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Determining the Financial Performances of ISE Tourism Companies in the Period of 2009-2020 by Data Envelope Analysis

(Araştırma Makalesi)

BIST Turizm Şirketlerinin 2009-2020 Dönem Aralığındaki Finansal Performanslarının Veri Zarflama Analizi ile Tespiti

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ABSTRACT

The tourism sector makes significant contributions to national and regional development. On the other hand, emerging political instabilities and any crisis have a significant impact on the development of the sector. In this study, it is aimed to determine the financial performance of companies within the scope of Istanbul Stock Exchange (ISE) Tourism index between 2009-2020. For this purpose, the Malmquist Total Factor Productivity index was created by using the financial ratios calculated from the financial statements of the companies. As a result of the study, it was determined that there was a significant decrease in the performances and productivity of tourism companies between 2016-2020. It has been revealed that the effects of the political crises that took place in Turkey were involved in the decrease in productivity in this period.

Anahtar kelimeler:
Finansal Performans, Finansal Oranlar, Malmquist Toplam Faktör Verimlilik Endeksi, Turizm Sektörü

ÖZET

Turizm sektörü ulusal ve bölgesel kalkınmaya önemli katkılar sağlamaktadır. Öte yandan, ortaya çıkan siyasi istikrarsızlıklar ve herhangi bir kriz durumu sektörün gelişimini önemli ölçüde etkilemektedir. Bu çalışmada Borsa İstanbul (BİST) Turizm endeksi kapsamındaki şirketlerin 2009-2020 yılları arasındaki finansal performanslarının tespit edilmesi amaçlanmıştır. Bu amaçla şirketlere ait finansal tablolardan hesaplanan finansal oranlar kullanılarak, Malmquist Toplam Faktör Verimliliği endeksi oluşturulmuştur. Çalışma sonucunda, 2016-2020 yılları arasında turizm işletmelerinin performanslarında ve verimliliklerinde önemli bir azalış olduğu tespit edilmiştir. Bu dönemde ortaya çıkan verimlilik azalışında, Türkiye'de meydana gelen siyasi krizlerin etkilerinin bulunduğu ortaya çıkmıştır.

1. INTRODUCTION

In the present century, tourism which has become an economic and social event, is considered as an invisible foreign trade item of countries. The economic benefits provided by the tourism sector and the political effects created by the sector contribute significantly to national and regional development. However, economic, and political instabilities occurring worldwide or regionally, and any emerging crisis can significantly affect the development of the tourism sector. This situation also significantly reduces the income come from the sector. As a matter of fact, tourism activities are affected very quickly by every crisis that affects the masses, and sometimes even individual crises can cause tourists to change their routes (Sarıçay and Ünal, 2014).

The economic and political crises that have occurred in Turkey have slowed the growth rate in the tourism sector from time to time. It is seen that the most important factor in the background of the decrease in the number of foreign tourists coming to Turkey and the decrease in the incomes obtained from tourism is the economic and political crises that have emerged in Turkey. The mortgage crisis, which started in the United States of America in 2008 and then spread to the whole world, inevitably affected the Turkish tourism sector as well as other sectors. The political events in Egypt in 2011 and the anti-government protests in the context of the Arab Spring negatively affected the Turkish tourism sector. The political events that took place in Syria have affected the tourism sector in Turkey. The tension between Ukraine and Russia, which started in 2014, has slowed the desired growth in Turkish tourism. Increasing Syrian events in 2015, terrorism, increasing geopolitical risks for Turkey and the Syrian migrant crisis have deeply affected the Turkish tourism sector (Karaçor and Garda, 2015).

It was claimed that the Russian warplane, which violated the border was shot down by Turkish warplanes on the Syrian border on November 24, 2015. This situation caused serious problems both economically and politically between the two countries. After the plane was shot down, a series of economic sanctions decisions taken by the Russian authorities against Turkey, banned the export of many products from Turkey. Russian citizens were also urged not to go on holiday to Turkey. This political tension between the two countries caused a significant decrease in the number of Russian tourists coming to Turkey. After all, the first of the countries sending the highest number of tourists to Turkey between the 2015-2017 period is Germany (22,595,351 visitors), and the second is the Russian Federation (22,212,985 visitors) (Tursab, 2020). With the coup attempt on 15 July 2016, the trust of foreign tourists in Turkey was shaken. This situation has caused a decrease in the number of tourists coming to Turkey.

The Covid-19 pandemic, which started in China's Wuhan region in November 2019, has also deeply affected most industries since 2020. A few measures have been taken all over the world to prevent the spread of the epidemic during the pandemic process. In this context, restrictions such as travel restrictions, strict quarantine practices, curfews, personal isolation measures, closure of workplaces except for urgent needs, transfer of many services, including education, from physical environment to the internet environment, were implemented. Especially due to the travel restrictions put into practice, the tourism sector has taken a serious blow all over the world in 2020 (Bakan, 2020).

In this study, it is aimed to determine the financial performance of companies operating within the scope of Istanbul Stock Exchange (ISE) Tourism index between 2009-2020. For this purpose, Input Oriented Data Envelopment Analysis (DEA) was carried out with the financial ratios calculated from the period-end financial statements of the companies. In the next step, the Malmquist Total Factor Productivity index (MTFP) was created.

2. LITERATURE REVIEW

DEA is one of the most used methods to determine the relative effectiveness of decision making unıts. Initially, DEA was used by non-profit organizations as a performance measurement tool. In later times, it has been frequently used by profit-oriented companies for performance evaluation purposes. In recent years, it has been widely used to evaluate the performance of educational institutions, schools, health institutions, hospitals, banks, and manufacturing companies (Ulucan, 2002).

