THE EFFICIENCY OF HEALTH TOURISM INFRASTRUCTURE IN CROATIA

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Abstract

The main idea of this paper is that health care providers need to be efficient in their operative in order to develop *new* competitive service. The developing of *new* service in health care for this paper is primarily understood as providing competitive tourism product for growing health tourism demand. Achieving high standards in health care could induce higher demand, especially in the light of the development of new tourism products intended to shift the destination competitiveness. Furthermore, the efficiency of health tourism facilities is prerequisite for a satisfactory tourism experience to be achieved and crucial for target markets to be attracted. The main purpose of the paper is to estimate the efficiency level in Croatian health institutions and to highlight the possibilities for improving the efficiency. The DEA was used to analyze the relative technical efficiency of special hospitals and natural spas in Croatia for 4-year period. The results showed the shift in efficiency level and in efficiency frontier due to the innovation in the analyzed period. In conclusion the raise of the competitiveness of destinations can be brought by supportive actions of public and private sector in order to shift the efficiency of health care facilities.

Key words: health tourism, efficiency, health system infrastructure, Malmquist productivity index

JEL Code: C44, D24, I15, Z32

Introduction

A phenomenon commonly termed health tourism is a significant new element of a growing trade in healthcare. Health tourism occurs when consumers elect to travel across international borders with the intention of receiving some form of health service (medical, healing or spa treatment). There are four elements that link tourism and health (i) the improvement of health as common motive for travel, (ii) the health of travelers going to particular destination, including health education for travelling to and of the conditions at destination, medical aspects of travel preparation, health problem of returning tourist and the cost associated with tourists‘ ill health, (iii) diseases contracted by tourists in one place and transferred to other destinations or back home and (iv) the quality and standards of health institutions and services in destination areas which contribute to the quality of tourist product (according to Wall and Mathieson (2006:255)).

Depending on the motivations and motivational typologies of tourists, its social status and other push determinants of tourism demand the travel choice is made. One of the motives to travel is certainly the betterment of health in any kind mental, physical or both. Health tourism is originated in the belief in the curative power of climate, mineral springs and other environmental conditions.

There are two groups of factors that determine tourists’ decision to visit a certain destination: (i) the cost of tourism to the visitor (the cost of transport services and the cost of ground services such as accommodation, food and beverage, etc.) and (ii) the qualitative factors such as transport access, health and safety issues, quality of service, nature of attractions and so on (Dwyer et al. 2010).

Nowadays, it is important to understand the factors that determine the competitiveness of the tourism industry and consequently of the destination. One of factors that need to be taken into consideration is permanent accession of the patterns which show the changes in the tourism demand. In fact, the rapid development of different tourism “types” has occurred in last few decades. Health expenditure has important role in developed economies as well as in developing economies (Haddad et.al. 2013, Sun et.sl. 2017). Faced with long waiting lists, the high cost of elective treatment and fewer barriers to travel, the idea of availing healthcare in another country is gaining greater appeal to many (Carrera and Bridges, 2006). Thus, an important component of the demand for tourism within contemporary society is also health tourism. Destinations which seek to diversify their tourism product find health tourism markets to be important target markets, from one side, and from the other side, those new target markets can help destinations to alleviate the pressure of competitiveness from emerging tourist destinations and the changing tastes of tourist. The quality of (public) health facilities and services in a destination contributes to higher levels of visitors’ satisfaction and destination image. Thus, those two elements are foremost factors that affect future tourist choice and finally determine the attractiveness of a destination for “health” tourists in the future.

Having all of this in mind, the main purpose of the paper is to estimate the efficiency level in Croatian health institutions, its improvement in a 4-year period and to highlight the possibilities for improving the efficiency.

The paper proceeds as follows. After introduction, the first section describes health tourism infrastructure as part of health system. Furthermore, it discusses possible answer to the challenges of efficiency of health institutions in providing services oriented to tourism demand. The second section gives description of the data used in the analysis while the third section provides a detailed description of data envelopment analysis (DEA). Empirical model and results are presented in the section four. The conclusions appear in the last section.

