How important is F&B operation in the hotel industry? Empirical evidence in the U.S. market

Abstract

In full-service hotels, the increase in resource (i.e., salary in this study) of the F&B department relative to that of the rooms department had a positive effect on the rooms' operational performance indicators including ADR (average daily rate), RevPAR (revenue per available room), GOPPAR (gross operating profit per available room), and gross operating profit ratio of the rooms department. Although it did not increase the demands for rooms, the improved room price (i.e., ADR) had a positive impact on their room revenue, as a result. Among the three major categories of full-service hotels, the positive impact of F&B offering on operational performance was observed significantly in the upscale category such as increased occupancy, ADR, RevPAR, GOPPAR, and even gross operating profit ratio of the rooms department, but not in luxury and upper upscale categories. The findings indicate that there are substantial customers' needs for F&B offering in upscale hotels.

Keywords: food and beverage operation, full-service hotels, limited-service hotels, upscale hotels, occupancy, ADR, RevPAR, GOPPAR

1. Introduction

With contemporary strategic emphasis on the importance of food and beverage (hereafter F&B) in giant hotel groups, among others AccorHotels and Marriott reshape the perception, feature, and value of hotel F&B. Recently, the CEO of AccorHotels F&B declares that F&B is one of their priorities to ensure the success of AccorHotels' transformation and will become the biggest differentiator for AccorHotels (Chesters, 2017). Similarly, Marriott has continued to expand its investment on F&B offering since the successful launching of Bistro Bar in 2007 and further, develops F&B loyalty program in 2016 to position Marriott hotels as the preferred place where people can meet, eat and drink (Simon, 2017).

In the past (or until the present), the driving forces of revenue in hotels were rooms, and F&B offering was considered as a supplementary but not the core competency for full-service hotels in the U.S. (Chen & Chang, 2012; Hallam & Baum, 1996; Yeh, Chen, & Hu, 2012). In the customers' viewpoint, the quality of F&B at full-service hotel restaurants was not overwhelming considering its high price since the customers could find a number of alternative F&B offerings from individual restaurants near their hotels. In a hotel manager's perspective, the high labor cost and employee turnover of F&B operation were persistent operational challenges because they dragged down not only the profitability of the F&B department but also overall hotel's operational performance: on average, the operating profitability of the F&B department (30.8% in 2016 and 31.3% in 2017) was significantly lower than the rooms department (74.6% in 2016 and 74.4% in 2017) mainly due to its higher labor cost (43.0% versus 15.9% in 2016 and 46.8% versus 16.2% in 2017) in the U.S. (HOTSTATS, 2018). Particularly, the average labor cost was much higher at hotel restaurants (43.0% in 2016 and 46.8% in 2017; HOTSTATS, 2018) even than the overall full-service restaurants (30.52%; Mun & Jang, 2018). To address the under-performance of F&B operation, some full-service hotels, especially in middle and economy

classes, have inclined to minimize F&B operation and solely focus on the standard breakfast buffet for serving their in-house customers (Hemmington & King, 2000). Others even eliminated, out-sourced, or co-branded F&B business to concentrate their resources fully on core business (Espino-Rodríguez & Padrón-Robaina, 2004; Hallam & Baum, 1996; Hemmington & King, 2000; Promsivapallop, Jones, & Roper, 2015).

In the same way, empirical evidences have showed that the attributes of F&B on customers' hotel preferences are lower priority than the attributes of rooms, value, cleanliness, location, and service (Chu & Choi, 2000; Dolnicar & Otter, 2003; Li, Law, Vu, Rong, & Zhao, 2015; Lockyer, 2005; Rhee & Yang, 2015). Even though the importance of hotel attributes on customers' hotel selections varies by different customer segments (e.g., between business and leisure travelers) and hotel types (e.g., between full-service and limited-service or luxury and economy hotels), the findings consistently have indicated that F&B is an afterthought and may not be a primary driver for hotel preferences. However, the conclusion may not necessarily be strategically relevant because these studies have not fully considered the trade-off effect of price (or cost) in the implications (Dolnicar & Otter, 2003; Lockyer, 2005). For example, the operational performance of hotels may not be significantly improved after investing more resources on location, cleanliness or service because it unavoidably requires higher price to cover the investment or cost, which has a negative effect on demands. Without considering the cost or price effect, the inferences are impractical and unreliable. Therefore, to reach more realistic implications, the research questions should reflect both input (e.g., cost) and output (e.g., performance) comparatively (Dolnicar & Otter, 2003). Among the resources, the salary expense will indicate a significant operating input not only for the rooms department but also, more importantly, for the F&B department to measure the efficiency or productivity (Barros, 2005;

Barros & Alves, 2004; Chen & Lin 2012; Reynolds, 2003) since the quality and capability of chefs are the most significant attribute of F&B offerings.

From a different angle, Albayrak and Caber (2015) suggest the importance of hotel F&B offerings to improve the overall customer satisfaction not because of its place in ranks but because of its lower performance than its importance. They further argue that, however, the customers may not be delighted with any improvement in the quality of hotel F&B because it is "must be" attribute to the hotels. Nevertheless, customers' expectation and perception on F&B should be significantly different by different types/classes of hotels (Tanford, Raab, & Kim, 2012). Obviously, the expectation of F&B quality is much higher when customers stay at luxury hotels than economy hotels (Xu & Li, 2016). Accordingly, it would be challenging to surpass the expectation of customers and to delight them even if luxury hotels allocate more resources than upscale hotels. Even, for upscale hotels, it would not be stress-free to satisfy the expectation of their in-house customers competing with individual restaurants around them. In this regard, the question arises: Is the recent strategic direction of expanding F&B operation in the hotel industry appropriate for improving business performance? If then, how much weight should hotel managers allocate to the F&B operation?

This study aims to answer the questions using operational information of the U.S. hotels through the following procedures. Firstly, this study will begin from a fundamental question, which asks the comparative performance of the full-service and limited-service hotels in the aspects of occupancy, ADR, RevPAR, and gross operating profitability. The statistical analysis between full-service and limited-service hotels will briefly answer how important the F&B operation is in the hotel industry. Secondly, this study will compare the relative importance of F&B operation among different classes of full-service hotels. The regression analysis will

specify whether the F&B operation adds the value on operational performance of full-service hotels in different hotel segments, including luxury, upper upscale, and upscale ones. The results will also provide detailed strategic weight for F&B operation in different types of hotels. By achieving the objectives, this study will enhance our understanding about the importance of F&B business in the hotel industry and provide a practical strategic direction for hotel managers who want to expand or reduce their F&B offerings. This study is exploratory in nature to acquire new insights into the issues and due to the lack of the extant literature on this topic.

To our best knowledge, this study is the first effort to examine whether F&B offerings can add value for the hotel operation in the aspects of room price, room revenue, and operating profitability with its historical data. In addition, this study considers the trade-off effects between the room price and the market demands in different classes of full-service hotels. Therefore, the findings can be used as a benchmark for the full-service hotels who aim to develop their strategic positioning through enhancing F&B offerings.

2. Literature review

2.1. Hotel differentiation and F&B services

As the strategic orientations, the levels of service have been used as a source of differentiation by the hotel firms (Canina, Enz & Harrison, 2005). The hotel industry has differentiated the market based on the price, quality, and the number of services offered (Mazzeo, 2002). The hotel differentiation by levels of service provides important indications for consumers to shape their expectation of services offered (Canina et al., 2005; Ingram, 1996) and

for hotels to mitigate the competition from other hotels (Freedman & Kosova, 2011; Lee & Jang, 2015).

Based on the service orientation, the hotels can briefly classify by two categories: full-service hotels and limited-service hotels. The significant difference between full- and limited-service hotels is the existence of 'full-service restaurants' (Xu & Li, 2016). The hotel restaurants "are viewed by customers as an integral part of the hospitality product … support and steer the hotel's image and are elements of the client's overall expected hotel experience" (Hemmington & King, 2000, p. 260). Because of the congruence of the image, the quality of F&B services provided in hotels is also depending on the levels of hotel services, such as luxury restaurants in luxury hotels (Hemmington & King, 2000; Wilkins, Merrilees, & Herington, 2007; Xu & Li, 2016).

Because of their wide variety of services and facilities (Xu & Li, 2016), a full-service hotel has "greater staff/customer ratios, more service offerings, a wider range of interactions (Chathoth, 2007, p. 396)" than a limited-service hotel. On the other hand, the limited-service hotel "… has limited service, low cost, basic accommodation service (e.g., guestroom, or guestroom plus breakfast) (Ren, Qui, Wang, & Lin, 2016, p. 15)" than the full-service hotel. According to this definition, even the limited-service hotel can provide some F&B services but they were very limited, such as simple breakfast (Xu & Li, 2016). The term 'budget hotel' was used as an interchangeable term for a limited-service hotel in some studies (Gilbert & Lockwood, 1990; Ren et al., 2016).

The differentiation between full service and limited service is especially crucial for hotel development as a particular market has strong preference of a certain service type (Ren, Qiu, Wang, & Lin, 2016; Rogerson, 2011; Xiao, O'Neil, & Wang, 2008). For example, the limited-

service hotels, such as Jin Jiang Inn and Super 8 in China (Xiao et al., 2008) and City Lodge in South Africa (Rogerson, 2011), grew rapidly in a short period because the operational costs and staff requirements of limited-service hotels are lower than those of full-service hotels (Rogerson, 2011; Yeung, 2016). Moreover, these classifications also significantly influence the operational style of hotels, such as human resources (Sun, Aryee, & Law, 2007). For instance, to provide outstanding services to the consumers, the luxury hotels need employees who have "customer-specific knowledge regarding the demand characteristics of particular individuals or segments and… know how to use that knowledge to negotiate customized offerings (Batt, 2002, p.508)." Thus, distinguishing between full service and limited service will also provide important directions for hotel companies to develop more productive and efficient strategies.

