6 (1): 61-72 (2022)

Journal of Aviation

https://dergipark.org.tr/en/pub/jav

e-ISSN 2587-1676

A Review of Financial Performance of Aircraft Leasing Companies

Kasım Kiracı[1], Veysi Asker[2] and H. Yusuf Güngör[3*]

[1]İskenderun Technical University, Faculty of Aeronautics and Astronautics, Department of Aviation Management, İskenderun, Hatay, Turkey. (e-mail: kasim.kiraci@iste.edu.tr).
[2] Dicle University, Aviation Management Department, Diyarbakır, Turkey. (e-mail: veysi-asker@outlook.com).
[3*]University of Iğdır, Aviation Mnagement Department, Iğdır, Turkey (e-mail: yusufhay@gmail.com).

Article Info

Received: Dec., 05. 2021
Revised: March, 05. 2022
Accepted: March, 11. 2022

Keywords:
Covid-19
Leasing
Financial Performance
CRITIC Method
CODAS Method

Corresponding Author: *H. Yusuf Güngör*

RESEARCH ARTICLE

DOI:https://doi.org/10.30518/jav.1032824

Abstract

The Covid-19 pandemic has caused many industries, especially the air transport industry, to experience a crisis. It is important to analyze the change in the financial performance of global aircraft leasing companies, one of the most important stakeholders of the airline industry during this crisis period. Therefore, this study aims to analyze the financial performance of global aircraft leasing companies in the period from Q1 2018 to Q4 2020. In the study, we analyzed the financial data of 6 global aircraft leasing companies using the CRITIC-based CODAS method. Our findings indicate that some aircraft leasing companies have been ahead of the competition due to the Covid-19 pandemic, while others have fallen behind in the financial performance rankings. Therefore, our results prove that aircraft leasing companies are affected by the covid-19 pandemic. Our analysis on a sectoral basis indicates the relationship between the debt repayment capacity of airlines and the performance of leasing companies.

1. Introduction

One of the most important stakeholders in the air transport industry is leasing companies. Leasing companies are vital to the success of airlines, which do not have enough funding resources to purchase aircraft. These companies make a significant contribution to the growth of the sector by entering into various long-or short-term contracts with airlines.

But the Covid-19 pandemic has significantly affected all sectors, especially the airline industry. Due to Covid-19, revenue passenger-kilometres (RPK) in the aviation industry has fallen by 66% year-on-year (IATA, 2021) while the total number of passengers has declined by 60% (ICAO, 2021). Therefore, leasing companies are significantly affected by shrinking demand in the airline industry. In this context, it is observed that airlines that have experienced financial difficulties or bankruptcy have delayed or failed to meet their obligations to leasing companies (Caslin and O'brien, 2020). This has caused leasing companies, which are already in a difficult situation due to shrinking demand, to have difficulties collecting receivables and increase their financial risks.

It is important to examine the performance of global aircraft leasing companies that face various risks due to the crisis experienced by the air transport industry during the Covid-19 period. This is because some of the decisions taken by global aircraft leasing companies give them a competitive advantage. Decisions taken by firms in times of crisis can increase their financial risk, as well as allow them to move well ahead of the competition when the crisis is over. In this study, we analysed the performance of global aircraft leasing companies from the pre-Covid-19 pandemic period to 2020. Our main goal is to determine the financial position of leasing companies that are vital stakeholders in the air transport industry. Several studies are examining the air transport industry in the Covid-19 period in the literature (Abate et al., 2020; Bauer et al.,2020; Dube et al., 2021; Gössling, 2020; Nabboush and Alnimer, 2020; Pereira and Soares 2021; Serrano and Kazda, 2020). However, we have not come across any study on the financial performance of global aircraft leasing companies. Therefore, we expect this study to benefit decision-makers and investors in the industry both by filling the gap in the literature and by revealing the performance of global aircraft leasing companies.

2. Literature Review

In the literature, there are numerous studies on the performance of leasing companies. As the number of aircraft leasing companies is limited, studies on these companies are few. Therefore, studies on general leasing companies were examined. As the study covers the period of the pandemic,

which has deeply affected aviation and other service industries, studies that measure financial performance during crises are initially examined. The use of multi-criteria decision-making methods in measuring financial performance provides a flexible structure since it is for finding the best option out of many options. Rates used in performance measurement are operating income, cash flows, the difference between book value and market value, and accumulated earnings and profits. The literature consists of four parts. The first part deals with studies on the financial performance of companies, the following part examines studies on leasing companies, studies using the CODAS method are examined in the third part, and studies on Covid-19 are reviewed in the last part.

Temizel et al. (2016) analyzed the financial performance ranking of 34 out of 50 companies of the Corporate Governance Index using the TOPSIS method. The results show that the financial performance of companies varied over the years analysed the relationship between firm financial performance and corporate social responsibility in Borsa Istanbul 100 index companies. They showed that there was a significant relationship between corporate social responsibility and company size. However, they did not find any significant relationship between financial performance and corporate social responsibility. Gumus et.al (2019) used SWARA and ARAS methods to evaluate the financial performances of the companies operating in the construction sector in Borsa İstanbul (BİST). They concluded that the current and cash ratios have the highest weight and the equity transfer rate has the lowest weight from the rates used in the decision-making method. Akcakanat (2018) evaluated the provinces based in the TR-61 region using multi-criteria decision-making methods based on the province with the EDAS method. The resulting criterion weights were calculated separately using the EDAS method and the calculation with two different criteria weights was found to be the same. Karakaya (2020) measured the performance of participation banks in Turkey based on the CAMELS system. The order of the main criteria based on their weights was determined as capital, earnings, asset quality, liquidity, management quality, and sensitivity. The highest weighted criteria were found to be the equity profitability ratio. Orcun (2019) evaluated the financial performances of the companies included in the Borsa İstanbul Electricity Index (XELKT) by the WASPAS method. According to the result of the study, companies declaring low profits, providing other variables of companies that are similar, were found to be the most successful companies. Sariay and Bagci (2019) examined the effect of asset consumption on financial performance by using the DEA method. They found that asset consumption increased financial performance. Ulutas and Karakoy (2020) measured the financial performance of a cargo company using CRITIC and ROV methods. They concluded that CRITIC and ROV methods are successfully applied in performance measurement. Tayyar et.al. (2018) analysed the performance of insurance companies using the Reference Ideal Method (RIM). They determined that RIM is a suitable method for performance evaluation according to financial ratios. On the other hand, decision-makers should be cautious when determining the ideal range. In addition to these studies, some studies examine performance in various dimensions in the airline industry (Tayyar et al., 2018; Borochin, 2020; Chen et al., 2021; Eufrasio et al., 2021; Gudiel Pineda et al., 2018; Huang et al., 2020; Renold et al., 2019).

