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ANALYSIS OF PUBLIC ENTERPRISES IN THE REPUBLIC OF SRPSKA AND ASSESSMENT OF THEIR FINANCIAL RISK

АНАЛИЗА ЈАВНИХ ПРЕДУЗЕЋА У РЕПУБЛИЦИ СРПскоЈ И ПРОЦЈЕНА ЊИХОВОГ ФИНАНСИЈСКОГ РИЗИКА

Summary: *The paper investigates how financially insecure public companies in the Republic of Srpska are using the Altman EM score model and the RAPO model developed on business entities in the Republic of Srpska. Public companies are classified as low, medium and high risk companies in terms of the probability of going bankrupt. The results show that in the observed period from 2013 to 2018, half of public companies are constantly in the problem zone, while about 40% are in the safe zone. That is, companies that have been identified as problematic have been in that group for many years, while those with low business risk have been consistently successful. The paper also presents the state's participation in the capital of public companies, as well as expenditures in the form of subsidies and recapitalizations that are allocated from the budget every year.*

Keywords: *financial risk, Z-Score, EM Score, public enterprises*

JEL classification: *G38, H63, L33*

Резиме: *У раду се истражује колико су финансијски несигурна јавна предузећа у Републици Српској кориштењем Алтмановог EM score модела и РАПО модела који је развијен на привредним субјектима у Републици Српској. Јавна предузећа су разврстана на предузећа са ниским, средњим и високом ризиком у смислу вјероватноће одласка у стечај. Резултати показују да је у посматраном периоду од 2013. до 2018. године константно половина јавних предузећа у проблематичној зони док је око 40% у безбједној зони. Односно, предузећа која су идентификована као проблематична су у тој групи дуги низ година, док она која су са ниским ризиком пословања су константно успјешна. У раду су приказана и учешћа државе у капиталу јавних предузећа, као и издаци у облику субвенција и докапитализација која се из буџета издвајају сваке године.*

Кључне ријечи: *финансијски ризик, Z-Score, EM Score, јавна предузећа*

JEL класификација: *G38, H63, L33*

1. INTRODUCTION

State-owned enterprises represent a significant part of the economy that affects fiscal sustainability, the labor market, and competitiveness. Due to the existence of market imperfections, the state realizes numerous goals through public enterprises, such as reducing unemployment, providing certain goods and services to citizens, buying social peace, etc. The inefficiency of the market in meeting public (common) needs exists due to (Richard and Musgrave 1995) the non-competitiveness of the consumption of public goods and the inability of excluding the individual from the consumption of public goods. Public enterprises in the Republic of Srpska were created through the transformation of socially-owned enterprises. In the process of transformation, the state privatized a part of socially-owned enterprises, while in others it retained a certain share in the capital. These are mainly companies that provide utilities at the local level, local media houses, and strategic companies such as railways, roads, and producers and distributors of electricity.

In performing their activities, they also realize a wider social role, as they are organized in the form of companies whose main goal is to generate profit. For these reasons, their success is primarily measured by the same indicators as the success of private sector enterprises. In addition, the fact that these enterprises are state-owned, that the state often supports their work with subsidies, loans and other benefits, the transparency of their operations is requested, in accordance with the concept of New Public Management.

There is no publicly available data on these companies in the Republic of Srpska. According to the APIF (Agencija za posredničke, informatičke i finansijske usluge - the Agency for Intermediary, IT and Financial Services) data from 2018, we have 178 public enterprises in the Republic of Srpska. The register was established in 2011 and has not been updated since. According to the Tax Administration data, there are 204 such enterprises, while according to the Institute of Statistics data there are 179 such enterprises. According to the IMF analysis for 2018, the Republic of Srpska is the majority owner of 172 public enterprises (which regularly submit financial reports) (International Monetary Fund 2019).

Up-to-date and complete information on public enterprises are needed in order to analyze their income, property and financial position, as well as to analyze their impact on other sectors of a country. The functioning of institutions, the protection of the public interest and the efficiency of market mechanisms can be ensured “only” on the basis of timely, reliable, understandable and comparable information available from the financial statements to external interested users.

One of the issues that has occupied the attention of creditors and investors for decades, as well as the academia, is the assessment of the success of the enterprise's operations in the coming period, i.e. the assessment of the possibility of its bankruptcy. Although we have determined that public enterprises, as well as private ones, should have the same goal, to perform a market activity, and their business should be evaluated by market criteria, the state rarely allows enterprises in its ownership to go bankrupt or liquidate. For this reason, when assessing the performance of public enterprises using globally recognized models for assessing the probability of bankruptcy, we could talk more about the assessment of financial difficulties or risks than about bankruptcy.

