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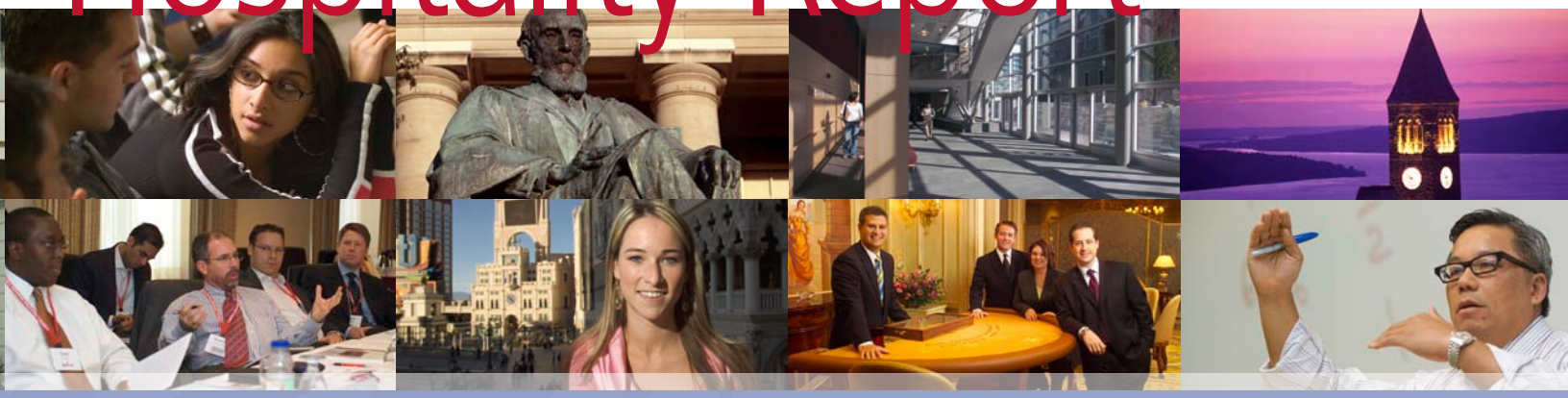
Revenue Management in U.S. Hotels: 2001–2005

by Linda Canina, Ph.D., and Cathy A. Enz, Ph.D.



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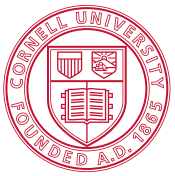

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Revenue Management in U.S. Hotels:

2001 - 2005

by Linda Canina and Cathy A. Enz

EXECUTIVE SUMMARY

Revenue management is executed more closely on average by hotels that price above their competitive set than by those that price below their competitive set. This observation holds true in each year from 2001 through 2005, even as the economic situation of the industry first deteriorated and then improved markedly. There are no differences in the results during economic downturns or rebounds in the lodging industry. However, the degree of revenue management as defined by the correlation between average daily rate (ADR) and occupancy varies across market price segments. In addition, for each hotel price segment the degree of revenue management is greater for those hotels that perform better than their competitors. This provides empirical evidence that revenue management strategies are more prevalent in higher performing hotels.

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Revenue Management in U.S. Hotels:

2001–2005

by Linda Canina and Cathy A. Enz

Revenue management is a strategy applied by most hotels in the United States. A study that we conducted in 2003 found differences in the use of revenue management according to whether a hotel typically sets prices above its competitive set or below its competitors. Using property-level operating data from over 6,000 hotels in all market segments, we found that virtually all hotels adjusted their rates in association with changes in occupancy. Although revenue management was nearly universal, hotels in certain market segments were less likely to adjust rates with occupancy, and some simply did not do so.

That study, however, examined a time when the hotel industry was struggling with poor demand, from 2001 through 2003. In this report, we update and complement our earlier study by comparing the degree of revenue management in hotels with higher RevPAR performance and different pricing strategies than their competitors. Economic conditions in the hotel industry have improved since 2003, and this study includes hotel performance data from 2004 and the first half of 2005. The two periods contrast with each other. Demand during 2001 through 2003 was relatively low, while the industry rebounded in 2004 and 2005. In 2004 the lodging industry experienced the largest percentage increase in RevPAR (7.8 percent) in the previous ten years.[1] In 2001 there was a 6.9 percent drop in RevPAR, followed by a 2.6 percent drop in 2002 and a slight 0.6 percent rise in 2003.[2] This uneven record provides the opportunity to explore whether revenue management operates differently in rising markets than it does in falling markets. Moreover, being able to analyze five years of data on the rate-to-demand relationship also allows us to explore any changes in the practice of revenue management. If the correlations are larger in 2005 than they were in 2001, for example, we would observe that the practice of revenue management is changing.

