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Does Cost Efficiency Lead to Better Financial Performance?

A Study on Taiwan International Tourist Hotels

Abstract

The purpose of this study is to conduct an investigation into the link between cost efficiency and financial performance as it pertains to the hotel industry. This study employs DEA approach to estimate cost efficiency and uses three traditional financial indicators, such as the ratio of net operating profit before taxes, the ratio of earnings before taxes, and return on assets before taxes, to measure financial performance. Data were generated from 68 hotels in the international tourist hotels in Taiwan from 1997 to 2006. The major finding indicates that cost efficiency is insignificantly associated with the financial performance, whatever three above financial performance variables. The implications of the findings are discussed and the limitations of the study as well as future research directions are addressed.

Keywords: cost efficiency; financial performance; data envelopment analysis; international tourist hotel

Introduction

According to the World Travel & Tourism Council (WTTC), global tourism expenditures will increase from USD 4.21 trillion to USD 8.61 trillion. Moreover, the total contribution of travel and tourism to global employment, including jobs indirectly supported by the industry, is forecast to rise by 2.3% per annum from 258,592,000 jobs (8.8% of total employment) in 2011 to 323,826,000 jobs (9.7% of total employment) by 2021. Looking solely at the World Trade Organization's international trade numbers, tourism is the world's largest Service Sector Industry (Lew, 2011). According to the prediction of World Tourism Organization (UNWTO), the average annual growth rate of tourists from 1995 to 2020 is 6.5% in East Asia, which is the second highest growth rate in the world. The Asia-Pacific market is forecasted to grow from 195 million person-visits in 2010 to 397 million in 2020. As one of the major tourist destinations in Asia-Pacific, Taiwan enjoys the growth of its tourism industry and the revenue generated by international tourists mainly from mainland China, Japan, and Hong Kong & Macau. In Taiwan the number of visitor arrivals increased by about 2.74 million from 2001 to 2010. According to the statistics of the Taiwan Tourism Bureau (TTB), the number of visitor arrivals reached 5,567,277 in 2010, which is 26.67% higher than the previous year. The grand total of foreign exchange in Taiwan's tourism industry has grown from USD 3.991 billion in 2001 to USD 6.816 billion in 2009. As the same time, the demand for accommodations in Taiwan has also risen quickly. The number of international tourist hotels (ITHs) rises from 44 hotels in 1985 to 70 hotels in 2011, and increasing continuously. This intensifies competition in hospitality industries, particularly the hotel industry, in Taiwan.

Facing increasingly fierce competition, how to enhance productivity and profitability, and use resources more effectively are now critical issues for hoteliers.

Hotel managers formulate and implement different business strategies that aim to increase the performance levels of hotels and get a competitive advantage. This process is difficult to pursue, and hotel managers need to know what actually drives a hotel's profitability (e.g. O'Neill & Mattila, 2006; Dev et al., 2009). Hotel managers also need to know what strategic behavior will effectively increase certain performance variables and how this affects performance.

As a service industry, the tourist sector is particularly interesting as the focus of an investigation on financial performance for three main reasons. First, this sector has an increasing economic importance. Second, the tourist industry shows an increasingly higher competition. Finally, studying a specific industry responds to Reed's (1998) viewpoint that few studies of the relationship between cost efficiency and financial performance examine a cross section of firms from many different industries thereby ignoring the likelihood that the degree to which a more proactive approach to financial performance will vary from one industry to another. Such distinctive characteristics of the tourist industry are especially dominant in Taiwan, according to Taiwan Tourism Satellite Account 2009, where the ratio of the tourism expenditure to GDP grows 4.69% and tourism GDP reaches US 8.6 billion dollars and accounts 2.07% of the total GDP for the year, growing year by year. As the hotel industry is one of the most important industries in Taiwan, especially in the development of ITHs, it is worth paying more attention to the evaluation of hotel operation efficiency and profitability.

