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EVALUATION OF OPERATING PERFORMANCE OF LISTED COMPANIES IN TAIWAN'S TOURISM INDUSTRY - APPLICATION OF DATA ENVELOPMENT ANALYSIS

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Abstract

Data envelopment analysis is an efficiency measurement method proposed by Charnes, Cooper and Rhodes in 1978, including CCR model efficiency analysis and BCC model efficiency analysis, which is used to evaluate the relative efficiency of decision-making units. The measured efficiency value is the most favorable result of the evaluated unit under objective circumstances.

This article applies data envelopment analysis method to evaluate the performance of listed companies in Taiwan's tourism industry. After analysis, it was found that the total efficiency of the six tourism industries including Huayuan, No. 1 Store, Gourmet KY, Wangpin, Xiongshi, and Holaday is effective, while the total efficiency of the three tourism industries including Farglory, Phoenix, and Xintiandi is not Effective, but technical efficiency is still effective. Except for the tourism industry whose total efficiency is effective, its returns to scale remain unchanged. Two tourism industries, such as Guobin and Jinghua, have diminishing returns to scale because their return to scale value is >1 and should reduce their business scale. The returns to scale of other tourism industries are all Increasingly, it is recommended to expand the scale of operations.

Keywords

Performance Evaluation, Data Envelopment Analysis, DEA

1. Introduction

Any organization or institution, whether it is a for-profit or non-profit organization, hopes to improve its own efficiency, thereby achieving the goal of increasing productivity in order to survive in the current fiercely competitive environment. The measurement of efficiency is the basis for improving productivity. The results of efficiency measurement can help decision makers understand whether the organization's use of resources is efficient (Wu J. H. and He B. Z., 2008). "Performance evaluation" aims to measure the operational performance of a decision-making unit (Decision Making Unit (DMU)) and the room for improvement of the unit's operations. It focuses on evaluating the productivity of a decision-making unit and how to efficiently achieve its maximum potential. (Huang J. G., Fu Z. T. and Huang M. Y., 2008).

Charnes, Cooper and Rhodes (1978) proposed the DEA (Data Envelopment Analysis) model, also known as data envelopment analysis. In the process of constructing the production function, all input data (data) are enveloped in the production process. It is named after the function. This method can objectively evaluate multiple input and multiple output items to measure the resource usage efficiency of individual enterprises.

The data envelopment analysis method evaluates the relative efficiency of a group of decision-making units based on the concept of Pareto Optimal solution. The evaluated efficiency value is the most beneficial result for the evaluated unit under the objective environment. This method is extremely flexible in use. It can objectively evaluate the performance of each unit, and it can also subjectively guide each unit to move in the direction emphasized by the decision-maker (Wu Jihua and He Baizheng, 2008; Zhang Hongfu, 2017).

This article applies the DEA model to explore the operating performance evaluation of listed companies in Taiwan's tourism industry. Based on the return-to-scale value and related efficiency evaluation results, it will provide a management reference for the future development of the tourism industry and its operating scale, whether to maintain the status quo, expand or reduce the operating scale.

2. Literature review

Chen C. H. (2019) combined the GM(1,1) forecast model to effectively predict the future value of each input and output indicator project, and provided the predicted future value of each indicator project to the DEA model for future business performance evaluation to break through the inability to predict by the DEA model Limits on future relative efficiency values. Finally, based on the empirical results, we compare the difference between future predicted performance and current performance, and put forward business policy suggestions that have more reference value for favorable decision-making units than only current performance; Chen C. H. (2018) used 2018Q1 Taiwan's construction industry listed companies as decision-making units to conduct business performance Evaluate. The four input variables of paid-in capital, total assets, total liabilities, and operating costs, and the two output variables of operating income and operating profit are used as measurement indicators to evaluate the operating performance of listed companies in the construction industry.

