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Economic Research-Ekonomska Istraživanja

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rero20

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To cite this article: Jan Frančeškin & Štefan Bojnec (2022) Economic efficiency of coastal hotel companies, Economic Research-Ekonomska Istraživanja, 35:1, 4425-4436, DOI: 10.1080/1331677X.2021.2013277

To link to this article: https://doi.org/10.1080/1331677X.2021.2013277

Published online: 10 Dec 2021.

ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA
2022, VOL. 35, NO. 1, 4425–4436
https://doi.org/10.1080/1331677X.2021.2013277

Economic efficiency of coastal hotel companies

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ABSTRACT

The article focuses on the analysis of the economic efficiency of Slovenian coastal hotel companies in the period between 2015 and 2018. We applied non-parametric Data Envelopment Analysis to estimate economic efficiency and the panel regression analysis to explain the association between economic efficiency, economic growth, and the hotel location. The results showed that most coastal hotel companies were economically inefficient associated with decreasing returns to scale. As a key source of inefficiency we identified inappropriate allocation of inputs. Given the high concentration of hotels in the municipality of Piran, the hypothesis on higher efficiencies in this location area has been rejected. Most coastal municipalities were negatively related to the economic efficiency of the hotel companies. We also rejected the hypothesis that economic growth affected the economic efficiency of the Slovenian coastal hotel companies.

ARTICLE HISTORY
Received 7 April 2021
Accepted 27 November 2021

KEYWORDS
Hospitality; hotel companies; input-oriented data envelopment analysis; technical efficiency; allocative efficiency; economic efficiency

JEL CLASSIFICATIONS
C14; C23; D24; L83; Z31

1. Introduction

The economic role of tourism has increased with economic development as one of the most important job and income generators, with an important role in building the image of a destination (Assaf & Cvelbar, 2010). Hotels are the largest generator of capital in the tourism industry, a reason to study their efficiency (Bacik et al., 2020). In Slovenia, the largest concentration of hotels (in terms of area) is on the Slovenian coast, which is traditionally one of the most popular summer destinations among both foreign and domestic tourists.

The previous research on hotels' efficiency differs mainly in the size of the sample, the methodology used, and the use of various exogenous variables. The samples of hotels were mostly geographically limited to smaller samples of hotels or belonged to a certain brand (Sellers-Rubio & Casado-Díaz, 2018). As an exogenous variable, the hotel location was mostly used in regression models such as coastal versus other hotels, or near to the airport versus city centre. In our research we introduce as the exogenous variable economic growth or growth of gross domestic product (GDP) in Slovenia and in three main Slovenian-emitting countries (Italy, Germany, and

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Austria) of which tourists have spent the most nights on the Slovenian coast since 2000. This kind of exogenous variable was introduced by articles which confirmed the hypothesis that GDP affects efficiency (Parte-Esteban & Alberca-Oliver, 2015) or were mixed findings (Weerathunga et al., 2020). Consequently, we assume that GDP growth affects the efficiency of hotel companies in this part of Slovenia.

In the last twenty years, measuring the efficiency of hotels has been mainly in the domain of frontier analysis, more precisely Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) (Oukil et al., 2016). In this study DEA frontier analysis is applied because it allows for a high degree of flexibility, especially in terms of the form of the production function, which fits the data and does not follow the assumptions excessively (Bogetoft & Otto, 2011). It is also able to operate with a larger number of inputs and outputs, which is the reason for its general prevalence among researchers. When the prices of inputs and the prices of outputs are known, we can also define cost or profit efficiency.

The article analyses the efficiency of the Slovenian coastal hotel companies in the period between 2015 and 2018. The efficiency of hotel companies is explained by the impact of GDP growth in Slovenia and in the three emitting countries (Austria, Italy, and Germany). In addition, the efficiency of hotel companies is explained by their location as a supply-side factor. Finally, based on an in-depth insight analysis of the hotel company efficiency on the Slovenian coast, study limitations and conclusions are derived.

The rest of the article is organized as follows. The next, second, section presents previous literature and develops hypotheses. The third and fourth sections describe methodology and data used. The fifth section explains and discusses results. The sixth section discusses study limitations, while the final section concludes.

