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# The Impact of the Covid-19 Period on the Stock Returns and Financial Performance of Companies

## Covid-19 Döneminin Şirketlerin Hisse Senedi Getirileri ve Finansal Performansları Üzerindeki Etkisi

### Abstract

This study examines the relationship between the financial performance and annual stock returns of 25 companies from the food, construction, energy, transportation, and technology sectors traded on BIST. The study aims to observe how the COVID-19 period affected these relationships. Data from 2018-2019 before COVID-19 and 2021-2022 after COVID-19 were included in the analysis. The financial performances of the companies were analyzed using the TOPSIS method. The relationship between companies' stock returns and financial performance was examined using Spearman correlation analysis. According to the results of the analysis, it has been observed that the stock returns of the companies fluctuate constantly, regardless of the COVID-19 period. It was concluded that there is no significant relationship between companies' stock returns and financial performance.

**Keywords:** Financial performance, topsis, Covid-19, stock returns, Spearman

### Öz

Bu çalışmada BIST'de işlem gören gıda, inşaat, enerji, ulaşım ve teknoloji sektörlerinden olmak üzere toplam 25 firmanın finansal performansları ile yıllık hisse senedi getirileri arasındaki ilişki incelenmiştir. Çalışmada COVID-19 döneminin bu ilişkileri nasıl etkilediğinin gözlemlenmesi amaçlanmıştır. COVID-19 öncesine ait 2018-2019 yılları verileri ve COVID-19 sonrasında ait 2021-2022 yılları verileri analize dahil edilmiştir. Firmaların finansal performansları TOPSIS yöntemi kullanılarak analiz edilmiştir. Firmaların hisse senedi getirileri ile finansal performansları arasındaki ilişkiyi incelemek için Spearman korelasyon analizinden yararlanılmıştır. Analiz sonuçlarına göre firmaların hisse senedi getirilerinin, COVID-19 döneminden bağımsız olarak, sürekli bir dalgalanma halinde olduğu görülmüştür. Firmaların hisse senedi getirileri ile finansal performansları arasında anlamlı bir ilişki olmadığı sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Finansal performans, topsis, Covid-19, hisse senedi getirisi, Spearman



## Introduction

The Covid-19 virus can also be economically contagious (Baldwin & Mauro, 2020). While the Covid-19 epidemic is defined as "Corononomics" in terms of its economic consequences, it is also called "Black Swan" by some (Barua, 2020).

During the Covid-19 epidemic, different restrictions were imposed in many countries. In particular, necessary precautions have been taken and prohibitions have been imposed to prevent people from gathering together. In many countries, travel has been cancelled, concerts and sports competitions have been postponed, distance education has been introduced, businesses have switched to flexible working hours or working from home, curfews have been introduced, and mask mandatory (Kılıç, 2020). All these measures were felt economically, and this had a negative impact on the financial environment. While this situation favoured some sectors, it was against others (Öndeş & Özkan, 2021).

One of the best indicators of financial situation is financial performance analysis. Financial performance analysis is identified as summarizing the situation of the companies in the sector by evaluating their sizes with different ratios. According to the analysis results, companies can identify their advantages and disadvantages and use this information to determine their plans and strategies for the future (Pala, 2021). Companies can also conduct performance analysis to see how efficiently and effectively they align with their goals (Karakaş & Öztel, 2020). It is difficult for investors to invest their savings in suitable investment areas. The most appropriate allocation of savings requires evaluating the information obtained by monitoring the market and making the most appropriate choice using different analysis methods (Yalçiner, Atan, & Boztosun, 2005). Therefore, stocks are a tool that should be examined so that investors can invest correctly.

The study aimed to observe how the Covid-19 period affected the relationship between companies' financial performances and stock returns. Data from 2018-2019 before Covid-19 and 2021-2022 after Covid-19 were included in the analysis. The financial performances of the companies were analyzed using the TOPSIS method. Spearman correlation analysis examined the relationship between companies' stock returns and financial performances. This study reveals its originality in that it is one of the studies examining the relationship between financial performance and stock returns during the Covid-19 period across more than one sector. In this regard, the study includes the introduction section, a literature review on financial performance and stock returns, a theoretical framework regarding the methods used, and results obtained from the application.

The Covid-19 virus can also be economically contagious (Baldwin & Mauro, 2020). While the Covid-19 epidemic is defined as "Corononomics" in terms of its economic consequences, it is also called a "Black Swan" by some (Barua, 2020). During the Covid-19 pandemic, various restrictions were imposed in numerous countries. Specifically, essential precautions were implemented and prohibitions were enforced to prevent gatherings. Travel plans were canceled, concerts and sports events were postponed, distance learning was introduced, businesses transitioned to flexible working hours or remote work, curfews were imposed, and mask mandates were enforced (Kılıç, 2020). All these measures had economic repercussions, leading to a negative impact on the financial landscape. While these circumstances benefitted certain sectors, they posed challenges for others (Öndeş & Özkan, 2021).

One of the best indicators of the financial situation is financial performance analysis. Financial performance analysis is defined as summarizing the situation of companies in the sector by evaluating their performance using various ratios. Based on the analysis results, companies can identify their strengths and weaknesses and utilize this information when formulating their future plans and strategies (Pala, 2021). Companies can also conduct performance analysis to assess how effectively and efficiently they are aligned with their objectives (Karakaş & Öztel, 2020). Investing savings in appropriate investment areas is a challenging process for investors. Optimal allocation of savings necessitates evaluating market data and making informed decisions using various analytical methods (Yalçiner, Atan, & Boztosun, 2005). Therefore, stocks are a tool that investors should carefully consider when making investment decisions.