In this study we examine the degree of linkage between a hotel's rate and its occupancy levels for properties operating in different market segments under various localized

[1] *The Host Study*, Smith Travel Research, 2005, p. 3.

[2] *Ibid.*

competitive situations and various industry-wide economic situations. We are primarily interested in the extent to which hotels employ revenue management. For this determination, we divided the sample into groups. First, we divided the hotels into two groups according to whether they set room rates higher or lower than those of their competitors. In a previous study, we found that hotels that price slightly above their competitors earn more revenue than those competitors do.[3] A related question, then, is whether those high-rate hotels make better use of revenue management than do those who are not pricing as aggressively relative to their competitors. Second, we categorized the sample according to whether the property's RevPAR performance was higher or lower than that of its competitors. This will provide some insight into whether revenue management is a key factor behind RevPAR performance. Knowledge of these empirical relationships may be useful to managers in developing their pricing and revenue management strategies.

The Study

In this study we focus on whether there are strong positive relationships between a given hotel's pricing activity and its occupancy levels. We compare the relationship between average daily rate and occupancy. In so doing, we seek to determine the degree to which hotels in various market segments employ a revenue-management strategy. We can conclude that a hotel is using revenue management when it maintains an approach to pricing in which there is a strong positive association (statistically significant, positive correlation) between occupancy and ADR.

As a starting point to the discussion, a revenue-management strategy would be in effect if prices fluctuated in concert with demand levels. Under such an approach the hotel would as a rule adjust its rates downward during low-demand periods and move them upward in high-demand periods. Many factors shape the pricing decision, but at its core is the idea that good revenue management exists when hotel rates and occupancy are positively correlated. Conversely, if no relationship or a negative relationship exists between rate and occupancy, we can conclude that a hotel is not practicing revenue management.

In this study we explore the relationship between hotels' annual ADR and annual occupancies for the January 2001 through June 2005. Our sample comprises nearly 6,000 hotels each year in five price segments (i.e., economy, midscale with and without F&B, upscale, upper upscale, and luxury). The focus is on individual hotels and their direct competitors in local markets. The data were drawn from the Smith Travel Research database, which is effectively a census of brand-name hotels in the United States. This comprehensive sample is widely considered to be representative of all branded hotels in the United States. Independent hotels were also included in this study as a separate category.

The competitive-set data used in this study are drawn from the aggregate performance of each subject hotel's direct competition. Typically, a competitive set consists of a group of six or more properties selected by a hotel's managers or its parent company. The three key factors used by operators to select hotels in their competitive set are: **(1)** product offering, **(2)** proximity, and **(3)** price. Usually a hotel's managers will select for inclusion in their competitive set hotels in reasonable proximity that offer comparable products and features and maintain rate parity. While proximity may vary by hotel segment, a three-mile distance is a reasonable standard, although a luxury hotel might compete in a wider radius, because it will have fewer closely proximate competitors than does the typical budget hotel.

We chose to analyze annual data rather than monthly data to avoid the influences of pricing and RevPAR irregularities that may have occurred in a particular month. Even though revenue-management programs adjust prices each day, the overall revenue-management program of adjusting prices according to demand conditions will become apparent in an analysis of annual data. Properties were eliminated from the sample if they had less than 12 months of data for 2001 through 2004 and less than six months of data for 2005.

[3] Cathy A. Enz, Linda Canina, and Mark Lomanno, "Why Discounting Doesn't Work: The Dynamics of Rising Occupancy and Falling Revenue Among Competitors," *Cornell Center for Hospitality Research Report*. Vol. 4, No. 7 (August 2004).

Exhibit 1

Correlations of ADR to occupancy, comparing hotels that price below competitors to those that price above

