THE DEVELOPMENT PREDICTION OF FINANCIAL AND ECONOMIC INDICATORS OF HOSPITALS OPERATING IN ŽILINA REGION

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Abstract: *The aim of this paper is to predict the development of financial and economic indicators of hospitals operating in Žilina region. Using the selected prediction´s method performs the analysis, which uses indicators of liquidity, activity, profitability and debt. The result of our research is to assess the current status of hospitals in the Žilina region and to predict their possible future developments, subsequently with recommendation of solutions.*

Keywords: *Hospital, Region Žilina, Altman Z-score, Liquidity, Debt*

JEL Classification: *M21, K20*

1. INTRODUCTION

Žilina Region is incorporated of 11 districts (Bytča, Čadca, Dolný Kubín, Kysucké Nové Mesto, Liptovský Mikuláš, Martin, Námestovo, Ružomberok, Turčianske Teplice, Tvrdošín and Žilina). Since 1.1.2003 this region has become the founder of four hospitals – Hospital of Liptov with policlinic in Liptovský Mikuláš, Hospital of Dolnáorava with policlinic MUDr. L. N. Jége in Dolný Kubín, Hospital of Kysuce with policlinic in Čadca, Hospital of Hornáorava with policlinic in Trstrená. In Žilina region there are also the following hospitals University hospital in Martin, University hospital with policlinic in Žilina, founded by the Ministry of Health SR, Central military hospital in Ružomberok - was founded by the Ministry of Defence SR. Ministry of Health since 2009 to now has invested less and less financial resources to the health sector. This situation reflects in the negative sense economic situation of hospitals. In the region also operates the Central Military Hospital in Ružomberok, which is funded by the Ministry of Defence, which annually provides funds to the hospital valued at around 8 million €, while a significant amount of their funds obtained hospital by its own activity. For other of hospitals operating in the Žilina region is the founder the Ministry of Health and Ministry of Defence. Since 2006 Žilina Region has gradually started to invest to the reconstruction of hospitals from public budget. 12 million € invested into four hospitals and one polyclinic. These investments were directed to the reconstruction of buildings and departments, amounting to 7.3 million €. The remaining 4.8 million € were directed to the modernization of the equipment. 8.2 million € was able to obtain from the EU funds which were used to the renovation of hospitals. In 2013, the municipality Žilina allocated from its health budget 2.4 million € into the hospitals [6]. In 2014 invested this region about 2, 5 million € to the reconstruction and the modernization of the hospitals again [5]. Therefore each hospital manages its funds, which receives from its founder or its own activities and also by the European Union. The aim of this paper is to analyze current situation of the hospitals operating in Žilina Region through the Altman Z- score, which is the best-known multidimensional bankruptcy model.

2. METHODOLOGY OF THE FINANCIAL INDICATORS AND ALTMAN Z- SCORE

Analyzing financial statement information is one of the most important elements in the fundamental analysis process. To analyze the financial situation of hospitals operating in the Region Žilina, we can use a variety of methods; one of them is the use of relative financial indicators. Basic classification of financial indicators is to the indicators of liquidity, activity, debt and profitability. We use for our research only indicators of liquidity and debt.

Our indicators of liquidity are the current liquidity and the quick liquidity. The current ratio is used to test a company's liquidity by deriving the proportion of current assets available to cover current liabilities.

Our indicators of debt are the debt ratio, the long-term debt ration and the credit debt ratio. The debt ratio compares a company's total debt to its total assets. A low percentage means that the company is less dependent on money borrowed from others. The long-term debt ratio represents the percentage of a corporation's assets that are financed with loans and financial obligations lasting more than one year. The credit debt ratio is the same ratio as the long-term debt ratio but it is the percentage of a corporation's assets that are financed with credits [3].

The Altman Z-Score was named after Edward Altman, the New York University professor who devised it in the 1960s. Altman Z- score is a statistical tool used to measure the likelihood that a company will go to the bankrupt. Altman developed the Z-Score after evaluating 66 companies, half of which had filed for bankruptcy between 1946 and 1965 [1]. He started out with 22 ratios classified into five categories (liquidity, profitability, leverage, solvency and activity) but eventually narrowed it down to five ratios. Altman's Z-Score determines how likely a company is to fail. This method distinguishes three specific types of companies but we choose one of them for our research. For “other companies”, the Z – Score model is calculated by using the updated formula from 1983 according to equation:

Z-Score = ([Working Capital / Total Assets] x 0.717) + ([Retained Earnings / Total Assets] x 0.847) + ([Operating