2. Literature review

Newell and Seabrook (2006) examined the impact of factors affecting investment in the hotel industry. The factors that are relevant to a particular investment are financial in 37%, location in 29.9%, economic in 14.5%, diversification in 12% and partnering in 6.6%. The hotel's efficiency and location can be verified through the calculation of the overall level of efficiency, whether the location is suitable for investment (Zhou et al., 2008).

Barros (2005) examined the difference within the State Hotel Chain ENATOUR between hotels that are either regional or historical. He found that their efficiency could be increased if the location was positioned in the vicinity of the coast or in the cities and near the main roads. Oliveira et al. (2013) specified the location factor in close association with another surrounding variable, namely the presence of a golf course. As a location factor in this case, they used the windward or leeward side of the Algarve district where the hotels are located. They found that the location did not have an impact on the efficiency of hotels. Ben Aissa and Goaied (2016) demonstrated that hotels positioned on the coast and in picturesque landscapes were more efficient than others. In addition, the performance of the hotel is also influenced by

the region or the attractiveness of it among guests. Solana-Ibáñez et al. (2016) found that coastal hotels proved to be more efficient than those located elsewhere. Corne (2015) argued similarly in the case of French hotels in conjunction with the French regions. He demonstrated the efficiency in relation to specific tourist attractions such as theme parks and historical and cultural artefacts. Lado-Sestayo and Fernández-Castro (2019) devoted their entire survey to differences in efficiency between individual Spanish regions and concluded that there are differences in efficiency between them. They cited Catalonia as an example where there are differences between the least efficient Loret del Mar and the most efficient Barcelona.

Therefore, the location is one of the most frequently used variables. This is less frequently applied for the GDP variable. Weerathunga et al. (2020) investigated the impact of surrounding variables, including GDP, on hotel efficiency. When interpreting the results on GDP growth, they found mixed results. Parte-Esteban and Alberca-Oliver (2015) analysed the impact of GDP using their own survey of 1385 Spanish hotels over a 10-year period. The GDP variable was used in the analysis as a proxy for the economy production and services in each region. The results showed that GDP has a strong impact on both the regional efficiency and the efficiency of hotels operating in the area. Table 1 shows the additional DEA literature review in connection with the hotel industry.

Based on the previous literature review, we have set the following two hypotheses:

Hypothesis 1: The efficiency of the Slovenian coastal hotel company is positively related to GDP growth at home and in the countries where most tourists come from: Italy, Austria, and Germany.

Hypothesis 2: The efficiency of the Slovenian coastal hotel company is positively related to the municipality in which it operates.

3. Methodology

3.1. The studied area and the selection of hotel companies

In the period between 2015 and 2018, Slovenian tourism recorded growth, starting from 10 million tourist overnight stays in 2015, and then recording continued annual growth in both the number of overnight stays and the number of tourist arrivals (Slovenska turistična organizacija (STA), 2015, 2016, 2017, 2018).

The studied Slovenian coastal area is divided into four municipalities: Piran, Ankaran, Izola, and Koper. Although Slovenia has a short coastline, there are several hotel chains, smaller boutique hotels, and other tourist accommodation. A large concentration of hotels is recorded mainly in the municipality of Piran (more precisely in district of Portorož) where hotels are built next to each other. On the other hand, the municipality of Koper is the largest and economically the richest one but has the fewest hotel complexes compared to others.

The structure of foreign guests in the Slovenian coastal municipalities is strongly linked to the geographical and historical proximity. Over the years, the closeness of Italy has enabled the uninterrupted arrival of Italian guests, who in the past frequently visited the Slovenian coast because of the casinos. Also very loyal are guests

Table 1. Review of DEA literature on hotel efficiency.

