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Is profitability a good proxy for efficiency? Evidence from the subsector of tour operators

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Abstract: The goal of the paper is to evaluate the economic efficiency of tour operators in the Czech Republic in the period 2007-2014 using data envelopment analysis (DEA) models and prove the link between economic efficiency and profitability and to find out if profitability is a good proxy for economic efficiency. Data was exported from the database Albertina CZ Gold Edition. We calculated the efficiency score using CCR (Charnes, Cooper and Rhodes) and BCC (Banker, Charnes and Cooper) models based on 3 inputs and 1 output. In the years 2007 to 2010, the efficiency score of almost all the companies was higher than 0.5; however, in years since 2011, we revealed significant differences in the efficiency of individual firms and only about 40 percent of tour operators achieved an efficiency score higher than 0.5. Using Pearson and Spearman correlation coefficients, our findings show that, in the case of the Czech tour operator market, profitability ratios do not correspond with firm efficiency. Profitability ratios are not a good proxy for economic efficiency and should not be used as the only firm criterion of performance.

Key words: DEA model, economic efficiency, tour operators, profitability, efficiency-profitability relationship

JEL Classification: Z31, C14, C67

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Introduction

With rapidly evolving information technologies, more and more people are not interested in buying tours through tour operators, as they organize their holidays on their own with the help of the internet and different types of applications such as Airbnb, Booking or Trivago. Thus, to be successful in this sector, it is necessary to be efficient and this factor is far more important than it was in previous decades. What is efficiency? How can it be measured?

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Assessing the efficiency of a company is very important for successful business management. Great attention is paid to this issue in academic circles as well, and a large number of studies are devoted to the phenomenon. Generally, efficiency means using resources in the best way (Samuelson and Nordhaus, 1998). However, the term "efficiency" is defined in various ways, and there are several concepts of efficiency in individual studies (dynamic efficiency, Pareto's efficiency, production efficiency, technical efficiency, etc.) (for more detail, see Raczkowski, 2016). In business, production efficiency is often examined. Following the pioneering work of Farrell (1957), production efficiency is usually divided into two components: technical efficiency and price efficiency. Technical efficiency means minimizing inputs at a given level of outputs, or maximizing outputs at a given level of inputs. Price efficiency indicates the optimal combination of inputs and outputs according to their price. Production efficiency, which is often referred to as economic efficiency, is defined as choosing the volume and structure of inputs and outputs that minimize cost or maximize revenue. (Farrell, 1957; Ali and Byerlee, 1991)

To evaluate efficiency, two main methods can be used: stochastic frontier approach (SFA) and data envelopment analysis (DEA) non-parametric approach (Porcelli, 2009; Kumar, 2008). Data envelopment analysis non-parametric approach is the most frequently used method for analysing the economic efficiency of firms in tourism (e.g. Bell and Morey, 1995; Anderson et al., 1999; Barros and Matias, 2006; Köksal and Aksu, 2007; Sellers-Rubio and Nicolau-Gonzálbez, 2009; Assaf et al., 2011; Fuentes, 2011). In comparison to SFA, the advantage of DEA is that it does not require a specification of the production function and the results do not suffer from functional form misspecification. It is also suitable for studies dealing with a relatively small sample of firms with a homogenous product, which is the case of our study (Porcelli, 2009; Kumar, 2008). Due to this, DEA will be used to assess economic efficiency in this paper.

In practice, however, managers rarely apply these advanced mathematical statistical methods. From both the shareholders' and stakeholders' point of view, profitability indicators are the key measurement of corporate performance. According to Hult et al. (2008), return on assets (ROA), return on sales (ROS) and return on equity (ROE) are among the most often applied performance indicators in empirical studies as well. The questions may arise: Do these indicators accurately reflect the economic efficiency of a company? What is the link between economic efficiency and profitability?

The relationship between efficiency and profitability should be positive when better use of resources contributes to higher profitability. However, the link between efficiency and profitability is not as unambiguous and is usually described using the efficiency-profitability matrix. In this matrix, the firms are divided among four groups based on their profitability and efficiency. Here, we can identify firms that have a high level of profitability and efficiency (star), firms with a low profit and efficiency (underdog) and in addition with firms with low efficiency and high profits (lucky), and firms with high efficiency and low profits (unlucky) (Kumar, 2008). The existence of less efficient and yet profitable firms, and vice versa, can be explained by market imperfections. The level of competition, the type of product or service offered and information play a very important role (Kumar, 2008; Keramidou et al. 2013).

The aim of this study is to examine the economic efficiency of tour operators in the Czech Republic in the period 2007-2014 using DEA models and prove the link between economic efficiency and profitability and to find out if profitability is a good proxy for economic efficiency.

To our knowledge, this is the first study to evaluate the economic efficiency of Czech tour operators using DEA models and also the first to explore the relationship between economic efficiency and profitability in the sub-sector of Czech tour operators. The study offers information useful to Czech tour operators' owners, managers, and also to customers. It demonstrates how economic efficiency can be assessed and illustrates the situation found on the Czech tour operators market. It also shows whether profitability ratio is a good proxy for economic efficiency in Czech conditions.

Literature Review

There are studies focused on evaluating the efficiency of tour operators or travel agencies. These papers can be divided into two main groups based on the methods used: (1) studies that measure efficiency with the help of DEA models and (2) studies that use different methods (e.g. free disposal hull (FDH), SFA). Usually these studies not only evaluate firm efficiency but focus also on its determinants.