Earnings / Total Assets] x 3.107) + ([Book Value of Equity / Total Liabilities] x 0.420) + ([Sales / Total Assets] x 0.998)

Altman revised Z-Score formula for private companies in 2002. The private company version weights the variables differently and uses book value of equity in place of market capitalization. The first ratio is an indicator of a firm's ability to pay its short-term financial obligations. The second ratio measures cumulative profitability over time as a proportion of total assets. The third ratio is used for a measuring of efficiency in that it indicates how much cents the company generates in earnings for every one euro of assets it owns. The fourth ratio shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the assets and the firm becomes insolvent. The fifth ratio is an indicator of the efficiency with which a company is deploying its assets. The Z-Score is a commonly used metric with wide appeal, though it is just one of many credit scoring models in use today that essentially combine quantifiable financial indicators with a small number of variables in an attempt to predict whether a firm will fail. The resulting value of Z - Score for "other companies" means [7]:

if Z> 2,9 – *safety zone* – the financial situation of company is actually in good condition and financial difficulties are not expected even in the future;

if Z is from <1,21 ; 2,89> - *gray zone* of ambivalent results;

if Z < 1,2 – *crisis zone* – the financial situation in the company is bad and bankruptcy threatens.

3. FINANCIAL AND ECONOMIC ANALYSES THROUGH THE FINANCIAL INDICATORS

We used only indicators of liquidity and debt, because indicators of liquidity provide us the information about the company's ability to pay its obligations and indicators of debt examine and evaluate the structure of the financial resources in a company.

Table 1 Liquidity indicators of observed hospitals for years 2013 - 2014

LIQUDITY	L2	L2	L3	L3
HOSPITALS	**2013**	**2014**	**2013**	**2014**
University hospital in Martin	0,24	0,48	0,29	0,59
Hospital of Dolnáorava with policlinic MUDr. L. N. Jégé in Dolný Kubín	0,15	0,37	0,16	0,41
University hospital with policlinic in Žilina	0,17	0,63	0,19	0,70
Hospital of Kysuce with policlinic in Čadca	0,14	0,25	0,16	0,29
Hospital of Liptov with policlinic in Liptovský Mikuláš	0,12	0,28	0,14	0,32
Hospital of Hornáorava with policlinic in Trstená	0,33	1,13	0,37	1,27
Central military hospital in Ružomberok	0,48	0,20	0,51	0,23

Source: Own processing according to http://www.registeruz.sk/

Slovak hospitals have suffered from significant inability to pay their liabilities. The following table shows the evolution of debt indicators for the years 2013 to 2014.

The government of SR has dealt the problem of high debt in hospitals for several years. This fact is clear from the above table that this problem persists also in the monitored hospitals.

4. ALTMAN Z- SCORE USED IN OUR RESEARCH

In this paper we have done the research to the financial situation of selected hospitals. We focused on quantifying Z – Score of each hospital for years 2013 – 2014. In the table below there are the results from this research.

Table 3 Z – Score of selected hospitals from 2013

Hospital / Z - Score	Z – Score 2013	
University hospital in Martin	0,91	crisis zone
University hospital with policlinic in Žilina	0,69	crisis zone
Hospital of Dolnáorava with policlinic MUDr. L. N. Jége in Dolný Kubín	0,96	crisis zone
Hospital of Liptov with policlinic in Liptovský Mikuláš	0,22	crisis zone
Hospital of Hornáorava with policlinic in Trstrená	1,4	gray zone
Central military hospital in Ružomberok	0,59	crisis zone
Hospital of Kysuce with policlinic in Čadca	0,59	crisis zone

Source: Own research

Table 4 Z – Score of selected hospitals from 2014

Hospital / Z - Score	Z – Score 2014	
University hospital in Martin	1,00	crisis zone
University hospital with policlinic in Žilina	0,73	crisis zone
Hospital of Dolnáorava with policlinic MUDr. L. N. Jége in Dolný Kubín	0,72	crisis zone
Hospital of Liptov with policlinic in Liptovský Mikuláš	0,20	crisis zone
Hospital of Hornáorava with policlinic in Trstrená	1,48	gray zone
Central military hospital in Ružomberok	1,05	crisis zone
Hospital of Kysuce with policlinic in Čadca	0,7	crisis zone

Source: Own research

According to the results from Altman's Z – Score for other companies the individual hospitals have mostly placed in a crisis zone. This zone is characterized by poor financial situation in the company and threatened bankruptcy. Nevertheless, the Hornooravska hospital has placed in the gray zone, which is characterized by unstable financial situation with ambivalent results. The higher level of Z-Score of this hospital has been recorded through given subsidies from surrounding towns and Higher Territorial Unit. Central Military Hospital in Ružomberok reached the score approaching to the gray zone because this hospital became more financial resources from Ministry of Defense (about 8 million €), extra resources from Ministry of school education, science and research and sport and resources from own revenues. Hospital has started with a modernization of a building and effect of this step is energetic saving and cost saving. Altman accuracy of bankrupt predictions of companies using the index Z-score between 1-5 years before the bankruptcy shows the table 5.