	ADR Relative to							
	Overall		Luxury and Upper Upscale		Upscale		Midscale with F&B	
	≤15% Below	≤15% Above	≤ 15% Below	≤ 15% Above	≤ 15% Below	≤ 15% Above	≤ 15% Below	≤ 15% Above
2001								
Correlation	0.44	0.51	0.33	0.57	0.45	0.37	0.55	0.59
Significance Level	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	(3,043)	(2,461)	(235)	(345)	(232)	(250)	(639)	(501)
2002								
Correlation	0.24	0.27	0.09	0.15	0.19	0.15	0.44	0.44
Significance Level	0.0001	0.0001	0.1650	0.0061	0.0022	0.0132	0.0001	0.0001
Observations	(3,056)	(2,524)	(243)	(329)	(248)	(256)	(622)	(477)
2003								
Correlation	0.24	0.26	0.19	0.20	0.29	0.21	0.27	0.33
Significance Level	0.0001	0.0001	0.0019	0.0006	0.0001	0.0001	0.0001	0.0008
Observations	(3,339)	(2,693)	(258)	(307)	(303)	(247)	(591)	(535)
2004								
Correlation	0.26	0.28	0.24	0.22	0.27	0.21	0.30	0.34
Significance Level	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0005
Observations	(3,422)	(2,861)	(233)	(327)	(286)	(284)	(624)	(533)
2005								
Correlation	0.29	0.36	0.29	0.28	0.27	0.24	0.31	0.41
Significance Level	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	(3,697)	(3,010)	(256)	(365)	(288)	(300)	(650)	(549)
2001-2005								
Correlation	0.30	0.35	0.25	0.28	0.31	0.24	0.39	0.44
Significance Level	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	(16,557)	(13,549)	(1,225)	(1,673)	(1,357)	(1,337)	(3,126)	(2,595)

Extended-stay hotels were excluded from this study because they have unusual demand characteristics, given that the typical traveler stays more than ten days at these complexes. We also excluded resorts because of their seasonality and their frequent inclusion of meals in room pricing.

Revenue Relationships by Pricing Strategy

As we said, we wanted to know whether we could see any difference in the strength of the rate-to-demand relationship for the two groups of hotels—those that position themselves above their competitors and those that set prices below those of their competitors. We explored this question by first testing the relationship between ADR and occupancy for hotels with a strategy of offering prices below those of their competitors, and then we conducted the same analysis for hotels that set rates above those of their competitors. We started by grouping hotels according to their comparative pricing strategies. So, for example, a hotel that underprices the hotels in its competitive set will be placed in the lower-than-competitor pricing category. Using a Pearson product-moment correlation we looked at the statistical significance of the relationship between ADR and occupancy for hotels that were pricing above their competitors and for those pricing below their competitors. The extent of a strong positive, significant correlation between rate and demand would be interpreted as empirical evidence of the degree to which a hotel employs a revenue-management strategy.

We made a year-by-year analysis of all hotels and then conducted an additional analysis for each price segment. We also performed a comprehensive five-year analysis employing over 30,000 observations for the entire period. For each grouping, we calculated the Pearson product-moment correlation coefficients between ADR and occupancy. In this correlation analysis the value of the coefficient measures the degree of association between a hotel's ADR and its occupancy.

Competitive Set						
Midscale without F&B		Economy		Independent	
≤ 15% Below	≤ 15% Above	≤ 15% Below	≤ 15% Above	≤ 15% Below	≤ 15% Above
0.42	0.41	0.30	0.43	0.58	0.50
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
(1,000)	(926)	(751)	(269)	(186)	(170)
0.27	0.28	0.14	0.19	0.34	0.23
0.0001	0.0001	0.0001	0.0023	0.0001	0.0084
(1,061)	(1,075)	(738)	(257)	(144)	(130)
0.19	0.26	0.01	0.06	0.17	0.06
0.0001	0.0001	0.7040	0.2858	0.0681	0.4520
(1,136)	(1,169)	(932)	(297)	(119)	(138)
0.23	0.22	0.04	0.09	0.35	0.15
0.0001	0.0001	0.2405	0.0995	0.0001	0.0651
(1,240)	(1,253)	(910)	(310)	(129)	(154)
0.25	0.28	0.11	0.16	0.26	0.45
0.0001	0.0001	0.001	0.0027	0.0013	0.0001
(1,388)	(1,285)	(964)	(347)	(151)	(164)
0.27	0.28	0.13	0.22	0.37	0.31
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
(5,825)	(5,708)	(4,295)	(1,480)	(729)	(756)

The Five-year Analysis

As shown in Exhibit 1 the overall or comprehensive performance of over 30,000 observations over the entire 2001-through-2005 period showed positive, significant correlations between ADR and occupancy, indicating the pervasive use of revenue management. This was true regardless of whether a hotel maintained higher prices than its competitors or undercut its competitive set's prices. Clearly, then, hotels work to match their rates to demand. Comparing the strength of the relationship across the five market segments revealed that some of the strongest correlations were for midscale hotels that offered food and beverage.

