 25%
Real estate and other real legal rights to real estate	life	≤ 30%	≤ 10%
	non-life	≤ 20%	≤ 7%
Deposits in banks in the Republic of Serbia		≤ 20%	≤ 5%
Cash in currency and coin or in bank accounts	life	≤ 7%	≤ 5%
	non-life	≤ 10%	

Source: Prepared according to [13, article 131] and [7, article 3]

in the risky portfolio with more than 20%, which satisfies the requirement that their share in the complete portfolio does not exceed 5%. The remaining 75% of the complete portfolio may be formed by risk-free instruments, i.e. Treasury bills.[1] Additional constraint can be represented as follows:

$$wi \leq 0.20, i = 1,2,..., n \quad (4)$$

As for the standard deviation of risk-free returns stands $\sigma_f = 0$, it follows that $Cov_{p,f} = \rho\sigma_p\sigma_f = 0$. Taking into account stated limitations, after construction of the optimal risky portfolio with the expected return $E(r_p^*)$ and standard deviation σ_p^*, the expected return of the complete portfolio $E(r_p^c)$ can be calculated on the basis of:

$$E(r_p^c) = 0.75\, r_f + 0.25E(r_p^*) = r_f + 0.25\,[E(r_p^*) - r_f] \quad (5)$$

while the standard deviation of the complete portfolio (σ_p^c) is equal to:

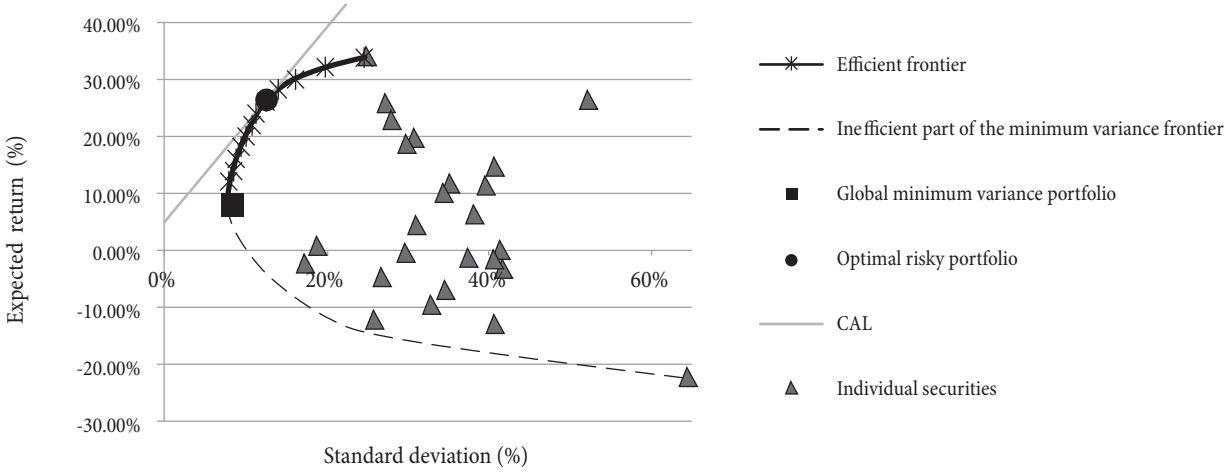
$$\sigma_p^c = 0.25\sigma_p^* \quad (6)$$

The analysis was conducted on the basis of data on prices of 25 shares traded by continuous trading method with the highest turnover on the Belgrade Stock Exchange in 2015, taken from the web site of the stock exchange [1]. Change in share prices was observed on a monthly basis during the period January 2011 - October 2015, thus obtaining 57 observations on the monthly returns of each share. The weighted average interest rate on Treasury bills denominated in RSD of 4.89% in October 2015 (according to a report on interest rates on the securities as a part of the official statistics of the National Bank of Serbia [23]) is taken for a risk-free rate of return. Data on average interest rates on long-term government bonds are taken from the same source.

The second hypothesis was tested by analyzing the real structure of assets used to cover technical reserves of non-life insurers in Serbia. Data on the structure of these assets at the level of the entire insurance sector were taken from the annual reports of the National Bank of Serbia insurance supervision department [21, 22]. The preview of the structure of technical reserves coverage in the case of a specific non-life insurance company is prepared on the basis of notes to the financial statements of that company for 2014, which are publicly available on the web site of the Business Registers Agency of the Republic of Serbia [26]. Data on the rates of return on the government debt securities held by the selected insurer are taken from

1 Long-term bonds are not included in the constructed portfolio since that there is only one old foreign currency savings bond maturing on 2016 and there are no corporate debt securities on the organized market at the moment. As of November 2015 long-term debt securities issued by the Republic of Serbia are added on the Belgrade Stock Exchange (secondary trading in government bonds has so far been performed on the OTC market through the bilateral investor contracts).

Figure 1: The minimum variance frontier of risky assets with the optimal CAL without constraints



Source: Authors' calculations on the basis of [1] and [23]

the auctioning reports of the Treasury of the Ministry of Finance of the Republic of Serbia [27].

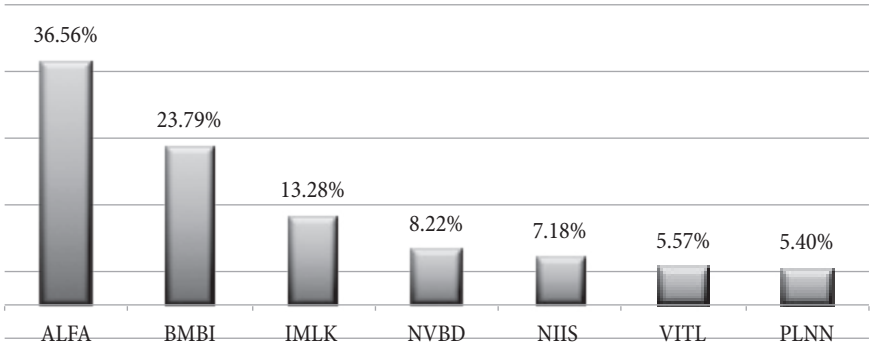
Discussion of results

The mean value and standard deviation of annualized returns on each of the observed shares (see Annex 1), as well as the covariance between shares, as necessary inputs for determining the portfolio return and standard deviation are calculated on the basis of obtained data on monthly returns. The minimum variance frontier is derived by applying the steps (1) and (2) of the explained algorithm (see Figure 1). By introducing risk-free assets, through the further optimization process based on the steps (3) and (2), we determined an optimal risky portfolio, which is located in the point of tangency between the efficient frontier and capital allocation line with the highest slope.[2] More specifically, the Sharpe ratio of 1.7 indicates that any increase in risk, or portfolio standard deviation by one percentage point leads to an increase in the portfolio return of 1.7%.

Figure 2 shows the structure of the optimal risky portfolio in the absence of regulatory constraints. The expected return on the optimal risky portfolio is 26.03% per annum and its standard deviation is 12.42%. In any particular case, the preferences of insurer's portfolio managers and the nature of liabilities to policyholders will determine the structure of the complete portfolio on the given capital allocation line.

Introduction of regulatory constraints in the form of expression (4) has caused a shift of the efficient frontier of risky assets and a narrowing of the efficient set (see Figure 3). The slope of the capital allocation line is reduced

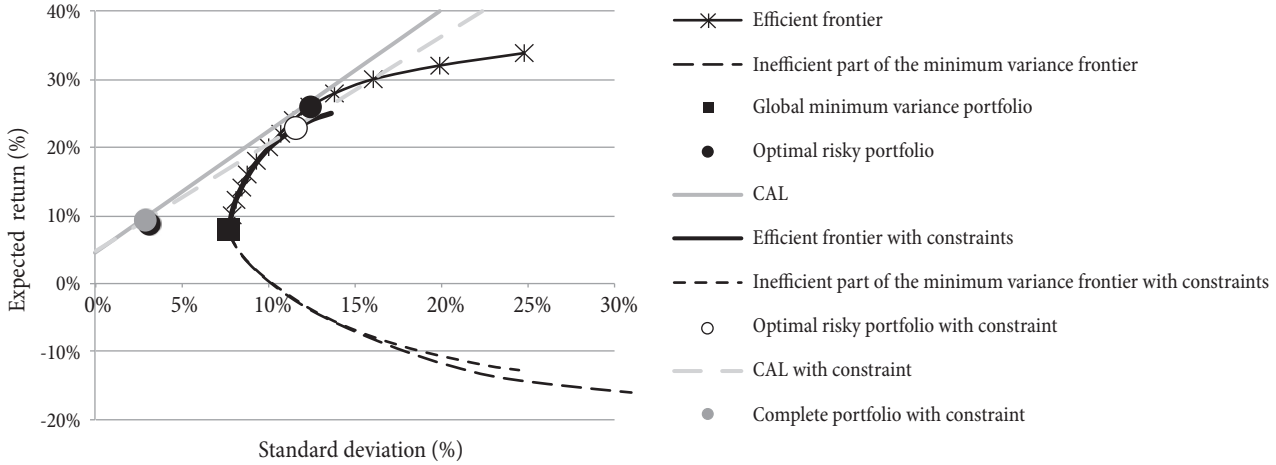
Figure 2: The structure of the optimal risky portfolio without constraints



Source: Authors' calculations on the basis of [1]

2 The optimization was performed using the Solver tool in Microsoft Excel.

Figure 3: The minimum variance frontier of risky assets with the optimal CAL with and without constraints



Source: Authors' calculations on the basis of [1], [23] and [7]

so that the newly created optimal risky will provide a smaller expected return (22.84%) at approximately the same level of risk (standard deviation of 11.60%). Being located below the original *Markowitz* efficient frontier, such a portfolio is sub-optimal, which is consistent with previous findings [2, p. 262].

Regulatory restrictions will be reflected in the structure of the complete portfolio also, in which shares cannot participate with more than 25%. If the rest of the assets used to cover technical reserves were invested in 1-year Treasury bills, expected return of the complete portfolio would be only 9.38%, and its standard deviation would be 2.90% (see Table 3).

However, there is still a possibility to increase the expected return of the portfolio. Instead of in 1-year Treasury bills, part of the complete portfolio can be invested in long-term government bonds, whose share is also not subject to regulatory limitations. For example, the weighted average interest rate on government bonds denominated in RSD with a maturity of 5 years amounted to 6.50% in October 2015 [23]. Bearing in mind the need to preserve liquidity of non-life insurers` investment portfolio, 30% of the portfolio may be invested in 1-year Treasury bills, 25% in the optimal risky portfolio made up of shares and the rest in long-term government bonds. Such an investment portfolio would provide expected return equal to:
$0.3 \cdot 0.0489 + 0.25 \cdot 0.2284 + 0.45 \cdot 0.065 = 10.10\%$

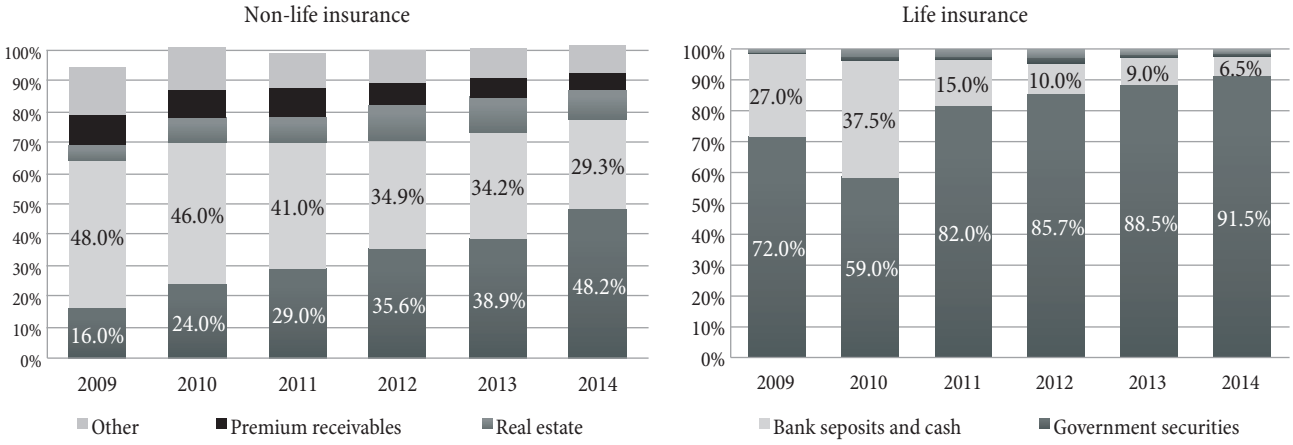
It is interesting to compare the obtained optimal portfolio with the actual structure of assets used to cover technical reserves of the average non-life insurer in Serbia. According to the report of the National Bank of Serbia, coverage of non-life insurers` technical reserves by prescribed types of assets was complete in 2014 (101.4%). Technical reserves were for the most part covered by government securities (48.2%), bank deposits and cash (29.3%), investment real estate (9.3%) and insurance premium receivables (5.8%) [22, p. 16]. Such a structure of the investment portfolio indicates the prevailing conservative investment policy in the domestic insurance sector. In comparison with the structure of assets covering technical reserves of life insurers (which is dominated by government bonds with a share of 91.5%), it can be concluded that non-life insurers invest funds over shorter time periods in line with the maturity of their liabilities (see Figure 4).

Table 3: Comparison of portfolios with and without constraints

Portfolio	Expected return	Standard deviation	Risk-free rate	Sharpe ratio
Optimal risky portfolio without constraints	26.03%	12.42%	4.89%	1.70
Optimal risky portfolio with constraints	22.84%	11.60%	4.89%	1.55
Complete portfolio with constraints	9.38%	2.90%		

Source: Authors' calculations on the basis of [1], [23] and [7]

Figure 4: Structure of technical reserve coverage of insurance companies in Serbia



Source: [21] and [22]

Over the course of time there is a visible increase in the share of government securities and decrease in the share of bank deposits in the portfolio of non-life insurers, contributing to improvement of their investment performance. However, the investment potential is not sufficiently utilized for the purpose of increasing overall business profitability, since the share of stocks in the observed portfolio was less than 5% in 2014. This result can be explained by the insufficient depth and breadth of domestic capital market, as well as with the decline and stagnation of stock exchange indices after the onset of the global financial crisis of 2008/09. The financial market in Serbia is characterized by a poor supply of financial instruments and the low level of investment activity. Given the relative scarcity of local government bonds and the virtual non-existence of corporate bonds, investors are faced with rather limited options regarding valorisation of available funds and diversification of risks taken [16, p. 147]. At the same time, the number of shares that are being traded daily is small, liquidity of the regular turnover is low and volatility of prices and trading costs are high. Immediately before the onset of the crisis in 2007 as much as 20% of technical reserves of non-life insurers were covered by shares traded on the organized market [20, p. 15]. At the end of the same year BELEXline index, which represents the capitalization-weighted portfolio of shares traded on the Belgrade Stock Exchange, reached the value of 3,830.84, while its value by the end of October 2015 was only 1,304.30 [1]. Having regard to the unfavorable market trends, the investment rules for insurers were also tightened during the observed period. Namely, there were no limitations on the total, but only on individual investments in shares traded on the organized market (amounting to 5% of technical reserves) in the previous legislation [8, article 4]. However, given the fact that the actual participation of shares in the structure of technical reserve coverage is on average significantly below the limit, it can be concluded that the conservative investment behavior of insurers on the domestic insurance market has been determined by the available investment instruments and trends in their prices, rather than by a restrictive regulator`s approach.

The portfolio of assets covering technical reserves in case of a specific insurance company engaged in non-life insurance in Serbia was, by its structure, aligned with the average portfolio at the sectoral level in 2014. The largest share in the portfolio of 46.91% refers to government bonds, with equal representation of long-term (two-year and three-year) bonds and bonds with maturities up to one year. Investments in long-term bonds generated an average return of 7.29%. The average rate of return on short-term bonds was slightly higher (7.84%), because the company invested mainly in Treasury bills denominated in dinars, while long-term bonds were mostly denominated in euros. Paying attention to investment dispersion, the company deposits its funds in seven banks in the country achieving an average rate of return on deposits of 4.67%. Finally, the company achieved income from renting its own investment properties of 2.76% in 2014 (see Table 4).

Table 4: Structure of technical reserve coverage in case of specific non-life insurance company

Type of assets	Share in assets covering technical reserves	Weighted average interest rate
Long-term government bonds	23.87%	7.29%
Treasury bills	23.04%	7.84%
Bank deposits	29.90%	4.67%
Investment real estate	9.25%	2.76%
Cash	6.85%	-
Insurance premium receivables	3.41%	-
Unearned premium and claim reserves recoverable from coinsurance and reinsurance	3.67%	-

Source: Prepared according to notes to the financial statements of the observed insurance company for 2014 [26] and [27]

Technical reserves of this undertaking were fully covered by the prescribed types of assets in 2014 (108.07%). The company has invested funds intended for future payment of liabilities to policyholders in accordance with the principles of safety and liquidity. However, the realized weighted average rate of return of the observed portfolio of 5.19% is twice lower compared to the expected return of the proposed complete portfolio (10.10%). In addition, a significant drop in average interest rates on government debt securities denominated in RSD was recorded during the past year should be noted. The weighted average interest rate on 1-year T-bills, for example, has declined from 8.00% in December 2014 to only 4.89% in October of the current year [23]. In other words, the same portfolio structure would bring even lower return at the end of 2015. The profitability of the portfolio can be increased by investing in shares traded within the organized market which were not used at all for covering technical reserves of the company in 2014. Of course, in order to preserve the security of investments, this recommendation relates primarily to liquid shares of issuers of high creditworthiness, especially those that are listed at the stock exchange.

Conclusion

In an attempt to fulfil their primary function of protection from the risks in the best possible manner, insurance companies perform maturity transformation of funds collected from the premiums paid by policyholders. Part of these funds that will be used for settlement of liabilities to policyholders in the future is available for investment until maturity of these obligations and is allocated in the form of technical reserves of insurers. Thanks to the forming and investing of technical reserve funds onto the financial market, insurance companies appear in the role of leading institutional investors in developed countries. By investing the temporarily available funds, insurance companies are trying to obtain an adequate return in the form of interest and capital gain at as little risk as possible. The structure of their investment portfolio is conditioned by the purpose of insurance business, the level of development of the financial market, the types of insurance that the specific company is involved in and the current legislation.

The paper analysed possibilities of investing funds of insurance companies in Serbia in terms of the existing limiting factors. The optimal risky and complete investment portfolios of non-life insurers were created using the *Markowitz* portfolio selection model on the basis of data on prices and yields of available instruments on the domestic financial market. A quadratic programming approach is used to generate efficient frontier of risky assets in the presence of quantitative investment rules. The study confirmed the hypothesis according to which investment constraints adopted by the regulator lead to a narrowing of the efficient set of investment opportunities and to a worsening of risk-return trade-off for insurance companies in Serbia. Quantitative portfolio regulations do not only prevent insurance companies from reaching through proper asset allocation the point on the efficiency frontier that is compatible with their liabilities, but can force them to keep inefficient portfolio that is below the efficient frontier.

With the introduction of a new legal framework in 2014, the more restrictive investment rules for insurers in relation to the previous period were established. Such an approach of domestic regulator is in contrast with current trends in terms of regulating investment activities of insurance companies in the European Union. The Solvency II concept, as an upcoming regulatory framework for the insurance sector in the EU, includes the replacement of the current quantitative constraints with prudential investment regulation. Assets used to cover technical reserves should be invested in a manner that is consistent with the nature and duration of insurers` liabilities. Member states will not be able to require insurers to invest in specific types of assets, as it would distort the free movement of capital. Indispensable prerequisite for this approach is the introduction of the risk-based solvency evaluation methodology (including investment risks), instead of the existing fixed coefficient model (taking into account only insurance risks), which will still remain applicable in Serbia.

Insight into the real structure of the assets used to cover technical reserves of the average and specific non-life insurer, on the other hand, indicates a pronounced conservative investment policy in the domestic insurance sector. However, the investment potential is not sufficiently used to improve the overall insurers` profitability. The proportion of shares traded on the organized market in the coverage of technical reserves has recorded a dramatic decline after the onset of the financial crisis of 2008/09 and is significantly less than the permitted. Hence it can be concluded that the primary factors that determine investment decisions of the insurers in Serbia are not regulatory constraints, but the availability of financial instruments and trends in their prices and yields. In terms of underdeveloped financial market, insurance companies cannot fulfil the important function of financial accumulation, which diminishes their contribution to the economic development of the country.

References

1. Belgrade Stock Exchange. *Historical Data*. Retrieved from http://www.belex.co.rs/eng/trgovanje/istorijski_podaci/
2. Beronja, D. (2011). Portfolio penzijskih fondova u Srbiji. In B. Jovanović Gavrilović & T. Rakonjac-Antić (Eds.), *Ekonomska politika i razvoj* (pp. 253-270). Belgrade: Faculty of Economics, University of Belgrade.
3. Bijapur, M., Croci, M., & Zaidi, R. (2012). Do asset regulations impede portfolio diversification? Evidence from European life insurance funds. *Working Paper,* New York: Social Science Electronic Publishing, Inc. Retrieved from https://mpra.ub.uni-muenchen.de/54265/1/MPRA_paper_54265.pdf
4. Bodie, Z., Kane, A., & Marcus, A.J. (2005). *Investments*. 6th ed., New York: McGraw-Hill/Irwin.
5. Davis, E. P. (2002a). Portfolio regulation of life insurance companies and pension funds. *Pension Institute Working Paper, PI-0101,* 1-50.
6. Davis, E. P. (2002b). Prudent person rules or quantitative restrictions? The regulation of long-term institutional investors' portfolios. *Journal of Pensions Economics & Finance, 1*(2), 157-191.
7. Decision on investment of insurance funds. *RS Official Gazette*, No. 55/2015.
8. Decision on limitations on individual deposits and investments of technical reserve funds and on the highest levels of individual deposits and investments of guarantee reserves of insurance companies. *RS Official Gazette*, No. 87/2012.
9. European Commission (1999). *Rebuilding pensions, security, efficiency, affordability - recommendations for a code of best practice for Second Pillar Pension Funds.* Brussels: European Commission.
10. Gui-quin, Z., & Hong, W. (2010). An empirical analysis on the impacts of investment restriction on asset ratio for the insurance industry's investment portfolio. *Insurance Studies, 9*(2010), 1-11.
11. Henebry, K. L., & Diamond, J. M. (1998). Life Insurance Company Investment Portfolio Composition and Investment Regulation. *Journal of Insurance Issues, 21*(2), 183-203.
12. Hershman, M. (1977). The Impact of Life Insurance Company Regulation. In J. D. Cummins (Ed.), *Investment Activities of Life Insurance Companies.* Homewood: Richard D. Irwin, Inc.
13. Insurance Law. *RS Official Gazette*, No. 139/2014.
14. Jones, L. D. (1968). *Investment Policies of Life Insurance Companies*. Boston: Division of Research Graduate School of Business Administration, Harvard University.
15. Kočović, J., & Jovović, M. (2013). Izvori i investicije osiguravača na srpskom tržištu osiguranja. *Novi ekonomist, 13,* 10-16.
16. Kočović, J., Rakonjac Antić, T., & Jovović, M. (2011). The impact of the global financial crisis on the structure of investment portfolios of insurance companies. *Economic Annals, LVI(191),* 143-161.
17. Kočović, J., Šulejić, P., & Rakonjac-Antić, T. (2010). *Osiguranje.* Belgrade: Faculty od Economics, University of Belgrade.
18. Kong, J., & Singh, M. (2005). Insurance Companies in Emerging Markets. *IMF Working Paper,* WP/05/88, Washington: International Monetary Fund, 1-21.
19. Markowitz, H. M. (1952). Portfolio selection. *Journal of Finance, 7,* 77–91.
20. National Bank of Serbia (2008). *Insurance sector in Serbia – Report for 2007.* Belgrade: National Bank of Serbia.
21. National Bank of Serbia (2013). *Insurance sector in Serbia – Report for 2012.* Belgrade: National Bank of Serbia.

22. National Bank of Serbia (2015). *Insurance sector in Serbia – Report for 2014.* Belgrade: National Bank of Serbia.
23. National Bank of Serbia. *Interest rates on securities.* Retrieved from http://www.nbs.rs/internet/english/80/index.html
24. OECD (2014). *Global Insurance Market Trends 2014.* Paris: OECD.
25. OECD (2015). *Regulation of Insurance Company and Pension Fund Investment - OECD Report to G20 Finance Ministers and Central Bank Governors.* Paris: OECD.
26. Serbian Business Registers Agency. *The Business Entities Register – Companies.* Retrieved from http://www.apr.gov.rs/eng/Registers/Companies/Search.aspx
27. Treasury of the Republic of Serbia. *Auctions:T-Bills.* Retrieved from http://www.trezor.gov.rs/t-bills-eng.html

Annex 1.

Data on issuers, average annualized returns and standard deviations for the observed shares (January 2011 - October 2015)

Issuer	Symbol	Average return (%)	Standard deviation (%)
AIK banka a.d., Beograd	AIKB	-12.02	26.07
NIS a.d., Novi Sad	NIIS	11.39	35.10
Energoprojekt holding a.d., Beograd	ENHL	4.43	30.97
Aerodrom Nikola Tesla a.d., Beograd	AERO	19.58	30.76
AIK banka a.d., Beograd	AIKBPB	-4.94	26.87
Komercijalna banka a.d., Beograd	KMBN	-6.78	34.45
Alfa plam a.d., Vranje	ALFA	33.86	25.04
Metalac a.d., Gornji Milanovac	MTLC	0.50	18.77
Messer Tehnogas a.d., Beograd	TGAS	9.86	34.40
Imlek a.d., Beograd	IMLK	22.98	28.06
Jubmes banka a.d., Beograd	JMBN	-13.12	40.64
Galenika Fitofarmacija a.d., Zemun	FITO	0.12	41.38
Nova Budućnost a.d., Žarkovac	NVBD	25.90	52.14
Bambi a.d., Požarevac	BMBI	25.39	27.15
Jedinstvo a.d., Sevojno	JESV	-2.68	17.44
Sojaprotein a.d., Bečej	SJPT	-3.57	41.60
Planinka a.d., Kuršumlija	PLNN	18.43	29.74
Montinvest a.d., Beograd	MOIN	14.45	40.44
Philip Morris Operations a.d., Niš	DINNPB	6.25	38.13
Vital a.d., Vrbas	VITL	11.11	39.60
Goša montaža a.d., Velika Plana	GMON	-9.36	33.05
Veterinarski zavod Subotica a.d., Subotica	VZAS	-1.24	40.86
Radijator a.d., Beograd	RDJZ	-1.48	37.60
Tigar a.d., Pirot	TIGR	-22.28	64.48
Energoprojekt industrija a.d., Beograd	EPIN	-0.33	29.54

Source: Authors' calculations on the basis of [1]

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THE ANALYSIS OF FINANCIAL STRUCTURE IN THE LARGEST ENTERPRISES IN SERBIA*

Analiza strukture finansiranja najvećih preduzeća u Srbiji

Abstract

The subject of this paper is financial structure of the largest enterprises in Serbia according to the criterion of the amount of operating revenues. The financial structure includes all sources of funding. It represents the structure of liabilities of the enterprise towards the owners, creditors, suppliers and other stakeholders. The aim of this paper is to identify changes and establish the regularities in the trends of financial structures in the largest enterprises in the period after the outbreak of the Great Recession (2008-2014). The research sample comprises 186 enterprises.

The research results show that greatest majority of vital enterprises in Serbia are undercapitalized and at high risk of bankruptcy. The main features of the financing structure of the largest enterprises in the reporting period were over-indebtedness and unfavorable maturity structure, with a trend of further deterioration. The research will also show the impact of financial structure on the profitability of enterprises and the level of risk of bankruptcy on the basis of Z-score adapted to developing countries.

Key words: *financial structure, large enterprises, financial leverage, Z-score, credit rating*

Sažetak

Predmet posmatranja ovog rada je struktura finansiranja najvećih preduzeća u Srbiji prema kriterijumu visine poslovnih prihoda. Struktura finansiranja obuhvata sve izvore finansiranja. Ona predstavlja strukturu obaveza preduzeća prema vlasnicima, kreditorima, dobavljačima i ostalim interesnim grupama. Cilj rada je da identifikuje promene i utvrdi pravilnosti u kretanju strukture finansiranja najvećih preduzeća u periodu nakon izbijanja Velike recesije (2008-2014). Uzorak na kojem je izvršeno istraživanje čini 186 preduzeća.

Rezultati istraživanja će pokazati da je većina vitalnih preduzeća u Srbiji potkapitalizovana i sa visokim rizikom bankrotstva. Glavne odlike strukture finansiranja najvećih preduzeća u posmatranom periodu su prezaduženost i nepovoljna ročna struktura, sa trendom daljeg pogoršanja. Istraživanje će, takođe, pokazati kakav je uticaj strukture finansiranja na profitabilnost preduzeća kao i visina rizika bankrotstva na bazi Z-skora prilagođenog zemljama u razvoju.

Ključne reči: *struktura finansiranja, velika preduzeća, finansijski leveridž, Z-rezultat, kreditni rejting*

* This paper is a part of the doctoral dissertation titled "The analysis of financial structure in the largest enterprises in Serbia during the Great Recession: Recommendations for financial restructuring and business strategy", which is approved by Faculty of Economics University of Belgrade. Its publishing is an integral part of the dissertation defense procedure at the University of Belgrade.