In some of these studies, financial ratios were used as input and output. In this frame, Benli & Karaca (2017), Yaşar (2017), Çelik & Ayan (2017), Yalama & Sayım (2006), Akyüz, Yıldırım & Balaban (2015), Dizkırıcı (2014), Soba & Akcanlı (2012), Soba & et all. (2012), Özer, Öztürk & Kaya (2010), Başkaya & Öztürk (2012), Cenger (2011), Kula & Özdemir (2007), Altın (2010), Kaya & Gülhan (2010) used financial ratios as input and output in their studies.

Some studies have also been carried out to measure the effectiveness of tourism enterprises in Turkey. Tümer and Tengilimoğlu (2023) investigated the impact levels of the stock market tourism indices of North America, Europe, Asia Pacific regions from COVID-19. They used COVID-19 data such as daily cases, daily deaths, total cases, and total deaths from January 2020 to January 2022. Spearman correlation and simple linear regression analyzes were performed. As a result of the research, they determined that the regional daily deaths caused by COVID-19 affected the stock market tourism indices negatively. Çilek (2022) aimed to determine the effects of Covid-19 on the financial success of BİST Tourism companies. For this purpose, Integrated CRITIC-COPRAS methods were used. As a result of the research, the best performing enterprises, and the worst performing enterprises in 2019 and 2020 were determined. Çoşkun and Çetiner (2022) examined the stock prices and market multipliers and performances of ISE Tourism companies. Between the years 2014-2021, the market value/book value ratio, Tobin's q ratio, price/sales ratio, company value/sales ratios were calculated. The importance weights of the ratios were examined by the Entropy method, and the performances were examined by the MOORA method. The price/sales ratio and the company value/sales ratio show that the importance of the ratio is high. ur companies are better than the others. Gezen and Özcan (2022) aimed to determine the impact of Covid-19 on the financial status of tourism businesses traded in the ISE Tourism Index in the period of 2011-2020. They used the Z-score model developed by Altman for service businesses. As a result of the research, they determined that 2 businesses in 2019 and 1 business in 2020 are in the risky range in terms of financial distress. They found that other businesses were in the safe range. However, in 2020, it has been observed that the market values of the enterprises included in the ISE Tourism Index tend to increase. Kılıç (2022) investigated the effect of Covid-19 on the financial performance of tourism and transportation companies within the scope of ISE with ratio analysis. The results showed that Covid-19 had a significant impact on the financial ratios of transportation and tourism businesses, apart from their liquidity ratios. In addition, according to the research findings, while Covid-19 increases the financial risks of businesses, it has a significant impact on profitability. Koç (2022) examined the financial effects of COVID-19 on accommodation tourism in the world and in Turkey. It has been determined that the epidemic caused negative effects on the sector, even at the beginning of the epidemic process, the sector came to a standstill, and with the stretching of the measures taken, the sector started to recover later. It has been revealed that many businesses and companies experienced economic contractions during the epidemic, and many of them even had difficulties in continuing their activities. Mammadli and Helhel (2022) determined whether there is a difference in terms of business failure estimation between the financial ratios of unsuccessful and unsuccessful tourism

businesses traded in the ISE in the period of 2012-2017. As a result of the Mann-Whitney U test analyzes made for each year; Unsuccessful companies have higher rank averages than unsuccessful companies. Unsuccessful businesses show that they are more successful in paying their short-term debts through more liquid current assets and their total debt obligations through annual EBITDA. In addition, non-failed businesses effectively use the funds invested in the company. Özçalık and Eren (2022) The response of investors to the tourism stock market indices of the COVID-19 epidemic was analyzed by the "event study" method. In this context, three events representing the development of the COVID-19 epidemic were identified in the study. In the study, four different tourism indices were selected. These; The STOXX Travel & Leisure Global index is the STOXX Travel & Leisure Asia-Pacific index, the STOXX Travel & Leisure Europe index and the STOXX Travel & Leisure North America index. The results of the analysis show that, in general, investors reacted negatively to the COVID-19 outbreak according to market returns (MSCI ACWI). When analyzed by regions, it is seen that the highest losses in all event windows are experienced in the European tourism index. Soy Temur (2022) investigated the effects of Covid-19 on the financial performance of businesses included in the ISE Tourism Index. First of all, the financial ratios of the enterprises in the 2019-2020 period were calculated. EDAS, TOPSIS and WASPAS methods were applied to the data. The Entropy method was used to calculate the criterion weights used in the analysis. The Spearman Rank Relationship Test was used to measure the consistency between the ranking results. As a result of the study, it has been determined that the financial performances of the enterprises have changed before and during the Covid-19 period. Yetiz, Süsay and Ünal (2022) Industrial Production Index, ISE Tourism Index, Hotel and Restaurants (Tourism) Total Cash Loans, CPI Indicators (Restaurants and Hotels), Service Sector Confidence Index, in the period 2011:01-2021:02 in Turkey and Turkey Geopolitical Risk Index monthly data. They used the Toda Yamamoto Causality test for the analyses. As a result of the research, they determined a one-way relationship from the Service Sector Confidence Index to growth. They found a one-way relationship from the Service Sector Confidence Index to the CPI. They found a one-way causality relationship from the ISE Tourism Index to the Service Sector Confidence Index. They found a one-way causality relationship from Hotel and Restaurants (Tourism) Total Cash Loans to CPI. Mazman itik ((2021) analyzed the financial statement data of companies within the scope of ISE Tourism index for 2019 by analyzing the "Vertical Percentage Method". It has been concluded that the companies are financed with equity instead of foreign resources, which is the general characteristic of the sector. Özer (2021) analyzed the stock performances of companies traded in the ISE Tourism index between 2012 and 2021. In this context, Sharpe, Treynor, Jensen, Sortino and Omega methods were used. It has been determined that the performance measurement methods used give results close to each other. Pala (2021) investigated the financial performances of the companies in the ISE tourism index in the 2016-2020 periods using CILOS and MAIRCA methods. As a result of the research, there was a significant difference in terms of the company with the highest performance compared to the performance of the others, while at the same time, statistical differences were obtained in terms of rankings in the Covid-19 pandemic period compared to other periods. Yıldız (2021) was used to research the financial data of the companies operating within the scope of ISE Tourism index between 2011 and 2018. The financial failures of tourism companies were investigated by using the data in Altman's Z score and Z" score models, Springate model and Fulmer model. As a result of the study, the tourism businesses included in the research did not give the same results in the specified models. Businesses that were measured as successful in some models were measured as unsuccessful in some models. It has been observed that the financial ratios and financial items used in the formulas of the models that produce similar results are the same, but the coefficients are different. With the above-mentioned models, a definite conclusion could