Efficiency in carrying out production—whether originating from technical capabilities, superior managerial routines, improved organizational characteristics, innovative ability, or from broadly defined embedded competences—represents the fundamental source of firms' differential competitiveness, and sets the stage for potentially different profitability levels (Bottazzi, Secchi & Tamagni, 2008).

This study concentrates on the hospitality industry, particularly in hotel industry. We do so for several reasons. One is that a lot of past studies to explore the relationship between cost efficiency and financial performance in different industries excluding hotel industry. A second reason is that since ITHs in Taiwan are still at the development and growth stage, studying the cost efficiency and financial performance of ITHs can help us understand the further relationship between cost efficiency and financial performance. In addition, another important reason is the convenience and availability of data-collecting. Therefore, this study aims to explore the relationship of cost efficiency and financial performance in Taiwan ITHs. We want to understand whether “the more cost efficient, the more profitable”, in the other words, “does cost efficiency lead to better financial performance?”

Literature review

DEA approach

Efficiency is a broad concept that can be applied to many dimensions of a firm’s activities. In this study we adopt narrow technical and the most commonly used definitions of efficiency. According to narrow technical definitions, a firm is cost efficient if it minimizes costs for a given quantity of output; it is profit efficient if it maximizes profits for a given combination of inputs and outputs. These two definitions take size and technology as given and focus on how production factors are combined, by comparing a firm’s actual costs or profits with the costs or profits of the best practice institution. Different definitions of efficiency call for different measurement methodologies. In this section we review briefly the most commonly used methods of efficiency measurements.

The efficiency measure was originated by Farrell (1957) and two primary categories approach can be applied to evaluate efficiency. These are the data

envelopment analysis (DEA) approach and stochastic frontier approach (SFA). Most of studies adopted DEA approach to evaluate the efficiency. DEA uses a mathematical programming model to calculate the best multiplier for inputs and outputs (Charnes, Cooper & Rhodes, 2009). DEA can be used to measure the relative efficiency of decision-making units (DMU) as part of a collection of DMUs that utilize similar resources, inputs, to produce similar goods or services' outputs. This method is accepted by most of people because it can evaluate efficiency in different period. SFA uses econometric methods first adopted by Aigner, Lovell & Schmidt (1977) and Meeusen & van den Broeck (1977) simultaneously.

Basically, DEA is a non-parametric technique in operational research and economics for the estimation of production frontiers. Non-parametric approaches have the benefit of not assuming a particular functional form for the frontier. Farrell was the pioneer to divide cost efficiency into technical efficiency and allocative efficiency. DEA has been widely applied in many different fields. In hotel industry, previous studies that used DEA to investigate the relative efficiency between different hotels are now described as follows:

Ditman & Morey (1995) analyzed the operational efficiency of 54 tourist hotels in the U.S. by DEA. The input variables included the room division expenditure, energy costs, salaries, non-salary expenses for property, related expenses for variable advertising, non-salary expenses for variable advertising, fixed market expenditures, payroll and related expenses for administrative work and non-salary expenses for administrative work. While the output variables included total revenue, level of service delivered, market share and rate of growth. The results showed that the operational efficiency of hotel was 89%. That means the hotel industry was efficiency.

Anderson et al. (1999) analyzed the operational efficiency of 48 tourist hotels in the U.S. in 1994 by SFA and DEA. The input variables included the number of

employees, the number of rooms, casino and entertainment expenditures, and food expenditure and other expenditure, while the output variables included income of rooms, income of casino and entertainment, and income of food and others. The results showed that the average efficiency of 48 tourist hotels was up to 89.4% when using the DEA. When using the SFA, the average efficiency was 94.6%.

Hotels efficiency in Taiwan

Tsaur (2001) used DEA to evaluate the operating efficiency of 53 international tourist hotels (ITHs) in Taiwan during 1996-1998. The result indicated ITHs in Taiwan were efficiency, because the average operating efficiency score was 87.33%. The study also showed that 71.7% of ITHs in Taiwan were inefficiency. In other words, there was room for improvement for almost three of four ITHs in Taiwan.