Given that public enterprises in many countries still have a significant share of gross domestic product, the management of these enterprises is essential to ensure their positive contribution to the overall efficiency and competitiveness of the country. Also, efficient management of these companies is very important for attracting potential investors. The need to assess the work performance of these companies and to anticipate potential difficulties certainly exists, having in mind that the state, if it does not want to declare bankruptcy of a public enterprise, will spend significant funds from the budget on the rehabilitation of such enterprises, instead of using that money to increase the welfare of citizens, i.e. using it for more efficient and effective projects.

Considering the previously mentioned, this paper will deal with the assessment of financial uncertainty, i.e. risk of public enterprises in the Republic of Srpska, classifying them into different risk groups. For this assessment, we will use the Altman's EM-Score Model due to its wide use and highly rated predictive value, but also the RAPO Model that was developed in the Republic of Srpska on companies, which takes into account the characteristics of the local market. In this regard, the main hypothesis is: “The number of problematic public enterprises in the Republic of Srpska is lower compared to the period five years ago”.

2. THE ROLE OF PUBLIC ENTERPRISES IN (NON) CRISIS TIMES

According to the Law on Public Enterprises (The Republic of Srpska Law on Public Enterprises, 75/04 and 78/11), a public enterprise is defined as a legal entity registered in the court registry as a limited liability company or joint-stock company, for the purpose of performing common interest activities and where the Republic of Srpska or a unit of local self-government directly or indirectly has the majority ownership in its capital. It is considered that the majority ownership is provided by the state by making investments that give it the right to manage the business and financial policy of the enterprise in which the investment was made while benefiting from that investment.

From the above definition of public enterprises, it can be concluded that their basic characteristic is to perform activities for the general, social interest, while the state through the performed investment in these enterprises realizes benefits that are not limited only to financial benefits.

Although private enterprises dominate a country's economy, the number of public/state-owned enterprises is not negligible while their importance varies from country to country. In the Scandinavian countries, for example, the presence of public enterprises in the market is quite strong. The advantages and disadvantages of state ownership of enterprises and thus state interference in the

market competition have been the subject of debate by the academia for decades (Kay and Thompson 1986; Megginson and Netter 2001; Nombela 2001). The existence of public enterprises was defended by the need for public control of natural resources, the need to implement certain policies, increase employment, resolving social issues, and similar (Grout and Stevens 2003). However, with growing integration through trade and investment, state-owned enterprises, which are traditionally oriented towards domestic markets, are increasingly competing with private firms in the global market (Kowalski 2013). The claim that is often made in political and business circles is that there is “great potential for economic distortions because some state-owned enterprises benefit from the unjust advantages granted to them by governments” (Kowalski 2013).

The most common shortcoming of public enterprises is their inefficiency, i.e. poorer business performance in relation to private enterprises, where the state, i.e. public management, is characterized by inefficient management of the entrusted resources. Opponents of state interventionism actually believe that the market through its mechanisms provides the most efficient allocation of resources and that the state by its interference leads to inadequate allocation of resources and thus directly to market deviations.

As in all aspects of public governance, control, financing, and regulation of public enterprises are issues that are subject to changes in international trends and domestic political imperatives. In the conditions of the crisis, these enterprises are gaining in importance precisely because of the government's ability to implement certain economic and social measures through them. The global economic crisis (2008) and the current crisis caused by COVID-19 have just shown that even the biggest opponents of state interventionism recognize that the economy cannot recover without the strong state influence on economic flows. “If we are unable to contain the economic shockwaves and corporate insolvency emerges on a massive scale, measures such as recapitalizations by the state could become measures of ultima ratio” said prominent German economist Gabriel Felbermayr of the Kiel Institute for the World Economy and former government advisers Peter Bofinger and Beatrice Weder di Mauro who raised the question of nationalization.

Part of the state activities is carried out through public enterprises, while at the same time the nationalization of significant private enterprises is carried out. During the global economic crisis in 2008, a large number of European countries nationalized a significant number of banks in order to preserve the financial sector, which was most affected by the crisis.

Achim Wambach, the Head of the ZEW Leibniz Centre for European Economic Research, does not believe in state ownership of free-market enterprises, but he adds: “under normal conditions”. “It wouldn't be the first time in recent German history that the government bails out a corporation with a big capital injection in exchange for a stake in it. During the financial crisis more than a decade ago, Berlin acquired a 15% stake in Germany's second-largest lender, Commerzbank, to protect it from collapsing.”

We are witnessing that currently, the leaders of the largest European countries are announcing similar measures to help the economy mitigate the negative consequences caused by the COVID-19 pandemic, primarily save jobs, and maintain the production of strategic products.

The French Minister of Finance Bruno Le Maire, announces measures that are planned and which include recapitalization, “and even nationalization if needed”. He says that the government does not intend to manage commercial enterprises but there is a responsibility of the government to protect strategic assets. Italy has approved € 600 million loan to Alitalia airline as part of a plan to renationalise this company. Even the IMF in its recommendations for preserving the economy mentions capital investment in enterprises and government guarantees as necessary measures.