not be reached in predicting financial failure. Karakaş and Öztel (2020) measured the financial performances of businesses within the scope of ISE Tourism index between 2014 and 2018 using the TOPSIS method. The relative importance levels of the calculated ratios were determined by the Entropy method, and tourism enterprises were ranked according to their financial performance. Out of the 12 financial ratios used as evaluation criteria, the importance levels of cash ratio and current ratio were the highest. In addition, it was observed that the 2015 political crisis between Russia and Turkey had a negative impact on the financial performance of tourism companies. Şimşek and Özcan (2020) used Turkey's annual visitor number, annual tourism income, national income per capita, number of museums, annual average temperature, annual tourism expenses, unemployment rate, annual number of foreign visitors, between 2010-2019. The constant returns to scale (CCR) model of DEA were analyzed. They determined the years 2011, 2012, 2013, 2014, 2015 and 2018 as effective years for the tourism sector in Turkey. Korkut et al. (2020) The effect of daily Covid-19 cases and daily deaths from Covid-19 on ISE ourism was examined by means of ARDL limit test. As a result of the analyzes made, it has been determined that Covid-19 has a cointegrated structure with tourism based on both the number of cases and deaths. Paça and Karabulut (2019) subjected the financial ratios of companies in the ISE Tourism Index between 2013 and 2017 to correlation and Kruskal Wallis H tests. It has been found that there is no difference between firms' asset turnover, working capital turnover, net profit to total assets ratio, and the ratios of profit before interest and tax to total assets. Süslü, Ateş, and Gök (2019) analyzed the financial performances of companies within the scope of ISE Tourism index between 2015 and 2016 through the Analytical Hierarchy Process (AHS). Idity, Leverage, Profitability and Activity ratios were chosen as the main criteria. Depending on the main criteria, 16 sub-criteria were selected. It has been observed that there are fluctuations in the performances of the companies between the periods of 2015-2016. It has been determined that the performances of tourism companies were affected by the events that directly and indirectly affected Turkey between 2015 and 2016. Karadeniz (2019) measured the effects of the aircraft crisis between Russia and Turkey on the performances of the businesses within the scope of the ISE Tourism index, by means of the calculated financial ratios. It was determined that there was a decrease in liquidity ratios, receivables turnover, net profit margin and equity profitability ratios in the post-crisis period. On the other hand, it has been determined that there has been an increase in total and short-term leverage ratios, asset turnover, inventory turnover, asset profitability ratio and price earnings ratio. In addition, it was determined that the difference between the averages of all calculated financial ratios was not statistically significant in the pre-crisis and post-crisis period. Karadeniz and Öcek (2019) determined the financial failure risks of businesses operating between 2012 and 2017 within the scope of ISE Tourism index according to the Altman Z Score model. Then, Mann Whitney U Test determined whether there is a difference between the financial ratios of the companies that carry the risk of financial failure and those that do not. It has been determined that there is a statistically significant difference between the companies that are at risk of financial failure and those that are not at risk of financial failure in terms of current ratio, acid-test ratio, cash ratio, leverage ratio, return on assets, return on equity, net profit margin and price/earnings ratio. Göral and Tengilimoğlu (2018) used the number of employees, tourism sector infrastructure, natural resources, and cultural resources as inputs, while the number of tourists and average income per capita are used as outputs. DEA and TOPSIS Based Productivity Ranking (ESM-VT) method was used to measure efficiency. According to the findings, the tourism sector efficiency ranking is Turkey, Azerbaijan, Mongolia, Kyrgyzstan, Kazakhstan, Tajikistan. Karadeniz et al. (2017) investigated the efficiency of tourism companies in 2014 with the vertical analysis method. In the study, they determined that ISE tourism companies have a higher rate of tangible fixed assets compared to