Lower Price Competitors

Hotels that consistently set their prices below their competitors were generally good revenue managers (coefficient = .30). Of the hotels that priced below their competitors, midscale hotels with F&B (coefficient = 0.39) recorded the strongest relationship between rate and occupancy, followed in descending order by independents (coefficient = 0.37), upscale (coefficient = 0.31), midscale without F&B (coefficient = 0.27), luxury and upper upscale (coefficient = 0.25), and economy hotels (coefficient = 0.13). It is interesting that the hotels that positioned themselves in the commodity-like economy segment and those in the highly differentiated luxury and upper upscale segments had the weakest rate-to-demand relationships. This finding is most likely due to rate integrity. The luxury and upper-upscale segments avoid rate manipulation as being detrimental to their value proposition. The economy segment offers a different type of value proposition, but also attempts to maintain rate integrity. Rates for those properties may essentially be fixed across certain demand periods because of advertised and promoted rates. In plain language, luxury is about high rates regardless of demand, and economy hotels are about low prices regardless of demand. It is in the huge middle market that operators find room for rate movement, as indicated by our findings that most hotels that offered low rates relative to their competitors were actively engaged in altering their rates with shifts in demand.

Higher Price Competitors

Performing the same analysis for hotels that priced above their competition, we found that the relationship between their rate and occupancy was also positive and statistically significant, both overall (coefficient = .35; $p < .0001$) and for each market segment. For this group of hotels, the strongest relationship again occurs for midscale with F&B (coefficient = 0.44), followed in descending order by independents (coefficient = 0.31), midscale without F&B (coefficient = 0.28), luxury and upper upscale (coefficient = 0.28), upscale (coefficient = 0.24), and economy (coefficient = 0.22).

We note that a stronger rate-and-occupancy relationship exists for hotels that price above their competitive set than applies to those that priced below the competition. This is indicated by the correlation coefficient of .30 for the below-competitor properties and .35 for the above-competitor group. However, for upscale hotels the correlation between

Exhibit 2

Correlations of ADR to occupancy, comparing hotels with RevPAR below competitors to those with RevPAR above

	Overall RevPAR		Luxury and Upper Upscale RevPAR		Upscale RevPAR		Midscale with F&B RevPAR	
	Less Than Competitors	Greater Than Competitors	Less Than Competitors	Greater Than Competitors	Less Than Competitors	Greater Than Competitors	Less Than Competitors	Greater Than Competitors
2001								
Correlation	0.43	0.44	0.39	0.47	0.29	0.50	0.49	0.56
Significance Level	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	(2631)	(2873)	(223)	(357)	(201)	(281)	(605)	(535)
2002								
Correlation	0.22	0.20	0.14	0.09	0.11	0.21	0.39	0.40
Significance Level	0.0001	0.0001	0.0330	0.0894	0.1131	0.0003	0.0001	0.0001
Observations	(2675)	(2905)	(231)	(341)	(226)	(278)	(583)	(516)
2003								
Correlation	0.20	0.19	0.15	0.14	0.15	0.26	0.21	0.25
Significance Level	0.0001	0.0001	0.0228	0.0097	0.0181	0.0001	0.0001	0.0001
Observations	(2859)	(3173)	(228)	(337)	(245)	(305)	(591)	(535)
2004								
Correlation	0.22	0.22	0.23	0.19	0.13	0.26	0.22	0.29
Significance Level	0.0001	0.0001	0.0005	0.0007	0.0444	0.0001	0.0001	0.0001
Observations	(3059)	(3224)	(229)	(331)	(241)	(329)	(663)	(494)
2005								
Correlation	0.29	0.28	0.17	0.33	0.13	0.27	0.31	0.26
Significance Level	0.0001	0.0001	0.0064	0.0001	0.0389	0.0001	0.0001	0.0001
Observations	(3299)	(3408)	(256)	(365)	(237)	(351)	(701)	(498)
2001-2005								
Correlation	0.28	0.28	0.22	0.27	0.18	0.32	0.34	0.37
Significance Level	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	(14523)	(15583)	(1167)	(1731)	(1150)	(1544)	(3143)	(2578)

rate and occupancy, with a coefficient of .31, was higher for the below-competitor properties than it was for the above competitor group, with a correlation of 0.24 for those upscale hotels that priced above their competitors. A similar reversal occurred for independent hotels that priced below their competitors, with a correlation of 0.37, compared to 0.31 for independent hotels that priced above their competitors. In spite of that observation, since the correlation coefficients are positive and statistically significant, we can state that hotel operators industry-wide are employing revenue management approaches by varying their rates as occupancy rises or falls. Moreover, from 2001 through 2005 hotels that priced above their competitors adjusted rates more closely to demand than did hotels that priced below their competitive set.

