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# Using a Two-Stage DEA Model to Measure Tourism Potentials of EU Countries and Western Balkan Countries: An Approach to Sustainable Development

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Received: 21 May 2020; Accepted: 13 June 2020; Published: 16 June 2020



**Abstract:** The concept of sustainable tourism development is imposed as an inevitable way of improving the tourism industry as a whole. This study tries to offer an adequate inclusion of sustainable factors in overall tourism development efficiency results. Through the detection and estimation of potential sources of efficiency, the paper will do the efficiency benchmarking of tourism services on the level of countries as destinations. In order to complete the task, data collection was focused on 27 EU countries and five Western Balkan countries over the period from 2011 to 2017. This paper utilized an output-oriented data envelopment analysis (DEA) procedure to estimate efficiency scores for each country, and a panel data Tobit regression model to emphasize the (in)significance of each individual tourism development indicator. The results in the first stage show relatively high-efficiency scores, particularly in the case of EU 15 countries and with room for improvement in the case of the others. The second stage reveals positive and significant effects on relative tourism efficiency by the sustainability of tourism development, the share of GDP, tourist arrivals and inbound receipts, as well as visa requirements and rate of use. Policymakers should gradually take control of the mentioned variables to protect the interests of all relevant stakeholders involved in the tourism development process.

**Keywords:** sustainable tourism development; data envelopment analysis; tobit regression

## 1. Introduction

Nowadays, the tourism business is one of the fastest growing industries in the world. It now represents around 10% of the world's economic activity and is one of the key generators of employment. Still, tourism effects are highly diverse, leading to conflicts due to different standpoints of stakeholders involved in the tourism industry. On the one hand, tourism is bringing income to local communities, but on the other hand tourism is a threat to sensitive environments [1], providing tourists with low-quality experience in a less safe and attractive environment. However, with the fast development of the tourism industry around the world, the negative impact on the ecological environment is increasing [2]. Clearly, sustainable tourism is not a special form of tourism activities, but all forms of tourism should aspire to be more sustainable. Most tourists wish to visit sites and areas that are attractive, clean and free of significant pollution. Therefore, the global initiative of focusing on sustainable tourism development is rising and leading to a new key policy objective at the global,

national and regional levels [3]. The goals of sustainable tourism development ensure that the resources on which industry depends are in a condition of sustainable balance.

The main hypothesis of this study is the proper inclusion of sustainable factors in the results of tourism development efficiency. Through the application of tourism efficiency analysis, researchers and policymakers are learning to understand and implement the findings regarding socio-economic benefits and significant implications on the sustainable development of regional tourism. Therefore, it is crucial to spot and estimate potential sources of in(efficiencies) of tourism practices today. The main sources of tourism destinations efficiency are mentioned by Cracolici et al. [4]. The group of authors defines sources or dimensions of tourism efficiency as global forces and government regulations, as well as culture, physiography and social forces. Global forces cannot be observed without the inclusion of attention to the natural environment. Dangi and Jamal [5] reveal other important sustainability dimensions that require more attention, such as justice, class and gender inequity and governance issues. Consequently, the leading goal of this paper is an estimation of sustainable tourism efficiency in practice through the inclusion of relevant variables from various sources of efficiency. Additionally, the research will do the efficiency benchmarking of tourism services on the level of countries as destinations. Moreover, because of the complexity of the issues surrounding the concept of sustainable tourism, the paper will focus on creating a unified methodology to assess tourism sustainability.