Hwang and Chang (2003) analyzed the efficiency of ITHs in Taiwan and the change of efficiency in 1994-1998 by DEA and Malmquist productivity index. They found the operational efficiency between hotels was different obviously, due to types of market, customer sources, and operational type.

Chiang et al. (2004) also adopted DEA to analyze the four and five star hotels in Taipei. The input variables were number of hotel rooms, capacity of food and beverage, number of employees and the total costs of the hotel. The output variables were yielding index, the revenue of food and beverage and miscellaneous revenue. Comparing three different operational types which were independently owned and operated; franchise licensed and internationally managed was the main purpose of the study. Their result showed that not all of Taipei's franchised or managed ITHs performed more efficiently than the independent ones.

Wang et al. (2006) studied the relative efficiency of ITHs in Taiwan. The study used five different measures: overall efficiency (OE), allocative efficiency (AE),

technical efficiency (TE), scale efficiency (SE) and pure technical efficiency (PTE). The result indicated these ITHs in Taiwan were inefficient. The Tobit regression results indicated that the proportion of foreign individual travelers, online transaction function and franchising are beneficial to operation efficiency of ITHs in Taiwan.

Yang and Lu (2006) explored 56 Taiwan ITHs' managerial performance by DEA in 2002. The finding indicated the mean technical efficiency was 84.80%, which can be divided into pure technical efficiency and scale efficiency with means 0.876 and 0.969. Therefore, the scale efficiency was relatively lower. The inefficiency of these hotels was composed of excess rooms and catering floors, or employing too many workers in the accommodation and catering departments.

Chen (2007) adopted SFA to analyze the operational performance of 55 ITHs in Taiwan in 2002. The results showed that the average efficiency of ITHs was 80%, and found that there was no relationship between efficiency and the location or scale of hotels.

Hu et al. (2009) investigated cost, allocative and overall technical efficiencies of ITHs in Taiwan during 1997-2006. They used three input variables, three output variables and three input prices variables. There were four environmental variables in this study: type of location, type of operation, distance to nearest international airport and the occupancy rate. The main contribution of this study was the chain system, non-metropolitan areas, and occupancy rate had significantly positive impacts on all efficiency scores of Taiwan's ITHs. And the distance from the nearest international airport had significantly negative impacts on efficiency scores.

Assaf et al. (2010) used a new method metafrontier which is used to estimate separate production frontiers for different groups of firms to evaluate 78 ITHs in Taiwan. The results indicated that the large size, chain operation of a particular hotel significantly bettered the efficiency scores.

Hu et al. (2010) used a one-stage stochastic frontier approach (SFA) to simultaneously estimate cost efficiency scores and factors of cost inefficiency for 66 ITHs in Taiwan during 1997-2006. In the study an SFA model with three outputs and three inputs is defined. The three outputs are room revenue, food and beverage revenue, and other operation revenue while the three inputs are price of labor, price of other operation, and price of food and beverage. Their model also takes into account five environmental variables, including dummy variable of the hotels located in non-metropolitan area, dummy variable of chain hotels, the number of tourist guides, the minimum distance from each hotel to Taoyuan or Kaohsiung international airport. Empirical results show that ITHs in Taiwan are on average operating at 91.15% cost efficiency. In addition, chain systems, tourist guides, and international transportation can significantly improve the cost efficiency of ITHs in Taiwan.

Financial performance

For hotel performance, RevPAR (revenue per available room) is the most widely accepted and adopted by the lodging industry as a standard measurement and a benchmark (Manson, 2006). Although the lodging literature has examined RevPAR in various settings, Chen, Koh & Lee (2011) point out no empirical research has investigated whether or not RevPAR reflects lodging firms' performance better than other traditional performance measures. With the assumption that the financial market is efficient, findings generally suggest that neither RevPAR nor other traditional performance measures provides a good indication of publicly listed lodging firms' stock performance in U.S., regardless of using different earning numbers to estimate the traditional performance measures (Chen, Koh & Lee, 2011).

