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Research Article

Financial Performance and Bankruptcy Risk Analysis: An Application on Private Health Insurance Companies in Turkey[a]

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Abstract

This research evaluates the correlation between the financial performances of seven insurance companies operating in Turkey from 2018 to 2022 and their risk of bankruptcy. In the study, data obtained from the year-end financial statements of the companies were used, weights were assigned to the criteria determined by the ENTROPY methodology, and the performance rankings of the companies were obtained using the WASPAS method. The Altman-Z model was applied to determine the risk of bankruptcy. The decisive criteria in the financial performance ranking are profitability ratios such as Asset Profitability, Equity Profitability, and Net Profit Margin. While Turkey Insurance and Anadolu Insurance's leadership positions in the sector were identified, Ray Insurance and Mapfre Insurance were determined as the companies showing the weakest performance. Although the research shows that financial performance affects the risk of bankruptcy, it also reveals that it is not the sole factor in determining the likelihood of bankruptcy. In this context, the evaluation of financial performance in the insurance industry should be considered as part of a more holistic risk assessment approach.

Keywords: insurance companies, financial performance, insolvency risk

JEL Codes: G15, G22, G52

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Araştırma Makalesi

Finansal Performans ile İflas Riski Arasındaki İlişkinin Analizi: Türkiye'deki Özel Sağlık Sigorta Firmaları Üzerine Bir Uygulama [a]

Neslihan Karavar [b] & Kemal Yaman[c]

Öz

Bu araştırma, 2018 ila 2022 yılları arasında Türkiye'de faaliyet gösteren yedi sigorta şirketinin finansal performanslarının iflas riski ile olan korelasyonunu değerlendirmektedir. Araştırmada, şirketlerin yıl sonu mali tablolarından elde edilen veriler kullanılmış, ENTROPİ metodolojisi ile belirlenen kriterlere ağırlıklar atfedilmiş ve WASPAS yöntemi ile şirketlerin performans sıralamaları elde edilmiştir. İflas riskinin belirlenmesinde ise Altman-Z modeli uygulanmıştır. Finansal performans sıralamasında belirleyici olan kriterler; Aktif Karlılık, Özsermaye Karlılığı ve Net Kâr Marjı Gibi karlılık rasyolarıdır. Türkiye Sigorta ve Anadolu Sigorta'nın sektördeki lider konumları saptanırken, Ray Sigorta ve Mapfre Sigorta ise en zayıf performansı gösteren şirketler olarak tespit edilmiştir. Araştırma, finansal performansın iflas riskini etkilediğini göstermekle beraber, bunun iflas olasılığını belirlemede tek faktör olmadığını ortaya koymaktadır. Bu bağlamda, sigorta endüstrisinde finansal performansın değerlendirilmesi, daha bütüncül bir risk değerlendirme yaklaşımının parçası olarak ele alınmalıdır.

Anahtar Kelimeler: sigorta şirketleri, finansal performans, iflas riski.

JEL Kodlar: G15, G22, G52

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Introduction

Financial performance and bankruptcy risk are crucial factors in terms of the sustainability and future success of businesses. In this context, examining the relationship between these two factors is of great importance in industries with high financial uncertainties and risks, such as the health insurance sector. Especially in Turkey, private health insurance companies operate in a dynamic competitive environment, undertaking a significant responsibility in preserving their financial performance.

This study aims to analyze the relationship between the financial performance and bankruptcy risk of private health insurance companies in Turkey. Financial performance is a metric used to evaluate companies' financial conditions, profitability, and growth potentials. On the other hand, bankruptcy risk is a measure used to determine the likelihood of a company facing payment difficulties. The main objective of this study is to understand the relationship between financial performance and bankruptcy risk and examine the interaction between these two factors in the private health insurance sector. This analysis provides a significant perspective on determining the financial health of health insurance companies and anticipating adverse situations in the future. Additionally, it offers valuable guidance to stakeholders, managers, and regulators in the health insurance sector for making strategic decisions to improve financial performance and reduce bankruptcy risk. This study also aims to contribute to the literature on financial performance and bankruptcy risk in the health insurance sector. The findings obtained will create a general understanding and awareness in the academic environment and serve as a foundation for future research.

Furthermore, in this analysis, financial ratios will be calculated using the Income Statement, Balance Sheet, Cash Flow Statements, and other financial reports of relevant insurance companies. Initially, various financial ratios will be employed to measure financial performance. Liquidity Ratios will assess the ability of companies to meet short-term payment obligations. Profitability Ratios will indicate how much of the sales companies generate as profit, while Activity Ratios will measure the use of assets and operational efficiency. Additionally, ratios such as Leverage Ratios, Return on Equity, and Debt Coverage Ratios will help evaluate different aspects of financial performance. Subsequently, the Altman-Z score model will be used to assess bankruptcy risk. The Altman-Z model is a predictive method used to determine the financial health and measure bankruptcy risk of companies. This model calculates a score by combining financial ratios, helping determine the bankruptcy risk of a company. If the Altman-Z score is above or below a certain threshold, the company's bankruptcy risk is considered low or high, respectively.

In conclusion, this study aims to analyze the relationship between the financial performance and bankruptcy risk of private health insurance companies in Turkey. Financial conditions of companies will be assessed, and bankruptcy risk will be determined using financial ratios and the Z-Score model in the analysis. The findings obtained will play a crucial role in understanding the financial health and future risks of companies operating in the health insurance sector. This study aims to provide stakeholders, managers, and regulators in the industry with important guidance to make strategic decisions for improving the financial performance and reducing bankruptcy risk of health insurance companies.

Literature Review

The insurance sector plays a critical role in maintaining economic balance and trust. Therefore, the relationship between the financial performance and bankruptcy risk of insurance companies represents a significant research area to understand the sustainability and resilience

of the sector. Effective performance assessment is crucial for both internal management and stakeholders in the industry to make financial decisions, manage risks, and predict companies' future success. In this context, this section of the study will include a review of other works in the literature.

Opler and Titman's 1994 study addresses the relationship between financial distress and financial performance, observing that companies with high debt levels experience a decline in market share and equity market values compared to their competitors during periods of financial difficulty. This result supports a positive and significant relationship between financial distress and indirect costs. The research also indicates that the negative effects of debt are more pronounced in large-scale industries, suggesting that financial leverage can have different effects depending on sector size.

The study by Campbell et al, (2011) aims to predict the financial condition and performance of firms with distressed and failing stocks between 1991 and 2008, using market and accounting data-based measurement methods. The analysis shows that distressed stocks offer volatile returns and carry high risk, with an interesting finding that investors have not been able to achieve the expected extra returns despite these high risks. These findings indicate that the potential returns from investing in firms at risk of financial failure are not offset by the risks associated with these investments.

