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## ALTMAN'S MODEL AS AN INSTRUMENT FOR THE EVALUATION OF THE FINANCIAL SITUATION OF THE ALMA MARKET S.A.

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### Summary:

This article is the result of empirical research on the use of Altman's model in assessing the financial position of companies. The aim of the study was to try to see the situation of the company Alma Market S.A. for symptoms suggestive of business failure. For a thorough analysis of the discriminative model was used. The calculated value of the function enabled the assessment of the condition of the body by classifying it into the group is not threatened by insolvency.

Key words: bankruptcy, crisis, discrimination analysis, model Altman.

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### INTRODUCTION

The object of the research is a company listed on the Stock Exchange in Warsaw. Research attempt to cover companies that according to the classification applied by the WSE are classified to the industry. The selection of

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objects in this regard has been made knowingly. In order to ensure the homogeneity of the test company account has been taken of the company present on the WSE in Warsaw in all the years of the period considered. Data for calculations are derived from the annual accounts of individual companies for the period 2008–2011, available in the Polish Monitor B below work posed the following research hypothesis: An Alma Market S.A. does not run the risk of bankruptcy in all the years of the period considered. As a method of research in the article you have selected Altman model, which was created with financial indicators, which are intended to show the status of the company and financial condition the period in question.

## 1. BANKRUPTCY OF THE COMPANY AND ITS PROCESS

The bankruptcy of the company you can considered in two aspects. The first is the legal aspect, the second is the economic aspect. From an economic point of view, the bankrupt is deemed to be an undertaking which is not in a position to pay its debts and the book value of its assets is not sufficient to cover all the obligations arising out of the establishment [Schwartz 2004: 3]. According to the definition of the firm failed is also considered an entity that, despite the fact that these arguments existed on operational activities.

Bankruptcy process does not occur all of a sudden, it is preceded by a prolonged crisis in the enterprise, which can be defined as a process of unplanned, that is, a string of events running at a given time that are a threat to the existence [Zimniewicz 1990: 223] of the company, but also prevent this existence. It should be noted that the crisis is a process. Companies acting in a constantly changing environment are exposed to external factors, which should be able to adapt, using internal resources in an appropriate manner. Incompetent use of their own resources and poor management leads to all sorts of deviations from the stated objectives.

Zimniewicz distinguishes four phases of the crisis: the potential crisis, the crisis hidden, acute phase and ending bankruptcy. In the initial phase, the potential crisis of the crisis do not see significant differences in the functioning of the undertaking arise only some deviations, which management may deal with in a timely fashion. The difficulties in identifying these deviations, inaction or incorrect action for their removal lead to instances of the hidden crisis. In this phase, there are already more likely to detect symptoms of the crisis in the company. Too slow or incompetent decisions over the use of their potential, in order to eliminate deviations may contribute to the onset of an acute crisis phase, which is the high point of the development of the crisis in the company. This is the period during which worsen and cumulative difficulty. Visible effects of the crisis are already, for example declining sales, increase in stocks of

products losing markets, increase the cost, unrealized financial tasks, etc. During this period, followed by the increasing impact of the destructive forces within the organization. Managers have to take difficult decisions in the short term, with the limited possibilities of choice of various variants. Poorly carried out sanitation companies leads to the end of its life, that is, achieving the fourth phase, which is called bankruptcy.

The life cycle is a sequence of stages, through which passes the majority of companies in the course of its existence. These stages are referred to differences both in terms of quantity as well as quality. They are stimulated by all kinds of internal and external forces. One of the phases of the life cycle is the phase of maturity. To a lesser extent managers take care of finding the way to the development of the company, however, focus more attention on maintaining stability. Begin to work on a routine basis according to specific standards of conduct. It happens that after a period of success in the market get the enthusiasm, and the Board is not in a position to objectively evaluate the prevailing situation.

The crisis causes the deterioration of the competitive position of the company and a decline in interest in his products, for example. as a result of the emergence of new substitutes or new products on the market, of inferior quality products. What is the consequence of the decrease in turnover. Changing one factor causes automatically change the next factor in the outcome, which followed by a deterioration of the situation in terms of both profitability and liquidity. Symptoms of depression can be identified as a result of permanent monitoring of financial and operational. It is on the basis of good economic analysis, which provides us with the necessary information of a measurable set, it can be concluded whether the situation has improved in the company, or worse and in which areas for any problem. The main determinant of the crisis in its initial phase is the presence of declining share of sales in the market, which is caused in many cases by the lack of marketing strategy and marketing research is carried out [Wawrzyniak 1999: 75–79].

