



International Journal of Eurasia Social Sciences
Vol: 11, Issue: 40, pp. (493-518).

Article Type: Research Article

Received: 28.12.2019

Accepted: 06.05.2020

Published: 07.06.2020

THE EFFECT OF OPERATING RATIOS ON FIRM VALUE: AN APPLICATION IN EUROPEAN AIRLINES *

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ABSTRACT

Firms should use their assets efficiently to increase their profit. There are many methods to evaluate the productivity of firms' activities. Ratio analysis is widely used to analyze productivity for financial performance. This study is used activity ratios to evaluate the financial productivity of airlines. Activity ratios are used the productivity of firms' assets, receivables, payables, inventories and fixed assets. As firms use their assets productively, their profit increases. Firms' high performance can raise their stock value, which in turn, increases their value. In this study, it is aimed in productivity in terms of activity ratios for Airlines. In addition, it is investigated the effect of activity ratios on firm value in this study. The 7-years (2010-2016) data of the top 10 airlines operating in Europe are used in the implementation. Asset turnover, inventory turnover, accounts receivables turnover, financial leverage ratio and stock price variables are analyzed using the method of panel data. According to analysis of results, firm value is positively affected by accounts receivables turnover and asset turnover, and negatively affected by inventory turnover and financial leverage ratio. As the financial productivity increases, the value of the firm increases.

Keywords: Airlines, operating ratios, firm value, productivity, panel data

* This study was presented at the "International Finance and Banking Conference FI BA 2019" in Romania on 28-29 March, 2019.

INTRODUCTION

Financial development for firms' economic activity has debated for years (Filer et al., 2000: 1). In the growth and development of firms, assets must be used effectively and efficiently. Firms want to increase their performance for productivity (Bartz-Zuccala et al., 2018: 503). Efficiency is not that firms cut costs and produce cheap goods. If the firms achieve maximum output with minimum input, the efficiency of the firm is increasing. Increasing efficiency, financial analysis should make by firm. Financial analysis is used to assess firms' financial situation and performance. A financial analysis is necessary to examine the financial performance. As a simple definition, financial analysis is the analysis of income statement and balance sheet data by various analysis methods. Firms analyze the financial statements of previous years to determine their current financial position prior to making any financial planning, which enables them to obtain fund needed to achieve their goals.

This study investigates the performance of firms operating in the civil aviation sector, which has become increasingly significant in the global economy and bolsters its total assets every years. Because operating performance is related to firm value in stock market (Hamadi & Bassil, 2015: 598-601). To this end, the effect of activity ratios on the market value of the Top 10 airlines operating in Europe was analyzed. We believe that the results of this study will contribute significant to the literature.

LITERATURE

Firms should use their assets effectively to achieve their targets. In addition, firms need previous years financial data to make their future plan. Therefore, assessing firms' financial performance play a significant role in financial analysis (Bayburt, 2007: 578). Financial analysis is generally performed using financial statements analysis technique, one of the most widely used of which is ratio analysis (Karadeniz et al., 2014: 131).

Ratio analysis is performed calculating mathematical ratios on interrelated accounts in financial statements in four categories; liquidity, activity, financial structure and profitability (Akdogan & Tenker, 2007: 640). Liquidity ratios are used to evaluated the liquidity status of firms. Financial structure ratios are used to evaluated the resources structure of firms. Profitability ratios are used to evaluated for financial performance. Activity ratios are used to evaluated operating performance for firms. Because operating performance is very important for both operating and financial success. The more efficient the activities of firms, the higher the performance of firms. Therefore, firms should use their assets productivity and efficiently.

This study analyzes the effect of activity ratios on airlines firms' market value. Airlines have high-cost aircrafts, hence high-cost asset, which means that they have a small number of but expensive aircraft. Therefore, they should use their assets effectively to achieve their financial goals. Airlines firms have high amount of assets. Using efficiently of assets is closely related to the degree of leverage of the activity. When assets are not used effectively, the assets can be reduced. Because firms with operating leverage can make high marginal profit. The purchase of high-cost assets increases their short and long-term liability. Increasing the liability, the cost of

capital and the level of financial risk increases. However, they keep low-cost inventory and sell tickets in advance or in short-term installments, reducing their debt collection period and increasing their liquidity. Firms' financial position should be assessed using activity ratios in order to analyze whether they use their assets effectively.