The full-service hotels are divided into 3 categories: luxury, upper-upscale, and upscale hotels. The limited-service hotels are also divided into 3 different classes: upper-midscale, midscale, and economy hotels. These 6 specified hotel types are based on Smith Travel Research (STR)'s service scale which is one of the most widely used classifications in the hotel industry (Canina et al., 2005; Freedman & Kosova, 2011). Following table provides the definitions and examples of hotel brands for each category.

(Insert Table 1 here)

2.2. Does hotel need F&B operation?

As mentioned above, the F&B offering is considered as one of the significant components of full-service hotels to differentiate their services from others. This indicates some hotels, especially luxury or upper-upscale hotels, have to compete for high-quality F&B services to attract or satisfy their guests, which inevitably require considerable strategic efforts and

operational costs. According to Han and Hyun (2017), the excellent quality of food and service in luxury hotel restaurants positively influenced to consumers' satisfaction and eventually increased the revisit intention not only of the restaurant but also of other restaurants in the same hotel. However, the implication did not consider how much tangible and intangible investment the luxury hotel has to dedicate to accomplish the exceptional quality of food and service (e.g., the trade-off effect between cost and benefit).

Most studies that have examined the attributes of hotel restaurants for customer's satisfaction and behavioral intention in the context of food and service quality had similar limitations (Han & Hyun, 2017; Wilkins et al., 2007; Wu & Liang, 2009; Xu & Li, 2016). Therefore, their managerial implications still provide vague picture to the hotel industry, because their conclusions are limited to identify "high quality of staff service and food (Han & Hyun, 2017, p. 89), "exquisite food presentation and a good range of bars" (Wilkins et al., 2007, p. 850), or "offering good food in the restaurant" (Xu & Li, 2016, p. 66) as critical factors for hotel restaurant performance without considering their costs for practical implementation. Furthermore, the findings did not explain how much quality improvement of F&B was required for the hotel restaurants and, as a result, how much benefit could be increased for them by offering better F&B services. To provide stronger support to the previous studies, it is crucial to examine from a more operational perspective: how the increase in the resource of F&B offering could eventually affect the business performance of the hotel including occupancy, room price (ADR), and operational profit (GOP) of hotels. Besides, F&B services should not analyse disjointedly but need to be explored from a broader perspective accompanied by the performance of the rooms department since hotel F&B service is the part of hotel operation, not as an isolated function (Wilkins et al., 2007).

There is another mainstream of the hotel literature that explore the needs of F&B services: outsourcing. The outsourcing research may not fully answer the value of F&B operation in hotels, but may infer the managers' perception of F&B offerings within hotel business (e.g., either positive or negative) through examining the motivations of the outsourced hotels. Empirically, the hotels have outsourced F&B services with branded restaurants companies (Hemmington & King, 2000) because of its high labour intensity and unstable demand (Lamminmaki, 2011): having the restaurants could be a nuisance to hotels. For another example, if a hotel does not have enough resources or capabilities to provide F&B services under the surging customers' demands for F&B offering, it has to outsource the F&B service from other suppliers (McIvor, 2008). The outsourced restaurants could achieve competitive advantage through subcontracted F&B services (Dyer & Singh, 1998) as they can provide F&B service at lower cost with high specificity than developing their own in-house restaurants (Espino-Rodrguez & Lai, 2014; Hemmington & King, 2000; Lamminmaki, 2011). For other incentives, some new hotels initially outsource F&B operation to avoid the capital outlay and to establish themselves quickly in the market (Hayward, 2002).

There is an obvious contrast in the perceived value of F&B operation between hotel managers who outsourced F&B service (i.e., negative perspective) and who emphasize their own F&B management (i.e., positive perspective). Nevertheless, both literature has not provided a clear answer whether the F&B offering can add value to the business performance of the hotels. The findings are also difficult to justify the effect of the hotel business performance of the F&B department on the rooms department because these studies either focused exclusively on benefits of F&B outsourcing (Wilkins et al., 2007; Wu & Liang, 2009; Xu & Li, 2016), the motivations of F&B outsourcing (Hemmingto & King, 2000; Lamminmaki, 2011; Vita & Tekaya, 2015), or

only the performance of outsourced restaurants by itself (Espino-Rodriguex & Lai, 2014; Lamminmaki, 2011; Vita & Tekaya, 2015). In general, there is a lack of studies, which provide objective and comprehensive findings for the hotel industry to evaluate their effectiveness and profitability potential of F&B services. Thus, to overcome these limitations, this study estimates the productivity consequence of F&B services by different level of hotel services.

3. Methodology

3.1. Samples and data

This study used the hotels' operational data in New York (NY) and California (CA) in the U.S. from STR reports. This study chose these two states because they were the most popular states in terms of tourist arrivals for the last 10 years in the U.S. (the National Travel and Tourism Office's (NTTO) Visitor Arrivals Program (I-94 Record)). The data was a perfectly balanced panel sample, which included total 389 hotels with 3,890 observations from 2008 to 2017. The data set contained the two types of hotel categories according to their F&B offerings (i.e., full-service versus limited-service hotels) and the six ranks (i.e., from the highest to the lowest: luxury, upper upscale, upscale, upper midscale, midscale, and economy hotels). The number of full-service hotels was 207 with 1,988 observations and the number of limited-service hotels was 213 with 1,902 observations. The luxury full-service hotels were 40 with 399 observations while there is no luxury limited-service hotel. The upper upscale full-service hotels were 97 with 944 observations and the upper upscale limited-service hotels were 15 with 46 observations. The upscale full-service hotels were 61 with 564 observations and the upscale limited-service hotels were 68 with 566 observations. The midscale limited-service hotels were 30 with 299 observations and the economy limited-service hotels were 92 with 920 observations.

(Insert Table 2 here)

(Insert Figure 1 here)

3.2. Variables and models

There were five dependent variables in the models, which were occupancy ((the number of rooms sold / the number of total available rooms) x 100), average daily rate (ADR = total room revenue / the number of rooms sold), revenue per available room (RevPAR = total room revenue / the number of total available rooms), gross operating profit per available room (GOPPAR = (total room revenue – total room expense) / the number of total available rooms), and gross operating profit (GOP = ((total room revenue – total room expense) / the room revenue). After testing normality of distribution, this study used the natural log of the variables: LogOccupancy [log (the number of rooms sold / the number of total available rooms) x 100], LogADR [log (total room revenue / the number of rooms sold)], LogRevPAR [log (total room revenue / the number of total available rooms)], LogGOPPAR [log (total room revenue – total room expense) / the number of total available rooms], and GOP ratio [((total room revenue – total room expense) / the room revenue)]. The independent variable was the proportion of F&B employees' salary over rooms employees' salary after logarization: Log(F&B Salary / Room Salary). This study chose the comparative ratio of employee salary between the F&B department and the rooms department because the labor cost was the most significant input for the F&B department. For the control variables, LogADR (when a dependent variable was LogOccupancy) or LogOccupancy (when a dependent variable was LogADR), class (luxury, upper upscale, upscale, upper midscale, midscale and economy), location of hotels (urban, suburban, and others), years of operation (Age), hotel size (largest, upper large, large, upper middle, middle,

and small based on the number of rooms), administrative and general expense (Log(A&G/Total Revenue)), marketing expense (Log(Marketing/Total Revenue)), and year dummies were included in the models. Here, class and hotel size were ordered variables, which were treated as continuous variables but location was a categorical variable with other areas as a base.

A random-effects regression was used because the models included important time invariant variables, including location, the class of hotel and the size hotel. The models were to examine how important the F&B operating was in hotel business performance in the aspect of occupancy, ADR, RevPAR, GOPPAR, and GOP ratio. The results of Breusch-Pagan / Cook-Weisberg test (Breusch, & Pagan, 1979) for heteroskedasticity indicated the variance were not homoscedastic (p-value<0.001) and Ramsey RESET test (Ramsey, 1969) also showed that the errors were autocorrelated (p-value<0.001). To avoid these heteroscedasticity issues, all models used the cluster-adjusted robust standard errors. The first model was examined with all full-service hotels, luxury full-service hotels, upper upscale full-service hotels, and upscale full-service hotels separately to eliminate the effect of hotel class on occupancy, ADR, RevPAR, GOPPAR, and GOP ratio.

Random-effects regression model:

$$Y_{it} = \beta 0 + \beta 1 * \text{Log(F\&B Salary/Room Salary)}_{it} + \beta 2 * \text{LogADR}^{a} \text{ or LogOccupancy}^{b}{}_{it} + \beta 3 * \text{Class}_{it} + \beta 4 * \text{i.Location}_{it} + \beta 5 * \text{Age}_{it} + \beta 6 * \text{Size}_{it} + \beta 7 * \text{Log(A\&G/Total Revenue)}_{it} + \beta 8 * \text{Log(Marketing/Total Revenue)}_{it} + \sum \text{year} + \gamma + \varepsilon_{it}$$

Results

4.1 Descriptive financial information

Undoubtedly, the total revenue per available room (Total RevPAR), room revenue per available room (RevPAR), and gross operating profit per available room (GOPPAR) of the full-service hotels were higher than the limited-service hotels during the recent 10 years (Table 3). The average ADR of the full-service hotels was $203.28, which was two times higher than $101.89 of the limited-service hotels. Consequently, the RevPAR of the full-service hotels ($155.26) was also almost two times larger (1.91 times) than the limited-service hotels ($81.18) although the occupancy was 2.25% point lower than the limited-service hotels (75.77% versus 78.02%). The proportion of F&B revenue in total revenue was 23.94% in the full-service hotels, which was a little less than one quarter of total revenue. Despite the higher total revenue and room revenue in absolute amount, the gross operating profit ratio of the full-service hotels was 22.48% point lower than the limited-service hotels (36.42% versus 58.89%) largely due to higher labor cost of F&B operation than the rooms department (52.02% of F&B revenue): the gross operating profitability of the rooms department in the full-service hotels was 55.04% but the total gross operating profitability of the full-service hotels dropped by 18.62% point to 36.42%. The lower total gross operating profit ratio of the full-service hotels compared to the limited-service hotels had been consistent during the recent 10 years and the gap was even wider when their occupancy dropped more than the limited-service hotels, especially in 2009 and 2010 (Figures 2 and 3).

