

# Discounting Works: A Structural Approach to Understanding Why

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# The Dick Pope Sr. Institute *for* Tourism Studies

at the

UCF Rosen College *of* Hospitality Management

## **Discounting Works: A Structural Approach to Understanding Why**

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## **Abstract**

Hotel managers have long toiled over a course of action that would help them preserve hotel revenue during diminished demand seasons. They have responded to this challenge by discounting hotel room rates to sustain revenue and the means by which they could determine how discounting could increase hotel financial performance. That revenue would otherwise be lost when supply of rooms exceeds the demand. Their need to find a procedure to aid them in solving hotel occupancy problems that threaten that revenue has been a source of discussion throughout the industry. However, most of the studies are more prescriptive and normative in scope rather than focusing on providing explanation of the behavioral pricing of hotel managers. This paper departs from previous studies in that it aims at providing an explanation of the discounting behavior and claims that discounting works in the short-term in the case of a perishable product (hotel rooms).

*Key words: discounting, perishable products, dynamic industry, seasonality, equilibrium, hotel manager, average price approach*

## **Introduction**

The hotel industry has a dynamic quality. It is a cause-effect institution that is given to fluctuations of financial performance as caused by consumer needs and demands, and product availability. Such variability in performance could be costly to the business, especially in the context of experience goods. As a result, hotel managers are charged with developing strategies to offset the imbalances that a fluctuating market creates in terms of supply and demand. Principal to that imbalance is the lack of demand for hotel rooms during diminished demand seasons. Thus, as occupancy levels decrease, supply of hotel rooms increase. In the process, managers scramble to find a way to make up for the revenue lost during this low demand season.

## **Explaining Discounting**

Traditionally, managers responded to the challenge of restoring lost revenue by engaging in discounting strategies. The discounting process involves offering a room rate that is below the average premium rate. Managers calculate the discounted rate by identifying the occupancy level that is necessary to hold the total revenue, less marginal costs, constant after the average daily rate (ADR) of a room is discounted. Here, the manager's objective is to increase hotel financial performance by bringing the market back to equilibrium. This equilibrium translates to a hotel room rate that balances supply and demand.

For the reason that occupancy rates are a key factor in hotel financial performance, discounting could be used as a short-term pricing strategy to generate revenue through the sale of a hotel's room nights. Because room nights are perishable

products, managers recognize that the value of a room night becomes zero if not sold by a specific point in time. Therefore, discounting may inflate a low occupancy percentage and increase hotel financial performance during low demand conditions.

The literature has been critical about discounting. Studies imply that discounting entails losing money (or potential revenues) and they suggest instead the use of average prices. These prescriptions rely on two sets of arguments: 1) lost revenues due to discounting are not compensated for through an increase in volume of sales (occupancy); and 2) it takes a long time to recover from rate reductions, and therefore securing price integrity is crucial to a hotel's profitability.

This study takes issue with the previously mentioned arguments in two ways. First, average behavior of managers could only make sense in the long run, because outcomes that result from expectations do not necessarily confirm and conform to those expectations. Even if everybody shares the same motivation (maximizing profits), and if everybody expects the same average behavior (do not discount), they will systematically displace the average from where they thought it would be. Hotel managers will make allowance for everybody else's bias and adjust his/her own performance, which then further aggravates the displacement. Consider a manager that wants to earn a little above the industry average. He/she raises the room price, other hotel managers follow suit, and the pattern of increasing prices to rise above those of the competitors' continues until the prices stabilize and no one can afford to earn above the average. What managers do will affect what other managers do. Therefore, the degree of quality with which each manager accomplishes his/her goal becomes dependent on what others are doing.

Second, even if managers have complete information and trust in each other, outcome might still deviate from expectations because the individual abilities of managers to adjust to the market conditions might be different. Thus, some managers may make compensating adjustments more readily than others. The consequence of this uneven distribution of ability is a kind of flip flopping in pricing, which some literature refers to as a "*bazaar*" kind of behavior. We prefer to label this adjustment process as self-correcting expectations. In actuality, if this process is a continuous one, we may have trends inducing a behavior that ultimately will become in-sync with expectations.

The study therefore focuses on the explanation of the behavior of discounting of hotel managers. In addition, it addresses the issue of whether discounting facilitates the profitability level of hotel operations. The study claims that discounting is a rational response of managers to the market conditions present in the hotel industry, and that it may work in the short-term. The study uses a case study to illustrate its claim.