Unlike most studies dealing with the evaluation of micro-level efficiency, this paper intends to contribute to the existing literature through the measurement of the relative efficiency of the countries in the tourism industry. The central attention of this paper is 27 EU countries and five Western Balkan countries (EU candidates and potential EU candidates) over the period from 2011 to 2017. According to the European Commission, major challenges for sustainable tourism do not include only environmental issues, but also promoting the wellbeing of the local community, reducing the seasonality of demand, making tourism accessible to all and improving the quality of tourism jobs as well. In this case, a large number of potential variables could find its place in the overall analysis of tourism efficiency. In the last couple of years, the data envelopment analysis (DEA) methodology was turned into the main approach in measuring and benchmarking efficiencies and sources of inefficiencies in many fields of science. This paper utilizes a DEA procedure by adding the second stage with a panel data Tobit regression model. The Tobit will be sufficient in most cases in representing second stage DEA models, although the OLS (ordinary least square) regression may in many cases replace it as an adequate second stage model [6].

The remainder of the paper is systematized as follows. Section 2 presents the results from previous relevant researches, starting from emphasizing the importance of sustainable tourism development to the application of DEA methods in the insufficiently researched field of measuring the efficiency of the tourism industry at the macro level. Section 3 provides research methodology by explaining the basis of a data envelopment analysis and a Tobit regression model, as well as data collection procedure and descriptive statistics. Section 4 contains research results, including complete data analysis procedure. Discussion is presented in Section 5 with detailed interpretation of research results. Finally, Section 6 concludes the empirical results while highlighting the potential advantages and limitations of such an analysis, along with recommendations for policymakers and other stakeholders.

There are only a few papers dealing with economic and environmental variables in the sector of tourism via the DEA procedure on the macro level so far, but there are even fewer of them [7,8] who use a two-stage approach. Based on the given consideration, the research has a potential to enhance the knowledge about assessing the relative efficiency of tourism services on the level of European countries. Additionally, the two-stage DEA approach adopts the optimal input and output indicators for the final evaluation of tourism industry efficiency.

## 2. Literature Review

The current pace of tourism economic development creates a new perspective on the problem of tourism's ecological security and sustainability. Following those perspective changes, scientists

initiated a discussion about tourism security assessment and its relationship with the environment [9]. Nevertheless, there is little evidence suggesting that the principles of sustainable development have been embraced amongst individual tourism businesses, sectors and the tourism industry as a whole [10]. In order to transform studies on sustainable tourism to a more scientific level, an interdisciplinary approach is obligatory [11]. Consequently, there is an imperative need to improve current policies and measures from more theoretical points to their practical feasibility. Gradually, tourism development has been comprehended as an answer capable of the right changes through the idea of sustainable tourism [12]. Nevertheless, some authors claim that there is no such thing as sustainable tourism (see, for example, [13]) leaving many good options for the tourism industry to contribute to socio-economic development. Rather than limiting the notion of sustainable tourism, Dangi and Jamal [5] suggest that tourism development principles need to be made more clear and applicable from a local to a global perspective.

In terms of policymaking, sustainable and eco-friendly tourism is now prevailing in government regulations and promotion materials [14]. The same author [14] emphasizes that implementation of sustainable tourism certification is a process of developing the type of tourism that a country desires to pursue, greater awareness in a business community and a change in approaches across sectors and generations. Overall, each country has an opportunity to create a sustainable tourism strategy established on the needs of local communities, available natural and cultural resources, ecological issues, domestic and foreign demand, etc. Based on those facts, the concept of the sustainable trinity has emerged. It aims at a smooth and transparent integration of the economy, society and environment [15].

In order to involve all possible indicators in such a comprehensive analysis, the data envelopment analysis (DEA) helps with the task of performance evaluation by reducing numerous units to a single measure [16]. A single measure or DEA score is linked straight to the tourism destination strategy for contending in a specific market segment. Undeniably, the emphasis of research has moved away from the central tendency explanation toward the development of theories of best practices [17]. DEA simultaneously handles multiple inputs and outputs to obtain the production frontier rather than the mean, while it separately recognizes relative efficiency and relative rankings in each of the observed units, providing specific references or information to tourism authorities [18]. Thus, the opportunities for using DEA modeling in the tourism sector will multiply in the future. Such a situation has given rise to numerous evaluation models based on the DEA procedure. One of the most commonly used is a two-stage DEA that could help measure the performance of a company's or authority's operations and understand different aspects of operations stages [19]. In the first stage, a model was used to estimate the efficiency scores, while in the second stage a regression was employed to induce the drivers of efficiency [20].