DEA methods were used to assess firm efficiency in studies such as those of Ramírez-Hurtado and Contreras (2016), Assaf et al. (2011), Fuentes (2011) or Köksal and Aksu (2007).

One of the newest studies is that of Ramírez-Hurtado and Contreras (2016). Their sample is made up of 23 travel agencies in the franchising sector in Spain in 2015. The results show that around 50 percent of the analysed travel agencies (for both CCR and BCC models) are inefficient. Assaf et al. (2011) investigated 25 Portuguese travel agents during 2005–2007 and their main finding is that the market share variable and group membership have a positive impact on efficiency. Fuentes (2011) analysed the link between agency ownership type, location and level of experience in a sample of 22 travel agencies in Spain in the year 2007. It was found that there is no statistically significant relationship between ownership type and efficiency. Also, experience has no effect on efficiency. Location is the only variable that affects efficiency. A higher concentration of travel agents around town centres has a positive impact on the level of efficiency. Köksal and Aksu (2007) measured the efficiency of 24 travel agencies operating in Turkey in the year 2004. Authors rejected the hypothesis that the type of ownership of the travel agencies (operating independently or under a chain brand) influences a unit's efficiency score.

Barros and Matias (2006) and Anderson et al. (1999) used SFA or applied more methods to assess firm efficiency. Barros and Matias (2006) focused on a sample of 25 Portuguese travel agencies in the years 2000-2004. Applying SFA, they concluded that the majority of examined travel agencies are relatively efficient. Their findings show that capital, labour, sales and M&A activities are the main factors that influence efficiency in this sector. Anderson et al. (1999) investigated the efficiency of 31 corporate travel departments using SFA and also DEA. They found that the travel management depart-

ments operated relatively efficiently. They compared results of DEA and SFA and revealed that DEA systematically outputs a higher inefficiency score than SFA.

There are also studies that focus on measuring profitability performance in the tourism sector. For instance: Subačienė and Senkus (2013), Inoue and Lee (2011) or Pan (2005). Subačienė and Senkus (2013) evaluated the net profitability of tour operators and travel agencies for the period 2009 to 2011 in Lithuania. The pyramidal analysis system was compiled for net profitability analysis and was divided into two first level factors - return on assets and assets turnover. The study revealed that net profitability was affected by sales revenue, costs of sales and operating expenses for the sample of medium-sized enterprises. For small firms, sales revenue, costs of sales and operating expenses influenced the net profitability ratio. Inoue and Lee (2011) focused on the link between corporate social responsibility (CSR) and corporate financial performance (CFP) in tourism-related industries (airline, casino, hotel, and restaurant). They used return on assets (ROA) to measure short-term profitability (the first dimension of CFP) and Tobin's q as a proxy for future profitability (the second dimension of CFP). Their results revealed that each dimension of CSR had a differential effect on both short-term and future profitability and that such financial impacts varied across the four industries. Pan (2005) used return on sales (ROS) to measure profitability and focused on the relationship between market concentration and profitability in a sample of international tourist hotels in Taiwan.

Empirical literature investigates the link between efficiency and profitability in different industries relatively often and the results differ. A positive impact of efficiency on profitability was confirmed by Aissa and Goaied (2016), Guillén, Rengifo and Ozsoz (2014), Fageda and Voltes-Dorta (2012), Mostafa (2010) or Greene and Segal (2004), among others. On the contrary, Palečková (2015), Shieh (2012), Keramidou et al. (2013) or Olson and Zoubi (2011) identified only a small or no relationship between efficiency and profitability. Despite the existence of many studies focusing on the link between efficiency and profitability, little attention has been paid to this relationship in the tourism sector. We have found only two studies that examined hotels (Aissa and Goaied, 2016 and Shieh, 2012) and one paper dealing with travel agencies (Sellers-Rubio and Nicolau-Gonzálbez, 2009).

Aissa and Goaied (2016) examined 27 hotels operating in Tunisia and used the DEA approach to measure efficiency and the ROA indicator for profitability performance. Regression results show the significant influence of a hotel's efficiency on its profitability performance. Shieh (2012) employed DEA to estimate the cost efficiency of Taiwan hotels and three financial ratios for profitability performance: the ratio of net operating profit before taxes, the ratio of earnings before taxes, and return on assets before taxes. In contrast to the aforementioned study, Shieh indicated that cost efficiency does not significantly influence profitability performance.

Finally, Sellers-Rubio and Nicolau-Gonzálbez (2009) examined the link between profitability, productivity and efficiency in Spain using a sample of 567 travel agencies. They employed SFA and DEA models for assessing efficiency. Profitability performance was measured using traditional indexes: return on capital employed (ROCE), return on assets (ROA) and return on investment (ROI). Sales per employee and sales per outlet were used as an indicator of productivity. Their results revealed a link between the prof-

itability indexes and efficiency of travel agencies that was not robust. The correlation coefficients indicated only a low or statistically insignificant relationship between profitability performance and efficiency.

Data and Methods

To assess the economic efficiency of tour operators in the Czech Republic, we used data from the database Albertina CZ Gold Edition. This database contains information on all profit and non-profit entities in the Czech Republic that have been assigned a personal identification number (IČ). At present, this database contains data for more than 2.7 million subjects. We chose the data for tour operators (group 79.12 Tour operator activities) for the period 2007-2014 using Statistical classification of economic activities in the European Community Rev.2 (NACE Rev.2).