the general sector. Doğan and Ersoy (2018) used the number of rooms, total expenses, and amount of personnel datas of twelve tourism companies operating in Yozgat province as inputs, and the number of customers, total revenues and customer satisfaction datas as output. Input-oriented DEA method was used in the study. Thus, they determined the efficient and ineffective companies. Karkacıer and Yazgan (2017) analyzed the efficiency of ISE tourism companies in 2015 using Gray Relational Analysis (GIA). Some financial ratios such as liquidity, leverage and profitability ratios were used in the study. They found that the leverage ratio is the most important ratio for measure performance of tourism sector. Kahveci and Turna (2016) analyzed the financial ratios of tourism businesses traded in the ISE with the TOPSIS method. A ranking was made between the enterprises with the performance scores obtained. As a result of the study, priority financial ratios that are effective in determining the performance scores of the companies operating in the sector have been determined. Özçelik and Kandemir (2015) analyzed the financial ratios of thirteen ISE tourism companies for the period of 2011-2015 using the TOPSIS method. It has been determined that the financial performance scores of tourism enterprises differ according to years. Ecer and Günay (2014) analyzed the efficiency of ISE tourism companies during 2008-2012 period using Gray Relational Analysis (GIA). Some financial ratios such as liquidity, leverage and profitability ratios were used in the study. They also revealed that financial ratios can be used to determine performance in companies. Uyar and Alış (2014), analyzed the efficiency of thirty-seven tourism companies in Alanya in 2013. Recorded customer satisfaction, annual overnight datas of tourism companies were used as inputs. Occupancy rate and room income datas were used as output. As a result of study, they determined that five companies were effective in their operations and the remaining thirty-two were ineffective in their operations. Benli (2012) determined the efficiency of accommodation establishments in the Aegean, West Marmara, East Marmara, and Mediterranean Regions during the 2007-2010 period with DEA and Malmquist Total Factor Productivity Index. Total bed capacity was used as input and number of arrivals and overnight stays at the facility as output. As a result of the study, it has been revealed that the accommodation establishments in the Mediterranean and Aegean Regions are richer and more developed in terms of tourism than the ones in the West and East Marmara regions. Babacan and Özcan (2009) used the related activities, other expenses, beverage expenses, food expenses, animation and game expenses, number of rooms and amount of personnel datas of tourism enterprises operating in Alanya as inputs. They used beverage revenues, meal revenues, revenues from games and room income datas as output. They found that thirteen of the twenty-two tourism companies were efficient and nine were ineffective. Emir and Özgür (2008) used the activities and total bed capacities of the tourism companies in the Mediterranean and Aegean coastal tourism regions as inputs. The number of arrivals and overnight stays datas as output. They concluded that tourism companies in tourism regions with more bed capacity are more effective. Doğan and Tanç (2008) used the number of rooms, total expenses, and amount of personnel datas of eighteen tourism companies in Cappadocia as inputs. The total number of customers, total revenues, and customer satisfaction datas as output. They determined that only four of the eighteen tourism companies' establishments were efficient. Erciş and Gülcü (2008) applied the investment cost, number of personnel, number of beds, periodical operating expenses datas of nine tourism companies operating in Erzurum and Kars regions as inputs. Net profit and occupancy rate datas as output. It has been determined that tourism enterprises that provide relative efficiency in service production have higher occupancy rates than ineffective rival tourism companies. Önüt and Soner (2006) used the number of employees, annual electricity consumption, annual water consumption, annual LPG consumption and occupancy rate datas as inputs. Annual total revenue and total number of guests as outputs. They determined the amount of input that tourism enterprises that do not use their input sources

effectively should use according to their active competitors. Aksu and Köksal (2005) used the investment cost, number of personnel, annual operating expense datas of twenty-four five-star, tourism companies in the Antalya as inputs, and net profit, occupancy rate, customer repeat data as output. They have determined that companies cannot use their input resources effectively. Tarım, Tarım and Dener (2000) used investment cost, administrative expenses, number of employees datas of as input, occupancy rate, customer satisfaction and net profit datas as output. With the DEA, they determined that four-star hotels are more efficient than five-star hotels.

In the literature, there are studies aiming to measure the efficiency of companies traded within the scope of ISE Tourism index in Turkey with financial ratios and DEA. Among these studies, Özcan (2021), the performances of companies in the tourism and transportation sectors in ISE were measured with the help of Data Envelopment Analysis (DEA) and Tobin q ratio, using financial statement data for the years 2019 and 2020. According to the DEA analysis results, it is not possible to talk about the negative impact of the Covid-19 pandemic on business performance. According to the Tobin q ratio, it was revealed that the Covid-19 pandemic had a negative impact on business activities in the transportation and tourism sectors. Atalay and Vatansever (2020) applied the total assets and operating expenses datas of ISE Tourism companies for the period 2016-2019 as ınputs, the operating income and operating profit datas as outputs. They used variable returns and the input-oriented BCC method for the scale assumption of DEA. Targeted input values have been determined so that companies can reach the effective output amount. Improvement values have been determined that will require a reduction in the current input amounts by about half. It has been determined that the companies that cannot reach the efficiency value should improve their expenses according to their activities. It turns out that they need to reduce the amount of their total investment compared to the income and profit they generate. Çelik (2016) used the datas of the number of rooms and the number of personnel of BİST tourism companies as inputs, and the occupancy rate datas as outputs. In addition, total assets and operating expenses datas are used as input and total operating income. Two different enterprises were determined as efficient. It has been determined that four enterprises, two of which are the same, are efficient in the return to scale model. Yakut, Harbalıoğlu and Pekkan (2015) used current ratio, financial leverage ratio, ratio of tangible fixed assets to equity as ınputs. They used return on equity ratio, return on assets ratio, net profit margin, operating expenses, cost of sales/sales ratio as outputs in the period of 2009-2013. They used the CCR DEA and MTFV index. Zengin, Çömlekçi and Mesci (2013) used current ratio, short-term debts/total assets ratio, equity/assets ratio, cost of goods sold as ınputs. They also used, return on assets ratio, net profit margin, profit per share datas of ISE Tourism companies for the period 2009-2010 as outputs. As a result of DEA, they determined that seven out of nine tourism companies were effective.

3. RESEARCH METHODOLOGY

The aim of this study is to determine the financial performances of companies traded in Istanbul Stock Exchange (ISE) Tourism index in the 2009-2020 period. With this purpose, some financial ratios have been calculated within the data obtained from the period-end financial statements of the companies. With this data set, input-oriented DEA, which is generally used in the performance measurement process in academic studies, was carried out and Malmquist TFP Index was calculated. Analyzes and calculations were performed with DEAP 2.1 software.

All tourism eleven companies traded within the scope of ISE were included in the research as Decision-Making Unıts (DMU). DMU's are presented in Table 1.

Selecting different input and output groups in measuring the efficiency of a company will create different efficiency values for the companies. For this reason, the representative quality of the inputs and outputs to be selected is important. In the process of examining the financial performance of companies, it has been seen that financial statement figures and some financial ratios are used as inputs and outputs in the literature from time to time.