Although in times of economic growth and prosperity, public enterprises represent a burden in terms of the continuing need for their financing due to mostly poor business, in times of crisis, these enterprises play a significant and irreplaceable role in implementing certain government measures. However, it is certainly necessary to assess how these enterprises operate in order to assess the amount of necessary state financial interventions, but also to give recommendations for possible improvements.

3. MODELS FOR ASSESSING FINANCIAL UNCERTAINTY/BANKRUPTCY

Credit scoring models, i.e. credit worthiness assessments for assessing the risk of collection of funds on the basis of granted loans, purchased bonds and other receivables, were first developed by financial institutions and other creditors 150 years ago in the USA. Early models were based on qualitative assessment of variables such as industry segment, personal guarantees, collateral, management experience and others. These models were very quickly replaced in the first half of the twentieth century by models based on univariate ratios and other data from financial statements. The beginnings of formal rating by agencies occurred with the appearance of Moody's, soon followed by Standard & Poor's (1916).

The first authors to study financial risks in a company were Fitz Patrick (1932), Beaver (1966), Deakin (1972), Edminster (1972), and Garcia, Calvo-Flores & Arqués (1997). William H. Beaver (1966) developed a statistical model for predicting financial problems based on company financial statements using data analysis techniques for one-variable (univariate technique). He concluded that an analysis using financial ratios can be useful in predicting business success or failure, solvency or insolvency, or bankruptcy of a company. After Beaver (1966), Altman (1968) made significant progress in developing insolvency prediction models. Altman developed a statistical model to predict the probability of company bankruptcy using a multivariate credit scoring model that combines data from financial statements with market data. After Altman, various authors developed models tailored to the markets of their countries, basically taking different ratios mainly from financial statements. Thus, Zmijewski developed a model for predicting bankruptcy in 1984 that includes indicators of company performance, indebtedness and liquidity. This model was developed on the basis of data obtained from the analysis of 800 enterprises that did not go bankrupt and 40 enterprises whose operations ended in bankruptcy. In 1978, Springate developed a model based on Altman's model, but he adapted it to Canadian market conditions. The analysis of a sample of 40 enterprises selected 19 financial indicators that allow to distinguish "healthy" enterprises from those threatened with bankruptcy. In creating the model, Fulmer used 40 financial indicators on the sample of 60 enterprises - 30 successful and 30 whose business ended in bankruptcy (the average value of the property was 455,000 US dollars). The model estimates the probability of going bankrupt within a year with 98% certainty, and going bankrupt in the period of over a year with 81% certainty.

A large number of the mentioned models have been developed on a large number of enterprises in developed economies, and the question of their applicability to small developing economies is justifiably raised. In that direction, models adapted to the characteristics of the economy, i.e. the market of each individual country started to be developed. In our environment, Bešlić, Jakšić, Bešlić and Andrić have developed a bankruptcy prediction model that accurately classifies 82.9% of solvent ("healthy") enterprises in Serbia and 93.3% of enterprises that have opened bankruptcy proceedings (insolvent enterprises), while the average (total) accuracy of model prediction is for 88.4% cases. In Croatia, Pervan (2017) developed a model that predicts the bankruptcy of small and medium-sized manufacturing enterprises with 87.9% accuracy.

In the Republic of Srpska, the Faculty of Economics of the University of Banja Luka has developed a model called RAPO¹ on all enterprises based on data from financial statements for the period 2012-2015, for the needs of the APIF to give an opinion on the creditworthiness of enterprises and entrepreneurs. The development of the logistic regression model began with 25 selected ratios that were assumed to be significant for predicting the occurrence of an adverse event. The obtained binomial model of logistic regression states:

$$\text{Logit } [Y_i = 0.6807224214 - 0.5140311245 * X_1 + 0.5076282824 * X_2 - 1.5606778219 * X_3 - 0.0311735833 * X_4 - 1.7373526565 * X_5$$

Where:

X_1 – Current assets/Short-term liabilities

X_2 – (Current assets - Stock)/Short-term liabilities

X_3 – Cash and cash equivalents/Short-term liabilities

X_4 – Earnings before tax/ (Total liabilities + Reserves)

X_5 – Operating income/Operating expenses

0.68007224214 – constant

¹ RAPO - RAdivojacPOLjašević

With a certainty of 72%, the RAPO Model classifies enterprises according to the criterion of optimal probability distribution $P > 0.216$ in the “Unsafe Zone”, i.e. for $P < 0.216$ in the “Safe Zone”. In the conditions of existence of different models, a legitimate question arises which model to use for the evaluation of the company and whether the use of only one model is justified.