First, we narrowed down the sample and selected entities whose data contained all the information necessary for assessing economic efficiency. The chosen operators were all active in the examined period, their sales were higher than 50,000 CZK per year in all examined years and they were insured against bankruptcy. This insurance is mandatory for all tour operators who are active in the Czech Republic and provide tour operator services. The final sample comprises data of 181 tour operators, with data of most of the firms not being available for the entire time period. The number of firms in individual years is shown in Table 1. According to the Ministry of Regional Development, the data provided represents approximately a quarter of the insured tour operators in individual years.

We use DEA models to assess economic efficiency. Output oriented models are selected. The reason for this is the fact that the firms aim to maximize their outputs and their behaviour is output-oriented although inputs are also under the control of the firms (Barros and Alves, 2003). Following the example of Barros and Mascarenhas (2005), Sellers-Rubio and Nicolau-Gonzálbez (2009) and Ramírez-Hurtado and Contreras (2016), we applied the two variants of output-oriented models: a model with constant returns to scale (CRS-O, also called CCR-O) and a model with variable returns to scale (VRS-O, also called BCC-O).

The fundamental principle of DEA models lies in estimating an efficient frontier based on the set of available decision-making units (DMUs). If a DMU lies on the frontier, it is referred to as an efficient unit, and otherwise as inefficient. DEA also provides efficiency scores and virtual units for inefficient DMUs that describe the possible changes of inputs/outputs of these units that could be made for them to be efficient. Reference units are hypothetical units on the efficient frontier, which can be regarded as target units for inefficient units. DEA models can be oriented to inputs or outputs. The output-oriented model assumes a fixed level of inputs and maximizes the level of outputs with respect to the given inputs. This model is usually called CCR by authors Charnes, Cooper and Rhodes (Charnes et al., 1978). These models could be used for constant returns to scale. In the case of variable returns to scale, we work with BCC models, whose authors are Banker, Charnes and Cooper (Banker et al., 1984). An overview and detailed information on DEA models can be found in Cooper et al. (2004), Cooper et al. (2006) or in Jablonský and Dlouhý (2004). The fundamental idea of the efficiency cal-

culation is to maximize the rate of the weighted sum of outputs divided by the weighted sum of inputs. For example, the CCR output oriented model transformed (Charnes-Cooper transformation) into linear programming form can be defined as follows (CCR-O) (Jablonský and Dlouhý, 2004):

Minimize $z = \sum_{j=1}^{m} v_j x_{jq}$

Subject to: $\sum_{i=1}^{r} u_i y_{ik} \leq \sum_{j=1}^{m} v_j x_{jk}$; k = 1, 2, …, n (1)

$\sum_{j=1}^{m} u_i y_{iq} = 1$

$u_i \geq \varepsilon$, i=1,2,…,r, $v_j \geq \varepsilon$, j=1,2,…,m, v=any value.

where q represents the evaluated DMU, y_{ik} are known r outputs, x_{jk} are known m inputs of the k-th DMU out of n DMUs, u_i and v_j are the variable weights to be determined by the solution of this problem and ε is the infinitesimal constant, which is usually set as 10^{-8}.

The BCC output oriented model is slightly different with additional parameter v relating to the convex efficiency frontier. The model is defined as follows (BCC-O) (Jablonský and Dlouhý, 2004):

Minimize $z = \sum_{j=1}^{m} v_j x_{jq} + v$

Subject to: $\sum_{i=1}^{r} u_i y_{ik} \leq \sum_{j=1}^{m} v_j x_{jk} + v$, k = 1, 2, …, n (2)

$\sum_{j=1}^{m} u_i y_{iq} = 1$

$u_i \geq \varepsilon$, i=1,2,…,r, $v_j \geq \varepsilon$, j=1,2,…,m, v=any value.

The efficient unit U_q lies on the efficient frontier when optimal efficiency (calculated by the model) z = 1. The inefficient units have a z higher than 1, but in order to better describe the percentage efficiency, the results are usually transformed into a 0-1 scale by changing the result to 1/z (Jablonský and Dlouhý, 2004). The efficiency score describes the relative distance from the efficient frontier (Cooper et al., 2004). The number of DMUs should be high enough; otherwise, in the case of a large number of inputs and outputs, all units are considered to be efficient. It can be proven that BCC (VRS) models usually discover more efficient units than CCR (CRS) models because of the convex efficiency frontier found in BCC compared to the CCR conical hull and also because the efficiency scores provided by BCC models are higher or equal to the ones of CCR models (Cooper et al., 2004).

As models (1) and (2) calculate the efficiency score for 1 DMU and it is necessary to run each model *n* times when *n* is the number of DMUs, it is better to use a software specialized for the solution of DEA models. We have chosen the software STATA.