The study aimed to observe how the Covid-19 period affected the relationship between companies' financial performances and stock returns. Data from 2018-2019 before Covid-19 and 2021-2022 after Covid-19 were included in the analysis. The financial performances of the companies were analyzed using the TOPSIS method. Spearman correlation analysis was conducted to examine the relationship between companies' stock returns and financial performances. This study is distinguished by its examination of the relationship between financial performance and stock returns across multiple sectors during the Covid-19 period. The study comprises an introduction section, a literature review on financial performance and

stock returns, a theoretical framework detailing the methods employed, and the results obtained from the application.

### Literature Review

When the literature was reviewed, it was observed that the analysis focused on stocks when evaluating financial performance. For instance, in a study by Akbulut (2020), the performance of cement companies traded on BIST was analyzed. The study revealed that the best-performing companies during the selected data period were those with codes ADANA, ADABGR, and KONYA. Similarly, Ersoy (2020) assessed the financial performance of eight companies listed in the transportation index and concluded that companies with high profitability exhibited better performance. Additionally, Hacifettahoğlu and Perçin (2020), Şahin and Karacan (2020), and Ertikin (2019) examined the financial performances of companies operating in the construction sector across various time periods.

When examining the literature, it is evident that Multi-Criteria Decision Making (MCDM) methods are commonly employed in evaluating the financial performances of companies. Akbulut (2020) utilized the CRITIC and MABAC techniques, both of which are MCDM methods, in his study. Ersoy (2020) employed the GIA technique, another MCDM method. Hacifettahoğlu and Perçin (2020) utilized VIKOR and TOPSIS, Şahin and Karacan (2020) employed COPRAS and ARAS, while Ertikin (2019) used TOPSIS and PROMETHEE methods in his study.

The literature has investigated the relationships between stock returns and financial performance. Çalış and Sakarya (2020), Ünal and Yüksel (2017), as well as Sakarya and Aytekin (2013), explored the link between banks' financial performance and stock returns employing the PROMETHEE method. Saygılı and Şahin (2018) sought to analyze the relationship between companies' stock returns and financial performance using the TOPSIS method. The studies have concluded that there is no significant relationship between stock returns and the financial performance of banks or companies.

### Method

In this study, the TOPSIS method, one of the multi-criteria decision-making methods, was utilized. A definitive judgment made to solve encountered problems or to achieve specific goals can be referred to as a decision. Decision-making can be defined as the process where organizations, individuals, or decision-makers select from available options and implement these choices to attain their objectives (Yıldırım & Önder, 2018). Multi-criteria decision-making involves selecting, class one or more alternatives from a set of options with diverse characteristics. This process typically advances based on criteria with varying weights, considering multiple and often conflicting qualitative and quantitative criteria to provide support (Özbek, 2021). Multi-criteria decision-making methods encompass algorithms designed to assist individuals in making the most beneficial decisions. Various methods can be employed to select the most advantageous option, based on the available information (Dalbudak & Rençber, 2022). Different multi-criteria decision-making methods can be applied to achieve optimal outcomes in problem-solving scenarios (Öztel, 2016).

#### Topsis

TOPSIS is a multi-criteria decision-making method created by Hwang and Yoon in 1981. According to the TOPSIS method, the solution alternative will be closest to the positive ideal solution point and furthest away from the negative ideal solution point (Saygılı & Şahin, 2018), (Özbek, 2021).

#### Step 1: Creating the Decision Matrix

The first step of the TOPSIS method is to create the decision matrix. The decision matrix creates by the decision maker. The rows of the matrix show the alternatives and the columns show the criteria. In the matrix  $A_{ij}$ ,  $m$  refers to the number of alternatives and  $n$  refers to the number of criteria. The decision matrix is shown as follows:

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

#### Step 2: Creating the Standard Decision Matrix

The standard decision matrix is created using the decision matrix. Each value in the decision matrix is squared and these values are summed across the column. A total is obtained for each column. Each  $a_{ij}$  value in the decision matrix is divided by the square root of the sum of the column values in which it is located. In this way, the standard decision matrix is created. This equation is as follows:

$$y_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^m a_{kj}^2}}$$

It is called the standard decision matrix and  $R_{ij}$  is shown as follows:

$$R_{ij} = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \dots & \dots & \dots & \dots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix}$$

### Step 3: Creating the Weighted Standard Decision Matrix

A weighted standard decision matrix is created using predetermined criterion weights ( $w_i$ ). The sum of the values to be used  $w_i$  must equal 1.  $R_{ij}$  The standard decision matrix is created by multiplying the column values  $w_i$  in the matrix by the value. It is called the weighted standard decision matrix and  $V_{ij}$  is represented as follows:

$$V_{ij} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ \dots & \dots & \dots & \dots \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix} = \begin{bmatrix} v_{11} & v_{12} & \dots & v_{1n} \\ v_{21} & v_{22} & \dots & v_{2n} \\ \dots & \dots & \dots & \dots \\ v_{m1} & v_{m2} & \dots & v_{mn} \end{bmatrix}$$