Introduction

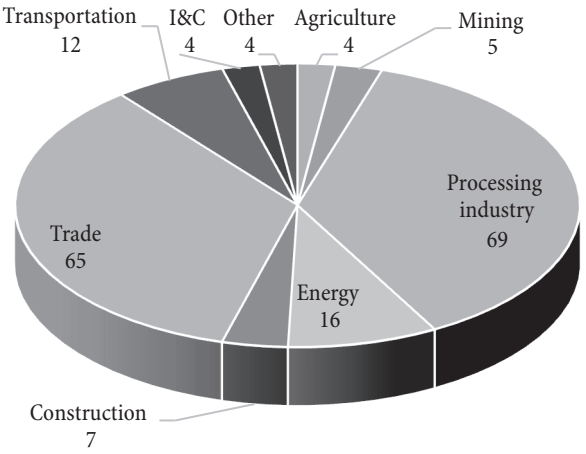
In 2014, there were 93,150 active enterprises in Serbia with a total of 967,199 employees. Compared to 2013, the total number of enterprises fell by 1,212 while the number of employees decreased by 23,831 [15]. According to the current Law on Accounting [11], from 2013, large enterprises include those enterprises that meet two of the following three criteria: 1) have more than 250 employees; 2) have average value of assets over EUR 17.5 million; and 3) have operating revenues above EUR 35 million.[1] Before the entry into force of this Act, the criteria in terms of the amount required, which are related to large enterprises, were significantly lower.[2] Consequently, the number of large enterprises was significantly higher than the number of large enterprises classified in accordance with current law. In 2013, there were 915 large enterprises (0.97%) in Serbia while in 2014 there were 494 large enterprises (0.53% of the total number of enterprises).

Although their ratio in the total number of enterprises is small, the importance of large enterprises is reflected in the following data: they employed 42.7% of the total number of employees, they made 38.6% of total turnover and 50.5% of the total Gross Added Value in 2014 [15].

This paper focuses on the largest enterprises in Serbia according to the criterion of the amount of operating revenues. The choice of this criterion was based on the idea to analyse the big businesses and agile enterprises that have the highest level of business activity, although some of them operate with losses (sometimes even greater than the level of equity). Having in mind the specific nature of their financial structure, enterprises from the financial sector (the largest banks and insurance companies) have been excluded from the sample, as well as enterprises with incomplete data[3]. Finally, the sample that was used for research comprises 186 enterprises.[4] The aim is to identify changes and establish the regularities in the trends of financial structures in the largest enterprises in the period after the outbreak of the Great Recession (2008-2014). Data source present regular financial reports of observed enterprises from database of Cube Risk Management Solutions[5].

The survey sample was very heterogeneous in terms of business activity, legal form and business head office of the observed enterprises. The largest share belonged to the enterprises in the processing industry (37%), followed by trade (35%) and electric power supply (9%). Sample structure by sectors is presented in Figure 1. In terms of their legal form, 39 enterprises were joint stock companies (21%), 13 were state-owned enterprises (7%), while 134 enterprises were limited liability companies (72%). The largest number of the largest enterprises was based in Belgrade (46%) and Vojvodina (27%).

Figure 1: Sample structure by sectors [Author]



The term and characteristics of financial structure

According to the criterion of source or origin, funding sources are classified as own and borrowed, while according to the criterion of maturity, they are classified as short and long term sources. This paper deals with the

1 The provisions of this Law have been applying beginning with the financial statements that are prepared on 31/12/2014.

2 According to the previous Law [10], large enterprises included those enterprises that meet two of the following three criteria: 1) have more than 250 employees; 2) have average value of assets over EUR 5 million; and 3) operating revenues above EUR 10 million.

3 For example, "EPS Snabdevanje" was established in 2013, thus the lack of data for the entire period observed.

4 For 2014, the sample comprised 180 enterprises, given that, as of 1 December 2015, there are no publicly available data for 6 enterprises observed.

5 Cube Risk Management Solutions is an enterprise operating in the field of business information, statistics, business intelligence and credit risk [3].

financial structure that includes all sources of funding. The financial structure is the structure of liabilities of an enterprise towards the owners, creditors, suppliers and other stakeholders.

Financial structure is often equated with capital structure, which is a narrower term. Capital structure is the ratio of debt to equity from which business enterprises are funded. Literature offers different interpretations of the capital structure, depending on how it defines debt. Some authors include long-term debt (bank loans, debt from bond issues, etc.), others include short-term loans as well (including debt from emissions of short-term securities), while some equate debt with the overall liabilities (including spontaneous sources of funding). Most often, capital structure includes only long-term funding sources (the traditional approach) [9, p. 116]. Given that short-term debt had a continuous growth and dominated total liabilities of enterprises in Serbia, observing capital structure in the traditional (narrow) sense, would not provide a realistic picture of the financial position of enterprises and the risks to which financers and other stakeholders are exposed. For this reason, this paper has a broader focus and deals with the financial structure.

The importance of financial structure stems from a wide range of impacts that it generates. Financial structure influences risk, expectations, profitability, financial flexibility, managerial flexibility, as well as the strategy of the enterprise [8], [9, p. 131]. With this in mind, the decision on the financial structure is not just financial, but also a strategic decision. The importance of capital (and financial) structure is reflected in the fact that it has been the focus of financial theory and practice for very long time. From times of Modigliani and Miller (1958) until modern days, there have been many theories, the most significant being the Static Trade-Off Theory and the Pecking Order Theory.

Financial structure is affected by a large number of factors that are divided into two groups: internal and external. Internal factors are those related to the specifics of a particular enterprise (enterprise-specific variables). The most important internal factors are: the size of the enterprise, assets tangibility, the volatility of profits (and cash flow), profitability, growth opportunities etc. [7]. External factors are related to the characteristics of the industry and macroeconomic context. There are industries with high levels of financial leverage: the airline industry, steel industry, healthcare industry etc. On the other hand, certain industries are characterized by a low level of financial leverage, such as: food industry, pharmaceutical industry, Internet providers and others. The financial structure of an enterprise largely depends on the macroeconomic indicators, such as growth rate, inflation rate, unemployment rate, cost of capital, exchange rate and others.

Serbian economy is one of the economies with a delay in economic development and a delay in transition. The economy is characterized by a large number of structural imbalances that are the result of wrong transition goals of and inadequate tools for economic policies making. The global economic crisis, which broke out in 2008 and that is still ongoing in our region, only reinforced the consequences of structural imbalance and increased exposure of economy to risk factors [5].

Our economy is permanently under the threat of insolvency, primarily due to low economic base. Since 2000, the economy has recorded relatively high growth rates. Nevertheless, it has not reached the level of production from the beginning of the transition, in 1990. In addition, the trend of positive growth was interrupted by the outbreak of the crisis, after which the economy has either stagnated or entered into periodic recessionary phases [6].

Opportunities for enterprises to use alternative sources of funding are directly dependent on the development of the financial system, especially the capital market. The financial sector in Serbia has a "bank-centric" character. The capital market is shallow and contracting. In early 2015, the market capitalization of the Belgrade Stock Exchange amounted to around EUR 7 billion. In the conditions of underdevelopment of capital markets, debt remains a dominant source of external financing. Savings exceeds EUR 9 billion.

The primary focus of this paper is on individual enterprises. The calculated indicators for individual enterprises were used to calculate average indicators for the entire sample. Monitoring macroeconomic indicators and aggregate financial indicators provides an insight into

the general state of an economy. The downward trend of an economy certainly means that enterprises have poorer performance on average. However, it is more important than this average is to identify which enterprises are pulling that average. Is it a merit of a few enterprises, a certain sector or a common feature of all enterprises? Losses of unprecedented scale generated by certain enterprises, which dominate the aggregate sizes and average, fully offset the results and reduce the visibility of successful enterprises that are, may and must be the engine of the local economy.

It is necessary to make a clear distinction between successful and unsuccessful enterprises, profitable and unprofitable ones, those which are not indebted and those heavily indebted, less and more risky, between those in expansion and those in contraction, etc. The current state of the economy could be improved in two ways: by preventing further downfall of unsuccessful enterprises and/or by energizing those that are in expansion, or have growth potential. This requires focus on the enterprise. Therefore, the aim of this paper is to increase the visibility of an individual enterprise.

Financial structure indicators

A number of indicators may be used to measure financial structure. They are calculated as a ratio of debt or liabilities, on the one hand, and equity or assets of the enterprise, on the other hand. These indicators are often referred to as indicators of financial leverage because they serve as a measure of acceptability of ways of financing enterprises from borrowed sources [12, p. 94]. To calculate those, it is possible to use book values and market values for the balance sheet positions referred to. The use of market values is characteristic for developed market economies, while book value is generally accepted and applicable globally.

This study uses five basic indicators of financial structure: 1) the equity/total assets ratio; 2) the long-term liabilities/total assets ratio; 3) the short-term liabilities/total assets ratio; 4) the debt[6]/total assets ratio; and 5) the interest coverage ratio. Book values were used for calculating the values of the indicators. The key reason for this is the lack of data on the market value of enterprises, considering that in Serbia, and therefore in the sample, most enterprises are not listed in the financial market. The indicators were calculated for each individual enterprise in the sample. The indicators of the observed enterprises were then used to calculate average values for the sample as a whole. Two central tendency measures were used: arithmetic average (mean) and median. Median has great informative power given that, unlike average value, it is not sensitive to extreme values. The overview of financial structure indicators for the largest enterprises in Serbia is shown in Table 1.

All indicators in the paper are average sizes for the year, with the exception of 2008 where the indicators are related to 31 December since the earliest available financial statements are those as of 31/12/2008. The indicators for 2014

Table 1: Financial structure indicators of the largest enterprises in Serbia [Author's calculation based on data from [3]]

		2008	2009	2010	2011	2012	2013	2014
Equity / Total assets	Average	0.38	0.35	0.33	0.32	0.33	0.32	0.31
	Median	0.35	0.33	0.34	0.33	0.34	0.36	0.35
Long-term liabilities / Total assets	Average	0.18	0.18	0.18	0.18	0.18	0.17	0.17
	Median	0.09	0.09	0.10	0.11	0.11	0.10	0.10
Short-term liabilities / Total assets	Average	0.44	0.47	0.49	0.50	0.49	0.51	0.53
	Median	0.39	0.42	0.47	0.44	0.44	0.47	0.48
Debt / Total assets	Average	0.32	0.32	0.33	0.33	0.32	0.31	0.32
	Median	0.28	0.30	0.30	0.28	0.27	0.25	0.22
EBIT/ Interest expense	Average	4.03	3.21	3.96	4.08	2.16	4.99	4.18
	Median	1.25	1.59	1.58	1.95	1.56	2.21	1.56

6 Debt being sum of long term liabilities and short term financial liabilities [7].

were calculated based on a sample of 180 enterprises, given that there were no publicly available financial statements as of 1 December 2015 for 6 observed enterprises.

As already mentioned, equity can be used in the denominator of these indicators. However, the problem is the growing number of enterprises operating with loss over equity. In enterprises with equity position of zero, or with loss over equity (negative equity), the calculation of these indicators does not make sense and is, therefore, not done. Consequently, the use of these indicators would prevent mutual comparison of enterprises and call into question all of aggregate sizes at the level of the sample. With the entry into force of the new Law on Accounting, there was a change in disclosing loss over equity, which is now disclosed on the right side of the balance sheet.

In the year of the outbreak of the global financial crisis equity share in total assets of the largest enterprises in Serbia was 38% on average, while the share of long-term liabilities and short-term liabilities amounted to 18% and 44%, respectively. Year after year, financial structure has gradually changed in favour of the short-term sources of funding which, in 2013 and in 2014, surpassed total long-term sources (see Figure 2). The average value of debt/total assets ratio was the same in the first and last year of observation (32%), while interest coverage ratio increased from 4.03 to 4.18.

Median values of these indicators point to important facts. Firstly, in contrast to the average, the median of equity/total assets ratio changed minimally, with the same value in the initial and last year of observation (35%). This means that half of the enterprises surveyed had equity share above 35%, while the other half of the enterprises was below this threshold both in 2008 and 2014. Given that the average value of this indicator decreased, it means the enterprises below this limit have more extreme (low) value. The immediate suspect is contributions of enterprises with losses over equity. Further analysis will show the real reasons. Secondly, the share of long-term liabilities to total assets was almost unchanged. Thirdly, the median of the current liabilities/ total assets ratio increased from year to year, indicating that in 2008, half of the surveyed enterprises had a share of current liabilities of over 39%, whereas in 2014, half of the enterprises had a share above 48%. Fourthly, in terms of the debt/total assets indicator share, there is an opposite situation compared to the first indicator. The average value of this indicator was unchanged, but the median fell by 6 percentage points, which may be attributed to growth in operating liabilities, which will be discussed further. Finally, the median of the interest coverage ratio is higher comparing to 2008.

The above data clearly show a trend of rising indebtedness of the largest enterprises in Serbia. The share of total liabilities to assets increased from 62% in 2008 to 69% in 2014. In order to gain a deeper insight into debt at the enterprise level, Table 2 shows distribution of levels of

Figure 2: Trend of financial structure [Author]

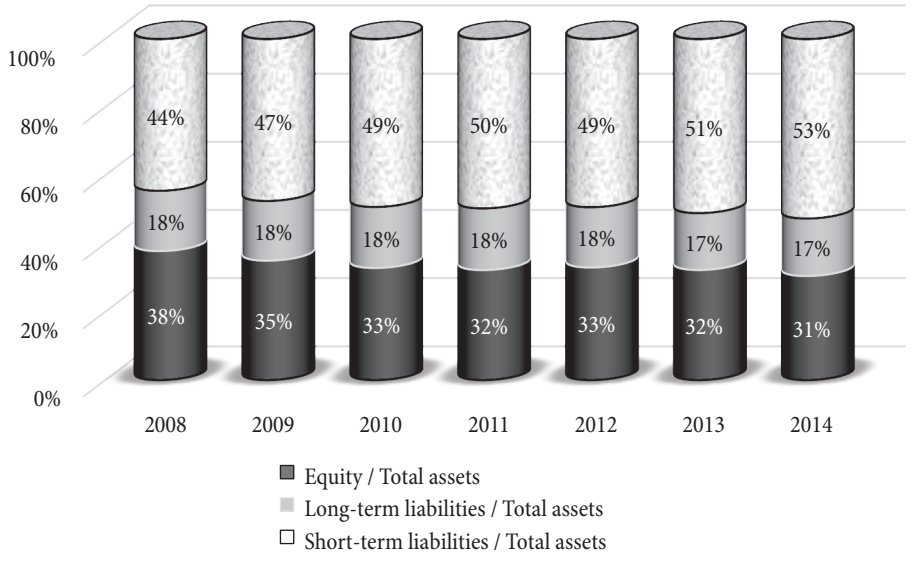


Table 2: Number of enterprises with different shares of liabilities in total assets [Author's calculation]

Total liabilities / Total assets	2008	2009	2010	2011	2012	2013	2014
<20%	21	14	14	13	11	14	15
20% - 40%	31	31	28	32	35	32	32
40% - 60%	34	37	35	38	32	37	36
60% - 80%	46	45	54	53	52	50	46
80% -100%	43	44	35	30	37	36	34
100%-120%	5	10	11	10	7	7	3
120% - 140%	3	0	1	1	6	0	3
>140%	3	5	8	9	6	10	11

indebtedness, or the number of enterprises with different shares of total liabilities in assets.

For most enterprises the share of liabilities in equity varies between 60-80%. If all enterprises are roughly divided into two categories, the conservative (with liabilities below 50%) and aggressive (with liabilities above 50%) it is clear that the latter category dominates. What is of particular concern are enterprises whose liabilities exceed the value of total assets (over 100%). It is clear from the table that these enterprises were plunging deeper into losses year after year (three times the number of enterprises with liabilities greater than 140% of total assets compared to 2008). The level of indebtedness of one enterprise exceeded even 300%.

In the period from 2008 to 2014, the 29 enterprises in the sample had losses over equity in one year minimum (usually in more than three years). To isolate and measure the impact of these, so-called business-controversial enterprises, the entire sample was divided into two groups: enterprises with positive equity value (157 enterprises) and enterprises with a negative equity value (29 enterprises). Average financial structure indicators for these two groups of enterprises are shown in Table 3.

Enterprises with positive equity exhibited stability in terms of the level of indebtedness. Average and median barely changed which is a mitigating factor in view of the trend for the entire sample. The share of total liabilities in the assets of these enterprises was around 56% on average. However, there was a noticeable change in the maturity of these liabilities (a reduction in long-term liabilities and a growth in short-term liabilities). In the second group of enterprises, the situation was alarming because the level of indebtedness was growing rapidly year by year. The average share of total liabilities in the assets of these enterprises increased by 50% compared to 2008. Such enormous growth in indebtedness was the result of

Table 3: Financial structure for enterprises with positive and with negative equity [Author's calculation]

		2008	2009	2010	2011	2012	2013	2014
Companies with positive equity value								
Total liabilities / Total assets	Average	0.56	0.56	0.57	0.56	0.56	0.56	0.55
	Median	0.58	0.59	0.61	0.58	0.61	0.59	0.57
Long-term liabilities / Total assets	Average	0.14	0.13	0.13	0.13	0.13	0.12	0.11
	Median	0.08	0.08	0.09	0.10	0.09	0.09	0.09
Short-term liabilities / Total assets	Average	0.42	0.43	0.44	0.43	0.43	0.43	0.44
	Median	0.38	0.41	0.42	0.41	0.41	0.40	0.41
Companies with negative equity value								
Total liabilities / Total assets	Average	0.95	1.13	1.23	1.29	1.25	1.32	1.47
	Median	0.91	1.01	1.05	1.09	1.04	1.09	1.21
Long-term liabilities / Total assets	Average	0.39	0.42	0.46	0.46	0.43	0.40	0.47
	Median	0.29	0.34	0.34	0.41	0.44	0.23	0.32
Short-term liabilities / Total assets	Average	0.56	0.71	0.78	0.84	0.82	0.92	0.99
	Median	0.50	0.66	0.83	0.75	0.75	0.77	0.82

growth, to a lesser extent, of the long-term liabilities, and to a greater extent, of the short-term liabilities. In 2014, the average share of total liabilities reached 147%, of which short-term liabilities were almost equal to the total assets of the enterprise (99%). The disastrous performance of these enterprises dragged along the average value of the largest enterprises in the sample, but certainly of the entire Serbian economy as well.

One of the important indicators of the quality of financial structure and long-term financial health is the net working capital (NWC), which is part of long-term sources of funding for the funding of working assets. Healthy enterprises have positive NWC or positive difference between the values of equity and long-term borrowed sources, on the one hand, and fixed assets, on the other hand. The total sum of NWC of all the enterprises in the sample was negative throughout the observation period and had a decreasing trend. When it comes to NWC at enterprise level, a third of the sample (around 64 enterprises) had negative NWC. The number of enterprises with negative NWC was relatively stable but it is obvious that their negative NWC was greater than the positive NWC of all other enterprises in the sample. This is, above all, attributed to the enterprises operating with losses over equity but certainly to a good portion of enterprises with positive equity as well. These enterprises fund part of their fixed assets through short-term loans and short-term spontaneous sources[7].

Unlike loans, spontaneous sources of financing are free of charge. Cash gap is used as an indicator of spontaneous sources of financing. It is obtained when the number of days of accounts payables outstanding is subtracted from the sum of the average number of days of inventory held and the number of days of average accounts receivables outstanding (i.e. "business cycle"). Cash gap is the period for which the enterprise has to provide additional sources for funding working assets. A reduction in cash deficit should lead to the reduction of indebtedness of the enterprise. However, reducing cash gap is not always a result of a more efficient management of working assets (for example, faster collection of receivables). On the contrary, it may be the result of prolonging the settlement of liabilities of the enterprise [13]. Table 4 shows the spontaneous sources of funding for the largest enterprises in Serbia.

At first glance, it appears that the average cash gap was and more than satisfactory. Based on low positive cash gap (of only a few days), it could be concluded that the enterprises were managing their working assets effectively with minimal additional funds for the settlement of liabilities to suppliers. However, the real situation was actually different. Therein lies the key trap of making conclusions solely on the basis of aggregate and average sizes. In this case, minimal positive cash gap was not the result of high efficiency, but the mass of prolonging the settlement of liabilities to suppliers.[8] In 2013, as many as half of the enterprises in the sample had a negative

Table 4: Cash gap [Author's calculation]

		2009	2010	2011	2012	2013	2014
1. No. days inventory held	Average	52	49	47	46	46	54
	Median	30	33	35	34	31	35
2. No. days accounts receivables outstanding	Average	75	72	73	70	74	74
	Median	59	55	55	55	56	54
3. No. days accounts payables outstanding	Average	124	123	115	113	117	110
	Median	81	82	84	82	82	75
Cash gap (1+2-3)	Average	3	(2)	5	3	3	18
	Median	10	12	14	11	4	13
Companies with negative cash gap	Number	68	75	75	73	84	74
	Share	40%	45%	45%	43%	50%	46%

Note: When calculating average values of the indicators, we have eliminated the extreme values that were thousands of times larger than the usual values of the parameters. Most often it was only one observation unit that deformed the average value of the indicator and distorts it significantly further away from the median.

7 Short-term spontaneous sources include payables to suppliers for delivered raw materials, energy sources and services rendered with grace period (the so-called "trade credits"), liabilities for deferred payment of taxes and contributions, liabilities for employees, etc. [12, p. 191].

8 Low level of average cash gap is a result of offset of the length of a (long) business cycle and (long) accounts payables outstanding period.

cash gap. The financial burden of these enterprises was spilled over to their suppliers who finance working capital and liquidity of the enterprise. This type of financing is unsustainable in the long term and represents a clear sign of chronic insolvency of the Serbian economy [13].

Bearing in mind that the level of debt increased, a natural question arises: what was actually being funded to such excess? Borrowing as a result of investment activities which would give high yields in the long run would be justified and even desirable. However, the growth rates of the enterprises do not justify such a thesis. Sales growth was recorded only in 2010, after which there was a continuous decline. The average annual growth rate of sales revenues reached the negative zone in 2014 and amounted to -2%. The median growth rate of sales revenues was at zero level, which means half of the enterprises observed had positive sales growth and half of them had negative sales growth in 2014.

The same trend applies for the growth rate of the total assets of the largest enterprises. The average annual growth rate of total assets declined over the last four years. In 2014, the average and median growth rate of total assets amounted to 3%. The minimum growth and maximum indebtedness indicate that the largest enterprises in Serbia, on average, do not finance their growth, but survival. Compared to the period of the onset of the global crisis, the number of enterprises that generate negative growth rates increased significantly which explains the pronounced downward trend in the business and investment activities at the level of the sample.

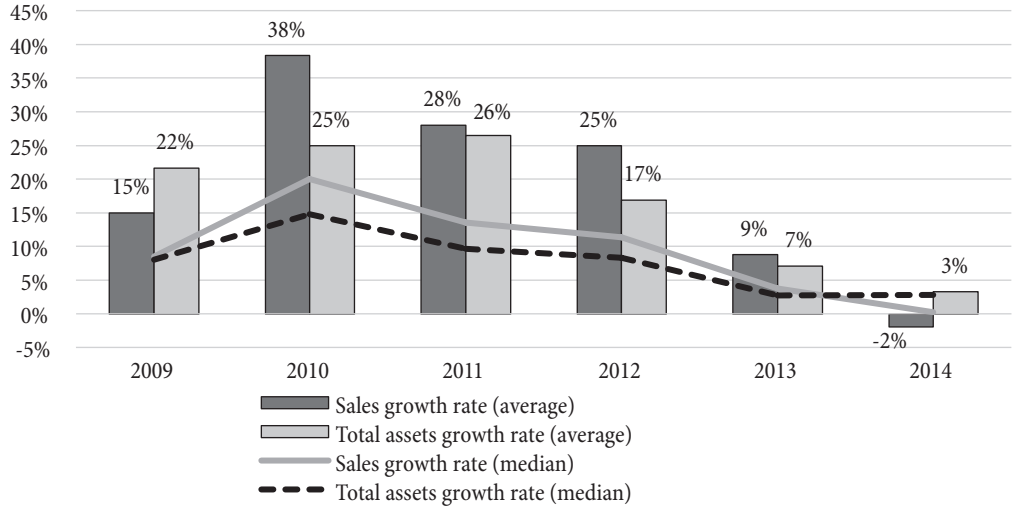
Profitability indicators and the effects of financial leverage

Relying on what we have previously learned and bearing in mind the macroeconomic indicators, it is possible to intuitively deduce a conclusion on the "profitability" of the largest enterprises in Serbia. For the purposes of measuring profitability, we used basic accounting indicators of profitability: common profit margins and the investment profitability indicators, such as return on total assets (ROA) and return on equity (ROE).

The largest number (about 77%) of the largest enterprises in Serbia operated with net profit in the period after the onset of the crisis. At first glance, this information seems encouraging. However, the number of the unprofitable enterprises increased significantly in 2014[9] (Figure 4).

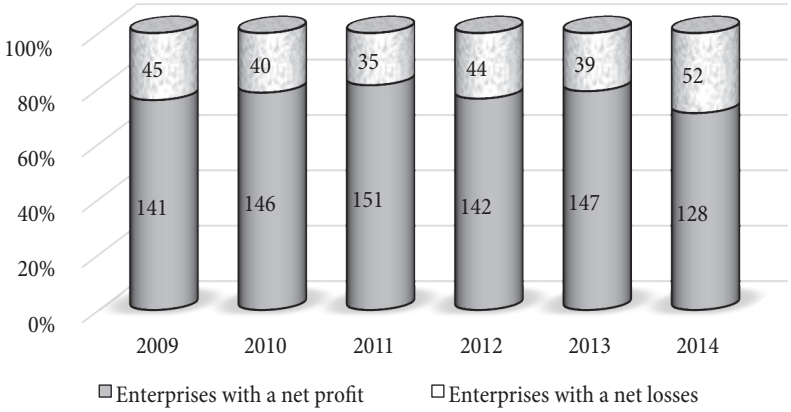
Our economy is characterized by unacceptably low profit potential. The main reasons are, on the one hand, inefficiency and lack of profit margins, and insufficient returns on equity, on the other hand. The average

Figure 3: Sales growth rates and total assets growth rates of the largest enterprises in Serbia [Author]



9 Given the fact that there are still no publicly available financial statements for 2014 for 6 of the observed enterprises, it is possible that the total number of unprofitable enterprises is even higher for that year.

Figure 4: The ratio of profitable and unprofitable enterprises [Author]



profitability of large enterprises and the entire economy was negative in the period of 2008-2013 with the exception of the year 2011.[10]

When it comes to the largest enterprises in Serbia, average profitability was slightly better and oscillated by a couple percent around zero. The average profitability was negative in the first and last year of observation period and marginally positive in the meantime. Profit margins are shown in Table 5.

The table shows three levels of margins in order to provide a deeper insight into the structure of net profit/loss. EBITDA is used as a rough approximation of cash flow from operating activities. EBITDA margin of the largest enterprises had its maximum value in 2010 (16%), followed by a gradual decline down to 10% in 2014. EBIT represents the concept of the profit that an enterprise makes before settling outstanding liabilities towards its funders and, finally, the state. EBIT margin had the same trend as the EBITDA margin, achieving a minimum value of 5% in 2014. When we consider that the cost of debt in Serbia is extremely high (double-digit interest rates), it is clear that profit margins are not sufficient to cover them. Finally, the net profit margin shows how many dinars from sales revenues come into the possession of the owner. In the period after the outbreak of the crisis, average net profit margin ranged between ± 3%.

One of the key issues raised in this paper is how financial structure affects the profitability of the enterprise. The impact of borrowed sources on profitability, or returns on equity, is measured by the effects of financial leverage. Financial leverage has a two-way effect. Borrowing can cause both an increase and a decrease in profitability for the owners. In a situation where operating income is not sufficient to cover the fixed costs of debt, financial leverage has a negative effect due to the use of debt which reduces the yield for the owners. Opposite is true as well. Given that the interest expenses are fixed and are a known value, the direction and intensity of the impact of financial leverage is determined by the level of operating income. Volatility of cash flow is a key problem in assessing the effects of financial leverage.

The effects of financial leverage can be estimated by comparing ROA and ROE. On the one hand, ROA is free from the effects of financial structure, while ROE

Table 5: Profit margins of the largest enterprises in Serbia [Author's calculation]

		2009	2010	2011	2012	2013	2014
EBITDA margin	Average	0.13	0.16	0.14	0.13	0.10	0.10
	Median	0.09	0.10	0.10	0.10	0.09	0.08
EBIT margin	Average	0.07	0.10	0.09	0.08	0.06	0.05
	Median	0.07	0.07	0.07	0.07	0.05	0.05
Profit margin	Average	(0.02)	0.02	0.03	0.01	0.02	(0.03)
	Median	0.02	0.02	0.02	0.02	0.02	0.01

10 The positive result in 2011 was achieved due to the stable foreign exchange rate, or considerably lower negative exchange rate differences based on it. For further details see [14, pp. 334-336].

includes these effects. In the denominator ROA is EBIT[11], the concept of profit, which represents an approximation of the profit that the enterprise made when it was fully funded from its own resources. Theoretically, ROA and ROE would be the same for enterprises that are fully funded from equity. If ROE was above the level of ROA, then the utilisation of debt had a positive impact on the profitability of equity, and vice versa.

It is superfluous to discuss the effects of financial leverage on enterprises with negative equity, and in particular to present evidence given that there is no equity. Therefore, the analysis of the effects of financial leverage is focused on enterprises with positive equity.

