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STUDY REGARDING COMPANIES PERFORMANCE MEASUREMENT THROUGH NON-FINANCIAL INDICATORS – THE CASE OF AIRLINE INDUSTRY

Empirical study

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Financial performance

JEL Classification
M41, Q01, Q56

Abstract

The fact that financial information alone is insufficient in assessing a company's performance is more and more debated. . The present paper aims to analyze the relation between the changes in companies' market value and selected financial and non-financial indicators for the airline industry. The main aim of this study is to analyze the value relevance of non-financial information in assessing a company's performance by reference to the airline industry. The results reveal that non-financial indicators "load factor", "available seat kilometers" and the financial measures "pretax return on assets","curent ratio", "debt-to-equity ratio" and "sales growth" are valuable in explaining the stock price evolution.

1. Introduction

There are great evidences that the use of non-financial performance measures has a great impact on an organization's activity by improving companies performance (Larcker, Richardson and Tuna, 2007, Ittner, Larcker and Rajan, 1997, Wyatt, 2008, Sun and Kim, 2013) or enhancing reporting transparency (Dorestani and Rezaee, 2011).
Our study aims to analyze the value relevance of non-financial information in assessing a company's performance by reference to the airline industry. Consequently, the paper examines the relationship between stock price evolution, four financial indicators (pretax return on assets, current ratio, debt-to-equity, sales growth) and two non-financial indicators (load factor and available seat kilometers), selected from the accounting literature.

2. Research method

The airline industry represents an interesting field for analysis as "airlines tend to have significant fixed costs related to the acquisition and operation of aircraft, therefore, the information content of historical financial statements may be limited, hence non-financial information may fill this void by providing important signals about financial performance in the industry" (Behn and Riley, 1999:34-35).
According to the results obtained, from the analysis of the United States airline companies, by Behn and Riley (1999), which are confirmed by future relevant studies conducted by Liedtka (2002) and Riley, Pearson and Trompeter (2003), stock returns are related to four non-financial indicators (load factor, market share, available ton miles and customer complaints) and the financial indicators, earnings per share and abnormal earnings per share. Moreover, their studies also confirm the opportunity of combining financial and non-financial information. The paper extends the previous relevant researches by extending the analyzed sample to a worldwide analysis and updating the results on a time basis through the collection of new data (Table 1).
The model used is based on the one developed by Amir and Lev (1996):
$\Delta SP = \beta 0 + \beta_1 \Delta ROA + \beta_2 \Delta CR + \beta_3 \Delta DE + \beta_4 \Delta SG + \beta_5 \Delta LF + \beta_6 \Delta ASK + \varepsilon$
The value relevance of information derives from its association with investor's valuation of the entity that is reflected in company's stock price, which covers and reflects all the aspects related to both financial and non-financial information, tangible and intangible resources (Amir and Lev, 1996,Behn and Riley, 1999, Riley, Pearson and Trompeter, 2003, Wyatt, 2008, Dainelli and Giunta, 2011).
The four financial indicators were chosen in order to cover the main aspects of a company's activity: profitability, liquidity, financial leverage and operating performances. Pretax Return on Assets is chosen as a measure to quantify the financial performance, independent from the influence of the taxation system in each country. Several researches agree on the use of earnings indicators when the stock price is considered as the dependent variable (Amir and Lev, 1996, Behn and Riley, 1999, Jorion and Talmor, 2001, Riley, Pearson and Trompeter, 2003 , Habib, 2010, Dainelli and Giunta, 2011).
The load factor is seen by most specialists as a key indicator in the airline industry, reflecting the management ability in finding the right equilibrium between pricing and marketing for more efficient capacity management. Available seat kilometers represents an output for efficiency and may better reflect aircraft capacity than flight equipment amortization and depreciation (Schefczyk ,1993 cited in Behn and Riley, 1999, Behn and Riley, 1999).
The selected sample initially included a total of 47 airlines companies, but due to the lack of information 15 entities were excluded, resulting a number of 32 companies from various countries: United States (8), Australia (2), China(2), Germany (2), Ireland (2), South Korea (2), United Kingdom (2), Canada (1), Chile (1), France (1), Hong Kong (1), Israel (1), Japan (1), Malaysia (1), New Zeeland(1), Norway (1), Singapore(1), Sweden (1), Thailand (1). All the variables embedded are concerned with an eight years period, from 2006 to 2013 and were extracted from Thomson Reuters Eikon Database. The consumer price index (CPI) used to deflate the average stock price was obtained from The World Bank database. In order to process data two software were used, EViews and Microsoft Excel.Table 2 presents the sample average values for the analyzed period.