Following symptoms appear later, particularly those of a financial nature. Reduction in income affects in a negative way on the evolution of financial revenue, which in turn causes problems with regulating the obligations on time. In view of the increasing demand for cash. Attempts to raise capital as a result of the drawdown, the increased interest expenses or the impossibility of its acquisition can help at a later stage of the crisis to the disposal of stocks at lower prices, then to the selling off of assets. If this process is not interrupted it at the end of the chain, there is a problem of insolvency, which is one of the grounds for declaration of bankruptcy. On the basis of the above reasoning, you will notice that an instance of one symptom implies the emergence of the next. The main management staff cues about the deteriorating situation of the company

come from the financial sphere. It is easy for them to identify, since they are continuous and measurable [Prusak 2008: 5].

An important obstacle to restructuring actions, when the first symptoms, it is fear of losing their own jobs. However, excessive extension of this state of affairs can lead to the deterioration of the financial situation of the company and consequently to the bankruptcy. As far as symptoms of the crisis in the financial sphere is relatively easy to identify so much more difficult to identify are the symptoms of a chart or behavior change, especially in the early stages of the crisis, and these may be the original cause of formation of undesirable consequences [Zelek and Gwarek 2000: 53].

One of the signals of a crisis in the company are deteriorating relations between managers or owners of the company. This ends up, in many cases, the change in the composition of the Board of directors or persons responsible for the financial results. Problems among the executives reflect negatively on the enthusiasm of employees lower levels. Displaying all sorts of interest groups, which are trying to reach its own goal, at the expense of other groups or individuals. This leads to the formation of the inter-group conflict. In the extreme case, where the company has liquidity difficulties and do not pay salaries to staff at the time, this situation could escalate into a conflict between employees and managers of the persons, who often ends the strike of workers. The strike is something wrong, what might happen to the company, in a difficult period of activity, as it worsens even more bad situation.

The company at the time of entering a phase of crisis are usually transformed, i.e. are characterized by a high degree of bureaucracy, operate on a routine basis according to predetermined rules of conduct. In addition, the longer the way information flows from the higher levels to lower, and vice versa. More difficult is direct and quick response to market signals as a result of what emerging opportunities are not used, and negative signals are received of late.

## 2. THE BASIC MODEL ALTMAN AND ITS MODIFICATIONS

E. I. Altman is a forerunner in the use of multidimensional discrimination analysis to prediction of bankruptcy. In 1968, E. I. Altman built the model Z-score or so called Z-score predictor bankruptcy, in the construction, which took advantage of the financial data company whose US 66 33 fell and 33 were on the market. The company analyzed were selected in terms of the industry and the value of the balance sheet total. In the course of his research E. I. Altman modified the original system can be found in the literature, hence the different characters of the model, which are characterized by different weights and threshold values. The following presented to the first form of the model and its

subsequent improvements, which Altman distinguished in the basis of its original model.

The original form of the model was the following form [Rogowski 1999: 66]:

$$Z = 1,2 \times X_1 + 1,4 \times X_2 + 3,3 \times X_3 + 0,6 \times X_4 + 1,0 \times X_5$$

where:

- $X_1$  – working capital/total assets,
- $X_2$  – retained earnings/total assets,
- $X_3$  – profit or loss before taxes and payment of interest/total assets,
- $X_4$  – market value of equity/total liabilities,
- $X_5$  – revenue from sales/total assets.

The size limit of the indicator for the first model E. I. Altman is 2,675 it means that the pointer below this value can indicate a serious risk of bankruptcy of the company. Studies have shown that among companies that fallen 94% one year before filing for bankruptcy was characterized by a rate below 1.80, and 97% of the enterprises that have not fallen above that level. As a result of further research, the author has in fact further limits: 1.8 and 3.0. On that basis, adopted the following guidelines for the classification of enterprises, which have been presented in tab. 1.

Table 1. Criteria for classifying enterprises for the first model E. I. Altman

The value of the pointer to the	The probability of bankruptcy
1,80 or less	very high
1,81–2,99	unspecified
3,00 and more	slight

Source: Stasiewski [1996: 630].

The point separating the company at risk of bankruptcy of companies not facing bankruptcy is the value of 2.675, which is characterized by the smallest error (5%) to classify businesses. On the basis of tests carried out in the United States was relatively high efficiency of the system in the following years: 95% accurate predictions of the collapse of the company in the event of bankruptcy prediction of the year ahead, 72% accurate predictions in the case of a two-year lead time, 29% accurate predictions from a four-year in advance, and 36% accurate predictions from the five-year period in advance.