(Insert Table 3 here)

(Insert Figures 2 and 3 here)

The lower total gross operating profitability of the full-service hotels (46.20%) than the limited-service hotels (52.75%) was also identified when the hotels with the same scale (upscale only) were compared as shown in Table 4. Interestingly, Total RevPAR ($119.26 versus

$126.11), RevPAR ($103.62 versus $123.12), and even ADR ($136.38 versus $150.38) were lower at the upscale full-service hotels than the upscale limited-service hotels. The proportion of F&B revenue in total revenue was 12.15%, which was 11.79% point less than overall full-service hotels (23.94%). Accordingly, the gap in total gross operating profit ratio between the upscale full-service hotels (46.20%) and the upscale limited-service hotels (52.75%) became much narrower (6.55% point lower in the upscale full-service hotels) than the gap of 22.48% point between overall full- and limited-service hotels. The gross operating profitability of the rooms department in the upscale full-service hotels was 60.83% but the total gross operating profitability decreased by 14.63% point to 46.20%. However, importantly, the gross operating profitability of the rooms department in the upscale limited-service hotels was 63.99%, which was just 3.17% point higher than the upscale full-service hotels. The results indicated that although the total revenue, room revenue, and ADR of the luxury and upper upscale full-service hotels were higher than those of the upscale full-service hotels, their operating profitability was lower than the upscale full-service hotels due to the larger share but lower profitability of F&B operation. Therefore, the proportion of F&B operation caused the biggest gap in overall operational profitability between the full- and limited-service hotels.

(Insert Table 4 here)

As expected, the total gross operating profitability of the luxury full-service hotels (28.34%) was the lowest even though the amount of Total RevPAR ($426.56), RevPAR ($268.77), ADR ($362.10), and GOPPAR ($120.81) were the highest among the upper upscale (35.42%, $199.39, $145.18, $184.72, and $72.35, respectively) and the upscale full-service hotels (49.48%, $122.69, $113.39, $143.39, and $61.17, respectively). The phenomenon were consistent during the recent 10 years (Figures 4 and 5). In addition, the proportion of F&B

revenue in total revenue drastically decreased as the class of hotel lower: the luxury (33.09%), upper upscale (26.29%), and upscale (6.29%). On the contrary, surprisingly, the gross operating profitability of the rooms departments increased as the class of hotel and the proportion of F&B operation lower: the luxury (49.43%), upper upscale (54.93%), and upscale (62.41%). The table showed that both increased room expense and labor cost of the rooms department caused lower gross operating profitability of the rooms departments in higher classes hotels: 30.65% and 19.92% in the luxury hotels, 27.57% and 17.50% in the upper upscale hotels, versus 22.91% and 14.68% in the upscale hotels. Clearly, the figures on Table 5 presented that the lower total gross operating profitability of the full-service hotels was caused mainly by higher labor cost: the labor cost of the F&B department compared to the rooms department was 163.24% in the luxury hotels, 113.09% in the upper upscale hotels and 22.71% in the upscale hotels.

(Insert Table 5 here)

(Insert Figures 4 and 5 here)

4.2 Statistical analysis

When all full-service hotels were considered, the occupancy (0.0040, p-value>0.10) was not significantly improved as the hotels paid more attention on F&B operation. Whereas, ADR (0.0295, p-value<0.05), RevPAR (0.0391, p-value<0.05), GOPPAR (0.0556, p-value<0.05), and even GOP ratio (0.0120, p-value<0.10) were significantly higher in hotels that increased the salary of F&B employees relative to the salary of rooms employees than counterparts. However, the higher ADR, RevPAR, and GOPPAR could be caused by higher proportion of F&B operation in higher class hotels, such as luxury and upper upscale hotels, although the class was included as a control variable: obviously, the class had a significant positive relation with ADR (0.3567, p-value<0.01), RevPAR (0.3306, p-value<0.01), and GOPPAR (0.3136, p-value<0.01).

The interesting finding was that the full-service hotels who focused more on F&B operation also showed higher GOP ratio (0.0120, p-value<0.05) from the rooms than counterparts even after controlling a significant negative effect (-0.0123, p-value<0.05) of the class. In the models, there was a significant negative relationship between occupancy and ADR at the 1% level. In addition, the models presented that hotels located in an urban area performed better than hotels in suburban and other areas in the aspects of occupancy (0.0772, p-value<0.01), ADR (0.1765, p-value<0.01), RevPAR (0.2334, p-value<0.01)and GOPPAR (0.1969, p-value<0.01) but worse than others in gross operating profitability (-0.0254, p-value<0.01). In addition, larger hotels performed worse than smaller hotels in the aspects of ADR (-0.0674, p-value<0.01), RevPAR (-0.0577, p-value<0.05), GOPPAR (-0.0922, p-value<0.01), and gross operating profitability (-0.0256, p-value<0.01). Among others, the inefficiency of administrative and general expense and marketing expense had significant negative effects on all performance at 1% level. Due to the substantial positive effect of class on ADR, RevPAR, and GOPPAR, this study implemented further analyses with sub-groups of full-service hotels in a same class.

(Insert Table 6 here)

Within luxury full-service hotels, more emphasize on F&B operation did not have a significant effect on operational performance. Although it showed an insignificantly positive impact on ADR (0.0471, p-value>0.10) and RevPAR (0.0015, p-value>0.10), it rather had an insignificantly negative effect on operational profitability (GOPPAR (-0.0188, p-value>0.10) and GOP ratio (-0.0113, p-value>0.10). Among other control variables, hotels located in urban area performed better than others in occupancy (0.1571, p-value<0.05) and RevPAR (0.2958, p-value<0.05) but worse than others in gross operating profitability (-0.0524, p-value<0.05).

While, hotel size had a significant negative impact on occupancy (-0.0489, p-value<0.10), ADR (-0.1574, p-value<0.10), RevPAR (-0.1786, p-value<0.05), and GOPPAR (-0.1949, p-value<0.05) but not on gross operating profitability (-0.0112, p-value>0.10). Like as the overall full-service hotels, the inefficiency of administrative and general expense and marketing expense had significant negative effects on all performance at the 1% level.

(Insert Table 7 here)

The insignificant effects of F&B operation on operational performance were identified in upper upscale full-service hotels as well. Only the occupancy (-0.0259, p-value<0.10) had a marginally significant negative relationship with the proportion of F&B salary. Whereas, ADR (-0.0199, p-value>0.10), RevPAR (-0.0202, p-value>0.10), and GOPPAR (-0.0142, p-value>0.10) had an insignificantly negative relation and GOP ratio (0.0098, p-value>0.10) had an insignificant positive relation with it. Similar to luxury full-service hotels, hotels located in an urban area performed better than others in occupancy (0.0767, p-value<0.01), ADR (0.1873, p-value<0.01), RevPAR (0.2362, p-value<0.01), and GOPPAR (0.2199, p-value<0.01) but did not performed worse than others in gross operating profitability (-0.0119, p-value>0.10). Yet, larger hotels showed lower GOPPAR (-0.0833, p-value<0.05) and gross operating profitability GOPPAR (-0.0356, p-value<0.01) in upper upscale full-service hotels. Consistent to the overall full-service and luxury full-service hotels, the inefficiency of administrative and general expense and marketing expense had significant negative effects on all performance at the 1% level.

(Insert Table 8 here)

The noticeable differences were identified within upscale full-service hotels as shown in Table 9. In upscale full-service hotels, the emphasis on F&B operation had a significant positive

effect on all operational performances. As upscale full-service hotels increased the proportion of F&B salary, occupancy (0.0350, p-value<0.01), ADR (0.0387, p-value<0.10), RevPAR (0.0747, p-value<0.01), GOPPAR (0.1060, p-value<0.01), and GOP ratio (0.0229, p-value<0.01) were significantly increased. Unlike other classes of full-service hotels, location was not a significant factor for operational performance, and hotel size only showed a significant negative impact on gross operating profitability (-0.0354, p-value<0.01). Nevertheless, the significant negative effects of inefficiency in administrative and general expense and marketing expense were also identified in upscale full-service hotels. The findings indicated that the F&B operation could add a value on hotel operation. More specifically, it verified when upscale full-service hotels provided better F&B offerings, they could charge higher room price without losing the demand, which ultimately increased their revenue and operational profitability from the rooms department in addition to the revenue and operational profit from the F&B department.

