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Comparison to Kralicek DF Indicators and Altman Z-Score Model for Serbian Metal Industry

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Abstract

This study compares the results of two instruments of strategic controlling. The research was based on a sample of several companies in the metal-industry sector of the Serbian economy. Using a software tool "Scorex.biz Analayzer" and publicly available data of annual financial statements, interdependence and similarity of the results obtained from Kralicek DF indicators and Altman Z-Score model will be shown. Controlling is one of the functions of management, which increases its efficiency, effectiveness and ability to adapt to changes. It is tool used to support management of each company, made of system methods and tools aimed to show business efficiency. Specifically, controlling includes the planning, coordination and control activities, and it was developed due to the increasing volume of business information. As a result, controlling is expected to provide expert and substantiated opinions, recommendations and conclusions for management so it can be familiar with the issues of running the business, as well as possible future risks and effects of potential business decisions. Because it covers the entire range of related activities and requires knowledge from different functional areas (finance, accounting, information technology, organizations etc.) controlling is important business supporting processes within the company, primarily focused to company internal managing stuff.

Key words: *Controlling, Kralicek DF indicator, Altman Z-Score, Scorex.biz Analyzer software,*

1. INTRODUCTION

In an increasingly turbulent business conditions, bussiness enterprises usses different ways of predicting the business changes. By tracking and analyzing data, business trends can be observed and leading to improved business organization and adequate goals execution. Companies are exposed to changes, in order to survive in highly competitive market, any information or change can significantly affect the business.

To obtain the necessary information,numerous procedures and information in financial statements are required. Also, it is necessary to bear in mind their limitations relating to unavailability of data from the past. Controlling is coordinative and integrative function within the specialized and articulated management system, which is made of values system, planning system, control system, information system, organization system and human resources management system. Managers need to be constantly informed about the activities within their companies and in their environment.

The need for good information management and analysis capabilities possession is becoming increased, as well as the ability to process large amounts of information. For all the mentioned requirements, the companys are establishing organizational units or hire experts for controlling. Controllers collect, handle and store a number of data and information. Businesses in today's age of informational technologies possess more data than ever but use them rarely and poorly, which can lead to erroneous business decisions.

In order to prevent such decisions, managers must begin to apply analytical approaches and methods in their daily operations. [1]

The term "controll" in management literature has meaning: to master, lead, manage, regulate in relation to processes. "*Control*" and "*controlling*" in this context is used synonymously. By Anthony and Dearden, "*control*" in an organization include: "*devices that insure that it goes where its leaders want it to go*." "*Control*" is therefore in litereture treated unequal with "control" in the German science of business economics. Anthony and Dearden, Considered that the term ,,*Management Control*" includes: programming, budgeting, execution and evaluation. In principle, insists that the concept of "*control*" may not translate as control.

The translation that makes any sense, one could speak about the conduct of business.
Controlling is in terms of managing the central task of management, because every manager conducts controlling activities. Controller Verein indicates controller as a "*sparring partner*" of managers in determining and achieving goals, ,,*the basic task of controlling is, to make the enterprise more profitable, and is also the orientation towards the future…''* [4]. Controlling as a process and a way of thinking, resulting in a team of managers and controllers and thus makes their "*section*". The following Figure 1. illustrates the section. [2]

