



Araştırma Makalesi • Research Article

Effecting Factors of Profitability: A Panel Data Analysis on the Best Airline Companies in Europe Ranked by the SKYTRAX*

SKYTRAX Tarafından Avrupa'nın En İyi Havayolu Olarak Derecelendirilen Şirketlerin Karlılıklarına Etki Eden Faktörler: Bir Panel Veri Uygulaması

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ÖZ

Bu çalışmanın amacı, bir derecelendirme kuruluşu olan SKYTRAX tarafından Avrupa'nın en iyi havayolu şirketleri arasında gösterilen firmaların aktif karlılıklarına etki eden faktörlerin 2006-2015 dönemine ilişkin veriler kullanılarak tespit edilmesidir. Bu amaçla faaliyet oranlarını temsilen; aktif devir hızı, özsermaye devir hızı ve sabit varlık devir hızı oranları; finansal yapıya ilişkin oranları temsilen de; uzun vadeli borçların kapitalizasyon oranı, borçlanma oranı ile kaldıraç oranı panel veri yöntemiyle analiz edilmiştir. Elde edilen bulgulara göre, finansal yapı oranlarını temsil eden kaldıraç oranı ve uzun vadeli borçların kapitalizasyona oranının aktif karlılığı üzerinde anlamlı ve negatif yönlü bir etkisi olduğu, faaliyet oranlarından biri olan özsermaye devir hızının ise çalışmaya ilişkin şirketlerin aktif karlılıkları üzerinde pozitif yönlü bir etkisinin olduğu tespit edilmiştir. Bununla birlikte, diğer bir faktör olan aktif devir hızı oranının havayolu taşımacılık şirketlerinin karlılıkları üzerinde istatistiki olarak anlamlı ve negatif yönlü bir etkisinin bulunduğu da elde edilen bulgular arasındadır.

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ABSTRACT

The aim of this study is to determine the effecting factors on the profitability of companies rated by the SKYTRAX as the best air transportation companies in Europe in the period of 2006-2015. Through this aim, asset turnover, equity turnover and fixed-asset turnover factors defined as activity ratios; leverage, debt and long-term debt to capitalization factors which are detected as the capitalization ratios on profitability is analyzed with panel data method. Empirical findings point out that the factors related to capitalization ratios namely; leverage and long-term debt to capitalization ratio significantly affect profitability negatively; while one of the activity factors namely equity turnover ratio has statistically a positive effect on profitability. Additionally, asset turnover seems to have a negative effect on profitability.

1. Introduction

Air transport is a cost-effective form of transportation because technological developments are both a forerunner and a priority practitioner, and economic and political stability have a key role in the development of the aviation industry. For this reason, it is crucial that sectoral regulations

and effective aviation policies are supposed to be viable in order for the growth in the aviation sector to be sustainable. Factors such as growth in world trade volume, economic growth, development in the tourism sector, increasing urban population, globalization, and the possibility of air travel for faster and more comfortable travel are the main factors

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supporting the growth of the industry all over the world. Demand in the sector has increased continuously for the last 10 years except for the 2009 crisis, and the rate of increase in passenger traffic has exceeded that of global economic growth.

In addition, improvements in passenger ticket fees, as well as faster, safer and more comfortable transportation with improved aircraft technology, have increased the interest of air travel within other modes of transport. The slowdown in global economic activity and security worries have weakened demand and the pace of air transportation and the number of passengers with cheap ticket prices continued to increase in 2016. Air transport in the world, reaching 1% by the end of 2017, its share in GDP expected to reach a volume of approximately \$ 776 billion. Because Revenue Passenger Kilometers (RPKs), which showed a tendency to grow despite the expected slowdown in the world economy, could not prevent the rise in oil prices.

On the other hand, airline transport is one of the most challenging business and operational areas. Two thirds of the operating expenses in the sector, which must be tightly controlled, such as personnel, fuel, aircraft and engine purchases or leases, spare parts, technical service, data processing, ground handling, sales, food and beverage, education and insurance, expenses. The average occupancy rate should be 65% in order to cover a company's costs.