3. Results

To test empirically the relation between the stock price evaluation and the financial and non-financial indicators, we regressed the change in the four-month average stock price on the change in the following financial and non-financial indicators: pretax return on assets, current ratio, debt-to-equity, sales growth, load factor along with available seat kilometers.
The results obtained, presented within Table 3, show a positive correlation between the stock price evolution and the four analyzed indicators for which significant results were obtained, namely pretax return on assets, current ratio, load factor and available seat kilometers, moreover 26.28% of the stock price variation is explained by the independent variables embedded. The other two financial indicators, debt-to-equity ratio and sales

growth registered insignificant regression coefficients.

Accordingly, the regression output the model used is valid (significance F <5%) and may be used for the analysis of the dependence of stock price evolution on the four variables. F-statistic (9.21) is higher than F-critical (2.19) meaning that the alternative hypothesis is accepted (the model is significant) as per Table 3.

All the independent variables registering an associated probability lower than the significance level (5%) are statically significant. As we have expected, the result obtained for the Durbin-Watson test (2.036) indicates a very low level of correlation in the residuals, meaning that there are other omitted variables which may explain the model (Andrei.,Stancu, Iacob and Tusa, 2008).

Analyzing the two partial models (Table 4), we can state that the non-financial indicator, load factor, as well as the financial indicators, return on assets and current ratio, remain statistically significant and restate their relevance in explaining stock price evolution. The relation between stock price evolution and the three mentioned above indicators is a positive one, confirming the results of the complete model.

The fact that available seat kilometers registered significant results after being added the financial indicators in the full model, as for the partial model the values attached to it were insignificant, sustains the opinion expressed inside the accounting literature (Amir and Lev 1996, Behn and Riley, 1999, Jorion and Talmor, 2001, Riley, Pearson and Trompeter, 2003) concerning the opportunity of complementing financial data with non-financial information.

According to the correlation matrix (Table 5), the highest correlation level obtained between the depended variable and the independent ones is attributed to pretax return on assets (0.429685), followed by load factor (0.303918) and current ratio (0.28891). The available seat kilometers indicator obtained the lowest correlation value (0.125054, significant at a 0.10 level), denoting the weakest relation with the stock price evolution among the analyzed variables. Also, sales growth registered a low positive correlation level, but statistically insignificant.

As regards the correlation between the financial and non-financial indicators (Table 6), we can state that the load factor indicator registered a low to moderate correlation with all the financial indicators, pretax return on assets (0.387269), sales growth (0.346311), debt-to-equity ratio (0.300611) and current ratio (0.249479). By contrast, the available seat kilometers indicator obtained a low negative correlation with the four financial indicators, despite the positive correlation registered with the load factor and stock price.

In addition, the value relevance of load factor in explaining financial indicators evolution is restated after running the regression of financial indicators, pretax return on assets and sales growth on the analyzed non-financial indicators.

4. Conclusion

As business environment has become more and more complex, financial information alone has lost its relevance and completeness. In order to respond to the actual diverse needs of different types of stakeholder's non-financial information is mandatory to assisting the financial information in drawing a complete and fair image of an entity's performance.

The results obtained are consistent with the ones presented by previous relevant studies conducted by (Behn and Riley, 1999, Riley, Pearson and Trompeter, 2003) and emphasize the adequacy of non-financial indicators, load factor and available seat kilometers in assessing airlines companies' performance and stock price evolution. Moreover, load factor also proved its value relevance in explaining the two financial indicators sales growth and pretax return on assets, confirming its usefulness in assessing the company's performance.

The relevance of financial indicators is restated, confirming other significant papers (Behn and Riley, 1999, Jorion and Talmor, 2001,Riley, Pearson and Trompeter, 2003 , Dainelli and Giunta, 2011), as pretax return on assets and current ratio have proved valuable in explaining stock price market trend.

The complementarity between financial and non-financial was also confirmed by our study as the available seat kilometers, non-financial indicator, prove its relevance in explaining stock price evolution after completing the model with the four financial indicators. The results are consistent with the ones presented by Amir and Lev (1996), Behn and Riley(1999), Jorion and Talmor (2001), Riley et al.(2003).

Future research may attempt to extend the present study to other sectors of activity and complete the actual model by involving other variables related to country specific indicators as well as social, environmental and governance metrics.

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Appendices

Table 1
Summary of embedded indicators

Indicator	Area covered	Explanation
ΔSP (change in Stock Price)	Overall company's performance	The relative change between two consecutive periods of the average stock price deflated by the consumer price index (CPI) for "the four-month window surrounding the publication date of the annual report" (Dainelli and Giunta, 2011:12)
ΔROA (change in Pretax Return on Assets)	Profitability	The absolute change between two successive periods
ΔCR (change in Current Ratio)	Liquidity	The relative change between two consecutive periods.
ΔDE (change in Debt-to-Equity Ratio)	Leverage	
ΔSG (Sales growth)	Operating	
ΔLF (change in Load Factor)	Operating	The relative change in the load factor indicator between two successive periods. The indicator "represents the percentage of aircraft seating capacity that is actually utilized, and is obtained using revenue passenger miles/kilometers, divided by available seat miles/kilometers" (Thomson Reuters, n.d.).
ΔASK (change in Available Seat Kilometers)	Operating	The relative change between two consecutive periods. It captures "the total flight passenger capacity of an airline in kilometers and is obtained by multiplying the total number of seats available for scheduled passengers and the total number of kilometers those seats were flown" (Thomson Reuters, n.d.)