### Step 4: Obtaining Positive Ideal Solution Values and Negative Ideal Solution Values

Ideal solution values are obtained after creating a weighted standard decision matrix. If the aim of the problem is maximization, the positive ideal solution value is found by selecting the maximum values of each column. The positive ideal solution value  $A^*$  is obtained as follows:

$$A^* = \{(max_i v_{ij} | j \in J), (min_i v_{ij} | j \in J') \mid i = 1, 2, 3, \dots, m\}$$

$$A^* = \{v_1^*, v_2^*, \dots, v_n^*\}$$

If the aim of the problem is minimization, the negative ideal solution value is found by selecting the minimum values of each column. The negative ideal solution value  $A^-$  is obtained as follows:

$$A^- = \{(min_i v_{ij} | j \in J), (max_i v_{ij} | j \in J') \mid i = 1, 2, 3, \dots, m\}$$

$$A^- = \{v_1^-, v_2^-, \dots, v_n^-\}$$

### Step 5: Calculation of Separation Measures

Separation measures are calculated by finding the distance values to the positive and negative ideal solution points. The Euclidean Distance Approach is used when calculating separation measures. There are two measures of separation: positive ideal discrimination and negative ideal separation.

Positive ideal distance  $S_i^*$ , defined as the distance of each alternative from the positive ideal solution and is calculated by the formula:

$$S_i^* = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^*)^2}$$

Negative ideal distance  $S_i^-$ , defined as the distance of each alternative from the negative ideal solution and is calculated by the formula:

$$S_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}$$

There are as many  $S_i^-$  and  $S_i^*$  as there are alternatives compared.

### Stage 6: Calculation of Proximity Based on the Ideal Solution

When calculating decision points according to the ideal solution, positive ideal and negative ideal distance values are used. The closeness to the ideal solution for each alternative ( $C_i^*$ ) is calculated by the formula:

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^+}$$

$C_i^*$  takes a value between 0 and 1.  $C_i^* = 1$  means that decision alternative  $i$  lies on the positive ideal solution point, and  $C_i^* = 0$  means that decision alternative  $i$  lies on the negative ideal solution point.

When the  $C_i^*$  value is sorted from largest to smallest, a ranking is made among the alternatives from best to most accurate. The best alternative to choose is the alternative with the largest  $C_i^*$  value will be the alternative that is closest to the positive ideal solution point and furthest from the negative ideal solution point.

### Application

In the study, the financial performances and stock returns of 25 companies in the BIST index were analyzed using the TOPSIS method, a multi-criteria decision-making approach, based on 8 financial ratios. Four years of data were utilized for the pre-Covid-19 (2018-2019) and post-Covid-19 (2021-2022) periods. The data was sourced from the official websites of Investing (investing.com) and Kap (Public Disclosure Platform). An illustrative application includes the computations for 2022 presented in the Appendix, with the outcomes for all years detailed in this section.

	COMPANY NAME	CODE
FOOD SECTOR	ANADOLU EFES BİRACILIK VE MALT SANAYİİ A.Ş.	AEFES
	COCA-COLA İÇECEK A.Ş.	CCOLA
	DARDANEL ÖNENTAŞ GIDA SANAYİ A.Ş.	DARDL
	TAT GIDA SANAYİ A.Ş.	TATGD
	ÜLKER BİSKÜVİ SANAYİ A.Ş.	ULKER
CONSTRUCTION SECTOR	ANEL ELEKTRİK PROJE TAAHHÜT VE TİCARET A.Ş.	ANELE
	EDİP GAYRİMENKUL YATIRIM SANAYİ VE TİCARET A.Ş.	EDIP
	ENKA İNŞAAT VE SANAYİ A.Ş.	ENKAI
	KUYAŞ YATIRIM A.Ş.	KUYAS
	YEŞİL YAPI ENDÜSTRİSİ A.Ş.	YYAPI
ENERGY SECTOR	AKSA ENERJİ ÜRETİM A.Ş.	AKSEN
	ODAS ELEKTRİK ÜRETİM SANAYİ TİCARET A.Ş.	ODAS
	ENERJİSA ENERJİ A.Ş.	ENJSA
	NATUREL YENİLENEBİLİR ENERJİ TİCARET A.Ş.	NATEN
	ZORLU ENERJİ ELEKTRİK ÜRETİM A.Ş.	ZOREN
TRANSPORTATION SECTOR	BEYAZ FİLO OTO KİRALAMA A.Ş.	BEYAZ
	ÇELEBİ HAVA SERVİSİ A.Ş.	CLEBI
	PEGASUS HAVA TAŞIMACILIĞI A.Ş.	PGSUS
	TRABZON LİMAN İŞLETMECİLİĞİ A.Ş.	TLMAN
	TÜRK HAVA YOLLARI A.O.	THYAO
TECHNOLOGY SECTOR	DESPEC BİLGİSAYAR PAZARLAMA VE TİCARET A.Ş.	DESPC
	LİNK BİLGİSAYAR SİSTEMLERİ YAZILIMI VE DONANIMI SANAYİ VE TİCARET A.Ş.	LINK
	KAREL ELEKTRONİK SANAYİ VE TİCARET A.Ş.	KAREL
	LOGO YAZILIM SANAYİ VE TİCARET A.Ş.	LOGO
	KRON TEKNOLOJİ A.Ş.	KRONT

**Table 1. Names and Codes of Companies Used in the Analysis**

In the study, companies in the food, construction, energy, transportation and technology sectors in the BIST index were examined. Five companies under each sector were selected and included in the analysis. Table 1 shows the names and codes of the companies included in the study.