Zhang H. F. (2017) used 20 listed computer and peripheral equipment companies in Taiwan in 2015 as decision-making units to conduct business performance analysis, using three input variables: total assets, operating costs, and operating expenses, and two outputs: operating income and operating net profit. Variables are used as measurement indicators to evaluate the operating performance of various computer and peripheral equipment listed companies; Chen Q. P (2016) used Tainan City Council unit departments to conduct performance evaluations, and the study showed that its management efficiency ratio was medium; Liu K. H. (2016) evaluated an insurance broker Based on the operating efficiency of the company, it was concluded that it showed growth in both efficiency changes and technological changes; Qiu Y. J. (2016) discussed the current use of funds for education for people with disabilities, and whether the input and output of each county and city are efficient; Chen Yi (2015) analyzed the impact of diversification strategies on the operating performance of tourist hotels and found that the contribution of income diversification strategies to chain international tourist hotels was significantly greater than that of independent international tourist hotels; Liu D. Y. (2014) selected Taiwan, China and a total of 17 online game listed companies in three places in South Korea to study their productivity changes and put forward suggestions for effectively improving operating performance; Ye J. J. and He B. Z. (2014) conducted performance evaluations on the efficiency of creative city governance in each county and city and discussed their competitiveness. Advantages and disadvantages, the research results can be used as a reference for policymakers to formulate policies; Li H. X. (2014) analyzed the operating performance of Taipei Municipal United Hospital before and after the merger.

Lin Y. S (2013) studied the operating efficiency of 17 large domestic banks in the eight years from 1994 to 101; Luo H. L. (2009) evaluated the impact of Ministry of Education subsidies on the performance of 164 universities across the country; Lai S. C. (2008) Taking a national university of science and technology as a case study to conduct performance analysis to make the most effective use of limited resources; Huang J. M. (2008) discussed the impact of corporate social responsibility on the performance of the company itself; Chen R. W. (2005) analyzed the impact of domestic mergers and acquisitions on UNI Airlines and Mandarin Airlines conduct business performance evaluations and observe whether mergers and acquisitions are helpful to their performance; Cai Q. Z. (2003) discusses the operating performance of Chunghwa Telecom and Taiwan's mobile communications market and the average total productivity over the years; Cai S. Q. (2001) analyzes the Republic of China The operating performance of 35 banks listed on the OTC from 1986 to 1989; Hu Zhijian and Li H. L. (2001) evaluated the industrial performance of Taiwan's IC design industry and proposed strategies for improving ROIC and DEA performance.

3. Research methods

This section describes the model, scale efficiency, technical efficiency and characteristics of the data envelopment analysis (DEA) method (Chen C. H., 2018).

(1) CCR mode

Charnes, Cooper and Rhodes (CCR) (1978, 1979, 1981) adopted the assumption of fixed economic returns to scale, that is, increasing a part of the input will also increase the output by a relative part. Estimate the efficiency value of a target:

$$\begin{aligned} &\text{maximize: } h = \frac{\sum_{r=1}^{s} u_r y_{ro}}{\sum_{i=1}^{m} v_i x_{i0}} \\ &\text{subject to } \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \leq 1;\ j=1,\ldots,n \\ &v_r, u_i \geq \varepsilon \end{aligned} \qquad (1)$$

R=1,…,s; i=1,…,m

h_0= the efficiency value of the target DMU;

y_{rj}= the number of the r-th output item of the j-th DMU;
x_{ij}= the number of i-th input items of j-th DMU;
u_r= the weight of the r-th output item;
v_i= the weight of the i-th input item;
ε= a non-Archimedean constant is a very small positive number; its purpose is to make all u_r and v_i are positive.

The limit in equation (1) is the ratio of each DMU's "actual output" to "actual input", and its value is between [0,1].

(2) BCC mode

Banker, Charnes and Cooper (1984) proposed the BCC model to expand the efficiency perspective and application scope of the CCR model. The BCC model assumes variable returns to scale (VRS), that is, an increase in some inputs will not cause a corresponding increase in output items. The linear programming model of BCC is as follows:

$$\begin{aligned} &\text{maximize: } h_0 = \textstyle\sum_{r=1}^{s} u_r y_{r0} - u_0 \\ &\text{subject to } \textstyle\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} - u_0 \le 0 \end{aligned} \qquad (2)$$

$$\sum_{i=1}^{m} v_i x_{i0} = 1$$

$$-u_r \le -\varepsilon$$

$$-v_i \le -\varepsilon$$

Calculated by equation (2), if $\theta = 1$ and the difference variables S^{-*} and S^{+*} are both 0, then a DMU has BCC efficiency.

(3) Scale efficiency and technical efficiency

Efficiency represents the comparative relationship between inputs and outputs or costs and benefits in business activities, and mainly includes total efficiency, technical efficiency and scale efficiency. Among them, the total efficiency is composed of technical efficiency and scale efficiency, also known as scale technical efficiency. When the observed decision-making unit reaches scale efficiency and technology efficiency at the same time, it is called scale technology efficiency. Scale efficiency reflects the effectiveness of the production scale, that is, whether each decision-making unit is operating at the most appropriate investment scale; technical efficiency reflects the effectiveness of the use of existing technology in production, that is, given the input, the assessed object can obtain maximum output.