In the period of 2009-2012, ROA was relatively stable at around 11%. After that, ROA declined, and was 8% in 2013 and 7% in 2014. On the other hand, ROE was more dynamic with strong negative trend. In the period from 2009 to 2013, the enterprises with positive equity had positive financial leverage because ROE was above the level of ROA. In 2009, average ROE was 22.5% while in 2013 it was 16%. However, in 2014, the largest enterprises in Serbia had negative financial leverage considering that the average ROE fell below the level of ROA and accounted for 4.5% only (Figure 5). Since average sales growth rate was negative in 2014, operating income was not sufficient to cover the high cost of debt.

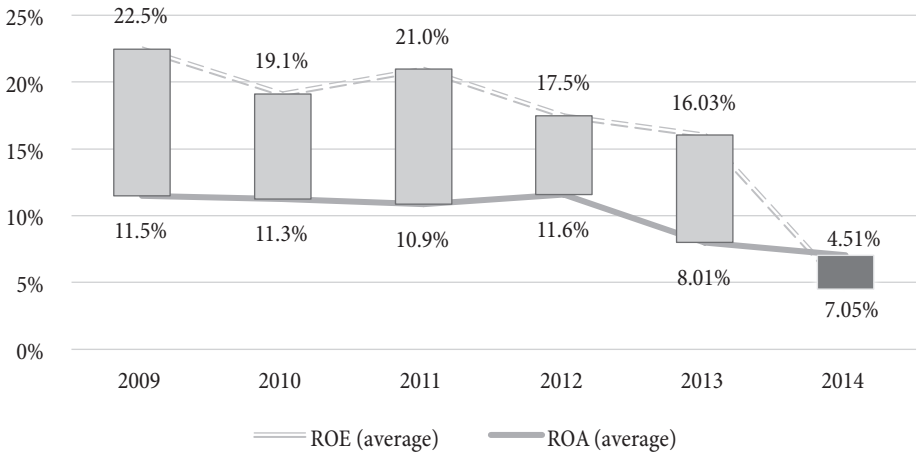
From the perspective of the entire time horizon observed, the largest enterprises in Serbia (with positive equity) generated positive financial leverage. Six-year average ROA of the observed enterprises amounted to 10%, while the six-year ROE was 16%. Although 77% of the enterprises from the entire sample operated with profit, about 50% of them experienced positive effects from financial leverage.

To get a more complete picture of profitability at the level of enterprises, Figure 6 shows the six-year average ROA and ROE of the observed enterprises. ROE dispersion around the average value is significantly higher than the ROA reflecting, primarily, the different financial structure of the enterprises. It is readily observed that the majority of enterprises were operating on the margins of profitability (concentrated around zero).

Bankruptcy risk indicators

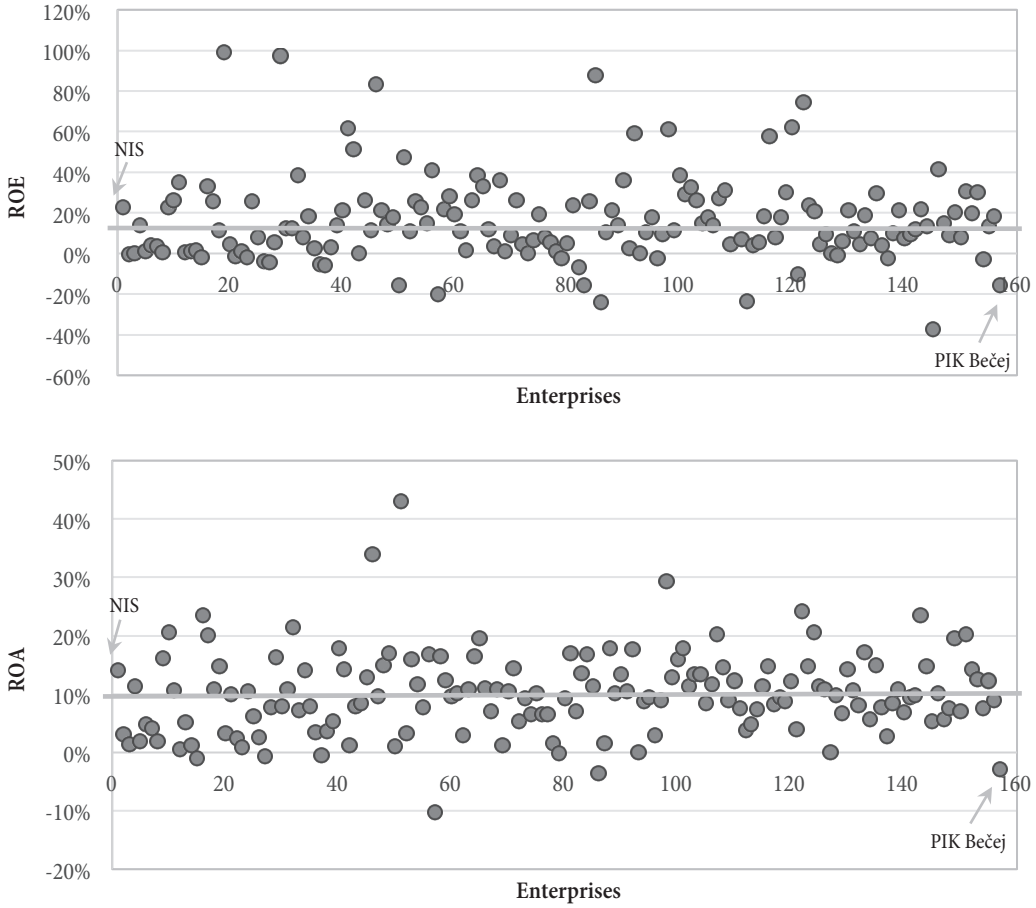
Excessive borrowing is often the cause of financial problems and bankruptcy of the enterprises. However, there are enterprises with extremely high financial leverage that survive and achieve high rates of return, while enterprises with a prudent borrowing policy disappear. This means that there are a great number of factors that determine the success or failure of an enterprise. Credit worthiness of an enterprise used to be assessed only on the basis of basic financial indicators, such as liquidity ratios, profitability and solvency, which are observed separately. The extent to which a creditor would place importance on profitability or liquidity or solvency depends on his knowledge and personal preferences. This problem is particularly present

Figure 5: The effects of financial leverage of enterprises with positive equity [Author]



11 EBIT is obtained as a sum of net profit and interest rates expenses adjusted by tax savings. See more in [12, p. 142-144].

Figure 6: Six-year average ROE and ROA for enterprises with positive equity [Author]



Note: The x ordinate shows enterprises with positive equity by size of operating revenues starting from the largest (number 1 – NIS) down to the smallest (number 157 – PIK Bečej). Horizontal line shows the average return for all enterprises.

in situations where these indicators are moving in the opposite direction, i.e. when, for example, indicators of profitability are increasing and those of liquidity are declining. In 1968, motivated by this problem, Edward Altman made the first model in which he integrated several indicators of financial health in the so-called "Z-core" [1].

It is a model that estimates the probability of bankruptcy of an enterprise based on multivariate analysis. It was based on a comparative analysis of two groups of enterprises: healthy enterprises and enterprises that went bankrupt. The result of the analysis is the coefficients of discrimination, which measure the intensity of the effects of certain financial indicators on credit risk. The original version of the Z-score was based on the data on open joint stock manufacturing companies from the developed market economies. Over time, the Z-Score was revised several times in order to expand the application and improve its accuracy. In this paper, we have used the EMS model (Emerging Market Scoring Model), a variant of Z-results adapted to developing countries [2].

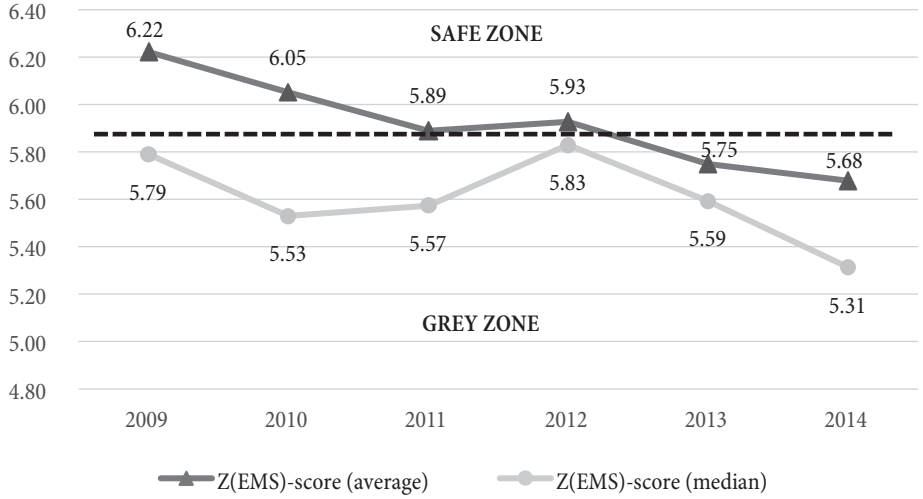
The EMS model is based on: 1) the financial analysis that is characteristic of universal (generic) models for risk measurement; and 2) the specific credit risks typical for developing countries (capital markets). It is appropriate for the analysis of manufacturing and service enterprises, as well as for various legal forms. The Z(EMS) score is obtained by the following formula:

$$Z(EMS) = 6.56\,X1 + 3.26\,X2 + 6.72\,X3 + 1.05X4 + 3.25$$

where: X1 = working capital/total assets; X2 = retained earnings/total assets; X3 = operating income/total assets; and X4 = book value of equity/total value of liabilities.

A distinction is made between three levels of Z-Score, and three safety zones for enterprises. On one side are enterprises with low risk of bankruptcy (safe zone), and on the other enterprises with high risk of bankruptcy (distress or red zone). Between these two extremes there is a buffer zone (grey zone) with a moderate level of risk of bankruptcy.

Figure 7: Z(EMS)-score of the largest enterprises in Serbia [Author]



The average Z(EMS) score for the largest enterprises in Serbia in the period from 2009 to 2014 is shown in Figure 7. The average Z(EMS) score of the observed enterprises decreased from year to year, indicating the increase in risk of bankruptcy. In the year after the outbreak of the financial crisis, the average Z-Score stood at 6.22 while in 2014 it amounted to 5.68. In 2013, the average Z-Score was transferred from the safe to a grey zone with a downward trend in 2014. The negative trend of this indicator is the result of growth of indebtedness, the decline in business activity and the marginal profitability.

Based on Z(EMS) results, it is possible to determine an equivalent credit rating. The credit rating determined by credit rating agencies is the most complete and the most reliable indicator of credit risk. However, in the absence of such indicators, various approximations are used. Damodaran, for example, uses the interest coverage ratio as a rough approximation of credit rating [4, p. 73].

Enterprises with Z(EMS) score above 5.85 are in a safe zone, or in the comfort zone, given that the credit risk is at sufficiently low levels to provide security to creditors. Equivalent credit ratings for such enterprises range in the interval from AAA to BBB (investment grade ratings). Z(EMS) score lower than 4.15 is in the red zone, which indicates high probability of bankruptcy (equivalent to a credit rating in the range of B to D). The grey zone represents the intermediate zone, i.e. it is in the range from 4.15 to 5.85 (equivalent to credit ratings in the range from BBB to B). The criteria for determining credit rating based on Z-Score and credit ratings for the observed enterprises are shown in Table 6.

Looking at changes in the relative relationship between the three safety zones, it is possible to notice a decline in the number of enterprises in the safe zone, which spilled over into the grey zone. The number of enterprises in the high-risk zone was the same in the first and last year of observation. However, the analysis of the relationships within each safety zone shows a trend of deterioration of credit quality. For example, although the number of enterprises in the red zone remained unchanged, the number of enterprises with a credit rating of D, which signals bankruptcy, had been increasing year by year, reaching a peak in 2014.

Credit rating assigned based on the value of Z(EMS) score could be further modified in order to improve its accuracy (the so called "modified credit rating") by including the following factors: 1) the vulnerability of the enterprise to currency depreciation; 2) the rating of the industry it belongs to; and 3) competitive position in the industry[12].

Conclusion

The financial structure of the largest enterprises Serbia in the period from 2008 to 2014 was characterized by: 1) excessive indebtedness; and 2) unfavourable maturity structure. Firstly, the largest enterprises in Serbia were

12 For example, with enterprises that are leaders in their industry, the initially determined credit rating is raised by a level on the ranking scale. More on this and the EMS model in [2].

Table 6: The number of enterprises by Z(EMS)-score and credit rating [Author's calculation]

	Credit rating	Z(EMS) Criteria	2009	2010	2011	2012	2013	2014
SAFE ZONE	AAA	>8.15	43	38	37	33	37	36
	AA+	7.60 - 8.15	6	12	5	7	7	9
	AA	7.30 - 7.60	10	7	10	7	5	6
	AA-	7.00 - 7.30	4	6	10	16	10	3
	A+	6.85 - 7.00	7	2	2	1	2	3
	A	6.65 - 6.85	6	2	5	8	8	4
	A-	6.40 - 6.65	4	7	4	8	2	6
	BBB+	6.25 - 6.40	3	1	6	2	5	1
	BBB	5.85 -6,25	9	9	8	9	8	12
		Total	92	84	87	91	84	80
GREY ZONE	BBB-	5.65 - 5.85	2	6	4	5	7	4
	BB+	5.25 - 5.65	7	9	11	13	12	8
	BB	4.95 - 5.25	8	12	7	8	4	5
	BB-	4.75 - 4.95	4	4	8	5	5	8
	B+	4.50 - 4.75	6	9	8	8	10	7
	B	4.15 -4.50	10	11	13	10	13	11
		Total	37	51	51	49	51	43
DISTRESS ZONE	B-	3.75 - 4.15	8	9	9	5	7	11
	CCC+	3.20 - 3.75	15	12	4	11	9	8
	CCC	2.50 - 3.20	9	5	11	10	12	11
	CCC-	1.75 - 2.50	10	9	7	4	6	5
	D	<1.75	15	16	17	16	17	22
		Total	57	51	48	46	51	57

heavily indebted with the trend of continuous growth in the level of debt. In the year of outbreak of the global financial crisis, the average share of total liabilities to assets amounted to 62% while in 2014 it amounted to 69%. Most of the enterprises had the liabilities to assets ratio that varied between 60-80%. A huge problem posed the enterprises whose liabilities exceed the value of total assets (negative equity). In the period from 2008 to 2014, 29 enterprises from the sample had loss over equity at least in one year, usually in the more than three years. The level of indebtedness of these enterprises was rapidly increasing year after year, which dragged down the average of the sample and the entire Serbian economy.

Secondly, every year, financial structure gradually changed in favour of short-term funding sources. Since 2013, short-term sources exceed the overall long-term funding sources. In 2014, short-term liabilities accounted for 77% of total liabilities of the largest enterprises, which demonstrates immense pressure on their cash flow. Unfavourable maturity structure of funding sources may also be observed through NWC. Although a third of the observed enterprises had negative NWC, the sum NWC for all the enterprises in the sample was negative throughout the observation period. It is, above all, attributed to the enterprises with losses over equity but certainly to a good portion of enterprises with positive equity as well.

The largest enterprises in Serbia were massively reliant on spontaneous sources of financing. In 2013, as many as half of the enterprises in the sample had a negative cash gap which means that the financing of working capital and liquidity spilled over to their suppliers. This type of financing is unsustainable in the long run.

What is most worrying is the serious decline in the level of business activity. The sales growth rate and total assets growth rate rose in 2010 followed by a continuous fall. In 2014, these rates had minimum values in the observed time horizon. The average growth rate of sales revenues was negative (-2%) for the first time, while the growth rate of total assets was only 3%.

The analysis of the effects of financial leverage was conducted on enterprises with positive equity since the effects of the enterprises with negative equity are more

than obvious. In the period from 2009 to 2013, the largest enterprises in Serbia had positive financial leverage, which was gradually reduced due to the decrease in profitability (of both ROE and ROA). In 2014, average ROE fell below the level of ROA indicating a negative financial leverage.

The high debt costs and the inability of funding through financial market hinder the solution to the problem of low liquidity of enterprises and financing growth. Expensive and restrictively available capital slows down cash flow in the supply chain thereby slowing turnover in the enterprise and increases investment in working capital. When the otherwise limited supply of capital is used to solve problems of inefficiency and lack of liquidity, space for capital investment completely diminishes. Such operation is untenable.

The high cost of capital, combined with other factors that reduce profitability of an enterprise leads to losses for an enterprise, which gradually erodes equity and pushes the enterprise towards the state of insolvency and bankruptcy. The use of EMS model pointed to an increase in the risk of bankruptcy as the average Z(EMS) score of the observed enterprises decreased from year to year. In 2013, average Z-Score transitioned from the safe to a grey zone, with a downward trend in 2014. The crisis has hit the most vital segment of the economy (enterprises with investment credit rating), which has been decreasing, while the high-risk enterprises (distress zone) are approaching the brink of bankruptcy. Therefore, based on the overall analysis, we can conclude that the most enterprises in Serbia are undercapitalized and at high risk of bankruptcy. Minimum growth and maximum debt in 2014 indicate that the largest enterprises in Serbia, on average, do not finance growth, but their survival.

References

1. Altman, E. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance*, 23, 189-209.
2. Altman, E. (2005). An emerging market credit scoring system for corporate bonds. *Emerging Markets Review*, 6, 311-323.
3. Cube Risk Management Solutions. (2015). Financial reports, B2B Online, Retrieved from https://b2bonline.rs/sr.
4. Damodaran, A. (2010). *Applied corporate finance*. Ney York: Wiley.
5. Đuričin, D., Vuksanović, I. (2014) „Quest for new development model and economic policy platform for Serbia: the role of industrial policy", *Ekonomika preduzeća, Sep-Oct*, 229-250.
6. Đuričin, D., & Vuksanović, I. (2015). Think through strategy: New vision for industrialization of economy and modernization of society. *Ekonomika preduzeća, Jan-Feb*, 1-15.
7. Frank, M. Z., & Goyal, V. K. (2009). Capital Structure Decisions: Which Factors are Reliably Important? *Financial Management, Spring*, 1-37.
8. Kaličanin, Đ., & Todorović, M. (2014). Interactions between business and financial strategies in Serbian companies. *Economic Annals, Vol. LI X*, 203, 55-74.
9. Kuč, V. (2015). Uloga i značaj strukture kapitala u stvaranju vrednosti, in Kaličanin, Đ., Lončar, D., Bogetić, Z., & Todorović, M. (eds). Stvaranje vrednosti: *Teorijsko praktični aspekti*. Beograd: CID, 115-132.
10. Law on Accounting, Official Gazette of the Republic of Serbia 46/2006.
11. Law on Accounting, Official Gazette of the Republic of Serbia 62/2013.
12. Malinić, D., & Milićević, V. (2010). *Upravljačko računovodstvo*. Beograd: CID.
13. Malinić, D., Denčić-Mihajlov, & K., Ljubenović, E. (2013). The Determinants of Capital Structure in Emerging Capital Markets: Evidence from Serbia. *Eurepean Research Studies, Vol XVI, 2*, 98-119.
14. Malinić, D., Milićević, V., & Glišić, M. (2014). Interdependence of enterprise size and vitality in Serbian economy. *Ekonomika preduzeća, Nov-Dec*, 323-347.
15. Statistical Office of the Republic of Serbia. (2015). Companies in the Republic of Serbia, by size, 2014, Working paper, No. 90, October 2015, Belgrade.

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IMPLEMENTATION OF INTERNATIONAL STANDARDS IN SERBIAN CONTRACT LAW: AN OVERVIEW OF SOLUTIONS OFFERED BY THE FUTURE CIVIL CODE OF SERBIA*

Primena međunarodnih standarda u srpskom ugovornom pravu - pogled na rešenja budućeg Građanskog zakonika Srbije

Abstract

The paper presents a brief analysis of the most important issues related to the implementation of international standards in Serbian contract law. In that respect, the paper examines main transnational documents relevant for contract law - international conventions and other sources of uniform contract law, the UN Convention on Contracts for the International Sale of Goods (CISG), the sphere of its application, the main differences between the CISG and the Serbian Law of Obligations, the application of the CISG by Serbian courts and arbitrations and the advantages of its application in business practice. Furthermore, it provides readers with an overview of the future Civil Code of Serbia, its central principles, solutions and reforms in the field of contract law, particularly with regard to the acceptance of international standards and principles. The analysis has lead the authors to the conclusion that the future codification in the form of Civil Code is a continuation of the process of full harmonization of Serbian contract law with the internationally accepted standards and achievements of European legal civilization, which can strongly contribute to the overall improvement of business environment in Serbia.

Key words: *international standards, transnational documents, international conventions, contract law, uniform rules, Civil Code, implementation, business practice*

Sažetak

Rad se bavi analizom primene primene međunarodnih standarda u srpskom ugovornom pravu. U radu su analizirani najznačajniji transnacionalni dokumenti relevantni za oblast ugovornog prava – međunarodne konvencije i ostali izvori uniformnog ugovornog prava, Konvencija UN o ugovorima o međunarodnoj prodaji robe (Bečka konvencija o međunarodnoj prodaji), oblast primene Konvencije, osnovne razlike između Konvencije i Srpskog Zakona o obligacionim odnosima, primena Konvencije od strane srpskih sudova i arbitraža, kao i prednosti primene Konvencije u poslovnoj praksi. Pored toga, u radu je učinjen osvrt na osnovna rešenja, principe i reforme budućeg Građanskog zakonika Srbije u oblasti ugovornog prava, posebno sa aspekta prihvaćenosti međunarodnih standarda i načela u Zakoniku. Učinjena analiza vodi zaključku da budući Građanski zakonik predstavlja nastavak procesa potpunog usklađivanja srpskog ugovornog prava sa međunarodno prihvaćenim standardima i tekovinama Evropske pravne civilizacije, čime značajno doprinosi unapređenju uslova poslovnog okruženja u Srbiji.

Ključne reči: *međunarodni standardi, transnacionalni dokumenti, međunarodne konvencije, ugovorno pravo, uniformna pravila, Građanski zakonik, primena, poslovna praksa*

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Introduction

Sources of uniform contract law, such as international conventions, principles of contract law, model laws, standard clauses, model contracts, legal guides and other documents adopted and recommended by the relevant international organizations, in most cases are based on the worldwide acceptance by lawyers raised in different traditions and backgrounds. In that regard, they represent transnational documents which are supposed to minimize the risks arising out of the differences between the national legal systems, being at the same time a "bridge" between the particularity of the local national rules and the international solutions with no national borders. These documents can, as a whole, be viewed as a general framework for the numerous types and specific varieties of transactions in international commerce. Accordingly, in implementing this general framework in practice, the parties should adapt it to the background and nature of each particular contract as well as to the specific conditions of the applicable law where such requirements exist [1, p. 253-278].

In that regard, acceptance, implementation and interpretation of the transnational documents in the field of contract law are the issues of great complexity and practical importance for international commercial contracts in general. This paper is focused on these questions, analysing: international standards contained in transnational documents relevant for contract law – international conventions and other sources of uniform contract law (I), the UN Convention on Contracts for the International Sale of Goods (CISG), the sphere of its application, the main differences between the CISG, its application by Serbian courts and arbitrations and the advantages of its application in business practice (II), the future Civil Code of Serbia, examining the general meaning and importance of the codification of civil law, alignment of the Civil Code with the European legislation and widely accepted international standards, the most significant novelties introduced by the Civil Code related to the implementation of international rules to the field of contract law and the regulation of new contracts by the Civil Code (III). The analysis of the above issues is wrapped up with a summary overview of the legal framework for arbitration as the most important method of resolving disputes arising from business contracts (IV).

Transnational documents in the field of contract law

International conventions

A particularly important source of contract law are the ratified international conventions governing, in a uniform way, the matters related to the field of contract law [2, p.156-160]. Ratified and promulgated international conventions are part of the internal legal order and are directly applicable when the requirements for application of each particular convention are met. Serbia has ratified numerous international conventions that directly, or indirectly, refer to the sphere of contract law. According to the Constitution of the Republic of Serbia, the ratified international conventions are part of the internal legal order of the Republic of Serbia; they must not be contrary to the Constitution while laws and other legal acts must not be contrary to the ratified international convention.[1] Ratified international conventions in Serbia are published in the official gazette together with the promulgating act.[2]

One of the most important international documents regarding the unification of contract law is the UN Convention on Contracts for the International Sale of Goods (CISG) of 1980.[3] As of December 2015, the CISG has 83 State Parties. These Member States belong to various legal traditions and economic systems. The CISG membership is particularly high in North America and Europe, and among the developed countries. The former Yugoslavia signed and ratified the CISG on 11th April 1980 and 27th March 1985, respectively. On 12th March 2001, the former Federal Republic of Yugoslavia declared the following: "The Government of the Federal Republic of Yugoslavia, having considered the Convention, succeeds to the same undertakes faithfully to perform and carry out the stipulations therein contained as from April 27th,1992, the date upon which the Federal Republic of

1 Art.16 and Art.194, Constitution of the Republic of Serbia.

2 Official Gazette of RS, International Contracts (*Službeni glasnik RS, Međunarodni ugovori*).

3 For the CISG in general, and for the sphere of its application see [3]; [4] and [5]. In Serbian doctrine, see [6].; [7, pp.272-307] and [2].

Yugoslavia assumed responsibility for its international relations". The Constitutional Charter of Serbia and Montenegro Union (4th February 2003) provided for the transmission of all the rights and obligations of former Federal Republic of Yugoslavia to Serbia and Montenegro Union (Art 63). Furthermore, the Charter stated that, in case of separation of Montenegro from the Union, all international documents shall be automatically taken over by the Republic of Serbia as the successor (Art 60.4). On the basis of these rules, the CISG has been in force in the Republic of Serbia since 27th April 1992.

Other international conventions which seek to achieve unification of substantive law in the field of contractual relations, which have been ratified in Serbia, include: Convention on the Limitation Period in the International Sale of Goods of 1974, Convention providing a Uniform Law for Bills of Exchange and Promissory Notes of 1930, Convention on the Contract for the International Carriage of Passengers and Luggage of 1973, Convention on the Contract for the International Carriage of Goods by Road of 1955, Convention concerning International Carriage by Rail (COTIF) of 1980 including Uniform Rules concerning the Contract for International Carriage of Passengers and Luggage by Rail (CIV) and Uniform Rules on the Contract for International Carriage of Goods by Rail (CIM), Convention for the Unification of Certain Rules relating to International Carriage by Air (Warsaw Convention) of 1929.[4]

Other sources of uniform contract law

In addition to the ratified international conventions, other sources of uniform contract law are also quite important for the development of contract law on Serbia. These sources include UNIDROIT Principles of International Commercial Contracts (UNIDROIT Principles), non-ratified international conventions, model laws, standard clauses, model contracts, legal guides, instructions, recommendations and other documents adopted and recommended by the relevant international organizations, especially UNCITRAL, UNIDROIT and ICC.

The influence of UNIDROIT Principles on Serbian contract law is reflected, first of all, in the fact that the contracting parties from Serbia, in concluding international commercial contracts, have begun in recent years to stipulate their application either through a choice of law clause explicitly providing that the contract shall be governed by these principles (*e.g.* "This Contract shall be governed by the UNIDROIT Principles of International Commercial Contracts"), or by providing that the contract shall be governed by general principles of law, or by *lex mercatoria*. Furthermore, Serbian arbitrators refer to UNIDROIT Principles in the reasoning of awards in some cases.[5] Finally, certain solutions of UNIDROIT Principles and their comparative analysis with the relevant rules of the Serbian Law of Obligations are intensively discussed in the doctrine of Serbian contract law, which has been paying more and more attention to the sources of uniform law.

The relevant international conventions not ratified by Serbia such as "UNIDROIT Convention on International Financial Leasing", "UNIDROIT Convention on International Factoring", and "Convention on Agency in the International Sale of Goods (Geneva)" have a significant role in the development of Serbian contract law, first of all as models for the national legislators in drafting new rules in certain fields of contract law, or in amending the existing ones. In that regard, it should be noted that the UNIDROIT Convention on International Financial Leasing of 20th May 1988 (Ottawa) was the main source of the Serbian Law on Financial Leasing which came into force on 27th May 2003.[6] The Serbian Law incorporates many provisions from that Convention, especially with respect to the principal issues. Consequently, the internationally accepted standards have been integrated into the national legal system, compatibly with the entire national legal system, the legal tradition and fundamental legal principles[10, pp.503-516].

4 For the list of international conventions relating to contract law and private international law ratified by Serbia, see [8].

5 See for example the award of International Trade Arbitration attached to the Chamber of Commerce of Serbia T-9/07, 23.01.2008 where the tribunal expressed the following view: "The arbitration tribunal considers that no important difference exists regarding damages due to non-performance of obligation from the part of the seller which he could foresee at the time of conclusion of contract as a reasonable person, independently on the legal basis to which the tribunal refers. All three documents – CISG, PECL and UNIDROIT Principles regulate this question on a similar manner".

6 *Law on Financial Leasing*[28]. About the Serbian Law on Financial Leasing, see, [9].

European Union directives

The directives of the European Union are binding as to the results to be achieved upon each Member State of the European Union to which they are addressed. The Member States are obliged to take the national measures necessary to achieve the results set out in the directive but they are free to decide how to transpose the directive into the national law.