In the increasingly competitive tourism sector, it is necessary to understand whether tourist destinations operate efficiently. In spite of the large number of studies on applying DEA in tourism, there are still not enough studies dealing with the measurement of sustainability effects on overall tourism destination efficiency. The reasons could have to do with evidence that specific environmental variables related to tourism are difficult to measure [21], even though there is a rising interest in filling the gap. The study of Li et al. [22] was expected to measure the change of efficiency of the hotel industry in major Chinese cities. Their results revealed that urban tourism efficiency was related to natural conditions, economic policies and tourism capital. Chaabouni [8] applied a two-stage data envelopment analysis in the case of Chinese provinces and indicated that tourism efficiency depends on trade openness, climate change and the intensity of market competition. The research on 53 Chinese coastal cities by applying the DEA–Tobit model implied that tourism development has a more negative effect on the environment and that there are considerable regional differences in efficiency [7]. Bosetti et al. [23] compared tourism destinations in terms of tourism service supply and the performance of environmental management and found those Italian municipalities that had additional waste production throughout the tourist season to be inefficient.

Considering the tourism industry at the macro level, there are only a few studies on relative efficiency. Tomić and Marcikić Horvat [24] applied an output-oriented DEA model with a constant return to scale to evaluate the efficiency of a region's tourism sector in order to improve a country's competitiveness on the global market. Efficiency is observed as the relation of multiple outputs (international tourist arrivals, international tourism inbound receipts and tourism industry GDP) and inputs (government expenditure and prioritization of tourism) for a four-year period. Assaf [25] compared the efficiencies of the leading tour operators in 12 Asian Pacific countries and found that the factors affecting the results are tourism infrastructure and serious tourism appeal. Martin et al. [26] applied a virtual efficiency DEA model to create a composite index of the travel and tourism competitiveness to rank 139 countries worldwide. Hadad et al. [27] assessed the relative tourism efficiency of 34 developed and 71 developing countries. The study outcomes indicated globalization and accessibility as important aspects of tourism efficiency. Furthermore, Kosmaczewska [28] evaluated the relative tourism efficiency of 27 European Union countries using various DEA models. The conducted analysis showed that richer countries achieved higher pure technical efficiency, while poorer countries reached higher scale efficiency. Another interesting paper from Chinese authors [29] aimed to identify inefficiency in the Chinese tourism industry using a two-stage network DEA model. The results showed a high imbalance among different regions and suggested ways of efficiency improvement. A group of authors [30] applied the DEA method to compare tourism destination competitiveness in French regions. They applied the output-oriented variance returns to scale (VRS) DEA model, with six input variables (hotels, campsites, parks, monuments, museums and beaches) and one output variables (number of arrivals) to analyze the performance of 22 French regions and indicate the best practices for perspective benchmarking procedure. Toma [31] applied the DEA model to evaluate the efficiency of the tourism sector at the regional level, using numerous input (employees, enterprises, investments and tourism places-days) and output (turnover, regional GDP, tourist numbers, foreign tourist numbers and overnights) variables. The results showed the insufficient efficiency of the regions that have a higher number of tourist visits and accentuated the need for intervention regarding the allocation of scarce resources (labor, capital and infrastructure) or for implementation of real measures to increase demand and outcomes. Finally, Soysal-Kurt [32] measured the relative efficiency of 29 European countries applying the Charnes, Cooper and Rhodes CCR-DEA method. The author emphasized that there are other controlled and uncontrolled factors affecting changes in relative efficiency. Therefore, the obtained results were not definitive but only preliminary ideas in the decision-making process of local authorities and major tourist companies.