To estimate efficiency, we chose one output and three inputs to place into the DEA model. This number of inputs and outputs assures distinction between efficient and inefficient units is achieved in DEA results, as the number of DMUs for all years is more than 3 times higher (Cooper et al., 2007). As the output, we used sales, which are calculated as the sum of revenues from sold goods and production. Sales and operating income are among the most frequently used outputs in studies evaluating efficiency in tourism (for an overview of the studies and outputs and inputs, see Sellers-Rubio and Nicolau-Gonzálbez, 2009). We prefer sales because they offer a better picture of the realized production compared to operating incomes, which contain, among other, revenues from disposals of fixed assets. As regards the inputs, we assume the microeconomic production function model with inputs in the form of labour and capital (Samuelson and Nordhaus, 1998). To attain applicability, we used monetary units for the inputs and outputs of the production function. We employed (1) personnel expenses, which represent labour (2) tangible and intangible fixed assets, which are a proxy for capital and (3) expenses on sold goods and production consumption as another proxy for capital. All inputs and output of the DEA models reached positive values. A DEA model was applied for each of the selected years separately to observe changes in the sector. The output and inputs of the DEA models and descriptive statistics are shown in Table 1.

This article examines the link between efficiency and profitability. We employ three frequently used indicators of profitability: ROE, ROA and ROS (Hult et al., 2008). Return on equity (ROE) = Earnings after tax (EAT)/Equity; Return on assets (ROA) = Earnings before interest and taxes (EBIT)/Total assets; and Return on sales (ROS) = Earnings before interest and taxes (EBIT)/Sales. The use of ROE as a profitability indicator is associated with the problem of seeing false positivity if both equity and profit reach negative values. Another problematic situation can occur when a company makes a profit, but due to its negative equity, ROE is negative. In order to eliminate these problems, in the case of negative equity, we assigned the missing value to the firm. This means that we excluded these firms from the analysis of the relationship between ROE and efficiency. The means of profitability ratios in individual years are shown in Table 1.

To assess whether there is a direct link between profitability and efficiency, we use the Pearson correlation coefficient and also the Spearman rank correlation coefficient to take into account the possible non-linearity of the relationship (Rose et al., 2015). We used STATA software for the calculation.

Table 1 Mean of inputs, outputs of DEA models (in thousands of CZK) and profitability ratios

	2007	2008	2009	2010	2011	2012	2013	2014
Output of DEA models								
Sales	150,152.1 (478,674.3)	153,883.8 (528,593.1)	139,840.9 (484,176.4)	123,074.8 (424,981.5)	121,190.8 (406,319.8)	123,466.4 (412,332.3)	124,497 (430,579.8)	93,730.72 (285,107.5)
Inputs of DEA models								
Personnel expenses	6,206.541 (19,258.68)	6,701.239 (20,922.09)	6,799.237 (21,235.19)	5,928.056 (19,581.01)	6,286.308 (19,521.47)	6,307.257 (19,652.72)	6,094.044 (18,253.22)	5,170.011 (15647.43)
Tangible and intangible fixed assets	7,155.802 (39,570.06)	7,455.761 (37,989.89)	7,152.904 (34,533.94)	5,656.979 (28,989.05)	5,530.58 (26,404.55)	5,565.917 (25,124.17)	5,904.059 (24,543.38)	4,171.258 (15,543.83)
Expenses on sold goods and prod. consumption	137,623.4 (438,694.9)	141,750.1 (485,930)	128,739.7 (446,047.5)	114,317.9 (396,497)	112,730.2 (379,473.6)	115,238.4 (389,789.3)	114,481.7 (403,121.9)	86,322.38 (278,450.5)
Profitability ratios								
ROE	0.295 (2.061)	0.482 (1.293)	-0.707 (7.567)	0.297 (0.624)	-0.328 (3.771)	0.105 (2.725)	0.023 (1.552)	-0.305 (2.092)
ROS	0.018 (0.089)	0.018 (0.071)	0.009 (0.082)	0.020 (0.067)	0.014 (0.073)	0.015 (0.049)	0.013 (0.05)	0.008 (0.043)
ROA	0.083 (0.303)	0.073 (0.340)	0.047 (0.246)	0.095 (0.338)	0.080 (0.294)	0.028 (0.174)	0.022 (0.221)	0.034 (0.171)
Number of firms	111	117	135	143	143	144	135	93

Note: Standard deviation in brackets

Source: Albertina CZ Gold Edition, authors' computations

Results and discussion

Firstly, we examined the efficiency of tour operators in the period 2007-2014 using DEA models with 3 inputs and 1 output, separately for each year. To create a comparison, we used CCR-O with the expectation of constant returns to scale (equation 1) and BCC-O based on variable returns to scale (equation 2). The efficiency score ranges from 0 to 1 where "one" indicates efficiency. The main results are shown in Table 2. The number of firms that reached economic efficiency and also the number and percentage of firms that have an efficiency score higher than 0.75 and 0.5 (as to observe the differences between individual years) are shown in Table 3.

Table 2 Main results of CCR-O and BCC-O models

	2007	2008	2009	2010	2011	2012	2013	2014
CCR-O								
Mean	0.775	0.809	0.843	0.859	0.525	0.360	0.414	0.399
Standard deviation	0.105	0.108	0.106	0.094	0.290	0.281	0.255	0.308
Minimum	0.389	0.403	0.498	0.464	0.111	0.101	0.074	0.038
Maximum	1	1	1	1	1	1	1	1
BCC-O								
Mean	0.859	0.856	0.884	0.896	0.729	0.483	0.493	0.463
Standard deviation	0.111	0.100	0.102	0.095	0.246	0.318	0.299	0.335
Minimum	0.389	0.521	0.528	0.474	0.111	0.101	0.074	0.038
Maximum	1	1	1	1	1	1	1	1
Number of firms	**111**	**117**	**135**	**143**	**143**	**144**	**135**	**93**

Source: Albertina CZ Gold Edition, authors' computations in STATA software

If we compare the results of both models, in the BCC-O model, the average value of the efficiency score is higher and a larger number of firms were indicated as efficient. It is typical for BCC models to have more efficient units than CCR models, as they try to find a convex hull instead of a conic one.