At the time of writing this paper, Serbia is still on its road to join the Union, so for the time being, one may only speak of the indirect influence of the EU directives on Serbian contract law. In any case, due to the EU membership of Serbia in prospect, the directives are supposed to be gradually transposed into the national law. This should be ensured on a case by case basis, taking into account the nature, background and wording of each particular directive as well as the results to be achieved. It means that the existing national legislation should be modified, or national provisions enacted for the sake of harmonization. In the field of contract law, in that regard, directives related to consumer protection, electronic signature and electronic commerce in general are of special importance. The European Union directives related to contract law should be transposed into Serbian national law by enacting new laws or by-laws, together with adequate changes of the existing relevant laws.[7]

Application of the UN Convention on International Sale of Goods in Serbian law

Sphere of application of the CISG

The UN Convention on Contracts for the International Sale of Goods (CISG) is one of the most important international uniform law instruments, as evidenced both by the number of Contracting States and the number of cases governed worldwide by its uniform rules. The CISG has been the centre of a tremendous interest in legal writing and has drawn the attention of domestic and international legislators. Thus, the understanding of the main rules regarding the sphere of application of the CISG in Serbian contract law is of great importance for the Serbian parties in international commercial contracts and for the Serbian courts in resolution of international business disputes.

The sphere of application of the CISG is defined by Articles 1 – 6. The CISG governs the contract of sale of goods (application *ratione materiae*) between the parties whose places of business are in different States (application *ratione personae*) when the states are Contracting States (direct application) or when the rules of private international law lead to the application of the law of a Contracting state (indirect application). These basic requirements for application of the CISG are defined by Article 1. On the other hand, Article 2 excludes certain types of sales from the scope of the CISG and Article 3 establishes additional requirements for the application of the CISG to the contracts for the goods to be manufactured and mixed contracts. Furthermore, the extent to which sales transactions are governed by the CISG is determined by Articles 4 and 5. Regarding the application of the CISG, the principle of parties' autonomy is expressly provided by Article 6 CISG, stating that the parties may exclude application of the CISG or derogate from or vary the effect of any of its provisions, with the exemption of the rules concerning the writing provided for in article 12 CISG. It means, in other words, that the CISG is not the mandatory law of a Contracting State. In regard to the application, the CISG adopts the "opting out" system, according to which the CISG is to be applied automatically if the conditions of its application *ratione materiae* and *ratione personae* are met and if the parties did not exclude its application. The parties may exclude the application of the CISG in whole or only in part by an express provision (a choice of law clause, either nominating the law of a non-contracting state or simply by excluding the CISG that would otherwise have applied) or by implicit derogation (by choice of a concrete national statute/code to be applied).

Main differences between the Serbian Law of Obligations and the CISG

The main differences between the Serbian Law of Obligations and the CISG lie in the concepts of the *fundamental breach*

7 Analysis of this and other questions regarding contract law in Serbia, see [11, pp. 93-109].

of contract and *non-conformity of goods*, as defined in the CISG.[8]

The CISG provides for the fundamental breach of contract as a basis for avoidance of contract (Article 25). The Serbian Law of Obligations, like many other codes in civil law countries, is unfamiliar with the concept of the fundamental breach of contract. Instead, it adopts the non-performance of contractual obligation as a general ground for the avoidance of bilateral contracts (Arts. 124-132) on one side, and material and legal defects as special grounds for avoidance of a sale contract, on the other (Arts.478-515). Nevertheless, the same criteria relating to the importance of non-performance, *i.e.* consequences of non-performance, are the starting point for both legal sources, regardless of the different concepts they use. In that regard, the basis for contract avoidance is not the non-performance of an obligation in general, but only a non-performance that substantially deprives the aggrieved party of the expected benefit under the contract and substantially impairs the entire purpose of the contract for that party. The main problem both systems face is how to evaluate the importance of a specific non-performance for the purposes of determining whether sufficient ground for contract avoidance exists [6, pp. 111–184].

The uniform concept of the lack of conformity as defined under the CISG is wider than the concept of material defects and includes not only differences in quality, but also differences in quantity, delivery of goods of different kind (*aliud*) and defects in packing (Article 35). On the other hand, the Serbian Law of Obligations specifies the rules for sales contracts regarding material defects of the goods (Arts. 478-500), while other cases of non-performance are subject to general rules on avoidance of contract due to non-performance. Nevertheless, the specific cases of non-conformity defined under the CISG, such as unfitness for ordinary purpose of the goods, lack of fitness of the goods for a particular purpose and non-conformity of goods to a sample or model, largely correspond to the definition of material defects under the Law of Obligations. In addition, the liability of the seller for non-conformity is dealt with almost identically under the CISG and the Law of Obligations' provisions dealing with the seller's liability for material defects, and those dealing with the defects for which the seller bears no liability. Provisions of the CISG dealing with buyer's right to rely on a lack of conformity are also similar to the relevant rules of the Law of Obligations. Based on the comparative analysis of these solutions, the conclusion seems to be that under both systems, it is not just any defect that gives the buyer the right to avoid the contract, but only such defect that diminishes the expected benefit to the buyer and substantially impairs the entire purpose of the contract. Under the CISG, this principle is integrated under the definition of fundamental breach, whereas under the Law of Obligations, it is articulated through the rules on avoidance of contract for partial defects as well as through the general rule stating that a contract cannot be avoided for non-performance of an immaterial part of an obligation.

Application of the CISG by Serbian courts and arbitrations

Although the application of the CISG as a ratified international convention has priority over national laws, the courts of Serbia are not very familiar with its application even in simple cases of direct application specified in article 1.1.a. CISG. Generally speaking, in most cases, the courts of first instance do not apply the CISG at all; instead, judges determine the applicable law by virtue of the rules of private international law which usually means the application of Serbian substantive law, which they perceive as the Serbian *Law of Obligations* and *not the CISG,* although all the conditions for the application of the CISG are met.

In appeal proceedings, the High Commercial Court has expressed different views regarding the application of the CISG. For example, in a decision of the High Commercial Court of 7 February 2006, the Court held that, when the seller is a foreign company and the buyer a domestic legal person, and both parties are from CISG Contracting States, the CISG and not the Law of Obligations must be applied to the contract of sale. Therefore, the application of the Law

8 One of the differences between the CISG and the Law of Obligations is related to the revocation of an offer. The CISG adopts the principle of revocability of an offer (with significant exceptions specified in Art 16) whereas under the Law of Obligations an offer is irrevocable; it may be revoked if the revocation reaches the offeree before an offer or in the same time as an offer (Art 36).

of Obligations to the contract by the court of 1st instance was wrong. A similar view is expressed in a decision of the High Commercial Court of 23 August 2004, where the Court stated that, concerning international sale of goods, the relevant source of law was the UN Convention on the International Sale of Goods of 11 April 1980 (CISG). The opposite view can be found in a decision of the High Commercial Court of 9 June 2004, where the Court decided to apply the law of Serbia to a contract for the international sale of goods concluded between a party with the place of business in Slovenia and a party whose place of business was in Serbia. Since the contract did not contain a choice of law clause, the Court held that the parties implicitly expressed that choice by choosing the court in Serbia. The Court perceived the parties' choice of the court in Serbia as one of the main indicators of their intention to apply the law of Serbia as the substantive law for their contract. On this assumption, the Court concluded that the decision of the first instance court to apply the Law of Obligations of Serbia as substantive law to the contract was correct.[9]

In contrast to regular court practice, the CISG is well known and widely implemented in Serbian arbitration practice. Most arbitration awards concerning contracts of international sale of goods, rendered between 1998 and 2015, involved the application of the CISG where the conditions for such application were met.[10]

Practical advantages of the CISG application

From the economic perspective, the CISG brings immediate benefits to traders in terms of reduction in transaction costs and lower prices for imported and exported goods [13]. Therefore, Serbian final users and consumers could receive more value for their money, and Serbian exports' lower prices could be more competitive in global markets. In light of these benefits, the vast majority of European Union Member States, as well as most other European States and almost all major trading States, have adopted the CISG. It is estimated that the CISG may apply to 80% of global cross-border sales. Most key commercial partners of Serbia are a party to the CISG, including 24 of the 28 members of the European Union, the United States of America, Canada, Brazil and most Latin American countries, China, Japan and South Korea.[11]

One of the most important advantages that the CISG provides concerns the efficiency of the legislative framework and predictability of applicable law. There is a widespread assumption among traders that the choice of the applicable law is merely a theoretical problem of little practical relevance and that the most important thing is to draft a "good" contract. They often look at the contract as if it were a self-sufficient set of clauses, without realizing that it must be put into the context of legal rules [15, pp.21]. Such approach causes significant problems in practice since the choice of applicable law may have a decisive impact on the success of a dispute arising from a contract of international trade. Differences in solutions offered by national legal systems in the field of contract law, solutions of relevant international conventions and sources of uniform contract law in general, and in particular the fundamental differences that exist between civil law and common law legal systems [16] can lead to substantially different outcomes of one and the same dispute, depending on the law applicable in the specific case [2, pp.135-187].

By the application of the CISG, the contractual parties may easily resolve the problem of the applicable law, since the CISG provides uniform, neutral, ascertainable legal rules. Small and medium-sized enterprises, as well as traders located in developing countries, typically have a reduced access to legal advice when negotiating a contract. Thus, they are more vulnerable to the problems caused by inadequate treatment in the contract of issues relating to applicable law. The same enterprises and traders may also be the weaker contractual parties and could have difficulties in ensuring that the contractual balance is kept. Those merchants would therefore derive particular benefit from the default application of the fair and uniform regime of the CISG to contracts falling under its scope [17].

The Civil Code of Serbia

Work on drafting Serbian Civil Code

Serbia is at present one of the few countries with no Civil Code at the beginning of the 21st century. This is a

9 Detailed analysis, see [1, pp. 253-278].

10 Detailed analysis, see [12].

11 [14] www.cije.up.pt/download-file/1202.

strange phenomenon, as it was one of the first European countries to have adopted its Civil Code, as early as 19th century (1844). Parts of civil law are presently regulated by specific laws: the Law of Obligations [18], Property Law [19], Family Law [20] and the Law on Inheritance[21]. It is well known that codification of civil law *per se* increases the richness of legal culture and contributes to the stability of legal relations. In addition, it regulates the entire corpus of subjective civil rights in one place, which is especially significant for natural and legal persons as the holders of these rights.

Starting from the fact that drafting of the Civil Code is an important step to legal certainty and rule of law, and considering the present status of Serbian private law, its history and culture, the Government of the Republic of Serbia established a Commission for Drafting the Civil Code of Serbia in 2006 [29]. The Commission published a report under the title "*Work on the Drafting of Civil Code of the Republic of Serbia*" in 2007, where it presented its work, together with open issues relating to the Code [22]. The work on drafting the Code is made considerably easier by the fact that some laws in the field of civil law, like for example the Law of Obligations, are already at the high end of legal culture. However, the Commission emphasised that the drafting of the Civil Code must not boil down to a simple reception of the existing particular laws in the field of civil law and their technical formulations in the form of codification. This work includes firstly an analysis of the existing legislative solutions, their modernization and development, and particularly their harmonization, both between themselves and with the most common solutions and trends in comparative law. This means that it is necessary to harmonize the corresponding legislative solutions with those adopted in ratified international conventions as well as with other international and particularly European standards. The Commission underlined that the future Civil Code of Serbia should meet two basic requirements: to further develop the rules in the sphere of private law promoting the principle of legal certainty and the rule of law, while at the same time not closing the road to the further evolution of civil law and its continuous improvement. In May 2015, the Commission published a Preliminary Draft of the Civil Code of the Republic of Serbia, consisting of 2.800 articles and of 480 alternative solutions. The Preliminary Draft was sent to one-year public debate which is ongoing [23, pp.696-710].

Compliance of the Civil Code with the European legislation and widely accepted international standards

One of the primary goals of adopting the Civil Code has been harmonization with the solutions of European law and international law. The Statement of Reasons for the Preliminary Draft of the Civil Code states that the comparative method with regard to the European legislation in the field of civil law was largely employed in drafting the Code. First of all, there was an analysis of the solutions from the Swiss, French and German legislations, as well as from the recently adopted civil codes (*e.g.* in Quebec, Russia, Brazil, Hungary, etc.). The Commission for Drafting the Civil Code anticipated a professional engagement of an *International Council*, composed of the most distinguished European jurists in the field of civil law, to whom the text of the Code translated into English would be delivered. Any suggestions and remarks of foreign experts would be used in drafting the final text and its harmonization with the modern achievements and tendencies of European legal culture [24].

The most important novelties offered by the Civil Code regarding application of international rules in the field of contract law

The Preliminary Draft introduces several major novelties relating to the application of international rules and standards to the field of contract law and its full harmonization with modern trends in comparative law.

In the first place, the Preliminary Draft provides that the Code seeks to achieve the virtues of justice. It proclaims equal legal protection of human rights in all areas it governs. A court of law or another competent authority shall apply this provision to all persons regardless of race, colour, sex, language, religion, political or other affiliation, national or social origin, property, birth or other similar circumstances (Arts 1-3).

Special attention is given to the fundamental values and principles on which the Code is based. These

principles are of tremendous importance, not only for the creation, exercise and protection of civil rights, but also for the proper interpretation of legislation, as well as for resolving disputes. The principle of good faith and fairness is proclaimed as the governing principle, which can be neither excluded nor restricted. In addition to the principle of good faith and fairness, the essential principles of the Code include: autonomy of will, equality of persons in civil law, direct implementation of the principles of fairness, protection of environment, prohibition of causing damage, prohibition of creation and exploitation of monopoly position, prohibition of abuse of rights, as well as other principles important to the civil law relations. The principle of uniform provisions for classic civil and commercial contracts dominates the modern legislation. This principle is observed in the Civil Code, however, special regulations have been proposed for certain commercial contracts, due to their specific nature.

The Preliminary Draft expressly provides that the UN Convention on Contracts for the International Sale of Goods shall apply to the "international commercial sale, provided that the requirements for such application as envisaged by that Convention have been met" (Article 663). The enjoinment to implement international rules contained in the express provisions of the Preliminary Draft of the Civil Code achieves several important goals – it emphasizes the *obligation* to apply the CISG, which, being a ratified Convention, constitutes an integral part of the legal order of Serbia; it *reminds* the parties of the existence of uniform rules in the field of international sale of goods; it eliminates *different interpretations* that may appear in the context of clauses of the contracts on the international sale of goods where the "Serbian law" is provided as the law applicable to the contract; and it underscores the legislator's general commitment to the application of widely accepted international standards in the field of contract law.

The impact of international uniform rules on the solutions contained in the Civil Code is particularly evident in the general rules of the Code relating to contract avoidance due to non-performance of an obligation. In this regard, the principle of fundamental breach of contract based on the solutions of the CISG and the UNIDROIT Principles of international commercial contracts has been introduced into Serbian contract law. Further harmonization with international standards has also been achieved in the context of the rules governing termination or modification of the contract due to changed circumstances – hardship (Arts 273-277), usurious contracts (Article 282), general conditions of adhesion contracts (Arts 283-285) as well as other general rules of the Code relevant to contract law.[12]

The rules of the Code relating to individual contracts have also been further aligned with international standards. Thus, certain rules governing sales contracts have been changed in order to be brought into compliance with the appropriate solutions of the CISG. In addition to contract avoidance due to the fundamental breach of contract, a particularly important issue is that of liability for material defects (Arts 691-698) and, within this context, the broadening of the concept of material defects for which the seller bears liability (Article 691), the extension of the period in which the seller bears liability for hidden defects (Article 694), as well as the notification of defects rule (alternative to Article 695). New solutions have also been introduced to the provisions of the Civil Code governing the sale with the pre-emption right, trial sales, sale by sample or model, sale with a specification, sale by retention of right of ownership, instalment sale and the order for sale.

In addition to the sales contract, the Code has introduced changes to a number of other special contracts, such as exchange contract, loan contract, lease contract, piecework contract, construction contract, licensing contract, contract of carriage, deposit, warehousing, order, commission business, agency contract, brokerage contract, forwarding contract, control of goods contract, travel package contract, agency travel contract, contract of allotment, insurance contract for property and persons, security contract, warranty contract, contract of assignment and settlement, as well as the rules relevant to the banking operations.[13]

12 For more details see *Obrazloženje Građanskog Zakonika*, (2015), in Građanski zakonik Republike Srbije, Vlada Republike Srbije, Komisija za izradu Građanskog zakonika, Belgrade.

13 For more details see [24].

Regulation of new contracts in the Civil Code

The contracts which are not regulated by law (un-nominated contracts, *contrats innommés*) [26, pp. 149-166] present a special issue in the contract law of Serbia. These contracts may be validly concluded by parties in accordance with the principle of party autonomy. Their content is determined by parties either through a combination of some elements of the contracts regulated by law or by stipulating an entirely new content, independent of any other contract provided for by law[27, pp. 69-109].

Where a contract is regulated by law, the parties do not have to regulate their relationship in detail. It suffices to reach an agreement on the essential elements of the specific contract so that the relevant statutory provisions may apply. For the innominate contracts, however, as there are no statutory provisions which may replace or supplement the parties' intention, the contract must be formulated with special care in order to ensure the parties' intention is expressed precisely, correctly and with no ambiguity. Where a dispute arises, the court/arbitration shall apply the general rules and principles of contract law as well as the rules relevant for similar contracts (analogy) regulated by the Law of Obligations. Generally, the most important national sources for contracts not regulated by law are: the contract itself as the first source, practices established by the parties between themselves, trade usages to which the parties have agreed, general principles in the field of commercial relations, general principles and rules of the national Law of Obligations and its specific rules relevant for similar contracts.

Quite a number of new commercial contracts arising out of the *lex mercatoria* in Serbia are not regulated by law. Thus, for instance, contracts on distribution, franchising, time sharing, factoring, forfeiting, and technology transfer, as well as agreements for long-term supply of goods, manufacture of goods, supply of services and other new commercial contracts are not regulated by the Serbian Law of Obligations.

Taking into account the economic and legal significance of certain contracts which have so far not been regulated by law, the Civil Code has opted to provide legal provisions to govern such contracts. The contracts in question include: contracts of sale with the right of repurchase, contracts of partnership, leasing, franchising, distribution contracts, deeds of gift, contracts of loan for use, publishing contracts, contracts of cooperation in agriculture, reinsurance contracts, liability insurance contracts, contracts of storage of items in dispute, contracts of lifelong annuity or games of chance contracts. Furthermore, the existing provisions on banking operations have been innovated and supplemented. In addition to the banking operations governed by law, such as bank cash deposit, savings deposits, lodging of securities, current account with a bank, contracts of safe-deposit box, loan contracts – especially those against pledged securities, letters of credit and bank guarantees, the Civil Code provides for the contracts of opening and maintaining accounts, payment services contracts, safe deposit box contracts and contracts of payment card transactions.[14]

Resolution of commercial disputes through arbitration

An analysis of the rules of Serbian contract law applicable to business transactions, particularly from the perspective of investors and business community in general, requires an overview of the key issues relevant to arbitration as the dominant method of resolving disputes arising from business relations.

Arbitration has received increased popularity and global recognition as the 'ordinary and normal method' of resolving commercial and investment disputes, in particular those of international character. This is due to its adaptability to the needs of business community and its multi-faceted advantages over litigation before national courts. Consequently, by agreeing on arbitral dispute resolution, Serbian businesses would not only gain recourse to a faster and often less costly and more efficient dispute resolution mechanism, but would also significantly contribute to enhancement of overall business climate in Serbia.

The legal framework for arbitration is comprised of both international and domestic sources. The most important international sources of arbitration law are the ratified international conventions related to arbitration,

14 For more details see [24].

such as: Protocol on Arbitration Clauses of 1923 (Geneva Protocol), Convention on Execution of Foreign Arbitral Awards of 1927 (Geneva Convention), Convention on Recognition and Enforcement of Foreign Arbitral Awards of 1958 (New York Convention), European Convention on International Commercial Arbitration of 1961 (European Convention), Convention on the Settlement of Investment Disputes Between States and Nationals of Other States of 1965 (Washington Convention), all of which the Republic of Serbia is a party to. The relevant provisions of arbitration-related regulations in Serbia are contained in the Law on Arbitration based on 1985 UNCITRAL Model Law on International Commercial Arbitration regulating both domestic and international arbitration, whether commercial or not.

It is important to underline that all of these sources recognize party autonomy as the primary source of arbitration law and, at the same time, give high regard to usages and business practices as elements of business oriented regulatory framework for arbitration [25, pp.238-255].

Conclusion

An analysis of the relevant sources of Serbian contract law and particularly the Law of Obligations and the central principles and solutions of the future Civil Code of Serbia, the significant influence of international standards contained in international conventions and other transnational documents on the development of Serbian contract law, reveals that it is a liberal, well developed, modern and progressive part of Serbian private law. Future codification in the form of the Civil Code is a continuation of the process of full harmonization with the worldwide accepted standards and European legal civilization, which can significantly contribute to the overall improvement of business environment in Serbia. However, the acceptance of uniform rules (by national legislator or by party autonomy) could not be taken *per se* as a guarantee for their successful implementation in practice. In order to accomplish the real uniformity, it is necessary to provide the uniform interpretation of international documents as well as to continuously develop and strengthen the knowledge of the sources of uniform contract law, especially among judges, lawyers and business communities and to share practical experiences from all around the world. Finally, the effects of transnational documents in one country should be regarded in the light of legal, economic and social factors of that country as a whole, since these factors determine in general way the legal destiny of a transnational document in each particular country.

References

1. Perović, J. (2011). *Complexity of transnational documents*. XVIII th International Congress of Comparative Law, Washington D.C. 2010, International Academy of Comparative Law. Torino: *ISAIDAT Law Review, Volume 1, Issue 3*.
2. Perović, J. (2012). *Standardne klauzule u međunarodnim privrednim ugovorima*. Belgrade: CID.
3. Schlechtriem P., & Schwenzer I. (2005). *Commentary on the UN Convention on the international sale of goods*. Oxford University Press.
4. Kröll S., Mistelis L., & Perales Viscasillas P. (eds) (2011). *UN Convention on contracts for the international sale of goods (CISG) – Commentary*. München: C.H. Beck Hart Nomos.
5. Honnold, J. O. (1999). *Uniform law for international sales*. Third Edition, Kluwer Law International.
6. Perović, J. (2004). *Bitna povreda ugovora. Međunarodna prodaja robe (Fundamental Breach of Contract. International Sale of Goods)*. Belgrade: Sluzbeni list Srbije.
7. Perović, J. (2008). *La contravention essentielle au contrat comme fondement à la résolution des contrats dans les codifications de droit uniforme. Revue de droit international et de droit comparé*. Bruxelles : Bruylant 2008/2-3.
8. Stanivuković M., & Živković M. (January 2009). *Serbia, Supplement 21*. International Encyclopedia of Laws, Private International Law.
9. Perović, J. (2003). *Komentar Zakona o finansijskom lizingu. (Commentary of the Law on Financial Leasing)*. Belgrade: Glosarijum.
10. Perović, J. (2005). *Financial leasing in Serbia: An overview of recent legislation. Uniform Law Review UNIDROIT* , NS -Vol.X.
11. Perović, J. (2010). *Contract law in Serbia*. Private Law in Eastern Europe. Tübingen: Mohr Sieneck.
12. Perović, J. (2011). *The CISG in Serbia*. GT Z – UNCITRAL PRO JECT: Regional implementation of the Convention on International Sales of Goods (CISG) and international arbitration rules. published by GT Z.
13. Cooter R. (2004). *Law & Economics*. Pearson Addison Wesley.
14. Castellani, L. (2013). The adoption of the CISG in Portugal: Benefits and perspectives. *Revista Electronica de Direito, no.2, Outobro*.
15. Bortolotti, F. (2013). *Drafting and negotiating international commercial contracts*. A practical guide. Paris: ICC .
16. Marsh, P. D. V. (1996). *Comparative contract law – England, France, Germany*. England: Gower.

17. *UN Convention on contracts for the international sale of goods* (Vienna 1980) (CISG). Explanatory note. www.uncitral.org/uncitral/en/uncitral_texts/sale.../1980CISG .html.
18. *Law of obligations (in Serbian: Zakon o obligacionim odnosima).* Official Gazette SFRY, No. 29/78, 26 May 1978. Modifications: Nos. 39/85, 45/89, 57/89, 31/93, 1/2003)
19. Law on foundations of property relations (in Serbian: Zakon o osnovnim svojinsko-pravnim odnosima), "Official Gazette SFRJ" No. 6/80, amended in 1990 and 1996.
20. *Family law. (in Serbian: Porodični zakon)* . RS Official Gazette, No. 18/2005, 72/2011, 6/2015.
21. *Law on inheritance (in Serbian: Zakon o nasleđivanju).* RS Official Gazette, No. 46/1995, 101/2003, 6/2015 .
22. *Rad na izradi Građanskog zakonika Republike Srbije. Izveštaj Komisije sa otvorenim pitanjima*. (November, 2007). Belgrade.
23. Perović, S. *Kratki izvodi iz rada Komisije za izradu Građanskog zakonika Republike Srbije*. (May, 2015). Belgrade: Građanski zakonik Republike Srbije, Vlada Republike Srbije, Komisija za izradu Građanskog zakonika.
24. *Obrazloženje građanskog zakonika* . (2015). Belgrade: Građanski zakonik Republike Srbije, Vlada Republike Srbije, Komisija za izradu Građanskog zakonika.
25. Perović J., & Đorđević M. (2013). Resolution of commercial disputes through arbitration as a contributor to improvement of business environment in Serbia. *Ekonomika preduzeća, March-April*.
26. Perović, J. (2012). How to secure contract performance? Distribution, franchise and financial leasing in Serbian law. *Ekonomika preduzeća, March-April*.
27. Perović, J. (2010). Modern contracts - Republic of Serbia. In Civil Law Forum for South East Europe. *Collection of studies and analyses, Volume III*. Belgrade: Deutsche Gesellschaft für Technische Zusammenarbeit (GT Z) Gmbh.
28. *Law on financial leasing (in Serbian: Zakon o finansijskom lizingu).* RS Official Gazette, No55/2003,61/2005, 31/2011, 99/2011.
29. *Decision on the establishment of the Commission for drafting the Civil Code of Serbia (in Serbian: Odluka o obrazovanju Komisije za izradu Građanskog zakonika)*, RS Official Gazette, No. 104/06 and 110/06.

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CHARACTERISTIC ANTIMONOPOLY RISKS FOR ENTERPRISES OPERATING IN SERBIA: IDENTIFICATION, APPRAISAL AND TREATMENT

Karakteristični antimonopolski rizici za kompanije koje posluju u Srbiji - identifikacija, ocena i tretman

Abstract

The paper focuses on the analysis of antitrust regulatory framework and its possible implications on business operations of enterprises in Serbia, which, consciously or unconsciously, exhibit anticompetitive behaviour. The main objective of this paper is to identify prohibited or anticompetitive practices from the standpoints of the law and the relevant European practice. Each antitrust corporate risk is described in detail and appraised, with subsequent specific suggestions for possible preventive strategies to treat these risks. The paper abounds in real life case studies so that it is easier for the readers from the corporate world to relate to this complex and important topic.

Key words: *anticompetitive behaviour, the Law on Protection of Competition, antimonopoly risks treatment*

Sažetak

U fokusu rada je analiza antimonopolskog regulatornog okvira i njegovih mogućih implikacija na poslovanje preduzeća u Srbiji, koja svesno ili nesvesno ispoljavaju antikonkurentsko ponašanje. Osnovni cilj rada je identifikovanje zabranjenih, odnosno antikonkurentskih praksi sa stanovišta Zakona i relevantne evropske prakse. Svaki antimonopolski korporativni rizik je podrobno opisan i evaluiran, a zatim su dati konkretni predlozi mogućih preventivnih strategija tretiranja ovih rizika. Rad obiluje realnim primerima iz prakse, kako bi se čitaoci iz korporativnog sveta lakše identifikovali sa ovom kompleksnom i važnom temom.

Ključne reči: *antikonkurentska praksa, Zakon o zaštiti konkurencije, tretiranje antimonopolskih rizika*

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Introduction

Preservation and promotion of competition is one of the most important segments of each national economy. Free operation of the existing and potential competitors in the market enables and increases prosperity of all market participants. Competitive pressure is the main driver for enterprise efficiency, increase in productivity, growth, and lower prices for consumers.

The Law on Protection of Competition is defined in order to protect both companies and end consumers. The law encourages fair competition with the aim of improving competitive dynamics and increasing prosperity. Therefore, the basic elements of the Law are prohibition of abuse of a dominant position, prohibited agreements, and control of excessive concentration. The Law applies to every company in the market, but competition clauses vary depending on the market position of the parties.

Dealing with the risk of competition primarily requires good understanding of relevant legislation and business practices. The significance of this field is becoming increasingly prominent with the process of Serbia's accession to the EU and more efficient work of the Commission for Protection of Competition of Serbia. However, regardless of how familiar the companies in Serbia

are with this area, the risk of breach, or the implementation of anticompetition practices is extremely high. There is a large number of "gray" areas and unclear guidelines that may be interpreted in many ways. Comprehension of this field requires an understanding of the logic at the heart of any forbidden practice. It is important to emphasize that lack understanding of regulations is no excuse before regulatory bodies.

The subject of this paper is the practice that most often constitutes breach, accidental or intentional, by the dominant or non-dominant companies operating in Serbia. Competitive practices are clearly described and defined, and, in order to facilitate their understanding, each unauthorized practice is supported by a relevant example. A prevention model is shown for each of the identified risks, and it is pointed out that certain practices must not be carried out because there is no method for their adequate treatment or elimination.