Claver-Cortés et al. (2007) use four objective measures including occupancy rate per room and bed, total gross operative profit per room (GOPPAR), total gross

operative profit per day, gross operating profit (GOP) per room and gross operating profit per day, and two subjective ones including valuation of the GOP and GOPPAR per day compared with the known competitors to assess the firm's performance.

Although financial performance as a concept can have a variety of meanings (e.g. short- or long-term, financial or organizational benefits), it is broadly viewed from two perspectives in the extant literature (Appiah-Adu, 1998). One is the subjective concept, which is primarily concerned with the performance of firms relative to that of their competitors (Golden, 1992); the other is the objective concept, which is based on absolute measures of performance (e.g. Chakravarthy, 1986; Cronin & Page, 1988). For this study, a subjective rather than an objective approach was used for the following two reasons. On the one hand, company information is usually regarded as highly confidential in Chinese societies such as Taiwan. Hoteliers may be reluctant to provide hard financial data. On the other hand, past studies have reported a strong association between objective measures and subjective responses (e.g. Venkatraman & Ramanujam, 1986; Pearce et al, 1987; Robinson & Pearce, 1988; Jaworski & Kohli, 1993; Dawes, 1999).

Ideally, information should be gathered panel data from at each firm to minimize the potential bias. However, almost all Taiwan ITHs are not the public listed companies, that is, this implies that they have no obligation to disclose their financial statements and we hardly obtain the further financial information. This nature of the ITHs limits the possibility of using panel data for all the ITHs. Nonetheless, there is considerable precedent for using a single well-informed respondent for research in environmental strategy (Henriques & Sadosky, 1999). The financial performance variables are selected based on the data-gathering convenience and availability. Therefore, this study uses traditional financial measures, such as the ratio of net operating profit before taxes (RONOPBT), the ratio of earnings before

taxes (ROPBT), and return on assets before taxes (ROABT), as financial performance variables.

Methodology and Data

Generally (multiple) regression

Generally (multiple) regression-based studies are suitable to study multi-causal models, that is, networks of interrelated determinants. They represent advanced, multivariate statistical procedures which are able to assess not only the total variance explained by a set of independent variables, but also how influential each individual variable is once its interaction with all other (independent) variables is accounted for. However application of regression analysis needs to take a number of issues, in particular (Oppenheim, 1970):

- the need for a large number of cases in order to achieve a variability adequate to indicate significant differences with the additional problem of interdependence between the number of included independent variables and the number of cases required,
- the need for a sound theoretical model linking variables, in particular if the aim is to substantiate causal relationships, since regression does not allow to make causal reference in a strict sense.

Regression analysis allows to carrying out continuous matching, however it requires larger samples as well as a sound theoretical model about causal relationships. The power of regression models lies in their ability to assess the relative influences of a potentially large array of independent variables on a dependent variable. The regression can help to generate a more concise map of the relationship between environmental and financial performance. Therefore, this study employs the regressions to investigate the relationship between cost efficiency and financial

performance.

Panel Data

The data we collected are cross-section and time-series data. If the study uses the traditional approach OLS to analysis these data, and will get a bias estimation, because the OLS assumes all samples have the same intercept. The study can notice that the panel data model allow the different samples have different intercepts. Therefore, the study adopted the panel data regression which is a special type of pooled cross-section and time-series data, and each firm is sampled over time in panel data. Panel data usually contain more degrees of freedom and less multicollinearity than cross-sectional data or time series data, hence improving the efficiency of econometric estimates (Hsiao, 2003). The standard regression model of panel data takes the form that:

$$R_{it} = \alpha_i + \sum_{k=1}^K \beta_k Z_{kit} + \varepsilon_{it}$$

where i represents i -th firm, $i = 1, 2, \dots, N$; t represents the period, $t = 1, 2, \dots, T$; R_{it} is the dependent value of i -th firm in the period of t ; α_i represents the intercept of i -th firms; β_k : is the regression coefficient of k -th explanatory variable; Z_{kit} : presents the explanatory variable value of k -th firm in the period of t ; and ε_{it} is the error component.