(Insert Table 9 here)

5. Conclusion and discussion

5.1. Summary of findings

On average, the RevPAR of full-service hotels ($155.26) was almost two times larger than limited-service hotels ($81.18) due to two times higher ADR ($203.28 versus $101.89) with slightly lower occupancy (75.77% versus 78.02%). Despite higher RevPAR in the full-service hotels, their overall operating profitability seemed to be much lower than the limited-service hotels (36.42% versus 58.89%). Surprisingly, the gross operating profitability of the rooms department in full-service hotels was also 15.47% point lower than the limited-service hotels

(55.04% versus 70.51%) even after lower gross operating profitability of F&B operation (26.74%) in the full-service hotels dragged down their total gross operating profitability. The tendency was consistent during the recent 10 years and the lower gross operating profitability of the full-service hotels was severer when their occupancy was comparatively lower than the limited-service hotels, especially in 2009 and 2010 (see Figure 2 and 3). However, when only the upscale hotels in both full- and limited-service were compared, the gap in total gross operating profitability between full-service and limited-service hotels became narrower: the total gross operating profitability of the full-service hotels was 6.55% point lower than the limited-service hotels (46.20% versus 52.75%). The difference of gross operating profitability in the rooms department between them was much smaller: the rooms gross operating profitability of the full-service hotels was only 3.17% point lower than the limited-service hotels (60.83% versus 63.99%).

The statistical information seemed to indicate that the F&B operation had a negative impact even on the operational profitability of the rooms department: the proportion of F&B revenue of the upscale full-service hotels in total revenue was only 12.15%, while it was 23.94% in overall full-service hotels (11.79% point higher in overall full-service hotels than the upscale full-service hotels). Not surprisingly, high labor cost relative to F&B revenue of the F&B department (52.02%) was problematic because it was the main cause of low operational profitability in the full-service hotels. The phenomenon was more clearly identified when different classes of full-service hotels were compared their F&B revenue, F&B labor cost, and F&B gross operating profitability with rooms revenue, labor cost, and rooms gross operating profitability of the rooms department. As the class of hotels higher from upscale to luxury, the proportion of F&B revenue over total revenue (upscale, upper upscale, and luxury: 6.29%,

26.29%, and 33.09%, respectively) increased and thus, the total gross operating profit over total revenue (49.48%, 35.42%, and 28.34%, respectively) became lower (see Table 5). More importantly, the rooms gross operating profitability turned lower in luxury than both upper upscale and upscale hotels (31.20%, 39.23%, and 53.61%, respectively; see Table 5). Consequently, although luxury hotels enjoyed higher ADR, RevPAR, and GOPPAR than upper upscale and upscale hotels, their operational profitability in both the rooms and the F&B departments was lower than others.

Nevertheless, contrary to conventional wisdom, this study suggested that F&B operation did not have a negative impact on the operational profitability of the rooms department. It was because the ratios of both room expense and labor cost in higher class hotels were higher than counterparts (see Table 5), which inferred relatively lower room price to operating expense or lower operational productivity in higher class hotels. More importantly, the regression analysis indicated the different implications, which showed a positive relationship between F&B operation and hotels' operational performance. In full-service hotels, the increase in salary of F&B department relative to salary of rooms department had a positive effect on ADR (0.0295, p-value<0.05), RevPAR (0.0391, p-value<0.05), GOPPAR (0.0556, p-value<0.05), and even gross operating profit ratio of the rooms department (0.0120, p-value<0.05). With the 1% increase in the salary of the F&B department relative to the salary of the rooms department, hotels could increase to approximately 0.030% of ADR, 0.039% of RevPAR, 0.056% of GOPPAR, and 0.012% of the gross operating profit ratio. The findings were opposite from the overall statistical implications. At first, when the full-service hotels increased the proportion of salary at the F&B department, it increased the hotels' ADR although it did not increase the occupancy. In other words, when the full-service hotels paid more attention to F&B offerings, they could charge a

higher price for their room and accordingly, their RevPAR would be positively influenced by the improved room price. As a result, the improved RevPAR was enough to cover the increased operating expense, including higher labor cost, at the F&B department, which ultimately increased the gross operating profitability of the rooms department in the full-service hotels.

Nevertheless, the positive impact of F&B offering on hotels' operational performance was not observed in luxury and upper upscale full-service hotels. In luxury full-service hotels, the emphasis on F&B offerings did not significantly increase their ADR (0.0471, p-value>0.10). As results, their RevPAR (0.0015, p-value>0.10) was not significantly increased. Fortunately, the emphasis on F&B offerings did not decrease either GOPPAR (-0.0188, p-value>0.10) or the gross operating profitability (-0.0113, p-value>0.10) of the rooms department. In upper upscale hotels, as they increased the proportion of labor cost of F&B department relative to the rooms department, their occupancy (-0.0259, p-value<0.10) decreased at a marginally significant degree but their ADR (-0.0199, p-value>0.10), RevPAR (-0.0202, p-value>0.10), and GOPPAR (-0.0142, p-value>0.10) were not significantly decreased. Even the gross operating profitability (0.0098, p-value>0.10) of the rooms department were not significantly decreased. The evidence clearly indicated the difficulties of adding value from F&B offerings on operational performance in higher classes' hotels.

The biggest difference in the importance of F&B offering among full-service hotels was identified in upscale hotels. As the upscale full-service hotel put more attention on salary at the F&B department than the rooms department, their occupancy (0.0350, p-value<0.01), ADR (0.0387, p-value<0.10), RevPAR (0.0747, p-value<0.01), GOPPAR (0.1060, p-value<0.01), and even gross operating profit ratio of the rooms department (0.0229, p-value<0.01) were significantly increased. Specifically, upscale full-service hotels could increase to 0.035% of

occupancy, 0.039% of ADR, 0.075% of RevPAR, 0.106% of GOPPAR, and 0.023% gross operating profit ratio when hotels increased the salary of the F&B department by 1% relative to the salary of the rooms department. The figures were not substantial in ratios, but the findings confirmed that better F&B offerings could add value to hotel operations by improving the demands of customers and allowing them to charge higher room prices in upscale hotels. The customers of upscale hotels wanted to receive better F&B offering and they were willing to pay higher room price if the hotels provided it. In other words, the upscale hotels had not provided satisfactory F&B offerings to their customers yet. Therefore, the role of F&B business was significant for upscale hotels because there were customers' needs for better F&B service in the market, but they were not fully satisfied yet.

Besides, in general, hotels located in the urban area tended to perform better than hotels in suburban and other areas in terms of occupancy (0.0772, p-value<0.01), ADR (0.1765, p-value<0.01), RevPAR (0.2334, p-value<0.01), and GOPPAR (0.1696, p-value<0.01) but worse in gross operating profitability (-0.0254, p-value<0.01) maybe due to higher operating expense, including labor and room maintenance expenses (see Table 6). In addition, large hotels showed lower operational performance than smaller firms, in ADR (-0.0674, p-value<0.01), RevPAR (-0.0577, p-value<0.01), GOPPAR (-0.0922, p-value<0.01), and gross operating profitability (-0.0256, p-value<0.01) maybe due to the increased inefficiency in larger firms (see Table 6). Whereas, the years of operation did not significantly influence the operational performance of full-service hotels (see Table 6, 7, 8, and 9). Lastly, the inefficient operational and marketing management indicated substantial negative impacts on the overall aspects of full-service hotel operation, which was consistent regardless of hotel classes (see Table 6, 7, 8, and 9).

5.2. Implications

The quality of F&B offering is one of the most important attributes for tourists' selection of full-service hotels (Han & Hyun, 2017). However, retaining and motivating talented chefs to provide better F&B service require not only high labor cost but also continuous strategic implementation, which are the severe challenges for hotel managers. The managers of full-service hotels also have to compete not only for the quality of F&B offerings but also for the prices of F&B products against the well-known restaurants around the hotels because the customers can easily explore the foods from various choices that can stimulate their appetite with less expensive prices. Due to such persistent operational and strategic challenges, many full-service hotel managers try to put less weight on F&B operation and focus on the performance of the rooms department. Conventionally, general managers of full-service hotels believe that the F&B department is not a profit generator but rather consider F&B services as unavoidable amenities (Chen & Lin, 2012; Hanson, 1984; Strate, & Rappole, 1997).

In some sense, this study supports the point that the operational profitability of F&B operation is much lower than the rooms department due to higher labor cost (Siguaw & Enz, 1999). The empirical evidence of this study indicates that even the operational performance of the rooms department (e.g., occupancy, ADR, RevPAR, and GOPPAR) is lower in the full-service hotels than the limited-service hotels within the same class (e.g., upscale hotels). The finding signifies that the F&B offering in upscale full-service hotels may not directly beneficial to improve room price than upscale limited-service hotels even though it is based on a simple statistical analysis. The capability of charging higher room price without losing the demands would be an essential element for improving the operational profitability of the rooms department. It is because that the increased ratios of room expense and labor cost in higher class

full-service hotels cause the lower gross operating profitability of the rooms department (see Table 4). The higher class hotels may not able to fully integrate higher room price for their better service (e.g., room facilities and employees) due to customers' stronger price resistance for increasing price than lower class hotels (e.g., the demands for rooms are more elastic in higher class hotels than lower class hotels).

However, in other sense, the findings of this study are contrary to conventional wisdom, which believes that F&B may not add value to the full-service hotels. Particularly, within the upscale full-service hotels, paying more attention to F&B operation increases the selling prices of rooms and, consequently, increases both revenue and operational profitability of the rooms department in addition to the extra revenue from the F&B department. The findings indicate that there are substantial customers' needs for F&B offering, especially within an upscale hotel class. In other words, the customers are willing to pay higher room price or stay if the upscale hotels provide better F&B offerings. Mattila & O'Neill (2003) corroborated that: The satisfaction level of hotel guests was most vulnerable at the medium price range of hotels, and these guests became more critical to hotel services. From this perspective, hotel guests who consider staying in upscale hotels could be more sensitive to the quality of F&B services. Such guests might also choose the hotel which provides good quality F&B services.