Further studies conducted in 1977, Altman with Haldeman and Narayanan. Studies were subjected to 58 companies qualified as not bankrupt and

53 companies recognized as bankrupts. The main change in relation to the first model was the inclusion of the obligations of capitalized interest, the appointment of the seven variables and the failure to specify weights, and thus has not been determined discriminant function.

In the course of these studies has been designated the following variables [Rogowski 1999: 66]:

- $X_1$  – profit after taxation/total assets,
- $X_2$  – stability of income (measured deviation from the initial value),
- $X_3$  – interest/profit or loss before paying interest and taxes,
- $X_4$  – retained earnings/total assets,
- $X_5$  – current assets/current liabilities,
- $X_6$  – capital stock/total capital,
- $X_7$  – capital stock/total assets.

This system was characterized by a high value of prognostic for a period of five years prior to the bankruptcy of the company. One year before the fall of the relevance of the company amounted to 96%, five years before the bankruptcy was relevance at the level of 70% [Rogowski 1999: 67].

In 1983, E. I. Altman developed the next versions of unquoted companies. In this system changed the weighting of individual indicators, with basically the same choice and construction of the individual indicators. A small change was replacing the fourth indicator from the first model ( $X_4$  = market value of equity/total liabilities), the  $X_4$  = book value of ordinary shares and preference/book value total liabilities. A new feature developed by discriminatory Altman took the following form [Rogowski 1999:67].

$$Z = 0,717 \times X_1 + 0,847 \times X_2 + 3,107 \times X_3 + 0,420 \times X_4 + 0,998 \times X_5$$

where:

- $X_1$  – working capital/total assets,
- $X_2$  – retained earnings/total assets,
- $X_3$  – profit or loss retained earnings s before taxes and payment of interest/total assets,
- $X_4$  – book value of ordinary shares and preference/book value total liabilities,
- $X_5$  – revenue from sales/total assets.

Changing the weights and the fourth indicator forced change limits developed a system which shows the tab. 2.

Table 2. Criteria for classifying enterprises for the second model E. I. Altman

Value of the indicator Z	The probability of bankruptcy
1,20 or less	very high
1,21–2,89	unspecified
2,90 and more	small

Source: Stasiewski [1996: 630].

In the case of the newly designated discriminatory function and changed limits error estimate was determined at the level of 6% [Rogowski 1999: 66].

When you build a new system allowing to predict the bankruptcy of companies Altman sought to minimize the impact of the downturn and the specifics of the industry in which the company operates. The result of this process of thinking was to eliminate the discriminatory index  $X_5$  – revenue from sales/total assets it is the rotation rate of the asset. As justification for the rejection of the rotation rate of the assets Altman gave the fact that fifth index depends on the level of sales, that the undertakings which are the subject of parent holding company may be relatively small compared to the assets, because the sale is carried out usually by subsidiaries, which translates to lower the value of the index. Consequently, this could destabilize the value of discriminatory and indicate a high likelihood of the collapse of the company. The fourth model Altman after elimination of the fifth has the following form:

$$Z = 3,25 + 6,56 \times X_1 + 3,26 \times X_2 + 6,72 \times X_3 + 1,05 \times X_4$$

where:

- $X_1$  – working capital/total assets,
- $X_2$  – retained earnings/total assets,
- $X_3$  – profit or loss before taxes and payment of interest/total assets,
- $X_4$  – book value of ordinary shares and preference/book value total liabilities.

The limit values for the third Altman model were presented in tab. 3.

Table 3. Criteria for classifying enterprises for the third model E. I. Altman

Value of the indicator Z	The probability of bankruptcy
1,10 or less	very high
1,11–2,59	unspecified
2,60 or more	small

Source: Rogowski [1999: 65].

In the course of his research Altman estimated the two types of errors that may be charged to the calculated indicator functions of discrimination.

The first type of error determines the probability that the result of applying the model of the company is qualified for companies with good financial condition, and in fact would collapse. The second type of error is the probability that the result of applying the discriminatory features of the estimated the company will be certified for firms in difficulty bankruptcy in fact work without obstacles.

In the case of the first model Altman – the first type of error was set at the level of 6%, and the error of the second kind at the level of 3%.