Anjum (2012) summarized significant bankruptcy prediction studies and compared different models most commonly used to assess creditworthiness and bankruptcy prediction. He pointed out that Altman was constantly improving i.e. upgrading the model in order to come up with the equation, i.e. formulation of the model that can be successfully used in modern conditions to predict both financial troubles of enterprises and bankruptcies, for one, two and three years in advance, and that his model is most represented in academic and professional literature.

3.1. Altman's Models

In 1968 (Altman 1968), Altman conducted a multivariate study of the relationship between financial indicators and the probability of bankruptcy, which resulted in the creation of the Z-Score Model. The research included 66 production enterprises divided into two equal groups according to activity and size. The first group was represented by 33 enterprises that operated successfully in the period from 1946 to 1965, and the second group by 33 enterprises that initiated bankruptcy procedure and that went bankrupt in the mentioned period. In the mentioned research, a multivariate discriminant analysis was applied, on the basis of which out of 22 financial indicators in the initial phases of the analysis, five financial indicators were important for the interpretation of the financial situation of the company. At the same time, these financial indicators had different weight and significance for the company's business, so they were assigned the appropriate ponder. This procedure created the following function i.e. model (Altman 1968, 594):

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Where:

- Z – Value of Discriminant Function,
- X_1 – Working Capital/Total Assets ratio,
- X_2 – Retained Earnings/Total Assets ratio,
- X_3 – Earnings before Interest and Tax (EBIT) /Total Assets ratio,
- X_4 – Market Value of Equity/Total Liabilities ratio and
- X_5 – Total Sales/Total Assets ratio.

The conclusion of the research was that the mentioned model separates in the best way financially successful (“healthy”) enterprises from those enterprises over which bankruptcy has been initiated. According to Altman, enterprises with a Z - score greater than 3 are considered successful and financially sound enterprises. If they have a Z - score in the range of 2.99 to 1.81, they are considered enterprises operating in the gray zone, they are subject to bankruptcy and they are characterized as financially vulnerable enterprises with the possibility of recovery. Enterprises with an indicator of less than 1.80 are enterprises with a high probability of initiating bankruptcy procedure. The reliability of the mentioned model when using the data one year before the bankruptcy was 95%, for two years 75%, for three years 48%, for four 36% and for five years only 29%. Based on the presented data, it can be concluded that the probability of error is higher with the extension of the prediction time.

The main disadvantage of this original model is that it was not applicable to enterprises whose securities (shares) are not traded on the Stock Exchange. To address this shortcoming of the original model, Altman installed a new Z’- Score Model in 1983. The main difference compared to the original model was the indicator X_4 , where the market value was replaced by the book value of the company. Since this is a modified model, there was a need to assign new ponders to all indicators, namely (Altman 1984, 122):

$$Z' = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.42X_4 + 0.998X_5$$

The border values for the evaluation of the modified Altman’s Z’ Score Model differ from the original model, so the lower border value for financially successful enterprises is 2.9. Enterprises that

operate in the gray zone have a Z' score of 2.89 to 1.24, while enterprises that do not have credit performance have a Z' score of less than 1.23. Despite noticing the basic shortcomings of the initial original Z Score Model and formulating a modified version of the model intended for enterprises whose shares are not traded on the stock exchange, this model could not be applied to non-manufacturing enterprises.

Noticing this shortcoming, Altman revised the model again with the intention of reducing the impact of the industry to which the company belongs. Namely, the X_5 indicator was excluded from the original model, because the largest deviations for certain activities were observed in that indicator. The revised model has the following form (Altman et al. 1995, 3):

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

After this correction, the model proved to be suitable for the analysis of creditworthiness of manufacturing and non-manufacturing industrial enterprises, as well as for enterprises operating in emerging markets. The obtained Z'' - Score is interpreted as follows: financially successful enterprises have a Z'' - Score greater than 2.6, enterprises operating in the gray zone have a Z'' - Score in the interval from 2.59 to 1.11, while financially unsuccessful enterprises have a Z'' - Score less than 1.10.

The EM Score Model is a specially adapted Altman model. The basic form of the EM Score Model implies an additional constant of 3.25 compared to the Z'' Score Model and is shown by the following formula:

$$EM\ Score = 6.56*X_1 + 3.26*X_2 + 6.72*X_3 + 1.05*X_4 + 3.25$$

Altman has classified the credit rating of an enterprise based on the EM Score Model, equivalent to the credit rating classification used by Standard & Poor's credit rating agency. The obtained result is classified into one of the categories shown in Table 1, which explains the degree of credit rating, i.e. assesses the creditworthiness of the enterprise.

All enterprises that have an EM Score higher than 5.85 are in the safe zone of creditworthiness, then, enterprises that have a score in the range from 4.5 to 5.85 operate in the gray zone of creditworthiness, while for enterprises that have a Z'' -score less than 4.50 it can be said that they are operating in a problematic zone. It should be noted that as the enterprise score decreases, the risk of bankruptcy for the enterprise increases. The results of this model can be converted into the probability of bankruptcy. The value obtained shows the degree of probability that an enterprise will find itself in bankruptcy procedure in the future.