Examining studies on financial performance measurement, models are capable of measuring the financial performance of companies. Moreover, it has been revealed that profitability is the most important performance indicator, and meeting liabilities and asset quality are also effective in the success of the company. The following section examines studies on leasing companies. Alam et.al. (2011) classified the leasing companies based on financial ratios. According to the result of the study, the ranking of leasing companies changed depending on different factors. Kiraci and Bakir (2019) evaluated the performance of airlines using CRITIC and EDAS methods. They concluded that the method they used was successful in measuring the impact of the crisis on firms. Dalfard et.al (2012) applied data envelopment analysis (DEA) models for the efficiency assessment and ranking of leasing companies. They found that both the CCR and BCC models were not suitable for ranking leasing companies. Ashgar and Afza (2013) calculated the profit efficiency, technical efficiency, and cost efficiency of modaraba and leasing companies in Pakistan with the help of the parametric Stochastic Frontier Approach (SFA). They concluded that leasing firms technically performed better than mudaraba firms, but mudaraba firms performed better in terms of cost management. Gurol (2018) calculated the financial ratios of financial leasing, factoring and financing companies, and these ratios were analyzed by the TOPSIS analysis method. Gurol found that financial leasing and factoring companies showed similar financial performance, but profitability rates fell despite the increase in the number of customers in 2016. Ceyhan and Demirci (2017) examined the performance of leasing companies using the MULTIMOORA method. They found that the MULTIMOORA method gave successful results for firms in different sectors. Kiraci and Asker (2019) examined the performance of aircraft leasing companies using the Entropy-based Topsis method and emphasized that the method was successful in measuring performance. Schmit (2004) examined the credit risk of leasing companies with the Basel II criteria and found that the risk levels of leasing firms varied depending on the assets they leased. Amanollahi (2016) examined external factors affecting the credit risk of leasing companies. He concluded that the external factors were the size of leasing, foreign exchange, ownership interest rate, inflation, and Gross Domestic Product (GDP). In addition to these studies, studies have also been conducted to examine the impact of aircraft leasing companies or airlines' leasing policies on the industry in various dimensions (Bazargan and Hartman, 2012; Bourjade et al., 2017; W. T. Chen et al., 2018; Gavazza, 2010; Kuhle et al., 2021; Oum et al., 2000).

Examining studies on CODAS, Tus and Adali (2018) emphasized that CODAS was successful in personnel ranking by using the CODAS method together with the CRITIC and PSI methods. Peng and Garg (2018) found that the method had great power to determine the most appropriate alternative and was successful in preventing parameter selection problems in emergency decision-making problems. Yalcin and Pehlivan (2019) presented a methodology that integrates the fuzzy CODAS (COmbinative Distance-based Assessment) method with the fuzzy envelope of HFLTs according to CLEs to figure out a personnel selection problem. They found that the presented methodology was efficient and stable for solving personnel selection problems in a hesitant fuzzy environment. Deveci et.al. (2020) stated that the method of selecting

alternatives to renewable energy sources in Turkey has some drawbacks such as not always providing reasonable results as in other multi-criteria decision-making methods. Badi and Kridish (2020) used a new COmbinative Distance-based ASsessment (CODAS) method to solve MCDM problems for a steelmaking company in Libya. The results indicated that the proposed method was effectively able to choose the best supplier out of the six alternative suppliers. Katranci and Kundakci (2020) assessed the most suitable ten cryptocurrency alternatives by using the Fuzzy CODAS (COmbinative Distance-based ASsessment) method. As a result of the study, the most suitable cryptocurrency alternative was determined for the investors.

Zheng and Ahang (2021) investigated the effect of the COVID-19 on the financial efficiency of microfinance institutions (MFIs). They found that the pandemic-induced impact decreased the financial efficiency of MFIs. Chen and Yeh (2021) examined the reaction of sectors to the global financial crisis and Covid-19 and found that firms were affected by the 2008 financial crisis and pandemic, but the monetary expansion policies announced by the US Federal Central Bank relatively prevented firms from affecting badly. Ichsan et.al. (2021) have examined the determinants of the performance of Islamic banks during the Covid-19 period and found that Islamic banks in Indonesia have been impacted by the pandemic due to suspension. Colenda et al. (2020) applied stress tests to health institutions during the pandemic. They found that health institutions were unprepared for the crisis, but they took lessons from the crisis. Folger-Laronde et.al. (2020) determined that sustainability performance did not affect the performance of firms during the crisis period by examining the financial performance of publicly-traded companies in the Covid-19 period. Rababah et.al. (2020) analysed the financial performance of publicly traded firms in China during the pandemic and found that there were very serious decreases in revenues, and the tourism and travel sectors were the most severely affected by the outbreak. Demirgüç-Kunt et al. (2020) examined the performance of the banking sector during the pandemic period. They determined that public banks with high liquidity were relatively more resistant to the crisis and that the impact of the crisis on the sector would be felt more in the medium long term. Khan et.al. (2021) identified the influence of entrepreneur traits on Small and Medium-Sized Enterprises' performance during COVID-19. They concluded that the age of SMEs and the educational background of the entrepreneur affected the resilience of firms to the crisis. Recently, many studies have been conducted in which the effect of the Covid-19 pandemic on the airline industry has been studied in various dimensions dimensions (Amankwah-Amoah et al., 2021; Belhadi et al., 2021; Brown and Kline, 2020; Carter et al., 2021; Dube et al., 2021b; Maneenop and Kotcharin, 2020; Pereira and Soares de Mello, 2021b; Piccinelli et al., 2021; Sobieralski, 2020). However, we have not come across any study in which the financial performance of global aircraft leasing companies has been studied, taking into account the Covid-19 pandemic. Therefore, we expect that this study will contribute to the literature both in terms of revealing the effect of the Covid-19 pandemic on global aircraft leasing companies and in terms of monitoring the recent performance of global aircraft leasing companies.

3. Method

3.1. Critic Method

Weights of the criteria are impacted as much by characteristics of the criteria as from the subjective point of view of the decision-maker (Kazan and Özdemir, 2014, s. 209). To eliminate subjective point of view of the decision-maker, many methods based on objective weighting have been developed. One of the most commonly used methods is the CRITIC method. The objective weights calculation is built as follows (Diakoulaki, Mavrotas, and Papayannakis, 1995, p. 764-765; Cakir and Rivet, 2013, p. 451):

Step 1: Creation of decision matrix

The matrix indicates the performance of different alternatives according to different criteria.

$$X = [x_{ij}] = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \ldots & x_{mn} \end{bmatrix} \quad (1)$$

In Equation 1, m denotes alternatives and n denotes the criteria.

Step 2: The decision matrix is normalized through the following equation.

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \quad (2)$$

Here; x_j^{min} means the lowest value of the j criterion, and x_j^{max} means the highest value according to the j criterion

Step 3: While deciding the criteria weights, both the standard deviation of the criterion and its correlation between other criteria are included.

$$\rho_{jk} = \frac{\sum_{i=1}^{m}(r_{ij} - \bar{r}_j)(r_{ik} - \bar{r}_k)}{\sqrt{\sum_{i=1}^{m}(r_{ij} - \bar{r}_j)^2 \sum_{i=1}^{m}(r_{ik} - \bar{r}_k)^2}} \quad (3)$$

Pearson correlation coefficient was used in equation (3). In cases where the number of alternatives is low, Spearman sequence correlation coefficients, which are non-parametric tests, are used.

Step 4: Calculation of the amount of information (cj)

This method covers the intensity of the contrast and the conflict in the structure of the decision making problem. For this purpose, standard deviations of normalized decision matrix column values are used.

$$c_j = \sigma_j \sum_{k=1}^{n}(1 - \rho_{jk}) \quad (4)$$

It can be said that this method gives a higher weight to the criterion which has a high standard deviation and low correlation with other criteria. The namely higher value of Cj indicates that a greater amount of information is obtained from the given criterion so the relative significance of the criterion for the decision-making problem is higher.