The paper is divided into four segments. The first part describes the theoretical and regulatory postulates of anticompetitive practices. The second part focuses on the possible abuse of a dominant position. The focus of the third part is on prohibited horizontal and vertical agreements. The last, fourth, part deals with the problem of excessive concentration of market power.

Anticompetitive practices

The legal framework of the Republic of Serbia on protection of competition largely relies on the adopted legal solutions and best practices of the European Union and the European Commission, which have extensively and systematically been engaged in the anti-monopoly legislation for a number of years. The Law on Protection of Competition (hereinafter the Law) is based on the assumption that the protection and stimulation of competition increases the range of products on the market, which causes a decrease in prices of those products, which, ultimately, has a positive effect on the welfare of end consumers [10]. Therefore, the Law on Competition prohibits any behaviour of companies that leads or may lead (consequence or intention) to reduced level of competition in the relevant market. Reducing the level of competition may be implemented either through mutual agreements with competitors (prohibited horizontal agreements - cartels), mutual agreements with customers or suppliers (prohibited vertical agreements in both directions), or due to the efforts of dominant companies to squeeze out their competitors from the relevant market (abuse of dominant position). It should be added that the Law also regulates control of concentrations, i.e. acquisitions, mergers and takeovers, and therefore each concentration, provided that certain conditions are met (thresholds for the application of concentration prescribed by the Law), must be reported to the Commission for Protection of Competition. According to its own discretion, market conditions and the effects that concentration will have on the market and consumer welfare, the Commission shall decide whether the concentration is approved, conditionally approved or not approved.

The Law essentially prohibits three groups of activities:

1. abuse of dominant position;
2. restrictive agreements;
3. excessive concentration of market power.

Abuse of dominant position

According to the Law "dominant position in a relevant market is deemed to be the position of an undertaking that, due to its market power, may operate in the relevant market to a substantial extent independently from real or potential competitors, customers, suppliers or consumers" [Article 15, 10]. Depending on whether a participant in the relevant market does or does not have a dominant position, the Law prohibits certain business practices. The basic assumption for the existence of a dominant position is the market share in the relevant market that exceeds 40%, which means that certain business practices may be permitted for non-dominant players, and prohibited for the dominant ones. Whereby, the Law recognizes the term of collective dominance that occurs when two or more legally independent market participants can have a dominant position if they are linked by economic relations in a manner that that jointly perform or act as one participant in the relevant market.

It should be noted that it is not necessary to have a written agreement (e.g., contracts, e-mail correspondence)

with counterparty for the Commission to establish an abuse of a dominant position. Abuse may be determined based on observed practice and business activities of market participants.

Based on the experience of the European Commission and the Serbian Commission for Protection of Competition, the most common abuses of dominant position are the following:

a. refusing and terminating cooperation;
b. predatory behaviour;
c. tying and bundling;
d. excessive pricing;
e. inappropriate rebate policy;
f. imposing exclusivity;
g. discrimination against customers;
h. parallel distribution channels;
i. renting shelf space, i.e. sales areas.

Refusing and terminating cooperation

Refusal and termination of cooperation is manifested through the unjustified refusal of the dominant players to enter into cooperation with a customer or supplier. In addition to refusal of cooperation, any termination of cooperation with an existing customer or supplier, without justification is also prohibited.

For example, a chemical company Commercial Solvents (CS) was producing a chemical substance A and sold it to a company called Zoja, which used the substance as an input for the production of a chemical substance E. When CS started producing chemical substance E, it refused to sell substance A to Zoja Company. The European Commission has determined that CS had a dominant position in the relevant market and concluded that the implementation of such a practice constituted an abuse of a dominant position [3].

Predatory behaviour

Predatory behaviour occurs when companies sell products to customers based on net sales prices (prices from the price list, net of all rebates and discounts offered) below cost price, with the objective of maintaining or increasing market share. This practice is known as predatory pricing and constitutes an abuse of a dominant position. A sale of products at prices below the average variable cost, in essence, is considered to be an abuse of a dominant position. The logical assumption is that the dominant company has no other interest in determining dumping prices, other than to drive competitors out from the market and subsequently raise its prices by using the acquired monopoly position in the market.

Therefore, the sale of products by a dominant company, at prices that are below average total cost (total cost price), but above average variable costs, also constitutes abuse of a dominant position. For this type of abuse, it is necessary that there is a visible intent to drive competitors out from the relevant market. Sales of products by the dominant company at prices that are below average total costs and above average variable cost is only permitted in exceptional cases, where there are objectively clear economic arguments for selling at such prices.

This practice by the financially strong dominant market participants may have a negative impact on the other players in the market that may be equally effective, but due to limited resources, are unable to withstand aggressive and unfair competition.

For example, the European Commission found that the company called Wanadoo was charging ADSL services at prices that were below the average total cost. The investigation and detailed analysis showed that, for a certain period, the prices were even below the variable cost (1999-2001), while in another period (2001-2002), they were at the level of variable costs, but far below the total costs. In this case, the Commission concluded that this practice was an abuse of a dominant position and imposed a fine of 10.35 million [3].

Tying and bundling

Tying products and assortment bundling are prohibited practices for dominant players. Tying product occurs when the sale of one product is conditional on the purchase of another product. For example, if you are to sell Bambi chocolate conditional on purchasing Plazma. Assortment bundling is very similar, except that here the customer is conditioned to buy a precisely defined assortment. Both of these practices are prohibited for the dominant players, and allowed for the non-dominant ones.

An example of tying is the case of TetraPak. The European Commission has found that TetraPak sold its packaging machines, subject to certain contractual conditions by which other it tied other products and services to the sale of machines. Thus, the customers who bought their machines were required to buy the carton from TetraPak as well. Also, TetraPak further conditioned on them being the sole provider of service and maintainance for the packaging machines. The Commission has imposed a fine on TetraPak in the amount of EUR 75 million for abuse of a dominant position [3].

A famous example of assortment bundling of products is Microsoft. Microsoft sold two of its products (PC OS operating system and Windows Media Player) in one package. The Commission considered that this infringed the competition rules, because customers who purchased Microsoft operating system were forced to buy Microsoft Media Player as well, without the possibility to choose and buy a media player that they find suitable. The Commission imposed extremely high fine on Microsoft amounting to EUR 497 million for abuse of dominant position.

Excessive pricing

Excessive pricing is prohibited for dominant players because it leads to extremely high profit margins.

For example, in the case of Napier Brown - British Sugar, the European Commission has established that over a longer period, this sugar manufacturer sold bulk sugar in wholesale market and packaged sugar in retail market at prices that were not a realistic reflection of costs. In this case, the Commission imposed a fine totalling EUR 50.2 million [3].

Rebate policy

Rebate policy is a specific and big topic in the area of protection of competition. For dominant market participants, rebate policy is inadequate in the following cases:

- If it is not transparent (customers have no insight into the seller's rebate policy);
- If it is not justified (no economically viable explanation for the range of rebates); and
- If rebate creates customer loyalty.

Transparency is achieved by making all consumers aware of sales policy or rebates so that customers know in advance how much rebate they qualify for and under what conditions. Dominant players must have economic justification for rebate. For example, the quantity rebate (discount that is offered depending on the amount of goods withdrawn) should be justified through the calculation of the effects of economies of scale. Offering rebates to customers individually, based on subjective assessment and at different scales is not permitted.

The dominant company in the market should not be offering rebates to customers to increase customer loyalty. Rebates are not allowed to be offered to customers on the condition that most of or all of their needs are met exclusively from the suppliers that grant these rebates. This type of rebate is offered with the aim of limiting customer choice and opportunity to change suppliers. The net effect is to close the market to competing suppliers. All discounts that are passed on to end consumers must comply with cost savings that result from the effects of economies of scale. If a discount is greater than the real savings of costs, it is clear that the dominant company wants to drive competitors out from the market.

A dominant company may also be abusing dominant position if it ties customers through a system of rebates offered in accordance with the sold quantities or according to sales growth over a relatively long reference period. In this way, it puts pressure on customers to achieve the amount of purchases required to qualify for rebates.

As noted above, excessive granting of rebates whose total amount lowers net sales price below cost (predatory pricing) is not allowed either.

The greatest risk arises from offering the so-called "simulated" rebates that are often included in the sales policies and business practices. Sales representatives believe that is enough to give a rebate an adequate name to denote it as meaningful and admissible. Namely, these are rebates that are granted without grounding and economic analysis to justify them. In practice, these rebates are given the following names: the sales promotion rebate, the rebate for the development of the network, the rebate for the expansion of markets, the incentive rebate for the growth of turnover and the like.

An illustrative example in the area of rebates is Michelin, the French tire manufacturer. The European Commission has established that Michelin had abused its dominant position by offering its dealers rebates at the end of the year that were based on the achievement of predetermined sales plan, but without economic justification in the amounts granted. For the implementation of such business practices the Commission imposed a EUR 20 million fine on Michelin [3].

Imposing exclusivity

Another prohibited practice is imposing exclusivity for dominant players. A classic form of imposing exclusivity is outlet exclusivity. This kind of limitation is implemented through the imposition of an obligation to the customer to sells the products of the dominant participant exclusively within that product category in their retail outlet.

For example, the European Commission has established an abuse of a dominant position by Unilever because it provided cooling devices to its customers on condition that they shelved Uniliver's products exclusively - freezer exclusivity. In its market research, the Commission has established that many retailers could not or did not want to install an additional cooling device in their retail outlet. When Uniliver has installed its cooling system in an outlet, it is highly unlikely that another manufacturer would install its own cooling system. Therefore, the Commission concluded that freezer exclusivity also constitutes outlet exclusivity, leading to the closing of the market for other competitors [3].

Discrimination against customers

Discrimination against customers occurs when a dominant company applies different sales conditions to different customers, for the same or equivalent transactions, without clear economic justification. This practice is manifested when the individual customers are offered better sales conditions compared to other customers in the same category, which, from the standpoint of the company, have the same commercial position (they belong to the same category of customers in the sales policy).

For example, the Croatian Agency has established that Proplin d.o.o. restricted competition in the relevant market in natural gas distribution by unequal application of discount policies to their customers or by granting rebates at their own discretion [3].

Parallel distribution channels

By that same logic as the previous prohibited practice, the Law on Prohibition of Competition prohibits the application of dissimilar conditions to equivalent transactions with other companies, due to which they may be discriminated against in comparison to the competition.

Intra-group companies may have different treatment in relation to independent companies, but it is necessary to take into account that such treatment does not exclude or restrict competition in the downstream markets. Therefore, companies are not in risk if the various conditions are based on economically justified reasons.

If the practice of placing intragroup customers in an unequal position compared to those who are independent of the market was *a priori* permitted, there would be a possibility that the companies with dominant position transfer and use their position from one market to another relevant market, thereby distorting market competition.

For example, Nintendo used to sell its products through exclusive distributors. The distributors who sold Nintendo products outside the territory for which they had exclusive rights were sanctioned. The Commission has found that such practice was restricting parallel trade and constituted the abuse of a dominant position for which it imposed a EUR 149.1 million on Nintendo [3].

Renting shelf space, i.e. sales areas

The business practice where rent is payable for a share in shelves with the intention of closing the market for the existing and potential competitors as much as possible or preventing exposure of their goods in retail outlets of the customer is not permitted in cases where the company paying the rent has a dominant position. This leads to restriction and weakening of competition, which, in future, may enable the dominant company to raise prices of their products. The end result of such practices reduces well-being of consumers, as they have more restricted choice at of products offered at higher prices. However, in practice, a dominant company is permitted pay rent

for a share in customer's shelves at the percentage that is not higher than the official market share of the dominant company (the space to sale rule), but not more than 80%.

The above prohibited practices are shown in Table 1. In addition to a short description, the table also shows the risk prevention measures if certain practice is not completely prohibited.

Restrictive agreements

Restrictive agreements are agreements between market participants (competitors, customers, suppliers) with the aim or effect of substantially restricting, distorting or preventing competition. Restrictive agreements may be contracts or individual contractual stipulations, explicit or tacit agreements and concerted practices that particularly, directly or indirectly, fix purchase or selling prices or other trading terms and conditions; limit and control production, market, technical development or investment; apply dissimilar conditions to equivalent transactions with respect to the various market participants, which places market participants into a disadvantageous position in relation to competitors; condition conclusion of contracts or agreement on acceptance of supplementary obligations which, given their nature and trading habits and practices are not related to the subject of the agreement; divide markets or sources of supply. Restrictive agreements are prohibited and void, except in specific cases of exemptions from the prohibition. It should be noted that voidance is only applied to those contractual clauses which have anti-

Table 1: An overview of forbidden practices and opportunities for risk mitigation

Name of a prohibited practice	Probability of identification of a prohibited practice	Risk prevention measures
Refusing and terminating cooperation Refusing and terminating cooperation with potential customers or suppliers without legal or economic justification.	Low	Enable cooperation with all interested market participants or clearly explain reasons for terminating cooperation
Predatory behaviour Selling products to customers below cost price with the aim of retaining or increasing market share.	Moderate	Pricing above level of variable costs
Individual or assortment tying of products Conditioning customers to buy certain products in order to be able to buy their desired product or conditioning customers to buy specific products.	High	Avoid such arrangements.
Excessive pricing Excessive prices that lead to extremely high profit.	Moderate	Clearly established and justified price policy.
Inappropriate rebate policy The existence of a large number of different rebates without economic justification leads to suspected simulated or fictive rebates.	High	Unique rebate policy based on economic savings.
Imposing exclusivity Conditioning customers to keep in their outlets only the products from the dominant market participant.	High	Avoid such arrangements.
Discrimination against customers Applying different sales terms and conditions for the same or equivalent transactions without clear economic justification.	High	Applying fair, uniformed and transparent sales policy.
Paralel distribution channels Applying unequal conditions for the same type of transactions with other companies, which may lead them into a less favourable position compared to competitors.	Moderate	Avoid such arrangements or determine cooperation terms and conditions such that they are economically justifiable.
Renting sales areas Renting shelf-space with the aim of closing the market for the existing and potential competitors as much as possible.	Moderate	Limiting rented space in accordance with the market share of the dominant player ('space to sale' rule).

competitive effects, while other provisions may remain in force provided that they are separable.

The prohibition of the existence of restrictive agreements also applies to the established practices with anti-competitive aim or effect. Concerted practices occur when there is a coordination of behaviour between the companies which, although without a formal agreement, consciously replace the risk of competition with mutual cooperation. Companies have concerted practices when exercising direct or indirect contact with intent to influence market behaviour or to disclose to each other their future business decisions. Also, if the result of the direct or indirect contacts between company is the effect of the exchange of sensitive information, it is deemed that there are concerted practices regardless of what the real intention in establishing these contacts was.

General prohibition of restrictive agreements does not apply to agreements within a group, or to legal affairs between the companies that are controlled by the same parent company, and are therefore considered to be a single undertaking. Restrictive agreements may be horizontal and vertical.

Horizontal agreements

Horizontal agreements are formed between actual and/or potential competitors operating at the same level of the supply chain. They constitute strict violation of competition rules. It should be noted that, under the Law on Protection of Competition, an agreement is also any oral agreement and concerted practice. Therefore any direct exchange of information between competitors about prices, costs, margins, profits, customers, suppliers, business plans, market share and other sensitive topics is strictly prohibited. Any open discussion or correspondence on this subject may be interpreted as a cartel fixing.

Horizontal agreements may restrict competition, particularly if the agreements include price fixing and market division, or if the market power that occurs as a result of horizontal cooperation causes negative effects on the market in terms of prices, production, innovation or the variety and quality of products.

All agreements between competitors with the aim of negotiating or fixing prices, dividing markets or undertaking joint activities in order to drive other competitors out from the market constitute strict violation of the rules of competition regardless of the size of the market share for the company.

When competitors mutually agree on sales price and exchange information on supply terms and conditions this actually weakens price competition between them. The result of such an agreement is pricing at a significantly higher level than the prices that would be in place if each company was forming them individually.

Similarly, in trying to increase their bargaining power and get more from their suppliers, companies may join forces and form a purchasing alliance. Joint purchase may have a positive effect through economies of scale and reduced transaction costs. However, when a company enters into an alliance with the aim of fixing the purchase price, then it is an agreement which is contrary to the competition rules.

Example of a prohibited horizontal agreement is the case of Hoffman La Roche for open agreement between eight pharmaceutical companies on prices and sales quotas. Eight companies participated in eight different secret cartel agreements in vitamin products market. The cartel operated in such a way that the participants agreed on the prices for different vitamin products, and divided sales quotas by products and product groups. They also established an internal system of monitoring the implementation of the cartel agreements. In this case, the total penalty case for all eight companies amounted to EUR 855 million [3].

However, cooperation between companies operating at the same level of the supply chain may be a means of sharing risk, saving costs, pooling know-how and faster innovation and, therefore, may sometimes have a positive impact on competition. This type of horizontal agreements is not permitted in principle, but may be exempted from the prohibition under certain circumstances. Such agreements include: agreements on research and development and specialization agreements [6, 7].

Vertical agreements

Vertical agreements are agreements along the vertical of the reproduction chain, with customers or suppliers. These

agreements are prohibited when they provide for certain activities that are contrary to the rules of competition, such as direct or indirect restriction of the customers' (retailers') right to determine their prices in re-sales, limiting the territory in which the customer may sell or restricting sales only to a specific group of end users/ customers.

Any kind of agreement between suppliers and retailers concerning the determination of retail prices, which may be manifested through the fixing of prices, strict adherence to the recommended price, determining formula for calculating the price, offering conditional rebates, minimizing sales prices and coordinating sales policy is prohibited.

Entering into agreements with customers which restrict competition is also prohibited whether they ban sale of competing products or implementation of promotional activities, as well as conditioning customers to purchase a certain minimum amount of supply in order to prevent them from purchasing the same goods from the competition.

An especially prohibited form of discrimination is the one where suppliers apply non-linear pricing schemes to retailers in which producers grant various rebates and discounts to retailers thus placing some of them in a more favourable position compared to other.

A typical example of a prohibited vertical agreement is price fixing between a supplier and a customer. For

Table 2: An overview of forbidden practices and possibilities for mitigation of risk in the segment of prohibited agreements

Name of a prohibited practice	Probability of identification of a prohibited practice	Risk prevention measures
Horizontal agreements		
Joint decision on wholesale prices	High	Independent sales policy making.
Conditioning customers related to prices	Moderate	Applying transparent and clear sales policy.
Exchange of information on costs and determining sales prices.	High	Avoid exchanging sensitive information with competitors completely.
Mutual agreements on supply terms and conditions, or purchase prices.	High	Avoid exchanging sensitive information with competitors completely.
Mutual agreements on market division, or sales territories division.	High	Avoid exchanging sensitive information with competitors completely.
Limiting the amount of products offered for sale through mutual agreements.	High	Avoid exchanging sensitive information with competitors completely.
Conditioning and joint boycotting the suppliers	High	Avoid mutual agreements of this type.
Joint research and development	High	This practice is conditionally allowed, but it is necessary to monitor what type of information is exchanged. It is necessary to seek approval from the Commission for this type of agreements.
Vertical agreements		
Determining retail prices together with customers, fixing prices	High	Avoid mutual agreements of this type. Retailers must be free to set their own prices.
Forcing retailers to adhere to recommended prices	High	Avoid mutual agreements of this type. Retailers must be free to set their own prices.
Determining a formula for price calculations	High	Avoid mutual agreements of this type. Retailers must be free to set their own prices.
Coordinating retail prices policy with competitors through relationships with suppliers	High	Avoid mutual agreements of this type.
Exclusivity – sales to one customer only	Moderate	Avoid exclusive agreements
Discrimination through non-linear price schemes	High	Applying uniform and transparent sales policy.

example, in the case of Bitumen, eight bitumen producers in the Netherlands entered into an agreement with six customers - building companies - on the purchase of bitumen at fixed prices. All other customers were charged higher prices. The parties to this agreement were fined a total of EUR 266 million [3].

In Romania, the Chamber of Market Competition imposed fines totalling EUR 35 million on 25 entrepreneurs for an agreement on prices between retailers and their suppliers. Retailers and their suppliers agreed on minimum prices for some products and also coordinated promotional campaigns so that if one retailer offered benefits for certain products, then no other retailer was allowed to carry out the same promotional activities. The proceedings before the Romanian Chamber for Protection of Market Competition lasted for five years, and was launched after the market research of food retail in 2008 [3].

The aforementioned vertical agreements are prohibited *per se*, while there are other types of vertical agreements that are generally not permitted but may be exempted from the prohibition under certain circumstances. Such agreements include: exclusive distribution, exclusive purchasing, and selective distribution, franchising agreement, as well as transferring or granting the use of intellectual property rights [5]. If the participants in these agreements have less than 25% market share, these agreements are permitted. Otherwise, if the participants have over 25% market share, it is necessary to seek an exemption from the prohibition of such an agreement with a detailed analysis of the effects of such an agreement.

The aforementioned prohibited practices are summarized in Table 3. Apart from a brief description, the table also measures to prevent the risk if a particular practice is not completely prohibited.

Excessive concentration

Companies that merge or are subjects to acquisition must report the concentration, if they meet the legal requirements. The Law stipulates that the concentration must be reported to the Commission if the total annual income of all participants in the global market, as well as individual income in the Serbian market, is above legal thresholds. Upon considering the effects that the concentration causes, the Commission decides whether a merger may be approved, whether it will be approved conditionally (if certain conditions are met, such as in the case of Agrokor-Mercator winding down or sale of a certain number of stores) or it will not be approved (when it is considered that such a concentration would jeopardize competition in the market).

For example, the Commission for Protection of Competition approved the concentration of Agrokor - Mercator provided that certain structural measures are applied (reducing the area of retail space and the closure of certain facilities) and behavioural measures (regular reporting to the Commission on certain conditions).

Conclusion

Institutional protection of competition is the basic prerequisite of effective protection of all market participants. Market pressure, expressed through effective competition, affects the business practices of individual companies in terms of continuous development, growth and reducing operating costs allowing them to achieve better market position. Business practices of market players, especially the selling policies should be appropriately implemented in practice. Many companies do not fully understand the essence of competition and make accidental or intentional errors.

Table 3: An overview of forbidden practices and possibilities for mitigation of risk in the segment of excessive concentration

Name of a prohibited practice	Probability of identification of a prohibited practice	Risk prevention measures
Mergers and acquisitions that result in high market share.	High	Concentrations require prior approval by the Commission; therefore it is necessary to follow the procedure stipulated by Law.

This paper describes the most common violation of competition. Certain activities such as the agreed production volume, joint price increases, limiting and dividing the market, the exchange of sensitive information, raising entry barriers for new market participants, limiting innovation, liasoning in order to impact customers or suppliers, and other activities mentioned in the paper, are prohibited by Law. The implementation of these activities may reduce competition, increase concentration of market power and lead to the formation of undesirable market structures, which ultimately reduces consumer welfare and all other affected market participants.

Very often, certain companies deliberately resort to the application of certain anticompetitive activities in order to increase their own market impact. Guided by higher profit in relation to a potential penalty, the company knowingly accepts the risk of breaching competition rules. However, it should be noted that the companies led by knowledge, innovation, investment and good business decisions deserve dominant business position. These companies are not affected by the provisions of the Law and the potential penalties because they are building and maintaining their position by adhering to fair competitive practices.

Relevant examples have shown that penalties may be very severe and may lead the company into a very difficult financial position and cause bad reputation. An effective competition policy is implemented with the aim of ensuring equality of all market participants, not as protection for small players. This segment emphasises managerial skills of the dominant companies in mitigating risks in the application of certain business and sales policies. Some companies are very skilful in exploiting room for manoeuvre in the application of certain practices, and accepting certain level of risk.

Some practices, such as price fixing, cartel agreements or introducing incentive rebates which tie customers are strictly prohibited and sanctioned. Practice has shown that the greatest risk exists in the area of granting rebates because the dominant market participants do not follow the logic of economic justification. Rebates are used as a subjective instrument of sales policy that ties and restricts the desires and activities of the customer, which is strictly prohibited. In these cases options to mitigate or eliminate risks are insignificant.

Businesses are not sufficiently acquainted with this area and therefore unintentional violations of competition are very common. In these cases, the measures of the Commission are limited and operate in the field of warning and education. It is necessary to educate the economy more about the effects and the logic of the Law and the practice of protection of competition. Therefore, the subject of future research may be in the area of how much individual companies are aware of (not)permitted practices. Better understanding of these areas may lead to preventative elimination of operating risk in this segment and more effective treatment of anticompetitive risk. Hence, one of the key recommendations for companies is introducing the Antitrust Compliance program, which includes creating manuals for employees and organising adequate education about permitted and prohibited business activities.

References

1. Begović, B., & Pavić, V. (2009). Jasna i neposredna opasnost: Prokaz novog zakona o zaštiti konkurencije, *Anali Pravnog fakulteta u Beogradu, 2/2009*, 70-88.
2. European Commission. (2009). Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings (2009/C 45/02). *Official Journal of the European Union*, 7-20.
3. http://ec.europa.eu/competition/elojade/isef/
4. Khemani, S. (1995). Competition law: Some guidenlines for implementation. *Liberalised Trade and Fair Competitioni,* CUTS , Calcutta.
5. Komisija za zaštitu konkurencije RS. (2010). *Uredba o sporazumima između učesnika na tržištu koji posluju na različitom nivou proizvodnje ili distribucije koji se izuzimaju od zabrane*, Retrived from: http://www.kzk.org.rs/kzk/wp-content/uploads/2011/08/Uredba-vertikalni-sporazumi.pdf [Accessed 02/12/2015].
6. Komisija za zaštitu konkurencije RS. (2010). *Uredba o sporazumima o istraživanju i razvoju između učesnika na tržištu koji posluju na istom nivou proizvodnje ili distribucije koji se izuzimaju od zabrane.* Retrived from: http://www.kzk.org.rs/kzk/wp-content/uploads/2011/08/Uredba-o-istrazivanju-i-razvoju.pdf [Accessed 02/12/2015].
7. Komisija za zaštitu konkurencije RS. (2010). *Uredba o sporazumima o specijalizaciji između učesnika na tržištu koji posluju na istom nivou proizvodnje ili distribucije koji se izuzimaju od zabrane.* Retrived from: http://www.kzk.org.rs/kzk/wp-content/uploads/2011/08/Uredba-o-specijalizaciji.pdf [Accessed 03/12/2015].

8. Nickell, S. J. (1996). Competition and cor porate performance. *The Journal of Political Economy,104, 4*, 724-746.
9. Snowdon, B., & Stonehouse, G. (2006). Competitiveness in a globalised world: Michael Porter on the microeconomic foundations of the competitiveness of nations, regions, and firms. *Journal of International Business Studies*, 37, 163-175.
10. The Law on the protection of competition. The Official Gazette of the Republic of Serbia, no. 95/2013.
11. Lončar D., & Milošević S. (2015). Antitrust policy in Serbia: regulatory framework and enforcement mechanism. *Journal of Contemporary Economic and Business Issues, 2, 2*, 75-92.

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IMPROVEMENT OF EFFICIENCY OF GAS DISTRIBUTION SECTOR IN THE REPUBLIC OF SERBIA: SOME RECOMMENDATIONS*

Unapređenje efikasnosti sektora distribucije gasa u Republici Srbiji - neke preporuke

Abstract

This paper aims to investigate the possibilities for improvement of efficiency of the natural gas distribution sector in the light of supporting the competitiveness of the domestic companies. The gas distribution network operated by distribution system operators (DSOs) is an important link of the value chain in delivering natural gas to industrial consumers and households. DSOs are in a position of natural monopoly that is economically and socially acceptable. Because of their importance for the competitiveness of national economy, we analyzed their technical efficiency and financial condition. We found that many of those companies have a low level of technical efficiency and ruined financial health and investment potency. Several possibilities for improving this performance were analysed, and as the most viable seemed to be mergers of these companies into a fewer number of DSOs. The main DSO-specific sources of value that could be activated through merger transactions were identified and analysed in depth. The process of mergers should be initiated by government, and its implementation should be supported by local authorities if they founded the DSO.

Key words: *gas distribution, technical efficiency, consolidation, mergers, economies of scale, DEA*

Sažetak

Cilj ovog rada je istraživanje mogućnosti za unapređenje efikasnosti sektora distribucije prirodnog gasa u svrhu podsticanja konkurentosti domaćih preduzeća. Gasna distributivna mreža, kojom upravljaju operatori distributivnog sistema (ODS), predstavlja važnu kariku u lancu vrednosti u isporuci prirodnog gasa industrijskim potrošačima i domaćinstvima. Operatori su u poziciji prirodnog monopola koji je prihvatljiv sa ekonomskog i društvenog stanovišta. Zbog njihove važnosti za konkurentnost nacionalne ekonomije analizirali smo njihovu tehničku efikasnost i finansijsku situaciju. Pronašli smo da su mnoga od ovih preduzeća slabe tehničke efikasnosti i narušenog finansijskog zdravlja i investicione potentnosti. Analizirano je nekoliko mogućnosti za unapređenje ovih performansi i kao najodrživija odabrana opcija spajanja tih preduzeća u manji broj ODS. Identifikovani su i detaljno analizirani za ODS specifični izvori vrednosti koji bi se mogli aktivirati u transakcijama spajanja. Proces spajanja treba da bude iniciran od strane nacionalne vlade, ali i podržan u implementaciji od lokalne samouprave ukoliko je lokalna samouprava osnivač.