Tan (2012) study examines the connection between financial failures and performance of 277 firms from 8 East Asian countries during the financial crisis, measuring financial performance by asset profitability ratios and Tobin's Q values, and financial distress by leverage. The results show that firms with low debt ratios performed better than those with high leverage, especially during crisis periods, indicating that high leverage firms tend to perform worse in such challenging times. This situation reveals that borrowing can create leverage effects for firms but can also lead to financial instability and liquidity problems, negatively affecting their performance. During crisis periods, the debt burden can increase financial difficulties and bankruptcy risk, highlighting the need for companies to follow a balanced debt management strategy to maintain their financial stability.

The study by Yusuf et al, (2014) aims to examine the relationship between financial failures and performance of local banks operating in Malaysia from 1990 to 2010, assessing financial performance by the equity profitability ratio and financial failure by the ratio of loan loss provisions to total debts. The results indicate a statistically significant negative relationship between financial failure and performance, showing that banks experiencing financial difficulties have lower performance and that increased loan losses negatively affect banks' equity profitability.

In Shahwan's (2015) study conducted on 86 non-financial firms listed on the Egyptian Stock Exchange, the aim was to reveal the impact of corporate governance index scores on financial performance and financial failure. Financial performance was measured using the Tobin's Q ratio in the study, while financial failure was calculated using the Altman Z-Score. The analysis results indicated that the corporate governance levels of the companies were low. Additionally, a positive relationship between corporate governance and financial performance was not found, and a statistically insignificant negative relationship between financial failure and corporate governance was observed. In other words, a significant connection between Tobin's Q ratio, which evaluates firm performance, and corporate governance was not identified, but a meaningful relationship between financial failure and corporate governance was not observed.

Shaukat and Affandi (2015) study examined the impact of financial distress on financial performance among 15 fuel and energy companies listed on the Pakistan Karachi Stock Exchange from 2007 to 2012. Financial performance was measured through asset profitability ratio, the ratio of prior year's profit to total assets, and the ratio of working capital to total assets, while financial distress was assessed using the Altman Z-Score. The results indicated a statistically significant negative relationship between financial distress and performance, demonstrating that firms with high Altman Z-Scores have lower financial distress risk and thus higher financial performance. This study supports the significant finding that financial robustness positively affects firms' economic performance.

Delavar et al, (2015) study investigated the relationship between financial performance, working capital, and financial distress for 71 companies traded on the Tehran Stock Exchange from 2004 to 2012. Financial performance was measured by Tobin's Q value, and financial distress was assessed using the Altman Z-Score. The analysis found no significant relationship between financial distress, working capital, and financial performance, indicating that in the examined period and sample, working capital management and financial distress risk did not directly affect firms' Tobin's Q value. This finding suggests the need to reevaluate the role of working capital management in determining financial performance and distress risk.

Kaygun, et al, (2016) study highlighted the importance of financial strength for businesses to achieve their goals, emphasizing that financial distress predictions are crucial for companies to foresee future financial risks and take appropriate measures. The research analyzed data from annual financial reports of 143 manufacturing industry companies continuously active on Borsa Istanbul between 2010 and 2013, using Data Mining and Logistic Regression Analysis techniques to predict financial success and failure situations. Models were created for one, two, and three-year retrospective predictions starting from 2013, and their prediction capabilities, i.e., classification accuracies, were compared. The analysis found that the predictive power of the models was highest for the year 2012 in forecasting financial success and failure situations.

In the study by Ege, Topaloğlu, and Erkol (2017), the aim is to uncover the relationship between financial failure and financial performance. In this context, data from manufacturing industry firms listed on the Borsa Istanbul 100 Index for the period 2011-2015 were examined using panel data analysis. Financial failure was expressed using the Fulmer H-Score, while financial performance was measured by Tobin's Q ratio. Additionally, control variables such as asset profitability ratio, logarithm of sales, and price/earnings ratio, believed to affect financial performance, were included in the analysis. The analysis results revealed a positive and significant relationship between the Fulmer H-Score and Tobin's Q ratio. In other words, as the level of financial failure of firms decreases, financial performance and firm value increase. Moreover, the study found a positive and significant relationship between asset profitability, price/earnings ratio, and Tobin's Q. However, no significant relationship was identified with the control variable of firm size.

The objective of Bülbül and Köse's (2016) study is to conduct a detailed examination of the financial performance of non-life insurance companies operating in the Turkish Insurance Sector. The application of the research is based on four years of balance sheet data from 2010 to 2013. During this period, 34 companies for the year 2010 and 35 companies for the subsequent three years were included in the analysis. The financial performance of companies in the relevant sector was evaluated in detail using the Promethee method, allowing for a comparative analysis of companies in the sector. The study explored factors affecting financial data after the period of 2010-2013, with a focus on significant events such as the December 17,

2013 investigation and exchange rate fluctuations in 2014. Understanding the potential impacts of such changes on the financial performance of companies in the Turkish insurance sector strengthens the purpose of the study. Ultimately, this research is expected to contribute significantly by providing a perspective that evaluates the financial performance of non-life branches in the Turkish insurance sector over various years, demonstrating sensitivity to sector changes, and guiding future studies.

Kula, et al (2016) study aims to examine the financial performance of eight insurance companies traded on the Borsa Istanbul using the Grey Relational Analysis (GRA) method. The research, conducted as a field study applying the GRA method to evaluate the performance of these eight companies using end-of-year 2013 data. According to the results of the study, identifiable factors contribute to achieving successful financial performance among insurance companies. These factors include maintaining a robust capital structure, keeping equity levels high, effectively preserving liquidity levels, and increasing profitability.

In Li and Wu's (2018) study conducted on 60 insurance companies in the Chinese insurance sector, it was observed that failing insurance companies exhibited unstable growth, low liquidity, high financial risk, and low profitability. Additionally, the study identified the impact of macroeconomic variables, where inflation rate, interest rate, and money supply were determined as significant macroeconomic variables in predicting the bankruptcy of insurance companies.

Karadeniz, et al, (2021) study evaluated the financial performance of businesses in the paper and paper products manufacturing sector in Turkey from 2009 to 2019 according to their size. The study conducted ratio analysis on the financial statements of micro, small, medium, and large enterprises using sectoral balance sheet data provided by the Central Bank of Turkey. The financial distress risks of the enterprises were also measured using the Altman Z score and Springate Z score models. The findings indicated that as the size of the enterprises increased, their liquidity, financial structure, and profitability performance improved, though operational performance varied with scale. It was also found that micro-scale enterprises in the sector were at high financial distress risk, while financial distress risk decreased as business size increased.