	Criteria/Financial Ratio	Direction of Effect	Abbreviations (Codes)
Liquidity Ratios	Current Rate	+	K1
	Cash Rate	+	K2
Activity Rates	Receivables Turnover Rate	+	K3
	Stock Turnover Rate	+	K4
Financial Structure Ratios	Leverage Ratio	-	K5
	Total Foreign Resources / Equity	-	K6
Profitability Ratios	Return on Assets	+	K7
	Return on Equity	+	K8

**Table 2 . Financial Ratios Used in the Study and Their Impact Directions**

Given that the primary objective of companies is profitability, financial ratios serve as fundamental indicators that offer insights into financial performance. Utilizing financial ratios to assess company performance is a longstanding yet commonly employed and highly efficient tool for decision-makers, business analysts, and investors (Delen, Kuzey, & Uyar, 2013). This study scrutinised the liquidity, activity, financial structure, and profitability ratios of the companies. Within each ratio category, two financial ratios were chosen and utilized as criteria in the analysis: current and cash ratio from liquidity ratios; receivables turnover and stock turnover from activity ratios; leverage and total foreign resources/equity ratio from financial structure ratios. Return on assets and return on equity ratios were encompassed in the study among the profitability ratios. Table 2 illustrates the ratios considered in the study and their impact on financial performance.

	Company Codes	2018	2019	2021	2022
FOOD SECTOR	AEFES	14	13	15	14
	CCOLA	11	9	11	12
	DARDL	25	20	18	16
	TATGD	10	7	7	17
	ULKER	7	10	22	19
CONSTRUCTION SECTOR	ANELE	15	18	23	21
	EDIP	19	17	2	4
	ENKAI	8	5	8	8
	KUYAS	22	24	4	3
	YYAPI	16	22	13	6
ENERGY SECTOR	AKSEN	12	16	17	25
	ODAS	23	23	16	7
	ENJSA	21	21	20	11
	NATEN	17	12	9	10
	ZOREN	24	25	24	24
TRANSPORTATION SECTOR	BEYAZ	13	14	10	18
	CLEBI	5	11	14	15
	PGSUS	20	15	25	23
	TLMAN	2	2	3	2
	THYAO	18	19	21	20
TECHNOLOGY SECTOR	DESPC	3	8	12	13
	LINK	1	1	1	1
	KAREL	9	6	19	22
	LOGO	4	3	6	9
	KRONT	6	4	5	5

**Table 3. Financial Performance Rankings of Companies according to the TOPSIS method**

Table 3 shows the four-year financial performance rankings of the companies in the study according to the TOPSIS method. LINK company ranks first in the performance rankings in all years. The findings are shown in Table 4.

	2018		2019		2021		2022	
	Return (%)	Rank	Return (%)	Rank	Return (%)	Rank	Return (%)	Rank
AEFES	-14.48	6	13.93	24	32.68	7	89.08	17
CCOLA	-8.12	4	26.90	22	33,24	6	85.54	18
DARDL	-57.18	17	123.55	3	-60.43	23	70.51	23
TATGD	-29.61	11	49.88	11	3.39	13	113.22	12
ULKER	-27.64	10	42.15	15	-28.34	20	91.96	15
ANELE	-77.59	20	68.38	8	-5.91	16	56.24	24
EDIP	-42.69	14	59.07	9	-17.39	19	150.37	6
ENKAI	-16.00	7	39.20	17	76.01	3	90.18	16
KUYAS	-115.88	23	37.82	19	79.83	2	164.29	4
YYAPI	-136.69	24	93.16	4	-69.31	24	102.73	14
AKSEN	-43.25	15	34.93	20	98.79	1	156.91	5
ODAS	-114.43	22	39.95	16	-77.99	25	212.77	1
ENJSA	-21.55	8	45.04	12	11,13	11	110.40	13
NATEN	0.00	3	77.19	7	21.66	9	146.61	8
ZOREN	-24.98	9	28.14	21	-42.09	22	145.48	9
BEYAZ	-251.06	25	14.63	23	-15.02	18	76.40	20
CLEBI	62.10	1	55.96	10	-4.21	15	146.63	7
PGSUS	-38.85	13	132.70	1	12.99	10	173.17	3
TLMAN	-80.79	21	43.87	14	7.18	12	70.84	22
THYAO	2.64	2	-10.81	25	43.87	5	195.13	2
DESPC	-9.02	5	43.95	13	-36.13	21	84.76	19
LINK	-53.86	16	78.07	6	-12.32	17	74.97	21
KAREL	-33.21	12	124.84	2	56.65	4	142.08	10
LOGO	-77.23	19	80.66	5	29.01	8	53.75	25
KRONT	-75.45	18	37.99	18	1.51	14	115.74	11

**Table 4. Annual Stock Returns and Rankings of Companies**

When the data in Table 4 is analyzed, it is observed that there is a fluctuation in the annual stock returns of the companies and that no company provides a positive return in all years. When evaluated in general, it was observed that there was a fluctuation in the annual returns of the companies.

	Correlation Coefficient	Sig. (2-tailed)
<b>2022</b>	-0.158	0.452
<b>2021</b>	0.101	0.632
<b>2019</b>	0.158	0.449
<b>2018</b>	0.102	0.629

**Table 5. Correlation Results Between Financial Performances of Companies and Stock Returns**

Spearman correlation analysis was conducted to ascertain a statistically significant relationship between the financial performance of the companies and their stock returns. Table 5 presents the outcomes of the Spearman correlation analysis. Based on the correlation analysis findings depicted in Table 5, it was noted that there was no significant association between the financial performance of the companies and their annual stock returns ( $p > 0.05$ ).