Author(s)	Sample	Inputs	Outputs
Morey and Dittman (2003)	54 American hotels	Room division expenditure, energy cost, salaries, non-salary expenditure for property, salaries and related expenditure for advertising, non-salary expenses for advertising, fixed marked expenditure for administrative work	Total revenue, level of service delivered, market share, rate of growth of output
Barros (2005)	43 Portuguese hotels	Capital and labour	Sales, number of guests, nights spent
Zhou et al. (2008)	31 Chinese regions	Total number of full-time employees in regional hotel industry, total number of guest rooms in the hotels in a region, total fixed assets in a regional hotel industry	Total revenue, the revenue generated by room occupancy, food and beverage service and other revenues from laundry and service fees, average occupancy rate
Barros et al. (2009)	15 Portuguese hotels	Number of employees, physical capital	Sales, added value
Assaf and Cvelbar (2010)	24 Slovenian hotels	Number of rooms, cost of materials, cost of services, amortization cost, number of employees and food and beverages (F&B) division capacity	Room division total sales, F&B division total sales.
Pulina et al. (2010)	150 Italian hotels in 21 regions and island of Sardinia	Labour costs, physical capital of hotels	Sales revenue, added value
Oliveira et al. (2013)	84 Portuguese hotels—Algarve	Number of rooms, number of employees, the F&B capacity, other costs	Total revenue
Parte-Esteban and Alberca-Oliver (2015)	1385 Spanish hotels	Number of full-time employees, book value of property, operational costs	Sales
Poldrugovac et al. (2016)	105 Croatian hotels	Energy expenses, room expenses, F&B expenses, expenses associated with other services, labour expenses	Total revenue, occupancy rate
Sellers-Rubio and Casado-Díaz (2018)	17 Spanish regions	Number of hotels in the region, number of available hotel beds in the region, number of full-time-equivalent employees of hotels in the region	Average daily rate, revenue per available room, average occupancy rate
Lado-Sestayo and Fernández-Castro (2019)	400 Spanish hotels placed in 97 tourist destinations	Depreciation, labour cost, operational cost	Sales revenue

Source: Compiled by the authors.

from Austria, who spent a little more than 30% of all hotel overnights on the Slovenian coast every year, and German guests, who also spent 30% of all hotel overnights in the mentioned period.

We investigate the population of hotel companies in the Slovenian coastal municipalities. However, our sample does not include other tourist accommodations in this area.

3.2. Measuring efficiency

To determine technical, allocative and economic efficiency, we followed the empirical model described in more detail by Bojnec and Latruffe (2008). We have determined the efficiency score through the DEAP 2.1 program (Coelli & Coelli, 2005). Hotel companies have a fixed number of rooms in a short period of time with which they need to meet customer needs to remain competitive in the market. We wanted to show how much a hotel company can decrease its input for a given level of output. To generate economic efficiency (EE), we used the DEA input-oriented model, assuming variable returns to scale (VRS) for each year separately. For comparison, we also applied the DEA input-oriented model, which assumes constant returns to scale (CRS) to the volume. EE was determined based on the ratio between technical efficiency (TE) and allocative efficiency (AE): EE = TE/AE. Following the previous research, we selected and included the most common inputs and outputs in our research. Among the inputs are included: labour costs (labour), costs of goods, materials and services (material input), other operating expenses, and tangible fixed assets (capital). Among outputs are included: net sales revenues and other operating revenues. The number of employees and fixed assets are often included as inputs. In both cases, they were excluded from the analysis, as there could be multicollinearity between labour costs and the number of employees or between the number of permanent beds and fixed assets.

In the second stage of the analysis, we performed a balanced panel regression analysis, which includes the results of the EE of hotel companies and the exogenous factor of GDP growth of Slovenia and the three emitting countries (Italy, Germany, and Austria). The panel regression analysis was conducted under the assumption of a model with random effects as there are differences in time between the observed subjects. This has been tested with the Hausman specification test. The economic growth of a country is the same for all hotel companies within a year; however, it differs between the emitting countries included in the analysis, which brings variability of observations on an annual basis. By including economic growth in the panel regression analysis, we wanted to check which foreign country with its economic growth and related tourist demand has the greatest impact on the efficiency of Slovenian coastal hotel companies. In addition, we estimated the panel regression analysis to determine the relationship between the hotel company EE and its location among four possible tourist municipalities on the Slovenian coast.

4. Data

We obtained data from two databases: hotel company-level GVIN data and the World Bank. The GVIN are already-processed secondary data relating to the hotels' financial statements with balance sheets and income statements. The World Bank

Table 2. Description of the hotel companies on the Slovenian coast.