### **Setting Room Rates**

Hotel managerial pricing decisions are subject to risk and uncertainty and may lead to more than one explanation about revenue outcome. One possible explanation is that managers set prices based on instinct. For example, you may recall working for a manager that developed "*rules of thumb*" for pricing a hotel room to measure performance. Perhaps, his/her "*rules of thumb*" incorporated their years of experience, common-sense best practices, or even a "*gut feeling*." This gut feeling reaction and common-sense practice may not work in an increased competitive setting and in the

context of a volatile demand pattern. In addition, it would be very difficult to establish behavioral patterns and, therefore, impossible to learn from regularities in behavior other than that common sense or instinct was used to set prices. This tacit knowledge would be difficult to convert into organizational knowledge.

Another technique explaining price setting behavior is the use of historical averages of room rates to forecast viable future room rates. This practice identifies the application of averages as a more secure method than simply forecasting room sales and demand based on gut feeling and instinct. Studies that conclude that using an average room rate is the best practice to pricing a hotel room base their claim on a commonly expressed complaint of some hotel managers, “*We have occupancy now but not an average room rate!*” This strand of analysis, like “*gut feeling*,” also rejects discounting as a viable way to price room rates. This perspective contends that, despite an increase in occupancy rates, the hotel still suffers from a decrease in revenue per available room (RevPAR).

Yet, they may still have erred in pricing in the short-term because they were guided by correlative perspectives regarding the relationship between room rates and financial performance. The ability to use correlations depends on the relationship between variables and whether this relationship remains relatively stable over time; a condition that is not evident in the price setting process of the hotel industry. Some of the familiar challenges to setting room rates are the availability of the hotel’s fixed capacity of rooms, the perishability of the product (room night), high fixed costs of operation, and the seasonal imbalance between a hotel’s room supply and demand.

Another plausible explanation of price setting behavior is that managers discount regularly from their set rack rates. Rack rates are set based on cost plus a mark-up without taking into account price elasticity of demand. In this manner, managers are not likely to be able to charge those rates, resulting in constant price adjustments to respond to demand changes. Some refer to this reality as a “*bazaar*” ambience for price setting. Still others take a normative stance on this behavior by asserting that this action imperils revenue generation and optimization of future profitability of the hotel. They promote price integrity as a sound pricing strategy that translates to an optimizing behavior.

### **A Structural Explanation for Pricing Behavior**

Managers may routinely use the room rate of the immediate past to forecast the appropriate room rate for the future. This means that they typically assume that present market conditions will behave similar to those of the past (rational expectations theory). Analysis of past historical data allows the manager to expect that a short-term discounting pricing strategy may guarantee that long-term strategies yield long-term revenue and profit growth. This approach recognizes that an equilibrium price exists when supply of hotel rooms in a given market equals the consumer demand for hotel rooms in the same market. This may be true in the long-term, but not in the short-term because of the oscillating uncertainties of the demand that is prevalent in seasonality. This means, prices rise when demand is strong, and prices fall when demand is weak.

Such an approach is appropriate for the hotel industry because the inventory of hotel rooms cannot be stored like that of tangible goods. In truth, a hotel room represents a product that is close to a “*pure service*.” That is, if the room night goes unsold, the revenue of the room is lost and its possible contributions to high fixed overhead costs are lost as well. Therefore, when the demand for hotel rooms is weak (low season), it may be in the best interest of hotel managers to implement a short-term discounting strategy based on historical seasonal room rates that will sell the room and include a profit; as well as cover the variable cost associated with serving that room.

However, using averages and maintaining price integrity is a dangerous position. The use of averages assumes that revenue outcome of a month is completely independent of the previous month. But this independence assumption does not seem to conform to a manager’s behavior. Managers know that, when occupancy falls short of expectations, they cannot make adjustment through room supply in the short run. So, the only possible option for adjustment in the short-term is price setting. Managers typically take the price outcome of a present time period and continue it in the future. Therefore, managers seem to take the past into account thus violating the independence assumption made by those who espoused the use of average prices.

In other words, studies that do not support the use of discounting may be biased because researchers who encourage the use of an average room rate instead of a discounted room rate, may not have properly assessed the statistical properties that a time series data set assumes in order to establish that a “*cause and effect*” relationship between discounting and hotel financial performance exists. As previously alluded, the problems of using an average room rate could be avoided if managers consider seasonal demand characteristics of the hotel industry. Hotel managers that are advised to set future room prices based on past information of averages can rely only on what they think they know.