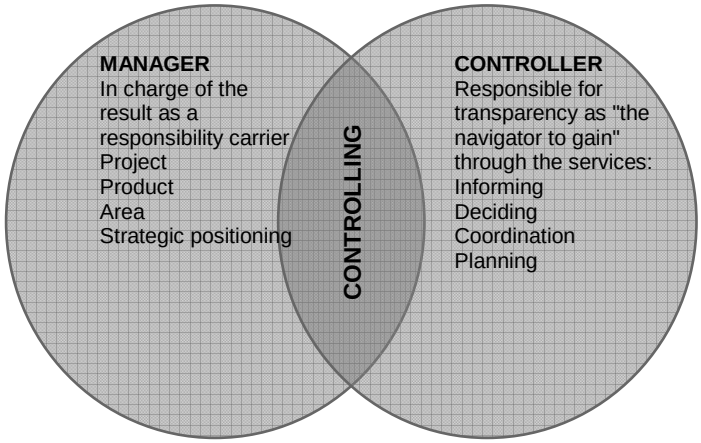


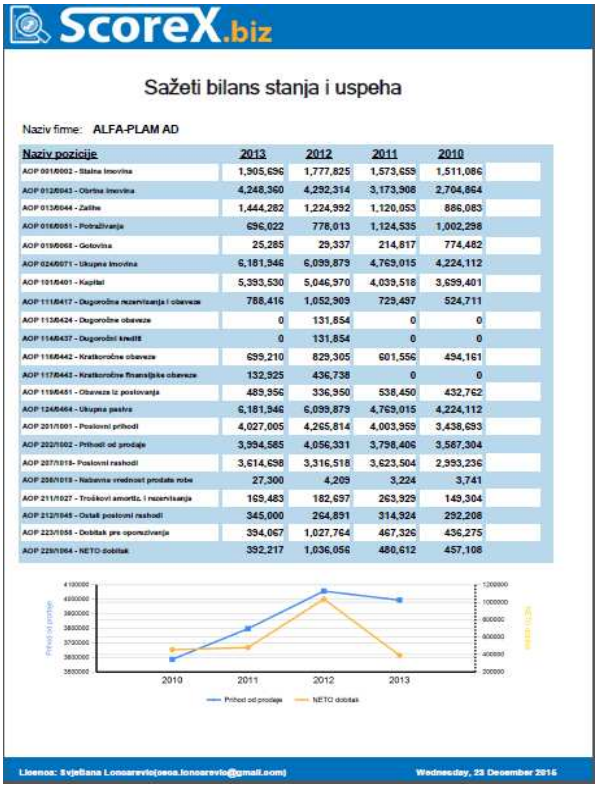
Figure 1. Controlling as section between manager and controller activity (Controller Verein e.V.)

2. RESEARCH

By random sampling procedure, several business entities are selected through which metal-processing industry will be analyzed using Altman Z-score model predictions of bankruptcy and Kralicek DF indicator of financial stability methods. The observed period is 2010 - 2013.
The data used for the calculation are taken from regular annual financial statements of companies, which are published and publicly available on the website of the Business Registers Agency of the Republic of Serbia. [3] Aim of This study is to present a comparative analysis of the results of two controlling instrument used for forecasting bankruptcy and the financial stability of businesses.

3. ANALYSIS

Comparative review of the results shows that both models show relatively similar forecasts. Using these results, trend of operations of the designated enterprises can be observed.
The following Figure 2. shows the summarized balance sheet and income statement. The data used for the calculation are taken from regular annual financial statements of companies.