Pehlivan and Akpınar (2022) study starts with the premise that any failure or adversity in the insurance sector can significantly impact a country's financial systems. It is stated as an important matter that the performance of the insurance sector, which provides significant contributions to national economies, should be regularly measured and evaluated. In this context, the study aims to analyze the performance of non-life insurance companies, which hold a large share in the Turkish insurance sector. The performance of 33 non-life insurance companies operating in the Turkish insurance sector between 2015 and 2019 was thoroughly examined. The Grey Entropy method was used to determine the weight scores of the evaluation criteria, and the performance scores of the companies were calculated using the COPRAS (Complex Proportional Assessment) method. According to the Grey Entropy method, the findings revealed that the Return on Equity Ratio had the highest impact on performance during the examined period. BNP Paribas Insurance Company was identified as the best-performing company in the period based on the COPRAS method. These analyses provide a significant contribution to objectively assessing the performance of companies in the non-life insurance sector. According to the results of this study, the Return on Equity Ratio, an important criterion for determining the performance of insurance companies, usually indicates negative or low values in companies that rank lower in the evaluation. This observation suggests that these companies have weak financial conditions or low profitability. It implies that more effective investment evaluation, better resource allocation, and stricter cost controls could be crucial in

enhancing overall performance. Careful management of investments, effective use of resources, and strict financial controls can positively influence critical metrics like the Return on Equity Ratio. Therefore, reviewing financial strategies and addressing potential weaknesses could be a critical step for companies to improve their overall performance.

In the study of Öcek, et al, (2023) the effects of the Covid-19 pandemic on the financial condition and bankruptcy risk of travel agencies and tour operators in Turkey were examined. Based on real sector data from the Central Bank of Turkey, the economic performance and bankruptcy risk of the sector for the years 2018-2020 were assessed. The economic condition of the sector was analyzed through liquidity, asset management, financial structure, and profitability ratios, while bankruptcy risk was measured using models such as the Altman Z Score, Fulmer H Score, Springate Score, and Ohlson Score. The findings indicated that during the pandemic, travel agencies and tour operators faced serious cash flow problems, increased debt levels, higher financial costs, and incurred losses. Furthermore, the sector was found to be at risk of bankruptcy during this period.

Karaçayır (2024) study aims to empirically assess the effects of exchange rate risk on businesses' financial success, stock earnings, and profit margins. Using data for quarterly periods from 2014 to 2022, the study analyzed the impact of currency risk on the financial performance of 23 companies listed in the BIST Information Technologies Index using panel data analysis. Exchange rate risk was measured by the ratios of Net Foreign Exchange Position / Equity and Net Foreign Exchange Position / Total Assets, while company performance was assessed using asset profitability, Tobin's Q value, and stock returns. The research was supported by analyses using three different models. Empirical findings suggest that exchange rate risk negatively affected the profitability of the companies but had a positive effect on stock returns; its impact on company performance was found to be insignificant. Additionally, it was observed that company size positively influenced both profitability and performance but had no significant effect on stock returns. The leverage ratio had a negative impact on company profitability and performance, while its effect on stock returns was insignificant. It was concluded that the growth rate positively influenced company profitability, but had no significant effect on company performance and stock returns.

Method And Analysis

In this study, the performance ranking of 7 insurance companies operating in Turkey (Allianz Insurance, Anadolu Insurance, Axa Insurance, Groupama Insurance, Mapfre Insurance, Ray Insurance, and Turkey Insurance) is aimed to be determined based on selected criteria to identify their success levels. The Weighted Aggregated Sum Product Assessment (WASPAS) method, a multi-criteria decision-making approach, is employed to rank the insurance companies' performance. The criteria chosen for the study are assigned weight degrees using the Entropy method, and subsequently, the WASPAS method is utilized for performance ranking based on the importance degrees of the criteria's weights.

Another method used in this study is the Altman-Z Score method. The Altman-Z Score method is a significant tool in financial analysis and risk assessment. Developed by Edward I. Altman in 1968, this method is particularly used to predict the risk of bankruptcy for companies. The Z score includes four fundamental financial ratios (Working Capital/Total Assets, Retained Earnings/Total Assets, Earnings Before Tax/Total Assets, and Market Value/Total Liabilities) to evaluate a company's financial health and determine the risk of bankruptcy. The result, often referred to as the Z score, indicates the financial health of the company. The Z Score method holds a crucial place in the financial world and is used by investors, lenders, and financial analysts to assess companies' financial health and identify risks.

Entropy Method

The concept of entropy was first defined by Rudolph Clausius in 1865 as a measure of uncertainty and disorder in systems (Schall & Haley, 1983). Today, it has become a significant concept in physics, mathematics, engineering, and various other scientific disciplines. The entropy method was introduced by Shannon in 1948 within Information Theory to measure the amount of useful information provided by existing data (Ross et al., 2005). This method has the capability to be applied from a single structural group to the entirety of a structure.

Another important feature of the entropy method is its acceptance as a non-objective evaluation method in aesthetic assessments. It is also used to analyze information related to structural forms (Akgüç, 2006). In this way, the entropy method can assess the order or disorder in complex datasets, evaluate information content, and be applicable in different fields.

The entropy method consists of five steps, outlined as follows (Ross et al., 2005):

Step 1: In the first step, the alternatives and criteria to be applied are determined. This involves defining alternative options to evaluate performance and the criteria to assess these options. Subsequently, a decision matrix is created using the identified alternatives and criteria. The decision matrix is a table containing performance values of each alternative on every criterion. This initial step establishes the foundation for the data and information used in subsequent steps, facilitating the progression of the analysis process.

Step 2: In this step, the normalization process of the decision matrix is carried out, and the PIJ value is calculated. These values represent the relative weights of alternatives. This step ensures the acquisition of data necessary for performance ranking.

$$p_{ij} = \frac{x_{ij}}{\sum_{j=1}^{n} x_{ij}} \qquad \forall_i,\ j \qquad (1)$$

$p_{ij;}$ Normalized Values
$a_{ij:}$ Given Benefit Value
$i_{:}$ Alternatives
$j_{:}$ Criteria

Step 3: In this step, the entropy value of subset ej is calculated. Entropy serves as a measure of the homogeneity or heterogeneity level of performance values for a criterion. The performance values of alternatives in subset ej undergo a normalization process, and the entropy value is computed. This value signifies the level of disorder or uncertainty in the performance of alternatives within subset ej. This step provides crucial information for weighting the criteria.

$$e_j = -k \sum_{j=1}^{n} [p_{ij} \cdot \ln/(p_{ij})]; \qquad \forall_j \qquad i=1,2,3,\ldots m \text{ ve } j=1,2,3,\ldots n \qquad (2)$$

k: Entropy Coefficient $(\ln(n))^{-1}$
e_{ij} : Entropy Value
p_{ij} : Normalized Value

Step 4: In this step, the uncertainty of dj is calculated. dj uncertainty computes the degree of uncertainty between different levels of a criterion. Probability values are calculated using the numbers of alternatives at each level. dj uncertainty is then determined using these probability values. dj uncertainty measures the variance or uncertainty between different levels of the criterion. This step plays a crucial role in weighting the criteria.