### 3. Materials and Methods

#### 3.1. Research Methodology

Efficiency, as a relation between achieved outputs and used inputs, has been introduced by Farrell [33], who defines the term technical efficiency as the ability to obtain a maximal output with a given set of inputs. Two decades later, Charnes et al. [34] developed the DEA method with a constant return to scale, which is a commonly used mathematical technique for measuring efficiency in various fields. DEA compares the efficiency of each individual entity with the maximal achieved efficiency score. This method does not require a prior assumption about the analytical form of the observed inputs and outputs, and different types of metrics are allowed. The results of the DEA present relative efficiency measures, since they depend on the number of entities involved, as well as on the number and structure of the input and output variables. Due to the uncontrollable variations in the macroeconomic environment of each country, removing inefficiencies due to scale seems not to be likely. For this reason, the DEA model with variable returns to scale has been assumed. The choice of DEA model orientation depends on whether decision-makers have more influence on improving input or output levels. Therefore, in our research, the output-oriented model was selected. The output-oriented DEA

model provides information about the extent to which outputs can be improved without worsening the input levels.

In our analysis, the output-oriented DEA model with a variable return to scale was applied to examine the technical efficiency of sustainable tourism development, since the assumption of constant return to scale can be accepted only if the entities operate at their optimal size. The analysis was performed by solving the following model [35] of linear programming for each country:

$$\begin{aligned}
 & \max \phi \\
 \text{s.t. } & \sum_{j=1}^n x_{ij} \lambda_j \leq x_{i0} \quad i = 1, 2, \dots, m; \\
 & \sum_{j=1}^n y_{rj} \lambda_j \geq \phi y_{r0} \quad r = 1, 2, \dots, s; \\
 & \sum_{j=1}^n \lambda_j = 1 \\
 & \lambda_j \geq 0
 \end{aligned} \tag{1}$$

where  $n$  is the number of decision making units (DMUs) and  $DMU_0$  represents the district under evaluation. Assume that we have  $s$  output variables and  $m$  input variables. Observed output and input values are  $y_r$  and  $x_i$ , respectively, thus  $y_{r0}$  is the amount of output  $r$  used by  $DMU_0$ , while  $x_{i0}$  is the amount of input  $i$  used by  $DMU_0$ .  $\lambda$  is the DMU's weight and the efficiency score is  $\phi$ .

The second stage of DEA analysis determines the drivers of the technical efficiency results. In output-oriented DEA models, technical efficiency scores have values at the interval  $\{0,1\}$ . Therefore, the type of regression for a limited dependent variable is applied to determine the relationship between the score and relevant factors. Although there are some critics of its application [36], the most frequently used model in practical tasks is the censored regression, known as Tobit regression. The use of standard linear regression is inappropriate and may lead to distorted results, since the condition of the least-squares is not met [37]. The principal notion of a Tobit model is to censor the dependent variable by determining the threshold of the latent dependent variable. The general formulation of the model is given as follows [38]:

$$\begin{aligned}
 y_{it}^* &= x'_{it} \beta + \varepsilon_{it}, \\
 y_{it} &= 0 \quad \text{if } y_{it}^* \leq 0 \\
 y_{it} &= y_{it}^* \quad \text{if } y_{it}^* \geq 0
 \end{aligned} \tag{2}$$

where  $y_{it}$  is the dependent variable measured by  $y_{it}^*$  as the latent dependent variable of the technical efficiency result for positive values and censored otherwise, related to the  $i$ th country and  $t$ th year,  $x'_{it}$  is the vector of explanatory variables,  $\beta$  is a vector of estimable coefficients and  $\varepsilon_{it}$  is a normally and independently distributed error term. The presented formulation is a general dynamic or panel data Tobit model that applies temporal and spatial scales data simultaneously.

Two potential forms of the model are possible in terms of omitted effects correlated with the independent variables. In order to check the effects, the study uses a modified Hausman test with the null hypothesis that random effects are independent of the explanatory (independent) variables and the alternative hypothesis that fixed effects are correlated with the explanatory variables. In other words, the null hypothesis suggests using the random effects estimator to run an analysis, while the alternative one recommends to use a fixed effect estimator.