According to Gao Q. et al. (2003), the scale efficiency value is equal to the CCR efficiency value divided by the BCC efficiency value. When the returns to scale efficiency value reaches 1, it means that the rated unit exhibits constant returns to scale (CRS), as shown in the figure As shown in the BC line segment in 1; if the returns to scale efficiency is less than 1, the returns to scale can be presented as returns to scale (IRS), or diminishing returns to scale (DRS); when one unit of input is added, the proportion of increase in output is greater than that of production The proportion of the increase in factors is called increasing returns to scale (IRS), as shown in the AB line segment in Figure 1; conversely, when one unit of input is added, the proportion of increase in output is less than the proportion of the increase in production factors, which is called diminishing returns to scale (DRS). As shown in the CD line segment in Figure 1 (Zhang H. F., 2017).

The effectiveness of each efficiency is described as follows:

A. Total efficiency (STE) effectiveness. The CCR model evaluates scale effectiveness and technical effectiveness simultaneously, that is, it evaluates overall efficiency. The total efficiency value satisfies $0 \le \theta \le 1$, when the efficiency value θ=1, the evaluated decision-making unit is effective in scale technology, otherwise it is invalid in scale technology.

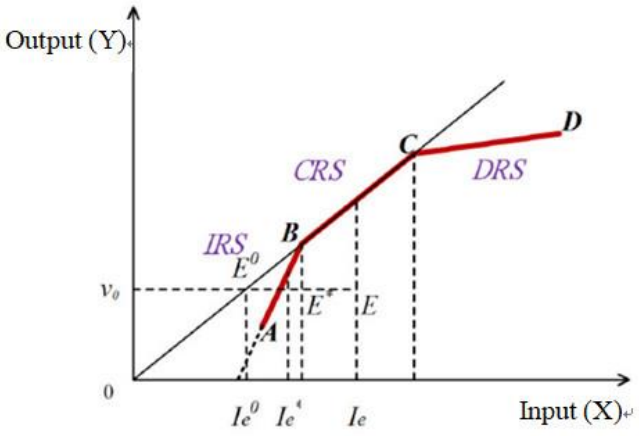
B. Technical efficiency (TE) effectiveness. The BCC model is used to evaluate the technical effectiveness of decision-making units. The technical efficiency value satisfies $0 \le \theta \le 1$, when the efficiency value θ=1, the evaluated decision-making unit is technically effective, otherwise it is technically invalid.

C. Scale efficiency (SE) effectiveness. Determined by total efficiency and technical efficiency, the formula is SE=STE/TE.

D. Super efficient DEA effectiveness. The efficiency value is no longer limited to the range of 0 to 1, and the

efficiency value is allowed to exceed 1. If $\theta \geq 1$, it means the scale technology is effective; if $\theta < 1$, it means the scale is invalid or the technology is invalid. This method allows comparison and ranking of decision-making units.

E. λ_j in the CCR model can be used to conduct return-to-scale analysis on decision-making units DMU_{j0}.When $\sum_{j=1}^{n} \lambda_j^0 = 1$, DMU_{j0} is the constant return to scale; when $\sum_{j=1}^{n} \lambda_j^0 < 1$, DMU_{j0} is the increasing return to scale; when $\sum_{j=1}^{n} \lambda_j^0 > 1$, DMU_{j0} is the decreasing return to scale.



Source: Banker et al., 2004

Figure 1. BCC changing returns to scale diagram

(4) Characteristics of DEA

According to Hong W. Z. (2016), DEA can objectively handle multiple inputs and outputs at the same time and evaluate the relative efficiency combination of the evaluated unit under the most favorable conditions.

The characteristics of DEA are as follows:

A. It can handle the evaluation of multiple input items and multiple output items at the same time. It can also handle categorical variable problems and examine the differences in efficiency values between groups.

B. Through the operating performance value, the resource usage and output status of the evaluated unit can be understood, and information can be provided to the management as a basis for management.

C. The "production frontier" composed of the efficiency values of each rated unit is a comprehensive weighted index. It is the best weighted combination of each rated unit, and the production function does not need to be predicted in advance.

