Прогнозирование банкротства бизнеса на основе модели Z-Альтмана на примере двух конкурирующих фирм: Adidas и Nike

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Аннотация

В данной статье раскрывается вопрос прогнозирования банкротства на примере использования Z-модели для двух фирм-соперников: Nike и Adidas. В текущий год, осложненный ситуацией с Covid-19, особенно важно правильно инвестировать свои средства в те компании, которые имеют стабильное финансовое положение, которое можно узнать с помощью модели Альтмана. После расчета модели для двух компаний, сравниваются их результаты и выносится предположение об инвестировании.

Ключевые слова: банкротство, инвестиции, Z-модель Аьтмана, Nike, Adidas.

Predicting business bankruptcy based on the Z-Altman model using the example of two competing firms: Adidas and Nike

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Abstract

This article reveals the issue of predicting bankruptcy on the example of using the Z-model for two rival firms: Nike and Adidas. In the current year, complicated by the situation with Covid-19, it is especially important to invest correctly in those companies that have a stable financial position, which can be found using the Altman model. After calculating the model for two companies, their results are compared, and an investment assumption is made.

Keywords: bankruptcy, investment, Atman Z-model, Nike, Adidas.

In this year, when the whole world is under the influence of Covid-19, the global economy is storming, and small and medium-sized businesses suffer huge losses and are closed, the issue of adequate investment is especially relevant, which can only be made on the basis of a multilateral analysis of the companies where you are going invest. In particular, one of the important factors for

analysis is forecasting business bankruptcy. Such forecasting can be built on the basis of the Z-Altman integral model.

So, what exactly is the Z-Altman model? This is a model showing the possibility of bankruptcy of a company, which was first presented in 1968 by the American economist Edward Altman, compiled from the analysis of data from 66 firms, half of which went bankrupt, and the other half continued to operate. The Altman index not only makes it possible to recognize future bankrupt companies, but also assesses the financial stability of the business, the work of the organization's management and allows you to compare any business with each other, regardless of its scope and size.

So, there are quite a lot of variations of the Z-Altman model. However, in my forecast, I will use the second type of model, the five-factor model. The main selection criterion was that this model is suitable for large companies that trade on the market, such as Adidas and Nike.

1)   Two-factor model is the simplest method of assessing bankruptcy, taking into account only 2 ratios: current liquidity and the weight of borrowed funds in the company's liabilities [1, p. 7]

$Z = -0.3877 - 1.073*X_1 + 0.0579*X_2$,

Where X_1 is the liquidity ratio,

X_2 - capitalization ratio = (Long-term liabilities + Short-term liabilities) / Equity

If Z <0, the probability of bankruptcy is less than 50% and the probability decreases with decreasing Z-model result.

If Z> 0, the probability of bankruptcy is more than 50% and increases with the increase in the value of the Z model.

If Z = 0, the probability of bankruptcy is 50%.

2)   Five-factor Z-model for those companies whose shares are traded on the market:

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

$$X_1 = \frac{Working\ capital}{Assets}$$

$$X_2 = \frac{Retained\ earnings}{Assets}$$

$$X_3 = \frac{EBIT}{Assets}$$

$$X_4 = \frac{Market\ capitalization}{Total\ Liabilities}$$

$$X_5 = \frac{Sales}{Assets}$$

After calculating the coefficients, we compare the results:

If Z> 2.9, the business is included in the "green" zone, i.e. financial stability zone

If 1.8 <Z <2.9 - the company is in the zone of uncertainty or "gray" zone

If Z <1.8 is a rather bright marker of the "red" zone-zone of financial risk for the company

If we consider the bankruptcy forecasting model within 1 year, then its probability is 95%, but if the forecasting horizon is 2 years, then the probability decreases to 83%.

3) There is also a five-factor model for those companies whose shares are not traded on the exchange.

4) Particular attention can be paid to the four-factor model for non-manufacturing companies, which can help in assessing the financial soundness of banks.

5) If we consider companies from developing economies (which includes Russia), then it is best to use a specially adjusted model for this type of markets.

6) The seven-factor Z-model makes it possible to predict bankruptcy over the horizon of 5 years with a probability of 70%. However, at the moment such a model has not been fully published and is a trade secret, since it is used only by Zeta Services Incorporated in its consulting calculations.

To assess the state of the company during the formation of an investment portfolio, investors also take into account the place of the company in credit ratings, for example, such as Moody's and S&P. A similar assessment can also be made based on the analysis of the Altman model, the results of which correlate with credit ratings: the higher the results of the Z-model, the better the credit rating of the company [2, p. 7].

So let's begin our analysis of two rival companies: Nike and Adidas. Which of them has the best financial position in the current and future market?

Let's start with Adidas. Adidas is a German industrial company founded in 1948 by Adolf Dassler, specializing in sports shoes, apparel and other sports products. At the moment, Adidas is the largest sportswear company in Europe, competing with the American corporation Nike, which ranks 1st in the world.