## Conclusion

Looking at the financial performance results of companies, it can be seen that most companies were not affected much by 2020, which was the Covid-19 period. While DARDL, one of the companies in the food industry, has increased its performance rankings every year, ULKER has gradually declined until 2022. EDIP and KUYAS in construction industry companies have made serious progress in their performance rankings after 2020, the Covid-19 period. ODAS has shown better financial performance every year when operating in the energy sector.

TLMAN has always had the highest performance ranking among companies operating in the transportation sector. In the technology sector, LINK ranked first in the performance rankings every year among all sectors included in the study. DESPC, KAREL, and LOGO, other companies operating in the technology sector, fell to lower performance rankings after 2020. Therefore, it can be said that the Covid-19 period negatively affected the financial performance of these companies.

Looking at the stock returns of the companies, it was concluded that all companies brought more returns in 2022 than the previous year, and no company had a negative return. AEFES and CCOLA operating in the food sector, ENKAI and KUYAS in the construction sector, and AKSEN in the energy sector have provided more stock returns every year.

While LINK ranked first in performance rankings yearly, it could not even enter the top 5 in companies' stock returns rankings. It has been observed that KUYAS company has increased in both performance rankings and stock returns after 2020. It was concluded that although AKSEN did not improve its financial performance after Covid-19, stock returns increased.

It has been observed that the companies that rank first in the stock returns ranking are those operating in the energy and transportation sectors. These companies are CLEBI, PGSUS, AKSEN and ODAS, respectively, according to years. While THYAO was in the top 5 in stock returns in all years except 2019, it ranked last in 2019. When looking at the financial performance of the company, it is seen that it ranks at the bottom in all years. Looking at the correlation results in Table 5, it can be said that there is no significant relationship between the financial performance of the companies and their annual stock returns.

Future studies can contribute to the literature by including more years or companies. At the same time, a comparison between companies and stock returns can be made by considering companies in one sector rather than five different sectors. Looking at the financial performance results of companies, it can be observed that most companies were not significantly affected by the Covid-19 pandemic in 2020. Among them, DARDL, a company in the food industry, has consistently improved its performance rankings annually, while ULKER experienced a gradual decline until 2022. In the construction industry, EDIP and KUYAS have made significant progress in their performance rankings post-2020. Operating in the energy sector, ODAS has demonstrated improved financial performance each year.

TLMAN consistently held the highest performance ranking among companies in the transportation sector. Within the technology sector, LINK consistently secured the top position in performance rankings across all sectors included in the study. Conversely, companies like DESPC, KAREL, and LOGO operating in the technology sector experienced a decline in their performance rankings post-2020. Hence, it can be inferred that the Covid-19 pandemic had a negative impact on the financial performance of these companies.

Analyzing the stock returns of the companies revealed that all companies delivered higher returns in 2022 compared to the previous year, with none reporting negative returns. Companies such as AEFES and CCOLA in the food sector, ENKAI and KUYAS in the construction sector, and AKSEN in the energy sector consistently provided increased stock returns annually.

Although LINK consistently ranked first in performance rankings annually, it did not feature in the top 5 for companies' stock returns rankings. Notably, KUYAS demonstrated improvements in both performance rankings and stock returns post-2020. Despite AKSEN's stagnant financial performance after the Covid-19 pandemic, stock returns surged.

Companies operating in the energy and transportation sectors, namely CLEBI, PGSUS, AKSEN, and ODAS, topped the stock returns rankings over the years. THYAO consistently ranked within the top 5 for stock returns in all years except 2019 when it placed last. However, when examining the company's financial performance, it consistently ranked at the bottom. The correlation results presented in Table 5 indicate a lack of significant relationship between companies' financial performance and their annual stock returns.

Future studies could enhance the existing literature by extending the analysis to include more years or companies. Additionally, a comparative analysis focusing on companies within a single sector, rather than across five different sectors, could provide valuable insights into company performance and stock returns.