Table 1. Companies Included in the Research and Their Transaction Codes in ISE

COMPANY CODES AND COMPANY NAMES
1 (AYCES) Altinyunus Cesme Touristic Facilities Inc.
2 (KSTUR) Kusadasi Tourism Industry Inc.
3 (AVTUR) Avrasya Petrol Touristic Facilities and İnvestments Inc.
4 (MAALT) Marmaris Altınyunus Touristic Facilities Inc.
5 (MARTI) Martı Hotel Enterprises Inc.
6 (MERİT) Merit Tourism Investment and Enterprises Inc.
7 (METUR) Metemtur Hotel and Tourism Enterprises Inc.
8 (PKENT) Petrokent Tourism Inc.
9 (TEKTU) Tek-Art Construction Trade Tourism Industry and Investments Inc.
10 (ULAS) Ulaşlar Tourism Investments and Durable Consumer Goods Trade Marketing. Inc.
11 (UTPYA) Tourism Construction Management Inc.

* The abbreviations in parentheses are the codes of the companies in ISE. After this part of the research, the companies in question are expressed with their share codes.

It is desirable that the number of inputs and outputs be large for the data envelopment analysis model to have a high decomposition ability (Boussofianee et al., 1991). However, the selected input and output elements must be used for each DMU. If the number of selected inputs is "m" and the number of outputs is "p", at least "m+p+1" DMU constitute a necessary constraint for the reliability of the research. According to another view, the number of DMU included in the evaluation should be at least twice the number of variables (Atan, 2005).

In this study, a total of eleven DMU were included in the research. Considering the above-mentioned constraints, financial ratios, which are frequently used in studies on this subject, are used as input and output values. In this context, three inputs and three outputs were determined. These financial ratios, symbols and formulas in the research are shown in Table 2.

Table 2. Inputs and Outputs Used in the Research

	SYMBOL	*RATIOS*	*FORMULAS*
INPUTS	CR	Current Ratio	Total Current Assets / Total Current Liabilities
	AT	Assets Turnover	Net Sales / Total Assets
	LV	Leverage Ratio	Total Liabilities / Total Equity
OUTPUTS	ROA	Return on Assets	Net Profit or Net Loss / Total Assets
	ROS	Profit Margin	Net Profit or Net Loss/Net Sales
	ROE	Return on Equity	Net Profit or Net Loss / Total Equity

After this part of the research, the financial ratios in question are expressed with the symbols shown in the table.

CR; It is an indicator of the liquidity status of companies, in other words, the capacity of companies to pay their due debts. AT; It is an indicator of how effectively and efficiently companies use their assets. LV; It shows the level of debt and equity in total liabilities. It is an indicator of the suitability of the financial structure of the company. ROA; It is an indicator of

the profitability obtained from the investment as a result of the effective use of assets. ROS; It is a measure of the profit made for one unit of sales. ROE; It is a measure of the profitability of the company's partners from the investment they make for the company.

Research data is calculated from the end-of-period balance sheets and income statements of companies. The financial statements of the companies were obtained from the official website of the Public Disclosure Platform (KAP.gov.tr). The figures obtained from the period-end financial statements have been converted into ratios in the Microsoft Office Excel (MS Excel). Calculated ratios were used as input and output in the analyses. The averages of the inputs and outputs to be included in the analysis are presented in Table 3 and Table 4.

Table 3. Averages of Inputs and Outputs by Companies (2009-2020)

	OUTPUTS			***INPUTS***		
Company	ROA	ROS	ROE	CR	AT	LV
AYCES	-0.02	-0.14	-0.02	0.41	0.16	0.19
KSTUR	0.13	0.28	0.15	5.50	0.40	0.09
AVTUR	0.19	-0.23	0.64	2.02	0.11	0.37
MAALT	0.06	0.31	0.08	2.33	0.14	0.19
MARTI	-0.06	-0.31	-0.41	0.47	0.13	0.71
MERİT	0.13	0.35	0.15	3.07	0.37	0.12
METUR	-0.03	-0.35	0.12	2.33	0.27	0.84
PKENT	0.03	0.01	0.03	0.69	0.80	0.55
TEKTU	0.00	-0.09	-0.01	1.54	0.06	0.22
ULAS	0.03	-0.26	-0.02	2.63	0.16	0.38
UTOPYA	-0.05	-0.36	-0.18	0.76	0.19	0.62
Average	0.04	-0.07	0.05	1.98	0.25	0.39

In the period of subject to the research, it is seen that the avarage ROS value is negative. The profit margin of the companies is quite low. In other words, the profit figure (ROS) is quite low compared to the net sales figure. It is seen that the output values of AYCES, MARTI, UTOPYA are all negative. The average CR value of the companies is 1.98, AT value is 0.25 and LV value is 0.39. The company holding the highest net working capital is KSTUR (CR:5.52). The company holding the least net working capital is AYCES (CR:0.41). The company that uses its assets most efficiently is PKENT (AT:0.80). The company that uses its assets least efficiently is TEKTU (AT:0.06). The company with the highest leverage ratio is METUR (LV:0.84). The company with the lowest leverage ratio is KSTUR (LV:0.09) (Table 3).

Table 4. Averages of Inputs and Outputs by Years (2009-2020)

	OUTPUTS			***INPUTS***		
Years	ROA	ROS	ROE	CR	AT	LV
2020	0.09	0.06	0.23	3.49	0.12	0.38
2019	0.18	-0.21	0.55	2.80	0.34	0.40
2018	0.07	-0.14	-0.25	2.25	0.25	0.44
2017	0.04	0.33	0.03	1.96	0.22	0.39
2016	0.03	-0.57	-0.16	1.98	0.17	0.41
2015	0.10	-0.17	-0.04	1.71	0.25	0.46
2014	0.03	-0.19	0.10	0.96	0.27	0.41
2013	0.00	-0.09	0.04	1.55	0.29	0.42
2012	-0.11	0.17	0.00	2.37	0.26	0.33
2011	0.01	0.05	0.13	1.77	0.30	0.30
2010	0.00	-0.05	-0.03	1.27	0.27	0.31

2009	0.01	-0.05	-0.01	1.61	0.30	0.41
Average	0.04	-0.07	0.05	1.98	0.25	0.39

In the period of subject to the research, it is seen that the avarage ROA (0.04) and ROE (0.05) are positive. It was found that the ROS (-0.07) was negative on average. In eight years out of a total of twelve years, ROS had negative values. It can be argued that in years when the ROS is negative, the profit according to the net sales is quite low. ROA (0.18) was found to be the highest in 2019 as well. The ROS (0.33) was found to be the highest in 2017. The ROE (0.55) turned out to be the highest in 2019. ROA (-0.11) was determined to be the lowest in 2012. It is seen that the ROS (-0.57) was the lowest in 2016. It was determined that the ROE (-0.25) was the lowest in 2018. CR (3.49) turned out to be the highest in 2020.