Table 1: Rating by result

EM Score		Rating	Zone (risk)
	higher than 8.15	AAA	Safe (low)
7.6	higher than 8.15	AA+	
7.3	7.6	AA	
7	7.3	AA-	
6.85	7	A+	
6.65	6.85	A	
6.4	6.65	A-	
6.25	6.4	BBB+	
5.85	6.25	BBB	
5.65	5.85	BBB-	
5.25	5.65	BB+	
4.95	5.25	BB	
4.75	4.95	BB-	
4.5	4.75	B+	
4.15	4.5	B	Problematic (high risk)
3.75	4.15	B-	
3.2	3.75	CCC+	
2.5	3.2	CCC	
1.75	2.5	CCC-	
	up to 1.75	D	

Source: Altman 2000; Altman and Hotchkiss 2010

Table 2: Overview of the probability of bankruptcy in the next 10 years according to Altman's EM model

Year	1	2	3	4	5	6	7	8	9	10
AAA	0%	0%	0.03%	0.06%	0.12%	0.21%	0.30%	0.41%	0.52%	0.63%
AA+	0.01%	0.04%	0.32%	0.48%	0.51%	0.54%	0.54%	0.64%	0.74%	0.85%
AA	0.01%	0.04%	0.32%	0.48%	0.51%	0.54%	0.54%	0.64%	0.74%	0.85%
AA-	0.01%	0.04%	0.32%	0.48%	0.51%	0.54%	0.54%	0.64%	0.74%	0.85%
A+	0.04%	0.13%	0.24%	0.40%	0.61%	0.84%	1.11%	1.34%	1.63%	1.94%
A	0.04%	0.13%	0.24%	0.40%	0.61%	0.84%	1.11%	1.34%	1.63%	1.94%
A-	0.04%	0.13%	0.24%	0.40%	0.61%	0.84%	1.11%	1.34%	1.63%	1.94%
BBB+	0.36%	3.56%	4.49%	6.16%	6.89%	7.31%	7.50%	7.68%	7.87%	8.18%
BBB	0.36%	3.56%	4.49%	6.16%	6.89%	7.31%	7.50%	7.68%	7.87%	8.18%
BBB-	0.36%	3.56%	4.49%	6.16%	6.89%	7.31%	7.50%	7.68%	7.87%	8.18%
BB+	1.22%	3.64%	7.88%	9.74%	12%	13.47%	15.25%	16.75%	18.40%	20.11%
BB	1.22%	3.64%	7.88%	9.74%	12%	13.47%	15.25%	16.75%	18.40%	20.11%
BB-	1.22%	3.64%	7.88%	9.74%	12%	13.47%	15.25%	16.75%	18.40%	20.11%
B+	5.81%	12.93%	19.51%	25.33%	30.48%	35.10%	39.45%	42.89%	45.89%	48.64%
B	5.81%	12.93%	19.51%	25.33%	30.48%	35.10%	39.45%	42.89%	45.89%	48.64%
B-	5.81%	12.93%	19.51%	25.33%	30.48%	35.10%	39.45%	42.89%	45.89%	48.64%
CCC+	28.83%	37.97%	46.71%	54.19%	59.72%	64.49%	68.06%	71.91%	74.53%	76.77%
CCC	28.83%	37.97%	46.71%	54.19%	59.72%	64.49%	68.06%	71.91%	74.53%	76.77%
CCC-	28.83%	37.97%	46.71%	54.19%	59.72%	64.49%	68.06%	71.91%	74.53%	76.77%
D	28.83%	37.97%	46.71%	54.19%	59.72%	64.49%	68.06%	71.91%	74.53%	76.77%

Source: Altman and Hotchkiss 2010.

Testing Altman's Z-Score Model, revised Altman's Z-Score Model for private enterprises, EM Score Model, Zmijewski model, Springate model and Fulmer model in the period from 2007 to 2016, Radivojac and Grujić (2016, 455-472) have shown that for companies listed on the Banja Luka Stock Exchange, the EM Score Model (adjusted Z Score) has the greatest predictive power. Also, they have shown that the most famous models with a high percentage of success classify problematic, i.e. "sick" enterprises. Nevertheless, they noted that there are reasons why the results from the model, although accurate, do not correspond to reality. In particular, in a large number of cases, bankruptcy is initiated too late - when enterprises are already "doomed" to failure. Therefore, even models cannot give a precise result. In addition, they have shown that the value of assets is overestimated in problematic enterprises, but also that a large number of models rely too much on market capitalization and the value of assets and cash flows.