D. Based on linear programming estimation, there is no need to preset the weights of input items and output items in advance, which will not be affected by subjectivity, and the analysis results can remain fair and objective.

4. Empirical analysis

This section will evaluate the operating efficiency of listed companies in Taiwan's tourism industry. Listed companies in the tourism industry (DMU), input indicators and output indicators are summarized in Table 1, including paid-in capital, total assets, total liabilities and operations. The cost items include 4 input indicators and 2 output indicators of operating income and operating profit. The efficiency values of each tourism industry company were calculated using DEA's CCR model and BCC model for empirical analysis.

DMU: Company Name (* : Rating)	Input indicators				Output indicators	
	Paid-in Capital	Total Assets	Total Liability	Operating cost	Operating Profit	Operating Income
9943 Holiday*	14.73	48.22	7.1	3.12	1.97	7.93
8940 New Palace	6.75	21.82	11.03	2.43	0.61	5.03
5706 Phx Tour *	6.26	20.57	9.14	4.14	0.21	4.87
2731 Liontravel*	7.0	70.45	45.55	59.27	1.09	67.48
2739 My Humble House ***	11.15	33.35	14.33	7.26	0.30	11.16
2727 WowPrime*	7.7	95.97	44.43	21.67	2.32	40.80
2723 Gourmet *	18.0	164.87	59.55	25.3	7.14	61.36
2722 Chateau	10.72	22.24	4.96	0.87	-0.26	1.14
2712 FGH*	10.5	14.63	2.61	0.6	-0.41	0.47
2707 GFRT***	36.69	117.08	14.85	11.7	1.37	17.2
2706 First Hote*	48.65	98.42	13.63	0.22	0.51	0.8
2705 LeoFoo *	33.92	87.28	60.72	6.09	-1.21	7.7
2704 AMBH *	36.69	114.08	14.85	4.45	1.37	8.05
2702 HG*	10.23	58.56	46.16	0.62	-0.35	2.86
2701 WanHwa *	43.88	82.11	11.46	0.42	0.41	0.91

Table 1 Main Indicator Data of Listed Companies in The Tourism Industry in Q1 2018

(Unit: 100 million dollars)

Source: 1. Taiwan Stock Exchange (http://wwwc.twse.com.tw);

2. Public Information Observatory (http://www.tybio.com.tw/mops/taiyen_mop.htm);

3. Summary of this study.

(1) CCR mode

In the efficiency evaluation analysis of listed companies in the tourism industry, this study first uses the CCR model to analyze the production efficiency value of the decision-making unit, which is the overall technical efficiency, then uses the BCC model to analyze the technical efficiency of the decision-making unit, and finally uses the ratio of the two to further obtain Gain scale efficiency. The CCR efficiency value results and rankings of the overall technical efficiency of the 15 rated listed companies in the tourism industry are shown in Table 2.

DMU: Company Name (* : Rating)	Comprehensive efficiency value (CCR)	Efficiency sorting
9943 Holiday*	1	1
8940 New Palace	0.8359	8
5706 Phx Tour *	0.5734	12
2731 Liontravel*	1	1
2739 My Humble House ***	0.7839	9
2727 WowPrime*	1	1
2723 Gourmet *	1	1
2722 Chateau	0.4963	13
2712 FGH*	0.3011	15
2707 GFRT***	0.9161	7
2706 First Hote*	1	1
2705 LeoFoo *	0.4826	14
2704 AMBH *	0.7033	11
2702 HG*	1	1
2701 WanHwa *	0.7315	10
Average Value	0.7883	---

Table 2 CCR efficiency value and ranking list of listed companies in the tourism industry

Source: This study

The efficiency value calculated by the CCR model, also known as total efficiency, represents the overall efficiency performance of each decision-making unit. The higher the efficiency value, the more efficient the decision-making unit's operation. According to the evaluation results in Table 2, the average production efficiency of 15 listed companies in the tourism industry The value is 0.7883. There are 6 companies with an efficiency value of 1, reaching full efficiency, namely HG, First Hote, Gourmet, WowPrime, Liontravel, and Holiday. Another 7 companies have lower than the average efficiency value, respectively. WanHwa (0.7315), AMBH (0.7033), LeoFoo (0.4826), FGH (0.3011), Chateau (0.4963), My Humble House (0.7839), Phx Tour (0.5734).