Company	Hotels
Eurotas hotels LLC	Hotel Barbara, Hotel Piran, Boutique Hotel
Hotels Bernardin PLC	Grand Hotel Bernardin, Hotel Histrion, Hotel Vile Park, Hotel Salinera, Hotel Haliaetum, Hotel Mirta
Artana LCC	Art Hotel Piran
Oleander resort LCC	Hotel Oleander, Hotel Lavander
Hotel Palace LCC	Hotel Kempinski, Hotel Palas
Hotels Metropol LCC	Hotel Metropol, Hotel Lucija
Istrabenz Turizem PLC	Hotel Lifeclass, Grand Hotel Portorož, Hotel Slovenija, Hotel Apollo, Hotel Riviera, Hotel Neptun, Hotel Mirna
Damjan Djuričič AmE	Hotel Fiesa
SVM Turizem LCC	Hotel Bio
Adria LCC	Hotel Convent, Olive Suites, Vila Cedra, Vila Bor, Vila Adriatic, Apartments Adria
Hotel Oltra LCC	Hotel Oltra
Keltika partner LCC	Hotel Keltika
Hotel Marina LCC	Hotel Marina
Delfin hotel ZDUS LCC Izola	Hotel Delfin
Belveder LCC	Hotel Cliff, Kamp in Ville
Hotel Marko LCC	Hotel Marko

Note. LLC = limited liability company, PLC = publicly limited company, AmE = sole proprietor.
Source: Compiled by the authors.

data are annual gross domestic product (GDP) growth (expressed as an annual percentage growth rate of GDP at market price based on constant 2010 U.S. dollars) of Slovenia and three emitting countries. Through the entire GVIN database, which covers all Slovenian companies, we identified the population of the companies on the Slovenian coast with their main activity in the hotel industry. In 2015, 2016, and 2017, 15 hotel companies operated on the Slovenian coast, and in 2018 a new hotel company entered the market: Artana LLC (Art Hotel Tartini Piran).

We had to exclude some hotels on the Slovenian coast from the analysis: first, Aquapark Žusterna Hotel, because it belongs to the hotel company Terme Čatež, which operates with most hotels in other regions. Second, Hotel Pristan, which falls under the auspices of the Port of Koper which mostly provides port and logistics services, and third, Hotel Krka, which belongs to the company Krka, which also operates with most hotels in other regions. Table 2 shows the list of the hotel companies on the Slovenian coast included in our analysis.

To assess the cost efficiency analysis, we included the relevant input prices obtained from the SI-Stat portal of the Statistical Office of the Republic of Slovenia: the average annual wage in catering; the price of materials, services and goods as the sum of retail prices of goods; the price of other operating expenses, which includes energy prices for non-household customers; and the prices of maintenance and tangible fixed assets, which include equipment prices reduced by the highest annual depreciation rate of 20%, and the average price of real estate in Slovenia reduced by the highest annual depreciation rate of 20%. Variables of outputs, inputs, and input prices were generated and used cross-sectionally for each year separately. The efficiency analysis was estimated on a cross-sectional annual data for each year separately between the years 2015 and 2018. The possible cumulated inflation does not affect either the cross-sectionally estimated efficiency measures or the regression analysis as the location variable is included as a dummy variable, while the GDP growth rates

are calculated as real GDP growth rates with inflation excluded. The variables were chosen based on the literature review and availability of the data. Table 3 presents the characteristics of the variables used for 15 hotel companies in the first analysed year (2015) and 16 hotel companies in the last analysed year (2018). Minimum and maximum values of variables confirmed observed heterogeneity, especially the size of the hotel companies. The association between used inputs and outputs confirms the adequacy of the variable selection.

5. Results

We present the results in two steps: first, we present DEA results. Second, we present regression analysis results.

Table 3. Descriptive statistics of variables for 2015 and 2018.