Year-by-year Pricing Activity

To determine whether the relationship between rate and demand altered as the economic conditions of the lodging industry changed from 2001 through 2005, we analyzed the data for each year separately. In 2001 the economic condition of the industry was deteriorating, while during the latter part of 2003 the industry was rebounding. Despite the differences in the industry's fortunes in various years, Exhibit 1 reveals that the correlations between rate and occupancy are positive and statistically significant for each year of the five years in our study. Furthermore, in each year the strength of the relationship is greater for hotels that price higher than their competitors than for those hotels that price lower than their competitors. The year 2001 is noteworthy since the strength of the relationship between rate and demand is much higher for that year than in each of the other years.

Midscale without F&B RevPAR		Economy RevPAR		Independent RevPAR	
Less Than Competitors	Greater Than Competitors	Less Than Competitors	Greater Than Competitors	Less Than Competitors	Greater Than Competitors
0.40	0.34	0.28	0.28	0.50	0.51
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
(844)	(1082)	(569)	(451)	(189)	(167)
0.21	0.22	0.07	0.15	0.15	0.24
0.0001	0.0001	0.1226	0.0019	0.0105	0.0088
(922)	(1214)	(560)	(435)	(435)	(121)
0.12	0.17	-0.08	0.04	0.10	0.01
0.0002	0.0001	0.0372	0.3990	0.2762	0.8910
(970)	(1335)	(692)	(537)	(133)	(124)
0.09	0.18	0.00	0.00	0.13	0.24
0.0032	0.0001	0.9531	0.9133	0.0997	0.0078
(1104)	(1389)	(659)	(561)	(163)	(120)
0.19	0.21	0.02	0.13	0.33	0.43
0.0001	0.0001	0.6604	0.0030	0.0001	0.0001
(1172)	(1501)	(752)	(559)	(181)	(134)
0.21	0.21	0.07	0.14	0.28	0.33
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
(5012)	(6521)	(3232)	(2543)	(819)	(666)

The tragic events of 2001 clearly led many hoteliers to drastically adjust rates because of sudden drops in occupancy. While our previous work has revealed that dramatic discounting did not yield the desired outcome, it is clear for this analysis that hotel operators did not tie their rates to demand in subsequent years quite as strongly as they did in 2001. In fact the substantially lower correlations between rate and occupancy for luxury hotels in 2002 may suggest an effort to correct overenergetic revenue management.

Segment Analysis

As we said, the correlations between rate and occupancy are generally greater for hotels that price higher than their competitors. Let's focus for a moment on the fact that this observation does not apply to luxury and upper upscale hotels in 2004 and 2005. We believe that the economic rebound freed high-price luxury hotels from having to apply revenue-management constraints. Instead, they could maintain their rate structure. At the same time, competitors that used a low-price strategy showed stronger rate-to-demand relationships, indicating that those hotels are carefully raising and lower prices with demand. Indeed we found it interesting that upscale hotels which underpriced their competitors were more aggressive revenue managers in all five years. On the other hand, in the midscale and economy segments the hotels that are the stronger rate-to-demand managers were those that kept prices higher than their competitors.

Revenue Relationships by Performance Outcomes

To what extent does a strong rate-to-demand relationship exist for hotels that outperform their competitors? To answer this question we explored revenue management for hotels with higher RevPAR than that of their competitive set and those with lower RevPAR. Since a fundamental objective of hotel operators is to maximize RevPAR performance, we analyzed whether revenue-management strategies differ for hotels that perform better than competitors compared to hotels that perform worse than their competitors. We compared the relationship between average daily rate and occupancy for hotels that achieved annual RevPAR performance above their competition and for those that recorded RevPARs below those of their direct competitors. This approach to analysis provides the opportunity for empirical discovery of the degree to which a strong rate-to-demand relationship (i.e., revenue management) exists for both high- and low-performing hotels across various market segments. Exhibit 2 shows the Pearson product-moment correlation coefficients between rate and occupancy for high and low RevPAR performing hotels in each of the last five years and for each segment of the industry.