The needs for improving F&B services in upscale hotels could be amplified by the Millennials who became the largest consumer demographic (Kostuch, 2017). Millennials have less disposable income than Boomers but higher interests in food and new ideas (Crowley, 2018). Moreover, Millennials' preference for food pushes hotels to provide more creative and healthier F&B offerings (Crowley, 2018; Kostuch, 2017). Such contribution reflects from the recent trend of investment in the grab-and-go area, healthy menu choices, and expanded

bars/lounges in large upscale hotels (e.g., Hilton Graden Inn's 24/7 grab-and-go counter, Hyatt's expanded partnership with GrubHub, and The Bistro at Marriot Courtyard).

The increased proportion of salary in the F&B departments in full-service hotels (i.e., measured by the independent variable in the current study models: Log(F&B Salary / Room Salary) imply several significant meanings. First, a major proportion of salary in the F&B area may be used to attract, retain and motivate qualified chefs, which is the most critical component to differentiate F&B offerings. Second, a higher salary may derive more stable staffing, in general, which is fundamental to deliver standardized quality products to the customers (Batt, & Valcour, 2003; Lum, Kervin, Clark, Reid, & Sirola, 1998). Third, F&B offerings in full-service hotels usually require duplicate staffing and thus, improved human resource management has a strong impact on their brand policy to provide standards of operations such as room service, three meal provision, and multiple outlets. Hotel restaurant outlets are established based on room occupancy and banquet needs, even if high occupancy and banquet needs may hit one or two meal times a day, a few days a week, or only peak seasons. Nonetheless, upscale full-service hotels should accommodate qualified F&B labors (Hanson, 1984); this is in contrast to general restaurant F&B staffing which is designed based on high table/seat turnover. Lastly, training activities in the F&B department would reflect a high proportion of salary in the F&B department, which is a costly structure to continue to enhance the quality of F&B offering.

In the luxury and upper upscale classes among full-service hotels, even though the added value of F&B operation on ADR and RevPAR of the rooms department has not been achieved, the emphasis on the F&B department does not deteriorate the operational performance of the rooms department. In other words, luxury and upper upscale full-service hotels can at least increase F&B revenue and achieve a better reputation of F&B service without losing the

operational profitability of the rooms department even after emphasizing more on F&B operation. The findings support that F&B operation, by and large, adds value to the business performance of full-service hotels, however, at the same time, they implicate the difficulty or challenge of F&B offering as a differentiator of the value of hotels among highest class hotels. Therefore, the biggest challenge for luxury and upper upscale hotels would be how they make their restaurants as favorite dining out destinations not only for in-house guests but also for residential customers. In this way, the hotels' labor efficiency would be reaching a comparative level of individual restaurants. Without a doubt, the critical success factors will be whether the hotel managers can truly understand customers' needs and develop a customer value-based pricing strategy.

6. Future research

Despite the important implications, this study is not free from the limitations. The importance of F&B offering to hotel customers may be different among different countries (e.g., Yeh et al., 2012). For example, the role of F&B products in the full-service hotels would be more important for Asian people than the American. In some top-tier properties in Asian cities, such as Tokyo (50% versus 45%), Seoul (46% versus 40%), and Osaka (52% versus 42%), the revenue from the F&B department exceeds the revenue of the rooms department (HTL, 2018). In addition, the price practices and labor cost of hotel F&B offerings also can be different among different countries. For example, the labor cost is much lower in some Asian countries than the U.S., and thus the effect on operational profitability would be different among them. Therefore, the comparison among different countries will enhance our understanding of the importance of F&B business in the hotel industry and provide meaningful implications in a different angle. We

leave the topic for future research. Lastly, a clear explanation of why increased F&B performance is significantly related to upscale hotels' room performance does not exist. Hotel restaurants are traditionally regarded as a part of hotel amenities. On the basis of the findings from this study, it is recommended for future hotel studies on the mechanism why and how good quality F&B services drive many tourists' willingness to stay or return to hotels in terms of different levels of services (i.e., upscale, upper-upscale, and luxury hotels).

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Table 1. Hotel Types by Service Level

Service Scales	Definitions	Examples
Full service	Properties with a wide variety of onsite amenities, such as restaurants, meeting spaces, exercise rooms or spas.	
Luxury	Top 15% average room rates	Ritz-Carlton, Four Seasons
Upper-upscale	Next 15% average room rates	Hilton, Pullman
Upscale	Next 15% average room rates	DoubleTree, Hyatt Place
Limited service	Property that offers limited facilities and amenities, typically without a full-service restaurant.	
Upper-midscale	Next 15% average room rates	Holiday Inn Express, Hampton
Midscale	Next 20% average room rates	Quality Inn, Best Western
Economy	Lowest 20% average room rates	Howard Johnson, Super 8
Sources	STR Glossary	STR Chain Scales

Note: The six service scales are defined by the previous year's average daily rate (ADR) and other factors in each market (e.g., U.S.). Each range of scale is determined by STR (STR Glossary, 2018).

Table 2. Sample data

Class	Luxury	Upper Up	Upscale	Upper Midscale	Midscale	Economy
Full-service	40(399)	97(944)	61(564)	7(70)	2(11)	-
Limited-service	-	15(46)	68(566)	7(70)	30(299)	92(920)

Note: the figure is the number of firms in each class; bracket presents the number of observations.

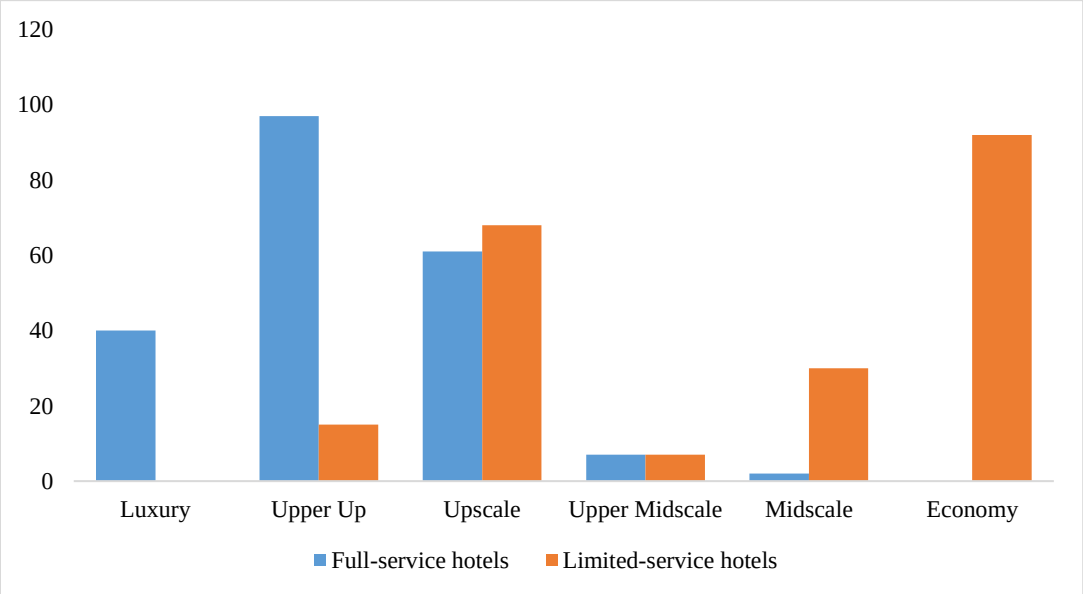

Fig. 1. The number of full-service versus limited-service hotels

Table 3. Full- versus limited-service hotels: all hotels

	All Hotels		
	Full-service	**Difference**	**Limited-service**
Total RevPAR	219.05	135.98***	83.07
		(37.8358)	
RevPAR	155.26	74.07***	81.18
		(30.6867)	
ADR	203.28	101.39***	101.89
		(32.8108)	
Occupancy	75.77%	-2.25%***	78.02%
		(-7.3303)	
Room expense PAR	43.34	28.00***	15.35
		(35.5684)	
Room labor expense PAR	28.22	18.00***	10.22
		(33.0254)	
Room GOPPAR	83.70	28.07***	55.62
		(21.7397)	
F&B revenue PAR	60.36	60.09***	0.27
		(41.8090)	
F&B cost PAR	11.25	11.18***	0.07
		(41.1679)	
F&B labor expense PAR	33.00	32.88***	0.12
		(36.8990)	
F&B GOPPAR	16.11	16.04***	0.07
		(34.4546)	
Total GOPPAR	75.12	27.32***	47.80
		(21.8384)	
Room expense / Room revenue	27.33%	9.83%***	17.51%
		(43.3383)	
Room labor / Room revenue	17.63%	5.64%***	11.99%
		(36.1996)	
Room GOP / Room revenue	55.04%	-15.47%***	70.51%
		(-41.5794)	
F&B food cost / F&B revenue	21.23%	5.66%***	15.58%
		(5.7452)	
F&B labor / F&B revenue	52.02%	-20.29%	72.31%
		(-0.4981)	
F&B GOP / F&B revenue	26.74%	14.63%	12.11%
		(-0.3595)	
Total GOP / Total revenue	36.42%	-22.48%***	58.89%
		(-57.6682)	
F&B revenue / Total revenue	23.94%	23.76%***	0.18%
		(80.0116)	
F&B revenue / Room revenue	36.68%	36.48%***	0.19%
		(59.8215)	
F&B expense / Room expense	25.84%	25.62%***	0.22%
		(56.7910)	
F&B labor / Room labor	104.70%	104.23%***	0.47%
		(62.3453)	
F&B GOP / Room GOP	20.59%	20.52%***	0.08%
		(39.6216)	
Observations	1,988	86	1,902

Note: US dollar; Total revenue includes room revenue, F&B revenue, and other revenue; F&B cost includes cost of goods sold and other miscellaneous expenses; ADR means average daily rate; RevPAR means revenue per available room; PAR means per available room; GOP (Gross operating profit) = Total revenue - Total operating expenses; Difference is the result from t-test with unequal variances; bracket shows t-value; *significant at 10%; **significant at 5%; ***significant at 1%.