$d_j = 1 - e_j \; ; \quad \forall_j$ (3)

Step 5: In this step, wj weight values are calculated to determine the importance level of criterion j. Weight values express the significance of criterion j relative to other criteria. wj weight value is obtained using entropy and dj uncertainty values. This value determines the relative importance of the criterion.

$$w_j = \frac{d_j}{\sum_{j=1}^{n} d_j} \quad (4)$$

WASPAS Method

The Weighted Aggregated Sum Product Assessment (WASPAS) method was developed by Zavadskas and colleagues in 2012. It comprises a combination of the Weighted Sum Model (WSM) and the Weighted Product Model (WPM) methods (Kumar and Singh, 2018). This method is designed to enhance ranking accuracy and is utilized in multi-criteria decision-making problems (Almajali et al., 2012). By merging the WSM and WPM methods, the total relative importance of each alternative can be calculated, leading to more accurate rankings. Unlike other methods in the field of multi-criteria decision-making, WASPAS method possesses a flexible structure and can be applied to decision-making problems with different scales.

The WASPAS method is completed in 5 steps, as outlined below (Almajali et al., 2012):

Step 1: In the first step of the WASPAS method, a decision matrix is created. The decision matrix is a table containing the performance values of alternatives with respect to criteria. This table forms the basis for the data used in the analysis process, providing an objective foundation for the decision-making process. This step plays a fundamental role in processes such as weighting criteria and performance ranking.

Step 2: In this stage, normalization of the decision matrix is performed, taking into account the benefit and cost criteria. Values in the matrix are appropriately adjusted, considering the interaction between criteria. This allows for an objective comparison and accurate evaluation of performance.

The equation used for the benefit criterion is:

$$x_{ij} = \frac{x_{ij}}{Max_{x_{ij}}} \quad (5)$$

The equation used for the cost criterion is:

$$x_{ij} = \frac{Min_{x_{ij}}}{x_{ij}} \quad (6)$$

Step 3: The calculation of the total relative preference of an alternative based on the Weighted Sum Model (WSM) is explained in the context of the WASPAS method, which relies on two equality criteria and seeks simultaneous optimism. In this method, the total relative preference of the i-th alternative is calculated by multiplying the weight value for each criterion with the performance value of the i-th alternative for that criterion. Subsequently, the total relative value preference for each alternative is computed in order.

$$Q_1 = \sum_{j=1}^{n} x_{ij}\, w_{ij} \qquad (7)$$

Step 4: Total relative importance values for alternative i are calculated based on the Weighted Product Model (WPM). The normalized decision matrix is used for this calculation. The values obtained for each criterion of alternative i are calculated by taking the power of the corresponding criterion weights, and the resulting values for each alternative are multiplied sequentially to obtain the Q2 value.

$$Q_2 = \prod_{j=1}^{n} {x_{ij}}^{w_{ij}} \qquad (8)$$

Step 5: In this stage, the weighted average criterion value for the methods employed in calculating the weighted total general criterion value is expressed by the following formula:

$$Q = \lambda \sum_{j=1}^{n} x_{ij}\, w_{ij} + (1-\lambda) \prod_{j=1}^{n} {x_{ij}}^{w_{ij}}\ , \qquad \lambda = 0, \ldots, 1. \qquad (9)$$

The WASPAS method allows for a transition between the Weighted Sum Model (WSM) and the Weighted Product Model (WPM) through the parameter λ. When λ = 0, the WASPAS method transforms into the WPM, and when λ = 1, it transforms into the WSM. In this way, a balance is achieved between different weighting methods in the evaluation of alternatives. The WASPAS method is particularly employed in multi-criteria decision-making problems, enhancing the reliability of ranking results.

Altman-Z and Bankruptcy Risk

In 1968, Altman designed a new model using the Multiple Discriminant Analysis method based on data from 66 publicly traded companies in the United States operating in 66 different manufacturing sectors. Out of the selected sample of 66 companies, 33 had gone bankrupt between 1946 and 1968, while the remaining 33 continued their operations successfully. Altman's Z-Score model, developed during a period when traditional ratio analysis was losing popularity in academic circles, has become widely used for predicting financial distress (Altman et al., 2007).

Altman determined financial coefficients based on the financial indicators of businesses and developed a new approach using these coefficients in the Z-Score model. Over the last 40 years, this method has become a significant tool for assessing credit risks and analyzing the future financial conditions of businesses. Studies have shown that the model has a high success rate in predicting bankruptcy. For instance, it can predict bankruptcy with a success rate of 72% for the previous two years, increasing to 94% for the previous year. Furthermore, tests conducted over 31 years after the model's development demonstrated that even non-bankrupt firms could be classified correctly in the range of 80-90%, and bankruptcy risk could be detected up to one year in advance (Akdoğan & Tenker, 2010). Therefore, Altman's Z-Score model is widely accepted as an effective tool in financial risk analysis.

The Z-Score model, created by Altman, utilizes seven values, including six accounting-based and one market-based, to form five fundamental ratios. Altman's Discriminant formula, developed using Multiple Discriminant Analysis, has gained significant interest among analysts and practitioners because each ratio in the formula provides valuable information about different aspects of the company's operations (Akdoğan & Tenker, 2010). As a result, the Z-Score model is considered an essential tool in various financial analyses.

Despite Altman's Z model being praised as a successful tool for predicting business bankruptcy, the prediction model has faced significant criticisms over time. These critiques primarily target the Multiple Discriminant Analysis method used in constructing the model, rather than the success level of the model itself. Critics point out that the fundamental assumptions of the Multiple Discriminant Analysis method in this particular study have not been thoroughly tested. However, later studies have shown that the prediction model is "robust," meaning it remains effective in achieving the desired results even when some assumptions are not met. These studies play a crucial role in evaluating the Altman-Z model (Ross et al., 2005). Thus, research indicates that Altman's model remains an effective analysis tool.

In calculating the Z score in the service sector, four different financial ratios are used, and each ratio is calculated by multiplying it with coefficients specific to the model. These ratios are referred to as X variables and are multiplied by coefficients determined by the effects of businesses' success status, as determined by Discriminant analysis, during the model development process (Akdoğan & Tenker, 2010).