The number of effective firms was relatively stable for the entire examined period and is 5 percent of firms when using the CCR-O model and 15 percent of firms when applying the BCC-O model. On the other hand, the proportion of firms achieving an efficiency score higher than 0.75 (respectively 0.5) differed significantly in the examined period. Based on the distribution of efficiency, we can split the time period into two parts: 2007-2010 and 2011-2014.

In the period 2007-2010, the tour operator market is characterized by a large number of companies that achieved a high level of efficiency, with almost all firms having an efficiency score higher than 50 percent using both DEA models. The average efficiency score was relatively high and reached a value from 0.775 to 0.896, depending on the method used. The standard deviation in this period is 0.1 and in the context of the mean value, this deviation indicated the relatively small differences among firms in terms of economic efficiency.

Table 3. Results of CCR-O and BCC-O models by efficiency score value (number of firms)

	2007	2008	2009	2010	2011	2012	2013	2014
CCR-O								
Efficiency score = 1	5 (4.5%)	6 (5.1%)	15 (11.1%)	9 (6.3%)	8 (5.6%)	4 (2.8%)	4 (3.0%)	5 (5.4%)
Efficiency score > 0.75	74 (66.7%)	88 (75.2%)	117 (86.7%)	130 (90.9%)	43 (30.1%)	26 (18.1%)	21 (15.6%)	19 (20.4%)
Efficiency score > 0.5	109 (98.2%)	116 (99.1%)	134 (100%)	142 (99.3%)	63 (44.1%)	38 (26.4%)	45 (33.3%)	30 (32.3%)
BCC-O								
Efficiency score = 1	17 (15.3%)	18 (15.4%)	28 (20.7%)	29 (20.3%)	21 (14.7%)	14 (9.7%)	12 (8.9%)	13 (14.0%)
Efficiency score > 0.75	96 (86.5%)	101 (86.3%)	123 (91.1%)	135 (94.4%)	78 (54.5%)	42 (23.2%)	37 (27.4%)	25 (26.9%)
Efficiency score > 0.5	110 (99.1%)	117 (100%)	135 (100%)	142 (99.3%)	112 (78.3%)	58 (40.3%)	54 (40.0%)	36 (38.7%)

Note: as a percentage in brackets
Source: Albertina CZ Gold Edition, authors' computations in STATA software

The situation changed dramatically in 2011, when the average efficiency score declined significantly. In 2011, only 44 percent of firms achieved an efficiency score above the level of 0.5 using the CCR-O model and approximately 78 percent using the BCC-O model. In the period 2012-2014, the average value of the efficiency score was between 0.360 and 0.493 and only 30-40 percent of tour operators reached an efficiency score higher than 0.5. Also, differences among individual firms increased, as is demonstrated by the standard deviation value in context of the mean.

Hence, our findings suggest that the significant differences in the efficiency of individual companies in the Czech tour operator market began to occur in 2011, and from the year 2012 onward, we can summarize the situation on this market as being unsatisfactory. About 60 percent of firms reached an efficiency score of less than 0.5 using both variants of the DEA model. The changes in the tour operators' performance could be explained by a combination of two main factors.[2] (1) In the year 2011, final consumption expenditure began to decrease (for the first time since the year 1998) in the Czech Republic as a result of the economic crisis. Foreign holidays, being luxury goods, are affected by declining consumption far more than necessity goods. According to Ministry of Regional Development of the Czech Republic (2017a, 2017b), outgoing tourism rapidly decreased in 2011. For instance, the number of trips abroad (with one or more overnight stays) fell by 8 percent, the number of overnight stays dropped more than 11

[2] A certain role in the assessment of efficiency of firms could also be played by the use of an unbalanced panel of companies. This approach has its advantages but also its limitations. The advantage is that it captures the market situation in the context of newly arriving and outgoing companies, and also allows for working with a larger sample of companies. This approach better reflects the market situation than the employing of a balanced panel. On the other hand, the results may be somewhat biased due to the absence of data from companies that are still on the market, but whose data has not been provided in any of the years.

percent and the number of overnight stays within long trips[3] decreased by more than 8 percent in 2011. (2) The Arab Spring, which began in December 2010 in Tunisia, and following the success of the Tunisian protesters, spread to other countries like Egypt, Libya, Yemen, Syria or Bahrain (Lotan et al., 2011; Aday et al., 2012). In 2011, the demand for holidays in Egypt declined significantly; in Tunisian, the decrease is already evident in 2009 (Czech Statistical Office, 2017a and 2017b). Czech residents made significantly more trips within the Czech Republic. Between the years 2010 and 2011, the number of trips of Czech residents in the Czech Republic increased by more than 40 percent and overnight stays increased by more than 25 percent (Ministry of Regional Development of the Czech Republic, 2017a and 2017b). As Czech tour operators primarily focus on outbound tourism, both of these factors significantly affected the sales of tour operators in 2011 (in nominal prices) and also all calculated profitability ratios (ROE, ROA, ROS) (see Table 1).

