

An Analysis Of Characteristics Of U.S. Hotels Based On Upper And Lower Quartile Net Operating Income

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In this article, the authors discuss hotel profitability with an eye toward assisting hotel owners, operators, and developers with the decision-making processes of development and positioning/repositioning by using empirical data to formulate answers to important questions regarding profitability.

When real estate development and management organizations formulate strategies and programs regarding existing and future lodging developments, concepts, positioning and investments, one question that often arises is what level of profitability is generated by different types of hotels? In other words, what characteristics relate to differences in profitability among hotels?

Hotel Profitability

It is well-known and understandable that real estate operators and developers favor more profitable concepts over less profitable ones, as the recent trend towards the development of midscale hotels without food and beverage (restaurant and cocktail lounge operations) over midscale hotels with F&B suggests.¹ In addition, many midscale hotels with food and beverage have been converted to more profitable midscale hotels without food and beverage. Though the profitability goal of hotels is fairly clear, there exists a lack of empirical research regarding the topic.

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This article reveals some of the important relationships regarding hotel profitability. Hotel owners, operators, and developers with the decision-making processes of hotel development and positioning/repositioning can be assisted by using empirical data to formulate answers to such questions as:

- What attributes are correlated with the most profitable hotels?;
- Do high occupancy or high room rates necessarily result in high profits measured by the most commonly used metric for hotel profitability of net operating income (“NOI”) per available room?;
- Are all suite or limited service hotels more or less profitable than full service hotels?;
- Which locations types are the most profitable?; and
- Which Smith Travel Research (“STR”) chain scale segments are the most profitable?

To answer these questions, a defined set of categories were chosen and studied based on STR 2006 data made available for these analyses.

The STR data was analyzed to determine which characteristics of a hotel unit (e.g., average daily rate, occupancy, price level, type of property) corresponded with the upper and lower quartiles of NOI performance.

It is important to note the STR confidentiality of data and specific data available from STR. No hotel (brand affiliation, for example) or the value or investment in the hotels was provided. It could be that a hotel with a relatively low NOI could provide a favorable return on investment, but the data to perform that analysis were not available; thus, the interest was in the attributes that relate to NOI. The results are interesting as well as, in some cases, non-intuitive.

Method

One challenge was understanding how the upper and lower quartiles differed in terms of the following attributes:

- Number of available guest rooms;
- Occupancy percentage;
- Average daily rate (“ADR”);
- Marketing expenses per available guest room; and
- Age of the hotel.

Instead of comparing the groups on one variable at the time, the variables were considered simultaneously to take into account their interrelationships and partially overlapping nature. Therefore, a two-group discriminant analysis was employed and a weighted combination of the previously listed variables to differentiate upper and lower quartile performers. A stepwise estimation approach was used and the model showed a good fit with the data (discriminant function with an Eigenvalue = 1.43, and canonical correlation of .770). An examination of discriminant loadings indicated that the following variables were substantive discriminating variables:

- ADR (.708);
- Occupancy (.598); and
- Marketing expenses per room (.597).

These discriminant loadings indicate the relative importance in discriminating between the two groups. ADR is thus the most important variable followed by occupancy and then marketing expenses per room. Specifically, upper and lower quartile performers exhibited significant differences in NOI based on their ADR, occupancy, and marketing expenses per room, and the higher the ADR, occupancy, and marketing expenses, the higher the NOI. The discriminant loadings for number of rooms (.292) and age of the property (-.089) were below the generally accepted .400 threshold.² Therefore, these variables do not explain differences between upper and lower quartile performance.

Once the combined effects of ADR, occupancy and marketing expenses per room on NOI were determined, the univariate statistics (statistics based on a single predictor/independent variable and a single response/dependent variable) were examined. A comparison of

means across these variables showed that the two groups differed significantly in terms of occupancy (Wilk’s Lambda = .658, $p < .001$), ADR (Wilk’s Lambda = .578, $p < .001$) and marketing expenses per room (Wilk’s Lambda = .724, $p < .001$).

After a determination was made that the discriminant function provided statistically reliable differentiation for the data, the issue was whether it provided meaningful and practical differentiation between the upper and lower quartile NOI performers. To that end, the classification of observations was examined. A total of 94.3 percent of the original cases were correctly classified based on their ADR, occupancy, and marketing expenses and the corresponding figure for a hold-out sample, (which included 135 randomly chosen cases), was 91.9 percent. These high hit ratios provide support for the predictive validity of the discriminant model.

To gain further insight into the underlying characteristics between upper and lower quartile NOI performance, a set of categorical variables were examined, including:

- Scale (luxury, upper upscale, upscale, midscale with food and beverage, midscale without food and beverage, economy, and independent);
- Price level (five categories based on the hotel’s relative ADR within its marketplace);
- Suite status (all suite or not);
- Extended stay status (yes or no);
- Food and beverage status (yes or no based on whether or not the hotel offered food and beverage outlets); and
- Location (urban, suburban, interstate highway, airport, resort, and small town) and region (New England, Middle Atlantic, South Atlantic, East North Central, East South Central, West North Central, West South Central, Mountain, and Pacific).

Mann Whitney test results indicated that the frequencies between the two groups varied in terms of:

- Scale ($Z=19.72$, $p < .001$);
- Price level ($Z=21.62$, $p < .001$);
- F&B status ($Z=5.18$, $p < .001$); and
- Location ($Z=3.74$, $p < .001$).