In the service sector, the Z" score for the Z Score method is calculated as follows: (Akgüç, 2006):

$$Z'' = 6{,}56.X1 + 3{,}26.X2 + 6{,}72.X3 + 1{,}05.X4$$

X1: The ratio of net working capital to total assets
X2: Ratio of undistributed profits to total assets
X3: The ratio of earnings before interest and taxes to total assets
X4: The ratio of market value to total liabilities

In this formula, X1, X2, X3, and X4 represent financial indicators. Each indicator is multiplied by the coefficients stated in the formula to calculate the total Z" value. This formula is considered a criterion used to evaluate bankruptcy risk in the Altman-Z method.

Financial success levels are determined based on Altman-Z scores. A insurance company is considered financially successful if its Altman-Z score is $Z'' \geq 2.6$, while it is considered in the 'grey zone' if the score is between $1.1 < Z'' < 2.6$. If the Z" value is 1.1 or less, the company is considered financially unsuccessful. These evaluations are considered a criterion used to analyze companies' bankruptcy risk and to assess their financial performance.

Analysis Results

This study aims to assess the financial performance and bankruptcy risk of 7 insurance companies in Turkey between the years 2018-2022. The insurance companies included in the analysis are Allianz Insurance, Anadolu Insurance, Axa Insurance, Groupama Insurance, Mapfre Insurance, Ray Insurance, and Turkey Insurance. The evaluation of the companies' performance employs the Entropy and WASPAS methods. These methods utilize financial metrics such as profitability ratios, activity ratios, leverage ratios, and liquidity ratios to analyze the performance of the companies.

Additionally, the Altman-Z model method has been utilized to calculate the bankruptcy risk of insurance companies. This model aims to predict potential bankruptcy risks by evaluating the financial condition of insurance companies. The calculations provide an approach to analyzing the financial condition of companies to determine bankruptcy risk and create a performance ranking. The obtained results are utilized to compare the financial situations of insurance companies, analyze their performances, and determine bankruptcy risks.

Consequently, the performance ranking of the 7 insurance companies in Turkey is revealed, intending to monitor developments in the sector and provide valuable information to decision-makers.

Table 1

Financial Ratios Related to Criteria

Financial Ratios	*Codes*	*Explanation*
	K1	Return on Equity (ROE)
Profitability Ratios	K2	Return on Assets (ROA)
	K3	Net Profit Margin
	F1	Asset Turnover
Activity Ratios	F2	Equity Turnover
	F3	Net Working Capital Turnover
	KO1	Total Debt Ratio
Leverage Ratios	KO2	Debt-to-Equity Ratio
	KO3	Asset Ratio
	L1	Current Ratio
Liquidity Ratios	L2	Cash Ratio
	L3	Current Assets to Total Assets Ratio

Note. Created by the author.

In order to conduct a financial performance ranking of seven insurance companies operating in Turkey, it is first necessary to calculate the weights of the criteria using the ENTROPY methodology. Table 1 presents a thorough examination of the criteria to be used in the ENTROPY and WASPAS methodologies for the mentioned companies. The selection of these criteria was made by taking into account the opinions of industry experts and relevant recommendations in the literatüre. These; Yurdoğlu and Kundakçı (2017), Ural, Demireli and Güler (2018), Akçakanat, Eren, Aksoy and Ömürbek (2017). The purpose of preparing Table 1 is to define the evaluation criteria for each criterion and the weighting procedures. The meticulous definition and weighting of these criteria are important in ensuring the objectivity and reliability of the performance evaluation process. Consequently, this table should be regarded as a fundamental step towards analyzing the performance of companies operating in the insurance sector in an objective and comparable manner.

The entropy method decision matrix is presented in Table 2. This matrix is a table created based on the criteria determined for the decision-making problem. In this table; alternatives are placed on the horizontal axis, criteria on the vertical axis, and each cell indicates the value of the alternative according to that criterion. This stage is a method effectively used in multi-criteria decision-making problems and is one of the most fundamental steps in the analysis process.

Table 2

Decision Matrix of Insurance Companies for the Year 2018

Decision Matrix for the Relevant Insurance Companies Based on Criteria for the Year 2018

	K1	K2	K3	F1	F2	F3	KO1	KO2	KO3	L1	L2	L3
Allianz Insurance	0,223	0,033	0,101	0,323	2,212	2,348	0,854	5,852	0,285	1,482	0,583	0,423
Anadolu Insurance	0,246	0,043	0,053	0,812	4,662	5,566	0,826	4,744	0,798	1,183	0,674	0,944
Axa Insurance	0,343	0,055	0,079	0,706	4,367	4,463	0,838	5,184	0,810	1,195	0,215	0,968
Groupama Insurance	0,417	0,166	0,511	0,326	0,817	0,682	0,601	1,507	0,376	2,272	0,956	0,854
Mapfre Insurance	0,030	0,006	0,008	0,737	3,920	5,012	0,812	4,316	0,783	1,188	0,395	0,930
Ray Insurance	0,134	0,031	0,055	0,557	2,434	2,918	0,771	3,368	0,726	1,263	0,796	0,917
Türkiye Insurance	0,238	0,058	0,260	0,221	0,914	1,962	0,758	3,129	0,742	1,152	0,788	0,855
TOTAL	1,632	0,391	1,066	3,682	19,325	22,952	5,460	28,099	4,520	9,735	4,407	5,890

Note. Researcher's Computation

The second step in the analysis process is the normalization stage. The normalization process is calculated using formula (1). In this context, the data in Table 2 are normalized to obtain Table 3. In this step, the values in the decision matrix can be measured on different scales and in different units. For an objective evaluation to be conducted, these values need to be on the same scale. Accordingly, the value of each cell in the decision matrix is normalized between the best and worst performance values for that criterion among the alternatives. These normalized values take a value in the range of 0-1. This process ensures that an objective comparison can be made.

Table 3

Normalized Decision Matrix of Insurance Companies for the Year 2018

Normalized Values of the Relevant Insurance Companies Based on Criteria for the Year 2018

	K1	K2	K3	F1	F2	F3	KO1	KO2	KO3	L1	L2	L3
Allianz Insurance	0,137	0,083	0,095	0,088	0,114	0,102	0,156	0,208	0,063	0,152	0,132	0,072
Anadolu Insurance	0,151	0,109	0,050	0,220	0,241	0,243	0,151	0,169	0,177	0,121	0,153	0,160
Axa Insurance	0,210	0,142	0,074	0,192	0,226	0,194	0,154	0,184	0,179	0,123	0,049	0,164
Groupama Insurance	0,256	0,425	0,479	0,089	0,042	0,030	0,110	0,054	0,083	0,233	0,217	0,145
Mapfre Insurance	0,019	0,015	0,007	0,200	0,203	0,218	0,149	0,154	0,173	0,122	0,090	0,158
Ray Insurance	0,082	0,078	0,052	0,151	0,126	0,127	0,141	0,120	0,161	0,130	0,181	0,156
Türkiye Insurance	0,146	0,147	0,244	0,060	0,047	0,085	0,139	0,111	0,164	0,118	0,179	0,145

Note. Researcher's Computation

Table 4 contains the entropy value (ej), uncertainty value (dj), and the weight values of the criteria (wj). The entropy values are calculated using formula (2), while the uncertainty value is calculated using formula (3). After calculating the uncertainty value, the weight values of the criteria are calculated using formula (4) and the resulting data are presented as the wj value in Table 4. Finally, the importance weight of each criterion is normalized by dividing it by the total weight of the criteria. In this way, the total importance level of each criterion is determined, and the decision-making process begins.