Variable	Units	Standard error (SE)	Mean	Standard deviation (SD)	Min.	Max.
				2015		
Outputs						
Net revenues from sale	EUR	2,018,811.39	5,497,687.34	8,075,245.54	27,021.00	256,945.00
Other income	EUR	79,985.41	164,134.00	319,941.65	0	1,133,736.00
Inputs						
Labour cost	EUR	720,129.14	1,840,530.74	2,880,516.57	4,760.96	9,865,953.00
Cost of goods, materials and services	EUR	987,122.07	2,712,372.74	3,948,488.28	28,679.00	12,567,117.00
Tangible fixed assets	EUR	98,971.89	209,418.75	398,887.54	0	1,242,472.00
Other operating expenses	EUR	5,578,500.93	14,467,483.50	22,314,003.70	106.00	76,396,460.00
Input prices						
Labour price	EUR	0	1070.13	0	1070.12	1070.12
Price of goods, materials and services	EUR	0	379.53	0	379.53	379.53
Price of other operating expenses	EUR	0	3393.03	0	3393.03	3393.03
Price of tangible fixed assets	EUR	0	16,845.48	0	16,845.48	16,845.48
				2018		
Outputs						
Net revenues from sale	EUR	2,341,728.18	6,740,659.09	9,655,192.64	50,133.30	30,632,600.00
Other income	EUR	83,201.81	140,685.91	343,049.86	0	1,397,965.00
Inputs						
Labour cost	EUR	774,179.39	2,092,209.75	3,192,023.40	9880.66	10,274,111.00
Cost of goods, materials and services	EUR	1,078,167.07	3,227,194.80	4,445,396.73	32,244.76	14,199,328.00
Tangible fixed assets	EUR	64,271.28	142,620.28	264,997.29	0	1,065,350.00
Other operating expenses	EUR	4,961,907.92	13,330,723.70	20,458,470.40	90.16	66,425,733.00
Input prices						
Labour price	EUR	0	1169.72	0	1169.72	1169.72
Price of goods, materials and services	EUR	0	333.26	0	333.26	333.26
Price of other operating expenses	EUR	0	3763.97	0	3763.97	3763.97
Price of tangible fixed assets	EUR	0	20,676.34	0	20,676.34	20,676.34

Source: Authors' own calculations.

5.1. DEA results

We initially launched the DEA input-oriented model with the assumption of VRS to obtain the TE. As we further introduced prices to the model, we obtained AE and EE (Tables 4 and 5). Furthermore, EE is defined as cost efficiency as we used the DEA input-oriented model. The results showed that the Slovenian coastal hotel companies were technically very efficient as the average TE over the analysed period was 0.977. In contrast to TE, the hotel companies were allocatively and economically inefficient during the analysed period, with the average of the AE being 0.568 and the EE 0.561. More detailed analysis showed that the number of hotel companies related to calculated TE during the period was more or less the same. On the other hand, the number of hotel companies related to calculated AE and EE fall during the analysed period. If we look at returns to scale, we can see that the number of hotel companies related to calculated decreasing returns to scale is slightly falling through the period, from 11 in 2015 to 7 in 2018. A completely different story can be seen for the hotel companies associated with calculated increasing returns to scale as the number of them increased within the analysed period, from 4 in 2015 to 8 in 2018. The decrease in the number of hotel companies associated with decreasing returns on scale is most likely due to business optimization as such hotel companies are usually too large and need to become smaller to increase efficiency. On the other hand, we have a large number of hotel companies that operate at an optimal level and any change in the scale of business would lead to a decrease in efficiency. In the analysed period, the estimation of average scale efficiency was quite high, namely 0.911, which indicates that most hotel companies operate close to or at the optimal size.

To compare the DEA model focused on inputs with the assumption of VRS, we took a similar model with the difference that we assumed CRS. The TE in the analysed period was slightly lower than in the VRS model, namely 0.951. Between the

Table 4. Efficiency of companies whose main gainful activity is the hotel industry.

YEAR	2015					2016				
Company	TE (VRS)	AE	EE	Scale		TE (VRS)	AE	EE	Scale	
1	1.000	1.000	1.000	0.565	Drs	0.967	0.053	0.052	1.000	Crs
2	1.000	1.000	1.000	1.000	Crs	–	–	–	–	Crs
3	1.000	1.000	1.000	1.000	Crs	1.000	1.000	1.000	1.000	Crs
4	1.000	1.000	1.000	1.000	Crs	1.000	1.000	1.000	1.000	Crs
5	0.913	0.141	0.129	0.538	Drs	0.981	0.154	0.154	1.000	Crs
6	1.000	1.000	1.000	0.789	Drs	0.958	0.586	0.561	0.991	Drs
7	1.000	0.173	0.173	0.536	Drs	1.000	0.129	0.129	1.000	Crs
8	0.779	0.071	0.056	0.512	Drs	0.772	0.071	0.055	0.981	Drs
9	1.000	0.808	0.808	1.000	Crs	1.000	0.639	0.639	1.000	Crs
10	1.000	0.685	0.685	0.625	Drs	1.000	0.960	0.960	0.912	Drs
11	1.000	0.055	0.055	0.491	Drs	1.000	0.059	0.059	0.999	Crs
12	1.000	0.428	0.428	0.550	Drs	1.000	0.564	0.564	0.989	Drs
13	1.000	1.000	1.000	0.588	Drs	1.000	1.000	1.000	0.978	Drs
14	1.000	1.000	1.000	0.487	Drs	1.000	1.000	1.000	0.896	Drs
15	1.000	0.666	0.666	0.584	Drs	1.000	1.000	1.000	0.996	Drs
16	–	–	–	–	–	1.000	0.472	0.472	0.996	Crs
17	–	–	–	–	–	–	–	–	–	–
Average	0.981	0.644	0.643	0.704		0.980	0.553	0.550	0.979	