Source:Dainelli and Giunta, 2011:12, Thomson Reuters, n.d.

Table 2
Sample average values for the analyzed period

Year / Indicator	2006	2007	2008	2009	2010	2011	2012	2013
Pretax ROA	8.11%	17.56%	-1.48%	1.62%	16.13%	5.33%	6.64%	11.07%
Current Ratio	1.12	1.06	0.92	0.97	1.03	1.00	0.98	0.94
Debt-to-Equity Ratio	1.81	1.71	3.35	5.06	2.53	2.40	2.93	2.05
Sales growth	0.5%	-0.2%	-4.7%	-2.9%	4.7%	0.6%	-1.2%	-1.1%
Load Factor	77.19%	78.54%	77.68%	77.65%	79.84%	79.92%	80.72%	80.78%
ASK (millions)	70,417	68,209	69,142	80,875	79,812	90,391	110,331	111,382

Source: Data processing

Table 3
Regression results

Dependent Variable: ΔSPMethod: Least Squares
Included observations: 162

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	0.000316	0.035145	0.008979	0.9928
ΔLF	3.792002	1.769688	2.142752	0.0337
ΔASK	0.065836	0.029295	2.247324	0.0260
ΔROA	2.845669	0.721742	3.942779	0.0001
ΔCR	0.493116	0.198174	2.488295	0.0139
ΔDE	0.018758	0.060046	0.312396	0.7552
ΔSG	-1.107796	0.578273	-1.915697	0.0572

R-squared	0.262828	Mean dependent var	0.024734
Adjusted R-squared	0.234292	S.D. dependent var	0.478607
S.E. of regression	0.418803	Akaike info criterion	1.139419
Sum squared resid	27.18644	Schwarz criterion	1.272833
Log likelihood	-85.29291	Hannan-Quinn criter.	1.193587
F-statistic	9.210494	Durbin-Watson stat	2.036686
Prob(F-statistic)	0.000000		

Source: Data processing

Table 4
Summarize of partial and full model regression results

Dependent Variable: ΔSPMethod: Least Squares Included observations: 162			
Variable	Coefficient (probability)		
	Financial	Non-financial	FULL
Intercept	0.032896	-0.012198	0.000316
	(0.3413)	(0.7416)	(0.9928)
ΔLF		6.740014*	3.792002*
		(0.0001)	(0.0337)
ΔASK		0.049027	0.065836*
		(0.1211)	(0.0260)
ΔROA	3.250769*		2.845669*
	(0.0000)		(0.0001)
ΔCR	0.436500*		0.493116*
	(0.0328)		(0.0139)
ΔDE	0.034513		0.018758
	(0.5711)		(0.7552)
ΔSG	-0.824860		-1.107796
	(0.1534)		(0.0572)
R^2	0.212773	0.106020	0.262828
F statistic	10.60858*	9.428185*	9.210494*

Source: Data processing *significance at 0.05 level

Table 5
Correlation matrix of the embedded variables

	ΔSP	ΔLF	ΔASK	ΔROA	ΔCR	ΔSG	ΔDE
ΔSP	1						
ΔLF	0.303918* (4.035158)	1					
ΔASK	0.125054 (1.594334)	0.02713 (0.3433)	1				
ΔROA	0.429685* (6.019119)	0.387269* (5.313212)	-0.06421 (-0.8139)	1			
ΔCR	0.28891* (3.817232)	0.249479* (3.258728)	-0.1284 (-1.63775)	0.399119* (5.506064)	1		
ΔSG	0.094297 (1.198111)	0.346311* (4.669482)	-0.08626 (-1.09523)	0.27799* (3.660612)	0.536819* (8.048254)	1	
ΔDE	0.223285* (2.897514)	0.300611* (3.986861)	-0.07643 (-0.9696)	0.388002* (5.325051)	0.315247* (4.201844)	0.20743* (2.682149)	1

Source: Data processing *significance at 0.05 level (t critic =1.665)

Table 6
Non-financial vs. financial indicators regression results

Dependent Variable: ΔSPMethod: Least Squares Included observations: 162		
Depended variable Variable	ΔROA	ΔSG
	Coefficient (probability)	
Intercept	-0.005851	-0.0074
	(0.153189)	(0.16503)
ΔLF	0.991006*	1.14565*
	(0.0000)	(0.0000)
ΔASK	-0.003562	-0.00588
	(0.30660)	(0.19789)
R^2	0.15556	0.12908
F statistic	14.6456*	11.7837*

Source: Data processing *significance at 0.05 level