The largest sports shoe and apparel company in the world is the American company Nike. This company was founded by Phil Knight and Bill Bowerman in 1964 and was originally called Blue Ribbon Sports. The company acquired its famous name only in 1978. The original idea of the business was to coordinate orders for the production of sneakers in Asian countries and their further sale in the United States. The company released its first sneakers in 1971, featuring a waffle-shaped sole, the design of which one of the founders, Bowerman, drew from his own kitchen when he saw his wife's waffle iron.

Today Nike owns about 62% of the sporting goods market, while Adidas only 5%. Unlike Adidas, Nike Corporation does not spend a lot of money on promoting its brand and advertising, as thanks to its simple and concise logo it is widely recognized throughout the world.

To start analysing bankruptcy, you need to get the financial data of the company from their annual reports.

Table 1. Calculation of the Altman Five-Factor Z-Model for Adidas (in million USD)

	2016	**2017**	**2018**	**2019**
Working Capital	2347,099	2660,73	3518,2	4797,44
Total Assets	16793,76	16414,2	18437,8	23186,4
Retained Earnings	6190,1	7093,8	6787,7	7349,5
EBIT	1765,8	2443	2761,1	2868
Market capitalization	33769,61	40215,7	42359,8	63674,4
Total Liabilities	18226,4	17440,9	10607,5	15273
Sales	20630,7	25041,5	25864,1	26505,2
X1	0,13976018	0,1621	0,19081	0,20691
X2	0,36859524	0,43217	0,36814	0,31697
X3	0,1051462	0,14883	0,14975	0,12369
X4	1,85278552	2,30583	3,99338	4,16908
X5	1,22847415	1,5256	1,40278	1,14314
Z model	3,37087347	4,19981	5,03736	4,74483

Let's see an example of a calculation based on 2019:

$$X_1 = \frac{4797,4412}{23186,4} = 0,20691$$

$$X_2 = \frac{7349,5}{23186,4} = 0,317$$

$$X_3 = \frac{2868}{23186,4} = 0,1237$$

$$X_4 = \frac{63674,37}{15273,0} = 4,17$$

$$X_5 = \frac{26502,5}{23186,4} = 1,143$$

$Z_{2019}=1,2*0,2069+1,4*0,317+3,3*0,1237+0,6*4,17+1,143=0,24828+0,4438+0,40821+2,502=4,74483$

After all the calculations, you can see that over the past four years (2016-2019), the coefficient at Adidas has been consistently more than 2.9, which can be interpreted as a successful company policy and a stable future without bankruptcy.

Pic. 1. Z-model for Adidas

If you look at the dynamics of the Altman coefficient for this company, you can see an increase in values from 2016 to 2018, which positively describes the company's behavior. Only in 2019 can we see a 5.8% decrease in the ratio compared to the previous 2018.

Summing up the change in position of Adidas in 4 years, the results have increased by almost 41%, which is a rather good result.

However, if you look at the results in absolute terms, the coefficient is more than 2.9 every year. That is, with a probability of 95%, the company will not go bankrupt within a year and you can invest in it.

A comparative analysis of the final results of Nike shows that over 4 years the company worsened its results by 16.4%, which is quite significant.

Comparing these 2 competing sports corporations, you can see more stability and growth with Adidas than Nike. However, the absolute values of each year of Nike's business are almost 2 times higher than those of Adidas for the same years. As a result, Nike retains its leading position by a wide margin from the German concern and by an even wider margin from the lower limit of the "green zone" in the Z-model.

Thus, after evaluating the two companies using the Altman model, it can be concluded that bankruptcy of these two sports companies is not expected. However, if you are a risk-averse investor, then it would be preferable for you to invest in Nike assets, as they are more reliable.

Today the brand owns companies such as Reebok, Rockport, which specializes in classic and casual shoes, CCM, which manufactures hockey equipment, and Taylor Made Golf, which specializes in golf equipment.

Table 2. Calculation of Altman's Five-Factor Z-Model for Nike (in million USD)

	2016	**2017**	**2018**	**2019**
Working Capital	9667	10587	9094	8659
Total assets	21379	23259	22536	23717
Retained Earnings	6899	6907	3517	1643
EBIT	4642	4945	4379	4850
Market capitalization	92867	87084	114983	120951
Total liabilities	9121	10852	12724	14677
Sales	32376	34350	36397	39117
X_1	0,45217269	0,45518	0,40353	0,3651
X_2	0,32269985	0,29696	0,15606	0,06928
X_3	0,21712896	0,21261	0,19431	0,20449
X_4	10,1816687	8,0247	9,0367	8,24085
X_5	1,51438327	1,47685	1,61506	1,64932
Z model	9,33429706	7,95522	8,38103	7,80377

The results of the calculations of the Z-model for Nike are rather heterogeneous and fluctuate over the entire research horizon. For a visual display, I will build a graph:

Pic. 2. Z-model for Nike

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Pic. 3. Comparison of Nike and Adidas by Z-model

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