This means that companies have increased their net working capital and cash holdings in 2020. AT (0.34) was the highest figure in 2019. It can be argued that the year in which companies use their assets most efficiently is 2019. LV (0.46) was found to be the highest in 2015 (Table 4).

The fact that the output values are negative for some DMU in some periods violates the assumption of the DEA method to be positive for the variables. Therefore, negative values should be converted to positive values (Yıldız, 2007). Therefore, negative output values were converted to positive values using the normalization formula shown below. The analyzes were carried out with the transformed data.

$$(X_{rj} - X_{jmin})/(X_{jmin} - X_{jmin}) \quad (1)$$

X_{rj}: r output value of the DMU_j,
X_{jmin}: The smallest r value,
X_{jmax}: Expressed as the largest r value.

4. METHODS USED IN THE RESEARCH

In the research, firstly, the input-oriented DEA method was used. Then, the Malmquist TFP index was calculated to provide the opportunity to make comparisons between DMUs over time and to determine the change in some factors affecting efficiency.

4.1. Data Envelopment Analysis

Data Envelopment Analysis (DEA) is one of the most frequently used methods to make comparisons between Decision-Making Units (DMU) when there are many inputs and outputs. DEA is a non-parametric method developed to measure the comparative (relative) activities of economic DMUs that produce the same type of outputs using the same type of inputs (Mercan and Yolalan, 2000). DEA determines the relative efficiency in two stages. In the analysis, the DMU constituting the efficiency limit is determined, and this efficiency limit is accepted as a reference, and the efficiency is determined by measuring the radial distances from the inactive DMU to this limit (Yolalan, 1993). The efficiency of a DMU is as shown in equation 2 (Dinçer, 2011):

$$\text{Efficiency} = (u_1y_1 + u_2y_2 + \ldots\ldots + u_sy_s) / (v_1x_1 + v_2x_2 + \ldots.. + v_mx_m) \quad (2)$$

s: total number of outputs
m: total number of inputs
ur: weight assigned to year of release
y: amount of output r.
Vm: weight assigned to input xi

Xi: amount of input i.

DEA was originally developed by Charnes, Cooper, and Rhodes. For this reason, it is known with the CCR model, which is the abbreviation of the names of these three authors. The CCR model assumes of constant returns to scale. The return to scale structure, which is constant in CCR models, have been developed by Banker, Charnes, and Cooper in which it is possible to deal with variable returns to scale. These models are also known as BCC models. Both the CCR and BCC models are among the most basic models in DEA. Each of these has both input and output oriented versions (Doğan, 2015).

Due to the convenience, it provides in measuring efficiency, DEA has become a frequently used method in performance evaluation over time (Kao and Liu, 2004). It allows to measure the relative performances of DMUs, especially in cases where the inputs and outputs of multiple and different DMUs will be compared. This situation is shown as the reason for the widespread use of this method (Kayalıdere and Kargın, 2004), DEA is a method in which multiple dependent and independent variables are used without the need for behavioral assumptions (Kök and Ay, 2013), a non-parametric method. Since it is a method, no distribution conditions (normal distribution, etc.) are sought.

4.2. Malmquist Total Factor Productivity Index

One of the methods developed based on DEA is the Malmquist TFP index (Gonzalez Rodriguez, 2015). Two types of relative assessments, cross-sectional and time series, are commonly used. The first one compares one DMU with others at the same time point. The second one compares a DMU by itself at different time points. For both types of assessment, the DEA methodology is used with appropriate indices, namely the efficiency score for cross-sectional assessments and the Malmquist TFP index for time series assessments (Kao, 2010).

The productivity changes calculated according to the Malmquist TFP index depend on the change in technical efficiency and technology. The TFP components revealing this interaction are shown in Figure 1. Accordingly, the change in Malmquist TFP depends on the change in technical efficiency and technological change. The change in technical efficiency, which can be called total technical efficiency, arises depending on the change in pure technical efficiency and scale efficiency (Atukalp, 2018).

The Malmquist TFP index consists of two components: Technical Efficiency Change (TEC) and Technological Change (TC) (Chen and Ali, 2004). The change in TEC is expressed as "the effect of catching the production limit", and the change in TC is expressed as "the displacement of the production limit". These effects constitute the main elements of the change in TFP. The product of TEC and TC gives the change in TFP (MTFP index) (Lorcu, 2010). The change in TFP can be formulated as follows.

$$TFP = TEC * TC \quad (3)$$

Change in Technical Efficiency (TEC) is divided into two sub-components, Change in Pure Technical Efficiency (PTEC) and Change in Efficiency of Scale (ESC) (Gonzalez-Rodriguez, Martin and Giuliani, 2014).

$$TEC = PTEC * ESC \quad (4)$$
$$TFP = PTEC * ESC * TC \quad (5)$$

If the change in the components of the Malmquist TFP index is less than 1, it indicates a decrease in performance, and a greater than 1 indicates an improvement in performance.