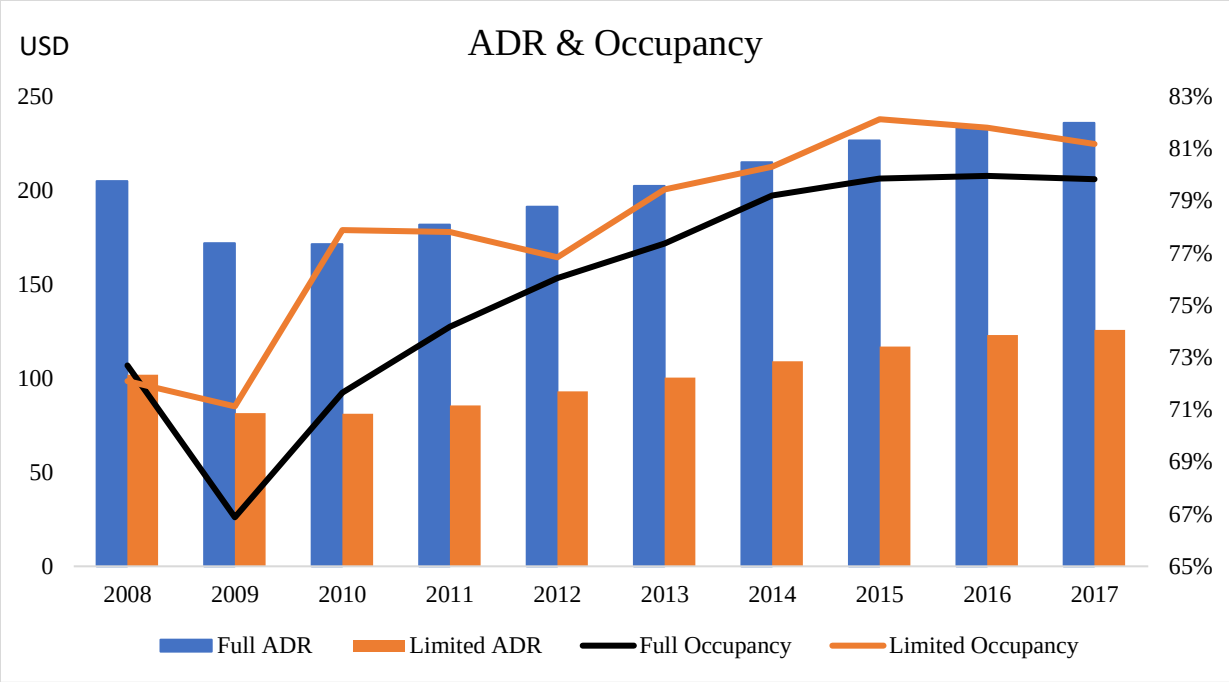

Fig. 2. Full-service versus limited-service hotels

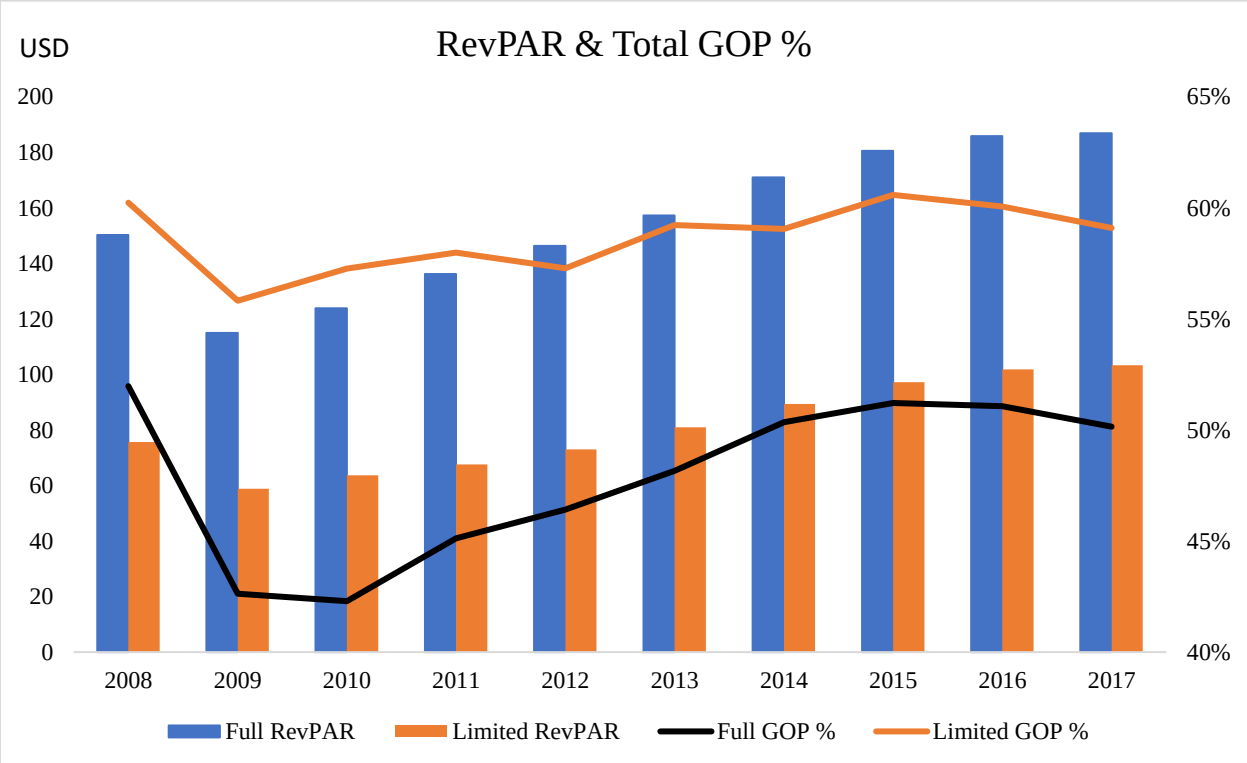

Fig. 3. Full-service versus limited-service hotels

Table 4. Full- versus limited-service hotels: **upscale** only

	Upscale Hotels		
	Full-service	**Difference**	**Limited-service**
Total RevPAR	119.26	-6.85***	126.11
		(-2.6894)	
RevPAR	103.62	-19.50***	123.12
		(-8.5748)	
ADR	136.38	-14.00***	150.38
		(-6.2625)	
Occupancy	74.70%	-6.28***	80.99%
		(-12.1004)	
Room expense PAR	24.01	-3.21***	27.23
		(-5.0571)	
Room labor expense PAR	15.69	-1.47***	17.16
		(-3.0863)	
Room GOPPAR	63.93	-14.81***	78.74
		(-9.2175)	
F&B revenue PAR	15.56	14.88***	0.67
		(22.5517)	
F&B cost PAR	3.54	3.34***	0.20
		(29.4177)	
F&B labor expense PAR	7.21	6.87***	0.34
		(20.7889)	
F&B GOPPAR	4.81	4.67***	0.14
		(16.5294)	
Total GOPPAR	55.17	-11.98***	67.14
		(-7.9882)	
Room expense / Room revenue	23.66%	1.50%***	22.16%
		(5.1338)	
Room labor / Room revenue	15.52%	1.67%***	13.85%
		(7.4338)	
Room GOP / Room revenue	60.83%	-3.17%***	63.99%
		(-6.2804)	
F&B food cost / F&B revenue	27.55%	0.81%	26.74%
		(0.6618)	
F&B labor / F&B revenue	42.63%	-103.84%	146.47%
		(-1.1416)	
F&B GOP / F&B revenue	29.82%	103.03%	-73.21%
		(1.1350)	
Total GOP / Total revenue	46.20%	-6.55%***	52.75%
		(11.4933)	
F&B revenue / Total revenue	12.15%	11.70%***	0.45%
		(29.0241)	
F&B revenue / Room revenue	15.41%	14.94%***	0.47%
		(21.8748)	
F&B expense / Room expense	14.75%	14.13%***	0.61%
		(33.5514)	
F&B labor / Room labor	44.37%	43.24%***	1.12%
		(17.0890)	
F&B GOP / Room GOP	8.64%	8.52%***	0.13%
		(15.3317)	
Observations	564	-2	566

Note: US dollar; Total revenue includes room revenue, F&B revenue, and other revenue; F&B cost includes cost of goods sold and other miscellaneous expenses; ADR means average daily rate; RevPAR means revenue per available room; PAR means per available room; GOP (Gross operating profit) = Total revenue - Total operating expenses; Difference is the result from t-test with unequal variances; bracket shows t-value; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 5. Full-service hotels