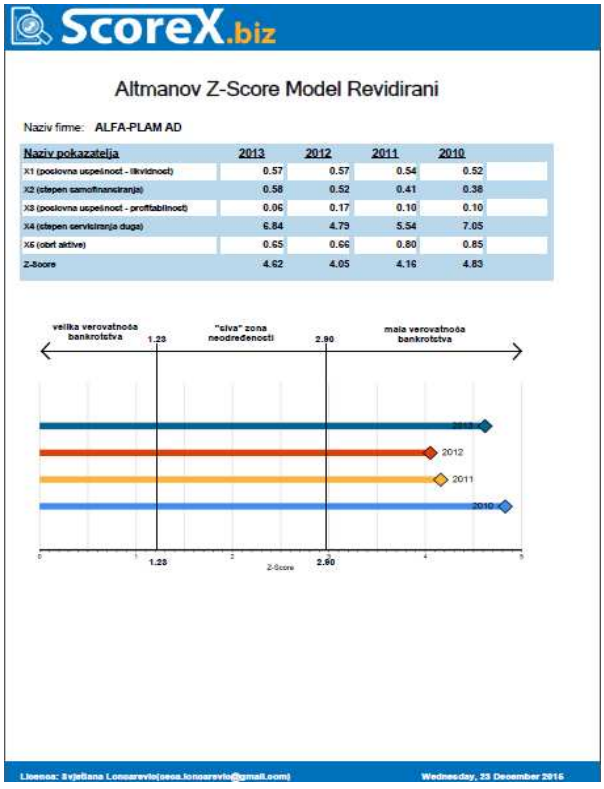

ScoreX.biz

Sažeti bilans stanja i uspeha

Naziv firme: ALFA-PLAM AD

Naziv pozicije	2013	2012	2011	2010
AOP 001/0002 - Stalna imovina	1,905,696	1,777,825	1,573,659	1,511,086
AOP 012/0043 - Obrtna imovina	4,248,360	4,292,314	3,173,908	2,704,864
AOP 013/0044 - Zalihe	1,444,282	1,224,992	1,120,053	886,083
AOP 016/0051 - Potraživanja	696,022	778,013	1,124,535	1,002,298
AOP 019/0068 - Gotovina	25,285	29,337	214,817	774,482
AOP 024/0071 - Ukupna imovina	6,181,946	6,099,879	4,769,015	4,224,112
AOP 101/0401 - Kapital	5,393,530	5,046,970	4,039,518	3,699,401
AOP 111/0417 - Dugoročna rezervisanja i obaveze	788,416	1,052,909	729,497	524,711
AOP 113/0424 - Dugoročne obaveze	0	131,854	0	0
AOP 114/0437 - Dugoročni krediti	0	131,854	0	0
AOP 116/0442 - Kratkoročne obaveze	699,210	829,305	601,556	494,161
AOP 117/0443 - Kratkoročne finansijske obaveze	132,925	436,738	0	0
AOP 119/0451 - Obaveze iz poslovanja	489,956	336,950	538,450	432,762
AOP 124/0464 - Ukupna pasiva	6,181,946	6,099,879	4,769,015	4,224,112
AOP 201/1001 - Poslovni prihodi	4,027,005	4,265,814	4,003,959	3,438,693
AOP 202/1002 - Prihodi od prodaje	3,994,585	4,056,331	3,798,406	3,567,304
AOP 207/1015 - Poslovni rashodi	3,614,698	3,316,518	3,623,504	2,993,236
AOP 208/1018 - Nabavna vrednost prodate robe	27,300	4,209	3,224	3,741
AOP 211/1027 - Troškovi amortiz. i rezervisanja	169,483	182,697	263,929	149,304
AOP 212/1045 - Ostali poslovni rashodi	345,000	264,891	314,324	292,208
AOP 223/1058 - Dobitak pre oporezivanja	394,067	1,027,764	467,326	436,275
AOP 229/1064 - NETO dobitak	392,217	1,036,056	480,612	457,108

Figure 2. Summarized Balance sheet and Income statement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Altmanov Z-Score Model Revidirani

Naziv firme: ALFA-PLAM AD

Naziv pokazatelja	2013	2012	2011	2010
X1 (poslovna uspešnost - likvidnost)	0.57	0.57	0.54	0.52
X2 (stepen samofinansiranja)	0.58	0.52	0.41	0.38
X3 (poslovna uspešnost - profitabilnost)	0.06	0.17	0.10	0.10
X4 (stepen servisiranja duga)	6.84	4.79	5.54	7.05
X5 (obrt aktive)	0.65	0.66	0.80	0.85
Z-Score	4.62	4.05	4.16	4.83