Samkin, Low, Adams (2012) examined the applicability of the Altman model to 20 enterprises in New Zealand that declared bankruptcy. They came to the conclusion that by using the Z'' - Score Model, enterprises with most risk had results that indicate the inevitable failure. Having in mind the importance of models for predicting financial difficulties, the authors suggest that such models be introduced as part of financial statements or as part of a published review of an enterprise's financial indicators. Lalith P. Samarakoon and Tanweer Hasan (Samarakoon & Hasan 2003) examined the applicability of Altman's models to enterprises listed on the Sri Lankan Stock Exchange. They concluded that the probability of predicting the bankruptcy of the Z'' - Score Model is 81%, and that the model has good potential in predicting financial difficulties in emerging markets as well as in developed markets.

4. METHODOLOGY

In order to answer the question of what is the financial situation of public enterprises in the Republic of Srpska in terms of predicting their financial difficulties, the financial analysis was performed. The testing covered all public enterprises that meet the definition of public enterprises according to the the Republic of Srpska Law on Public Enterprises, which are not from the financial sector, and which submitted their financial reports from 2013 to 2018 to the APIF.

The analysis was performed based on the presented methodology of Altman's EM Score, which was identified as a model applicable to manufacturing and non-manufacturing industrial enterprises operating in emerging markets. At the same time, an assessment was performed on the basis of the RAPO Model, since this model, during its development, included all companies in the Republic of Srpska, therefore including public enterprises, for the period 2012-2015.

5. RESULTS AND DISCUSSION

The analysis of the operations of public enterprises only on the basis of one or two models that take into account only a few selected financial indicators gives very scarce information and imprecise estimations. For this reason, before presenting the results of the application of the model, it is necessary to present other financial indicators of public enterprises, which cannot be read from the tested models themselves.

The performance of public enterprises in the observed period 2013-2018 is quite uneven, which can be seen from Table 3.

Table 3: Net operating result of public enterprises in the period 2013-2018 (in million BAM)

Year	2013	2014	2015	2016	2017	2018
Profit/(loss)	0.441	-48.9	-94	-30.9	-72	94.97

Source: APIF

Out of the presented 94.97 million profit in the public sector in 2018, 84.05 percent refers to three companies: Public Enterprise RS Highways - *Autoputevi RS* Banja Luka (30,117,805 or 31.71%), RS Railways - *Željeznice RS* Doboj (28,539,014 or 30.05%) and Public Enterprise RS Roads - *Putevi RS* Banja Luka (21,169,973 or 22.29%). The listed results of these three companies are a consequence of the following:

- during 2018, the collection of excise duties on oil was doubled, which was reflected in the revenues of RS Highways, while the same Law introduced a dedicated excise tax for roads, which was reflected in the income statement of RS Roads;
- The Republic of Srpska Railways presented the amount which the Government took from the World Bank as regular revenue of 51 million and showed a net result of 28 million.

The example of these three companies shows that the intervention of the state largely determines the business results of these companies and not the success in market competition. At the same time, the total assets of these companies represent 46.63% of the total assets of the public sector: RS Highways Banja Luka has assets of 767,107,023 BAM (25.77%), RS Railways Doboj 340,593,699 BAM (11.44%), and RS Roads Banja Luka with 280,076,828 BAM (9.41%).

The mentioned data and the realized losses of public enterprises in previous years confirm the theory that public enterprises are basically inefficient, and that although they were founded as companies whose goal is to generate profits, social and other government goals implemented through these companies dominantly affect their business results.

On the other hand, it is interesting to analyze how much the state, both at the Republic of Srpska and local level, through recapitalization i.e. subsidies, supports the work of these companies. According to the data from the consolidated balance sheet of the Republic of Srpska for 2018, the value of the participation of the Republic of Srpska in the capital of the enterprises is BAM 2.7 billion, while that amount at the level of all local communities is BAM 239 million.

Table 4: Expenditures from the budget of local communities 2013-2018 for local public enterprises and the participation of local communities in the capital of public enterprises

	Expenditures	2018	2017	2016	2015	2014	2013	TOTAL
1	Subsidies	14,796,817	13,686,355	12,841,631	10,557,694	10,305,413	10,787,323	72,975,233
2	Expenditures for additional participation in capital	1,937,530	13,429,030	168,000	10,000	5,056	12,223,024	27,772,640
3	Participation in capital	239,160,973	258,794,671	209,612,095	208,560,954	157,246,987	158,828,496	100,747,873

Source: Author's calculation

Table 4 shows that local communities increase the amount of subsidies for public enterprises owned by them from year to year, while expenditures for recapitalization are unequal by year. Significant investments in the capital of public enterprises at the local level happened in 2013 and 2017, and in both cases the largest part refers to the recapitalization of the City of Banja Luka into City Heating Plants.