The Overall Period 2001–2005

Hotels with both high and low RevPAR performance showed positive, significant correlations between ADR and occupancy during the 2001-through-2005 period. This finding (coefficient = .28) underscores the idea that all types of hotels use revenue management. The strength of the relationship is

This study provides empirical evidence that the implementation of revenue management is valuable.

approximately the same regardless of a hotel's performance relative to its direct competitors. In essence both high- and low-performing hotels are manipulating rates in concert with occupancy. However, as the data in Exhibit 2 reveal, differences in revenue management do exist in specific segments when comparing low- and high-performing hotels. For the all five years aggregated, higher performing hotels had stronger rate-to-demand correlations. While we cannot conclude anything about causality from this study, it is possible that higher performing hotels better at matching rate to occupancy. Taking the correlation from the other direction, it may be that some hotels' ability to manage revenue more assiduously contributes to their higher RevPAR performance. Whatever the cause, higher performers have stronger correlations between ADR and occupancy. The only exception occurs for midscale properties without F&B, for which the coefficients are the same (coefficient = 0.21). For those hotels with RevPAR greater than their competitors, the strongest relationship is for the midscale with F&B segment (coefficient = 0.37), followed by independents (coefficient= 0.33), upscale (coefficient = 0.32), luxury and upper upscale (coefficient = 0.27), midscale without F&B (coefficient = 0.21), and economy (coefficient = 0.14).

A year–to-year analysis shows that high-performing upscale hotels are the most consistent year after year in showing the strongest revenue management. That type of consistency was not in evidence over the five years for luxury hotels and midscale hotels with F&B. In the case of luxury hotels, revenue management was stronger for lower performers in 2002, 2003, and 2004. A reversal occurred in 2005, when higher performing luxury hotels recorded the stronger rate-to-demand relationships. The reversal went in the opposite direction in 2005 for the midscale hotels with F&B, when lower performers began engaging in more revenue management than the higher performers. The remaining hotel segments appeared to have a more stable relationship from year to year. As is true of the entire sample, the strength of the relationship in 2001 is higher than in any other year for each of the market price segments. There are only a few exceptions to the observation that the strength of the relationship is greater for those hotels that achieve greater RevPAR than their competitors. The results by year are significantly positive for each segment with the exception of the economy segment, in which in some performance groups for the years 2002 through 2005 had insignificant relationships between rate and demand. In the case of 2003, lower performing economy hotels actually had ADRs fall as occupancy rose.

Conclusion

Our study found all hotels applying rate-to-demand revenue management. Hotels that price higher than their competitors have strong, positive correlations between their ADRs and occupancies. The correlation coefficient is higher for hotels that price above their competitors than it is for hotels that price below their competitors. This result holds for the luxury and upper-upscale segments, midscale with or without food and beverage, and the economy segments. In contrast, for upscale and independent properties, the correlation coefficient is greater for hotels that price below their competitors, suggesting that lower-price hotels rely more on revenue management in these segments. These results are consistent each year over the 2001-through-2005 time period. Thus, we can conclude that revenue management is in effect despite the economic condition of the lodging industry.

Further, this study provides empirical evidence that the implementation of revenue management is valuable. The correlation coefficient between rate and occupancy was higher for hotels that performed better than their competitors. This result held for each price segment excluding midscale without F&B, for which the correlation coefficients were equal for both performance groups.

This study provides evidence of strong revenue management in the lodging industry overall, but also suggests that hotels that price above their competitors and have stronger performance are in many instances even more proactive in adjusting rate to demand. What this study has not examined are other factors that contribute to the effective implementation of revenue management. For example, it is likely that a manager's experience with revenue management programs and that manager's ability to fine-tune the system are key factors. In addition, whether managers', owners', and other key stakeholders' interests are aligned will contribute to the effective use of revenue management. As an example of failure of alignment, the sales manager's objective may be to fill rooms, while the revenue management director seeks to maximize revenue. Beyond that, an owner's expectations and concerns may influence a general manager's approach to revenue. Future studies should continue to expand our understanding of this topic by investigating the impact of factors such as management structure, owner relations, and revenue system experience, as well as others factors that serve to shape the effectiveness of revenue management. ■

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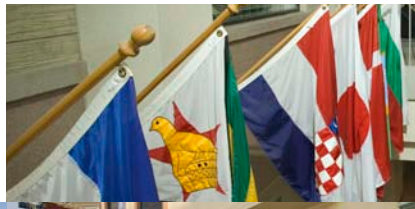

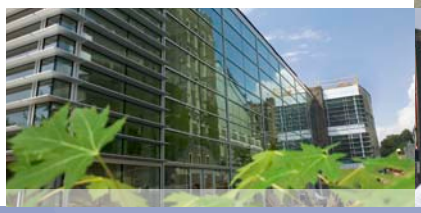

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