In particular, oil prices, fluctuations in currencies, terrorist incidents, economic and political uncertainties, reduced trade and regional problems, and excessive capacity increases have been major factors affecting the aviation industry in 2016 (The International Air Transport Association, IATA 2016). Besides, according to IATA data, the number of passengers carried in the world increased by 5.7% in 2016 to 3.77 billion passengers; capacity increased by 6.2%. While the net profit of the sector was \$35.6 billion, total expenses decreased by 2.5%; unit costs excluding fuel increased by 2%. On the other hand, passenger and cargo revenues decreased by 8% and 12.5% respectively. The decrease in demand has put pressure on revenues per passenger and occupancy rates, and the profitability of airline companies adversely affected by these developments. As a result, airline companies have shifted capacity and changed short-term strategies to reduce their risks.

Additionally, Investment and financing decisions are an important aspect of corporate finance and airlines must regularly replace their fleets of aircraft so that the airline industry has consistently high capital expenditures in transportation. Furthermore, capital expenditures also significantly affect the cash flows and profitability of the airline companies. Therefore, in this study, the factors affecting the profitability of companies in order to make an estimation in terms of the major airline companies in Europe tested with appropriate methods for a period of 10 years in 2006-2015 for aiming to provide a contribution to the portfolio creation of those who request to invest in this sector.

The study consists of five parts in total. In the following section, the scientific studies in which the models used in the studies related to the determination of the factors affecting the profitability of companies in the finance literature was examined. Section 3 and 4 are about data set, variables,

model, the methodology and empirical results of the study, severally. Eventually, conclusions are drew in the last section.

2. Literature Review

Oum et al. (2004) examined the effect of horizontal alliances on firm performance in terms of productivity and profitability by panel data method from 22 international airline companies formed alliances during the period 1986–1995. The study revealed that horizontal alliances make a significant contribution to productivity gains, whereas they have no overall significant and positive impact on profitability. Chin and Tay (2010) tested the relationship between airline growth and profitability and the survival probabilities of Asian carriers by the Markov Model. Regression analysis showed that growth rates of air traffic are positively associated with GDP growth rates and both an airline's growth and profitability are positively related. Perezgonzalez and Lin (2010) analysed that the net return for airlines before and after joining an alliance. The data compiled from ICAO Data, and comprised 15 international airlines as subjects and their net financial results for a period of 11 years as primary research variables. The results showed that a deterioration of net profits after joining an alliance, although this trend was only significant when comparing performance over the short-term. Vieira (2010) examined the relationship between liquidity and profitability in a group of companies comprising the major airline carriers in the world between 2005 and 2008. It was observed that there is a significant positive correlation between liquidity and profitability on the short run, contradicting the main literature. Mantin and Wang (2012) investigated the determinants of profitability in the U.S. domestic airline industry by considering operations strategy, productivity and service measures by focusing before and after 9/11 attacks. The findings revealed that prior to 9/11 operations strategy, productivity, and service measures are significantly related to profitability conversely after 9/11 none of the service measures was significant. Mwangi (2013), examined the effects of the macroeconomic variables on financial performance (Return on Assets (ROA) was determined as a measure of financial performance) of aviation industry in Kenya. The results revealed that ROA of companies in aviation industry had weak positive insignificant correlation with GDP and change in money supply. Douglas and Tan (2014) investigated whether the formation of global airline alliances, with its related expansion of network reach, resulted in an increase in profitability for the founding members. According to results of the study, there is no evidence of the formation of global alliances improved the profitability of founding member airlines, or conferred an economic advantage over airlines that were not founding members. Alahyari (2014) have analyzed the affecting factors of the profitability of Turkish Airlines by panel data method for the years 1994-2003. According to the findings, both tangibility of assets, growth opportunities and liquidity ratios have significant and negative impact on the profitability. Solomon (2015) studied the affecting factors of the profitability of Ethiopian Airlines by the annual data for the period of 1987-2014. He found that the demand side variables, both yield (measurement of total revenue per passenger mile) and load (measurement of the percentage of the available seats for sale on operating flights for the given