Ključne reči: *distribucija gasa, tehnička efikasnost, konsolidacija, merdžeri, ekonomija obima, DEA*

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Introduction

In order to improve competitiveness of domestic companies it is important to ensure a secure energy supply at an affordable price. Natural gas is an important energy source in Serbian economy; in the structure of total final energy consumption in 2015, gas accounted for 14%, and the industrial buyers accounted for 71% of the total gas consumption (1.19 billion m^3, which is an increase by 10% compared to 2014) [19]. Gas is also an important raw material for some companies. Finally, safe and convenient gas supply is also important for households. In this paper, we directly deal with the sector of natural gas distribution.

Gas distribution companies, i.e. distribution system operators - DSOs have the responsibility to ensure safe and reliable delivery of natural gas to end-users and to maintain the distribution networks. Gas distribution is considered to be a "natural monopoly", meaning that in the specific geographic area one DSO can generate a desired output at a lower social cost than two or more DSOs because of high fixed costs and economies of scale. Including one more customer on the network will increase a DSO's revenues, and lower the average cost for customers. Consequently, larger firm serves a customer base more efficiently. Additionally, DSO can plan investment in the long run. However, monopolies are in constant position to exploit their advantage at the expense of their customers. Because of that threat, regulations are needed. The gas distribution prices (tariffs) are regulated by the national regulatory authorities, who define or approve the level of tariffs (and/or profits) that DSOs are allowed to remunerate. DSOs should be allowed to have a sufficient rate of return to recover the investment in gas network and related operational costs.

Currently DSOs in Serbia are not in a favourable position, neither with respect to their technical efficiency nor in terms of their financial sustainability. For the purpose of helping enhancement of comparative advantage of national economy, the gas distribution sector should pass through consolidation and efficiency improvement.

In order to recommend appropriate strategic changes of the gas distribution sector, first of all, we have to describe a problem, and then to review the current situation. We chose to analyse the sector in terms of technical efficiency of DSOs as well as through analysis of their financial condition, e.g. financial health and investment potency. Rising technical efficiency and strengthening the financial health could be achieved through merging processes. Those processes would lead to cost savings, strategic alignment, savings in capital expenditures, financial synergies, and control gains. The final result would be lower distribution tariffs and consequently lower energy costs for domestic industry, and stronger competitiveness of the national economy.

Problem background

To protect its national interests, reduce dependency on imported energy, and assure the overall health and welfare of the local population, sound environmental practices and the responsible use of energy are carefully considered by every country [2]. On the other hand, the anti-crisis program of the national economy should have two major tracks: systematic actions (leading to macroeconomic stability) and sectoral activities (leading to bolster priority sectors). Energy sector of the Republic of Serbia is seen as sector in which programs can enhance the comparative advantage of its national economy. As a sector with dominant characteristics of natural monopoly, it should pass through the programs of consolidation and efficiency improvement [4].

After oil, natural gas is the second primary energy source in Europe. That is a consequence of its relatively lower prices in relation to other energy sources and because of the fact that it is more environmentally friendly fuel. Europe is strongly dependent on gas delivery from Russia and North African countries, and in the future, it is expected to be a great importer of gas from Middle East [13, p. 3]. The world's largest producers of natural gas in 2014 are the United States (730 billion m^3 or 20.7%), the Russian Federation (644 billion m^3 or 18.3), Iran, Canada, Qatar (all together around 487 billion m^3, or 13.9%). The biggest net exporters are Russian Federation (179 billion m^3), Qatar (119) and Norway (107). The biggest net importers are Japan (128 billion m^3), Germany (68), Italy

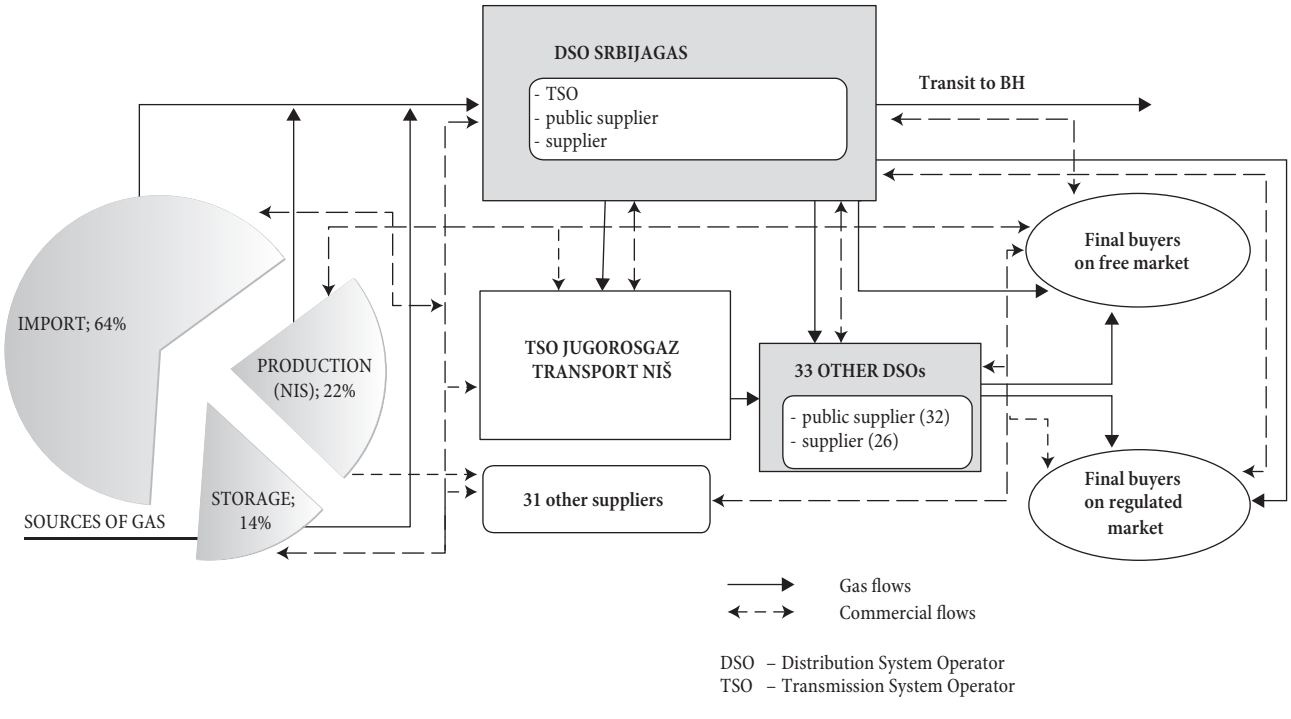
(56), PR of China, Korea, Turkey (every country around 49 billion m^3) [14].

Natural gas will remain an important energy source in the future; it is envisaged that at the global level the future natural gas demand could increase in future years, after the consequences of economic crises are mitigated. This increase will be influenced by the natural gas prices, among other factors. This particularly goes for the industry, especially large industry which uses natural gas as raw material, that their consumption will be largely dependent on the future gas prices. It can also be expected that natural gas consumption could be increased in the areas where distribution networks are still underdeveloped.

In Serbia, natural gas industry includes import, processes of domestic reserves exploitation, refinement, transportation and distribution of natural gas to final consumers is performed [18]. Oil and gas remain the primary energy sources, supplying 70% of Serbian energy demand 40 years ago, and supplying 70% today. The quantities of natural gas available for consumption in 2014 were 2,166 billion m^3, and they were provided from import, domestic production and from the underground gas storage. Most of these quantities were imported from the Russian federation according to long-term supply contract. These imported quantities in 2014 amounted to 1,393 million m^3 out of which 1,346 were overtaken from the transmission system in Hungary and 47 million were taken from the underground gas storage. Domestic production of natural gas in 2014 was almost the same as in 2013 and amounted to 467 million m^3 and its share in total quantities available was 22%.

Serbia is not largely dependent on energy imports as whole (about 33%), but its dependence is significantly obvious in the natural gas industry (86%). This problem could be solved by forming adequate reserves and diversifying sources of supply [17]. Security of supply is significantly increased by activating the underground gas storage Banatski Dvor, with a withdrawal capacity of 5 million m^3/day. Also, an agreement for the construction of interconnector Niš-Dimitrovgrad-Dupnica was signed in 2012, and some activities have been undertaken in preparation phase for the construction of this pipeline, which is supposed to increase Serbia's' security of supply. This pipeline should be 150 km long and have the capacity, in the first phase, of around 1,8 billion m^3/year. If other potential interconnections with other countries come to realization, such as with Romania and Croatia, the security of supply situation would also be improved [8].

Figure 1: Place of DSOs in the natural gas market in the Republic of Serbia



DSO – Distribution System Operator
TSO – Transmission System Operator

Source: [6, modified by authors]

The natural gas industry of Serbia operates as a bilateral market which means that gas is bought and sold directly between market participants. The gas market participants are: manufacturers, suppliers, public suppliers, end users, operators of transportation systems, distribution system operators, and operator of storage facilities (see Figure 1).

It can be seen that in the gas distribution sector, there are currently 34 companies. However, they differ significantly in their physical indicators and their financial performance. Observed through the dimension of distributed quantity, around 70% of the whole amount is distributed by only one distributor. In 2014, only 3 DSOs delivered more than 30 million m^3, while 23 DSOs delivered less than 10 million m^3 [8]. Based on these facts, it could be assumed that distribution sector is too much fragmented. Bearing in mind the amount of distributed gas, there is a concern that some DSOs have a low technical efficiency. Size of DSOs, quantity of gas they distributed and their technical efficiency may adversely affect the amount of distribution tariffs, as well as on the final price of gas and, consequently, on the competitiveness of industrial customers. Currently there is a significant difference in the distribution tariffs which are practically built into the final price of gas paid by these customers; the lowest price of access to the gas distribution system is 1.38 RSD/m^3 and the highest price is 12.56 RSD/m^3. The participation of the distribution tariff in the final gas price ranged from just 3.15% up to 20.90% [9]. Apart from the fact that more than 2/3 of DSOs are of small size, what we can conclude from the previous data, there is another disappointing fact that some of them are financially weak and do not have the ability to invest, which will be the subject of analysis in the next section.

Gas distribution, transport and public supply are regulated activities in Serbia. Methodology for regulated price setting is at the moment determined to be "cost plus method". Under this method the maximum allowed revenue in the regulatory period is set for each of DSOs i.e. the price of the service is set in a way that it provides (distribution tariffs) a return on justified operating costs as well as a return on assets employed [5]. This type of regulative is also used for example in Belgium. Other countries use a different type of regulation. For example, "incentive based" regulation is implemented in the Czech Republic, France, Germany, the Netherlands and the UK. Italy uses a combination of the two types of regulation. Finally, some countries use a third type of regulation – "revenue cap" – such as Finland, Greece, Poland (with "cost plus"), and Turkey [12].

Current financial condition of companies in gas distribution sector

Analysis of the financial situation of companies that operate in the gas distribution business we performed in an abbreviated form based on data from their annual reports for 2014.[1] Except these companies perform activities in gas distribution sector, they also operate in the gas supply sector (as we have seen in Figure 1), and some of them are also engaged in other businesses. Since the information in the financial statements does not relate solely to the distribution of gas, our analysis did not go into the details of their operational efficiency and profitability, but we focused on the analysis of their financial health and investment potency.

After examining the financial position, financial results and cash flows of companies it can be concluded that many of them are not in good financial health. About 32% of the total number of companies ended the fiscal year with a negative net income (totalling - 40.15 billion RSD), negative profit margin and negative ROE. Operating Cash Flow (OCF) for the sector was negative, and consequently the indicators of current liabilities and total liabilities were negative (see Table 1). The overall picture of the solvency, liquidity and investment potency of the sector is very unfavourable. And yet, the sector average is largely affected by unfavourable results of one large company. In order to isolate the impact of this company on the results of the analysis, we calculated selected performance indicators for each of the companies and grouped them into four groups according to the their quality (rank 4 is the worst, and rank 1 is the best). After performing this

1 The data were retrieved from the business portal CUBE Risk Management Solutions - http: //cube.rs. For six of 34 DSOs data were not available for the year 2014, and for five of the 28 there were not available information from the Cash flow statement.

Table 1: Selected financial indicators

	Sector average		Rank 4	Rank 3	Rank 2	Rank 1
Financial health						
OCF/Total Liabilities	**- 0.05**	*Range of values*	*<0*	*0.01-0.10*	*0.11-0.20*	*>0.2*
		% of total DSOs	**34.8%**	**17.4%**	**21.7%**	**26.1%**
Total Debt / EBITDA	**9.59**	*Range of values*	*<0*	*10.1+*	*1.1-10.0*	*0-1.0*
		% of total DSOs	**17.9%**	**7.1%**	**39.3%**	**35.7%**
EBITDA/interest coverage	**1.55**	*Range of values*	*<0*	*0.1-2.0*	*2.1-4.0*	*>4*
		% of total DSOs	**17.9%**	**28.6%**	**7.1%**	**46.4%**
Liquidity						
OCF /Current liabilities	**- 0.04**	*Range of values*	*<0*	*0-0.2*	*0.21-0.4*	*>0.4*
		% of total DSOs	**34.8%**	**39.1%**	**21.7%**	**4.35%**
Investment potency						
OCF /(Long Term Assets + working capital)	**- 7.33%**	*Range of values*	*<0*	*0-0.06*	*0.061-0.12*	*>0.12*
		% of total DSOs	**34.8%**	**22.7%**	**18.2%**	**24.3%**

Source: Authors' calculations

kind of grouping, the performance indicators of the sector are better, but still unfavourable.

Illiquidity is obvious - even 34.8% of companies operated with negative OCF. Only 4.35% of companies had a ratio of OCF/Current liabilities greater than the recommended of 0.4. On the side of solvency, almost ¾ of them had OCF/Total Liabilities below the recommended 0.2. About 10% of the total number of companies did not use debt. As a result of this, picture of solvency is slightly better from the perspective of the Total Debt/EBITDA and EBITDA/Interest coverage ratios. Unfortunately, 17.9% of the total number of companies operated with negative EBITDA, and 46.4% of the total number of companies have EBITDA/Interest coverage ratio below 2. The same percentage of companies had this indicator above the level of 4. The number of years for loan repayment from EBITDA for the whole sector amounted to almost 10, but it is encouraging that more than one third of the companies had this indicator between 0 and 1. Finally, when investment indicators potency is considered, a little bit less than ¼ of the companies had this indicator at a relatively high level of above 12% (it roughly indicates the possibility of replacement of property, plant and equipment and other long term assets and working capital from OCF within about 8 years).

The reasons of poor financial health and investment capabilities of a large number of companies can be considered in a few lines. Current legislation can present a significant burden in terms of personnel costs: salaries of a regulatory prescribed number of technical staff maintaining the network, and compensation for DSOs' corporate governance structure (board of directors, committees at the board, etc.). Purchase and maintenance of IT software and hardware for small and financially weak companies may also represent a high burden. Purchase of pipes, metering devices and other equipment necessary for the maintenance of the network are to be made in small procurements, which leads to generally weak negotiating power in relation to the suppliers of those inputs. Consequently, it leads to higher purchase price. Furthermore, some companies have big network losses. Their financial capability is often insufficient to obtain favourable loans from banks, and capability to attract equity are more than limited. Keeping all of the above in mind, it is obvious that the risk of entry of some companies into financial distress, bankruptcy and liquidation is not negligible.

In other countries DSOs are also not very successful despite their monopoly position. The return on invested capital of natural gas distribution in the USA was generally lower than their cost of capital in the past decade [22]. Nevertheless, there are differences between different DSOs. For example, in Turkey public companies compared to private ones, non-tender companies compared to tender ones, large companies compared to small ones, and

Table 2: Choice of input and output variables

Variables	Operating expenditure + losses provision	Total quantities delivered	Quantities delivered to households'	Quantities delivered to industry buyers
Model 1	Input	Output		
Model 2	Input		Output	Output
Model 3	Input		Output	
Model 4	Input			Output

Source: Authors' choice

companies operating in more developed areas compared to companies operating in underdeveloped areas are more efficient in cost manner [11].

Current technical efficiency of DSOs

Current technical efficiency of DSOs was assessed applying Data Envelopment Analysis (DEA) methodology. Because of the data availability, we made analysis for 17 out of 34 DSOs. We used four models of efficiency analysis (see Table 2).

The results of the analysis are calculated by the application of software for Data Envelopment Analysis EMS v 3.1, under variable returns to scale (VRS) assumption, are given in the Table 3.

The results show high variation in efficiency scores in all four models used, whereby the lowest scores had DSOs with the smallest amount of gas distributed. In order to confirm our assumption we continue the analysis, dividing the DSOs in three categories according to the scale of the quantities delivered - the ones with the throughput of natural gas below 5 million m^3 a year, from 5 to 10 million m^3 throughput a year, and over 10 million m^3 a year. The average efficiency of these three groups is given in Table 4.

The results presented in Table 4 and also in Figure 2 below confirmed our previous assumption within all models. One of possible explanation is that new and small DSOs cannot increase neither the number of customers neither the quantities they consume in order to improve its efficiency. Sometimes the minor operating expenditures are due to the fact that the maintenance and repair of the network and calibration of metering devices are not performed in a timely manner.

Technical efficiency can be analysed in other ways. For example, according to some empirical research recommended minimum acceptable ratio for quantities delivered in comparison to the network length should be $60m^3/m$ [21].

From the results presented in previous table it can be concluded that there is a very large variation in ratio

Table 3: Technical efficiency according to DEA

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5	DSO 6	DSO 7	DSO 8	DSO 9	DSO 10	DSO 11	DSO 12	DSO 13	DSO 14	DSO 15	DSO 16	DSO 17
Model 1	0.07	1.00	0.11	0.08	0.33	0.18	0.33	0.23	0.32	0.38	0.09	1.00	0.10	0.39	0.16	0.58	0.12
Model 2	0.25	1.00	0.11	0.22	1.00	1.00	0.44	1.00	0.65	0.62	0.31	1.00	0.10	0.40	0.16	0.66	0.20
Model 3	0.25	1.00	0.11	0.22	1.00	1.00	0.25	1.00	0.50	0.40	0.31	1.00	0.10	0.11	0.16	0.28	0.07
Model 4	0.05	1.00	0.11	0.07	0.17	0.08	0.29	0.03	0.23	0.30	0.09	1.00	0.10	0.40	0.16	0.56	0.20

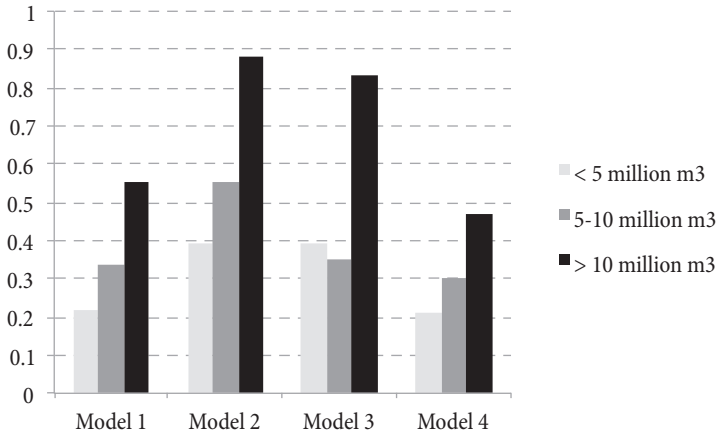
Source: Authors' calculations

Table 4: Average efficiency of the groups according to the quantities delivered

Quantities delivered	< 5 million m^3	5-10 million m^3	> 10 million m^3
Model 1	0.22	0.34	0.55
Model 2	0.39	0.55	0.88
Model 3	0.39	0.35	0.83
Model 4	0.21	0.3	0.47

Source: Authors' calculations

Figure 2: Average efficiency of the groups according to the quantities delivered



Source: Authors' calculations

Q/l across DSOs and also that only one DSO achieved the recommended level of min. 60 m^3/m. Comparing those results to the results of the other study [see 21] when the data for 2008 were used, and 1/3 of all DSOs did satisfy this recommendation, the decline in this ratio is significant. This can be caused by the decline of quantities delivered in the past years.

Some recommendations

The results of our previous analyses emphasise the need to consider measures for the improvement of technical and economic efficiency of DSOs. It is in the interest of the DSOs, but it also could ensure better preconditions for the competitiveness of the industry that uses gas as an energy source or raw material as well as in the interest of the companies that might use the network if it would be further developed. Although the possible actions in case of natural monopolies are in a way limited, there are few alternatives which could support the competitiveness of Serbian industry.

Potentially the most effective alternative to support the competitiveness of industry is diversification of sources of gas supply at the national level. But, domestic resources of natural gas are limited and nowadays, chances for diversifying external sources of natural gas are even less than several months ago. South Stream is cancelled in December 2014, Turkish Stream is uncertain and there is a huge risk of interruption of transit of Russian gas through Ukraine after the expiry of their contract in 2019. Since Serbia cannot play an active role in the design and building the streams, in the short run it can only look for the opportunities for making cost savings and making the whole gas network more efficient. Below, we discuss three alternatives to improve efficiency of gas distribution sector in the Republic of Serbia.

The first alternative is the change in the regulatory framework, i.e. introduction of incentive based and revenue

Table 5: Quantities delivered in relation to distribution network length (in 2014)

	DSO 1	DSO 2	DSO 3	DSO 4	DSO 5	DSO 6	DSO 7	DSO 8	DSO 9	DSO 10	DSO 11	DSO 12	DSO 13	DSO 14	DSO 15	DSO 16	DSO 17
Quantities delivered (000 m3)	2,620	2,412	1,115	2,677	23,190	2,881	5,267	5,785	15,138	9,387	2,237	945,099	1,995	8,991	259	9,108	5,153
Network length (000 m)	198	105	50	150	511	170	183	267	454	333	121	7,514	59	205	20	172	127
Ratio Q/l (m^3 /m)	13.22	22.96	22.46	17.82	45.42	16.91	28.78	21.71	33.37	28.18	18.46	125.77	33.63	43.92	12.93	52.95	40.71

Source: [8, derived data]

cap regulation, which forces the DSOs to perform their activities in an efficient way. When incentive based regulation is applied the efficiency of the company becomes very important because it directly influences the charges DSOs are allowed to charge. Although this kind of regulation is very successfully applied in well developed countries, for our case it would be inappropriate for the reason that such strict regulation could additionally weaken the position of small and financially non-viable DSOs and because it could have the adverse effect on further network development.

Second, nowadays there are tendencies to open up almost every type of market through the gradual introduction of competition. But in the case of gas distribution, a monopoly is both economically and socially acceptable; DSOs are in a position of natural monopolies. It is logical to have just one network to distribute gas to consumers, because of avoiding duplication of sunk costs. Although, there is a potentially efficient way of controlling the natural monopoly in the gas distribution sector as it could be a system of multi-criteria tenders. In that case regulator creates a kind of "competition for the market", as it was, for instance, implemented in Italy [3] and Turkey [11]. These criteria may include: verification of DSO's references, ex-ante control of DSO's capabilities, ongoing inspection, and ex-post control of quality of DSO's service delivering.

Finally the third alternative is in encouraging the consolidation of the natural gas distribution sector. There is more than one way of action in this respect. First of all, the conditions for obtaining DSO license or the conditions to conclude the contract on the right to perform the activity of common interest which is to be signed with the Government, as two preconditions to perform distribution of natural gas, should be more strict, i.e. the minimum number of delivery points and minimum quantities to be delivered should be defined. By raising the entry barriers, further fragmentation of the sector would be avoided. The already existing DSOs should be encouraged to restructure themselves. These measures can go into two directions: financial and asset restructuring. Financial restructuring should be aimed at debt to equity swaps that would in turn lead to a reduction in debt burden and increase of equity making insolvent and financially weak DSOs viable. Business restructuring should be focused on incentivizing the mergers of DSOs. In case of many existing companies in gas industry, it would be opportune to separate a distribution part of companies before their possible merger. It could be done for example through the spin-off, spin-out, split-off and other transactions [see 15]. The announcement of introduction of incentive based regulation in the medium term could also encourage managers of DSOs to think about mergers.

Below, we discuss the potential benefits that could be achieved as a result of the consolidation of the distribution sector through mergers of DSOs. Having in mind that the DSOs are often not aware of these benefits, the emphasis on sharing know-how and spreading the information about it is very important and can also impede the activities of merging.

Potential benefits of consolidation of fragmented gas distribution sector

The merger of DSOs is a type of horizontal integration. From a broader social perspective, a common problem resulting from mergers, especially the horizontal integrations, may be an excessive strengthening of market power and decreasing the degree of competition (increase of market concentration), which on the basis of market dominance can lead to greater opportunities to control the sales price (or/and the quality and size of supply). Sales prices can, however, be controlled even though the company does not dominate the market, if there is collusion, illegal coordination and cooperation between two or more competitors, whereby mergers, due to the reduction in the number of competitors, increase the likelihood of such incidents. Those socially harmful activities – excessive strengthening of market power and collusions – are especially unfavourable in a situation when customers have no or few alternative sources of supply. These disadvantages of mergers would not be reasonable to expect in the case of integration of the gas distribution companies, since they are already in a position of natural monopoly.

By DSOs mergers numerous potential gains could be achieved both for the DSOs themselves, but also for their customers and for a national economy as well. Synergies are the most important potential gain and source of value

in mergers. Synergies can be operational and financial, wherein the first ones are more likely and they are more significant. Operating synergies are mostly manifested through increased free cash flow to the firm (FCFF) and financial ones through a reduction of weighted average cost of capital (WACC). The main operating synergy is identified in the area of cost savings based on the activation of economies of scale. Besides, merger of DSOs can bring other cost savings, facilitate strategic alignment of the company to changes in regulation and technology, but also a positive change in investment strategy, capital expenditures and performance of these investments. The potential benefits of mergers can be also achieved on the basis of the effects of enhanced control and through the influence of a takeover premium that the company could achieve in a potential future sales transaction of DSOs.

Economies of scale. Cost savings could be realized on the basis of activating the economies of scale, but also through a reduction in other operating costs. The concept of economies of scale is usually linked to the ability to conduct activities at a lower cost per-unit of product or service with the increasing scale of activities; the greater the quantity of a gas that is distributed, the lower the per-unit fixed cost because these costs are shared over a bigger number of units (m^3) distributed.

In order to substantiate the effects of economies of scale we performed additional DEA analysis in which small DSOs were merged. The model 1 was applied. Firstly, two DSOs with the lowest efficiency scores were merged, then five DSOs, and finally all nine small DSOs were merged. The results are shown in the Table 6.

The results show explicitly that mergers of DSOs lead to the increase of the technical efficiency of that virtually merged DSOs (M2, M5, M9). Ignoring all expected cost savings that would occur as a result of mergers, after M2 merger technical efficiency DSO has more than doubled compared to the initial situation, and after M9 the score grew at a level of 0.35 which is significantly higher than efficiency levels of the DSOs before their hypothetical merger.

Mergers can be promoted in close geographical areas. Merging processes gave significant results in Italy between 1970 and 1998, especially when local DSOs operating at small scale were participants in that process. The recommendation was that distribution companies serving less than 20,000 customers and delivering less than 40 million m^3 should merge [10]. This recommendation is in some ways valid for the Republic of Serbia too, but it should have in mind that this recommended level is very high since there are only three DSOs which distributed more than 30 million m^3.

Other operating expenses (OPEX). DSOs mergers can not only reduce fixed costs per m^3 of gas distributed, but also the total amount of fixed costs. Cost savings could be realized by performing activities of two or more previously separated companies now under a single corporate umbrella i.e. under centralized management. For example, new economies can be activated by reducing administrative costs of concluding sales contracts, lowering the cost of debt collection, research and development costs, general administration costs, costs of finance and accounting department, human resource management costs and the costs of IT support (hardware and software). It should not be forgotten that the reduction of fixed costs by itself reduces the level of business risk, i.e. brings the benefits of stabilization in operating profit.

Cost savings can be made in some other ways, too. Larger DSO's size could provide the benefits of obtaining pipes, metering devices etc. that have better (or known) quality, at a potentially lower purchase price, on time

Table 6: Technical efficiency after the hypothetical merger of DSOs

DEA scores	DSO 1	DSO 2	DSO 3	DSO 4	DSO 6	DSO 11	DSO 13	DSO 15	DSO 17	After the merger
Current situation	0.07	1.00	0.11	0.08	0.18	0.09	0.10	0.16	0.12	
M2 - merger of two	/	1.00	0.11	/	0.18	0.09	0.10	0.16	0.12	0.15
M5 - merger of five	/	1.00	/	/	0.18	/	/	0.16	0.12	0.19
M9 - merger of nine	/	/	/	/	/	/	/	/	/	0.35

Source: Authors' calculations

and without conditioning. In comparison to purchases in small amounts, how they are carried out now, centralized procurement after mergers promises an opportunity for savings. Legislation in force envisages that every DSO must have at least seven staff persons in charge of technical management, operation and maintenance of the system, with professional exam passed, in order to obtain a license [20]. For small and financially weak DSOs it presents an excessive financial burden, therefore, through the integration, companies could relieve themselves from the part of those operating costs. In the area of personnel costs, after the merger savings could be achieved in board members' compensation. Furthermore, some DSOs have difficulties to ensure funds for maintaining the network. Theoretically, it could jeopardize the security of supply of existing customers, and in the practical domain certainly endangers those DSOs who have gas losses in the network above the regulatory acceptable level. In this regard, twelve DSOs submitted data about their significantly high network losses in 2013 (in the range from 2.6% to 11.8%) and the average percentage of losses for these 12 DSOs is 6,2%, which is rather high value [7]. Since every company has its own maintenance team, their possible mergers could bring savings in maintenance costs of the entire network at all.