Step 5: Obtaining criterion weights

In the last step, criterion weights are obtained with the help of equation (5).

$$w_j = c_j / \sum_{k=1}^{n} c_k \quad (5)$$

3.2. Codas Method

The COmbinative Distance-based ASsessment (CODAS) is another new MCDM method, developed by Ghorabaee et.al. (Dahooei et al, 2018, s. 176; Peng and Garg, 2018, s. 440). In the Codas method, in the process of determining the performance of alternatives for decision problems, the distance of decision problems from the negative-ideal solution is taken as a basis. The distance to the negative ideal solution (NIS) is divided into Euclidean (Euclidean) and Manhattan (Taxicab) distances (Badi, et al., 2018, p. 4; Yeni and Özçelik, 2019, P. 440). Euclidean distance is generally used as the primary criterion in the comparison stage of alternatives. But the taxicab distance approach, which is considered a secondary criterion, is applied if the Euclidean distances of the compared alternatives are equal; (Keshavarz et al., 2016, p. 28; Mathew and Sahu, 2018, p. 140; Bolturk and Kahraman, 2018, p. 2; Deveci, et al., 2020, p. 2)

The CODAS utilizes the Euclidean distance as the primary measure of assessment. If the Euclidean distances of two alternatives are very close to each other, the Taxicab distance is utilized to contrast them. The degree of closeness of Euclidean distances is determined by a threshold parameter. The Euclidean and Taxicab distances are measures for 1^2-norm norm and 1^1-norm indifference spaces, respectively (Peng and Garg, 2018, s. 440; Bakır and Alptekin, 2018, s. 1341).

The application stages of the CODAS method are given below (Keshavarz et al., 2016, p. 29; Bolturk and Kahraman, 2018, p. 4; Ulutas, 2020, P. 1642; Kiracı and Bakır, 2020, P. 89);

Step 1: Construct the decision-making matrix (X), shown as follows:

$$X = [x_{jk}]_{nxm} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \cdot & \cdot & \cdot & \cdot \\ x_{n1} & x_{n2} & \ldots & x_{nm} \end{bmatrix} \quad (6)$$

Where xij $(xij \geq 0)$ indicates the performance value of ith alternative on jth criterion ($i \in \{1,2, \ldots, n\}$ and $j \in \{1,2, \ldots, m\}$).In the decision matrix, there are performance values that the alternative "j" shows on the criterion "k".

Step 2: Calculate the normalized decision matrix.

$$n_{ij} = \begin{cases} \dfrac{x_{jk}}{max_j x_{jk}} & if\ k \in N_b \\ \dfrac{min_j x_{jk}}{x_{jk}} & if\ k \in N_c \end{cases} \quad (7)$$

where Nb and Nc indicate the sets of benefit and cost criteria, respectively.

Step 3: Calculation of weighted normalized decision matrix; after determining the weighting coefficients (wj) of the criteria to be evaluated, the weighting process is applied to the decision matrix. This process takes place by multiplying the weight coefficients (wj) with the elements in the columns in the decision matrix with the normalization process. The said transaction is carried out through equation (8).

$$r_{kj} = w_j n_j \quad (8)$$

Step 4: Determine the negative-ideal solution (point) as follows:

$$ns = [ns_j]_{1xm} \quad ns_j = min_k r_{kj} \quad (9)$$

At this stage, it is considered that the alternative located at the furthest distance from the negative ideal solution point in terms of all criteria is the optimal alternative.

Step 5: Calculate the Euclidean and Taxicab distances of alternatives from the negative-ideal solution, shown as follows:

$$E_i = \sqrt{\sum_{j=1}^{m} (r_{kj} - ns_j)^2} \quad (10)$$

$$T_i = \sum_{j=1}^{m} |r_{kj} - ns_j| \quad (11)$$

Step 6: Form the relative assessment matrix, shown as follows; The comparative evaluation matrix is arranged employing equation (12) by comparing the values of each alternative according to the Euclidean and Taxicab distances to other alternative values.

$$R_a = [h_{ik}]_{nxn}$$
$$h_{ik} = (E_i - E_k) + \big(\psi(E_i - E_k) \times (T_i - T_k)\big) \quad (12)$$

ψ indicates a threshold function to recognize the equality of the Euclidean distances of two alternatives and is defined as follows. The value in question is calculated through equality (13).

$$\psi(x) = \begin{cases} 1 & if\ |x| \geq \tau \\ 0 & if\ |x| < \tau \end{cases} \quad (13)$$

The value of τ shown in Equation (13) is an indicator created by the decision-maker. It is suggested that this indicator be valued between 0.01 and 0.05. Accordingly, if the difference between the Euclidean distances of the values of the two alternatives compared is less than the τ value, the comparison is performed based on the taxicab distance of these alternatives.

Step 7: Calculate the assessment score of each alternative, shown as follows:

$$H_{ik} = \sum_{k=1}^{n} h_{ik} \quad (14)$$

4. Application and Findings

In this study, the financial performance of 6 aircraft leasing companies for the period from Q1 2018 to Q4 2020 was examined by the CRITIC-based CODAS method. From this point of view, firstly, the CRITIC method was used, and then the CODAS method was conducted. Within the scope of the research, ten financial performance indicators, which are among the most commonly used indicators in the literature, were used. Data on performance indicators were obtained from the Thomson Reuters DataStream database. Financial performance indicators of aircraft leasing businesses are given in Table 1.

Table 1 Financial Performance Indicators and Codes Used in the Study

Financial Performance Indicators	Code
Current Assets / Short-Term Liabilities	C1
Total Debt / Total Assets	C2
Total debt / Shareholder's Equity	C3
Shareholder's Equity / Total Assets	C4
Long-Term Liabilities/ Total Assets	C5
Net Sales / Shareholder's Equity	C6
EBIT / Total Assets	C7
EBIT / Shareholder's Equity	C8
Operating Profit / Shareholder's Equity	C9
Operating Profit / Total Assets	C10

Table 1 includes financial performance indicators and codes for these indicators. Codes for financial indicators will be used in the tables in the later parts of the study.

In this part of the research, the CRITIC method was used during the weighting process of variables belonging to aircraft leasing companies. The CRITIC method is a method that can be used in cases where subjective weighting approach reflecting the values and judgments of decision-makers is insufficient and therefore the resulting judgments are uncertain [85].

As part of the research, due to the use of quarterly data for the period 2018-2020, the criterion weights for each quarter were taken from the decision matrix and the application process was performed and repeated for each period. However, as an example, the application process was carried out using only the first quarter data of 2018.

At the first stage of the CRITIC method, the decision matrix is produced. The decision matrix in Table 2 was produced with the help of equation (1). The decision matrix is composed of 6 aircraft leasing companies (alternative) and 10 criteria (indicator).

4.1. CRITIC Method Application

Table 2 Decision Matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
AERCAP	1.16	0.80	3.91	0.20	0.73	0.13	0.01	0.07	0.06	0.01
GE	1.81	0.80	3.89	0.20	0.58	0.38	0.00	0.02	-0.02	-0.00
AIR LEASE	0.44	0.62	2.34	0.27	0.70	6.21	0.01	0.05	0.05	0.01
ORIX	14.18	0.36	1.54	0.24	2.18	0.11	0.01	0.03	0.02	0.00
FLY	14.43	0.73	4.74	0.15	0.84	5.84	0.01	0.08	0.07	0.01
SMBC	0.97	0.04	0.35	0.11	0.04	0.03	0.00	0.04	0.08	0.01

After the decision matrix is produced in the CRITIC method, the normalization process is applied to the decision matrix through equality (2). The normalization process is a set of processes in which the maximum and minimum values of each criterion are determined and the equation is applied through these alternative values. The decision matrix obtained through the normalization process is given in Table 3.

Table 3 Normalized Decision Matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
AERCAP	0.05	0.00	0.19	0.61	0.68	0.02	0.99	0.76	0.74	0.86
GE	0.10	0.00	0.19	0.62	0.75	0.06	0.05	0.00	0.00	0.00
AIR LEASE	0.00	0.23	0.55	1.00	0.69	1.00	1.00	0.51	0.71	1.00
ORIX	0.98	0.57	0.73	0.81	0.00	0.01	0.28	0.09	0.38	0.48
FLY	1.00	0.09	0.00	0.30	0.63	0.94	0.86	1.00	0.85	0.84
SMBC	0.04	1.00	1.00	0.00	1.00	0.00	0.00	0.25	1.00	0.69

As seen in Table 4, not only the normalization process was applied, but also the standard deviation (σ_j) value used in calculating the amount of information (c_j) was obtained. After the normalization process, correlation analysis was applied, which revealed the strength and direction of the relationship between the criteria. Correlation analysis is given in Table 4.