airline that are filled) have large contribution over the supply side variables positively. Garafelakis et al. (2016) European and American airline companies have used the data for the period 2005-2011 in their studies examining the factors affecting their profitability. Their findings show that the size and the location of the companies' have an important role on the profitability. Besides, cash flows from the ROIC and quick ratio have also an impact on the airline companies' profitability. Scotti and Volta (2017) analyzed airline profitability change including the largest worldwide airlines dataset in the period of 1983-2010 computed by Bayesian estimation of a cost function. They found out that productivity change drove by technical changes by input price change, which exhibits a similar pattern to output price change. Bourjade et al. (2017) measured the impact of leasing on profitability by the data on 73 airlines operating worldwide over the period 1996-2011. The results identified that a non-monotonic and concave effect of leasing is decreasing on an airline's profit margin. Suhadak (2017) investigated the effect of jet fuel price and macroeconomic variables (exchange rate, GDP, and inflation) on profitability represented by net profit margin (NPM) of airline industry in Asia period 2006-2015. The results of the research indicated that Jet Fuel Price, Exchange Rate, GDP, and Inflation have significant effect on NPM of all airline companies.

3. Methodology

3.1. Data and Variables

The aim of this study is to determine the financial health factors which are considered to have an impact on the profitability of companies of the Europe that were rated by SKYTRAX which is an international air transportation rating company established in UK in 1989. Therefore, in this study, sector specific factors affecting profitability of the best 7 airline companies of Europe in the period of 2006- 2015 consistently, were analyzed by micro panel data method. The data is annually and obtained both the official web sites of the Yahoo Finance and the annual reports of the companies. Definitions and symbols of the variables were used in the study is shown in Table 1 as below;

Table 1. Variable Definitions

Variables	Definitions	Symbols
Return on Assets	Net Income/Total Assets	ROA
Interest Coverage Ratio	EBIT / Interest Expense	ICOVER
Operating Margin	Operating Income / Net Sales	OPMARG
Long Term Debt to Capitalization Ratio	Long Term Debt / (Long Term Debt+ Preferred Stock + Common Stock)	LTDCAP
Asset Turnover Ratio	Sales / Total Assets	ASTOVER
Fixed-Asset Turnover Ratio	Sales/Net Fixed Assets	FIXASTOVER

Additionally, the airline companies' list is given that have analyzed in the study in Table 2 below:

Table 2. Airline Companies' List

1.	Lufthansa Airlines
2.	Air France-KLM
3.	Turkish Airlines
4.	British Airways (IAG)
5.	Finnair
6.	Norwegian Airlines
7.	Aegean Airlines

3.2. Model

The model established in order to identify the financial risk factors affecting the profitability of airline companies. In the model, Return on Assets (ROA) described as a function of the independent variables as given above:

$$ROA = c + \alpha_1(ICOVER)_{i,t} + \alpha_2(OPMARG)_{i,t} + \alpha_3(LTDCAP)_{i,t} + \alpha_4(ASTOVER)_{i,t} + \alpha_5(FIXASTOVER)_{i,t} + \varepsilon_{i,t} \quad (1)$$

4. Empirical Results

The panel data has used to analyze both the horizontal section and the time series data together. Furthermore, there are three approaches for estimating the panel data model, namely: pooled regression, fixed effects, and random effects. For all that, fixed effect model, focuses on a particular individual, firm or set of countries, and the consequences are limited to the behavior of the individual, firm or country; however, in the random effects model is appropriate when the case of randomly selected from a large sample of companies or countries. On the other hand, panels with minimum 2 and maximum 10-20 time dimensions are micro panels (Baltagi, 2013: 14-20). Also in the study, the data set consists 7 horizontal sections and 10 time dimensions, so it has treated as a micro panel dataset. Thus, the following explanations have made for micro panel operations.