### 3. ANALYSIS OF COMPANIES ALMA MARKET S.A. USING ALTMAN MODEL

The article will be used for the last model Altman. This model has undergone many improvements to better inform about the possibility of business failure. This section will be presented with the data needed to calculate specific indicators that make up the model discrimination. Fig. 1 illustrates the working capital in the company of Alma Market S.A. in 2008–2011.

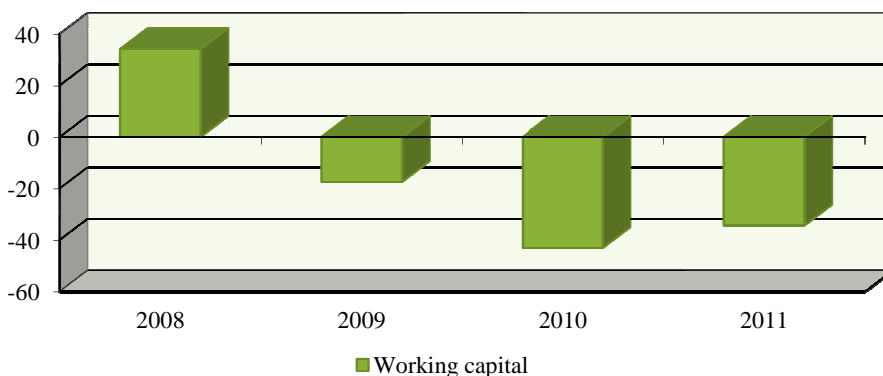


Figure 1. Working capital Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

On the basis of the above data, we can determine that the working capital, which consists of the difference between the assets and short-term liabilities, throughout the period these values ranged. In 2008, the value of working capital had a positive value, and from 2009 to 2011, these values were negative. The highest value of this index was in 2008 and amounted to more than 34,1 million PLN. The lowest value we can see in 2010 and amounts to 17,498 million PLN.



Positive working capital means that the company's solvency margin for solvency needs. Capital fixed (except for fixed assets) is funding part of the financial assets. Negative working capital means that the company has more liabilities than to cover them. Fig. 2 shows the total assets in the enterprise Alma Market S.A. in 2008–2011.

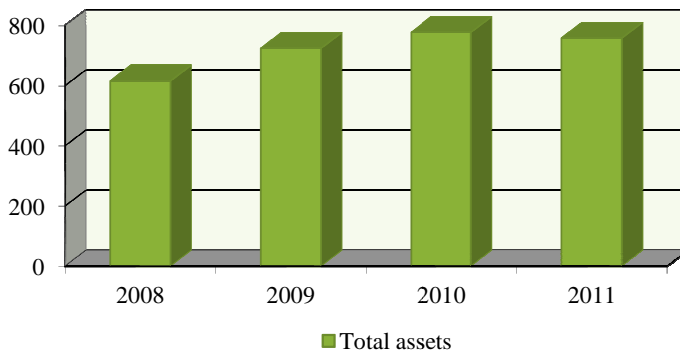


Figure 2. Total assets Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

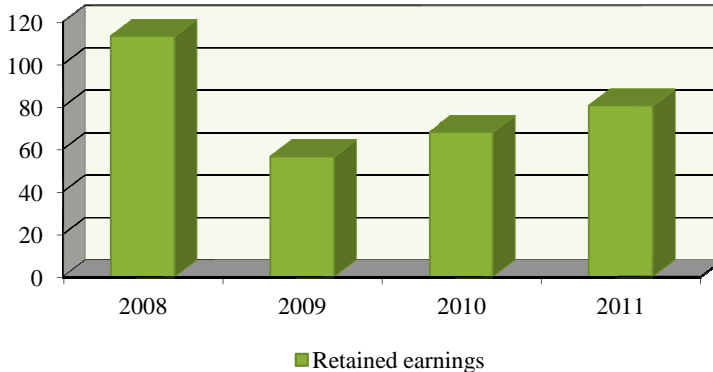


Figure 3. Retained earnings Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

Presented statistical data allow us to that total assets from 2008 to 2010, with the trend rising. In 2011 compared to 2010 there has been a decline in the value of more than 18 million PLN. The largest value of the balance sheet was in 2010 and amounted to more than 776,575 million PLN. In 2009 compared to 2008, we can notice an increase of more than 108,490 million PLN. In 2010,

there was already a smaller gain in that component, namely by more than 53 million PLN. Figure 3 shows the retained earnings in the enterprise Alma Market S.A. in the years 2008–2011.