Table 4 The Correlation Coefficients Between The criteria

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1	1.00	0.01	-0.19	-0.03	-0.72	0.19	0.04	0.20	-0.04	-0.02
C2	0.01	1.00	0.93	-0.47	0.05	-0.32	-0.57	-0.40	0.41	0.07
C3	-0.19	0.93	1.00	-0.15	-0.01	-0.35	-0.52	-0.56	0.25	0.05
C4	-0.03	-0.47	-0.15	1.00	-0.55	0.23	0.41	-0.15	-0.50	0.02
C5	-0.72	0.05	-0.01	-0.55	1.00	0.09	-0.05	0.17	0.38	0.12
C6	0.19	-0.32	-0.35	0.23	0.09	1.00	0.66	0.60	0.31	0.57
C7	0.04	-0.57	-0.52	0.41	-0.05	0.66	1.00	0.83	0.38	0.77
C8	0.20	-0.40	-0.56	-0.15	0.17	0.60	0.83	1.00	0.64	0.75
C9	-0.04	0.41	0.25	-0.50	0.38	0.31	0.38	0.64	1.00	0.85
C10	-0.02	0.07	0.05	0.02	0.12	0.57	0.77	0.75	0.85	1.00

After the correlation analysis application, the amount of information and the criterion weights were calculated. In this respect, the amount of information for each criterion (c_j) was calculated with the help of equation (4). During the calculation of the amount of information, the standard deviation of the values shown in Table 4 was taken and the process was carried out. In the next step, with the help of equation (5), the criterion weights were obtained by dividing the (c_j) value of each criterion by the sum of the (c_j) value of all criteria. Information values (c_j) and criterion weights (w_j) related to these criteria are shown in table 5

.

Table 5 Criterion Weights for Q1 2018

Std. Dev	0.490	0.400	0.380	0.360	0.330	0.490	0.470	0.390	0.360	0.360
Cj	4.670	3.690	3.640	3.660	3.160	3.450	3.330	2.720	2.300	2.100
W.	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
1	0.1427	0.1127	0.1112	0.1119	0.0967	0.1053	0.1018	0.0832	0.0702	0.0643

Within the scope of the research, the criterion weights for the Q1 2018 period have been determined so far. Criteria weights for other periods other than Q1 2018 period are shown in Table 6.

Table 6 Criteria Weights (2018 Q1-2020 Q4)

Period/Criterion	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Q1 2018	0.143	0.113	0.111	0.112	0.097	0.105	0.102	0.083	0.070	0.064
Q2 2018	0.095	0.117	0.120	0.107	0.086	0.100	0.086	0.114	0.095	0.080
Q3 2018	0.144	0.103	0.085	0.121	0.141	0.146	0.066	0.065	0.066	0.065
Q4 2018	0.102	0.131	0.128	0.121	0.108	0.102	0.090	0.075	0.074	0.070
Q1 2019	0.134	0.121	0.119	0.102	0.090	0.098	0.075	0.077	0.092	0.093
Q2 2019	0.099	0.140	0.130	0.130	0.119	0.097	0.077	0.070	0.071	0.067
Q3 2019	0.126	0.122	0.079	0.116	0.145	0.134	0.072	0.064	0.072	0.070
Q4 2019	0.105	0.144	0.106	0.125	0.128	0.085	0.071	0.101	0.073	0.062
Q1 2020	0.126	0.119	0.112	0.114	0.084	0.114	0.083	0.086	0.084	0.077
Q2 2020	0.149	0.118	0.077	0.118	0.129	0.134	0.075	0.065	0.069	0.067
Q3 2020	0.151	0.092	0.070	0.128	0.116	0.109	0.077	0.082	0.084	0.091
Q4 2020	0.142	0.088	0.078	0.121	0.079	0.120	0.090	0.086	0.093	0.104

Due to the fact that the weighting of the relevant criteria covers more than one period, the change of weights according to periods is shown in Figure 1.

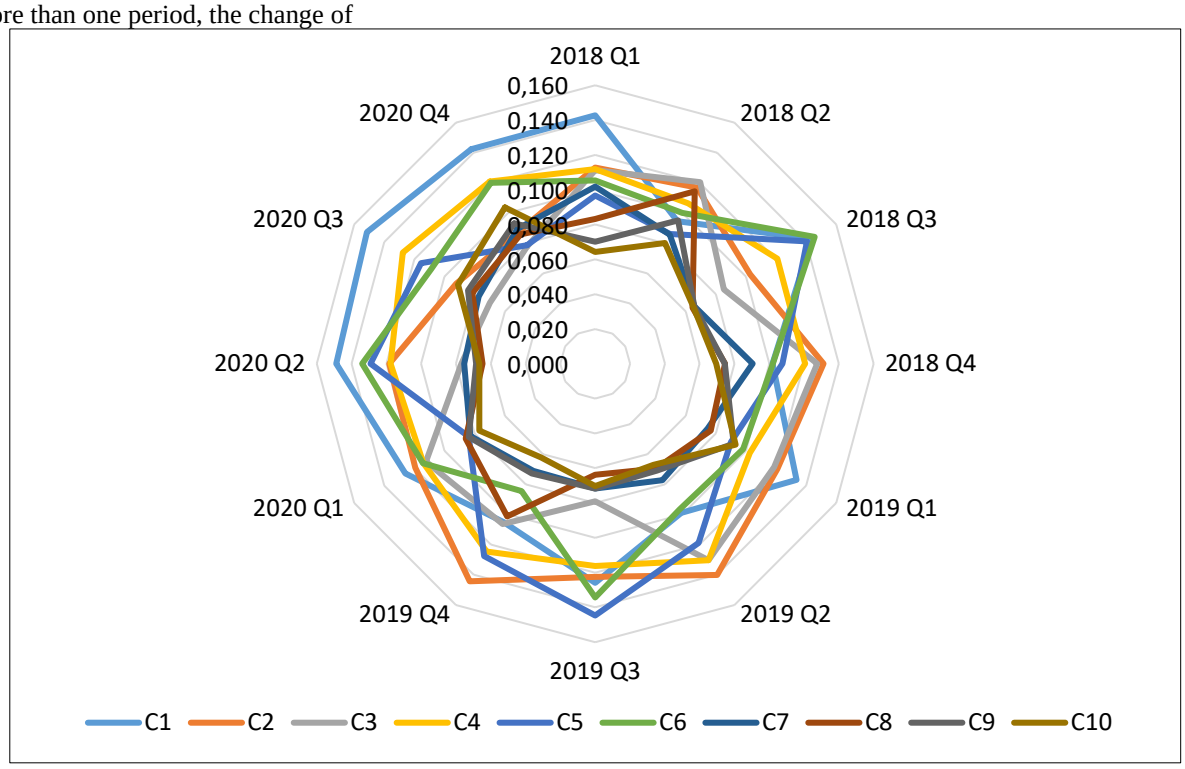

Figure 1. Change in Significance of Performance Criteria in Q1 2018 – Q4 2020 Period

4.2. CODAS Application

In this study, the financial performance of aircraft leasing companies in the Covid-19 period was examined using the CODAS method. CRITIC method was used in weighting the criteria. As in other multi-criteria decision-making methods, firstly, the decision matrix is constructed with the help of equation (6) in the CODAS method. The initial decision matrix for financial indicators is included in Table 7.