### 3.2. Data Collection and Descriptive Statistics

The results of the DEA method allow us to investigate the relative technical efficiency of sustainable tourism development in the Western Balkan countries, as well as to provide a comparative analysis with the EU countries. This paper assessed the change in technical efficiency of tourism for five Western Balkan countries and the EU countries, over the period of six years. The group of Western Balkan countries includes Serbia, Montenegro, North Macedonia and Albania, which are candidate

countries for European Union membership, as well as Bosnia and Herzegovina, which is currently a potential candidate. The EU countries were divided into two groups that allow a separate analysis of the obtained efficiency scores for the oldest EU members (EU 15) and the other countries (the new member states group includes Bulgaria, Croatia, Cyprus, The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia). The data were collected from the Travel and Tourism (T&T) Competitiveness Reports published in 2013 [39], 2015 [40], 2017 [41] and 2019 [42] by the World Economic Forum. Just for the record, the data from the mentioned reports refer to the period from 2011 to 2017. The descriptive statistics of input and output variables are presented in Table 1 for the first and the last year. The only input variable used in the DEA model is the T&T government expenditure, presented as a percentage of the total government budget. This indicator includes expenditures (transfers or subsidies) made by government agencies to provide T&T services, such as cultural (e.g., art museums), recreational (e.g., national parks) and clearance (e.g., immigration/customs) to visitor. On the side of outputs three variables were used:

- Average receipts per arrival. International tourism receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country.
- T&T industry employment, as a percentage of total employment.
- Sustainability of travel and tourism industry development, which shows how effective are a government's efforts to ensure that the T&T sector is being developed in a sustainable way (1 = very ineffective, development of the sector does not take into account issues related to environmental protection and sustainable development; 7 = very effective, issues related to environmental protection and sustainable development are at the core of the government's strategy).

**Table 1.** Descriptive statistics. T&T: Travel and Tourism.

Countries	Year	Statistics	T&T Government Expenditure	T&T Industry Share of Employment	Average Receipt per Arrival	Sustainability of T&T Industry Development
Western Balkan	Report 2019	Max	4.00	8.00	898.74	4.90
		Min	0.50	1.80	415.52	3.00
		St. dev.	1.41	2.84	225.48	0.79
		Average	1.92	4.38	656.65	3.82
	Report 2013	Max	3.90	7.60	5.30	1602.19
		Min	0.80	1.20	3.50	585.97
		St. dev.	1.29	2.87	0.73	451.62
		Average	1.94	3.56	4.08	972.80
EU 15	Report 2019	Max	8.10	12.70	4352.33	5.80
		Min	2.20	2.00	543.33	3.90
		St. dev.	1.77	2.92	961.13	0.49
		Average	3.94	5.42	1191.99	5.01
	Report 2013	Max	8.00	8.90	5.50	8862.88
		Min	2.10	1.70	3.40	598.58
		St. dev.	1.70	2.27	0.64	2043.36
		Average	3.56	3.74	4.72	1541.10
New member states	Report 2019	Max	11.60	11.40	915.58	5.20
		Min	1.40	1.90	383.65	3.50
		St. dev.	3.16	2.96	177.69	0.49
		Average	4.68	4.65	613.86	4.42
	Report 2013	Max	11.30	14.90	4.80	16629.69
		Min	1.40	1.50	3.20	468.67
		St. dev.	3.06	4.06	0.58	4382.43
		Average	4.81	5.43	4.10	2080.10

The application of a Tobit regression in the second stage is conducted with the aim to highlight the statistically significant factors (independent variables) affecting the relative tourism efficiency.