LITERATURE REVIEW

The number of studies on the relationship between airlines' activity ratios and market value are very limited. Because, related with the effect of operating ratios on firm value has not got in the literature. Therefore, it is explained research on ratio analysis method and airlines' financial and operational performance. Related studies in the literature are also included in this section.

Pineda et al. (2018) propose a model to improve the financial and operational performance of airlines. Various methods are used in the analysis as MCDM, Data Mining and DANP. They found that the current model can be used by airlines to achieve financial efficiency. Dayi and Ulusoy (2018) used various ratios such as asset turnover, accounts receivable turnover and inventory turnover ratios to assess the financial performance of 19 international airlines. The Minimum Spanning Tree Approach is used in the application. According to results of analysis, Turkish Airlines has high profitability, assets and revenues. Sakiz and Unkaya (2018) investigated the risk of bankruptcy of Turkish Airlines (THY) to assess airlines' financial and operational performance. All calculated data of THY shows that airline is in a good financial condition terms of bankruptcy risk. Seufert et al. (2017) use variables (capital, staff, etc.) to evaluated efficiency and productivity of airlines in the World in the period of 2007-2013. European airlines are more successful than the others for operational efficiency and productivity.

Omrani and Soltanzadeh (2016) used the NDEA (Network Data Envelopment Analysis) method to assess Iranian airlines' performance. The results obtained from the model enabled the determination of sections with lower efficiency. Teker et al. (2016) assessed the financial performance of 20 major international airlines. It is stated that financial performance measurement based on total income or profitability is weak and that other indicators can be expanded by Including other indicators. Saranga and Nagpal (2016) evaluated Indian airlines' operational performance in terms of efficiency. According to the results of the analysis, some structural and regulatory factors have an undesirable effect on airline performance, but low cost carriers in India have achieved significant operational efficiency. Miranda et al. (2016) investigated to show efficiency for difference performance factors as low cost and airline carries. They have used the method of Multi Criteria Decision Making. Analysis results show that would measure efficiency for companies.

Wanke et al. (2015) used the TOPSIS and MCMC generalized linear mixed models to assess Asian airlines' operational performance. The findings show that costs, ownership type, market positioning is important on efficiency. Arjomandi and Seufert (2014) chose comparing performance of 48 airlines in six different region period of 2007-2010. Results show that technically efficiently airlines are from China and North Asia and many

airlines in Europe have got the best environmental performance. Tretheway and Markhvida (2014) examine the sustainability levels of airline companies in the long term. Airlines has got high fixed assets and cost. According to analysis results, they should reduce their marginal cost and to use their assets effective. Omurbek and Kinay (2013) used the TOPSIS method to analyze the performance of two airlines operating in Turkey and Germany. The performance indicators and weights of the two airlines were evaluated by using TOPSIS method. It was stated that one of the companies performed better than the other.

Coli et al. (2011) investigate that improving efficiency for airlines via Data Development Analysis and Stochastic Frontier Analysis. Method of SFA gives more successful results than DEA. Assaf and Josiassen (2011) assessed British airline companies' performance using data envelopment analysis. In the study, it is stated that the increase in oil prices and the factors of severe market competition are among the determinants of potential inefficiency. Malighetti et al. (2011) have investigated the factors that have an impact on the value of airlines and airports. The analysis is included 24 airport and 87 airlines in the World. Although the age of airline companies and the number of routes have a negative impact on the market value, the market value for low-cost companies is statistically higher than the other.