Table 7 Initial Decision Matrix (Q1 2018)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
AERCAP	1,160	0,796	3,914	0,204	0,727	0,130	0,014	0,067	0,055	0,011
GE	1,810	0,796	3,893	0,204	0,581	0,380	0,004	0,021	-0,016	-0,003
AIR LEASE	0,440	0,620	2,339	0,265	0,696	6,210	0,014	0,052	0,052	0,014
ORIX	14,185	0,362	1,541	0,235	2,177	0,106	0,007	0,027	0,020	0,005
FLY	14,430	0,725	4,744	0,153	0,838	5,840	0,012	0,081	0,065	0,011
SMBC	0,967	0,037	0,350	0,106	0,037	0,027	0,004	0,036	0,080	0,008

After the decision matrix was formed, the normalization process was applied to the decision matrix utilizing equation (7) in the second stage of the analysis. The normalization process is GIVEN in Table 8.

Table 8 Normalized Decision Matrix (Q1 2018)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
AERCAP	0,080	0,046	0,089	0,768	0,051	0,021	0,990	0,825	0,695	0,824
GE	0,125	0,047	0,090	0,771	0,064	0,061	0,318	0,264	-0,196	-0,234
AIR LEASE	0,030	0,060	0,150	1,000	0,053	1,000	1,000	0,640	0,647	1,000
ORIX	0,983	0,102	0,227	0,887	0,017	0,017	0,480	0,332	0,255	0,364
FLY	1,000	0,051	0,074	0,577	0,044	0,940	0,902	1,000	0,815	0,804
SMBC	0,067	1,000	1,000	0,400	1,000	0,004	0,279	0,446	1,000	0,619

In the third stage of the analysis, the weights of the criteria are included in the calculation process. In this direction, the weighting procedure is shown in equation (8) was performed using the criterion weights found through the CRITIC method. In the fourth stage of the analysis, negative ideal solution points of the criteria were determined utilizing equality (9). In other words, the smallest value was determined by calculating the weighted normalized Matrix values of the column in which the criterion is located in terms of each criterion. In the fifth stage, the Euclidean and taxicab distance values of the alternatives were determined with the help of equality (10-11). The weighted normalized matrix obtained, the distance values from the negative-ideal solution, and the distance values of Ei (Euclidean) and Ti (Taxicab) are given in Table 9

Table 9 The Weighted Normalized Decision Matrix and Distance Values From the Negative-Ideal Solution (Q1 2018)

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Ei	Ti
AERCAP	0,011	0,005	0,010	0,086	0,005	0,002	0,101	0,069	0,049	0,053	0,133	0,305
GE	0,018	0,005	0,010	0,086	0,006	0,006	0,032	0,022	-0,014	-0,015	0,045	0,071
AIR LEASE	0,004	0,007	0,017	0,112	0,005	0,105	0,102	0,053	0,045	0,064	0,178	0,429
ORIX	0,140	0,012	0,025	0,099	0,002	0,002	0,049	0,028	0,018	0,023	0,157	0,311
FLY	0,143	0,006	0,008	0,065	0,004	0,099	0,092	0,083	0,057	0,052	0,216	0,522
SMBC	0,010	0,113	0,111	0,045	0,097	0,000	0,028	0,037	0,070	0,040	0,204	0,465
NIS	0,004	0,005	0,008	0,045	0,002	0,000	0,028	0,022	-0,014	-0,015		

After the calculation of Ei (Euclidean) and Ti (Taxicab) distance values, each alternative was evaluated according to the other alternatives by using these distance values and a relative evaluation matrix was formed. Equality (12) was used to create a relative evaluation matrix. In the calculation phase, the value of ψ in Equation (12) was used. The value of ψ was determined as 0.02, as in many studies in the literature (Badi, et al., 2018; Mathew and Sahu, 2018; Boltürk and Kahraman, 2018; Kiracı and Bakır, 2020). The comparative evaluation matrix is given in Table 10.

Table 10 Comparative Evaluation Matrix (Q1 2018)

	AERCAP	GE	AIR LEASE	ORIX	FLY	SMBC	H	Rank
AERCAP	0,000	0,322	-0,169	-0,031	-0,300	-0,231	-0,4085	5
GE	-0,322	0,000	-0,491	-0,353	-0,622	-0,552	-2,3399	6
AIR LEASE	0,169	0,491	0,000	0,138	-0,131	-0,062	0,6056	3
ORIX	0,031	0,353	-0,138	0,000	-0,269	-0,200	-0,2246	4
FLY	0,300	0,622	0,131	0,269	0,000	0,012	1,3348	1
SMBC	0,231	0,552	0,062	0,200	-0,012	0,000	1,0326	2

At the last stage of the analysis, the evaluation score for each decision alternative was calculated by means of equation (14). H_i value was obtained by summing the values in the related lines for each alternative. The ranking of the decision alternatives was obtained by ordering the H_i values in descending order.

According to the results of the analysis, the aircraft leasing company with the best performance for the Q1 2018 period was FLY, while the aircraft leasing company with the worst performance was GE.

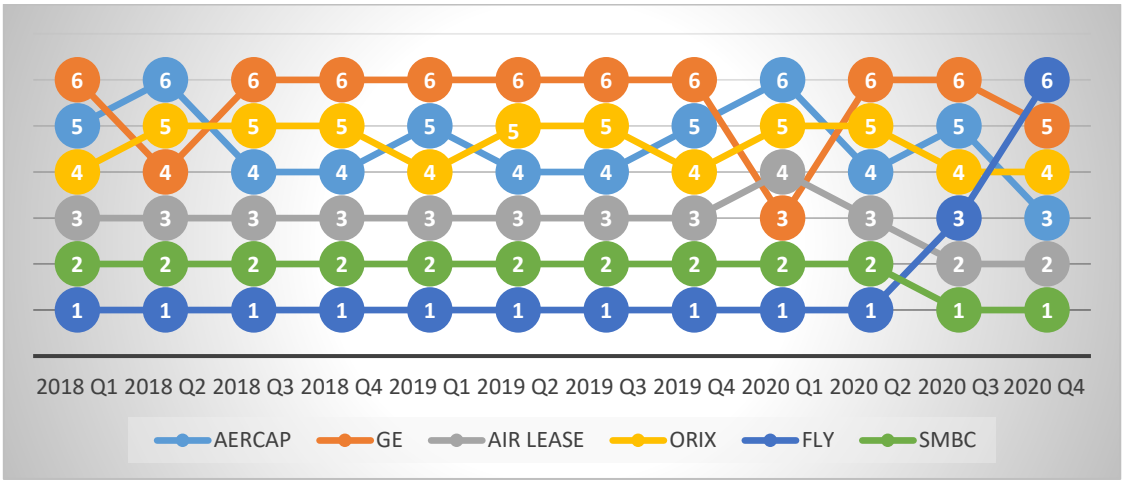

Figure 2. Performance of Aircraft Leasing Companies In Q1 2018 – Q4 2020

Figure 2[1] depicts the change in the financial performance of aircraft leasing companies in the period Q1 2018 - Q4 2020. FLY leasing was the best performer until the beginning of the pandemic. However, its performance has decreased after the pandemic. This company ranked first until Q2 2020 period. But it dropped back to sixth place in Q4 2020 period. The pandemic affected SMBC less than others. The financial performance of AIR LEASE decreased with the beginning of the pandemic. However, it has improved slightly in comparison to the beginning of the pandemic. The financial performances of other companies did not change significantly.