Table 2 Indicators of debt of observed hospitals for years 2013-2014

DEBT	Debt Ratio	Debt Ratio	Long-term Debt Ratio	Long-term Debt Ratio	Credit Debt Ratio	Credit Debt Ratio
HOSPITALS	**2013**	**2014**	**2013**	**2014**	**2013**	**2014**
University hospital in Martin	92,33	105,29	0,19	0,13	0,00	0,00
Hospital of Dolnáorava with policlinic MUDr. L. N. Jégé in Dolný Kubín	123,09	105,63	0,19	0,11	0,00	0,00
University hospital with policlinic in Žilina	150,07	154,34	0,02	2,31	0,00	0,00
Hospital of Kysuce with policlinic in Čadca	128,85	111,26	4,49	2,76	0,00	0,00
Hospital of Liptov with policlinic in Liptovský Mikuláš	129,40	128,93	0,53	0,60	0,00	0,00
Hospital of Hornáorava with policlinic in Trstená	88,58	92,91	0,02	0,01	0,00	0,00
Central military hospital in Ružomberok	69,23	70,63	0,05	0,11	0,00	0,00

Source: Own processing according to http://www.registeruz.sk/

Table 5 The accuracy of Altman bankrupt prediction of companies

Number of years before the bankruptcy	Correct prediction (%)	Wrong prediction (%)	Correct prediction (%)
1	31	2	95
2	23	9	72
3	14	15	48
4	8	20	29
5	9	16	36

Source: Pollak H. 2003. Jak obnovit životaschopnost upadajících podniku.Praha : C. H. Beck

Since it is the hospital sector, which is supported by state subsidies, Z - score does not relevantly predict the probability of hospital's bankruptcy. In fact, if it was the business sector, the results could be interpreted differently.

5. CONCLUSION

The aim of this paper was to predict the development of financial and economic indicators of hospitals operating in Žilina region by using the selected prediction´s method performs the analysis, which uses indicators of liquidity, activity, profitability and debt. We used Altman's Z – Score which showed the financial situation of those hospitals with the inclusion in certain zones. We have reached following conclusions from our research:

1. It is confirmed that hospitals in Slovakia have a problem with their liquidity (the ability to pay own liabilities). This condition can be observed in the values of Quick Ratio (L_2) and Current Ratio (L_3). These indicators show no difference in level front the standpoint of the founder, whether hospital is managed by HTU or ministry. All subjects exhibited the low level of liquidity.
2. Slovakia has faced a longer time these issues like the inability of hospitals to pay its liabilities as well as the indebtedness hospitals. The steps of Slovak government for the progressive debt elimination of hospitals were not very successful. One of the reasons was the need to consolidate public expenditure, which leads to the suspension of funding for the debt elimination of hospitals [2]. In 2011 were provided 300 million € for the elimination of the debt in hospitals. The current debt of hospitals has climbed up to the value of 400 million €, which will be the required amount for the recovery of the health sector in Slovakia. From those calculations we suggest that all the observed hospital suffer from significant inability to pay their liabilities. The Slovak government solves this issue for several years, and its aim was the debt elimination of hospitals and their transformation into joint stock companies. This step, however, was suspended indefinitely, and also due to lack of funding in the state budget, since for the debt elimination of hospitals around 400 million € would be necessary, which currently a state budget does not have. The government of SR has dealt the problem of high debt in hospitals for several years. The government implemented some measures such as a maximum value of maturity of liabilities in hospitals on the level 60 days; streamline their operations, optimizing purchase of the material and many other measures. Currently, the debt of hospitals achieved 400 million €, although The Ministry of Health provided "cash injection" of over 300 million € in 2011. The government has considered the financial support for the health care but this support was stopped for a consolidation of the government spending. The hospitals recognized the values in the case of long-term debt ratio and credit debt ratio in range of mean values of financial indicators. Low long-term and credit debt ratio are caused by providing non-repayable financial support from the government, from the HRU (The Higher territorial unit) or from the European Union.
3. From Altman's Z – Score for other companies the individual hospitals have mostly placed in a crisis zone. This zone is characterized by poor financial situation in the company and threatened bankruptcy.

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