After having assessed the efficiency of tour operators on the Czech market, we examine the relationship between alternative indicators of firm performance: firm efficiency and firm profitability. We employ Pearson and Spearman correlation to prove the tightness of the link. We use the efficiency score from CCR-O and BCC-O models as the indicator of efficiency, and we applied ROE, ROA and ROS as profitability indicators. The results are shown for individual years in Table 4.

Similar to the evaluation of tour operator efficiency, we can also divide the examined period into two parts: 2007-2010 and 2011-2014. In the 2007-2010 period, correlation coefficients are predominantly statistically significant and indicate small to moderate correlation between profitability and efficiency (statistically significant correlation coefficients range from 0.18 to 0.57). In the case of the ROE indicator, the relationship between profitability and efficiency is not linear and it is more appropriate to use Spearman's rank correlation here. A stronger link between efficiency and profitability was identified when using ROA and ROS indicators. This can be explained by the fact that the level of ROE is strongly influenced by the proportion of equity and liabilities used. If companies achieved the same efficiency (efficiency score) and have a different leverage, their ROE would most likely differ in favour of the company with a higher proportion of liabilities. In 2011-2014, the correlation between efficiency and profitability was statistically insignificant in most cases and the magnitude of correlation coefficients indicates no or only a small correlation. These conclusions are valid for all three profitability indicators and are independent of the correlation method applied. Here, our results are the same as the conclusions of Sellers-Rubio and Nicolau-Gonzálbez (2009), who examined the efficiency-profitability relationship in the travel agencies sub-sector in Spain.

[3] A trip for the purpose of leisure activities and recreation that includes at least 4 consecutive overnight stays outside the traveller's usual environment (Ministry of Regional Development of the Czech Republic, 2017)

Table 4 Pearson and Spearman correlation coeficients (individual years)

	2007	2008	2009	2010	2011	2012	2013	2014
Pearson correlation coeficients								
CCR-O								
ROE	0.108	0.082	0.252***	0.175*	-0.148	-0.120	0.151	0.021
ROA	0.370***	0.260***	0.411***	0.216***	0.064	0.068	-0.028	0.256**
ROS	0.570***	0.364***	0.440***	0.287***	0.060	0.038	0.034	0.154
BCC-O								
ROE	0.148	-0.003	0.211*	0.150	-0.097	-0.101	0.198	0.001
ROA	0.304***	0.274***	0.211***	0.199**	0.111	0.071	-0.010	0.192*
ROS	0.538***	0.307***	0.427***	0.355***	0.145*	0.009	0.055	0.120
Spearman rank correlation coeficients								
CCR-O								
ROE	0.328***	0.276***	0.450***	0.325***	-0.108	0.093	0.129	0.097
ROA	0.387***	0.260***	0.456***	0.334***	0.026	0.231***	0.064	0.189*
ROS	0.312***	0.175*	0.359***	0.285***	-0.045	0.121	0.065	0.138
BCC-O								
ROE	0.286***	0.118	0.298***	0.304***	-0.130	0.1372	0.140	0.050
ROA	0.222**	0.205**	0.381***	0.308***	0.041	0.200**	0.062	0.118
ROS	0.279***	0.164*	0.319***	0.314***	-0.027	0.104	0.086	0.064

*Note: ***significant at the 1 percent level, **significant at the 5 percent level, *significant at the 10 percent level.*

Source: Albertina CZ Gold Edition, authors' computations in STATA software

Our findings suggest that, in the case of the tour operator market, profitability indicators, which are commonly used as a measure of firm performance, do not correspond to efficiency. Profitability ratios should not be used as the only indicator of company performance; it should be viewed in a wider context. These conclusions are interesting not only for managers and owners, but also for academics. The use of profitability ratios as the only performance criterion of a firm can be misleading and lead to biased conclusions.

Conclusion

The aim of this paper was to examine the economic efficiency of tour operators in the Czech Republic and to explore the relationship between economic efficiency and profitability. We calculated efficiency with the help of two DEA models, BCC-O and CCR-O, in the period 2007-2014 for each of the years separately to see the differences on the market. In both models, the number of efficient tour operators was stable through the whole time period. However, differences were found in the distribution of firms below the efficient frontier. Here, we can divide the examined period into two sub-periods: from 2007 to 2010 and from 2011 to 2014. Whereas in the first period (2007-2010), almost all tour operators received an efficiency score higher than 0.5, the proportion of firms with an efficiency score higher than 0.5 dramatically decreased in the second period (2011 – 2014). These results could be caused by two main factors: (1) The economic crisis in 2008 was accompanied by a decline in consumption from 2011 onward and (2) The Arab Spring, which began in December 2010 and which partly affected the demand of Czech residents for outbound tourism – mainly in Egypt and Tunisia. A higher percentage of Czech residents spent their holidays in the Czech Republic, some of them due to their purchasing power and some of them due to safety awareness.

As regards the link between economic efficiency and profitability, a strong relationship between profitability and business efficiency has not been identified. In the examined period of 2007-2014, correlation between all three profitability ratios and the efficiency score (for both models BCC-O and CCR-O) was predominantly weak and in many cases not statistically significant. Therefore, in the case of the Czech tour operator market, profitability indicators like ROA, ROS or ROE do not correspond to the efficiency of the company and should not be used as the only firm performance criterion.

