Evaluation of financial failure of healthcare companies traded in BIST with Fulmer H and Springate S Score Models

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Abstract

According to modern finance principles, financial failure occurs when companies fail to meet their obligations regarding assets and liabilities. Determining the financial performance of health companies traded on the BIST will ensure that health expenditures that concern the entire society are transferred to appropriate areas with maximum social benefit. This study evaluates whether companies operating in the health field and whose shares are traded in BIST carry the risk of financial failure. For this purpose, financial risk situations were examined with Fulmer H and Springate S score models using the financial statement data of 8 companies in the BIST100 index over the period 2019–2022. The results show that all but one of the health companies traded on the BIST are not facing financial failure.

BİST'te işlem gören sağlık şirketlerinin finansal başarısızlığının Fulmer H ve Springate S Skor Modelleri ile değerlendirilmesi

Öz

Modern finans ilkelerine göre, finansal başarısızlık şirketlerin varlıkları ve borçlarıyla ilgili yükümlülüklerini yerine getirememesiyle başlar. BİST'te işlem gören sağlık şirketlerinin finansal performanslarının belirlenmesi toplumun tamamını ilgilendiren sağlık harcamalarının, maksimum sosyal fayda gözetilerek, uygun alanlara aktarılmasını sağlayacaktır. Bu çalışma, sağlık alanında faaliyet gösteren ve BİST'te hisseleri işlem gören şirketlerin finansal başarısızlık riski taşıyıp taşımadıklarını değerlendirmektedir. Bu amaca yönelik olarak, BİST100 endeksinde yer alan 8 şirketin 2019-2022 dönemindeki finansal tablo verileri kullanılarak Fulmer H ve Springate S skor modelleri ile finansal risk durumları incelenmiştir. Çalışmanın sonuçları, BİST'te işlem gören sağlık şirketlerinden biri hariç diğerlerinin finansal başarısızlık ile karşı karşıya olmadıklarını göstermektedir.

Introduction

The risk of financial failure arises due to the fact that companies cannot obtain the desired amount of profit from their commercial activities and assets, that they do not have sufficient capital to tolerate the loss, that their managers do not have sufficient information, that a strategic plan is not prepared in line with new developments, and that there is a lack of supervision. This process can lead companies into bankruptcy. Bankruptcy risk, on the other hand, is the situation in which companies' capital is insufficient and they are legally incapacitated in the face of unexpected value losses in their assets (Kalyoncu, 2013).

Since the first study of bankruptcy forecasting, companies' bankruptcy forecasting studies have been an area of interest. Anticipating the possible risk of bankruptcy or financial failure that companies may face is of great importance because it negatively affects investors, businesses, and indirectly the entire financial environment (Ural, 2020).

Considering that financial management is equivalent to the survival of health companies, factors such as the growth of companies, new services, and new market studies, the increase in expenditures for meeting the managerial needs of companies and developing new products, prioritizing economic growth, their tendency to merge, and the increase in their tendency to buy or sell some or all of them have affected the development of health companies. (Akbulut, Göktaş, Ağırbaş, Uğurluoğlu Aldoğan and Doğanay Payzıner, 2013).

Financial managers in healthcare companies have a lot of responsibilities, as the financial failure of healthcare companies can directly impact overall healthcare delivery. Financial failure estimations to be made in businesses in the health sector, which has an extremely dynamic structure, will guide health company managers in making investment decisions for health services. In this direction, in this study, financial failure estimations of companies in the BIST100 index operating in the field of health have been made. Fulmer H and Springate S Score methods, which are among the most preferred discriminant methods in the literature, were used in the evaluation made by accessing the financial statements of the companies between the years 2019 and 2022 via the Public Disclosure Platform. Thus, an evaluation was made of the situation of health companies facing the risk of bankruptcy.

The study consists of four parts. In the first part, information about the managerial needs of health companies, financial failure prediction, and bankruptcy risk is given; in the second part, a conceptual framework is created about financial failure; and in the third part, financial failure estimation is made by using Fulmer H and Springate Score methods by considering some financial ratios of companies over the years. Finally, the results obtained in the conclusion section were interpreted together with the results of similar studies.