Homsombat et al. (2010) evaluated the financial and operational performance of airline firms operating in North America. It is stated that the efficiency levels of the airlines are related to the over all economic cycle, the efficiency levels of the Airlines as total factor productivity. Barros and Peypoch (2009) examined the operational performance of airlines operating in Europe using Data Envelopment Analysis. As a result of Regression analysis, it was stated that population and flight networks played an important role in the effectiveness of airlines. Barbot and Sochirca (2008) have searched difference airlines productivity and efficiently. According to analysis, they do not suggest DEA analysis for efficiency and effectiveness every time. Schefczyk (1993) researches operational performance of 15 international airlines with analysis of DEA. The analysis results show that the higher airlines have operational performance, the higher they have profitability.

MATERIAL AND METHOD

The aim of this study was to analyzed the effect of the operational performance of airlines operating in Europe on their market value. It was made for the first time in the literature. Investigation of the impact of financial performance on the value of the firm is expected to contribute significant to the literature. The evaluation of the financial efficiency of the firms with their operational ratios was made in trade and industrial companies before. For this reason, the study sample consisted of airlines firms. The 7-year (2010-2016) data of the top 10 airlines operating in Europe were used. The 10 biggest airlines in Europe, the names, origins of the airline firms and passengers numbers (in 2016) are given in Table 1 (CNNTURK, 2019):

Table 1. List of Airlines

Number	Airlines	Country	Passenger Numbers (million)
1	Lufthansa Group (Lufthansa, Austrian, Swiss, Eurowings)	Germany	117,4
2	Ryanair	England	101,4
3	IAG (British Airways, Iberia, Vueling, Aer Lingus)	England - Spain	94,9
4	Air France – KLM (Air France, KLM, HOP Transavia)	France	87,4
5	Easyjet Airlines	England	74,5
6	Turkish Airlines	Turkey	62,8
7	Aeroflot Group (Aeroflot, Rossiya, Pobeda)	Russian	43,4
8	SAS Group (Scandinavian Airlines)	Sweden	29,4
9	Norwegian Airlines	Norway	29,3
10	Air Berlin Group (Air Berlin, NIKI)	Germany	28,9

Reference: <https://www.cnnturk.com/dunya/avrupanin-en-buyuk-10-hava-yolu-sirketi?page=8>

Lufthansa Group carried 117.4 million passengers with the highest passengers in the Europe in 2016. As Ryanair offers a cheap ticket price, they are second place in the Europe. It carried 101.4 million passengers in the 2016. Turkish Airlines carried 62.8 million passengers and it is sixteenth in the Top 10. SAS Group, Norwegian Airlines and Air Berlin Group have carried lower number of passengers than the Top 10. Berlin Group is 28.9 million passengers with the lowest passengers in the Top 10.

There are many ratios in the literature, evaluating for airlines financial productivity as like current assets turnover, fixed assets turnover, etc. However, using activity ratios suitable for sectors in which firms operate is vital to the success of research. Dayi and Esmer (2017) assessed the financial performance of airlines using accounts receivable turnover, inventory turnover, net profit margin, return on assets (ROA) and return on equity (ROE). It is stated that increased the revenues in airlines, their receivables is increasing so much. Inventory turnover is decreasing that airlines have fewer inventories by previous year. Therefore, these variables are very important for airlines financial productivity. Unlike other studies, a model was created from the most used activity ratios in this study. Therefore the ratios that elicit information on the airlines' activity were used in this study. Table 2 shows the codes, data types, frequencies and data sources of variables in the Model.

Table 2. Variables and Data Set

Variables	Codes	Types	Frequency	Data Sources
Stock Price	P	Dependent	Daily	Yahoo Finance
Assets Turnover	AT	Independent	Annual	Financial Statements
Accounts Receivable Turnover	ART	Independent	Annual	Financial Statements
Inventory Turnover	IT	Independent	Annual	Financial Statements
Financial Leverage	FL	Independent	Annual	Financial Statements

2006-2016 data was going to be used in the implementation; However, 2009 data was excluded as the financial statements of that year were negatively affected by the 2008 global financial crisis is stated that by Isik and

Kiraci (2012). Therefore, data set includes 2010-2016 periods. Asset turnover, accounts receivable turnover, inventory turnover and financial leverage ratio were calculated using independently audited financial statements. The closing price of the stock on the last day of the fiscal year was taken as the stock price. It was taken from related stock exchange. Because, the last closing price shows the value of company in that year. The success of the airlines at the end of the operating period is expected to reflect on the price of the stock. Financial performance increases as airlines use their assets efficiently. Thus, the financial performance of the airlines is expected to have a positive effect on the stock value of the stocks.