1 Health tourism infrastructure and its relative efficiency in Croatia

Till today, the health tourism is in majority of studies used as an umbrella term covering medical, spa and wellness tourism and their various sub-types and combinations (Hall, 2013). The global market health tourism is expanding rapidly at a rate between 15% and 20% per year and has the potential to become one of the main travel motives in the future (Tourism Development Strategy of the Republic of Croatia until 2020, 2013). Thus, there are significant opportunities for a wider range of countries to participate in providing of tourism health care products. A developed health tourism product consists of adequate health care hard and soft infrastructure, i.e. physical facilities that make care accessible and services provided by trained staff and professional training systems together with mechanisms to distribute resources and expertise to tourist. Thus an adequate tourism product in health care is capable of providing preventive, diagnostic, and curative care, according to the requirements of the tourists being served.

Croatia has a significant comparative advantage for the development of health tourism. This includes: skilled staff and generally good reputation of health services, competitive prices, proximity to major source markets, natural beauty and pleasant climate, high security of the country and a long tradition in tourism. Consequently, the rise of the competitiveness of Croatia as a tourist destination can be seen through the development of competitive health tourism product which has high growth potential.

Hence, this paper highlights assessing efficiency and quantifying evolution of productivity over a period of time of health tourism facilities in Croatia. There are two main reasons for doing so. One is linked to the tourists' satisfaction and fulfillment of their expectations, and the other is in the rise of the competitiveness of Croatia as destination. The efficiency of health tourism facilities is prerequisite for a satisfactory tourism experience to be achieved and crucial for target markets to be attracted.

Nowadays Croatia does not utilize the potential for health tourism development based on the natural healing remedies, such are the areas with healing mountain climate. Furthermore, Croatian natural spas are far from the optimal health tourism products. Most of them are turned into special hospitals under the state sponsored medical insurance scheme. According to the Tourism Development Strategy of the Republic of Croatia until 2020 (2013) healing tourism is regarded as the holder of health tourism.

Successful market economy assumes content profiling and specialization of natural spas and special hospitals. This will reduce their dependence on contracts with the Croatian Health Insurance Fund (HZZO) with the aim of attracting high-paying tourist demand.

2 Data description

The relative technical efficiency of special hospitals and natural spas in Croatia for 2012-2015 period was analyzed using DEA. The homogeneity of the sample of health care services is satisfied by the analysis performed on a single specialization group in health care, which is physical medicine and rehabilitation. Croatian Health Service Yearbook is the source of the data for identification of special hospitals and natural spas. In the period 2012-2015 there were 10 special hospitals and three natural spas specialized in physical medicine and rehabilitation. All of them are included in the analysis.

Technical efficiency shows the use of input factors for the provision of services, in which it implies the maximum possible amount of output factors achieved on the basis of available input factors. Input and output factors are defined in non-monetary terms. The selection of inputs and outputs was guided by previous empirical studies and depended on the availability of data. According to Worthington (2004) difficulties in defining the cost of input factors in the public sector are the reason for the domination of the measurement of the technical efficiency within the healthcare system. Labor and capital were considered important inputs in the delivery of healthcare services (Cheng et al. 2016).

Data set for measuring efficiency of special hospitals and natural spas oriented at health tourism consist of two inputs (material and human) and two outputs (number of discharged patient and number of bed days). Since correlation between these two outputs was 0.99 the analysis is continued without one output. For the reason that rehabilitation is specific in terms of length of stay (in comparison to other operations in the hospitals), analysis continues with the number of discharged patient as the output. Thus, final set of inputs consists of the number of doctors and the number of beds, while the number of the patients represents the output.

3 Specification of the DEA model

DEA is a comparative approach for identifying performance by considering multiple resources that are used to achieve outputs/outcomes. DEA identifies the optimal ways of performance, rather than the average, it does not require assumption on the functional form and can handle multiple inputs and outputs. (Cheng et al. 2016)

Types of DEA models can be identified based on scale and orientation of the model. CCR model assumes a constant rate of substitution between inputs and outputs while BBC model presupposes existing of the economy of scale. The importance of assessing efficiency of special hospitals and natural spas is highly emphasized in the conditions of growing demand pressure. In that context, the objective of selected special hospitals and natural spas is to maximize number of services using existing resources. Hence, the output oriented model was chosen for this analysis.

Due to the last mentioned and assuming variable returns to scale, the output oriented BCC model was chosen for this analysis. Formulation of the chosen model is presented below (Hadad et al., 2013).