4.1. Multi-Collinearity

Before the panel data analysis, some assumptions likely, multi collinearity autocorrelation, heteroscedasticity and the stationary of the variables should have detected. When applying unit root tests for each series, it is firstly necessary to test whether the series and the panel contain horizontal section dependency. For this, multi-collinearity problem should have tested by the analysis of correlations between the variables by the Variance Inflation Factor (VIF) values. For the correlation coefficient, the range of values from 0.68 to 1 is considered which was specified by Taylor in 1990 and accepted by many researchers as an indicator of the strong correlation between the variables (Acikgoz et al., 2015: 427-433). As the VIF value, "4" is decided out of the values from 4, 5 and 10 that have accepted by the most researchers as indicators of upper limit that there is no multi-collinearity problem (O'Brien, 2007: 673-675). The R2 values and the VIF values have calculated (VIF value is calculated by using the formula $(1/[1-R2])$). R2 values have obtained from the estimated regression models that each independent variable has used respectively as the dependent variable and the others are independent has given as in Table 3:

Table 3. VIF Values of Independent Variables

Variables	R ²	VIF Values
ICOVER	0.414	1.708
OPMARG	0.371	1.590
LTDCAP	0.169	1.204
ASTOVER	0.702	3.360
FIXASTOVER	0.665	2.992

However, as can be seen from the VIF values from the Table 3, the panel does not contain horizontal section dependency. Besides, according to Baltagi (2013) micro and macro panels require different econometric treatment. For example, the asymptotic for micro panels have to be for large N and large T. Also with a long time series for a macro panels, one has to deal with issues of non-stationary in the time series, such as unit root, structural breaks and co-integration. In contrast, when applying unit root for micro panels one does not need to be concerned with non-stationarity issues, since T is short for each individual or household surveyed. Thus, in the process of the research, the unit root tests have not detected on the strength of Baltagi (2013).

Besides, there are three approaches for estimating the panel data model: pooled regression, fixed effects, and random effects. Pooled (Pooled) and fixed effects (fixed effects) which will be valid in the regression model Breusch-Pagan / LM and decided by F test. Using the pooled regression approach allows to achieve more accurate results if it is known that the horizontal cross-sectional variables are independent of neglected random effects. Additionally, as focusing on a specific set of firms in the study, it is necessary to use the Fixed Effects Model in panel data analysis. Therefore, there is no need to perform any tests to choose between Random Models and Pool Models or between Random Models and Fixed Models. For this reason, the Breusch-Pagan LM and Hausman tests have not detected.

When the model estimated under the assumption of constant effect, the data had to test with an F-test in below. According to the results in Table 3, it is observed that only in the Cross-Section F dimension, p value is less than the 0.05. Hence the model consists only one way cross sectional fixed effect.

Table 4. F-Test Results

Test Summary	Prob.
Cross-Section F	0.0250
Period F	0.7652
Cross-Section/Period F	0.1696

4.2. Autocorrelation Test

In panel data analysis, autocorrelation is an important issue either as in all regression analyses. As is known, one of the main assumptions of regression analysis is that there is no correlation between the same errors for different observations. If the error terms related to each other, this is called autocorrelation or serial correlation. Before panel regression analysis, Baltagi and Lee (1995) test for autocorrelation in FE (fixed effects) was used for investigate whether there was a problem of autocorrelation in the data set. The test results are shown in Table 5.

According to the autocorrelation test statistics, the null hypothesis, "No autocorrelation", accepted in the model. In

other words, no autocorrelation problem observed between the error terms in the equations.

Table 5. Autocorrelation Test

Test	Statistics	Prob.
LMP-stat	2.112274	0.1462

According to the autocorrelation test statistics, the null hypothesis, "No autocorrelation", accepted in the model. In other words, no autocorrelation problem observed between the error terms in the equations.

4.3. Heteroscedasticity

In the study, the existence of the variance problem in the model was tested with Breusch-Pagan LM (1979) method and the null hypothesis based on the assumption of constant variance was rejected because the probability value was greater than 0.05, and thus the variance in the model was observed in Table 6.