The asset turnover ratio is calculated by dividing net sales by average total assets and shows the productivity use of firm assets. The higher the asset turnover ratio, the more productivity the firm uses its assets. Firms have low assets should have high asset turnover rate. What is important is to achieve high efficiency, using fewer assets. The accounts receivable turnover ratio indicates the number of times the net sales meet accounts receivables. The higher the accounts receivable turnover ratio, the better it is, because it shows that the firm collects its receivables quickly. The collection of receivables is important for the cash cycle. If the receivables collect late, the firms may suffer cash burn. As more sales are made in advance, the firms can have more cash. Because they will reduce their receivables. The inventory turnover ratio shows the number of times inventory is sold or used in a year. The higher the inventory turnover ratio, the shorter the period that the firm converts its inventory into cash or receivables. Furthermore, firms want to convert inventory into cash. Since airlines have low cost of inventories, their inventory turnover ratios are not expected to be very high. The average collection period and inventory cycle time were not included in the analysis, as they would have a high correlation with the accounts receivable and inventory turnover ratios. There is a significant relationship between financial leverage ratio and profitability (Cakir & Kucukkaplan, 2012: 81). Financial leverage is an important indicator of the efficiency of assets. As borrowing increases, firms pay more interest. When the expenses increase, the profit of the firms decreases. Therefore, financial leverage is used the model for evaluating financial performance about liabilities.

Panel data consists of a combination of multiple horizontal and time sections such as households, companies and countries (Baltagi, 2005: 1). Several horizontal and vertical sections require panel data analysis. Because it is not possible to use econometric methods other than panel data analysis in case of more than one cross-section in time series. The formula used in panel data regression analysis is as follows (Baltagi, 2005: 11):

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \quad i = 1, \dots, N; t = 1, \dots, T$$

i is the number of firms, t is the time series, u_{it} is the coefficient of error, α is the constant, X'_{it} is the it number of observations and β is the coefficient of explanatory variables (Guris, 2018: 7). There are several panel data analysis methods, the most common of which are fixed effects, random effects, pooled regression and stochastic parameters (Green, 2010: 386-387). There are also balanced and unbalanced panel data models (Baum, 2006: 46-51). Unbalanced panel data analysis is used when a dataset has missing data on some years (Tatoglu, 2013: 1). Hausman test is used to decide which method to use in panel data analysis. Hausman test is

used to decide which estimators to use in panel data analysis (Tatoglu, 2018: 184). The dependent variable has missing data for several years because one of the firms in the sample started trading on the stock market after 2010. Therefore, unbalanced panel data method was used. The model of the study is as follows:

$$P_{it} = \alpha + \beta_1 AT_{it} + \beta_2 ART_{it} + \beta_3 IT_{it} + \beta_4 FL_{it} + u_{it}$$

Stock price is the dependent variable while asset turnover, accounts receivable turnover, inventory turnover and financial leverage ratio are the independent variables. In order to prevent differences in stock prices from affecting the model, their logarithms were used. As the model is unique and different the others, it is expected to make significant contributions to literature.

FINDINGS

It is presented firstly the descriptive statistics of the variables in this section. The analysis results of Hausman, Breusch Pagan and Panel Data Random Effects test are given later. Firstly, it has been analyzed the descriptive statistic. Results of analysis are given that Table 3.