Analyzing financial statements companies Alma Market S.A. we can see that the retained earnings we can calculate as the difference between the net profit and a dividend. We note also that the retained earnings at first period was marked by a downward trend, and from 2009 to 2011, the trend of increasing. The greatest value we can observe in the year 2008 and was she over 113,264 million PLN. The minimum value was in 2009 and amounted to over 56,570 million PLN. In 2009 compared to 2008, we can observe a decrease in retained earnings of more than 56,694 million PLN. In 2010 compared to 2009, we can see an increase of nearly 12 million PLN. In 2011 compared to 2010 also we conclude on the basis of the figure above an increase of more than 12 million PLN. Retained earnings of the ability of the operator to be self-financing. Is a component of the equity capital of the company. The difference lies in the fact that, in contrast to the capital, which has a long-term character and static, the amount of retained earnings, shows the contribution of the owners of capital growth of the company. It should be noted that the source is subject to a relatively large fluctuations, along with the size of the company sales and economic results. Manipulation of him should be cautious, since leaving a large profit retained in the company limits the possibility of payment of dividends. Incompetent conduct of the funding policy for may, therefore, significantly affect the marketability of the action the next time and the behavior of the shareholders having an impact on the company. Fig. 4 shows the profit or loss before taxes and payment of interest in the enterprise Alma Market S.A. in the years 2008–2011.

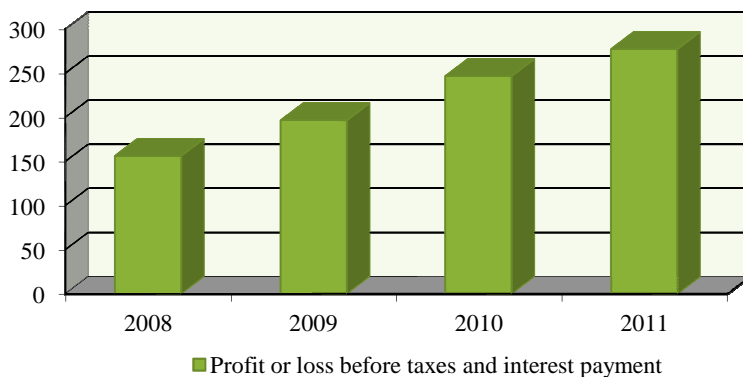


Figure 4. Profit or loss before taxes and interest payment Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

Profit or loss before taxes and payment of interest we can calculate, as gross profit minus interest paid. From the data presented above we can deduce that the profit or loss before taxes and payment of interest during the whole period was characterized by the growing trend. The greatest value we can observe in 2011, was she more than 277,302 million PLN, the smallest in 2008 and it is more than 156,325 million PLN. In 2009 compared to 2008, the value of this component has increased by more than 40 million PLN. In 2010 compared to 2009, we can notice an increase of more than 50 million PLN. In 2011 compared to 2010, we see an increase of more than 30 million PLN. The growing trend means that the company's revenues began to rise in relation to the costs and obligations. This demonstrates the efficiency and improvement of sales under staffed financial health to the company discussed below. Figure 5 shows the accounts the value of ordinary shares and preference in Alma Market S.A. in the years 2008–2011.

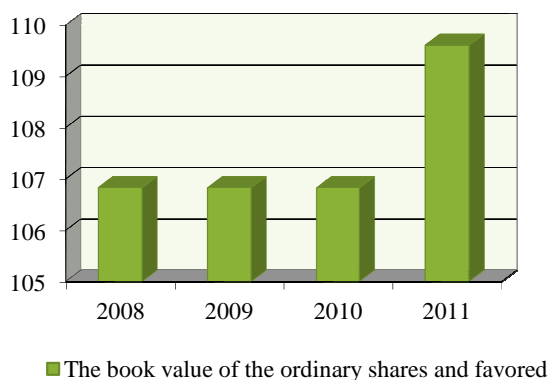


Figure 5. The book value of the ordinary shares and favored Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

The book value of the common stock and preferred stock in the first 3 years during the period had almost identical level. In 2009 and 2010, these values were identical and were 106,826 million PLN, this was the lowest value in the whole period. Comparing these two years to 2009, this value decreased only 5 thousand PLN. Best value posting of ordinary shares and preference was in 2011 and was more than a 109,606 million PLN, almost 3 million PLN more than in 2009 and 2010. The higher the value of the shares the better, it means that the company is of great importance among investors and customers. Gaining additional profits from the issue of its shares. Figure 6 shows the value of the company's total liabilities book Alma Market S.A. for the years 2008–2011.