Note. TE = Technical Efficiency, AE = Allocative Efficiency, EE = Economic Efficiency, Drs = decreasing returns on scale, Irs = increasing returns on scale, Crs = constant returns on scale.
Source: Authors' own estimations.

Table 5. Efficiency of companies whose main gainful activity is the hotel industry.

YEAR	2017					2018				
Company	TE (VRS)	AE	EE	Scale		TE (VRS)	AE	EE	Scale	
1	0.849	0.066	0.056	1.000	Crs	0.809	0.068	0.055	0.872	Drs
2	–	–	–	–	–	–	–	–	–	–
3	1.000	1.000	1.000	1.000	Crs	1.000	1.000	1.000	1.000	Crs
4	1.000	1.000	1.000	1.000	Crs	1.000	1.000	1.000	1.000	Crs
5	1.000	0.160	0.160	1.000	Crs	1.000	0.128	0.128	1.000	Crs
6	1.000	0.165	0.165	0.991	Irs	0.990	0.123	0.122	0.999	Irs
7	1.000	0.128	0.128	1.000	Crs	1.000	0.115	0.115	0.922	Drs
8	0.769	0.061	0.047	1.000	Crs	0.861	0.072	0.062	0.972	Drs
9	1.000	0.601	0.601	1.000	Crs	1.000	0.400	0.400	1.000	Crs
10	1.000	1.000	1.000	1.000	Crs	1.000	0.653	0.653	1.000	Crs
11	1.000	0.062	0.062	0.997	Irs	1.000	0.052	0.052	1.000	Crs
12	1.000	0.709	0.709	0.998	Drs	1.000	0.442	0.442	0.915	Drs
13	1.000	1.000	1.000	1.000	Crs	1.000	1.000	1.000	0.951	Drs
14	1.000	1.000	1.000	0.937	Drs	1.000	1.000	1.000	0.892	Drs
15	1.000	1.000	1.000	1.000	Crs	1.000	0.388	0.388	0.935	Drs
16	0.924	0.739	0.683	1.000	Crs	1.000	1.000	1.000	1.000	Crs
17	–	–	–	–	–	1.000	1.000	1.000	1.000	Crs
Average	0.971	0.555	0.550	0.991	–	0.977	0.502	0.500	0.968	–

Note. TE = Technical Efficiency, AE = Allocative Efficiency, EE = Economic Efficiency, Drs = decreasing returns on scale, Irs = increasing returns on scale, Crs = constant returns on scale.
Source: Authors' own estimations.

two different assumptions, there were major differences in the estimated average AF and EF in the period between 2015 and 2018. In the CRS model values were significantly lower than in the case of the VRS which was estimated at 0.339, and in the case of the CRS at 0.331. The EE results were also much lower, assuming CRS. Regardless of the assumption of CRS or VRS, we sum up to the conclusion that most coastal hotel companies were economically inefficient. Among those companies that were fully efficient (TE, AE and EE), we find mainly larger hotel companies that own several hotels or are part of a foreign hotel chain. The estimated scale efficiencies were quite high within the analysed period, so we assumed that the main source of hotel companies' economic inefficiency is inappropriate allocation of inputs. The operation of hotel companies is likely to be exposed to a strong seasonality (Gričar et al., 2021).

5.2. Regression analysis results

In the second part of the research, we wanted to test H1 and H2 through applied panel regression analysis: whether the type of municipality in which the hotel company is located affects efficiency (H1) and whether the GDP growth of the domestic and three foreign emitting countries affects efficiency.