The growth of the share of local communities in the capital of public enterprises is not the result of retention of profit, but the assessment of assets at higher levels and, consequently, the growth of revaluation reserves.

At the Republic of Srpska level, subsidies to public enterprises are around 40 million annually, where most subsidies relate to the RS Railways. Furthermore, the Republic of Srpska and local communities are often guarantors of loans taken by public enterprises, and it often happens that in the inability to repay the due annuity, the Republic of Srpska does it for them.

Having in mind the above mentioned, we can conclude that the losses of public enterprises at both the Republic of Srpska and local level would be significantly higher if budgets do not allocate funds every year to subsidize these companies. It is also important to note that local utility companies use infrastructure funds that are owned by local communities and local communities allocate significant funds for the additional construction and maintenance of them. The losses of public enterprises on this basis would be higher if the enterprises themselves would build and maintain the funds with which they perform their core business.

After the general introduction to the business of public enterprises through the prism of the achieved result and the Republic of Srpska investments, we continue with the assessment of financial uncertainty i.e. the risk of public enterprises according to the previously explained models.

The classification of public enterprises into high, moderate and low risk groups is shown in Table 5. The Table shows that in all observed years the percentage of public enterprises in the problem zone is about half, while it is interesting to find that a small percentage is in the gray zone. That is, public enterprises are either problematic or safe and a small number of enterprises have moved from a safe to a problematic zone during these years.

Table 5: Overview of the number of "healthy" and "problematic" enterprises according to the Altman model

Risk	2013	2014	2015	2016	2017	2018
Problematic (high)	51%	50%	49%	52%	52%	49%
Gray (moderate)	8%	6%	5%	6%	7%	9%
Safe (low)	42%	43%	45%	42%	41%	42%

Source: Overview of the author

Analysing the value of individual components that form the EM Score (Appendix 1), it can be determined that public enterprises that are classified in the problematic zone in all observed years have negative net working capital, they make losses, and their own capital is less than liabilities. Negative working capital has been around 24% of total assets in the last three years, and due to losses, EBIT/assets and retained earnings/assets are negative. The ratio of capital and liabilities is less than one and it is constantly going down (from 0.78 to 0.47), which indicates that these enterprises increase the share of liabilities in the structure of liabilities.

On the other hand, low-risk public enterprises have a positive value of net working capital over the years, they make profits, while the value of equity is about twenty times higher than the value of liabilities.

Since 2015, public enterprises with moderate risk have been constantly increasing the share of their own capital in the structure of liabilities, while in 2018 this ratio was 1.2. They generate positive EBIT and have a positive net working capital, but all of these indicators are significantly lower than the value of indicators in the safe zone.

Table 6 shows the amount of liabilities and assets of public enterprises by categories, where we see that problematic companies have 17.43% of assets, but they account for 54.76% of liabilities of all public enterprises. That is, 82% of their assets are covered by liabilities. On the other hand, 90.34% of the total capital of all public enterprises refers to low-risk companies, while at the same time they use 75.74% of total assets. Financing of assets with liabilities of these companies is at the level of 12%.

Table 6: Amount of assets, capital and liabilities by risk level

No	Risk	Low risk	Moderate risk	High risk	Total
1	Number of companies	78	16	86	180
	<i>Percentage</i>	43%	9%	48%	100%
2	Amount of liabilities	1,031,596,473	314,811,605	1,629,984,896	2,976,392,974
	<i>Percentage</i>	34.66%	10.58%	54.76%	100.00%
3	Amount of assets	8,593,670,486	775,328,261	1,977,815,545	11,346,814,292
	<i>Percentage</i>	75.74%	6.83%	17.43%	100.00%
4	Amount of capital	7,562,074,013	460,516,656	347,830,649	8,370,421,318
	<i>Percentage</i>	90.34%	5.50%	4.16%	100.00%

Source: Author's calculation

In addition to identifying financial risk according to the EM Score Model, we classified public enterprises into good and bad also according to the RAPO Model, and these results are shown in the following table.

Table 7: Overview of the number of "healthy" and "problematic" enterprises according to RAPO Model

Number of enterprises by samples in absolute value				
Year	2018	2017	2016	2015
Number of healthy – safe enterprises	86	89	84	93
Number of problematic enterprises	81	78	83	73
Total	167	167	167	166
Number of enterprises by samples in %				
Year	2018	2017	2016	2015
% healthy – safe enterprises	51.50%	53.29%	50.30%	56.02%
% problematic enterprises	48.50%	46.71%	49.70%	43.98%
Total	100.00%	100.00%	100.00%	100.00%

Source: Overview of the author

If we compare the percentage of problematic enterprises according to the EM Score Model and the RAPO Model, we notice a growth trend of problematic enterprises according to the RAPO Model, which in 2018 is approaching the percentage according to the EM Score. Although these two models are based on completely different indicators, their results are similar. While the EM Score Model is more based on indebtedness and asset efficiency indicators, the RAPO Model relies on liquidity and earnings indicators.