(2) BCC efficiency analysis

The technical efficiency obtained by the BCC model indicates whether each decision-making unit effectively uses various inputs. The higher the technical efficiency, the better it can make full use of various inputs in order to maximize output. The BCC efficiency value results and rankings of the technical efficiency of 15 rated listed companies in the tourism industry are shown in Table 3.

DMU: Company Name (* : Rating)	Technical efficiency value (BCC)	Efficiency sorting
9943 Holiday*	1	1
8940 New Palace	1	1
5706 Phx Tour *	1	1
2731 Liontravel*	1	1
2739 My Humble House ***	0.9536	12
2727 WowPrime*	1	1
2723 Gourmet *	1	1
2722 Chateau	0.9553	11
2712 FGH*	1	1
2707 GFRT***	0.9254	13
2706 First Hote*	1	1
2705 LeoFoo *	0.5101	15
2704 AMBH *	0.7057	14
2702 HG*	1	1
2701 WanHwa *	0.9919	10
Average Value	**0.9361**	---

Table 3 BCC efficiency value and ranking list of listed companies in the tourism industry

Source: This study.

The average technical efficiency value obtained by the BCC model of 15 listed companies in the tourism industry is 0.9361. According to the evaluation results in Table 3, there are 9 companies with an efficiency value of 1, which means they have reached full efficiency, namely HG, First Hote, FGH, Gourmet, WowPrime, Liontravel, Phx Tour, New Palace, and Holiday, and others Three companies have lower than average efficiency values, namely AMBH (0.7057), LeoFoo (0.5101), and GFRT (0.9254).

(3) Analysis of scale efficiency and returns to scale

Scale efficiency is the production efficiency value of CCR divided by the technical efficiency value of BCC. Through the analysis of scale efficiency values, we can further determine whether the inefficiency is technical inefficiency or scale inefficiency. For returns to scale, λ_j in the CCR model can be used to analyze returns to scale for decision-making units DMU_{j0}.

When $\sum_{j=1}^{n} \lambda_j^0 = 1$, DMU_{j0} means that the returns to scale remain unchanged and the current business scale is maintained. When $\sum_{j=1}^{n} \lambda_j^0 < 1$, DMU_{j0} represents increasing returns to scale, expanding the existing scale of operations. When $\sum_{j=1}^{n} \lambda_j^0 > 1$, DMU_{j0} represents diminishing returns to scale, which means reducing the existing scale of operations. The comprehensive evaluation table of the 2018Q1 efficiency of listed companies in the tourism industry is shown in Table 4.

DMU: Company Name (* : Rating)	Comprehensive efficiency value (CCR)	Technical efficiency value (BCC)	Scale efficiency value	Returns to scale	Returns to scale	Super efficient DEA	Efficiency sorting
9943 Holiday*	1	1	1	1	Constant (CRS)	2.31415	1
8940 New Palace	0.8359	1	0.8359	0.1934	Increment (IRS)	0.43017	4
5706 Phx Tour *	0.5734	1	0.5734	0.0782	Increment (IRS)	0.10014	7
2739 My Humble House ***	0.7839	0.9536	0.8221	0.1784	Increment (IRS)	0.07058	9
2731 Liontravel*	1	1	1	1	Constant (CRS)	0.09152	8
2727 WowPrime*	1	1	1	1	Constant (CRS)	0.13502	6
2723 Gourmet *	1	1	1	1	Constant (CRS)	0.28046	5
2722 Chateau	0.4963	0.9553	0.5196	0.1649	Increment (IRS)	-0.0006	13
2712 FGH*	0.3011	1	0.3011	0.0646	Increment (IRS)	-0.0201	15
2707 GFRT***	0.9161	0.9254	0.9899	1.2621	Decreasing (DRS)	0.00352	10
2706 First Hote*	1	1	1	1	Constant (CRS)	0.57223	3
2705 LeoFoo *	0.4826	0.5101	0.9462	0.5272	Increment (IRS)	-0.003	14
2704 AMBH *	0.7033	0.7057	0.9966	1.0626	Decreasing (DRS)	2.2E-05	11
2702 HG*	1	1	1	1	Constant (CRS)	3E-07	12
2701 WanHwa *	0.7315	0.9919	0.7374	0.6395	Increment (IRS)	0.73147	2
Average Value	**0.7883**	**0.9361**	**0.8481**	**0.5957**	**---**	**0.5429**	**---**

Table 4 Comprehensive evaluation table of Q1 efficiency of listed companies in the tourism industry in 2018
Source: This study

It can be seen from Table 4 that the total (comprehensive) efficiency of the six tourism companies including HG, First Hote, Gourmet, WowPrime, Liontravel, and Holiday is effective. Although the total (comprehensive) efficiency of the three tourism companies, Farglory, Phoenix, and Xintiandi, is not effective, their technical efficiency is still effective.