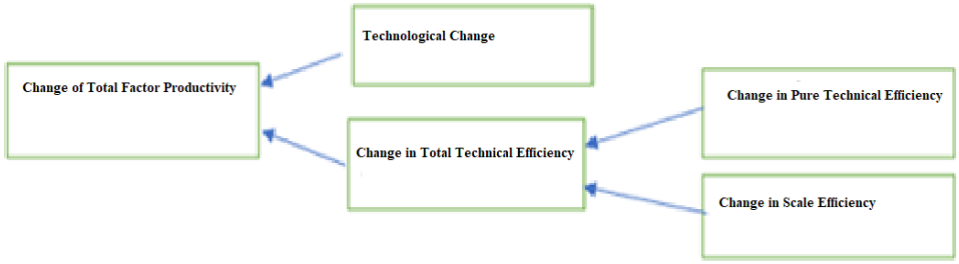

Figure 1. Total Factor Efficiency Components

**The figure was created by the authors*

5. FINDINGS

Input-oriented CCR analysis was performed with the calculated inputs and outputs. The reason for using the input-oriented DEA method is that output variables lose their original values because of revision (Kula and Özdemir, 2009). Efficiency coefficients are required to be 1 and very close to 1. As a result of the analysis, companies with efficiency coefficients of 1 and above were determined as efficient companies, and those with efficiency coefficients below 1 were determined as ineffective companies.

It was determined that 2009 was the most productive year and 2016 was the least productive year for the tourism companies. The efficiency level, which was 1 on average in 2009, changed between 0.61 and 0.91 until 2016. The average efficiency level, which was 0.96 in 2015, decreased to 0.22 in 2016. After 2016, productivity rates (0.35 and 0.39, respectively) decreased considerably in 2018 and 2019 (Table 5).

Table 5. Results of Input Side CCR Data Envelopment Analysis (2009-2020)

	EFFICIENCY VALUES											
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AYCES	0.99	0.55	0.51	0.99	1	1	0.97	0.02	0.54	1	0.27	0.1
KSTUR	1	0.53	0.51	0.1	1	0.1	0.99	0.02	0.52	0.1	0.31	1
AVTUR	1	0.56	0.63	0.1	1	0.95	0.95	0.01	0.52	1	1	0.98
MAALT	0.99	0.56	0.84	0.69	0.55	1	0.95	0.02	1	0.11	0.74	0.1
MARTI	1	0.55	0.49	0.68	0.48	0.01	0.94	1	0.51	0.1	0.27	0.97
MERİT	1	0.54	1	0.72	0.71	0.96	0.94	1	0.53	1	0.28	0.97
METUR	1	0.51	1	1	0.68	0.97	0.94	0.03	0.52	0.11	0.27	0.97
PKENT	1	1	0.61	0.96	0.06	0.98	0.94	0.03	0.52	0.11	0.27	0.97
TEKTU	1	0.55	1	0.1	0.07	0.98	1	0.03	0.67	0.11	0.27	1
ULAS	1	0.55	0.48	0.96	0.6	0.98	0.95	0.03	0.56	0.11	0.27	0.97
UTOPYA	0.99	1	1	1	0.57	0.1	1	0.26	1	0.11	0.3	0.95
Average	**1**	**0.63**	**0.73**	**0.66**	**0.61**	**0.73**	**0.96**	**0.22**	**0.63**	**0.35**	**0.39**	**0.82**
=1	8	2	4	2	3	2	2	2	2	3	1	2
<1	3	9	7	9	8	9	9	9	9	8	10	8

Then the Malmquist TFP index was calculated to provide the opportunity to make comparisons between DMUs over time and to determine the change in some factors affecting efficiency. If the change in the components of the Malmquist TFP index is less than 1. it indicates a decrease in performance, and a greater than 1 indicates an increase in performance. Pure technical efficiency change (PTEC) measures the DMU's ability to transform its inputs into outputs (Gonzalez-Rodriguez, Martin and Giuliani, 2014). The change in PTEC and the fact that ESC is greater than 1 indicate the success of the enterprise in terms of managerial efficiency and production at an appropriate scale. An increase in any component of the Malmquist TFP index

causes the relevant index to be greater than 1, while a decrease in components causes the index to take a value less than 1. The developments in the technological change components can be considered as evidence of innovation (Fare, Norris and Zhang, 1994).

Except for these three companies, it was determined that there was a 7% to 99% decrease in TFP in this period. It is seen that the decrease in TEC of AYCES and MAALT is due to the decreases in both PTEC and ESC. Decreases in TFP of AVTUR, MARTI, MERIT, METUR, PKENT and UTOPYA generally resulted from the decrease in TC. It was determined that there was a 0.4% loss of technical efficiency. This situation should be perceived as an expression of the fact that tourism companies can achieve their outputs by using less inputs in the 2009-2020 (Table 6).

Table 6. Malmquist TFP Index and TFP Components by Companies (2009-2020)

	TFP COMPONENTS				
Company	TEC (%)	TC (%)	PTEC (%)	ESC (%)	TFP (%)
AYCES	0.81	0.94	0.79	0.82	0.76
KSTUR	1.00	1.17	1.00	1.00	1.17
AVTUR	1.00	0.94	1.00	1.00	0.94
MAALT	0.81	0.89	0.81	0.81	0.72
MARTI	1.00	0.00	1.00	1.00	0.00
MERİT	1.00	0.56	1.00	1.00	0.56
MERTUR	1.00	0.14	1.00	1.00	0.14
PKENT	1.00	0.90	1.00	1.00	0.90
TEKTU	1.00	1.14	1.00	1.00	1.14
ULAS	1.00	1.01	1.00	1.00	1.01
UTOPYA	1.00	0.03	1.00	1.00	0.03
Average	**0.96%**	**0.08%**	**0.96%**	**0.96%**	**0.08%**
<1	**2**	**8**	**2**	**2**	**8**
=1	**9**	**-**	**9**	**9**	**-**
>1	**-**	**3**	**-**	**-**	**3**

* Geometric mean results are included,
TEC: Change in Total Technical Efficiency, TC: Technological Change, PTEC: Change in Pure Technical Efficiency, ESC: Change in Scale Efficiency, TFP: Change in Total Factor Productivity

The technological change was 8% and the change in scale efficiency was 96%. In the period of 2009-2020, it is seen that TEC is largely derived from TC (0.08) and PTEC (0.96). This may mean that companies are operating on an inefficient scale during this period. TEC was generally 1 in all companies except AYCES and MAALT. AYCES and MAALT's TEC (both 0.81) is less than 1, indicating a decline in their technical efficiency. For AYCES, the reduction in TEC is due to decreases in TC, PTEC, and ESC. The decrease in the TEC value of MAALT was due to the decrease in TC and ESC. The regression in mean TC was measured as 91%. All companies except KSTUR (0.117), TEKTU (0.114) and ULAS (0.101) companies showed a decrease in TC (Table 6).