Table 4

Importance Weights of Criteria for Insurance Companies in the Year 2018

Importance Weights of Criteria for the Year 2018

	K1	K2	K3	F1	F2	F3	KO1	KO2	KO3	L1	L2	L3
e_j	0,817	0,743	0,660	0,844	0,815	0,821	0,883	0,857	0,860	0,871	0,850	0,874
d_j	0,183	0,257	0,340	0,156	0,185	0,179	0,117	0,143	0,140	0,129	0,150	0,126
w_j	**0,087**	**0,122**	**0,162**	**0,074**	**0,088**	**0,085**	**0,055**	**0,068**	**0,066**	**0,061**	**0,071**	**0,060**

Note. Researcher's Computation

Table 5 shows the weight importance rankings of the criteria determined in 2018 for measuring financial performance. According to this evaluation, with a weight percentage of 16%, Net Profit Margin is considered an important financial indicator used to assess the profitability of an insurance company. This criterion indicates the difference between the company's revenues and expenses and is used as a significant indicator of financial soundness for investors. The second most influential criterion is Asset Profitability, with an impact rate of 12%. This criterion evaluates the profitability obtained by companies using their assets. Asset Profitability reflects a company's ability to manage its assets effectively.

According to the analysis results, the third highest criteria considered in evaluating the company's performance, with an impact rate of 9%, are Equity Profitability and Equity Turnover Rate. While Equity Profitability shows how profitably the company's equity is used, Equity Turnover Rate reflects how efficiently the company turns over its equity. These two criteria are important measures in terms of the company's use and efficiency of equity. Their position at third place with a 9% impact rate provides valuable information regarding the company's long-term profitability and capital usage.

The first fundamental step in performing a performance ranking using the WASPAS method is the creation of the decision matrix. Table 5 is calculated based on the criteria measures in Table 1, which are derived from the balance sheet data of the relevant insurance companies.

Table 5

WASPAS Method Decision Matrix of Insurance Companies for the Year 2018

Decision Matrix for the Relevant Insurance Companies in the Year

w_j	0,09	0,12	0,16	0,07	0,09	0,08	0,06	0,07	0,07	0,06	0,07	0,06
	K1	**K2**	**K3**	**F1**	**F2**	**F3**	**KO1**	**KO2**	**KO3**	**L1**	**L2**	**L3**
Allianz Insurance	0,223	0,033	0,101	0,323	2,212	2,348	0,854	5,852	0,285	1,482	0,583	0,423
Anadolu Insurance	0,246	0,043	0,053	0,812	4,662	5,566	0,826	4,744	0,798	1,183	0,674	0,944
Axa Insurance	0,343	0,055	0,079	0,706	4,367	4,463	0,838	5,184	0,810	1,195	0,215	0,968
Groupama Insurance	0,417	0,166	0,511	0,326	0,817	0,682	0,601	1,507	0,376	2,272	0,956	0,854
Mapfre Insurance	0,030	0,006	0,008	0,737	3,920	5,012	0,812	4,316	0,783	1,188	0,395	0,930
Ray Insurance	0,134	0,031	0,055	0,557	2,434	2,918	0,771	3,368	0,726	1,263	0,796	0,917
Türkiye Insurance	0,238	0,058	0,260	0,221	0,914	1,962	0,758	3,129	0,742	1,152	0,788	0,855
Max/Min	**0,417**	**0,166**	**0,511**	**0,812**	**4,662**	**5,566**	**0,601**	**1,507**	**0,285**	**2,272**	**0,956**	**0,968**

Note. Researcher's Computation

Considering the data in Table 5, benefit and cost criteria are taken into account. In this context, the normalized decision matrix in Table 6 is obtained using formulas (5) or (6). The values in the decision matrix can be measured in different scales and units. For an objective evaluation, these values need to be on the same scale. Therefore, the value of each cell in the decision matrix is normalized between the best and worst performance values for that criterion among the alternatives. The normalization process ensures a fairer comparison. This process is

carried out using the highest or lowest performance value in each criterion. As a result of normalization, a separate matrix is created for each criterion.

Table 6

Normalized Decision Matrix of Insurance Companies for the Year 2018 Using the WASPAS Method

Normalized Values for the Year 2018 Using the WASPAS Method

wj	0,087	0,122	0,162	0,074	0,088	0,085	0,055	0,068	0,066	0,061	0,071	0,060
	K1	**K2**	**K3**	**F1**	**F2**	**F3**	**KO1**	**KO2**	**KO3**	**L1**	**L2**	**L3**
Allianz Insurance	0,534	0,196	0,197	0,398	0,474	0,422	0,704	0,257	1,000	0,652	0,610	0,437
Anadolu Insurance	0,589	0,257	0,103	1,000	1,000	1,000	0,728	0,318	0,358	0,521	0,704	0,975
Axa Insurance	0,822	0,333	0,154	0,870	0,937	0,802	0,717	0,291	0,352	0,526	0,225	1,000
Groupama Insurance	1,000	1,000	1,000	0,402	0,175	0,123	1,000	1,000	0,759	1,000	1,000	0,882
Mapfre Insurance	0,073	0,034	0,015	0,909	0,841	0,900	0,740	0,349	0,365	0,523	0,413	0,961
Ray Insurance	0,321	0,184	0,108	0,687	0,522	0,524	0,780	0,447	0,393	0,556	0,833	0,947
Türkiye Insurance	0,570	0,346	0,509	0,273	0,196	0,353	0,793	0,482	0,385	0,507	0,824	0,883

Note. Researcher's Computation

Table 7 includes the Weighted Sum Model (Q1), Weighted Product Model (Q2), and WASPAS Value (Q). The Weighted Sum Model is calculated using formula (7) and the Weighted Product Model using formula (8). After calculating the Weighted Sum Model and Weighted Product Model, the WASPAS Value is calculated using formula (9).