1. Literature

It has been seen that the majority of the research in the field of financial performance in health care businesses is on issues such as financial analysis (Ercan, 2013; Alparslan, Gençtürk & Özgülbaş, 2015; Ayanoğlu, Atan & Beylik, 2010; Aydemir, 2018), financial performance (Çam, 2016; Korkmaz & Güney, 2013), bankruptcy risk (Işık, 2020; Karasu, 2009), cost effectiveness and financial failure estimation applications (Bağcı & Sağlam, 2020; Civan & Dayı, 2014; Tarcan, 2010). Below are summaries of a few studies on financial failure that have been published in the literature.

Medetoğlu and Uçar (2023) used Springate S and Fulmer H Score models for the financial failure status of 23 businesses operating in the BIST Textile, Clothing, and Leather Sector between the years 2017 and 2021. As a result of the study, they reached the conclusion that the financial failure risk of the related sector is high and that the sector has a fragile structure in accordance with the literature.

Kendirli and Çıtak (2022) estimated financial failures for 15 companies using the Altman Z Score model, using the balance sheets and income statements of companies operating in the forest, paper, and printing sector in Borsa Istanbul between the years 2016-2020. Following the research, it was found that 5 companies do not have a significant danger of bankruptcy, 7 companies do, and the financial health of the other 3 enterprises is unknown.

Bağcı and Sağlam (2020) examined whether businesses operating in the health and sports sectors in the BIST carry the risk of financial failure with Altman Z, Springate S, and Fulmer H score models. In the study, including 4 sports and 2 health enterprises, financial failure estimations for 6 enterprises were made in the years 2014–2018. When Altman Z scores are examined in general, it is seen that sports enterprises carry the risk of financial failure and their financial situation is bad in all years, while health enterprises carry the risk of financial failure in only two years and financial failure assessment cannot be made in other years. When the Springate Model is examined, it has been determined that the financial structures of sports businesses are weak and they may face the risk of bankruptcy; however, it has been determined that health enterprises have strong financial structures and do not have the risk of bankruptcy, even if they are successful. According to the Fulmer Model, while it was determined that the financial performance of health enterprises was good and their financial structure was successful, it was

seen that some of the sports enterprises could not be commented on and that the sports enterprises that could be commented on did not carry the risk of bankruptcy, even if they were financially successful. All these analyses, including the financial failure results of health and sports businesses, have revealed that the financial structures of sports businesses are bad and that they can face the danger of bankruptcy at any time. On the other hand, it has been found that health enterprises are in good financial condition and do not carry the risk of financial failure.

Ananto, Sriyunianti and Ferdawati (2020), used the Fulmer method to detect financial distress in the 2014–2018 period of PT Semen Padang. As a result, they concluded that there was no risk of financial failure.

Karadeniz and Öcek (2019) first determined the financial failure risks of tourism businesses listed on Borsa Istanbul between 2012 and 2017 according to the Altman Z Score model and then measured the difference between the financial status of the businesses with the Mann Whitney U Test. As a result of the analysis made during the specified period, it was determined that 29 of the enterprises showed a risk of failure, 29 of them did not have any risk, and 8 of them were in the grey zone. They discovered that the businesses whose liquidity, profitability, market performance, and financial structure were assessed differed statistically significantly in terms of profitability. They found that the ratio of cost of sales to net sales did not show a statistically significant difference between businesses.

Kürklü and Türk (2017) compared the financial status of 7 sectors traded in BIST-100 with the help of Springate and Altman Z Score Models. In conclusion, it was concluded that 51 of 166 companies failed in financial evaluation according to the Altman Z Score Model and 71 according to the Springate Model.

Mizdraković, Knežević and Stanić (2015), Altman Z Score, Altman Z' Score, M Score, Kralicek's DF score models examined the financial failure of businesses in Serbia. It was concluded that it was not financially successful.

In the estimation of financial failure, or, in other words, in failure prevention models, financial ratios are generally used as a variable. As a method, many methods such as discriminant analysis, probit model, multiple regression, logistic regression, case-based reasoning, clustering methods, support vector machines from supervised learning methods, and fuzzy logic algorithms are used (Altman, 1968; Karbhari & Sori, 2007; Li & Sun, 2013; Bağcı E, 2015; Erol Fidan, 2021; Lifschutz & Jacobi, 2010; Grice & Ingram, 2001; Büyükarıkan & Büyükarıkan, 2014; Tekin & Gör, 2022). However, the Fulmer H and Springate S models are the most valuable and useful methods for assessing the continuity of companies in terms of financial distress and bankruptcy risk. These models, which consider company activities from a broad perspective, measure financial indicators (Vickers, 2006). In this direction, in the next part of the study, method explanations and analysis findings for both the Fulmer H score and Springate S score models are given.