Table 7. Changes in Total Factor Productivity Indices by Periods (2009-2020)

	TFP COMPONENTS				
Years	TEC (%)	TC (%)	PTEC (%)	ESC (%)	TFP (%)
2010 – 2011	0.62	1.85	0.70	0.88	1.13
2011 – 2012	1.16	0.00	1.40	0.83	0.00
2012 – 2013	0.69	0.00	1.02	0.67	0.00
2013 – 2014	0.95	1.81	0.73	1.30	1.72
2014 – 2015	0.93	0.52	1.35	0.69	0.48
2015 – 2016	2.27	0.93	1.01	2.25	2.12

2016 – 2017	0.05	0.00	0.30	0.16	0.00
2017 – 2018	12.76	0.46	2.20	5.80	5.87
2018 – 2019	0.32	2.86	0.45	0.71	0.92
2019 – 2020	1.76	0.59	1.65	1.06	1.04
2020 – 2021	1.87	0.28	1.95	0.96	0.53
Average	**0.96%**	**0.08%**	**0.96%**	**0.96%**	**0.08%**
<1	**6**	**8**	**4**	**7**	**6**
>1	**5**	**3**	**7**	**4**	**5**

* Geometric mean results are included,
TEC: Change in Total Technical Efficiency, TC: Technological Change, PTEC: Change in Pure Technical Efficiency, ESC: Change in Scale Efficiency, TFP: Change in Total Factor Productivity

The highest increase in TFP was in the 2017-2018 period (587%). It turned out that most of the increase in TFP was due to the increase in PTEC (220%). It was determined that part of the increase in TFP was due to the increase in ESC (580%). The highest decrease in TFP was in 2011-2012, 2012-2013, 2016-2017 periods (0% in all three periods). It was observed that the decrease in TFP resulted from the decrease in TC (0%) in the 2011-2012 and 2012-2013 periods. It has been determined that the decrease in TFP stemmed from the decreases in TC (0%), PTEC (30%) and ESC (16%) in the period of 2016-2017. In terms of the components of TFP, it was revealed that the highest increase in TC was in the 2018-2019 period (286%). It was determined that the highest decrease in TC occurred in the periods of 2011-2012, 2012-2013 and 2016-2017 (0% in all three periods). It is seen that the highest increase in TEC was in the period of 2017-2018 (1276%). It was determined that the highest decrease in TEC was in the period of 2016-2017 (5%). It turned out that the highest increase in PTEC was in the period of 2017-2018 (220%). It was determined that the highest decrease in PTEC occurred in the periods of 2016-2017 and 2018-2019 (30% and 45%, respectively). It is seen that the highest increase in ESC was in the period of 2017-2018 (580%) (Table7).

6. CONCLUSION

A worldwide or regional economic instability and political crisis can significantly affect the growth of the tourism sector. It can be said that the financial and political crises experienced in Turkey are in the background of the decrease in the number of international tourists coming to Turkey in recent years.

In this study, it is aimed to measure the financial performance of companies traded within the scope of ISE Tourism index in the 2009-2020 period. Some financial ratios have been calculated from the period-end financial statements of the companies. With these financial ratios, input-oriented DEA was realized. Then, the Malmquist TFP Index was calculated to determine the change in the productivity of the companies.

According to the findings, it has been revealed that there is a decrease in the average total factor productivity in the tourism sector in the 2009-2020 period. It was revealed that this regression was caused by the regression in the total factor productivity index components. It has been determined that the technical inefficiency detected in the sector is largely due to scale inefficiency. It has been determined that the highest increase in total factor productivity occurred in the period of 2017-2018. It turned out that this increase was due to the increase in pure technical efficiency and scale efficiency. It was determined that the highest decrease in total factor productivity occurred in the periods of 2011-2012, 2012-2013 and 2016-2017.

The average productivity in the tourism sector, which was 100% in 2009, was 96% in 2015. Average productivity in the tourism sector decreased to 22% in 2016. Some political crises are

thought to be effective in this decline. Efficiency in the sector was 22%, 35% and 39% in 2016, 2018 and 2019. The Covid 19 pandemic, which affects the whole world in every aspect, has also significantly affected tourism sector in Turkey.

As a result of the study, it was determined that there was a significant decrease in the performances and productivity of tourism companies between 2016-2020. The growth in the tourism sector, which is one of the most important sources of income for Turkey, could not reach the desired level due to regional conflicts, terrorist acts, political tensions, and the July 15 coup attempt.

The fact that only eleven tourism companies were included in the research in this study constitutes the first of the limitations of the research. The second limitation of the study is that the period range is limited to the period 2009-2020, since it is a very early period to access company datas in the Covid 19 period at the time of the study. The third limitation of the study is that only three input and three output variables were used in the study. The fourth limitation of the study is that the methods used in the study are limited to DEA and MTFV only.

It should be considered that the results of the research may differ in terms of the number of decision-making units, period intervals, input and output variables, and method size. For this reason, the analyzes can be repeated with different decision-making units, or different the time interval, changing the input and output variables, and using different methods in the studies to be carried out after this study. Thus, the effects of different factors on efficiency and total factor productivity can be examined.

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