In the Weighted Sum Model, the importance of each criterion is calculated by multiplying it with the criterion's weight, and then the sum of all ratios gives the Q1 values for each company. In the Weighted Product Model, the weight of each criterion is used as the exponent of the normalized value for that criterion, and the product of all criteria yields the Q2 value. For the calculation of the WASPAS Value, it is assumed that Q1 and Q2 values have the same importance, thus taking $\lambda = 0.5$

Table 7

Performance Ranking of Insurance Companies for the Year 2018 Using the WASPAS Method
Performance Ranking for the Year 2018 Based on the WASPAS Method

	Q1	Q2	Q	Arrangement
Allianz Insurance	0,442000703	0,388443331	0,415222017	6
Anadolu Insurance	0,572617715	0,445373097	0,508995406	2
Axa Insurance	0,543078915	0,446605251	0,494842083	3
Groupama Insurance	0,78559737	0,653913026	0,719755198	1
Mapfre Insurance	0,438779549	0,200594101	0,319686825	7
Ray Insurance	0,45908367	0,372235304	0,415659487	5
Türkiye Insurance	0,486608637	0,447387849	0,466998243	4

Note. Researcher's Computation

Table 7 shows the performance ranking of insurance companies for the year 2018. Accordingly, the insurance company with the highest performance is Groupama Insurance, followed by Anadolu Insurance in second place. In the performance ranking, Axa Insurance is third, Turkey Insurance fourth, Ray Insurance fifth, Allianz Insurance sixth, and Mapfre Insurance seventh.

This study covers the performance ranking between the years 2018-2022. The Entropy method and WASPAS method are used for the performance ranking in the study. The performance ranking for the year 2018 is examined in detail. In the subsequent parts of the study, the performance rankings of insurance companies for the years 2019-2022 are obtained using the same methods.

Table 8 includes a comprehensive representation of the weight values, obtained using the ENTROPY method, which express the changing importance of the determined criteria over time. This table quantitatively displays the extent to which each criterion has been prioritized during the analyzed time period, thereby allowing for the dynamic weighting of criteria in long-term performance evaluation studies.

Table 8

Insurance Companies' Criteria Weights
The Criteria Weight Values of Insurance Companies Calculated by the Entropy Method Over the Years, 2019-2022

wj	K1	K2	K3	F1	F2	F3	KO1	KO2	KO3	L1	L2	L3
2019	0,09	0,20	0,11	0,08	0,07	0,01	0,07	0,07	0,06	0,07	0,10	0,07
2020	0,09	0,10	0,09	0,08	0,09	0,09	0,06	0,08	0,08	0,07	0,12	0,07
2021	0,11	0,12	0,10	0,08	0,09	0,09	0,05	0,06	0,06	0,08	0,12	0,05
2022	0,12	0,07	0,06	0,06	0,12	0,13	0,05	0,11	0,06	0,08	0,10	0,05

Note. Researcher's Computation

The analysis of Table 8, created using the Entropy method, reveals that for the performance evaluation conducted in 2019, Asset Profitability took the lead in performance ranking with an impact rate of 20%, while in 2020 and 2021, the Cash Ratio and Asset Profitability became decisive in the ranking, each with equal impact rates of 12%. This situation reflects the increasingly significant importance of these two indicators in terms of companies' liquidity and profitability. By the year 2022, Net Working Capital has become the criterion with the strongest impact on performance ranking. This change indicates that the efficiency in the management of short-term assets and liabilities of insurance companies is gaining increasing weight in the evaluation of their performance.

Table 9 displays the annual performance evaluations of insurance companies in a ranked order based on the WASPAS multi-criteria decision-making method. This ranking is assessed separately for each year and is structured according to a set of performance metrics that represent the financial and operational successes of the companies for that year.

Table 9

Performance Ranking of Insurance Companies

Performance Ranking of Insurance Companies Using the WASPAS Method Between 2019-2022

	2019	2020	2021	2022
Allianz Insurance	4	6	3	3
Anadolu Insurance	3	2	4	2
Axa Insurance	6	3	1	1
Groupama Insurance	1	7	6	5
Mapfre Insurance	7	4	7	7
Ray Insurance	5	5	5	6
Türkiye Insurance	2	1	2	4

Note. Researcher's Computation

Bankruptcy risk analysis is conducted using balance sheet data of insurance companies from 2018 to 2022 and data compiled from the Investing website. This analysis aims to assess and compare the bankruptcy risk of companies in the insurance sector. The calculations of bankruptcy risk are carried out using financial models and ratios, while factors such as the liquidity status, debt level, profitability, and operational efficiency of the companies are evaluated to determine a bankruptcy risk score. This analysis provides a crucial tool for understanding the financial health of companies in the insurance sector, identifying potential risks, and assessing overall trends in the industry.

Table 10

Altman-Z Bankruptcy Risk Values for the Year 2018

Altman-Z X1, X2, X3, and X4 values

	Allianz Insurance	Anadolu Insurance	Axa Insurance	Groupama Insurance	Mapfre Insurance	Ray Insurance	Türkiye Insurance
Fixed Assets	12.956.150.677	424.531.964	215.563.309	55.377.545	253.415.662	76.975.918	953.889.547
Current Assets	**9.491.211.320**	**7.152.455.785**	**6.477.278.766**	**322.965.783**	**3.364.766.240**	**849.696.589**	**5.617.112.827**
Total Assets	**22.447.361.997**	**7.576.987.749**	**6.692.842.075**	**378.343.328**	**3.618.181.902**	**926.672.507**	**6.571.002.374**
Short-Term Liabilities	**6.405.673.595**	**6.047.711.891**	5.418.317.222	142.160.773	2.832.408.392	672.772.065	**4.875.747.218**
Long-Term Liabilities	12.765.811.949	210.113.586	192.241.117	85.261.708	105.172.567	41.728.577	103.709.939
Total Liabilities	**19.171.485.544**	**6.257.825.477**	**5.610.558.339**	**227.422.481**	**2.937.580.959**	**714.500.642**	**4.979.457.157**
Market Value	**74.119.000.000**	**2.584.000.000**	**44.946.000.000**	**266.820.000**	**7.080.000.000**	**226.700.000**	**405.000.000**
Depreciation Expenses	-78.045.241	-29.160.345	-13.721.042	-1.298.584	-15.768.993	-4.830.281	-6.861.268
Interest Expenses	0	-304.105	-3.426.077	0	0	-1.019.586	-1.244.121
EBITDA	**652.653.084**	**295.042.526**	**354.133.327**	**61.689.106**	**4.987.422**	**22.541.663**	**370.408.773**
Net Working Capital	3.085.537.725	1.104.743.894	1.058.961.544	180.805.010	532.357.848	176.924.524	741.365.609
Retained Earnings	596.465.142	80.319.522	0	0	60.935.719	0	0
Net Profit/Loss for the Period	730.698.325	324.506.976	371.280.446	62.987.690	20.756.415	28.391.530	378.514.162
Undistributed Profits	134.233.183	244.187.454	371.280.446	62.987.690	-40.179.304	28.391.530	378.514.162
X1	0,137456585	0,145802518	0,158222999	0,47788608	0,147134075	0,190924542	0,112823823
X2	0,005979909	0,032227511	0,055474258	0,166482888	-0,011104833	0,030638149	0,057603717
X3	0,029074823	0,03893929	0,052912249	0,163050598	0,001378433	0,024325382	0,056370208
X4	3,866106246	0,412922989	8,010967409	1,173234936	2,410146341	0,317284529	0,081334167

Note. Researcher's Computation

For the fiscal years 2019-2022, selected accounting data from the financial statements of 7 insurance companies operating in Turkey and the values of X1, X2, X3 and X4 are calculated as shown in Table 10. The Z scores are presented in Table 11.