Samples and Data Source

This study uses unbalanced panel data from the period from 1997 to 2006. And the numbers of observations from 1997 to 2006 are as follows: 1997 (51 hotels), 1998 (52), 1999 (54), 2000 (54), 2001 (54), 2002 (55), 2003 (57), 2004 (57), 2005 (56), and 2006 (57), making 547 observations in total. The principal source of data used in this

study to measure cost efficiency and financial performance are obtained from the Annual Operating Report of ITHs published by the TTB.

As above mentioned that the financial performance variables should be selected based on the data-collecting convenience and availability, this paper selects the financial data with the intercourse period of at least ten years and examines their data over the past these ten years (1997-2006). Therefore, this paper refers to the financial data from 1997 to 2006 as financial performance variables. This study uses traditional financial measures, such as the ratio of net operating profit before taxes (RONOPBT), the ratio of earnings before taxes (ROPBT), and return on assets before taxes (ROABT), as financial performance variables. The formula is as follows:

Ratio of net operating profit before taxes (RONOPBT) = (net operating profit before taxes) / (revenues)

Ratio of earnings before taxes (ROPBT) = (earnings before taxes) / (revenues)

Return on assets before taxes (ROABT) = (earnings before taxes) / (total assets)

The main variables are combined into the panel regression equation to test the relationship between cost efficiency and financial performance. The empirical form of the model is set out below.

$$\text{RONOPBT}_{it} = \beta_0 + \beta_1 \text{CE}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{ROPBT}_{it} = \beta_0 + \beta_1 \text{CE}_{it} + \varepsilon_{it} \quad (2)$$

$$\text{ROABT}_{it} = \beta_0 + \beta_1 \text{CE}_{it} + \varepsilon_{it} \quad (3)$$

Empirical results and discussion

Operational efficiency analysis

The study adopts DEA to estimate the operational efficiency of international tourist hotels. The efficiency values include cost efficiency (CE), allocative efficiency (AE), technical efficiency (TE), pure technical efficiency (PTE), and scale efficiency (SE).

The computed results are summarized in Table 1.

Table 1 Mean efficiency scores of international tourist hotels (1997-2006)

Year	CE	AE	TE	PTE	SE
1997	0.564	0.778	0.707	0.795	0.880
1998	0.596	0.817	0.714	0.823	0.861
1999	0.576	0.798	0.707	0.823	0.853
2000	0.578	0.803	0.703	0.797	0.875
2001	0.576	0.775	0.722	0.828	0.867
2002	0.561	0.787	0.699	0.811	0.858
2003	0.576	0.756	0.743	0.820	0.901
2004	0.544	0.736	0.727	0.810	0.892
2005	0.569	0.764	0.739	0.820	0.894
2006	0.562	0.768	0.721	0.819	0.870
Average	0.570	0.778	0.718	0.815	0.875
Minimum	0.544	0.736	0.699	0.795	0.853
Maximum	0.596	0.817	0.743	0.828	0.901
SD	0.014	0.024	0.015	0.011	0.016

The average score of technical efficiency is slightly lower than the allocative efficiency every year. The combined effect of these two results is in the low average score of cost efficiency for all international tourist hotels during the period 1997-2006. The average cost efficiency score is 0.570, suggesting that hotels could reduce their input costs by 43% without decreasing their output. The result shows that inefficiency is coming from both allocative and technical inefficiencies, but more primarily due to

technical inefficiency.

Empirical Result

As noted above, the evidence concerning the relationship between cost efficiency and financial performance is contradictory, since on the one hand the study finds studies that detect a positive relationship between cost efficiency and financial performance, while others indicate that this relationship is negative. This leads us to believe that it would be worthwhile to look into this relationship further, since it seems likely that reasons exist that might explain the differences found in the relationship of both dimensions and which have not been dealt with in these previous studies.