	Full-service Hotels				
	Luxury	**Difference**	**Upper Upscale**	**Difference**	**Upscale**
Total RevPAR	426.56	227.17*** (22.1872)	199.39	76.70*** (28.4468)	122.69
RevPAR	268.77	123.60*** (17.1780)	145.18	31.78*** (14.4823)	113.39
ADR	362.10	177.39*** (17.9509)	184.72	41.33*** (18.8561)	143.39
Occupancy	74.51%	-2.71%*** (-4.4053)	77.22%	-0.62% (-1.4757)	77.84%
Room expense PAR	82.00	41.97*** (17.9082)	40.03	14.41*** (20.6916)	25.62
Room labor expense PAR	53.56	27.60*** (16.6085)	25.95	9.53*** (17.8152)	16.42
Room GOPPAR	133.22	54.02*** (14.0905)	79.19	7.85*** (5.9120)	71.35
F&B revenue PAR	143.35	90.40*** (20.3585)	52.96	44.86*** (39.0855)	8.10
F&B cost PAR	27.04	17.75*** (20.7039)	9.26	7.42*** (33.9695)	1.86
F&B labor expense PAR	83.70	56.34*** (18.9903)	27.36	23.59*** (38.6134)	3.77 (0.1941)
F&B GOPPAR	32.62	16.30*** (9.8784)	16.32	13.85*** (26.3226)	2.47
Total GOPPAR	120.77	48.42*** (12.9650)	72.35	11.18*** (8.0968)	61.17
Room expense / Room revenue	30.65%	3.08%*** (8.7030)	27.57%	4.66%*** (18.7234)	22.91%
Room labor / Room revenue	19.92%	2.42%*** (8.1630)	17.50%	2.82%*** (13.8042)	14.68%
Room GOP / Room revenue	49.43%	-5.50%*** (-8.7513)	54.93%	-7.48%*** (-17.2536)	62.41%
F&B food cost / F&B revenue	19.18%	1.04%*** (2.6577)	18.14%	-9.20%*** (-19.4642)	27.34%
F&B labor / F&B revenue	58.37%	6.30%*** (6.0619)	52.08%	-17.43% (-0.7395)	69.51%
F&B GOP / F&B revenue	22.45%	-7.34%*** (-7.0203)	29.79%	26.63% (1.1320)	3.15%
Total GOP / Total revenue	28.34%	-7.09%*** (-10.6973)	35.42%	-14.06%*** (-32.2070)	49.48%
F&B revenue / Total revenue	33.09%	6.80%*** (10.5312)	26.29%	20.00%*** (42.0042)	6.29%
F&B revenue / Room revenue	57.90%	18.47%*** (11.5736)	39.43%	31.50%*** (35.7240)	7.93%
F&B expense / Room expense	37.71%	11.38%*** (8.8698)	26.32%	18.66%*** (26.2823)	7.67%
F&B labor / Room labor	163.24%	50.14%*** (12.5786)	113.09%	90.39%*** (37.1434)	22.71%
F&B GOP / Room GOP	29.05%	4.98%*** (3.3936)	24.07%	19.70%*** (24.2819)	4.38%
Observations	400	-590	990	-140	1,130

Note: US dollar; Total revenue includes room revenue, F&B revenue, and other revenue; F&B cost includes cost of goods sold and other miscellaneous expenses; ADR means average daily rate; RevPAR means revenue per available room; PAR means per available room; GOP (Gross operating profit) = Total revenue - Total operating expenses; Difference is the result from t-test with unequal variances; bracket shows t-value; *significant at 10%; **significant at 5%; ***significant at 1%.

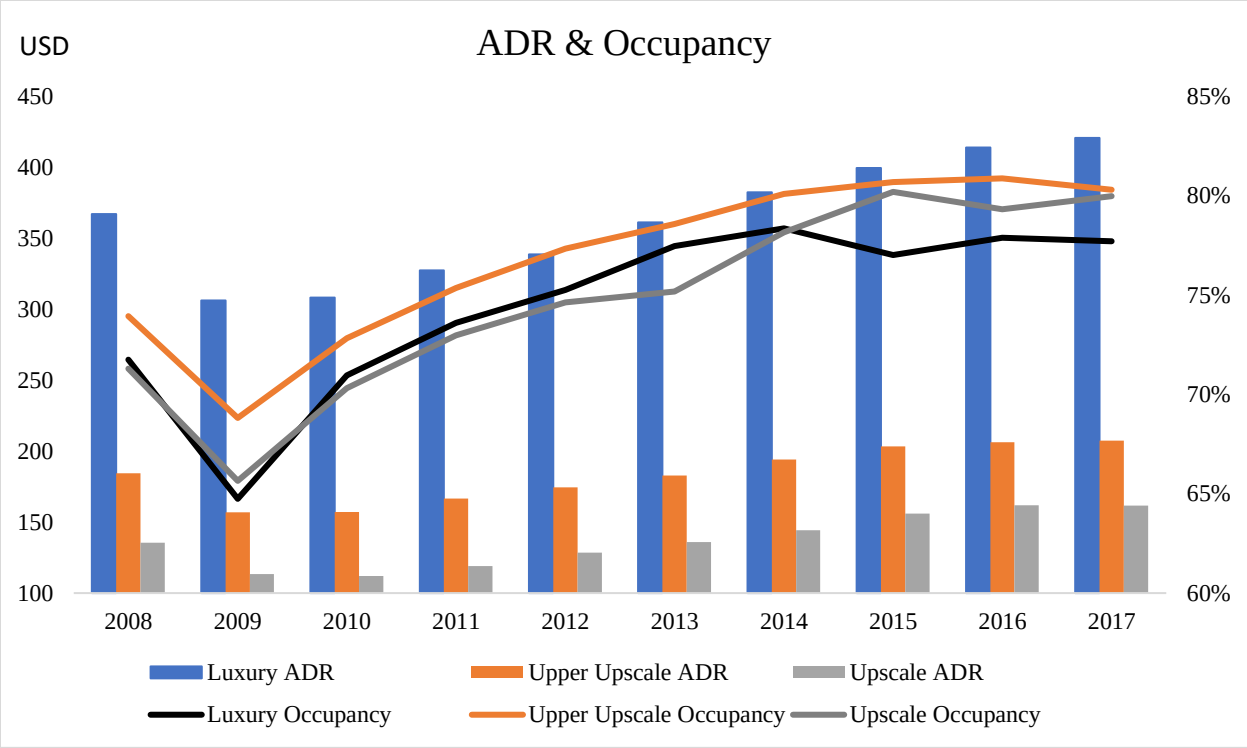

Fig.4. Luxury, upper upscale, and upscale full-service hotels

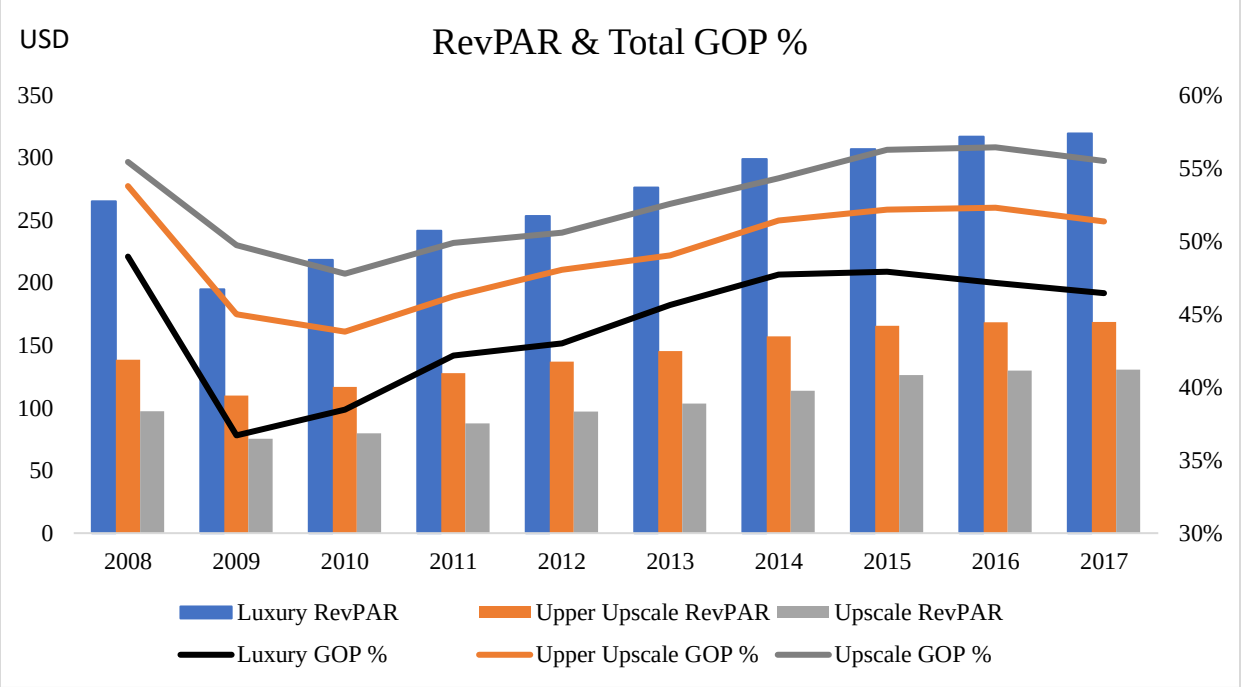

Fig. 5. Luxury, upper upscale, and upscale full-service hotels

Table 6. Two-way random-effects regression analysis: all full-service hotels

	Dependent variable (Rooms only)				
	LogOccupancy	LogADR	LogRevPAR	LogGOPPAR	GOP ratio
Log(F&B Salary /Room Salary)	0.0040	0.0295**	0.0391**	0.0556**	0.0120**
	(0.0094)	*(0.0152)*	*(0.0169)*	*(0.0185)*	*(0.0049)*
LogADR	-0.0664***	-	-	-	-
	(0.0254)	-	-	-	-
LogOccupancy	-	-0.1742***	-	-	-
	-	*(0.0554)*	-	-	-
Class	0.0062	0.3567***	0.3306***	0.3136***	-0.0123**
	(0.0138)	*(0.0339)*	*(0.0312)*	*(0.0297)*	*(0.0056)*
Location Urban	0.0772***	0.1765***	0.2334***	0.1969***	-0.0254***
	(0.0218)	*(0.0510)*	*(0.0551)*	*(0.0547)*	*(0.0085)*
Location Suburban	0.0141	-0.0555	-0.0391	-0.0220	0.0114
	(0.0216)	*(0.0415)*	*(0.0469)*	*(0.0492)*	*(0.0076)*
Age	0.0001	0.0016	0.0016	0.0009	-0.0005***
	(0.0003)	*(0.0013)*	*(0.0013)*	*(0.0013)*	*(0.0001)*
Size	0.0104	-0.0674***	-0.0577**	-0.0922***	-0.0256***
	(0.0085)	*(0.0242)*	*(0.0255)*	*(0.0250)*	*(0.0038)*
Log(A&G /Total Revenue)	-0.2511***	-0.3377***	-0.5334***	-0.6639***	-0.0954***
	(0.0344)	*(0.0623)*	*(0.0697)*	*(0.0794)*	*(0.0104)*
Log(Marketing /Total Revenue)	-0.0602***	-0.0933***	-0.1392***	-0.1723***	-0.0150***
	(0.0163)	*(0.0224)*	*(0.0296)*	*(0.0353)*	*(0.0051)*
R^2	0.5344	0.7214	0.7984	0.7646	0.3970
Wald chi^2	645.07***	2,509.64***	3,000.78***	2,567.06***	890.97***
Observations	1,957				