2. Methods and Findings

A possible financial failure in healthcare businesses operating in a constantly changing and developing environment directly affects not only businesses but also general healthcare services. Because of this, it is more crucial and effective to estimate the likelihood of financial failure and bankruptcy for health-related businesses than it is in other businesses. In this direction, the financial failure estimation of eight companies operating in the health sector in BIST100 for the period of 2019–2022 was examined with Fulmer H and Springate S score models. The enterprises examined in the analysis and their notations are given in Table 1.

Table 1. Businesses in the health sector and their notations

Notations	Business
SELEC	Selçuk Pharmacy Warehouse Trade and Industry Inc.
TRILC	Turk Drug and Serum Industry Inc.
RTALB	RTA Lab Biological Products Pharmaceuticals and Machinery Industry Trade Inc.
ECILC	Eczacıbaşı Pharmaceutical and Industrial Investment Co. Inc.
DEVA	Deva Holding Inc.
SEYKM	Seyitler Chemical Industry Inc.
MEDTR	Meditera Medical Equipment Industry and Trade Inc.
GENIL	Gen Drugs and Health Products Industry and Trade Inc.

Fulmer H Scor Model: The Fulmer model is a multiple discriminant analysis introduced in 1984 (Fulmer, Moon, Gavin and Erwin, 1984; Astuti & Anggela, 2021). Despite the fact that the variables in this model were derived from the companies' past financial statements, it is still possible to forecast the future due to the stability of their growth. By measuring the soundness of the financial structure of the companies, it is revealed whether they will go bankrupt within a high confidence interval. The financial ratios included in the Fulmer H score model are listed in Table 2.

Table 2. Ratios and notations used in the Fulmer H Score Model

Notations	Information
x_1	Retained Profit/Total Assets
x_2	Sales/Total Assets
x_3	Profit Before Tax/Equity
x_4	Cash Amount/Total Payables
x_5	Total Liabilities/Total Assets
x_6	Short-Term Liabilities/Total Assets
x_7	Log (Tangible Fixed Assets)
x_8	Working Capital/Total Debts
x_9	Log (Earnings Before Interest and Taxes/Interest rate)

The Fulmer H Score Model (1) given for the explanations of the variables in Table 2 is expressed with the equation (Fulmer, Moon, Gavin and Erwin, 1984; Astuti & Anggela, 2021; Wahyuningsih & Venusita, 2022).

$$H\ Score = 5.528x_1 + 0.212x_2 + 0.073x_3 + 1.270x_4 - 0.120x_5 + 2.335x_6 + 0.575x_7 + 1.083x_8 \quad (1)$$
$$+ 0.894x_9 - 6.075$$

According to the Fulmer H score model expressed by equation (1), the score values are within a certain range. Businesses with an H score of less than 0 are considered unsuccessful, and businesses with an H score greater than 0 are considered successful (Fulmer et al., 1984).

Springate S Score Model: Gordon LV Springate introduced Springate model in 1978. In essence, this model is a revolution of the Multiple Discriminant Analysis-created Altman model (Husein & Pambekti, 2014; Tekin & Gör, 2022). During the Springate model development process, 19 financial ratios, which were frequently used in the literature, were taken into account. In light of his research, Springate has whittled down the number of financial ratios that should be used to assess a company's success or failure to only four. The model, called the Springate S score test, has an accuracy rate of 92.5%. The ratios used in the Springate S score test are given in Table 3.

Table 3. Ratios and notations used in the Springate S Score Model

Notations	Information
z_1	Working Capital/Total Assets
z_2	Earnings Before Interest and Taxes/Total Assets
z_3	Profit Before Tax/Short-Term Liabilities
z_4	Sales/Total Assets

The Springate S Score Model (2) given for the explanations of the variables in Table 3 is expressed with the equation (Springate, 1978; Husein & Pambekti, 2014; Astuti & Anggela, 2021; Wahyuningsih & Venusita, 2022).

$$S\ Score = 1.03z_1 + 3.07z_2 + 0.66z_3 + 0.4z_4 \quad (2)$$

According to the Springate S Score model expressed by equation (2), businesses with an S score below 0.862 are considered unsuccessful, and businesses with an S score above 0.862 are considered successful (Springate, 1978).

With the help of the Fulmer H and Springate S score models, the study estimated at the financial failure estimation of eight businesses involved in the healthcare industry that were traded on the BIST100 via public disclosure platform for the years 2019–2022. Accordingly, the Fulmer H score values of the sector by year are given in Table 4.