There are some limitations in our research and the presented conclusions. We assessed the economic efficiency of Czech firms that reported tour operator services as their main activity. However, these firms may also generate revenue from other complementary activities and this fact cannot be recognized from the available data. Here the conclusions may be somewhat distorted. Data is available only for companies (not self-employed), who are required to publish financial statements. However, not all companies respect this obligation, and data is thus not available for all businesses. These facts represent another limitation of our conclusions. Officially published financial reports from which our data is drawn may also not faithfully reflect the situation of individual companies, where some transactions may occur outside official accounts - we are aware this is another limitation of our research. However, assuming that all firms on the market behave in a similar way (in terms of creative accounting), this fact would not play a significant role when comparing mutual companies' efficiency and profitability. To overcome these limitations, we plan to use detailed data received directly from a selected group of tour operators, covering the number of trips sold, number of employees, etc. to examine the economic efficiency in more detail. Drawing on Brown and Ragsdale (2002) or Reynolds (2003), we would also like to take consumer satisfaction into account. And like Šiška (2017), we would also like to examine the link between non-financial performance and financial performance.

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References

Aday, S., Farrell, H., Lynch, M, Sides, J. and Freelon, D. (2012). *Blogs and Bullets II: New Media and Conflict after the Arab Spring*. United States Institute of Peace, Peaceworks No. 80. Available from: https://www.files.ethz.ch/isn/150696/PW80.pdf. [Accessed: 2017-06-08].

Aissa, S. B. and Goaied, M. (2016). Determinants of Tunisian hotel profitability: The role of managerial efficiency. *Tourism Management*, 52, 478–487. DOI: 10.1016/j.tourman.2015.07.015

Ali, M. and Byerlee, D. (1991). Economic efficiency of small farmers in a changing world: A survey of recent evidence. *Journal of International Development*, 3(1), 1–27. DOI: 10.1002/jid.4010030102

Anderson, R. I., Lewis, D. and Parker, M. E. (1999). Another Look at the Efficiency of Corporate Travel Management Departments. *Journal of Travel Research*, 37(3), 267–272. DOI: 10.1177/004728759903700308

Assaf, A. G., Barros., C. P. and Machado, L. P. (2011). The future outlook for Portugue-se travel agents. *Tourism Economics*, 17(2), 405–423. DOI: 10.5367/te.2011.0034

Banker R. D, Charnes, A. and Cooper, W. W. (1984). Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science*, 30(9), 1078–1092. DOI: 10.1287/mnsc.30.9.1078

Barros, C. P. and Alves, C. (2003). Hypermarket retail store efficiency in Portugal. *International Journal of Retail and Distribution Management*, 31(11), 549–560. DOI: https://doi.org/10.1108/09590550310503285

Barros C. P. and Mascarenhas M. J. (2005). Technical and allocative efficiency in a chain of small hotels. *International Journal of Hospitality Management*, 24(3), 415–436. DOI: 10.1016/j.ijhm.2004.08.007

Barros, C. P. and Matias, A. (2006). Assessing the efficiency of tour operators with a stochastic cost frontier: A Portuguese case study. *International Journal of Tourism Research*, 8(5), 367–379. DOI: 10.1002/jtr.578

Bell, R. A. and Morey, R. C. (1995). Increasing the Efficiency of Corporate Travel Management through Macro Benchmarking. *Journal of Travel Research*, 33(3), 11–20. DOI: 10.1177/004728759503300303

Bisnode (2016). *Albertina CZ Gold Edition*: [database on DVD-ROM] [Accessed: 2016-07-01].

Brown, J. R. and Ragsdale, C. T. (2002). The competitive market efficiency of hotel brands: An application of data envelopment analysis. *Journal of Hospitality and Tourism Research*, 26(4), 332–360. DOI: 10.1177/109634802237483

Charnes, A., Cooper, W. W. and Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6), 429–444. DOI: 10.1016/0377-2217(78)90138-8

Cooper, W. W., Seiford, L. M. and Zhu, J. (2004). *Handbook on Data Envelopment Analysis*. Norwell: Kluwer Academic Publishers.

Cooper, W. W., Seiford, L. M. and Tone, K. (2007). *Data Envelopment Analysis – A Comprehensive Text with Models, Applications, References and DEA-Solver Software*. New York: Springer Science + Business Media Inc. DOI: 10.1007/b109347

Cooper, W. W., Seiford, L. M. and Tone, K. (2006). *Introduction to Data Envelopment Analysis and Its Uses*. New York: Springer Science + Business Media Inc. DOI: 10.1007/0-387-29122-9

Czech Statistical Office (2017a). *Domácí a výjezdový cestovní ruch v ČR - Archiv 2003 - 2013 - Cestovní ruch - časové řady*. Available from: https://www.czso.cz/csu/czso/cru40_cr. [Accessed: 2017-06-12].

Czech Statistical Office (2017b). *Cestovní ruch - časové řady*. Availabe from: https://www.czso.cz/csu/czso/cru_cr. [Accessed: 2017-06-12].

Fageda, X. and Voltes-Dorta, A (2012). *Efficiency and profitability of Spanish airports: a composite nonstandard profit function approach*. Working paper, Universitat de Barcelona. Available from: http://www.ub.edu/graap/airport_ef.pdf. [Accessed: 2017-08-16].

Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of Royal Statistical Society (Series A)*, 120(3), 253–281.