Table 11 presents a compilation of the criteria used to determine the bankruptcy risk levels of the examined insurance companies, based on the Altman-Z score analytical model. It quantitatively evaluates the bankruptcy risk over the years to provide a detailed perspective on the financial health of each insurance firm.

Table 11

Bankruptcy Risk Values of Insurance Companies

Bankruptcy Risk Values of Insurance Companies According to the Altman-Z method, 2018-2022

	2018	2019	2020	2021	2022
Allianz Insurance	5,176	5,012	3,743	9,653	5,299
Anadolu Insurance	1,757	1,804	1,996	1,180	1,698
Axa Insurance	9,986	11,735	8,809	10,062	6,701
Groupama Insurance	6,005	7,372	5,565	6,454	5,175
Mapfre Insurance	3,469	3,366	3,319	2,309	-117,699
Ray Insurance	1,849	2,073	3,065	2,437	1,725
Türkiye Insurance	1,392	1,447	3,493	2,526	1,688

Note. Researcher's Computation

Table 11 presents the results obtained using the Z-Score method. These results are based on the calculation of specific financial indicators representing each insurance company, multiplied by the coefficients specified in the Z-Score method. These calculations are conducted to assess the bankruptcy risk of each insurance company.

In the service sector, the formula used for the Z-Score method calculates the Z" as follows:

$Z'' = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$

In this formula, X1, X2, X3, and X4 represent the financial indicators (Net Working Capital/Total Assets, Retained Earnings/Total Assets, Earnings Before Interest and Taxes (EBIT)/Total Assets, Market Value/Total Liabilities). Each indicator is multiplied by the coefficients specified in the formula to calculate the total Z" value. This formula is considered a measure used in the Altman-Z method for assessing bankruptcy risk.

Financial success levels are determined based on Altman-Z scores. A company is considered financially successful if its Altman-Z score is $Z'' \geq 2.6$, while scores in the range of $1.1 < Z'' < 2.6$ are considered the grey zone. If the Z" value is less than 1.1, the company is considered financially unsuccessful. These evaluations serve as a criterion for analyzing the bankruptcy risk of companies and assessing their financial performance.

Result and Recommendations

The insurance sector in Turkey plays a vital role in the financial system and holds a central position in risk management. This sector is crucial in mitigating various risks faced by companies and individuals, thereby maintaining a critical position within the financial system. Insurance companies need to continually update their decisions regarding financing, investment, and profit distribution under the influence of factors such as economic fluctuations, inflation, company size, indebtedness, and asymmetric information. This study primarily addresses the financial performance and subsequent bankruptcy risk of insurance companies.

Financial performance analyses aim to measure companies' performance, identify problems, and make improvements. These analyses help assess the companies' positions within

the sector and guide managers in making critical decisions. When evaluating multiple and often inconsistent criteria, methods like "Multi-Criteria Decision Making (MCDM)" analysis come into play. In this study, the WASPAS method was chosen, and the Entropy method was used to determine the criteria weights.

Financial failures affect not only businesses but also stakeholders such as shareholders, employees, and creditors. Therefore, financial health should be regularly monitored, bankruptcy probabilities should be determined, and solutions should be developed. The literature contains many models for assessing financial failure. These models analyze the financial status of businesses using financial ratios and other indicators, detecting risks beforehand and allowing for preventive measures. These approaches are critical in enhancing the sustainability of businesses, maintaining stakeholder trust, and effectively responding to crises.

This study analyzes the performance and bankruptcy risk of seven insurance companies in Turkey from 2018 to 2022. The analyses determined that profitability ratios are the main indicators of the financial success of insurance companies. Specifically, factors such as Asset Profitability, Equity Profitability, and Net Profit Margin significantly influenced the performance rankings of the companies. While Liquidity Ratios, like the Cash Ratio, were notably impactful in the performance ranking during 2020 and 2021, the Net Working Capital Turnover emerged as the most influential factor in 2022.

In the sector, Anadolu Insurance and Turkey Insurance were leading, with Axa Insurance and Groupama Insurance also holding significant positions. While Allianz Insurance's performance could not be distinctly classified as good or bad, Ray Insurance and especially Mapfre Insurance lagged in financial success.

In the second part of the study, the companies' bankruptcy risk was assessed using the Altman-Z Score Model. This model predicts the likelihood of bankruptcy by evaluating the financial health of companies through certain ratios. The assessment for the 2018-2022 period showed that Allianz Insurance, Axa Insurance, and Groupama Insurance did not carry bankruptcy risk. While Anadolu Insurance, Turkey Insurance, and Ray Insurance were not at the desired level of financial success, they did not carry bankruptcy risk, Mapfre Insurance was identified as financially unsuccessful, falling into the grey zone in 2021 and below the Z-Score of 1.1 in 2022.

This research was conducted by reviewing various studies in the existing literature. While supporting the general view that a company's performance can affect its bankruptcy risk, it emphasizes that this effect is not solely determinative. Although there is a significant relationship between business performance and bankruptcy risk, it is clear that other factors must be considered to understand this relationship. Thus, it can be said there is a significant relationship between performance and bankruptcy risk among large insurance companies, but this relationship should be viewed as just one element of a complex equation. To support this assertion, the following studies are referenced: [Opler and Titman (1994), Campbell, Hilscher, and Szilagyi (2011), Tan (2012), Yusuf, Karim, and Yunus (2014), Shahwan (2015), Shaukat and Affandi (205), Ege, Topaloğlu, and Erkol (2017), Öcek, Beyazgül, and Karadeniz (2023), and Karaçayır (2024)]. These studies demonstrate that the relationship between performance and bankruptcy risk needs to be viewed from a broad perspective, helping us understand the multifaceted factors affecting business sustainability.

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