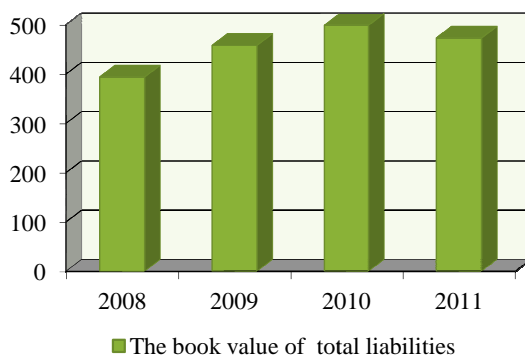


Figure 6. The book value of total liabilities Alma Market S.A. in 2008–2011 (million PLN)

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011.

According to the data contained in the reports of the book value of total liabilities, for 2010 to grow, and in 2011 we can observe a decrease this value. The smallest book value those commitments, we can notice in 2008 and amounted to over 394,051 million PLN. However, the greatest value of this component was in 2010 and amounted to nearly 500 million PLN. In 2009 compared to 2008, the value of the liabilities has increased more than 64 million PLN. In 2010 compared to 2009, this value has increased by more than 40 million PLN. In 2011 compared to 2010 the book value of total liabilities decreased by more than 25 million PLN. This amount of liabilities may indicate an aggressive strategy used by Alma Market S.A.

On the basis of the above data, we can calculate the indicators needed us to Altman's model for evaluation of bankruptcy. In tab. 4 presents the indicators in different years calculated for Alma Market S.A.

Table 4. Pointers in Alma Market S.A. for the years 2008–2011

Indicators	2008	2009	2010	2011
Working capital/total assets $\times 6.56$	0,363508	-0,64794	-0,36457	-0,29793
Retained earnings/total assets $\times 3.26$	0,600019	0,254766	0,285706	0,346416
Profit or loss before taxes and interest payments/total assets $\times 6.72$	1,707076	1,825512	2,13472	2,458406
The book value of ordinary shares and preference/value book total liabilities $\times 1.05$	0,284665	0,24483	0,224805	0,243186

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011 and Altman model.

Table 5 shows the value of the indicator in the enterprise Alma Market S.A. in the years 2008–2011.

Table 5. The indicator Z in the Alma Market S.A. in the years 2008–2011

Specification	2008	2009	2010	2011
Together Z in the enterprise $Z = 3,25 + 6,56 \times X_1 + 3,26 \times X_2 + 6,72 \times X_3 + 1,05 \times X_4$	6,21	4,93	5,53	6,00

Source: own calculations based on financial statements Alma Market S.A. from the years 2008–2011 and Altman model.

On the basis of tab. 5, which is the final result the indication Z for Altman's model, for the assessment of the financial situation, we can conclude that in the enterprise Alma Market S.A. is a small possibility of bankruptcy. Throughout the period, the level of this indicator was higher than 2,60, and therefore the possibility of bankruptcy, we can rule out according to the theory of Altman. The lowest level of this indicator was in 2009, and it was 4, 93, and the biggest and the best, in which we can avoid bankruptcy was 2008 where the level of this indicator was 6,21.

## CONCLUSION

Using a set of standard financial statements, you can designate a large number of economic and financial indicators that show the condition of the company. A large number of indicators gives a lot of opportunities to assess the health of the company. However, there is a risk of introduction of information chaos, which instead help in the assessment of the economic and social situation of the firm may make it harder for making analyses. Comes with the help of LDA, which is becoming more and more popular method to synthetic evaluation of the financial health of enterprises on the basis of the available financial statements. It not only allows for the simultaneous and consistent use, at least a couple of economic and financial information, but also takes into account the ability of certain indicators of financial and economic bankruptcy predictor. The essence of this method involves applying a discriminatory function linear, often called discriminatory model. The calculated value to the total health assessment by subject classification of it to one of two groups, businesses operating without any visible signs of problems in the economic sphere or at risk of bankruptcy. The main objective of the article was reached to Alma Market S.A. not threatened bankruptcy in the test for years to come. The article has been following the research hypothesis: An Alma Market S.A. does

not run the risk of bankruptcy in all the years of the period considered. This hypothesis is confirmed, because throughout the period, the level of this indicator was higher than Altman's equation, and therefore we can bankruptcy 2,60 except in accordance with the theory of Altman.

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