Table 3. Descriptive Statistics

Variables	Mean	Std. Dev.	Min.	Max.
Price	1.45	0.98	0.23	3.24
Asset Turnover	67.28	554.46	0.39	4.64
Accounts Receivable Turnover	19.90	21.26	3.67	99.01
Inventory Turnover	69.74	57.46	8.06	288.94
Financial Leverage	0.77	0.24	0.43	2.06

The firms' stock prices range from 0.23 to 3.24, asset turnover ratio from 0.395 to 4.64, accounts receivable turnover ratio from 3.67 to 99.01, inventory turnover rate from 8.06 to 288.94 and financial leverage ratio from 0.43 to 2.06, showing that the ranges of the activity ratios are high. Stock price has average is 1.45. Because it has taken logarithm. If the logarithm had not been taken, it would have a negative impact on the model as there would be a lot of differences between the prices. Asset turnover average is very high. Assets can use efficiently. Efficiently using assets increases the liquidity and profitability. Accounts receivable turnover is low. It is useful for firm this rate is high. The high turnover rate of the receivables increases the rate of converting the receivables of the firms into cash. Inventory turnover average is normal. Because the service firms do not have high inventory. Therefore the rate is high. Since they have not got high stock. Financial leverage ranges from 0.43 to 2.06 and its average is %77. Firms operate with an average of 23% of the equities. Firms have more liabilities than equity. As the borrowing increases, the amount of interest paid increases. Furthermore, the extreme liabilities increase the financial risk.

Hausman Test is used to decide whether to use fixed effects or random effects in panel data analysis. Hausman Test has been analyzed and Table 4 shows the Hausman Test results.

Table 4. Hausman Test Results

	(b) Fixed Effects	(B) Random Effects	b-B	S.E.
Asset Turnover	.0002204	.0002336	-.0000132	.0000234
Accounts Receivable Turnover	.0126165	.0137277	-.0011112	.0018362
Inventory Turnover	-.0017042	-.0018660	.0001618	.0003165
Financial Leverage	-.5127839	-.5268744	.0140905	.0301479
Prob >chi2 = 0,9762				

According to the Hausman test results, the null hypothesis (fixed effects) is rejected and alternative (random effects) is accepted ($p > 0.05$), which means that the random effects model should be used. Breusch-Pagan test is used to decide which pooled least squares model to use with the random effects method. Table 5 shows the Breusch-Pagan test results.

Table 5. Breusch-Pagan Test Results

	Var	st = sqrt(var)
Price	.9720658	.985934
e	.0330350	.1817555
u	.8496049	.9217401
	chibar2(01) = 147.38 Prob>chibar2 = 0.0000	

According to Breusch-Pagan Test results, Prob. value is smaller than 0.05. Therefore, the random effects model is used. Furthermore, panel data analysis for random effects made and Table 6 shows the results of the panel data analysis.

Table 6. Panel Data Random Effects Results

Number of Observations =67 Number of Airlines =10	R-sq: 0,4352	Wald chi2(5) = 28.71 Prob>Chi2=0.0000		
Price	Coefficient	Std. Dev.	z	P>z
Asset Turnover	.0002336	.0000631	3.70	0.000
Accounts Receivable Turnover	.0137277	.0042071	3.26	0.001
Inventory Turnover	-.0018660	.0008478	-2.20	0.028
Financial Leverage	-.5268744	.1319500	-3.99	0.000
Constant	1.7172740	.3117933	5.51	0.000

Panel data random effects result shows that the model is meaningful. Furthermore, all of the variables are meaningful, too. The explanatory power of model is 43.52%. Asset turnover shows the efficiency of assets. When the firm uses its assets efficiently, it sells more and makes more profit, which, in turn, increases its market value. According to the results, there is a positive relationship between asset turnover and stock price. The coefficient between the asset turnover and the stock price is low. But the correlation is positive. So, the firms use their assets efficiently, their stock price can be high value. Literature is confirmed this. Ayricay and Turk (2014) found a significant relationship between asset turnover and firm value, While Karaca and Basci (2011) stated that asset turnover ratio positively affects firm value. When firms use their assets efficiently,

sales revenues and profitability may increase. As the firm's profit increases, its equity also increases. In this case, the shareholders will want to buy the company's stock. Because, they think the company is successful. As the demand of the stock increases, the price will increase and thus the market value of the company will be increased.