Figure 3. Values of Z-score model

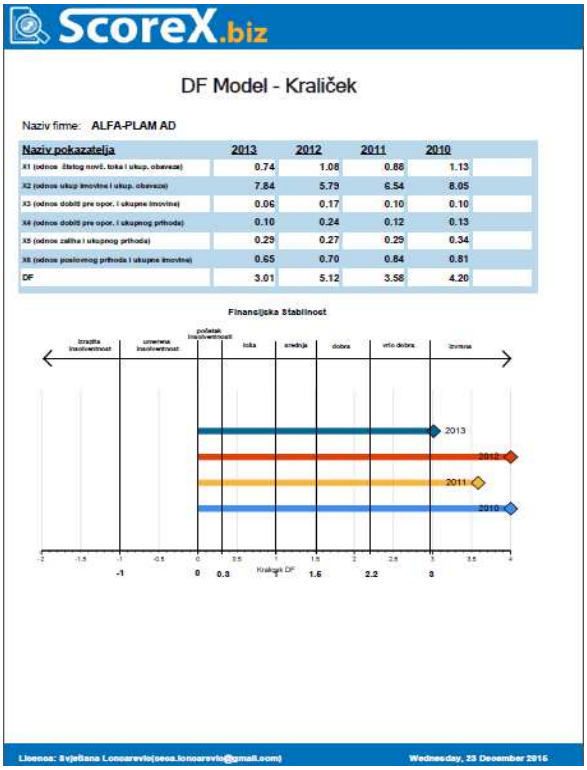

Figure 4. Values Kralicek DF Indicator

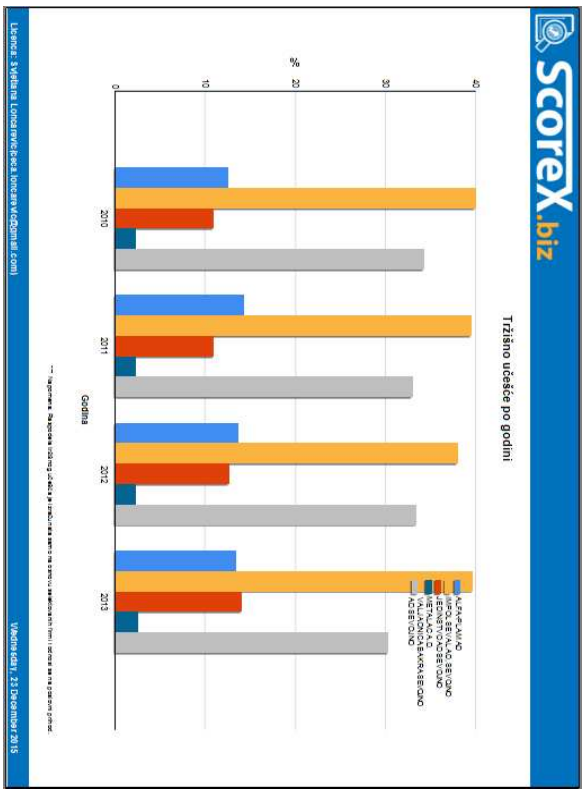

Figure 5. Market share (based on several business entities)

The following Table 1. shows the values individually for each year. Comparing the results, it easy to notice trends according to year. The values obtained for the Altman Z-score and Kralicek DF models show a more or less similar values. In most of the companys results are in the area of bankruptcy and beginning of insolvency or opposite.

Altman Z-Score model is a model for predicting bankruptcy. The original Altman Z-Score model is designed for enterprises in the industrial activity, whose shares are listed on the stock exchange. Later, they made two corrections of which one applies to private companies.

Marginal values of interest are 1.23 and 2.90. If the Z-Score is less than 1.23 the company is prone to bankruptcy, and if Z-Score higher than 2.90 the company has a good future. Area gray zone located between 1.23 to 2.90. [4] The following Table 2. illustrates the values of Z-Score models.

Kralicek DF indicator of financial stability can have positive and negative values, where negative values indicate insolvency, and positive indicate solvency of the company.

Start insolvency of the company occurs when the value of DF indicator falling from 0.3 to 0.0, after which goes moderate insolvency for all DF values from 0.0 to -1.0, and beyond that exceptional insolvency is indicated.

For DF indicator values from 0.3 to 1.0 financial stability of the company is poor, and from 1.0 to 1.5, financial stability is medium.

For companies with DF indicator from 1.5 to 2.2 financial stability is good, and from 2.2 to 3 is very good. Companies with DF indicator of higher than 3.0 are considered excellent. [4]. The following Table 3. illustrates the critical values of DF indicators with accompanying assessment of financial stability Table 4. shows the average values of Altman Z-Score and Kralicek DF models per year, taking into account results obtained from a sample. Companies that were taken as a sample are part of the stock exchange index BELEXline on the BSE. [6] BELEXline consists of stocks traded on the BSE market, which have met the criteria for entry into the index basket.

Calculated average values for the period 2010 – 2013. shows very similar forecasts for bankruptcy and financial stability, where we see that the average Altman Z-score model for 2010 is the zone of possible bankruptcies and the average value Kralicek DF indicator points to very good financial stability. In 2013 there was a slight increase in the value Altman Z-Score model due to the increased level of debt for some companies, which are found in the sample. At the same time there is a decline in the value Kralicek DF financial stability indicator. This is shown on Figure 6.