According to relevant literature and available macro data in case of the tourism sector of EU countries and Western Balkan countries, the proposed independent variables are as follows:

- Sustainability of travel and tourism industry development;
- Travel and tourism industry share of GDP;
- Travel and tourism industry share of employment;
- Number of international tourist arrivals;
- Amount of international tourism inbound receipts;
- Travel and tourism government expenditure;
- Visa requirements index, measures to what extent a destination country is facilitating inbound tourism through its visa policy;
- Rate of use (tourist attendances/rooms);
- Number of World Heritage cultural sites;
- Number of World Heritage natural sites.

#### 4. Research Results

##### 4.1. Data Envelopment Analysis Results

The results obtained from the output-oriented DEA model with a variable return to scale are shown in Figure 1 and Table 2.

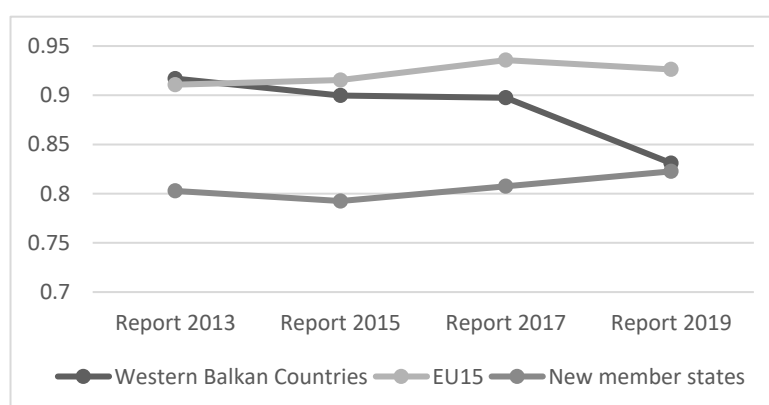


Figure 1. Average efficiency scores.

Table 2. Efficiency scores.

Country	Report 2019	Report 2017	Report 2015	Report 2013	Average Efficiency
Albania	0.83	0.82	0.73	0.79	0.79
Austria	1.00	0.99	1.00	1.00	1.00
Belgium	0.79	0.89	0.92	0.87	0.87
Bosnia and Herzegovina	0.72	0.80	0.82	0.92	0.81
Bulgaria	0.74	0.69	0.70	0.70	0.71
Croatia	1.00	1.00	1.00	1.00	1.00
Cyprus	0.84	0.81	0.92	0.88	0.86
The Czech Republic	0.85	0.86	0.74	0.73	0.80
Denmark	0.88	0.87	0.86	0.86	0.87
Estonia	0.88	0.96	0.86	0.87	0.89
Finland	1.00	1.00	1.00	1.00	1.00
France	0.91	0.94	0.92	0.92	0.92
Germany	0.97	1.00	0.98	0.98	0.98
Greece	1.00	0.94	0.80	0.75	0.87
Hungary	0.74	0.68	0.76	0.72	0.73

Table 2. Cont.

Country	Report 2019	Report 2017	Report 2015	Report 2013	Average Efficiency
Ireland	0.91	0.93	1.00	0.93	0.94
Italy	0.77	0.72	0.60	0.63	0.68
Latvia	0.90	0.90	0.85	0.75	0.85
Lithuania	0.73	0.71	0.73	0.66	0.71
Luxembourg	1.00	1.00	1.00	1.00	1.00
Malta	0.93	1.00	1.00	1.00	0.98
Montenegro	0.96	0.99	0.95	1.00	0.98
The Netherlands	0.94	0.96	0.96	0.95	0.95
North Macedonia	0.64	0.88	1.00	0.88	0.85
Poland	0.75	0.78	0.71	0.70	0.74
Portugal	0.99	1.00	0.91	0.91	0.95
Romania	0.67	0.57	0.69	0.67	0.65
Serbia	1.00	1.00	1.00	1.00	1.00
Slovakia	0.73	0.67	0.64	1.00	0.76
Slovenia	0.92	0.86	0.69	0.76	0.81
Spain	0.83	0.89	0.86	0.93	0.88
Sweden	1.00	1.00	0.99	1.00	1.00
The United Kingdom	0.90	0.92	0.94	0.93	0.92

#### 4.2. Tobit Regression Results

Table 3 illustrates the estimation results of the Tobit regression model. The backward variable selection procedure was applied in order to exclude insignificant variables from the model. Moreover, a modified Hausmann test result  $\chi^2 = 1.2325$  indicates the usage of a random effects form of the model instead of a fixed effects form.