If the firm, the higher the liquidity, has got the shorter the average collection period, it can have the higher its market value. There is a positive relationship between accounts receivables turnover ratio and stock value. Accounts receivables affect the firm's value by 1.3%. An increase of 1.3% in the collection of receivables increases the value of the stock by 1%. In other Words, when the stock price decreases by 1%, the collection of receivables is expected to decrease by 1.3%. As the collection of receivables increases, the liquidity of the firm increases. The increase in liquidity is expected to give up a positive impression on the financial position of the airlines.

Inventory is an important item of account for firms, and therefore, inventory turnover is an important ratio giving information about the efficiency of a firm. However, airlines are service enterprises. Therefore, they do not have as much inventory as commercial or production companies. The analysis results confirm this and show a negative relationship between inventory turnover and firm value. The coefficient is less than one percent. Although inventories are an important asset in net working capital, the rate may be insignificant as airline companies do not have inventory. Uluyol and Turk (2013) reported that inventory turnover ratio had no effect on the firm value of production companies. Therefore, there a negatively relationship between inventory turnover ratio and firm value in airlines.

The financial leverage ratio shows how much assets a firm holds relative to its equity. As the borrowing increases, the value of the firm is increasing to the optimum capital amount. The leverage effect of the debt can affect the firm value, and therefore, is included in the model. The results show a negative relationship between airline companies and financial leverage ratio. The higher the financial leverage ratio, the lower the firms' market value (up to 52%). If firms borrow necessary, the cost of capital increases. Therefore, the value of firm is effected negatively from this situation. It is observed that airlines borrow more as their losses increase. It is thought that borrowing may have a negative impact on the market value.

CONCLUSION and DISCUSSION

Activity ratios are used to assess firms' productivity. Activity ratios are used to evaluate the firm's financial and operational performance. Activity ratios affect not only firms' performance but also their values. Making more sales with less cost, collecting receivables as soon as possible and turning them into liquidity, achieving a fast inventory turnover and taking advantage of the leverage effect of the debt increases firms' profits, which, in turn, affect their market values. This study investigated the effect of airlines' activity ratios on their firm value.

Asset turnover shows the efficiency of assets. If asset turnover rate is high, the firms' assets used effective. Firms earn more as they make more sales. Therefore their profitability raises high. According to the results, there is a positive relationship between asset turnover and share price. The coefficient between the asset turnover and the stock price is low. The more efficiently the firms are in their activities, the more active turnover is expected, the better the company's market value. The shorter the average collection period, the higher the liquidity of a firm. There is a positive relationship between accounts receivables turnover ratio and stock value. Accounts receivables affect the firm's value by 1.3%. Therefore collecting receivables positively affects the value of the firm. As firms collect their receivables, their revenues and profit increases. The more profitability firm's value can be increased. The other variable is inventory turnover is important for firms. Inventory turnover rate has meaningful in the results. But, there is a negative relationship between inventory turnover and firm value in study. This is confirmed by the fact that the inventory of airlines is small. Because, the airlines don't make to products. They do not work with inventory. The financial leverage ratio shows how much assets a firm holds relative to its equity. The results show a negative relationship between airline companies and financial leverage ratio. The higher the financial leverage ratio, the lower the firms' market value (up to 52%). The financial leverage is effected for negatively on firm value.

The fact that airlines have high fixed-capital investment reduces the productivity use of assets. The aircraft is very expensive and airlines firms must have a lot of aircrafts growing for firm. Airlines carry as many passengers as their aircraft are equipped to carry, which positively affects the productivity of their activities. In addition, the effective use of working capital affects firms' market value. It is, Therefore, recommended that future studies assess the effect of airlines' working capital on their value.

ETHICAL TEXT

In the articles, the rules in the text below should be followed and a text similar to the text below should be added to the article under the title of ethical text.

"In this article, journal writing rules, publishing principles, research and publishing ethics rules, journal ethics rules are followed. Responsibility belongs to the author (s) for any violations related to the article. "

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