Fuentes, R. (2011). Efficiency of tour operators: A case study of Alicante, Spain. *Tourism Management*, 32(1), 75–87. DOI: 10.1016/j.tourman.2009.12.003

Greene, W. H. and Segal, D. (2004). Profitability and Efficiency in the U.S. Life Insurance Industry. *Journal of Productivity Analysis*, 21(3), 229–247. DOI: https://doi.org/10.1023/b:prod.0000022092.70204.fa

Guillén, J., Rengifo, E. W. and Ozsoz, E. (2014). Relative power and efficiency as a main determinant of banks' profitability in Latin America, *Borsa Istanbul Review*, 14(2), 119–125. DOI: 10.1016/j.bir.2014.02.003

Hult, G. T. M., Ketchen, D. J., Chabowski, B. R., Hamman, M. K., Dykes, B. J. et al. (2008). An assessment of the measurement of performance in international business research. *Journal of International Business Studies*, 39(6), 1064–1080.

Inoue, Y. and Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management*, 32, 790–804. DOI: https://doi.org/10.1016/j.tourman.2010.06.019

Jablonský, J. and Dlouhý, M. (2004). *Modely hodnocení efektivnosti produkčních jednotek*. Praha: Professional Publishing.

Keramidou, I., Mimis, A., Fotinopoulou, A. and Tassis, C. D. (2013). Exploring the relationship between efficiency and profitability. *Benchmarking: An International Journal*, 20(5), 647–660. DOI: https://doi.org/10.1108/bij-12-2011-0090

Köksal, C. D. and Aksu, A. A. (2007). Efficiency evaluation of A-group tour operators with data envelopment analysis (DEA): A case study in the Antalya region, Turkey. *Tourism Management*, 28(3), 830–834. DOI: 10.1016/j.tourman.2006.05.013

Kumar, S. (2008). An Analysis of Efficiency – Profitability Relationship in Indian Public Sector Banks. *Global Business Review*, 9(1), 115-129. DOI: 10.1177/097215090700900108

Lotan, G., Graeff, E., Ananny, M., Gaffney, D., Pearce, I. and Boyd, D. (2011). The Revolu-tions Were Tweeted: Information Flows During the 2011Tunisian and Egyptian Revolu-tions. *International Journal of Communication*, 5, 1375–1405.

Ministry of Regional Development of the Czech Republic (2017a). *Statistiky cestovního ruchu 2010*. Available from: http://www.mmr.cz/cs/Regionalni-politika-a-cestovni-ruch/Cestovni-ruch/Statistiky-Analyzy/Statistiky-cestovniho-ruchu-2010. [Accessed: 2017-06-09].

Ministry of Regional Development of the Czech Republic (2017b*). Statistiky cestovního ruchu 2011*. Available from: http://www.mmr.cz/cs/Regionalni-politika-a-cestovni-ruch/Cestovni-ruch/Statistiky-Analyzy/Statistiky-cestovniho-ruchu-2011. [Accessed: 2017-06-09].

Mostafa, M. M. (2010). Does efficiency matter? Examining the efficiency-profitability link in the US specialty retailers and food consumer stores. *International Journal of Productivity and Performance Management*, 59(3), 255–273. DOI: 10.1108/17410401011023582

Olson, D. and Zoubi, T. A. (2011). Efficiency and bank profitability in MENA countries. *Emerging Markets Review*, 12(2), 94–110. DOI: 10.1016/j.ememar.2011.02.003

Palečková, I. (2015). Relationship between Profitability and Efficiency in the Czech Banking Sector. In: Palečková, I. and Szarowská, I. (eds.), *Proceeding of the 15th International Conference on Finance and Banking.* Karviná: Silesian University, 286–291.

Pan, C-M. (2005). Market structure and profitability in the international tourist hotel industry. *Tourism Management*, 26, 845–850. DOI: 10.1016/j.tourman.2004.04.008

Porcelli, F. (2009*). Measurement of Technical Efficiency. A Brief Survey on Parametric and Non-Parametric Techniques*. United Kingdon: University of Warwick.

Raczkowski, K. (2016). *Public management*. New York: Springer International Publishing.

Ramírez-Hurtado, J. M. and Contreras, I. (2016). Efficiency of travel agency franchises: a study in Spain. *Service Business*, First online. 1–23. DOI: 10.1007/s11628-016-0326-1

Reynolds, D. (2003). Hospitality-productivity assessment using data-envelopment analysis. *The Cornell Hotel and Restaurant Administration Quarterly*, 44(2), 130–137.

Rose, S., Spinks, N. and Canhoto, A. I. (2015). *Management Research: Applying the principles*. London and New York: Routledge.

Samuelson, P. A. and Nordhaus, W. D. (1998). *Economics*. Boston: Irwin/McGraw-Hill.

Sellers-Rubio, R. and Nicolau-Gonzálbez, J. L. (2009). Assessing performance in services: the travel agency industry. *The Service Industries Journal*, 29(5), 653–667. DOI: 10.1080/02642060902720147

Shieh, H-S. (2012). Does Cost Efficiency Lead to Better Financial Performance? A Study on Taiwan International Tourist Hotels. *Journal of Hospitality Financial Management*, 20(1), 17–30. DOI: 10.1080/10913211.2012.10721889

Subačienė, R. and Senkus, K. (2013). Net profitability analysis of travel organizers and travel agencies. *Ekonomik*a, 92(1), 156–165.

Šiška, L. (2017). Comparing CB-SEM and PLS-SEM: a case showing management accounting impact on performance. *Polish Journal of Management Studies*, 15(2), 240–249.