Strategic alignment. With regulatory changes and changes in technology applied, strategic alignment is often a necessary precondition not only for successful growth and development, but also for the survival of the company. Small DSOs are not necessarily able to do so. In this respect, enlarging the DSOs through their mergers creates possibilities for better compliance with legislation in force and the latest technological improvements, especially in the field of IT.

Capital Expenditures (CAPEX). In the theoretical domain, merger transactions can lead to the reduction in CAPEX. DSOs with negative cash flow from operating activities have no ability to raise debts and are not able to invest in gas network i.e. they cannot develop the network, but also experience difficulties in replacement of worn-out elements of the existing network. The inability to further develop the network leads to the situation that potential industrial buyers in remote areas cannot be connected to the network. As a consequence, these companies have to use other sources of energy that might be more polluting.

Some DSOs have rounded network without the possibility of profitable expansion, while the others have network that could be expanded a lot. If some distributors in the first group have a positive operating cash flow, in the absence of profitable investment opportunities managers could be prone to invest cash in projects with negative net present value – known as the destruction of free cash flow – FCF [16]. The extent to which the problem of destruction of FCF will be manifested depends on whether the ownership structure and corporate governance structure are such that the owners can ensure control over the use of their cash (insisting on high payouts or by withdrawal of capital i.e. purchase of shares) or not. On the other hand, a DSO with a negative operating cash flow has often a problem of underinvestment i.e. loss of return on missed profitable investments. Therefore, mergers of DSO with positive FCF and without good investment opportunities, on the one hand, and DSO who does not have sufficient cash to fund network expansion may make the sense. Sources of value in this combination lie in the net present value of the projects that would not be undertaken in DSOs with a lack of cash. On the other side, the value is "preserved" in the amount of the present value of agency costs arising from destroyed FCF in non-merged DSO with cash surplus/ no attractive projects.

Financial synergies. Sources of financial synergies can be the following: utilization of unused debt capacity, reduction of the risk of financial distress and reduction of DSO's WACC.

Debt capacity, in terms of the amount of debt that a DSO can obtain, may be increased after the merger on two grounds: 1) if one or some of the DSOs that are joining have a low level of debt compared to the value of assets that could put as debt collateral or to the FCF that will generate and 2) due to reduction in volatility in operating profit, FCF or business risks of combined entity compared to individual companies. The first ground is clear in itself - when some of the companies that are included in the combination have valuable assets unpledged as collateral or high future FCF they can be used to obtain new debt for the combined entity. Moving the capital structure in

the direction of greater use of debt can sometimes lead to reduction of WACC and to increase the value of the company. With regard to the second ground, the fact is that different DSOs achieve different levels of profitability and FCF at different points of time. Therefore, as a rule the combined profits and FCF have less volatility than the volatility of individual companies. Reduced volatility of profits and FCF caused by the integration of DSOs promises greater security for creditors that interest and principal of loans will be paid. Creditors would consequently be able to lower the required rate of return i.e. it would enable a lower cost of debt for DSOs. Credit availability can also be increased due to the increasing size of the debtor.

This reduction in the volatility of the profits in addition to the aforementioned reduction in business risk from the effects of reductions in fixed costs could reduce the risk of entering into financial distress. Financial distress can be terminated by the bankruptcy and decay of DSOs. The bankruptcy procedure is expensive and complicated and results, even in the case of successful completion, in suffering significant costs for the DSO and also can threaten the security of supply to gas end-users. The collapse of the DSO could lead to the problem of finding new companies who would be interested and able for gas distribution in a given area, the problems of buying gas network from the bankruptcy procedure and the like. Therefore, a big potential gains from DSOs integration can be a reduction in the risk of bankruptcy and collapse of the DSOs that are financially weak. Because the distribution of natural gas is defined as activity of common interest in Serbia, according to the Law on public enterprises, if it happens that a company loses its license due to the bankruptcy, the Government decides and makes it obligatory for another company to perform the activity of distribution on the network of the bankrupted company. In such cases the problem of the ownership and corresponding rights and fees based on this ownership as well as distribution tariffs raise many problems to be solved.

Reduction of the cost of second component of DSOs capital i.e. the cost of equity is questionable in literature. However, the general position is that if the equity investors cannot easily, accurately and cheaply manage their exposure to systemic risk, reduction of systemic risk at a company level could lead to reductions in the cost of equity. Combining DSOs may improve management of systemic risk, reduce cost of the equity, but also enable obtaining additional equity (recapitalisation) or facilitate the fulfilment of assumptions for their listing on the stock exchange (Initial Public Offering - IPO) which would significantly expand the range of potential equity providers.

Transaction costs related to raising capital affect the company's WACC. Since these costs are largely fixed in nature, raising debt and equity in larger volumes after the DSOs' mergers could bring some kind of benefit of economies of scale in the field of transaction costs.

"Control gains". In the case of poorly managed companies, i.e. companies with poor management and/or board of directors, value through mergers can also be created by better management and/or control of corporate assets in the future. Although the owners of DSOs can make removal of inefficient and opportunistic-minded management teams themselves, problems related to the inefficiency of the board and other imperfections of mechanisms of corporate governance, especially in small companies, make the changes in management teams (and the board of directors) rarely occurring, even in the case of very poor performance. Gains from enhanced control after the merger may occur on several grounds e.g. by improved business strategies, better monitoring of the management team and making managers more focused on the goal of maximizing owners' value. That is achieved through more efficient corporate governance mechanisms (e.g. more suitable managers' compensation incentive systems), firing of the managers with poor performance, changing the structure, mode of operation and efficiency of the board of directors etc.

Like any other regulator, the national energy regulatory authority (Energy Agency of the Republic of Serbia - AERS) is in the informational asymmetry with respect to entities that are subject to regulation. Information asymmetry reduces the possibility of adequate in-depth controls, particularly in situations where the information risk is amplified due to lack of or inadequate audit of financial statements of regulated subjects. The problem increases if the regulator does not have the sufficient capacity or the authorizations in relation to the number of entities

to be regulated when, in some way, the regulator is forced to accept the amounts of operating costs and regulated assets value as stated in books and in DSOs' financial statements. For example, a DSO can state in financial statements assets that do not exist, the assets that exist, but DSO has no right to those assets, cause assets are not in DSO's ownership (e.g. assets taken into an operating lease) or state assets at values that are not in accordance with IFRS (especially if assets are measured at fair value). In addition, it is also known phenomenon that companies in regulated industries are naturally prone to moral hazard in the sense of avoiding or relaxing externally imposed constraints. In connection with that, the rate-of-return regulation reduces the motivation of companies to reduce costs if they know that the increased costs will be accepted by the regulator, and at the same time increases their motivation to increase regulated assets - Averch-Johnson effect [1]. Therefore, this regulation gives incentives for regulated companies to overcapitalize themselves, enabling in that way higher absolute profit. Increase in regulated assets can be achieved not only by the new investment, but also by the use of fair value accounting in measuring property, plant and equipment, as well as creative use of other options permitted under IFRS, for example, capitalization of interest expense and foreign exchange differences which do not fulfil the prerequisites for capitalization. The problem of creative accounting can be particularly pronounced for those DSOs that are not obliged for statutory audits. Energy regulation per se does not impose an obligation on the audit, i.e. audited financial statements submitted to AERS only by those DSOs that have that obligation by other laws, primarily by Low on Audit. Integrating DSOs may therefore bring additional control gains, both through the dimensions to facilitate monitoring by the regulator, as well as through mandatory audits of financial statements.

Preventing the acquisition of DSOs at low price and by unwanted buyers. High fragmentation of distribution networks reduces the intrinsic value of DSOs and allows that some of them, even the most successful, become the subject of takeover at a low price or by investors who may be considered as undesirable. Low selling price in this case would not be a result of poorly managed businesses, but result of poorly informed owners, current financial problems faced by owners or bargaining superiority of a potential buyer. Merging DSOs certainly reduces this kind of danger or increases the potential selling price that could be obtained in the event of a future sale of DSO.

Conclusion

The question of natural gas supply is one of the most important issues in energy strategy. The distribution network is an important link of the value chain in delivering natural gas to end users. DSOs are in a position of natural monopoly, but in a monopoly that is economically and socially acceptable. As in any case of monopoly there is a necessity for its controlling as well as necessity for making them more efficient because of final aims – sustainability of the gas industry and competitiveness of the national economy.

Since distribution tariffs constitute a part of the gas price that industry pays in the end, in order to make companies competitive and to lower their production costs we had to look deeper into the value chain. We investigated technical efficiency of DSOs and the financial condition of those companies. It was concluded that the vast majority of these companies has a low level of technical efficiency and they are generally weak in terms of financial health (solvency), liquidity and investment potency. Also distribution sector is too much fragmented. Since Serbia cannot easily diversify sources of natural gas, it is necessary to look for the possibilities for cost savings and making the gas network more efficient. Three alternatives for improvement of DSOs' efficiency were analysed: introduction of incentive and revenue cap regulation, the introduction of multi-criteria tender system and, finally, consolidation of the fragmented gas distribution sector.

Due to potential further weakening of small and financially non-viable DSOs and the adverse effect on network development, introduction of generally superior and stricter incentive based or revenue cap regulative should be postponed. Controlling of the natural monopoly in the gas distribution sector could be achieved also through multi-criteria tenders to choose the best operators for

the parts of distribution network. Finally, in regard to consolidation of distribution sector, it could be enforced by raising the sector entry barriers (e.g. with stricter conditions for licensing), financial restructuring of DSOs (e.g. debt to equity swaps), and asset restructuring aimed to separation of a distribution part of companies before the merger (e.g. spin-off, spin-out, split-off). The main DSO-specific sources of value that could be activated through merger transactions are economies of scale, savings in OPEX, increase of investment potency, enhanced control of DSOs etc.

Since managers and/or founders of distribution companies did not recognize the need for DSOs mergers to date, the consolidation process should perhaps be encouraged by the government itself. We should not forget that the distribution of natural gas represents an activity of public interest and that therefore the Government of the Republic of Serbia can have a great impact on these processes. The greater involvement of the energy regulator and the local authority could help remove some of the technical obstacles that these merger processes could face.

References

1. Averch, H., & Johnson, L. (1962). Behavior of the Firm Under Regulatory Constraint, *American Economic Review, 52*, 1052-1069.
2. Bukurov, M. Z., (2010). Finding the Balance between the Energy Security and environmental protection in Serbia. *Thermal Science, 14,* 15-25.
3. Dorigoni, S., & Portatidino, S. (2009). Natural gas distribution in Italy: When competition does not help the market. *Utilities Policy, 17,* 245-257.
4. Djuričin, D., & Vuksanović, I. (2014). Quest for new development model and economic policy platform for Serbia: The role of industrial policy. *Ekonomika preduzeća, 62,* 229-250.
5. Energy Agency of the Republic of Serbia. (2012). Methodology for setting prices of access to natural gas distribution system. http://www.aers.rs/FILES/Metodologije/2012-12-25_Metodologija%20distribucija%20GAS%20SG%20123-12.pdf
6. Energy Agency of the Republic of Serbia. (2014). Natural gas market, http://www.aers.rs/Index.asp?l=1&a=42.01&tp=TEG
7. Energy Agency of the Republic of Serbia. (2015). Price regulation http://www.aers.rs/Index.asp?l=1&a=22.05&tp=TarifeG
8. Energy Agency of the Republic of Serbia. (2014). Energy Agency 2014 report. http://www.aers.rs/Files/Izvestaji/Godisnji/Eng/AERS%20Annual%20Report%202014.pdf
9. Energy Agency of the Republic of Serbia. (2014). Price approvals and argumentations ttp://www.aers.rs/Files/Odluke/OCenama/Vazece%20cene%20pristupa%20sistemu%20za%20distribuciju%20prirodnog%20gasa.xls
10. Erbetta, F., & Rappuoli, L. (2003). Estimating optimal scale and technical efficiency in the Italian gas distribution industry. *Hermes*. Working paper 6.
11. Ertürk, M., & Türüt-Aşık, S. (2011). Efficiency analysis of Turkish natural gas distribution companies using data envelopment analysis method. *Energy Policy, 39,* 1426-1438.
12. Ernst & Young. (2013). Mapping power and utilities regulation in Europe, http://www.ey.com/Publication/vwLUAssets/Mapping_power_and_utilities_regulation_in_Europe/$FILE/Mapping_power_and_utilities_regulation_in_Europe_DX0181.pdf
13. Gilardoni, A. (2008). *The World Market for Natural Gas: Implications for Europe*. Springer.
14. International Energy Agency. (2015). Key World Energy Statistics http://www.iea.org/publications/freepublications/publication/KeyWorld_Statistics_2015.pdf
15. Ivanišević, M., & Todorović, M. (2014). Rearranging Residual Claims: Choosing the Right Transaction to Unlock Hidden Value, in *Contemporary Management and Marketing Methods in Improving Competitiveness of Companies in Serbia in the Process of its Integration in European Union,* N. Janićijević (ed), Faculty of Economics University of Belgrade, 87-101.
16. Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review, 76*, 2, 323-329.
17. Kaličanin, Đ., & Kuč, V. (2013). Industrial policy in the energy sector: The example of gas sector in Serbia. *Ekonomika preduzeća, 61*, 492-505.
18. Ministry of Energy, development and the Environmental Protection of the Republic of Serbia. (2013). Energy sector development strategy of the Republic of Serbia for the period by 2025 with projections by 2030 - draft.
19. Ministry of Mining and Energy. (2014). Serbian energy balance sheet for 2015. http://www.mre.gov.rs
20. Ministry of Mining and Energy. (2015). The rulebook on energy activities licensing and certification. „Službeni glasnik RS", br. 87/15.
21. Tubin-Mitrović, B. (2011). Model of strategy selection for development of natural gas distribution. Conference: *Gas 2011*, Kladovo.
22. Weijermars, R. (2012). Regulatory reform options to revitalize the US natural gas value chain. *Utilities Policy, 21*, 50-58.

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THE COMPETITIVENESS OF AGRICULTURAL PRODUCTS: CASE STUDY OF PLUM PRODUCTION AND SALE*

Konkurentnost poljoprivrednih proizvoda: studija slučaja proizvodnje i prodaje šljiva

Abstract

The presented analysis of basic agricultural products, on the example of the fruit growing sector (the case study of plum), with quantitative data on the marketing channels subjects level, points that in the family-owned farms the most common goods turnover is the natural consumption aimed to satisfy own needs, with a low level of marketability and competitiveness. As a measure of success and development of Serbia's agriculture, the data of the fruit growing sector's marketability (the case study of plum) are presented, i.e. the average rate of movement, the manifestation of the variance coefficient around the computed average value of a given activity of the marketing channels. The small agricultural properties have a scattered production, an insufficient sale structure, and the present marketing channels fail to realize a safe placement of the seasonal products. In this research the recommendations are presented for achieving agro competitiveness and a higher export orientation.

Key words: *Serbia, production and export of plum, competitiveness of agricultural products, policy*

Sažetak

Predstavljena analiza osnovnih poljoprivrednih proizvoda, na primeru sektora voćarstva (studija slučaja šljive), sa kvantitativnim podacima na nivou subjekata kanala marketinga, ukazuje da je u okviru porodičnih gazdinstava najzastupljeniji oblik prometa naturalna potrošnja za zadovoljenje sopstvenih potreba. Izražen je nizak stepen tržišnosti i konkurentnosti. Kao meru uspešnosti i razvijenosti poljoprivrede Srbije, prezentovani su podaci o tržišnosti za sektor voćarstva (studija slučaja šljive), odnosno prosečne stope kretanja, koeficijent varijacije pojave oko izračunate prosečne vrednosti određene aktivnosti kanala marketinga. Mali poljoprivredni posedi koji imaju za posledicu usitnjenu proizvodnju, nedovoljno razvijenu infrastrukturu prodaje, usled čega postojeći kanali marketinga ne ispunjavaju uslove sigurnog plasmana proizvoda koji je sezonske prirode. Kroz istraživanje date su preporuke za postizanje agrokonkurentnosti i postizanje veće eksportne orijentacije.

Ključne reči: *Srbija, proizvodnja i izvoz šljive, konkurentnost poljoprivrednih proizvoda, politika*

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Introduction

The basic characteristic of the situation in Serbia's agriculture is the economic failure and a constant decline of the agricultural producers' revenue, manifested in various intensity through pulling out a part of surplus value from agriculture, mainly to the benefit of industry, trade and banking.

Following the reduction of the spending capacity of agricultural producers, their demand for agrarian inputs is also reduced, influencing the agricultural production's extensivity, a stagnant instability of return and the scope of production, a relatively low level of using the capacities of the manufacturing industry's appropriate branches and a still greater decrease of Serbia's agro industry competitiveness on the market.

The agricultural producers of modest size, productive and financial capacities, most frequently select the production orientation and satisfaction of the needs of own households. They transfer an eventual market surplus and their own goods turnover to others – wholesale buyers, those buying-up goods, or selling on the spot.

Export potential and agro competitiveness of basic agricultural products

A more thorough insight into the structure of the agricultural and alimentary products may be obtained by examining the participation of some of the major agrarian products of Serbia from 2005 to 2011 (see Table 1). From the following presentation we may conclude that corn is dominant in export.

A low added value of any agricultural and alimentary product means an insufficiently developed manufacturing industry (the alimentary, i.e. food industry), automatically pointing to a low competitiveness on the foreign markets. The most exported agricultural products are the primary ones, i.e. those in a raw state, or which "underwent" a low level of processing (see Figure 1). Consequently, such products have a low added value and a low selling (market) value. Such a characteristic of export refers to less developed countries, where a sector potential, the agrarian in our example, fails to be valued in an appropriate manner, since the final product reaching the consumer (i.e. the buyer as the final consumer) has a low sale value, resulting in lower income. The example of raspberry may be stated as one of the major export article. Either being exported in its raw or frozen state, it is a primary agricultural product or a great number of countries disposing of the low-priced working force and similar climate are interested in its production.

Consequently (referring to almost all primary products dominant in our agriculture's export structure) points that Serbia will not be able to maintain its competitive advantage for a long time and thus realize relatively high foreign exchange inflows. Namely, only with the highly processed products the stability of the alimentary products export can be maintained. The orientation to a greater activity of the manufacturing industry in the domestic agrarian sector is set as an imperative necessarily included into the new *Strategy of Agriculture Development* [9].

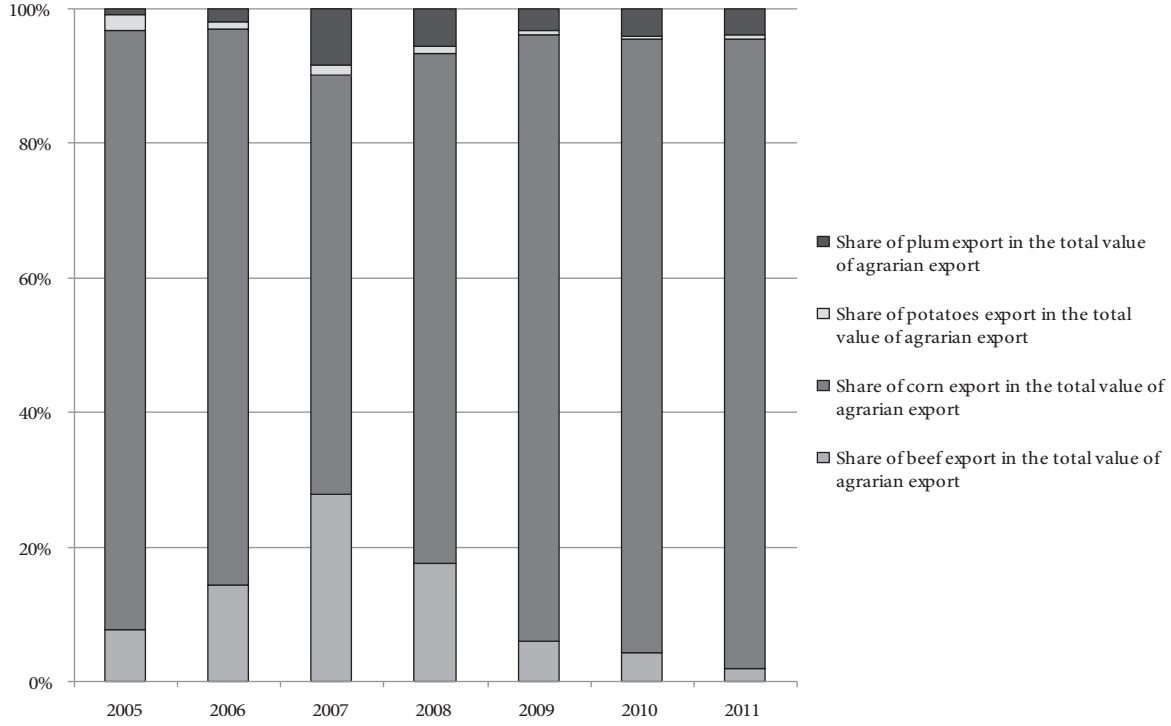
As for the geographical distribution of the Serbian agricultural and alimentary products in the international scope, based on data from UN Comtrade referring to export, following the movements from 2005 to 2011, the

Table 1: Export of the agricultural and alimentary products from 2005 to 2011 (mil. USD)

	2005	2006	2007	2008	2009	2010	2011
Value of agrariam export	924.4	1,265.5	1,690.3	1,957.5	1,945.3	2,240.8	2,696.6
Meat and meat products	33.0	76.7	95.6	88.3	64.5	59.5	58.8
Raw beef	9.0	31.0	38.0	30.0	19.0	16.0	9.0
Cereals and products	184.1	291.8	342.5	361.3	477.3	578.6	731.8
Corn	103.0	180.0	85.0	130.0	288.0	335.0	455.0
Vegetables and fruit	262.5	326.0	466.5	479.3	453.1	528.9	657.6
Potatoes	2.8	2.0	2.0	1.7	1.8	2.0	3.0
Plum	1.0	4.4	11.5	9.6	10.4	14.6	18.6

Source: [11]

Figure 1: Share of selected products in Serbia's structure of the total agrarian export from 2005 to 2011, in percentages



Source: [2]

groups of the CEFTA region countries and those from the European Union held a major share in the total export, while the other countries realized less than ten percent of the total agrarian export.

A higher inflow of foreign exchange resources based on export may be obtained with increasing prices on the world market, with a quantitatively extended export, with changes in the foreign exchange rate, etc. However, none of the solutions is constant and systematic, sustainable in the long-run, and in some cases there is no control over the given factors (for example, the world prices). The aim should be toward the development of the alimentary industry's capacities, increase of productivity, a harmonization with the provisions and standards of EU and CTO, the application of the international practice and meeting the constantly more strict foreign demands. A higher level of finalizing the exported agrarian products is among the priorities towards a further strengthening the competitiveness, but the possibilities of extending the primary agricultural production should not be forgotten, since such production is the raw material basis of the alimentary industry. Serbia disposes of extremely favorable climatic and geographical predispositions for growing the organic agricultural products (ecologic, nonconventional), but it is also suitable for cultivating the particular plant and animal species, with a relatively smaller share on the international and world market compared to other products.

In case we tend to pursue a more detailed analysis of the agrarian products production and export, in order to know which agro product in our country disposes of such productive capacities to improve the level of competitiveness in export, we have to analyze some kinds of vegetables, fruit, cereals and meat holding major positions in export and production in Serbia.

In the next period, the concept of the agriculture development will be based on modernizing and changing the production and the turnover structure towards a larger market orientation, with improving the total quantitative and qualitative efficiency of the marketing channels in the sector of growing vegetables, fruit and cereals and the basic cattle breeding products.

The selected agricultural products with the quantitative indices of production and delivery from 2003 to 2012, on the level of the marketing channels subjects, point that in the scope of the family-owned properties the most present kind of turnover is the natural consumption to

satisfy own needs. The level of marketability amounts to 70-80% in the developed countries, while in Serbia such level is low for the total production of the selected products – potatoes, plum, corn and beef amounting to 2,6 up to 35% (potatoes 6,43%, plum 2,6%, corn 13,73% and beef 35%) [6]. The criterion in selecting the mentioned primary agricultural products is the highest scope of production for this sector from 2003 to 2012. The trade of those products is carried out between the producers of raw materials, those producing the alimentary products being finalized in industry, whole sellers selling further those products in an unchanged or slightly changed form and retailers selling the products to final buyers. A number of troubles and difficulties were identified on this way to the final market and consumers - the organizational but also the economic ones. The trend of the decreased turnover through the organized marketing channels is caused both by low revenue and an underdeveloped market and the present conditions of developing the production having low return and an extensive organization.

Fruit growing is one of the major agricultural branches since various kinds of fruit may be produced regardless to both, the land location and quality and the climatic conditions. The regions with the land of poor quality for growing and less appropriate climate are appropriate for fruit in bushes and those with pits, since such kinds of fruit need no special conditions for growth and development. The research carried out in the mentioned period for the specific agricultural products points that plum had the lowest level of marketability (2,6%). Consequently, a more detailed analysis in this work will refer to the sector of fruit growing on the example of plum.

Strategies and recommendations for the turnover flows of plum

The raw fruit belongs to agricultural products of uneven quality, easily perishable and with high oscillations in supply and demand (see Table 2). In the aim of overcoming the mentioned characteristics and providing a continuity of supply and meeting the consumers needs, the role and the function of an organized trade in the turnover channels is unavoidable. In an engagement of the necessary financial resources and an organized technological infrastructure, the mentioned products should be bought, with providing the necessary supplies, kept in refrigerators and put on the market following the needs. Consequently, the horizontal and vertical cooperation and integration in the line of supply are highly important in placing fruit on the market.

When speaking about fruit export, plum is still another Serbian great asset besides raspberry. High returns of plum are unsatisfacrorily used due to a lack of organization and quality of production, while the opportunity of developing the marketing channels for placing plum would be significantly improved with its production of higher quality (see Figure 2).

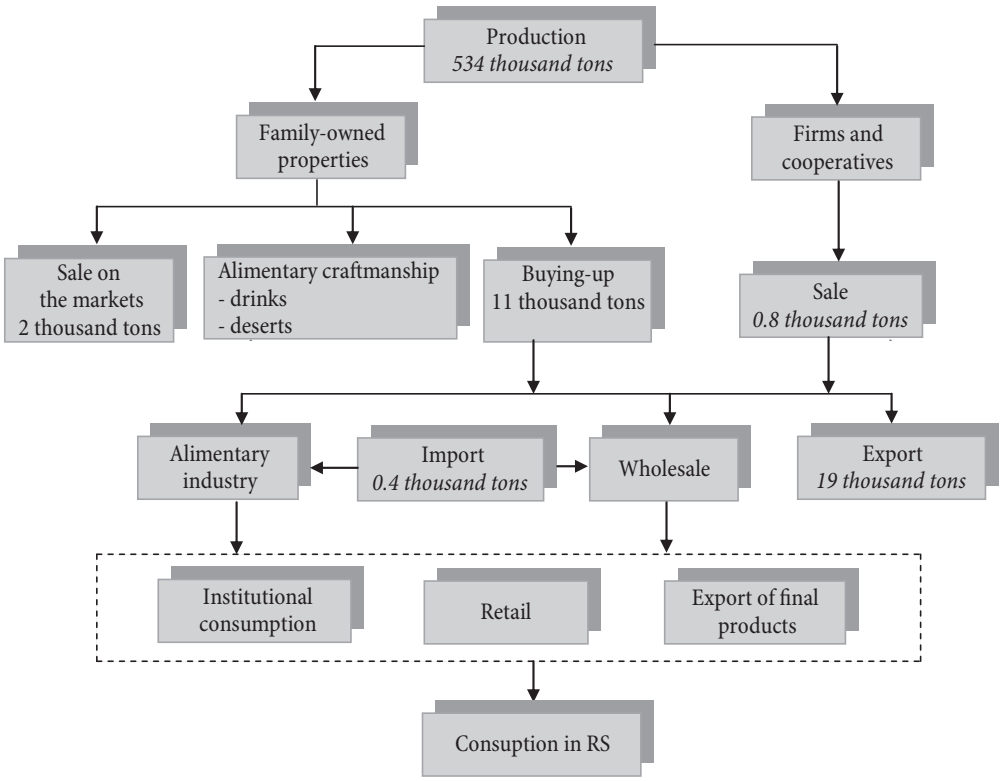
Plum is a fruit of great importance not sufficiently used in its raw state due to processing in a number of

Table 2: The comparative review of fruit production with the highest share in Serbia (in tons)

	Plum	Apple	Sour Cherry
2003	570,913	246,138	86,174
2004	561,199	183,571	112,326
2005	304,351	198,030	63,870
2006	556,227	240,320	80,510
2007	680,566	245,228	99,893
2008	606,767	235,601	89,746
2009	662,631	281,868	105,353
2010	426,846	239,945	66,224
2011	581,874	265,676	90,596
2012	391,485	178,713	74,656
Total	**5,342,859**	**2,315,090**	**869,348**

Source: The author's adaptations based on [6]

Figure 2: The marketing channel of plum in Serbia (2003-2012)



Source: The author's own illustration based on [6]

manufactures products, mostly into brandy of specific quality. The average plum production in the mentioned period amounts to 534 thousand tons, tending towards a slight increase at a 7.08% annual rate. The coefficient of variation in the computed line of trend, amounting to 22.7%, point to some variations in production.