5. Discussion and Conclusion

The airline industry is facing one of the most significant crises in its history. Due to Covid-19, all industry stakeholders, especially airlines, have experienced financial difficulties. Global aircraft leasing companies, which interact closely with airlines, have also been significantly affected by this crisis. In particular, the difficulties experienced by airlines in meeting their obligations and the contraction in the airline leasing market have increased the likelihood that these companies will experience financial difficulties or bankruptcy. Managerial and tactical decisions implemented in this process significantly have affected the survival and/or competitive performance of firms. Therefore, while some global aircraft leasing companies came out of the crisis stronger, some of them got into difficulties. In this study, we aim to determine the financial performances of global aircraft leasing companies from the pre-Covid-19 period to the end of 2020.

To determine the financial performance of global aircraft leasing companies, financial performance indicators were determined at the first stage. Ten financial performance indicators were determined through a thorough literature review. These indicators are frequently used in the literature to measure the financial performance of firms in terms of cash flow, debt level, and (Abban and Hasan, 2021; Elyasiani and Jia, 2019; García-Ramos and Díaz, 2020; Lahouel et al., 2021; Ma et al., 2019; Martí-Ballester, 2021; D. Wang et al., 2021).. Therefore, we used these indicators to determine the financial performance of global aircraft leasing companies ambidextrously.

In multi-criteria decision-making, it is important to correctly determine the criteria weights. Determining criterion weights

[1] The details of air leasing companies' score and rankings in the period between 2018 Q1 - 2020 Q4 is in the appendix.

with deviations may cause performance analysis results to be biased. In this study, we used the CRITIC method to determine the weights of financial performance criteria. The CRITIC method is one of the methods based on objective weighting (Diakoulaki et al., 1995). In addition, we made the weight calculations separately for each period we examined in the study (Q1 2018 – Q4 2020). It is observed that there are changes in the importance levels depending on the Covid-19 pandemic in the criterion weights.

In the study, we applied the CRITIC-based CODAS method to reveal the financial performance of global aircraft leasing companies. We examined the financial performance of six global aircraft leasing companies for the Q1 2018 - Q4 2020 periods. The findings indicate significant changes in the financial performance of global aircraft leasing companies occurred due to the Covid-19 pandemic. The results of the study show that SCMB rose to first place. In contrast, FLY, the best performer until Q2 2020, dropped back to last place. The findings indicate that Air LEASE and AerCap aircraft leasing companies improved their financial performance compared to the pre-Covid-19 period, while there was no significant change in the financial performance of ORIX and GE. Another interesting finding in the study is that GE aircraft leasing has improved its financial performance indicators in the Q1 2020 period, but they have deteriorated in a short period.

There are several reasons why some aircraft Leasing companies have lower performance than their peers in performance analysis results. First of all, the B737 MAX aircraft two fatal crashes on October 2018 and March 2019 negatively affected aircraft leasing companies that had more B737 MAX in their fleet. Because after the two fatal crashes, Boeing 737 MAX type airplanes were grounded worldwide between March 2019 and December 2020. Secondly, many airlines have experienced financial distress due to Covid-19. Due to Covid-19, approximately 90% of airlines unable to make lease payments and had to request a rental deferral (Charters, 2020; CMS, 2020). Therefore, the Covid-19 performance of aircraft leasing companies is closely related to the risk of airlines experiencing financial distress or bankruptcy. That is why some aircraft leasing companies performed lower than others during the Covid-19 process. There may be many reasons for the performance change in question, but we think that further studies might focus on this case.

Ethical approval

Not applicable.

Funding

No financial support was received for this study.

References

Abate, M., Christidis, P., and Purwanto, A. J. (2020). Government support to airlines in the aftermath of the COVID-19 pandemic. Journal of Air Transport Management, 89(1), 1-15.

Abban, A. R., and Hasan, M. Z. (2021). The causality direction between environmental performance and financial performance in Australian mining companies - A panel data analysis. Resources Policy, 70 (2), 1-15.

Afza, T., and Ashgar, M. (2014). Efficiency of Modaraba and Leasing Companies in Pakistan. Procedia - Social and Behavioral Sciences, 109, 470-482.

Airline Economics Research. (2021). Airline Economics Aviation Industry Leaders Report 2021: Route to Recovery. www.airlineeconomics.com

Akçakanat, Ö., Aksoy, E., and Teker, T. (2018). CRITIC ve MDL Temelli EDAS Yöntemi İle TR-61 Bölgesi Bankalarının Performans Değerlendirmesi. Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi(32), 1-24.

Alam, H. M., Raza, A., Farhan, M., and Akram, M. (2011). Leasing Industry in Pakistan: A Comparison of Financial Performance of Leasing Companies. International Journal of Business and Social Science, 2(10), 218-223.

Amankwah-Amoah, J., Khan, Z., and Osabutey, E. L. C. (2021). COVID-19 and business renewal: Lessons and insights from the global airline industry. International Business Review, 30(3), 10-22.

Amanollahi, G. F. (2016). The Influence of External Factors on The Credit Risk in Leasing Industry. Management Science Letters, 6, 251-258.

Ashgar, M. J., and Afza, T. (2013). Efficiency of Modaraba and Leasing Companies in Pakistan. Middle-East Journal of Scientific Research, 17(3), 305-314.

Badi, I., and Kridish, M. (2020). Landfill site selection using a novel FUCOM-CODAS model: Acase study in Libya. Scientific African, 9(1), 13-23.

Badi, İ., Abdulshahed, A. M., and Shetwan, A. G. (2018). A Case Study of Supplier Selection For A Steelmaking Company in Libya By Using The Combinative Distance-Based Assesment (CODAS) Model. Decision Making: Applications in Management and Engineering, 1(1), 1-12.

Bakır, M., and Alptekin, N. (2018). Hizmet Kalitesi Ölçümüne Yeni Bir Yaklaşım: CODAS Yöntemi İle Havayolu İşletmeleri Üzerine Bir Uygulama. Business and Management Studies An International Journal, 6(4), 1336-1353.

Bauer, L. B., Bloch, D., and Merkert, R. (2020). Ultra Long-Haul: An emerging business model accelerated by COVID-19. Journal of Air Transport Management, 89(2, 1-13.

Bazargan, M., and Hartman, J. (2012). Aircraft replacement strategy: Model and analysis. Journal of Air Transport Management, 25(3), 26–29.

Belhadi, A., Kamble, S., Jabbour, C. J. C., Gunasekaran, A., Ndubisi, N. O., and Venkatesh, M. (2021). Manufacturing and service supply chain resilience to the COVID-19 outbreak: Lessons learned from the automobile and airline industries. Technological Forecasting and Social Change, 163(2), 40-55.

Boltürk, E., and Kahraman, C. (2018). Interval-valued intuitionistic fuzzy CODAS method and its

application to wave energy facility location selection problem. Journal of Intelligent & Fuzzy Systems, 35(4), 1-13.

Borochin, P. (2020). The information content of real operating performance measures from the airline industry. Journal of Financial Markets, 50 (3), 13-28.

Bourjade, S., Huc, R., and Muller-Vibes, C. (2017). Leasing and profitability: Empirical evidence from the airline industry. Transportation Research Part A: Policy and Practice, 97(2), 30–46.

Brown, R. S., and Kline, W. A. (2020). Exogenous shocks and managerial preparedness: A study of U.S. airlines' environmental scanning before the onset of the COVID-19 pandemic. Journal of Air Transport Management, 89 (2), 35-46.

Budd, L., Ison, S., and Adrienne, N. (2020). European airline response to the COVID-19 pandemic – Contraction, consolidation and future considerations for airline business and management. Research in Transportation Business and Management, 37(3), 10-23.

Carter, D., Mazumder, S., Simkins, B., and Sisneros, E. (2021). The Stock Price Reaction of the COVID-19 Pandemic on the Airline, Hotel, and Tourism Industries. Finance Research Letters, 44(2), 15-30.