Consider n DMUs where each DMUj (j=1,...,n) uses m inputs $\xrightarrow[X_j]{} = (X_{1j}, X_{2j}, ..., X_{mj})^T > 0$ to produce S outputs $\xrightarrow[Y_j]{} = (Y_{1j}, Y_{2j}, ..., Y_{Sj})^T > 0$. For each unit k, model find the best weights U_r^k (r=1,2,...,S) and V_i^k (i=1,2,...,m) that maximize the ration of total weighted output to the weighted input with $h_k = \underset{U_r^k V_i^k}{Max} \frac{\sum_{r=1}^{S} U_r^k Y_{rk}}{\sum_{i=1}^{m} V_i^k X_{ik}}$ (k=1,2,...,n). The BCC model adds a constant variable L_k to the weighted output in order to permit variable returns to scale. The output-oriented BBC model is formulated as follows:

$$
\begin{aligned}
& h_k = Max\sum_{r=1}^{s} U_r^k Y_{rk} + L_k \\
& s.t \\
& \sum_{i=1}^{m} V_i^k X_{ik} = 1 \\
& \sum_{r=1}^{s} U_r^k Y_{rj} - \sum_{i=1}^{m} V_i^k X_{ij} + L_k \le 0, j = 1,...,n \\
& U_r^k \ge \varepsilon > 0, r = 1,2,...,s \\
& V_i^k \ge \varepsilon > 0, i = 1,2,...,m
\end{aligned}
\tag{1}
$$

DEA forms a frontier using the efficient DMUs. The efficient DMUs receive a score 1 and those that are not on efficient frontier line, have score less than 1, but greater than 0.

With the objective of quantifying the evolution of productivity over a period of time, the Malmquist productivity index was uses in this analysis. This is a method that provides an opportunity to compare the health care facility's performance from one period to another (Prior, 2006). The Malmquist DEA calculates DEA efficiency for the chosen model: calculating the frontier in time period t+1 and comparing efficiency scores $\theta_0^{t+1}(x_0^{t+1}, y_0^{t+1})$ of health care organizations at period t+1, calculating the frontier in period t and comparing efficiency scores $\theta_0^{t}(x_0^{t}, y_0^{t})$ of health care organizations at period t, comparing efficiency scores of period t+1, $\theta_0^{t+1}(x_0^{t}, y_0^{t})$ to the frontier at period t and comparing efficiency scores of time period t, $\theta_0^{t}(x_0^{t+1}, y_0^{t+1})$ to the frontier at time period t+1 (Ozcan, 2016):

$$
\begin{aligned}
& M_0 = \sqrt{\frac{\theta_0^{t}(x_0^{t+1}, y_0^{t+1})}{\theta_0^{t}(x_0^{t}, y_0^{t})} * \frac{\theta_0^{t+1}(x_0^{t+1}, y_0^{t+1})}{\theta_0^{t+1}(x_0^{t}, y_0^{t})}} \\
& \sum_{j=1}^{n} \lambda_j = 1, j = 1,...n
\end{aligned}
\tag{2}
$$

Malmquist index can decompose the overall efficiency measure into two components, one measuring change in technical efficiency (EFF, the first half of equation) and one measuring change in technology (TCH, the second half of equation). If the values of the Malmquist index and its components are greater than one they indicate the progress, while the value equal to one indicate no change. On the other hand, if the value of the Malmquist index and its components are lower than one, they indicate regress.

4 Results

Table 1 evidences the technical efficiency scores obtained from the output oriented BCC model. The efficiency analysis was conducted using computer software Frontier Analyst Banxia Software.

Tab. 1: Technical efficiency scores of natural spas and special hospitals (2012 and 2015)

DMUs	2012			2015		
	Efficiency score	Rank	1/score	Efficiency score	Rank	1/score
SPA_1	1	1	1	1	1	1
SPA_2	0.973	8	1.028	0.813	8	1.230
SPA_3	1	1	1	0.105	13	9.524
SP_1	0.988	7	1.012	0.641	12	1.560
SP_2	0.601	12	1.664	0.719	11	1.391
SP_3	1	1	1	1	1	1
SP_4	1	1	1	1	1	1
SP_5	0.889	11	1.125	0.754	10	1.326
SP_6	0.924	10	1.082	0.99	6	1.010
SP_7	0.947	9	1.056	1	1	1
SP_8	1	1	1	0.888	7	1.126
SP_9	0.547	13	1.828	0.762	9	1.312
SP_10	1	1	1	1	1	1