However, as the future is not the same as the past, they err on setting the price. As a result, the managers begin the seasonal price adjustment process of hotel rooms in an effort to determine the room rates that could insure the most rooms at the greatest profit. In reality, the concept behind room rate pricing is similar to setting a thermostat on an air conditioning unit. Past average temperatures have no relevance to setting the thermostat temperature today. Instead, the thermostat is a mechanical process that adjusts to the present environmental conditions of heat. Likewise, hotel room rates are dependent on present conditions of seasonality.

Studies that implement price strategies such as averages of room rates rather than discounting assume that a simple linear correlation between room supply and demand accurately represents the consumption trends in the hotel industry. However, the use of a simple linear model to demonstrate the relationship between supply and demand ignores the effects of fluctuating demand patterns that seasonal consumption produces in the hotel industry.

Forecasting of seasonal consumption should not assume a linear function over time. This is because of the perishable nature of the available room inventory. It cannot correspondingly expand or contract according to the seasonal demand spikes and

plummets. The use of averages to set room prices may be an appropriate strategy to use when supply and demand are in balance, but is most likely an ineffective strategy when the market is in a state of disequilibrium.

The potential managerial consequences of continued implementation of the averages price approach during the industry's volatile demand cycles could result in an inflation of room rates for which the market is not willing to pay. This pricing error may then result in the loss of potential revenue that could negatively affect the overall financial performance of the hotel.

## **Study Results**

It is understood that a manager could set appropriate price adjustments and estimates to account for nonstationarity conditions (high and low demand seasons) with the detection of data trends that indicate if a variable is dependent on the previous values of that variable. This statistical implication confirms if historical data points "*hold memory*."

Time series data sets that "*hold memory*" are said to have a unit root. A unit root may cause serial correlation problems which can be resolved by including a number of lags to the time series data set. The number of lags is determined through a series of statistical tests (called ADF tests.) After resolving the issue of correlation, the study proceeded to conduct cointegration analysis.

Cointegration means that there is a combination of variables which in their natural form are nonstationary. However, if the variables are integrated in their first difference form, they become stationary. This indicates that a long-term linear relationship exists between the variables of discounting and financial performance. That relationship prevents the variables from drifting apart. The results of the cointegration analysis in this study revealed that discounting and financial performance were expected to converge, or come together, to a meaningful equilibrium over time.

To illustrate the practical use of cointegration analysis and its potential in supporting management revenue decision making, the study used three years of historical financial data from a convention hotel in Orlando, Florida. The research incorporated a thorough academic analysis of the properties of a time series data set, as well as complex statistical models that may verify the use of discounting hotel room rates as a viable strategy to increase hotel financial performance during times of decreased demand.

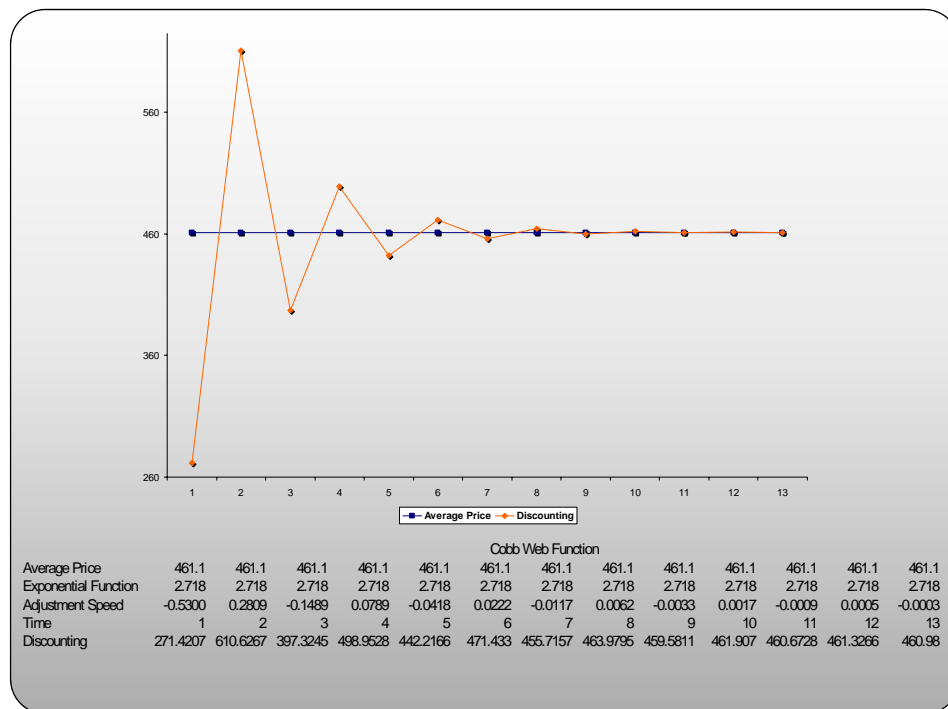
In the case of this study, the time series data set revealed that the discounting variable contained a unit root. Essentially, then, using a previous discounting data point (fiscal period) may be used to predict the next fiscal period's discounted rate. A unit root can mean two things: 1) in the short run there is a constant adjustment process that may err on the room price and produce biased estimates of the equilibrium relationship between variables; and 2) in the long run discounted rates could return to a long-term mean regardless of the increase or decrease in seasonal demand. Managers may like to know how long these short and long run processes will take. In order to determine if