6. CONCLUSION

From the point of view of the current share owners and potential investors, it is of great importance to know the creditworthiness of the enterprise. To express this situation, various models are used, which assess the credit performance of the enterprise and predict bankruptcy. Altman's EM - Score Model is most widely used for developing enterprises, which is aimed at forecasting the future danger of financial difficulties and bankruptcy, and less at excellence. In other words, it expresses the probability of bankruptcy, but also provides answers to other questions of interest to stakeholders.

Although the state rarely allows bankruptcy of its majority-owned companies, testing the public enterprises using the EM Score Model provides information on enterprises with high financial risk for which the state will allocate funds from the budget for their survival, thus decreasing investment in more efficient projects.

The results in this paper show that about half of public enterprises are constantly problematic throughout the observed period. It is also interesting to note that about 40% of enterprises are constantly at low risk, which indicates that the observed enterprises are mostly either problematic or in a safe zone, and that they rarely move from one group to another. Financially risky enterprises are characterized by the generation of loss, high indebtedness, and lack of net working capital. Nevertheless, the research confirms the research hypothesis that the number of public enterprises is lower compared to the period five years ago.

The indicators would certainly be even worse if subsidies and recapitalization were excluded, where both the Republic of Srpska and local communities finance public enterprises every year. In this regard, further research on this topic can be moved in this direction. At the same time, the implementation of certain government measures through these enterprises does not mean that they must be ineffective, as shown by the example of 40% of public enterprises that are in the safe zone. It is necessary to research and consider the adoption of a strategy for the recovery of public enterprises that are currently problematic in order to reduce the negative impact on the budget.

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APPENDIX

Public Enterprises 2018								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.012	0.001	0.317	- 0.997	1.000	- 0.234	0.062	0.194
X2	- 0.016	-	0.433	- 2.310	0.951	- 0.230	- 0.079	0.222
X3	0.021	0.005	0.154	- 1.002	0.921	- 0.015	0.027	0.057
X4	9.049	1.331	32.536	-	281.652	0.470	1.272	20.042
Z	12.694	4.895	34.824	- 8.086	299.061	1.231	4.913	26.678
Public Enterprises 2017								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.036	-	0.302	- 1.000	0.600	- 0.234	0.084	0.157
X2	3.260	3.260	0.000	3.260	3.260	- 0.219	6.720	0.009
X3	0.001	0.005	0.124	- 1.000	0.393	3.260	3.260	3.260
X4	11.109	1.288	49.986	-	515.512	0.413	0.955	24.984
Z	13.972	4.358	52.094	- 10.113	548.245	0.978	4.868	31.182
Public Enterprises 2016								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.019	0.010	0.310	- 0.997	1.000	- 0.265	0.115	0.143
X2	- 0.161	-	1.303	- 15.882	0.820	- 0.523	- 0.018	0.154
X3	- 0.006	0.003	0.116	- 0.479	0.490	- 0.036	0.001	0.021
X4	11.479	1.116	54.350	-	584.266	0.458	0.856	24.859
Z	14.671	4.951	57.391	- 13.678	616.796	0.622	4.849	30.935
Public Enterprises 2015								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.019	0.010	0.310	- 0.997	1.000	- 0.247	0.112	0.142
X2	3.260	3.260	0.000	3.260	3.260	- 0.536	6.720	- 0.018
X3	0.004	0.003	0.183	- 0.856	1.505	3.260	3.260	3.260
X4	11.343	1.421	49.290	-	469.229	0.448	0.871	22.409
Z	14.590	5.751	51.889	- 11.300	497.042	0.515	4.829	28.409
Public Enterprises 2014								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.392	- 0.089	1.378	- 13.867	1.000	- 0.808	0.033	- 0.078
X2	- 0.158	- 0.002	1.066	- 12.787	0.888	- 0.389	- 0.141	0.060
X3	0.110	0.015	0.569	0.000	7.331	0.188	0.043	0.050
X4	14.193	2.099	43.095	-	335.517	0.617	1.567	29.435
Z	15.627	4.983	46.066	- 40.698	355.402	- 1.284	4.945	34.173
Public Enterprises 2013								
Variable	Mean	Median	Std dev	Minimum	Maximum	High risk	Moderate risk	Low risk
X1	- 0.392	- 0.089	1.378	- 13.867	1.000	- 0.643	- 0.021	- 0.222
X2	3.260	3.260	0.000	3.260	3.260	- 0.258	6.720	0.038
X3	0.060	0.013	0.117	-	0.730	3.260	3.260	3.260
X4	27.544	2.130	128.924	-	1,433.044	0.786	1.517	56.498
Z	28.397	5.125	133.123	- 68.003	1,508.141	- 0.794	5.005	61.535