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## Appendix

## TOPSIS Application of 2022

Decision Matrix								
	K1	K2	K3	K4	K5	K6	K7	K8
AEFES	1,226359	0,567843	6,420633	-4,08012	0,575713	1,356896	0,045301	0,106771
CCOLA	1,63076	0,813295	8,017452	-5,41528	0,611758	1,57571	0,073762	0,189988
DARDL	0,793306	0,011749	7,859064	-5,97156	0,453834	0,830946	0,021115	0,03866
TATGD	1,259989	0,092579	1,16495	-0,82325	0,751172	3,018843	0,066539	0,26741
ULKER	1,490718	0,548034	5,643489	-3,96056	0,797075	3,927931	0,00527	0,025971
ANELE	0,753244	0,040907	4,293128	-4,65638	0,786591	3,685836	0,022257	0,104293
EDIP	1,023283	0,176761	635,2842	-320,937	0,78128	3,572061	0,271216	1,240014
ENKAI	2,386308	0,692573	8,877484	-6,82384	0,237059	0,310718	0,01318	0,017275
KUYAS	4,15046	0,355796	2,088371	-0,73834	0,257359	0,346545	0,323325	0,435372
YYAPI	0,877634	0,032283	0,027737	-0,06448	0,374435	0,598555	0,314966	0,50349
AKSEN	1,430591	0,117462	186,7767	-164,482	0,429518	0,752902	0,146996	0,25767
ODAS	1,432684	0,499884	12,41503	-7,20429	0,436368	0,774206	0,249796	0,44319
ENJSA	0,703607	0,267839	54,05298	-43,9219	0,635534	1,743738	0,244947	0,672072
NATEN	1,854903	0,612799	37,90948	-24,2712	0,263692	0,358127	0,099161	0,134673
ZOREN	0,598624	0,10177	58,91987	-51,2849	0,738852	2,829239	0,000593	0,002272
BEYAZ	1,164429	0,201443	7,322151	-6,99723	0,779742	3,540133	0,062746	0,284876
CLEBI	1,492322	0,901576	93,89505	-60,3432	0,596066	1,475652	0,143342	0,354866
PGSUS	0,997959	0,508595	85,17386	-62,0992	0,811647	4,309194	0,074112	0,393474
TLMAN	3,423018	0,583524	42,33445	-19,0275	0,223886	0,28847	0,520745	0,670964
THYAO	0,877012	0,494625	50,22095	-38,0129	0,686422	2,189002	0,081981	0,261438
DESPC	1,698637	0,025828	7,299107	-6,76564	0,581174	1,387625	0,09501	0,226848
LINK	7,042514	8,099214	164,6904	-16,498	0,131685	0,151655	0,387859	0,44668
KAREL	1,013644	0,059065	2,577771	-2,00033	0,80707	4,183239	0,013106	0,067932
LOGO	0,91499	0,193294	184,6079	-43,4297	0,550473	1,22456	0,159124	0,35398
KRONT	1,518257	0,387124	116,0236	-15,6948	0,469262	0,88417	0,222074	0,418425

Standard Decision Matrix								
	K1	K2	K3	K4	K5	K6	K7	K8
AEFES	0,113855	0,067802	0,008722	-0,01063	0,195519	0,119607	0,045614	0,051597
CCOLA	0,1514	0,09711	0,010891	-0,01411	0,20776	0,138895	0,07427	0,091812
DARDL	0,073651	0,001403	0,010676	-0,01556	0,154127	0,073246	0,021261	0,018683
TATGD	0,116978	0,011054	0,001582	-0,00215	0,255107	0,266104	0,066998	0,129226
ULKER	0,138399	0,065437	0,007666	-0,01032	0,270696	0,346238	0,005306	0,01255
ANELE	0,069931	0,004884	0,005832	-0,01214	0,267136	0,324898	0,022411	0,0504
EDIP	0,095002	0,021106	0,862978	-0,83641	0,265332	0,314869	0,273086	0,599237
ENKAI	0,221546	0,082695	0,012059	-0,01778	0,080508	0,027389	0,013271	0,008348
KUYAS	0,38533	0,042483	0,002837	-0,00192	0,087402	0,030547	0,325555	0,210393
YYAPI	0,08148	0,003855	3,77E-05	-0,00017	0,127163	0,052761	0,317138	0,243312
AKSEN	0,132816	0,014025	0,25372	-0,42867	0,145869	0,066367	0,14801	0,124519
ODAS	0,133011	0,059688	0,016865	-0,01878	0,148196	0,068245	0,251519	0,214172

ENJSA	0,065323	0,031981	0,073426	-0,11447	0,215835	0,153707	0,246637	0,324779
NATEN	0,17221	0,07317	0,051497	-0,06325	0,089553	0,031568	0,099845	0,065081
ZOREN	0,055576	0,012152	0,080038	-0,13366	0,250923	0,249391	0,000597	0,001098
BEYAZ	0,108106	0,024053	0,009947	-0,01824	0,26481	0,312055	0,063179	0,137666
CLEBI	0,138548	0,107651	0,127548	-0,15726	0,202431	0,130075	0,144331	0,171489
PGSUS	0,092651	0,060728	0,115701	-0,16184	0,275645	0,379846	0,074623	0,190146
TLMAN	0,317794	0,069675	0,057508	-0,04959	0,076034	0,025428	0,524337	0,324243
THYAO	0,081422	0,05906	0,068221	-0,09907	0,233117	0,192956	0,082547	0,12634
DESPC	0,157702	0,003084	0,009915	-0,01763	0,197374	0,122316	0,095665	0,109624
LINK	0,653829	0,967072	0,223718	-0,043	0,044722	0,013368	0,390535	0,215858
KAREL	0,094107	0,007053	0,003502	-0,00521	0,274091	0,368743	0,013196	0,032828
LOGO	0,084948	0,02308	0,250774	-0,11319	0,186947	0,107942	0,160221	0,171061
KRONT	0,140955	0,046224	0,157608	-0,0409	0,159367	0,077938	0,223606	0,202204