An examination of the frequency counts for our two-level categorical variable, food and beverage status (hotels having versus those not having food and beverage outlets), indicated that a significantly lower percentage of the upper quartile performers (35.1 percent) had food and beverage outlets while the corresponding percentage was significantly higher in the lower quartile group (54.6 percent).

To examine the differences with our multilevel categorical variables of scale, price level, and location, a standard Pearson chi-square test was utilized and

adjusted standardized residuals for determining the effect size were examined. These statistics were calculated by dividing the difference between the observed and the expected counts for each cell into an estimate of the residual's standard error normalized to have a variance of 1, and were distributed as Z-scores. The results are shown in Tables 1 through 4.

The adjusted standardized residuals for price were significant for most levels (level 1—the lowest price level; level 3—the middle price level; level 4—the second highest price level; and level 5—the highest price level) but level 2 (the second to lowest price level). Specifically, the upper quartile performing hotels were significantly more likely to be lower priced and significantly less likely to be higher priced. This finding is surprising considering that these data represent a time period of economic expansion. Specifically, even during the previous economic expansion, when luxury hotel operators were reporting relatively high revenues, lower priced hotels were significantly more profitable based on NOI related to these empirical data.

In terms of scale, the proportions were significantly different for every single category. In other words, upper quartile NOI performing hotels were significantly more likely to be economy, midscale without food and beverage outlets, midscale with food and beverage, or

independent hotels; the lower quartile NOI performers were significantly more likely to be upscale, upper upscale, or luxury hotels.

Similarly, the frequencies for location across the upper and lower quartile performers were different for all categories but Location 3 (airport hotels). Specifically, the upper quartile NOI hotels were significantly more likely to be located in urban and resort areas, and the lower quartile NOI hotels were significantly more likely to be in suburban, interstate highway, or small town locations.

Finally, regional differences existed for all other regions but Region 1 (New England). This finding indicates that the upper quartile NOI performers were significantly more lower quartile NOI to be located in the Middle Atlantic, South Atlantic, or Pacific regions, while the lower quartile NOI performers were significantly more likely to be located in the East North Central, East South Central, West North Central, West South Central, or Mountain regions. Specifically, hotels located in or near the central part of the United States were significantly in the upper NOI quartile, rather than hotels located on or near either the east or west coasts.

Table 1

Price	Top 25	Bottom 25	Adjusted residual	p-value*
1	481	58	23.1	<.05
2	184	168	0.9	ns
3	38	280	15.5	<.05
4	2	91	9.6	<.05
5	0	104	10.6	<.05

Notes:

Price levels are based on the hotel's relative ADR in its marketplace, and higher numbers indicate higher prices.

ns = not significant

*Cut-off value = 1.96

Table 2

Scale	Top 25	Bottom 25	Adjusted residual	p-value*
1 - Economy	77	3	8.5	<.05
2 - Midscale w/ F&B	318	66	15.0	<.05
3 - Midscale w/out F&B	187	96	6.0	<.05
4 - Upscale	21	127	9.2	<.05
5 - Upper Upscale	24	245	15.0	<.05
6 - Luxury	14	124	9.9	<.05
7 - Independent	64	40	2.4	<.05

*Cut-off value = 1.96

Table 3

Location	Top 25	Bottom 25	Adjusted residual	p-value*
1 - Urban	247	92	9.6	<.05
2 - Suburban	233	395	8.8	<.05
3 - Airport	83	70	1.1	ns
4 - Interstate	2	47	6.6	<.05
5 - Resort	120	36	7.1	<.05
6 - Small Town	20	61	4.7	<.05

ns = not significant

*Cut-off value = 1.96

Table 4

Region	Top 25	Bottom 25	Adjusted residual	p-value*
1 - New England	34	40	0.7	ns
2 - Mid Atlantic	97	38	5.3	<.05
3 - South Atlantic	218	139	4.8	<.05
4 - East North Central	36	96	5.5	<.05
5 - East South Central	12	54	5.3	<.05
6 - West North Central	17	57	4.8	<.05
7 - West South Central	56	124	5.5	<.05
8 - Mountain	49	73	2.3	<.05
9 - Pacific	186	80	7.2	<.05

ns = not significant

*Cut-off value = 1.96

Conclusions

These findings should provide general guidance of benefit to hotel owners, operators, and developers as they develop future plans. The findings indicate that upper quartile NOI performing hotels in the United States were likely to be hotels that do not offer food and beverage outlets and significantly more likely to be lower scale properties offering relatively lower prices. In addition, top performers were significantly more likely to be located in urban and resort areas on either coast. These properties had relatively high marketing expenses resulting in relatively high occupancies, average daily rates, and profit (NOI). One interesting finding was that the size of the hotel and its age were found to be insignificant predictors of NOI performance. Thus, while some older hotels, for example, may be less successful than some newer ones, any such differences may be attributed to the significant variables of ADR, occupancy, and marketing investment.

These findings will also offer additional guidance to lodging decision makers and analysts. This sample represents what are the best available data for conducting research of this type. A study of whether the return on investment is greater for the upper than lower quartile NOI performance was not possible. However, these factual data and statistical tests provide exploratory, empirical, and generalizable conclusions and also appear to confirm some assumptions regarding the relative performance of upper and lower scale hotels.

¹ O'Neill, J. & Mattila, A. The Debate Regarding Profitability: Hotel Unit and Hotel Brand Revenue and Profit Relationships (2006). *Journal of Travel and Tourism Marketing*, 21(2/3), 131-135.

² Hair, J., Black, W., Babin, B., Anderson R., & Tatham, R. *Multivariate Data Analysis*, 6th Edition, Prentice Hall: Upper Saddle River, NJ.