Note: GOPPAR=(total room revenue-total room expense)/number of total available rooms; GOP ratio=(total room revenue-total room expense)/total room revenue; Class is an order variable that includes luxury (6), Upper upscale (5), Upscale (4), Upper midscale (3), midscale (2), and Economy (1); Location is an order variable that includes urban (2), suburban (3), and others (1 as a base) as dummy variables; Age is years from opening; Size is an order variable with five (5) as the largest and one (1) as the smallest; A&G is administrative and general expense; Marketing is marketing expense; coefficients of year dummies and constant are not reported on the table; bracket presents adjusted robust standard error; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 7. Two-way random-effects regression analysis: luxury full-service hotels

	Dependent variable (Rooms only)				
	LogOccupancy	LogADR	LogRevPAR	LogGOPPAR	GOP ratio
Log(F&B Salary /Room Salary)	-0.0717	0.0471	0.0015	-0.0188	-0.0113
	(0.0521)	*(0.0317)*	*(0.0532)*	*(0.0508)*	*(0.0108)*
LogADR	-0.1219**	-	-	-	-
	(0.0527)	-	-	-	-
LogOccupancy	-	-0.3182**	-	-	-
	-	*(0.1482)*	-	-	-
Location	0.1571**	0.1951	0.2958**	0.2163	-0.0524**
Urban	*(0.0639)*	*(0.1399)*	*(0.1487)*	*(0.1501)*	*(0.0181)*
Location	0.1439**	0.0481	0.1522	0.1553	0.0028
Suburban	*(0.0621)*	*(0.1494)*	*(0.1644)*	*(0.1703)*	*(0.0210)*
Age	0.0003	0.0001	0.0002	0.0001	-0.0001
	(0.0005)	*(0.0021)*	*(0.0022)*	*(0.0021)*	*(0.0002)*
Size	-0.0489*	-0.1574*	-0.1786**	-0.1949**	-0.0112
	(0.0254)	*(0.0878)*	*(0.0888)*	*(0.0886)*	*(0.0077)*
Log(A&G /Total Revenue)	-0.3911***	-0.2678***	-0.5314***	-0.7003***	-0.1114***
	(0.0878)	*(0.0974)*	*(0.1035)*	*(0.1272)*	*(0.0200)*
Log(Marketing /Total Revenue)	-0.0923**	-0.1665***	-0.2173***	-0.2990***	-0.0509***
	(0.0431)	*(0.0610)*	*(0.0702)*	*(0.0840)*	*(0.0132)*
R^2	0.5970	0.7519	0.8281	0.7906	0.5049
Wald chi^2	265.24***	2,054.04***	1,766.28***	1,459.21***	299.10***
Observations	398				

Note: GOPPAR=(total room revenue-total room expense)/number of total available rooms; GOP ratio=(total room revenue-total room expense)/total room revenue; Class is an order variable that includes luxury (6), Upper upscale (5), Upscale (4), Upper midscale (3), midscale (2), and Economy (1); Location is an order variable that includes urban (2), suburban (3), and others (1 as a base) as dummy variables; Age is years from opening; Size is an order variable with five (5) as the largest and one (1) as the smallest; A&G is administrative and general expense; Marketing is marketing expense; coefficients of year dummies and constant are not reported on the table; bracket presents adjusted robust standard error; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 8. Two-way random-effects regression analysis: upper upscale full-service hotels

	Dependent variable (Rooms only)				
	LogOccupancy	LogADR	LogRevPAR	LogGOPPAR	GOP ratio
Log(F&B Salary /Room Salary)	-0.0259*	-0.0199	-0.0202	-0.0142	0.0098
	(0.0147)	*(0.0242)*	*(0.0240)*	*(0.0287)*	*(0.0094)*
LogADR	-0.0968**	-	-	-	-
	(0.0253)	-	-	-	-
LogOccupancy	-	-0.2518***	-	-	-
	-	*(0.0893)*	-	-	-
Location Urban	0.0767***	0.1873***	0.2362***	0.2199***	-0.0119
	(0.0253)	*(0.0602)*	*(0.0650)*	*(0.0670)*	*(0.0107)*
Location Suburban	-0.0079	-0.0926*	-0.0944*	-0.0801	0.0082
	(0.0255)	*(0.0497)*	*(0.0529)*	*(0.0596)*	*(0.0115)*
Age	0.0001	0.0020	0.0020	0.0007	-0.0008***
	(0.0004)	*(0.0014)*	*(0.0016)*	*(0.0015)*	*(0.0002)*
Size	-0.0141	-0.0213	-0.0335	-0.0833**	-0.0356***
	(0.0140)	*(0.0347)*	*(0.0371)*	*(0.0365)*	*(0.0056)*
Log(A&G /Total Revenue)	-0.2238***	-0.3417***	-0.4903***	-0.5992***	-0.0843***
	(0.0526)	*(0.1120)*	*(0.1235)*	*(0.1398)*	*(0.0170)*
Log(Marketing /Total Revenue)	-0.1299***	-0.1825***	-0.2590***	-0.2933***	-0.0134
	(0.0375)	*(0.0672)*	*(0.0819)*	*(0.0906)*	*(0.0109)*
R^2	0.5273	0.6897	0.7866	0.7440	0.3041
Wald chi^2	327.72***	1,287.09***	1,630.32***	1,214.91***	351.25***
Observations	935				

Note: GOPPAR=(total room revenue-total room expense)/number of total available rooms; GOP ratio=(total room revenue-total room expense)/total room revenue; Class is an order variable that includes luxury (6), Upper upscale (5), Upscale (4), Upper midscale (3), midscale (2), and Economy (1); Location is an order variable that includes urban (2), suburban (3), and others (1 as a base) as dummy variables; Age is years from opening; Size is an order variable with five (5) as the largest and one (1) as the smallest; A&G is administrative and general expense; Marketing is marketing expense; coefficients of year dummies and constant are not reported on the table; bracket presents adjusted robust standard error; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 9. Two-way random-effects regression analysis: upscale full-service hotels

	Dependent variable (Rooms only)				
	LogOccupancy	LogADR	LogRevPAR	LogGOPPAR	GOP ratio
Log(F&B Salary /Room Salary)	0.0350*** *(0.0103)*	0.0387* *(0.0232)*	0.0747*** *(0.0273)*	0.1060*** *(0.0254)*	0.0229*** *(0.0082)*
LogADR	0.0261 *(0.0462)*	- -	- -	- -	- -
LogOccupancy	- -	0.0080 *(0.0873)*	- -	- -	- -
Location Urban	0.0129 *(0.0388)*	0.0273 *(0.0819)*	0.0403 *(0.1038)*	0.0315 *(0.1079)*	-0.0073 *(0.0091)*
Location Suburban	-0.0218 *(0.0397)*	-0.0023 *(0.0559)*	-0.0245 *(0.0817)*	-0.0134 *(0.0872)*	0.0081 *(0.0095)*
Age	-0.0011 *(0.0013)*	0.0046* *(0.0026)*	0.0037 *(0.0036)*	0.0029 *(0.0037)*	-0.0005** *(0.0003)*
Size	0.0259* *(0.0144)*	0.0091 *(0.0311)*	0.0355 *(0.0362)*	-0.0128 *(0.0387)*	-0.0354*** *(0.0065)*
Log(A&G /Total Revenue)	-0.1876*** *(0.0355)*	-0.3784*** *(0.0594)*	-0.5750*** *(0.0799)*	-0.6896*** *(0.0854)*	-0.0859*** *(0.0122)*
Log(Marketing /Total Revenue)	-0.0333* *(0.0190)*	-0.0560** *(0.0223)*	-0.0921*** *(0.0296)*	-0.1143*** *(0.0344)*	-0.0167*** *(0.0058)*
R^2	0.5934	0.7959	0.8394	0.8258	0.5298
Wald chi^2	672.31***	1,124.65***	1,048.41***	1,161.67***	580.67***
Observations	543				

Note: GOPPAR=(total room revenue-total room expense)/number of total available rooms; GOP ratio=(total room revenue-total room expense)/total room revenue; Class is an order variable that includes luxury (6), Upper upscale (5), Upscale (4), Upper midscale (3), midscale (2), and Economy (1); Location is an order variable that includes urban (2), suburban (3), and others (1 as a base) as dummy variables; Age is years from opening; Size is an order variable with five (5) as the largest and one (1) as the smallest; A&G is administrative and general expense; Marketing is marketing expense; coefficients of year dummies and constant are not reported on the table; bracket presents adjusted robust standard error; *significant at 10%; **significant at 5%; ***significant at 1%.