Weighted Standard Decision Matrix								
	K1	K2	K3	K4	K5	K6	K7	K8
AEFES	0,014232	0,008475	0,00109	-0,00133	0,02444	0,014951	0,005702	0,00645
CCOLA	0,018925	0,012139	0,001361	-0,00176	0,02597	0,017362	0,009284	0,011476
DARDL	0,009206	0,000175	0,001334	-0,00195	0,019266	0,009156	0,002658	0,002335
TATGD	0,014622	0,001382	0,000198	-0,00027	0,031888	0,033263	0,008375	0,016153
ULKER	0,0173	0,00818	0,000958	-0,00129	0,033837	0,04328	0,000663	0,001569
ANELE	0,008741	0,000611	0,000729	-0,00152	0,033392	0,040612	0,002801	0,0063
EDIP	0,011875	0,002638	0,107872	-0,10455	0,033167	0,039359	0,034136	0,074905
ENKAI	0,027693	0,010337	0,001507	-0,00222	0,010064	0,003424	0,001659	0,001044
KUYAS	0,048166	0,00531	0,000355	-0,00024	0,010925	0,003818	0,040694	0,026299
YYAPI	0,010185	0,000482	4,71E-06	-2,1E-05	0,015895	0,006595	0,039642	0,030414
AKSEN	0,016602	0,001753	0,031715	-0,05358	0,018234	0,008296	0,018501	0,015565
ODAS	0,016626	0,007461	0,002108	-0,00235	0,018524	0,008531	0,03144	0,026771
ENJSA	0,008165	0,003998	0,009178	-0,01431	0,026979	0,019213	0,03083	0,040597
NATEN	0,021526	0,009146	0,006437	-0,00791	0,011194	0,003946	0,012481	0,008135
ZOREN	0,006947	0,001519	0,010005	-0,01671	0,031365	0,031174	7,47E-05	0,000137
BEYAZ	0,013513	0,003007	0,001243	-0,00228	0,033101	0,039007	0,007897	0,017208
CLEBI	0,017318	0,013456	0,015944	-0,01966	0,025304	0,016259	0,018041	0,021436
PGSUS	0,011581	0,007591	0,014463	-0,02023	0,034456	0,047481	0,009328	0,023768
TLMAN	0,039724	0,008709	0,007188	-0,0062	0,009504	0,003178	0,065542	0,04053
THYAO	0,010178	0,007382	0,008528	-0,01238	0,02914	0,024119	0,010318	0,015793
DESPC	0,019713	0,000385	0,001239	-0,0022	0,024672	0,01529	0,011958	0,013703
LINK	0,081729	0,120884	0,027965	-0,00537	0,00559	0,001671	0,048817	0,026982
KAREL	0,011763	0,000882	0,000438	-0,00065	0,034261	0,046093	0,00165	0,004104
LOGO	0,010618	0,002885	0,031347	-0,01415	0,023368	0,013493	0,020028	0,021383
KRONT	0,017619	0,005778	0,019701	-0,00511	0,019921	0,009742	0,027951	0,025276

Positive Ideal and Negative Ideal Solution Values								
	K1	K2	K3	K4	K5	K6	K7	K8
A*	0,081729	0,120884	0,107872	-2,1E-05	0,00559	0,001671	0,065542	0,074905
A-	0,006947	0,000175	4,71E-06	-0,10455	0,034456	0,047481	7,47E-05	0,000137

Positive Ideal Discrimination Measures								
	K1	K2	K3	K4	K5	K6	K7	K8
AEFES	0,45558	1,263573	1,140241	0,000171	0,035531	0,017636	0,358087	0,468608
CCOLA	0,394429	1,182553	1,134458	0,000304	0,041534	0,02462	0,3165	0,402312
DARDL	0,525948	1,457058	1,135031	0,00037	0,018703	0,005602	0,395446	0,52663
TATGD	0,450327	1,428079	1,159379	6,11E-06	0,069159	0,099806	0,32681	0,345172
ULKER	0,415107	1,270228	1,143061	0,000161	0,079788	0,173129	0,420926	0,537814
ANELE	0,532713	1,446571	1,147969	0,000224	0,077294	0,151642	0,39364	0,47066
EDIP	0,48795	1,398207	0	1,09267	0,076045	0,142036	0,098636	0
ENKAI	0,291983	1,222066	1,131349	0,000485	0,002001	0,000307	0,408107	0,545546
KUYAS	0,112643	1,335727	1,156005	4,82E-06	0,002846	0,000461	0,061741	0,236249
YYAPI	0,51185	1,449669	1,163542	0	0,01062	0,002425	0,06708	0,197942
AKSEN	0,424147	1,419216	0,579993	0,286893	0,015986	0,004389	0,221284	0,35212
ODAS	0,423831	1,286479	1,118607	0,000541	0,016729	0,004705	0,116296	0,23168
ENJSA	0,541155	1,366244	0,974051	0,020413	0,04575	0,030773	0,120496	0,117699
NATEN	0,362433	1,248533	1,02891	0,006219	0,00314	0,000518	0,281552	0,445817
ZOREN	0,559228	1,424802	0,957807	0,027843	0,066436	0,087042	0,428598	0,559016
BEYAZ	0,465334	1,389508	1,136974	0,00051	0,075686	0,139396	0,332291	0,332886
CLEBI	0,414867	1,15407	0,84509	0,038561	0,038863	0,021282	0,225632	0,285888
PGSUS	0,492064	1,283531	0,872536	0,040841	0,083321	0,209853	0,316004	0,261492
TLMAN	0,176437	1,258316	1,013723	0,003816	0,001532	0,000227	0	0,118158
THYAO	0,511953	1,28826	0,986937	0,015283	0,055458	0,050393	0,304966	0,349424
DESPC	0,384597	1,45199	1,137057	0,000477	0,03641	0,018546	0,287124	0,374563
LINK	0	0	0,638522	0,002866	0	0	0,027973	0,229655
KAREL	0,489514	1,440059	1,154219	3,98E-05	0,082203	0,19733	0,408226	0,501279
LOGO	0,505665	1,392378	0,585616	0,019958	0,031606	0,013975	0,207156	0,28646
KRONT	0,410999	1,32494	0,777418	0,002593	0,020537	0,006514	0,141311	0,246305