Caslin, J., and O'brien, D. (2020). Banking and Aviation Finance Sub-Committee Current Topics: Discussion Paper 202005/2.

Ceyhan, İ. F., and Demirci, F. (2017). MULTIMOORA Yöntemiyle Finansal Performans Ölçümü: Leasing Şirketlerinde Bir Uygulama. Bartın Üniversitesi İ.İ.B.F. Dergisi, 8(15), 277-296.

Charters, A. (2020). Aircraft leasing companies face challenges. https://www.grantthornton.co.uk/insights/aircraft-leasing-companies-face-challenges/

Chen, H.-C., and Yeh, C.-W. (2021). Global financial crisis and COVID-19: Industrial reactions. Finance Research Letters , 42 (2), 1-13.

Chen, W. T., Huang, K., and Ardiansyah, M. N. (2018). A mathematical programming model for aircraft leasing decisions. Journal of Air Transport Management, 69 (2), 15–25.

Chen, Y., Cheng, S., and Zhu, Z. (2021). Exploring the operational and environmental performance of Chinese airlines: A two-stage undesirable SBM-NDEA approach. Journal of Cleaner Production, 289(3), 125-140.

CMS. (2020). COVID-19 Challenges for the Aircraft Leasing Industry https://www.cms-lawnow.com/ealerts/2020/03/covid-19-challenges-for-the-aircraft-leasing-industry?cc_lang=en

Colenda, C. c., Applegate, W. B., Reifler, B. V., and Blazer, D. G. (2020). COVID-19: Financial Stress Test for Academic Medical Centers. Academic Medicine, 95(8), 1-3.

Çakır, S., and Perçin, S. (2013). Çok Kriterli Karar Verme Teknikleriyle Lojistik Firmalarında Performans Ölçümü. Ege Akademik Bakış, 13(4), 449-459.

Dahooei, J. H., Zavadskas, E. K., Vanaki, A. S., Firoozfar, H. R., and Ghorabaee, M. K. (2018). An Evaluation Model of Business Intelligence for Enterprise Systems with New Extension of CODAD CODAS-IVIF). Economics and Management, 21(3), 171-187.

Dalfard, V. M., Sohrabian, A., Najafabadi, A. M., and Alvani, J. (2012). Performance Evaluation and Prioritization of Leasing Companies Using the Super Efficiency Data Envelopment Analysis Model. Acta Polytechnica Hungarica, 9(3), 183-194.

Demirgüç-Kunt, A., Pedraza, A., and Ruiz-Ortega, C. (2020). Banking Sector Performance During the COVID-19 Crisis. Working Paper. World Bank.

Deveci, K., Cin, R., and Kağızman, A. (2020). A modified interval valued intuitionistic fuzzy CODAS method and its application to multi-criteria selection among renewable energy alternatives in Turkey. Applied Soft Computing Journal 96(1), 1-18.

Diakoulaki, D., Mavrotas, G., and Papayannakis, L. (1995). Determining Objective Weights in Multiple Criteria Problems: The CRITIC Method. Computers and Operations Research, 22(7), 763-770.

Dube, K., Nhamo, G., and Chikodzi, D. (2021). COVID-19 pandemic and prospects for recovery of the global aviation industry. Journal of Air Transport Management, 92(2), 1-12.

Elyasiani, E., and Jia, J. (Jane). (2019). Relative performance and systemic risk contributions of small and large banks during the financial crisis. Quarterly Review of Economics and Finance, 74, 220–241.

Eufrásio, A. B. R., Eller, R. A. G., and Oliveira, A. V. M. (2021). Are on-time performance statistics worthless? An empirical study of the flight scheduling strategies of Brazilian airlines. Transportation Research Part E: Logistics and Transportation Review, 145 (1), 23-38.

Fitch Ratings. (2021). Aircraft Lessor Sector Outlook to Negative on Coronavirus Impact. https://www.fitchratings.com/research/non-bank-financial-institutions/aircraft-lessor-sector-outlook-to-negative-on-coronavirus-impact-16-03-2020

Fulger-Laronde, Z., Pashang, S., Feor, L., and ElAlfy, A. (2020). ESG ratings and financial performance of exchange-traded funds during the COVID-19 pandemic. Journal of Sustainable Finance & Investment, 22(/3), 1-8.

García-Ramos, R., and Díaz, B. D. (2020). Board of directors structure and firm financial performance:

A qualitative comparative analysis. Long Range Planning, 10201.

Gavazza, A. (2010). Asset liquidity and financial contracts: Evidence from aircraft leases. Journal of Financial Economics, 95(1), 62–84.

Gössling, S. (2020). Risks, resilience, and pathways to sustainable aviation: A COVID-19 perspective. Journal of Air Transport Management, 89(3), 101-113.

Gudiel Pineda, P. J., Liou, J. J. H., Hsu, C. C., and Chuang, Y. C. (2018). An integrated MCDM model for improving airline operational and financial performance. Journal of Air Transport Management, 68(4), 103–117.

Gümüş, U. T., Can Öziç, H., and Sezer, D. (2019). BİST' te İnşaat ve Bayındırlık Sektöründe İşlem Gören İşletmelerin SWARA ve ARAS Yöntemleriyle Finansal Performanslarının Değerlendirilmesi. Uluslararası Toplum Araştırmaları Dergisi, 10(17), 835-857.

Gürol, B. (2018). Faktoring, Finansal Kiralama ve Leasing Sektörlerinin Performanslarının TOPSIS Yöntemi İle Ölçülmesi: Türkiye Karşılaştırması. Başkent Üniversitesi Ticari Bilimler Fakültesi Dergisi, 2(2), 61-73.

Huang, F., Zhou, D., Hu, J. L., and Wang, Q. (2020). Integrated airline productivity performance evaluation with CO2 emissions and flight delays. Journal of Air Transport Management, 84 (2), 100-113.

IATA. (2021). IATA Economics' Chart of the Week New Covid variants pose a risk to air travel recovery . https://www.iata.org/en/iata-repository/publications/economic-reports/new-covid-variants-pose-a-risk-to-air-travel-recovery/

ICAO. (2021). Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis Economic Development-Air Transport Bureau.

Ichsan, R. N., Suparmin, S., Yusuf, M., Ismal, R., and Sitompul, S. (2021). Determinant of Sharia Bank's Financial Performance during the Covid-19 Pandemic. Budapest International Research and Critics Institute-Journal, 4(1), 298-309.

Karakaya, A. (2020). Bulanık Karar Verme Yaklaşımıyla Katılım Bankaları Finansal Performansı. Uluslararası İktisadi ve İdari İncelemeler Dergisi, 13(2), 99-122.

Katrancı, A., and Kundakçı, N. (2020). Bulanık CODAS Yöntemi ile Kripto Para Yatırım Alternatiflerinin Değerlendirilmesi. Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi, 22(4), 958-973.

Kazan, H., and Özdemir, Ö. (2014). Financial Performance Assesment Of Large Scale Conglomerates Via TOPSIS and CRITIC Methods. International Journal of Management and Sustainability, 3(4), 203-224.

Keshavarz Ghorabaee, M., Zavadskas, E. K., Turskıs, Z., and Antucheviciene, J. (2016). A New Combative Dıstance-Based Assesment (CODAS) Method For Multı- Criteria Decision-Making. conomic Computation and Economic Cybernetics Studies and Research, 50(3), 25-44.

Khan, M. A., Azharuddin, S., Khan, S. S., and Ali, M. M. (2021). Influence of Entrepreneur Traits on SME's Financial Performance: Case Study of GCC Entrepreneurs who survived during COVID-19. IJARIIE, 7(1), 651-660.