Both observed kinds of the production organization point to a positive trend by the average annual rate for the given period amounting to 1.57% for cooperatives and firms and to 7.11% for the family-owned properties. The approximate rate of variance amounting to 22% is characteristic. The family-owned properties are the dominant participants in production, providing 99% of the total plum production. On the basis of the computed variances presented in Table 3, the plum production may be presented by a parabolic trend, taken as appropriate for a short-term forecast, after analyzing the variances for a linear exponential and parabolic trend. The equation may be presented by the Figure 3.

The plum delivery to the market is carried out through two kinds of turnover - the organized and the direct one. The delivery through the organized channels of turnover amounts in average to 11.8 thousand tons, with a tendency of growth by an average rate amounting to 18.24% annually. The variation around the computed line of trend is expressed, amounting to 43.59% (See Table 4).

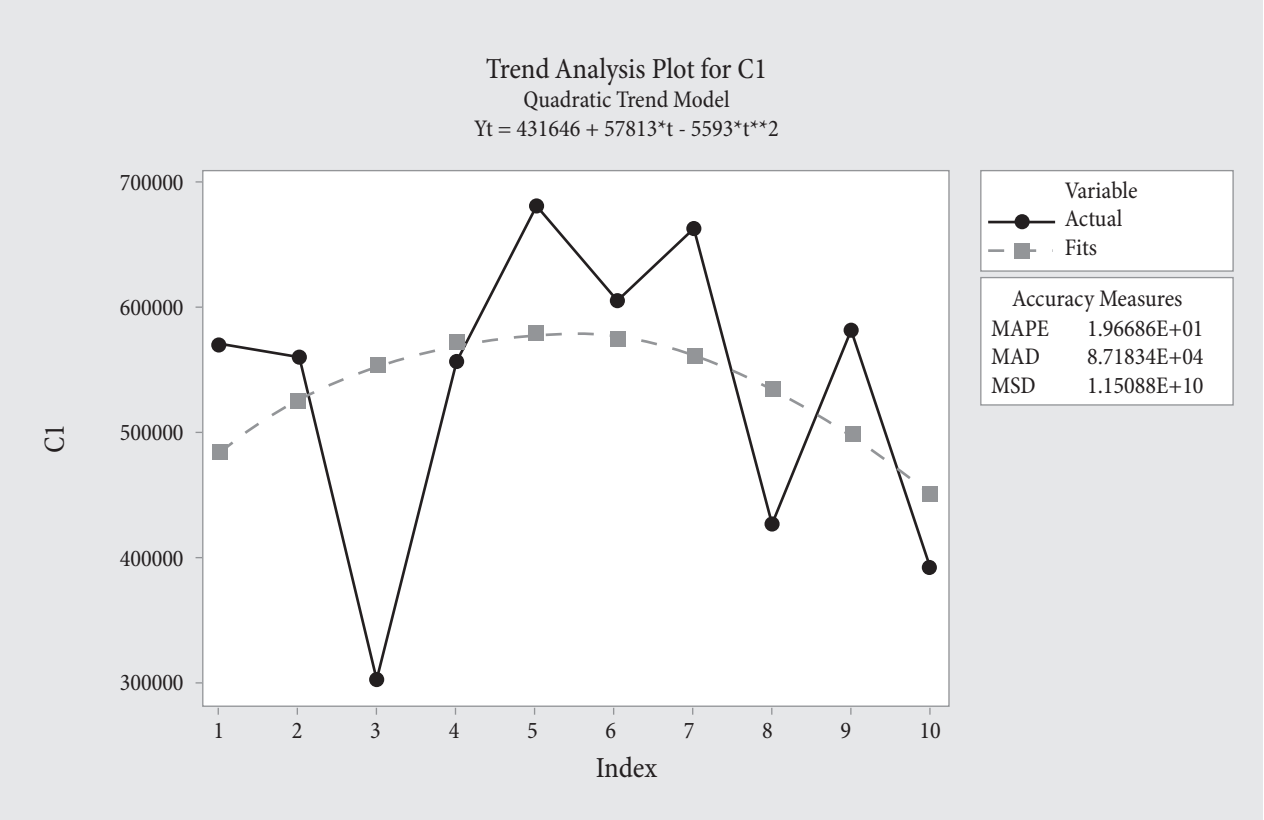
The delivery was carried out differently due to the kind of organization. The buying-of from the family-owned property tends to grow by an average rate amounting to 25.5% annually. On the contrary, sale from the firms and cooperatives has a negative trend amounting to 5.05% annually. The marketability of buying- up compared to the

Table 3: Variance and kind of trend

Trend	Variance
Linear Trend	14,622,817,741.21
Exponential Trend	14,631,270,416.36
Parabolic Trend	12,787,585,408.08

Source: The author's adaptations based on [6]

Figure 3: Trend of plum production



Source: The author's own illustration based on softver Mini Tab.

marketability of sale and the markets the highest rate of variability, amounting in average to 43.9% annually. The family-owned properties have a higher average participation in the structure of the total plum delivery through the intermediary marketing channels, amounting to 93%. The Figure 4 illustrate plum delivery in the Republic of Serbia in the observed period.

The average sale through the direct marketing channel amounts to 2 thousand tons, tending towards a negligible tendency of growth amounting to 0.68% and a variance amounting to 43.59%. The intermediary kind of turnover is dominant in the total plum delivery, participating with 85% in the mentioned amount.

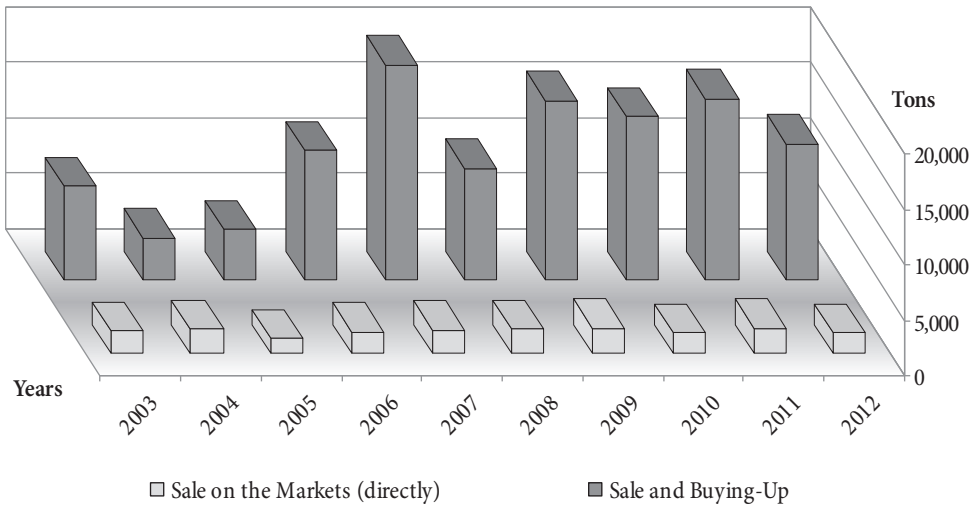
The average marketability of the total plum production, stated without the market, amounts to just approximately 2.2%. The highest total turnover of goods through the mediatory marketing channels amounted to 3.46% in 2010, and the lowest to 0.69% in 2004, without the markets. In the observed period the percentage of goods turnover varied considerably. The orientation to spending plum

Table 4: The plum supply according to the marketing channels subjects on the Serbian market (2003-2012)

Characteristics	Total	
	average	rate %
Production – 000 tons	**534**	**7.08**
Family-Owned Property	532	7.11
Firms and Cooperatives	2	1.57
Delivery, Mediate Marketing Channels – 000 tons	**11.8**	**18.24**
Family-Owned Property	11	25.5
Firms and Cooperatives	0.8	-5.05
Turnover on the Market, 000 tons	2	0.68

Source: The author's adaptations based on [6]

Figure 4: Movement of plum delivery in the Republic of Serbia



Source: The author's adaptations based on [6]

in the households, and particularly for the production of brandy, led to an extremely low marketability.

In the observed period the firms and cooperatives have much higher marketability in the mediatory marketing channels, amounting to 43.7%, while the marketability in the family-owned properties amounted to only 2.06% (See Table 5). The highest goods turnover of the firms and cooperatives amounted 59.3% in 2006.

The future trend of the total delivery may be presented by a parabolic trend, expressed by the variances in Table 6. The equation and the table are presented in the following illustration.

In Serbia the major importance is on the comparative advantages, and not on the competitive. When it comes to marketability, the one-way trend of both the mediatory and the direct marketing channel may be noticed in the family-owned properties. There is a negative movement amounting to 6% and besides a positive rate of the production growth amounting to 1.57%, the marketing channels of the small family-owned properties become inferior. The total marketability of the mediatory and direct marketing channels amount to 2.6% (See Table 5), and the positive trend of movement at a rate of 5.84% annually, with a variation amounting to 34.13%. The characteristic of the plum turnover process is that a major part of the produced good (97.4%) is used in the property itself, through the natural consumption. In the firms and cooperatives the plum is applied for own needs in its raw and processed state, while in the family-owned properties is mostly used for the alimentary craftsmanship - marmalades, brandy, jam, etc.

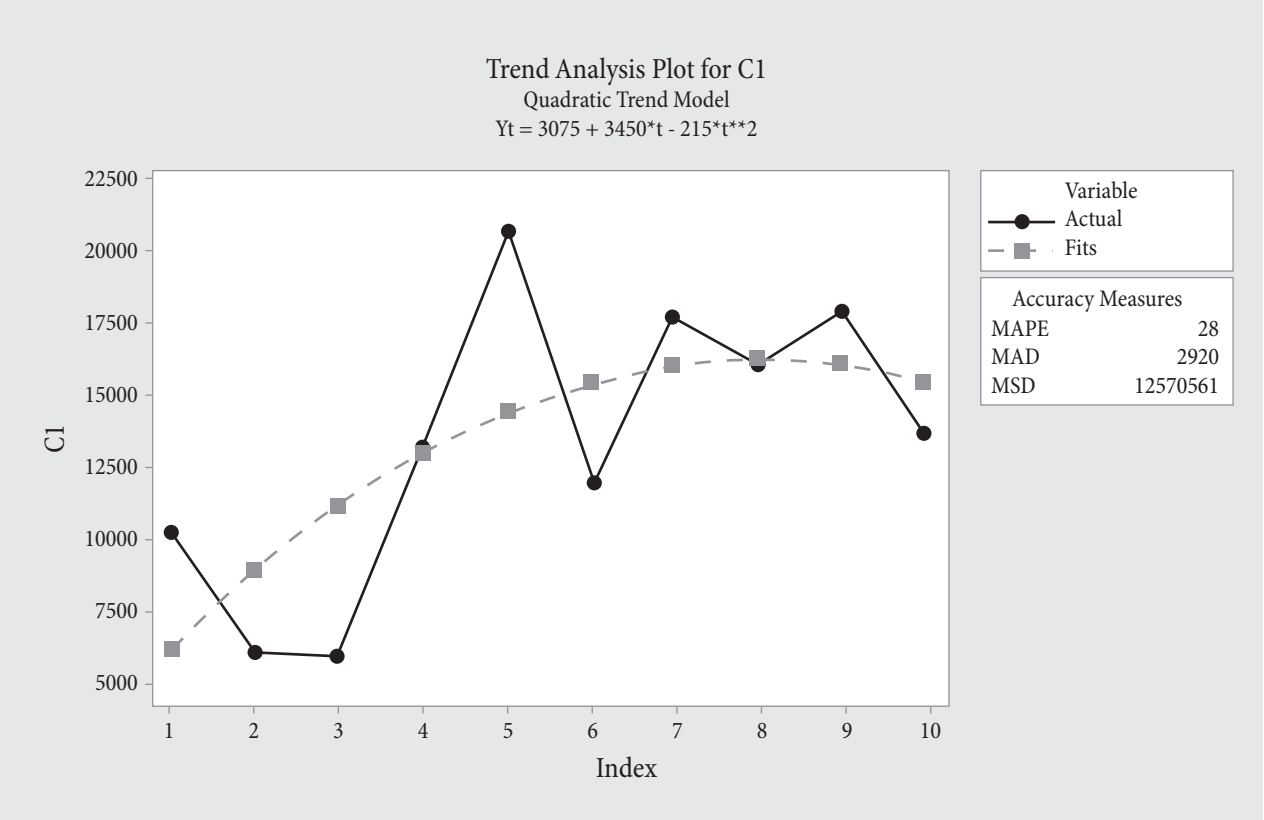
We may conclude that 0.38% of the total plum production is realized through the direct marketing channel. The total sale through the mediatory and direct marketing channels

Table 5: The Marketability of plum according to the marketing channels subjects on the market of Serbia (2003-2012)

Characteristics	Total	
	average %	rate %
***Marketability**	**2.6**	**5.84**
Total Marketability of Family-Owned Properties	2.45	4.8
Marketability of Firms and Cooperatives	43.7	-6.52
Marketability of Family-Owned Properties, Directly	0.39	-6
Marketability of Family-Owned Properties, Mediatory	2.06	17.17

*The total marketability is expressed on the market
Source: The author's adaptations based on [6].

Figure 5: The trend of plum delivery



Source: The author's adaptation based on softver Mini Tab

has a trend of growth at an average rate amounting to 13.4% and a coefficient of variation amounting 38.06%.

In the turnover process 40% of plum from the cooperatives and firms is distributed to the trade enterprises and only 2% from the family-owned properties. The total quantity coming to the retail stores amounts to 2%, while the rest is used in the manufacturing capacities, processed in various kinds of manufactured goods. The production of the manufactured goods from plums is carried out through the natural consumption into retail. In the peasant properties it is used for the alimentary craftsmanship, i.e. for the production of brandy, jams and marmalades. The plantations sell their market surplus to trade firms and to industry for fruit processing.

After a mediatory placement of plum amounting to 11,8 thousand tons in average in the observed period, the marketing channel continues its export amounting to 19 thousand tons, while approximately 0.4 thousand tons were imported (See Figure 2). The export of plum id highly variable amounting to 44.38%, compared to the computed line of trend the total sale on the domestic market varies to 38.6%, while the coefficient of the production variation amounts to 22.73%. We may conclude that the marketing channels are disorganized and inconstant both on the domestic and the export market.

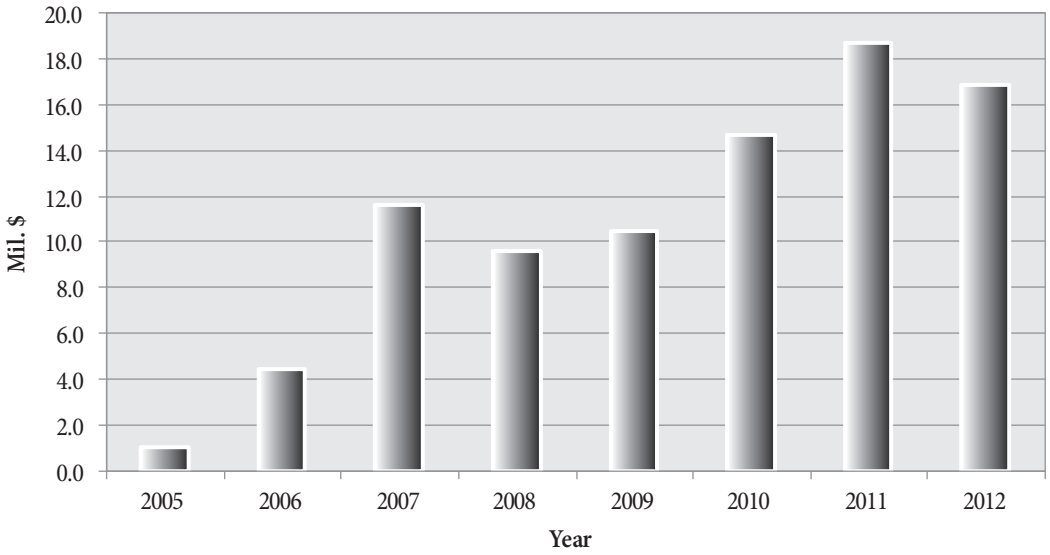
After China, Serbia, Romania and the USA are the countries being the global leaders, with the highest production amounting to approximately 600,000 tons each. Serbia is

Table 6: Variance and type of trend

Type of Trend	Variance
Linear Trend	16,673,331.05
Exponential Trend	18,825,822.98
Parabolic Trend	13,967,290.14

Source: The author's adaptations based on [6]

Figure 6: Export of plum (mil. USD)



Source: [11]

the sixth world exporter of plum and holds the fifth position in exporting prune. The EU is the major importer (Great Britain, Germany and Holland) (See Figure 8), while the major exporters are Spain, the USA and Chile. In 2009 the world average price amounted to approximately $ 1.04/ kg [1].

Plum is traditionally exported From Serbia as a manufactured product. The export of raw plum to the Russian market started in 2004. In 2009, 2/3 of the total export was delivered to Russia, and accordingly it became the major market for the Serbian plum. The other important importers are Austria, Italy and Croatia. A part of raw plum is later transformed into brandy. The major part of export is carried out in cardboard boxes weighting 10-15 kg. We may conclude that Serbia doubled its export of raw plum and prune from the amount in 2005 and 2009 and that the value of the exported plum is constantly increasing (See Figure 6).

Also, the trend of the plum export is presented by a parabolic trend (see Figure 7). The values of the variances determining the mentioned trend are presented in Table 7.

The plum production in Serbia is an example what happens in the specific production without a state phytosanitary system as a part of the system of public interest - a precondition of a profitable production and development. Due to its unfavorable situation, Serbia disposes of lowest quality of plum intended for export, accordingly realizing a lowest price.

Serbia is characteristic by the old seedings, owners of the family-owned properties, which use plum mainly for the production of brandy. The high costs of production are the result of uneven returns and inadequate quality, and the sale through mediators or buying-up is mostly applied. The future trend should contain investments into new technologies of breeding, thus reducing the expenses of production, increasing the quality of revenue and the number of organized producers.

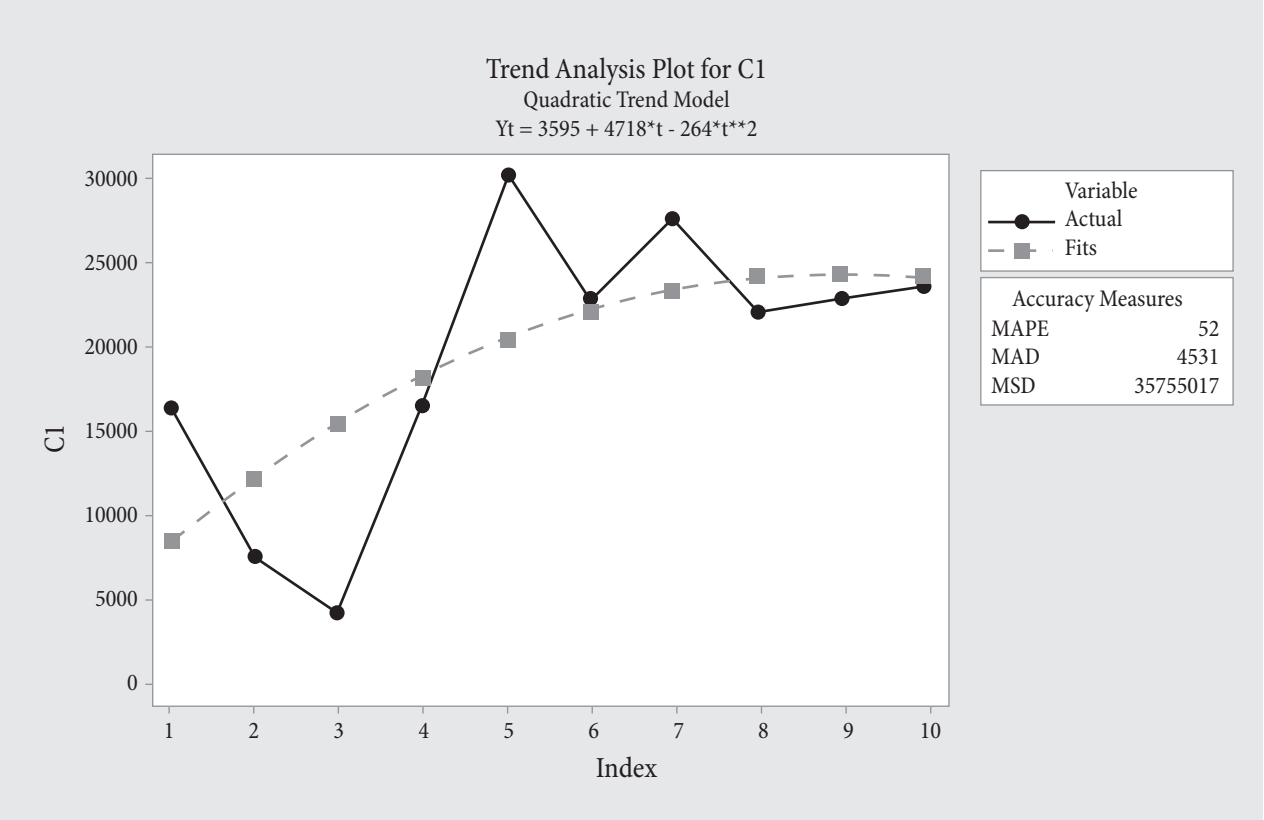
Serbia disposes of good comparative advantages for plum production, with its fertile land, convenient climate and the farmers with appropriate knowledge. The plum production varies due to the lack of cultivation and

Table 7: Variance and type of trend

Trend	Variance
Linear Trend	39,427,875.86
Exponential Trend	47,647,621.41
Parabolic Trend	35,755,016.95

Source: The author's adaptations based on [6]

Figure 7: Trend of plum export



Source: The author's adaptation based on softver Mini Tab

protection, and occurs hyperproduction which leads to oscillations in production. Following an irrational picking, a large quantity of plum is destroyed or processed into brandy. From the total plum production, amounting in average to 400-45000 tons, 80% is processed into brandy. A small part is manufactured into prune (about 200 tons according to statistical data, although it is estimated that some farmers and households may process still 600 to 800 tons, not being statistically computed.) and the rest is used for alimentation. A smaller part of fruit is processed into jams, marmalades, juices, jellies, etc. [1].

In the line of plum production can be expected a larger association of the family-owned properties, i.e. the creation of trading objects aimed to an organized storage and gathering plums. An increased seeding and export of raw plum should be realized, as to take a full advantage of the provision of the Agreement of Free Trade with the Russian Federation, not being at any other country's disposition (see Figure 8).

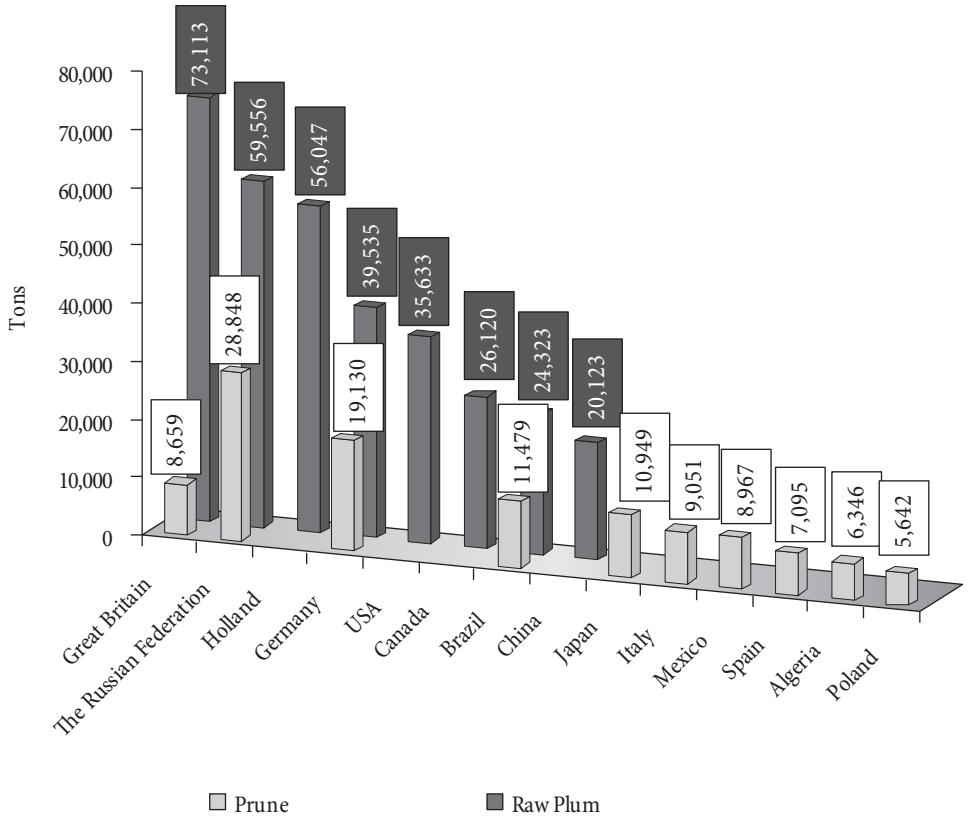
The value lines of plum tend towards selling raw fruit, the production of brandy, the raw plum processing for the needs of production, fruit brandies, prune, jams, puree, compotes, etc.

The important role of state in stimulating the agro competitiveness

One of the reasons of building up the present economic structure and its nonproductive use was a great illusion that through a natural potential of agriculture - with low-priced products, the measures of the social policy may be infinitely stimulated, and by a constant draining of incomes from agriculture the initial capital for the industrial development may be generated. As a rule, the producers had no appropriated conditions for an accumulative price for their products, and instead of taking care about protecting the most destitute categories of its population through the measures of the social policy; the state applied the linear control of prices of the basic agricultural and alimentary products.

The experience of the developed countries points to the effort to concentrate some of the resources for the

Figure 8: Major Importers of Raw Plum and Prune (in tons)



Source: [1]

agriculture financing. Those resources are mainly in banks - capable to finance such a specific branch of the economy. Accordingly, most European countries have the agrarian banks, mainly operating in the financing the agricultural production (France, Holland, Denmark, Greece...). The state greatly influences the development of the agrarian banks and their qualification to carry out the agrarian policy.

Due to a long process of production and successive investments, the turnover of capital in the agricultural production becomes decelerated. Accordingly, the agricultural production is obliged to run into debts, and the state holds a great responsibility regarding the interest rates. The state should assist in the reconciliation of the domestic products quality with the EU standards, and to support the horizontal and the vertical integration of the producers and the meat production [10].

The state should be interested in the large agricultural properties through approving favorable credits for the lands buying-up, the arrangement of land, introducing the irrigation systems, etc. The large agricultural properties and those including 5-8 hectares may contribute that our agriculture becomes a powerful economic factor in the country's development and also a great exporter of food to the well-known and eminent world markets.

The free market with managing risk is an alternative that mostly generates the problem of prices in agriculture. The efficiency of the agricultural production may be achieved if the farmers can share the risk (referring to the variations of return of prices and revenue) with other groups in society. The risk management may be improved by a limited government's intervention, including insurance, forward of the market, futures contracts, and the financial market institutions capable to reduce the risk.

Through its stimulative measures of the credit and development policy the state should offer a great support to all the economic subjects, and particularly in case where the present comparative advantages could be transformed into the competitive ones. The implementation of an appropriate credit, legal, customs and foreign exchange policy should be a role of the state.

References

1. Agri-Livestock Consultants Ltd. (2010). Preparation of Fruits & Vegetables sector study for the IPARD Programme. *Final Report - March 2010*. Chester: Agri-Livestock Consultants Ltd.
2. Chamber of Commerce and Industry of Serbia (2012). *The Foreign Trade Exchange of the Agricultural and Food Products from 2005 to 2011*. Retrieved from http://www.pks.rs/
3. Martinez, S., Hand, M., Da Pra, M., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S., & Newman, C. (2010). Local Food Systems: Concepts, Impacts, and Issue. *Economic Research Report, 97,* Washington, D.C.: U.S. Department of Agriculture, Economic Research Service.
4. Radosavljević, K. (2015). Strategija razvoja kanala marketinga u agrobiznisu Republike Srbije. *Doctoral dissertation*. Kragujevac: Faculty of Economics, University of Kragujevac.
5. Serbia Investment and Export Promotion Agency (SIEPA). *Doing Business in Serbia 2015*. Retrieved from: http://siepa.gov.rs/en/
6. Statistical Office of the Republic of Serbia. *The Statistical Yearbooks of RS (2003-2012)*. Retrieved from http://www.stat.gov.rs
7. Stojanović, Z. (2007). The Agricultural Policy Changing Directions and Implications on Agricultural and Rural Development in Serbia. In G. Rikalović & S. Devetaković (Eds.), *Economic policy and development*. Belgrade: Faculty of Economics, University of Belgrade.
8. Stojanović, Z., & Ognjanov, G. (2012). Strateška opredeljenja Srbije u domenu ruralnog razvoja – proizvodnja i marketing tradicionalne hrane. *Ekonomske teme, 1*(2012), 19-32.
9. Stojić Karanović, E., & Janković, S. (2008). *Elementi strategije spoljne politike Srbije*. Belgrade: Institute of International Politics and Economics.
10. The National Agricultural Program of the Republic of Serbia 2010–2013. *RS Official Gazette,* No. 83/10.
11. UN Comtrade. *Commodity Trade Statistics Database*. Retrieved from http://comtrade.un.org/
12. World Trade Organization (2012). *International Trade Statistics 2012*. Geneva: World Trade Organization.
13. yStats.com (2010). Global Retail Trends 2010. *Research on International Markets*. Hamburg: yStats.com GMBH & Co.

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