The impact of the type of municipalities on efficiency (H1) was tested through a balanced panel in which there were 68 observations (17 groups × 4 years). The results showed that only the municipality of Koper was statistically significant ($p = 0.049$) (Table 6). All other municipalities were statistically insignificant as their p-values are higher than 0.05. Nevertheless, the municipality of Piran came very close to the statistically significant municipality ($p = 0.067$) and the municipality of Izola was

Table 6. Panel model with generalized least squares (GLS) random effects.

Dependent variable: Economic efficiency	Coef.	Std. Err.	Sig.
Municipality of Piran	0.326	0.178	0.067
Municipality of Izola	0.104	0.197	0.598
Municipality of Koper	0.448	0.227	0.049
Constant	0.270	0.161	0.093

Note. The benchmark of comparison in estimation is the Municipality of Ankaran.
Source: Authors' own estimations.

Table 7. Panel model with GLS random effects.

Dependent variable: Economic efficiency	Coef.	Std. Err.	Sig.
GDP growth of Germany	0.0005317	0.00154	0.730
GDP growth of Italy	–0.0008589	0.0017323	0.620
GDP growth of Austria	0.0000185	0.0005241	0.972
Constant	3.863133	05.213472	0.459

Note. The benchmark of comparison in estimation is the GDP growth of Slovenia.
Source: Own authors' estimations.

insignificant ($p = 0.598$). Therefore, the regression results regarding the validity of the set H1 are mixed.

In addition, H2 was tested with the panel regression analyses with random effects: whether the GDP growth of Germany, Italy, Austria, and Slovenia affects the EE of hotel companies in the period between 2015 and 2018 (Table 7). The results showed that none of the GDP growth affects the EE of the Slovenian coastal hotel companies as all p-values were higher than 0.05. Based on the results, we cannot claim that the EE and the GDP growth of the domestic and three foreign emitting countries are associated. Therefore, H2 was rejected.

6. Study limitations

The restrictions are related mainly to the data that was available for the Slovenian coastal municipalities. The survey included all companies whose main gainful activity is the hotel industry and not individual hotels, which is a general limitation of the survey and relates primarily to the availability of secondary company-level data intended for the study of the entire population. Certain companies also own hotels in other regions, but this represents a smaller share compared to those positioned on the Slovenian coast. Input prices, which represent the best approximation of prices in tourism in terms of data availability, were also included in the analysis. It should also be noted that the selection of inputs and outputs is adapted from the literature review. The last limitation refers to the method used to evaluate the EE. In this case the non-parametric DEA method was used, which could be compared with the SFA parametric method as an issue for the research in the future.

7. Conclusion

The study contributes to a well-known framework of EE in the literature which included the exogenous variables for the hotel location and GDP growth of the domestic (Slovenia) and three emitting countries (Italy, Germany, and Austria) in the period between 2015 and 2018. Average EE decreased during the analysed period from 0.643

in 2016 to 0.500 in 2018. In 2015, one third of hotel companies were inefficient according to the EE; in 2016 and 2017, there were 6 out of 15 hotel companies that were inefficient and in 2018 there were 9 out of 16 hotel companies that were inefficient. One of the potential sources of inefficiency could be the seasonality recorded by coastal hotels as most tourist arrivals and overnight stays are during the summer months. Hotels are almost empty in the late fall and winter; the only exception is Christmas time and the New Year, and days around Easter. Softening the seasonality would certainly help to improve efficiency for all hotel companies on the Slovenian coast. Also, the large concentration of hotels in the municipality of Piran did not significantly help to improve the EE of hotel companies, although the largest hotel companies operate in this area and own the largest hotel complexes. Efficiency was also not affected by the GDP growth of the domestic and three foreign emitting countries. The reason for such results lies mainly in the fact that we consider a rather short period. We anticipate that economic growth would have a greater impact on efficiency if the research period is extended, which opens the possibility for further research. A second potential source of inefficiency might be the management of hotel companies, as most of the larger ones have been privatized, restructured, or taken over by other foreign companies in a certain period. A third potential source of inefficiency stems from the relatively new phenomena. Namely, it is difficult to verify title of transfer prices, which on the Slovenian coast are mainly related to hotels that have been privatized by foreign companies. All three potential sources of inefficiency are also opportunities for further research in the field of coastal hotel companies as well as at the level of Slovenia and worldwide.

Disclosure statement

No potential conflict of interest was reported by the authors.

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