From the tables 2-4, the study can make a conclusion that the statistics results of these three regression models are insignificant. Whatever the ratio of net operating profit before taxes, the ratio of earnings before taxes, or return on assets before taxes, the cost efficiency has neither positive nor negative impact on these three financial variables. In other words, our results differ from earlier studies in that the study finds a neither positive nor negative relationship between cost efficiency and financial performance in Taiwan ITHs. From a managerial perspective, the findings of this study do not support the long-held belief that cost efficiency is a critical positive factor for financial performance— that ITHs in Taiwan should improve their financial performance through the enhancement of cost efficiency. There does not appear to be a well defined relationship between the cost efficiency and financial performance, but the study does offer some possible interpretations of these results and extensions for future research.

Table 2 Tobit Regression by 'Cost Efficiency' on RONOPBT

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.701202	0.057635	8.16635	0.0000
Cost Efficiency	0.023978	0.026831	0.89366	0.3734

Table 3 Tobit Regression by 'Cost Efficiency' on ROPBT

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.213276	0.033159	6.431902	0.0000
Cost Efficiency	0.046846	0.042662	0.678334	0.5782

Table 4 Tobit Regression by 'Cost Efficiency' on ROABT

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.506237	0.029364	4.35927	0.0000
Cost Efficiency	0.056762	0.044551	0.74145	0.4468

Discussion

Next to purely methodological aspects, data constraints have severely limited research on the relationship of cost efficiency and financial performance for Taiwan ITHs so far. For a start, as a result of data constraints, only a limited universe of firms is observable. When attempting to use continuous cost efficiency or financial performance data only a very small subset of firms is observable in Taiwan.

Regarding data constraints in Taiwan, it needs to be distinguished further between publicly available data and between privately-generated data. As far as publicly generated data is concerned, we can obtain the relative data from the official website or the publications. As far as privately-generated data is concerned, the

proprietary nature of financial data leads to unavailability of such data, which in turn makes it less likely to be used in research.

Almost all Taiwan ITHs are not the public listed companies, that is, this implies that they have no obligation to disclose their all financial statements and related information. Besides, company information is usually regarded as highly confidential in Chinese societies such as Taiwan. Hoteliers may be reluctant to provide hard financial data and we hardly obtain the further financial information. This nature of the Taiwan ITHs limits the possibility of using panel data for all the ITHs.

This paper recommends that future studies on hotel efficiency should estimate the efficiency of hotels belonging to different strategic groups that are to be distinguished by other methods (such as different regions, tourists, or business types), then the existence of different groups in the samples and factors, which influence cost efficiency and financial performance in different groups, is the direction that future studies should investigate.

Limitations

Although this study has provided relevant and interesting insights into the impacts of cost efficiency on financial performance in the hotel industry, it is important to recognize its limitations.

First, cross-sectional data were used in this study. Consequently, the time sequence of the relationships between cost efficiency and financial performance could not be determined unambiguously. Therefore, the results might not be interpreted as proof of a causal relationship. Developing a time-series database and testing the relationship between cost efficiency and financial performance in a longitudinal framework would provide more insights into the probable causation.

Second, a subjective approach was used to measure cost efficiency. Extensive

use of similar measures in research (e.g. Appiah-Adu, 1997; Greenley, 1995; Slater & Narver, 1994) as well as the practical difficulties associated with data collection in an Asian culture necessitated this approach (e.g. Luo & Chen, 1996; Tan & Litschert, 1994). Thus, future studies have to be done to examine the generalizability of this relationship between these two measures in an Asian context.

Third, this study focused only on the relationship between cost efficiency and financial performance. Because this relationship might be moderated by some variables, future research in the hotel industry can expand on the present study by including these variables.

Finally, the sample used for analysis was drawn only from Taiwan, one of the major tourist destinations in Asia-Pacific, and the generalizability of the results remains to be tested. Future research, therefore, can also expand on the present study by using samples from hotels located in countries with varying business environments.

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