The scale efficiency can be obtained by dividing the production efficiency of the CCR model by the technical efficiency of the BCC model. The average value is 0.8481. Among them, there are 6 DMUs with a scale efficiency of 1, namely HG, First Hote, Gourmet, WowPrime, Liontravel and Holiday show that these six listed companies are in the stage of business scale that is most suitable for production. There are 9 DMUs with scale efficiency less than 1, which means that there is still room for expansion in their business scale, and they can consider expanding their scale to reach the scale stage of optimal efficiency.

In addition, referring to the scale return value, except for the six tourism companies with effective total (comprehensive) efficiency, such as HG, First Hote, Gourmet, WowPrime, Liontravel, and Holiday, their scale returns remain unchanged, that is, they maintain their existing operations scale. Except for the two tourism industries such as AMBH and GFRT, whose return-to-scale value is >1, their returns to scale are diminishing, so they should reduce their existing business scale. The returns to scale of other tourism industries are all increasing, that is, they can expand their existing operations. scale of operations.

5. Conclusions

This study aims to explore the operating efficiency of listed companies in Taiwan's tourism industry in 2018Q1, using the CCR model and BCC model of the DEA model, respectively, based on its paid-in capital, total assets, total liabilities, operating costs and other four input variables, as well as operating income and operating profits. The two output variables are used as evaluation indicators to analyze the efficiency performance of each company.

The efficiency value obtained through the DEA model is relative. According to the research results, the production efficiency value, technical efficiency value and scale efficiency value of DMU are all 1, which can only represent the efficiency for the period of data selected in this article. A company's performance is better than that of other relatively inefficient companies, which means that its operating efficiency is relatively optimal, not that it is in the best operating condition.

According to the efficiency results of the CCR model analysis, the average production efficiency of the 15 listed tourism industry companies in Taiwan rated in Q1 2018 was 0.7883, and 6 companies had an efficiency value of 1, reaching full efficiency, namely HG, First Hote, and Gourmet, WowPrime, Liontravel, Holiday, and seven other companies have lower than average efficiency values, namely WanHwa (0.7315), LeoFoo (0.4826), FGH (0.3011), Chateau (0.4963), and My Humble House (0.7839)), Phx Tour (0.5734).

According to the efficiency results of the BCC model analysis, the average technical efficiency of the 15 listed tourism companies in Taiwan evaluated in Q1 2018 was 0.9361, and 9 companies had an efficiency value of

1, reaching full efficiency, namely HG, First Hote, FGH, Gourmet, WowPrime, Liontravel, Phx Tour, New Palace, and Holiday, there are three other companies below the average efficiency value, namely AMBH (0.7057), LeoFoo (0.5101), and GFRT (0.9254).

Based on the scale efficiency value analysis, it can be further determined whether the inefficiency is technical inefficiency or scale inefficiency. For returns to scale, λ_j in the CCR model can be used to analyze returns to scale for the decision-making unit DMU_{j0}. When $\sum_{j=1}^{n} \lambda_j^0 = 1$, returns to scale remain unchanged and the existing scale of operations is maintained; when $\sum_{j=1}^{n} \lambda_j^0 < 1$, returns to scale increase, and the existing scale of operations is expanded; when $\sum_{j=1}^{n} \lambda_j^0 > 1$, returns to scale decrease, then reduce the scale of existing operations.

The overall (comprehensive) efficiency of the six tourism companies including HG, First Hote, Gourmet, WowPrime, Liontravel, and Holiday is effective. Although the total (comprehensive) efficiency of the three tourism companies, FGH, Phx Tour, and New Palace, is not effective, their technical efficiency is still effective. Referring to the return-to-scale value, except for the six tourism companies with effective total (comprehensive) efficiency, including HG, First Hote, Gourmet, WowPrime, Liontravel, and Holiday, their return-to-scale remains unchanged, that is, the current business scale is maintained. Two tourism companies, including AMBH and GFRT, have a scale return value >1 and their scale returns are diminishing, so they should reduce their existing business scale. The returns to scale of other tourism industries are all incremental, which means that the existing scale of operations can be expanded.

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