Table 4. Fulmer H Score Values

Business	2022	2021	2020	2019
SELEC	0.459301	0.481495	0.719755	0.462196
TRILC	0.410794	-0.033590	1.110747	0.817182
RTALB	0.294290	0.657303	0.555249	0.198668
ECILC	0.589224	0.685991	0.650361	0.624839
DEVA	0.947659	0.899947	0.854717	0.772470
SEYKM	0.666482	0.608548	0.390050	0.312198
MEDTR	1.054407	1.046306	0.697941	0.418793
GENIL	0.851339	0.695300	0.573212	0.677698

Note: Ready data obtained from KAP financial statements were used, therefore ethics committee approval is not required. It is not investment advice.

When the Fulmer H Score values in Table 4 are examined, it is observed that all enterprises operating in the health sector were successful in 2019, 2020, and 2022, while in 2021 all enterprises except TRILC were successful. Springate S score values of the sector by year are given in Table 5.

Table 5. Springate S Score Values

Business	2022	2021	2020	2019
SELEC	0.867898	1.086139	1.105450	0.938450
TRILC	0.595541	0.847519	0.703357	0.878180
RTALB	1.994429	2.526394	3.288523	0.863432
ECILC	1.935875	3.870368	2.623425	2.718658
DEVA	1.996089	2.320344	2.484019	2.240604
SEYKM	5.602003	4.266209	3.424650	2.587287
MEDTR	7.534375	7.934826	3.849299	7.732170
GENIL	0.942252	0.890405	1.659990	2.896988

Note: Ready data obtained from KAP financial statements were used, therefore ethics committee approval is not required. It is not investment advice.

When the Springate S Score values in Table 5 are examined, it is observed that all businesses are successful in 2019, while all businesses except TRILC are successful in 2020, 2021, and 2022. When both models are evaluated together, it is observed that the financial failure risks of all businesses operating in the health sector, except TRILC, are low.

Conclusion

Developments in the health sector occur in an extremely dynamic and changing environment. Financial failure estimation made through financial analysis will shed light on how health company managers make investment decisions for health services. Financial managers of healthcare companies have a great deal of work to do, as financial failure for healthcare companies can directly impact not just the company but overall healthcare delivery.

By determining the financial performances of health companies traded on the BIST, it will be ensured that the health expenditures that concern the whole society are transferred to appropriate areas by considering the maximum social benefit, and the financial resources used in this direction will be tailored to the needs. The existence of service quality and the appropriateness of health service delivery fees will have a positive impact on the health services provided.

In the study, it is aimed to make a financial failure estimation by using the Fulmer H and Springate S Score method by accessing the financial data of the health companies listed on BIST100 between the years 2019 and 2022 from the Public Disclosure Platform.

According to the Fulmer H Score model, while it is observed that all enterprises operating in the health sector in 2019, 2020, and 2022 are successful, it is observed that all enterprises, except TRILC, are successful in 2021. According to the Springate S Score model, while it was observed that all enterprises were successful in 2019, all enterprises except TRILC were successful in 2020, 2021, and 2022. When both models are evaluated together, it is observed that the financial failure risks of all businesses operating in the health sector, except TRILC, are low. In other words, SELEC, RTALB, ECILC, DEVA, SEYKM, MEDTR and GENIL are not at risk of financial failure. However, when the findings are examined specifically for TRILC, the data obtained from the Springate S model progresses linearly with values very close to the financial failure limit, while the lowest score is obtained in 2021 in the Fulmer H score model, and then the H score increases in 2022. In other words, it can be said that there is an improvement in financial failure. In this case, it can be said that the company has positively broken the financial failure curve.

The common result of the studies that analyse the financial failures of the health sector in the literature is that the health enterprises are financially successful. In general, it can be said that the findings are supported by the literature. In this respect, managers of health enterprises can confidently direct appropriate investments with awareness of the low risk of bankruptcy and adopt bold strategies accordingly.

The high risk of financial failure of a business does not mean that the business will go bankrupt, and the low risk of financial failure does not mean that the business will not go bankrupt. Depending on whether the financial failure risk is high or low, the business manager creates a strategy. According to these results, which are not investment advice, in future studies, the financial performance of healthcare businesses, which are at risk of financial failure, can be analysed, and measures that can be taken to reduce the risks of bankruptcy and financial failure can be determined.

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