Kiracı, K., and Asker, V. (2019). Havaaracı Leasing Şirketlerinin Performans Analizi: Entropi Temelli Topsis Uygulaması. Uluslararası İktisadi ve İdari İncelemeler Dergisi, 12(4), 17-28.

Kiracı, K., and Bakır, M. (2019). Evaluation of Airlines Performance Using an Integrated CRITIC and CODAS Methodology: The Case of Star Alliance Member Airlines. Studies in Business and Economics, 15(1), 83-99.

Kuhle, P., Arroyo, D., and Schuster, E. (2021). Building A blockchain-based decentralized digital asset management system for commercial aircraft leasing. Computers in Industry, 126(2), 103-126.

Lahouel, B. ben, Zaied, Y. ben, Song, Y., and Yang, G. liang. (2021). Corporate social performance and financial performance relationship: A data envelopment analysis approach without explicit input. Finance Research Letters, 39(3), 120-132.

Ma, W., Jin, M., Liu, Y., and Xu, X. (2019). Empirical analysis of fractional differential equations model for relationship between enterprise management and financial performance. Chaos, Solitons and Fractals, 125(4), 17–23.

Maneenop, S., and Kotcharin, S. (2020). The impacts of COVID-19 on the global airline industry: An event study approach. Journal of Air Transport Management, 89(3), 109-123.

Market Research. (2021). Aircraft Leasing Market Size, Share & Analysis - Industry Report, 2026. https://www.polarismarketresearch.com/industry-analysis/aircraft-leasing-market

Martí-Ballester, C. P. (2021). Analysing the financial performance of sustainable development goals-themed mutual funds in China. Sustainable Production and Consumption, 27, 858–872.

Mathew, M., and Sahu, S. (2018). Comparison of New Multi-Criteria Decision Making Methods for Material Handling Equipment selection. Management Science Letters , 8(3), 139-150.

Naboush, E., and Alnimer, R. (2020). Air carrier's liability for the safety of passengers during COVID-19 pandemic. Journal of Air Transport Management, 89(2), 104-118.

Orçun, Ç. (2019). Enerji Sektöründe WASPAS Yöntemiyle Performans Analizi. BAİBÜ Sosyal Bilimler Enstitüsü Dergisi, 19(2), 439-453.

Oum, T. H., Zhang, A., and Zhang, Y. (2000). Optimal demand for operating lease of aircraft. Transportation Research Part B: Methodological, 34(1), 17–29.

Özçelik, F., Avcı Öztürk, B., and Gürsakal, S. (2014). Türkiye'de Kurumsal Sosyal Sorumluluk ve Finansal Performans Arasındaki İlişkinin Araştırılması. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi, 28(3), 189-203.

Peng, X., and Garg, H. (2018). Algorithms for interval-valued fuzzy soft sets in emergency decision making based on WDBA and CODAS with new information measure. Computers & Industrial Engineering, 119(2), 439-452.

Pereira, D. da S., and Soares de Mello, J. C. C. B. (2021a). Efficiency evaluation of Brazilian airlines operations considering the Covid-19 outbreak. Journal of Air Transport Management, 91(3), 120-134.

Piccinelli, S., Moro, S., and Rita, P. (2021). Air-travelers' concerns emerging from online comments during the COVID-19 outbreak. Tourism Management, 85(2), 104-113.

Rababah, A., Al-Haddad, L., Sial, M. S., Chunmei, Z., and Cherian, J. (2020). Analyzing the effects of COVID-19 pandemic on the financial performance of Chinese listed companies. Journal of Public Affairs, 20(4), 1-6.

Renold, M., Kuljanin, J., and Kalić, M. (2019). The comparison of financial performance of airlines with different business model operated in long-haul market. Transportation Research Procedia, 43(3), 178–187.

Sarıay, M. İ., and Bağcı, H. (2019). Varlık Tüketiminin İşletmelerin Finansal Performansına Etkisi: BİST'te İşlem Gören Perakende Sektörüne Yönelik Bir Uygulama. Ekonomi, Politika & Finans Araştırmaları Dergisi, 5(1), 140-157.

Schmit, M. (2004). Credit Risk in The Leasing Industry. Journal of Banking & Finance, 28, 811-833.

Serrano, F., and Kazda, A. (2020). The future of airports post COVID-19. Journal of Air Transport Management, 89(3), 88-105.

Sobieralski, J. B. (2020). COVID-19 and airline employment: Insights from historical uncertainty shocks to the industry. Transportation Research Interdisciplinary Perspectives, 5(1), 113-130.

Tayyar, N., Yapa, K., Durmuş, M., and Akbulut, İ. (2018). Referans İdeal Metodu ile Finansal Performans Analizi: BİST Sigorta Şirketleri Üzerinde Bir Uygulama. İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 7(4), 2490-2509.

Temizel, F., Doğan, H., and Bayçelebi, B. E. (2016). Kurumsal Yönetim Endeksi Kapsamındaki İşletmelerin Finansal Performans Analizi. Business and Management Studies: An International Journal, 4(2), 185-202.

Trinkuniene, E., Podvezko, V., Zavadskas, E. K., Joksiene, I., Vinogradova, I., and Trinkünas, V. (2017). Evaluation of quality assurance in contractor contracts by multi-attribute decision-making methods. Economic Research-Ekonomska Istraživanja, 30(1), 1152-1180.

Tuş, A., and Aytaç Adalı, E. (2018). Personnel Assessment with CODAS and PSI Methods. The Journal of Operations Research, Statistics, Econometrics and Management Information Systems, 6(2), 243-256.

Ulutaş, A. (2020). SWARA Tabanlı CODAS Yöntemi İle Kargo Şirketi Seçimi. MANAS Sosyal Araştırmalar Dergisi, 9(3), 1640-1647.

Ulutaş, A., and Karaköy, Ç. (2020). CRITIC ve ROV Yöntemleri İle Bir Kargo Firmasının 2011-2017 Yılları Sırasındaki Performansının Analiz Edilmesi. MANAS Sosyal Araştırmalar Dergisi, 8(1), 223-230.

Vinod, B. (2020). The COVID-19 pandemic and airline cash flow. Journal of Revenue and Pricing Management, 19(4), 228–229.

Wang, D., Li, X., Tian, S., He, L., Xu, Y., and Wang, X. (2021). Quantifying the dynamics between environmental information disclosure and firms' financial performance using functional data analysis. Sustainable Production and Consumption, 28(3), 192–205.

Wang, Y., Zhou, Y., Hansen, M., and Chin, C. (2019). Scheduled block time setting and on-time performance of U.S. and Chinese airlines—A comparative analysis. Transportation Research Part A: Policy and Practice, 130(3), 825–843.

Yalçın, N., and Yapıcı Pehlivan, N. (2019). Application of the Fuzzy CODAS Method Basedon Fuzzy Envelopes for Hesitant Fuzzy LinguisticTerm Sets: A Case Study on a PersonnelSelection Problem. Symmetry, 11(4), 1-27.

Yeni, F. B., and Özçelik, G. (2019). Interval-Valued Atanassov Intuitionistic Fuzzy CODAS Method for Multi Criteria Group Decision Making Problems. Group Decision and Negotiation 28(2), 433-452.

Zheng, C., and Zhang, J. (2021). The impact of COVID-19 on the efficiency of microfinance institutions. International Review of Economics and Finance, 71(1), 407-423.

Cite this article: Kiracı, K., Asker, V., Güngör, H.Y. (2022). A Review of Financial Performance of Aircraft Leasing Companies. Journal of Aviation, 6(1), 61-72.

This is an open access article distributed under the terms of the Creative Commons Attiribution 4.0 International Licence

Copyright © 2022 Journal of Aviation https://javsci.com - http://dergipark.gov.tr/jav