Table 3. Coefficients and test values of the Tobit model.

Variable	Coefficient	z-Statistic
Constant	0.149488 ***	2.8005
Sustainability of travel and tourism industry development	0.133326 ***	14.9574
T&T industry Share of GDP	0.013807 ***	5.8257
International tourist arrivals	0.000001 ***	3.3449
International tourism inbound receipts	0.000003 ***	3.0045
T&T government expenditure	−0.012822 ***	−4.4239
Visa requirements	0.004835 ***	3.7652
Rate of use	0.000229 **	2.1456

Note: \*\*\* and \*\* indicate significance at the levels of 1% and 5%, respectively.  $\chi^2 = 1.2325$ .

## 5. Discussion

Figure 1 indicates that the average efficiency score values are relatively high (above 80%); therefore it can be concluded that the tourism sector operates under high efficiency. The highest average technical efficiency was achieved in the EU 15 countries, while the countries that joined EU later showed the lowest average efficiency of tourism development in the observed period. The average efficiency of tourism development in Western Balkan countries is relatively high, since the values lie between 0.83 and 0.92, but a negative trend is present during the entire period, especially in the last year. The slight decline can also be noticed for the group of EU 15 countries in the last year, while the average efficiency score of the other EU countries has been increasing. Kosmaczewska [28] noticed that poorer countries can improve their relative efficiency through the change of scale of investment in the tourism sector, while the group of richer countries faces fewer options for improvement resulting in limited and slow growth of efficiency. In such conditions, the concept of sustainable tourism development is imposed as a potential way of improvement not only for developing countries but also for those in a developed stage.

Table 2 shows relative tourism efficiency per country and year. Countries with the highest tourism efficiency obtained by the mentioned DEA model are Finland, Luxemburg, Croatia, Serbia, Austria, Sweden, Malta and Germany. During the observed period of time the lowest efficiency scores (below the average score of 80%) were achieved in Romania, Italy, Lithuania, Bulgaria, Hungary, Poland and Slovakia. This finding is consistent with similar previous research [27], if we compare the results of the Banker, Chames and Cooper (BCC) model for Luxemburg, Malta, Austria, Romania, Lithuania, Bulgaria, Hungary, Poland and Slovakia. It is also interesting to emphasize the efficiency of tourism development in Croatia, since this country is characterized by high efficiency scores in similar research [24,28]. It is important to notice that the values of relative technical efficiency scores highly depend on the choice of DEA model, sample, observed period of time and included variables.

The results, presented in Table 3, indicate the significance of sustainability of travel and tourism industry development, T&T industry share of GDP, international tourist arrivals, international tourism inbound receipts, T&T government expenditure, visa requirements and rate of use. All mentioned variables are kept in the model, while the travel and tourism industry share of employment and number of cultural and natural sites are excluded from it.

The level of sustainability tourism development has a significant and positive influence on the relative tourism efficiency. By controlling the external environmental and sustainable variables the efficiency scores increase in most cases [43]. The coefficient for tourism share of GDP remains significant and positive with overall efficiency results, showing that countries that give special attention to the tourism sector are more efficient. According to Liu et al. [7], the growth of the economic level and the technological progress will elevate the tourism eco-efficiency. The coefficients concerning the relationship between international tourist arrivals and inbound receipts with tourism efficiency are positive and statistically significant at the 1% level. It means that an increase in the number of tourists and their total consumption leads to an increase in efficiency, although Liu et al. [7] mentioned that more tourists lead to a more negative impact on sustainable tourism efficiency. The coefficient for government expenditure in tourism is negative and statistically significant at the 1% level. Another important determinant of the tourism development is an openness of the country measured by visa requirements. The coefficient for visa requirements indicates the positive and statistically significant relationship between country openness and overall tourism efficiency. In fact, openness can potentially encourage traveling and increase international competition, which provides lower prices, better quality and product and service variety for international visitors [8]. There is no doubt that the coefficient for rate of use is positive and statistically significant at the 5% level, indicating the importance of better usage of existing tourist facilities. Obviously, concerning the number of tourists and rate of use, the government and other policymakers should gradually take control of the mentioned variables in order to ultimately promote the better service quality and protect all relevant stakeholders involved in the tourism development process.