Source: Author's calculation

As can be observed from the second column, this model shows that six of 13 natural spas and special hospitals are efficient in 2012. Two natural spas (SPA_1 and SPA_3) and four special hospitals (SP_2, 4, 5 and 9) receive a score of one and are considered efficient. These health care facilities are used to create an efficient frontier against which all other systems are compared. Observing the fourth column, those having the score greater than 1, are inefficient. These facilities can improve their efficiency by augmenting their outputs. So the most inefficient facility in 2012, SP_9, need to augmenting output by 82.8% (1-1,828) in order to improve efficiency. Furthermore, according to BCC model, five health care facilities are efficient in 2015 (SPA_1 and SP_3, 4, 7 and 10). The remaining eight facilities are relative inefficient and have score lower than one. According to values from the last column, SP_9 need to augment output by 31.2% (1-1,312) in other to improve efficiency in 2015.

The multi-period Malmquist index is measured over the years 2012-2015. The efficiency scores for a pair of adjacent years are shown in Table 2. Since the four years are analyzed, there are three adjacent years to show for all component of the Malmquist index.

Tab. 2: Malmquist results for adjacent periods

	2013			2014			2015		
DMU	Malmquist index	Catchup	Frontier shift	Malmquist index	Catchup	Frontier shift	Malmquist index	Catchup	Frontier shift
SPA_1	1.1374	1	1.1374	0.8527	1	0.8527	1.0692	1	1.0692
SPA_2	0.9288	1.0105	0.9191	0.9811	0.9832	0.9978	0.9612	0.8411	1.1428
SPA_3	0.8179	0.1520	5.3815	0.6702	0.6767	0.9904	1.0638	1.0217	1.0413
SP_1	0.8127	0.6772	1.2000	0.8607	0.7842	1.0977	1.1850	1.2222	0.9696
SP_2	1.3352	1.3966	0.9560	0.7260	0.6602	1.0997	1.2419	1.2967	0.9577
SP_3	0.9895	1	0.9895	1.1184	1	1.1184	0.9583	1	0.9583
SP_4	0.9400	1	0.9400	1.0453	1	1.0453	1.0466	1	1.0466
SP_5	0.9453	0.9591	0.9857	0.8804	0.8049	1.0938	1.0837	1.0984	0.9866
SP_6	0.8460	0.9787	0.8644	1.0699	1.1054	0.9679	1.1524	0.9899	1.1641
SP_7	1.0815	1.0557	1.0245	1.0815	1.0557	1.0245	1.0774	1	1.0774
SP_8	0.7729	1	0.7729	0.8640	0.9805	0.8811	1.1581	0.9051	1.2795
SP_9	1.3440	1.3705	0.9807	1.0412	0.9848	1.0572	1.0501	1.0327	1.0169
SP_10	0.9621	1	0.9621	0.9915	1	0.9915	0.9684	1	0.9684

Source: Author's calculation

The three sets of information display the results for each health care facility. The first set of information (2., 5 and 8. columns) shows the Malmquist index, the second set of information (3., 6. and 9. columns) presents the catch-up, the third set of information (4., 7. and 10. columns) depicts Frontier-shift. Accordingly, analyzing special hospital SP_9 its Malmquist index was in increase in the all periods (1.3440, 1.0412 and 1.0501 respectively). However, it has an increase on technical efficiency but decline in innovation in the 2012-2013 period. On the contrary, during 2013-2014 it shows decrease in efficiency but increase in innovation, while in the last adjacent period H_9 had increases in both, technical change (1.0327) and in innovation (0.9684).

Conclusion

In this study, the changes in productivity in a sample of natural spas and special hospitals in Croatia is examined from 2012 to 2015. The results indicate that the level of overall technical efficiency in health institutions oriented at health tourism decrease from 2012 (efficiency score is 0.91) to 2015 (efficiency score in 0.82). Although the shift in efficiency has been detected for same health care facilities, the needs for improvements still exist. Most of them operate under the state sponsored medical insurance scheme. From the above mention it can be concluded that present economic policy is not suitable to keep up and respond to multiple challenges facing the health infrastructure. In those circumstances, health tourism can be seen as one of the possible solution to deal with the above mentioned challenges.

The further improvements would increase the quality of tourism product due to the shift in efficiency of health care facilities. In order to become more competitive and more attractive health tourism destination, the main suppliers of health tourism product in Croatia, natural spas and special hospitals, have to upgrade their infrastructure. They should also provide cost-effective medical services of international standards at an affordable price. Therefore, they need to develop optimization-based approaches to assess the efficiency of the institutions.

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