Table 6. Heteroscedasticity Test

Test	Statistics	Prob.
LMh-fixed	10.99687	0.0884

When the assumptions of the linear regression model are satisfied, the parameters of this model give unbiased and accurate results. When the variances of the error terms differ between the observations, the problem of varying variance encountered. If the error terms have varying variances, the validity of the coefficients leads to doubt, even though the OLS estimator preserves its reflectivity. Moreover, the predictor of standard errors is inconsistent. This is a common problem in panel data analysis as it is in horizontal section analysis. Since variance problem observed in fixed and random effects models, leading to incorrect results. Therefore, in order to overcome this problem, a model was established by Panel Corrected Standard Errors (PCSE) method developed by Beck and Katz (1995), which allows parameter estimation under both autocorrelation and changing variance problem and the results in Table 7 below are reached.

Table 7. Panel Regression Results

Variables	Coefficient	Prob.
C	0.114746	0.2295
ASTOVER	-0.181287	0.0005
DEBTRATIO	0.394104	0.1544
FIXASTOVER	0.001996	0.3657
LTDCAP	-0.370639	0.0400
FINLEV	-0.023773	0.0001
EQOVER	0.022042	0.0000
R ²	0.460088	
Adj. R ²	0.358854	
F-statistic	4.544815	
Prob(F-statistic)	0.000029	

5. Conclusion

Profit maximization and long-term survival are both among the major goals of all the companies like the air transportation firms. As known, activity ratios measure both a company's ability to convert different accounts within its balance sheets into cash or sales and the relative efficiency of a company based on its use of its assets or leverage in

determining whether a company's management is doing a good enough job of generating revenues and cash from its resources. Besides, by calculating activity ratios a company's operational efficiency and profitability can be evaluated either. Because these ratios can form a basis of comparison across multiple reporting periods to determine changes over time. On the other hand, the proportion of debt in a company's capital structure is another important indicator for measuring the financial performance especially for the air transportation companies. Because fundamental costs of the air transportation companies, not only made up with the fixed costs like airplanes as tangible assets but also contains operating costs (fuel, maintenance and repairs, landing fees, catering etc.). Therefore, this study tries to contribute the determinants of the asset profitability of air transportation companies rated by the SKYTRAX as the best air transportation companies in Europe in the period of 2006-2015 by focusing on activity and the capitalization frame. The analysis are performed by panel data derived from the financial statements of listed companies in stock markets.

The results show statistically significant and positive relationships between profitability and operating margin and fixed asset efficiency. Nevertheless, the other indicator, long-term financial capitalization position has statistically significant and negative effect on profitability.

The findings point out that the profitability of the air transportation companies are declining by establishment or fleet renewal investments. Because long-term purchases, reflecting the high cost of air vehicles, reflected in the company's statements every year, even though there is no regular and constant expenditure items. Additionally, passenger revenues, which has increased rapidly after the 2009 crisis of the sector, decreased by 3.9% in 2015, partially reflecting the price of jet-fuel in the decreased oil prices, and continued to decrease in 2016 affected the profitability of the companies in the negative direction. The long-term debt to total assets ratio is a measurement representing the percentage of a company's assets financed with loans or other financial obligations lasting more than one year. The ratio provides a general measure of the long-term financial position of a company, including its ability to meet financial requirements for outstanding loans. According to the findings, there is a negative relationship between the profitability of airline companies and their long-term financial position. In capital-intensive companies, like air transportation companies, asset investments tend to be more costly for containing of their long-term. As known, the costs of capital are increasing when the maturity of the investments become longer. The findings also revealed that there is a positive and strong relationship between the operating margin ratio (which is a measure of a company's ability to generate operational sales) and profitability. As a result of this study, portfolio investors will be able to test the relationship between market realities and portfolio returns sectoral. In addition, during the process of evaluating credit requirements of airline companies, credit institutions will be provided with information and airline owners and managers will be able to obtain feedback on the effectiveness of their management activities.

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