## 6. Conclusions

According to previously conducted analysis made by the output-oriented DEA model in the first stage and the panel Tobit regression model in the second, the research assesses the sustainable tourism development efficiency of 27 EU countries and five Western Balkan countries over the period from 2011 to 2017. The results in the first phase show relatively high efficiency scores, particularly in the case of EU 15 countries and with room for improvement in the case of the others. In order to improve the overall level of sustainable tourism efficiency, the second stage results present several aspects that should be carefully considered. The regression estimated coefficients for sustainability of tourism development, share of GDP, tourist arrivals and inbound receipts, as well as visa requirements and the rate of use of tourist accommodation units reveal positive and significant effects on relative tourism efficiency. However, government expenditure on tourism is negatively and significantly influential on the overall efficiency. The mentioned factors, given the level of realized efficiency scores, should offer potential opportunities and pitfalls for further sustainable tourism developments for each

country. The novelty of this research lies in a detailed analysis of the efficiency scores and factors that influence sustainable tourism development in the Western Balkan countries, which is explained over time in the context of the EU integration process. The implications of this research are reflected in the competent indicators of the position of sustainable tourism development in the Western Balkans countries in comparison to the EU. These contribute to a better understanding of the various aspects of sustainable tourism development in the Western Balkan countries, which could be important during the pre-accession negotiations with the EU.

The research, however, has some limitations. Due to the fact that efficiency scores are relative measures and there are other observable and unobservable factors affecting the final result, the presented findings give only a preliminary idea about balancing between given inputs and outputs. A different selection of the observed input and output variables in the DEA model leads to different relative efficiency scores. In order to obtain more comprehensive insights, the proposed two-stage DEA model should be expanded to include more countries worldwide, to cover a longer period and to incorporate more indicators that would address additional aspects of sustainable tourism development. Paper results (relative efficiency scores and Tobit estimated coefficients) can be suggestive at the macro-level in terms of government policy-making and asset allocation, and at the micro-level by addressing potential issues and challenges that tourism companies may face in the near future. The data limitation in terms of dynamics and indicator standardization among observed countries occurs as another issue leaving researchers a small space to introduce other relevant indicators.

Despite various relentless research efforts in the case of tourism sustainability, the merits of such analyses remain not fully clear and well under expected utilization. According to Liu et al. [7], the transformation of tourism economic development from the traditional and vulgar pattern to a sustainable and green mode is really essential. The governments, particularly in the case of the new EU members group and Western Balkan countries, should actively establish regulations towards eco-tourism and increase the investment in more sustainable tourism development in order to reduce inequalities among members and potential candidates. On the other hand, the concept of sustainable tourism development could be a valuable tool for generating resources for the preservation of natural and cultural assets. Such a feedback relationship is able to protect stable financial returns in both the public and the private sector. Finally, by enhancing all available interconnections between stakeholders, the tourism sector will not only act as a user of natural resources but also as someone who maintains them.

**Author Contributions:** The five co-authors worked together towards the completion of this article. B.R. and A.M.H. were in charge of data collection, software processing, analyzing final results and discussion. M.G. and V.K. contributed to reviewing and revising the literature and discussion sections. B.D. and M.G. contributed to reviewing the discussion and conclusion sections. B.D. and V.K. acted as corresponding authors throughout the revision and submission process. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

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