Table 1. Values of Altman Z-score model and Kralicek DF indicators by years for observed enterprises

Company	MODEL	2010	2011	2012	2013
METALAC AD	Altman Z-score	2,55	3,29	4,66	6,15
	Kralicek DF Ind.	4,15	5,46	4,72	5,72
IMPOL SEVAL AD	Altman Z-score	1,74	1,96	1,7	1,73
	Kralicek DF Ind.	1,04	1,41	1,2	0,88
VALJAONICA BAKRA SEVOJNO AD	Altman Z-score	1,15	1,18	1,3	1,52
	Kralicek DF Ind.	0,57	0,67	0,56	0,46
ALFA-PLAM AD	Altman Z-score	4,83	4,16	4,05	4,62
	Kralicek DF Ind.	4,2	3,58	5,12	3,01
JEDINSTVO SEVOJNO AD	Altman Z-score	3,31	2,22	2,09	2,16
	Kralicek DF Ind.	4,1	2,48	1,45	1,58

Table 2. Range of limits for assessing Altman Z-Score model [5]

No	Z-Score	Range for the indicator calculated			
		Low risk	Grey zone		High risk (95%)
			Worry	Within 2 years	
1.	Original model	> = 3,0	2,99 to 2,79	2,78 to 1,81	> = 1,80
2.	Model A	> = 2,9	2,89 to 2,69	2,68 to 1,24	> = 1,23
3.	Model B	> = 2,6	2,59 to 2,39	2,38 to 1,11	> = 1,10

Table 3. Kralicek DF Indicator values [5]

DF Indicator value	Financial stability description
> 3,0	Excellent
> 2,2	Very good
> 1,5	Good
> 1,0	Medium
> 0,3	Poor
≤ 0,3	Insolvency beginning
≤ 0,0	Medium insolvency
≤-1,0	Extreme insolvency

Table 4. Average values of Z-score model and Kralicek DF indicators by years

Model	2010	2011	2012	2013
Altman Z-Score	2,72	2,56	2,76	3,24
Kralicek DF Indicator	2,81	2,72	2,61	2,33

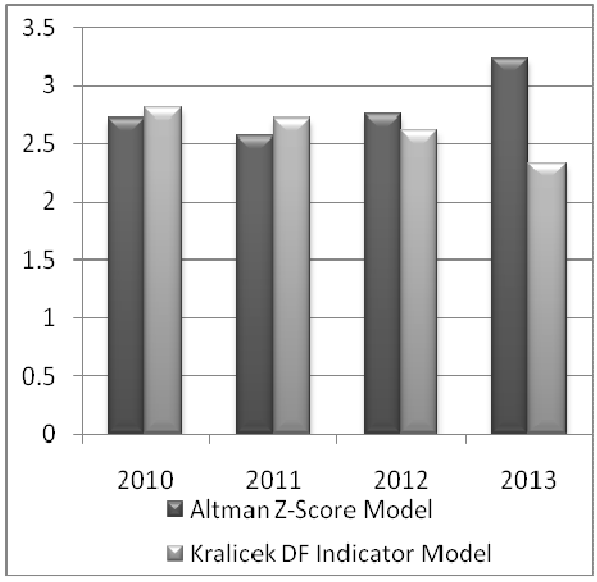

Figure 6. Average values of Z-Score model and Kralicek DF indicators by years

4. METODOLOGY

Calculation of Altman Z-Score of the bankruptcy risk is based on the equation:

Z = 0.717X1 + 0.847X2 + 3.107X3 + 0.42X4 + 0.998X5 where:

X1 = Current assets/Total assets = business success,liquidity;
X2 = Retained earnings / Total assets = the degree of self-financing;
X3 = EBIT / Total assets = business performance,profitability;
X4 = Market value of equity / book value of total liabilities = degree of debt servicing;
X5 = Sales / Total assets = asset turnover; [5]

The values obtained are divided by zones where the values are the following:

Z > 2.90 - "Safe" Zones - safe zone

1.23 < Z <2.90 - "Grey" Zones - zones of possible bankruptcy

Z < 1.23 - "Distress" Zones - Zone bankruptcy.