Negative Ideal Discrimination Measures								
	K1	K2	K3	K4	K5	K6	K7	K8
AEFES	0,005307	0,006889	0,000118	1,065492	0,010032	0,105819	0,003166	0,003985
CCOLA	0,014347	0,014312	0,000184	1,056531	0,007201	0,090714	0,008481	0,012858
DARDL	0,00051	0	0,000177	1,052809	0,023073	0,14688	0,000667	0,000483
TATGD	0,005891	0,000146	3,73E-06	1,087508	0,000659	0,020214	0,006889	0,025651
ULKER	0,010718	0,006407	9,09E-05	1,066296	3,83E-05	0,001765	3,47E-05	0,000205
ANELE	0,000322	1,89E-05	5,25E-05	1,06162	0,000113	0,004718	0,000743	0,003798
EDIP	0,002429	0,000607	1,163542	0	0,000166	0,006597	0,116016	0,559016
ENKAI	0,04304	0,010326	0,000226	1,047119	0,059498	0,194103	0,000251	8,21E-05
KUYAS	0,169902	0,002637	1,22E-05	1,088085	0,055368	0,19064	0,164996	0,068445
YYAPI	0,001048	9,39E-06	0	1,09267	0,034449	0,167163	0,15656	0,091668
AKSEN	0,009322	0,000249	0,100554	0,259779	0,026315	0,153546	0,033954	0,023801
ODAS	0,009369	0,005308	0,000442	1,044584	0,02538	0,151711	0,098378	0,070938
ENJSA	0,000148	0,001461	0,008415	0,814387	0,005589	0,079905	0,094587	0,163702
NATEN	0,021255	0,008048	0,004138	0,934025	0,05411	0,189527	0,015391	0,006397
ZOREN	0	0,000181	0,01	0,77167	0,000955	0,026591	0	0

BEYAZ	0,004311	0,000802	0,000153	1,045963	0,000183	0,007181	0,006119	0,029142
CLEBI	0,010757	0,017639	0,025405	0,720695	0,008375	0,097477	0,03228	0,045364
PGSUS	0,002148	0,005499	0,020903	0,711016	0	0	0,008562	0,055843
TLMAN	0,107434	0,007283	0,005161	0,967336	0,062257	0,196269	0,428598	0,163161
THYAO	0,001044	0,005194	0,007264	0,8495	0,002826	0,054575	0,010493	0,024509
DESPC	0,016296	4,42E-06	0,000152	1,047507	0,009573	0,103627	0,014122	0,018403
LINK	0,559228	1,457058	0,078176	0,983614	0,083321	0,209853	0,23758	0,072066
KAREL	0,00232	4,99E-05	1,87E-05	1,079525	3,78E-06	0,000193	0,000248	0,001573
LOGO	0,001348	0,000734	0,098232	0,817283	0,012293	0,115518	0,039812	0,045137
KRONT	0,01139	0,003139	0,038794	0,98881	0,021126	0,14242	0,077708	0,063193

Positive Ideal, Negative Ideal and Solution Values Table					
$S_i^*$		$S_i$		$C_i^*$	
S*1	1,93376	S-1	1,095813	$C^*_1$	0,361706
S*2	1,869949	S-2	1,097556	$C^*_2$	0,369858
S*3	2,016132	S-3	1,106616	$C^*_3$	0,354373
S*4	1,969451	S-4	1,070963	$C^*_4$	0,352242
S*5	2,010028	S-5	1,041899	$C^*_5$	0,341391
S*6	2,054437	S-6	1,035077	$C^*_6$	0,335029
S*7	1,815363	S-7	1,359548	$C^*_7$	0,428216
S*8	1,897852	S-8	1,163892	$C^*_8$	0,38014
S*9	1,704605	S-9	1,319123	$C^*_9$	0,436257
S*10	1,844756	S-10	1,242404	$C^*_{10}$	0,402442
S*11	1,817699	S-11	0,779436	$C^*_{11}$	0,300114
S*12	1,788538	S-12	1,185796	$C^*_{12}$	0,398676
S*13	1,793483	S-13	1,08083	$C^*_{13}$	0,376031
S*14	1,837695	S-14	1,110356	$C^*_{14}$	0,376641
S*15	2,027504	S-15	0,899665	$C^*_{15}$	0,30735
S*16	1,967889	S-16	1,045876	$C^*_{16}$	0,347033
S*17	1,739038	S-17	0,978771	$C^*_{17}$	0,360132
S*18	1,886701	S-18	0,896644	$C^*_{18}$	0,322146
S*19	1,603811	S-19	1,391941	$C^*_{19}$	0,464638
S*20	1,887505	S-20	0,977448	$C^*_{20}$	0,341174
S*21	1,921136	S-21	1,099857	$C^*_{21}$	0,364071
S*22	0,948165	S-22	1,918566	$C^*_{22}$	0,669252
S23	2,067092	S-23	1,04112	$C^*_{23}$	0,334958
S*24	1,744367	S-24	1,063182	$C^*_{24}$	0,378687
S*25	1,711904	S-25	1,160422	$C^*_{25}$	0,404001