Modeled after the original Altman Z-Score model which is based on a sample of US companies, Peter Kralicek has developed its DF indicator on a sample of European companies to identify the crisis in the company.

Equation Kralicek DF indicator is:

DF = 1,5X1 + 0,08X2 + 10X3 + 5X4 + 0,3X5 + 0,1X6 where:

DF - The value of the discriminant function

X1 - Free cash flow (EBIT + Amortization) / Total liabilities
X2 - Total assets / Total liabilities
X3 - Operating profit / Total assets
X4 - Operating profit / Sales income
X5 - Stocks / Sales income
X6 - Sales income / Total assets. [5]

5. CONCLUSION

Controlling as function and subsystem of management contributes to efficiency and effectiveness in the work of management, increasing the ability of company to adapt to internal and external changes, increases the vitality of the enterprise and its market adaptability.
As part of controlling, financial analysis is the process of applying different analytical procedures and techniques by which data from financial statements are converted into usable information relevant to business management and enterprise development. The main objective of the analysis of financial statements is the assessment of past achievements but also creating the foundation for decisions on some future goals. The analysis actually provide signals for action. Presenting of the controller's report of the past and present company status is a moment when the controlling function begins to guide strategic decisions in the right direction. Controlling connects all the information, monitors them and reports the results.
In addition to preparation of financial and non-financial indicators, leading companies apply analytics to determine the facts that really affect performance. In unstable times using analytics it is possible to monitor and decrease business risk. Beside that, companies can gain a competitive advantage in other ways, by adequate treatment of data, such as collection of unique data over time, or the development and conversion of analytics methods as one of the basic characteristics of their business processes. It is important to mention the future approach to analytics and controlling, because the data will be collected automatically and based on them real time business decisions will be made on a daily basis.
To make this possible it is necessary to develop and implement adequate information systems that will enable the use of the collected data, business rules and information, and to present final results to multiple users. [1]
Scorex.biz Analyzer software is a set of useful tools for analyzing the history of business, on which some future trends prediction can be made, that could positively or negatively affect the entity. The main aim of the software is to gather high-quality input data, to analyse them, to display the results, and to store that results to database for further use.

6. REFERENCES

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Uporedjivanje Kralicekovog DF Indikatora i Alman Z-Score modela u metaluškoj industriji

Svjetlana Lončarević

Primljen (15.11.2015.); Recenziran (21.12.2015.); Prihvaćen (27.12.2015.)

Apstrakt

Ovo istraživanje uporedjuje rezultate dva instrumenta strateškog kontrolinga. Istraživanje je bazirano na uzorku od nekoliko preduzeća iz metalskog sektora srpske privrede. Koristeći softverski alat Scorex.biz Analyzer i javno dostupne podatke redovnih godišnjih finansijskih izveštaja, pokušava se ukazati na medjuzavisnost i sličnost dobijenih rezultata Kralicekovog DF pokazatelja i Altmanovog Z-scor modela. Kontroling predstavlja jednu od funkcija menadžmenta kojom se povećava njegova efikasnost i efektivnost, a time i sposobnost prilagođavanja promenama. Reč je o podršci upravljanju svakog preduzeća koju čini sistem metoda i alata usmerenih na učinkovitost poslovanja. Tačnije, kontroling obuhvata planiranje, koordinaciju i kontrolu aktivnosti, a pojavio se usled sve veće količine poslovnih informacija. Kao rezultat rada kontrolinga očekuje se davanje stručnih i argumentovanih mišljenja, preporuka i zaključaka sa ciljem da se menadžment upozna sa tekućom problematikom poslovanja, kao i sa mogućim budućim rizicima i učincima potencijalnih poslovnih odluka. Zbog toga što obuhvata ceo niz međufunkcijskih aktivnosti i pritom zahteva znanja iz različitih funkcijskih područja, kao to su finansije, računovodstvo, informatika, organizacije i sl. kontroling je moguće i potrebno označiti kao potporni poslovni proces unutar preduzeća primarno usmeren internim potrošačima – menadžerima. [1]

Ključne reči: *kontroling, Kralicek DF pokazatelj, Altman Z-scor, Scorex.biz Analyzer softver*