discounting and financial performance will converge, or attain equilibrium over time; managers may use a cointegration regression model.

The findings from the cointegration analysis validated the recommendation to further analyze the variables within the time series data set by using an error correction model. The purpose of the error correction model is to display whether discounting and financial performance have both a short and long-term relationship. The results of this test suggested that discounting and hotel financial performance also have a short-term relationship (seven months.) These statistical procedures bear significant implications for hotel managers.

Figure 1 displays the pricing behavior of the examined hotel. The original price level was set at the premium price in accordance with the expectation of demand. If the customers' demand is less than expected at  $T_1$ , then the hotel manager adjusts price to  $P_2$  at  $T_2$ , which stimulates demand. Provided that supply is inelastic compared with demand, the fluctuations progressively reduce to a stable short run equilibrium (the cone effect).

Figure 1  
Results of the Cointegration Analysis



Note: The above figure conceptualizes the results of the cointegration analysis indicating points of convergence between discounting and hotel financial performance.

## Implications



The practical implications of this study indicate that managers may use short-term discounting as a means to increase hotel financial performance. Further, in the case of the examined hotel; it was found that it is possible for a hotel manager to rely on the hotel's historical financial data for approximately seven months from any given fiscal period to forecast the effects of a discounted room rate on hotel financial performance. However, after seven months, the effects of discounting may become diluted in the data set and may no longer be detected as having an effect on financial performance.

This study proposed a more practical industry approach in the implementation of discounting room rates as is in keeping with diminished demand. Trend analysis (error correction model) determined that hotel managers may use historical financial data to establish the upper and lower price bands that act as indicators of seasonal financial performance. The price bands may provide critical limits of the expected effects of discounting on hotel financial performance. While a manager may err in the pricing of a room by deviating from appropriate seasonal rates, price bands may allow him/her to readjust optimal room rate in the short run.

Although the manager may err in the pricing of a room by going over or under the suitable seasonal rate, the use of the upper and lower price bands creates a self-adjusting optimal room rate in the short run which is likely to result in an increased hotel financial performance during weak demand conditions. The use of averages assumes that past performance is not important. Averages further assume that managers do not embrace and employ their knowledge regarding which pricing strategies worked in the past and how those strategies could assist them in the preparation of uncertain seasonal demand conditions of the future.

In the short-term, it is impossible to use averages to set prices in the hotel industry. The structural characteristics of the industry impede such a pricing behavior. That is, demand response is unclear, supply of rooms is inelastic, and the rooms are perishable. Managers know and understand these characteristics but may not always grasp, or may be ill advised about, the most appropriate strategy to use to set prices. This study has contended that managers may use the immediate past to predict pricing.

Using price averages without taking the immediate past into account could be detrimental to the continued financial success of a hotel. This behavior means that the nature of price patterns of a hotel could be crucial to the determination of price setting. The properties of the examined hotel's time series data set indicated that managers from that hotel accessed past performance when setting prices. This was supported by the exposure of unit roots in the data set. Therefore, the authors of this white paper contend that the price of tomorrow contains memory from previous price points; and, that price evolves and is interdependent over time.

## **Conclusions**

The results of this study indicated that using averages of room rates may not be an effective method to determine an optimal seasonal room rate to balance supply and demand. This method provides the wrong implications for managers. The use of averages requires that all competitors have access to all available market information and

that they respond to market pricing in the same manner. This is not a realistic perspective of management. Further, using an average method may jeopardize the capture of revenue and market equilibrium.

The results are unique in that the research recognizes the challenges of the industry's dynamics as they affect discounting pricing decisions; and addresses the "how to" pricing concerns of hotel managers. Importantly, the results are empirically supported through a robust theoretical framework that incorporates the cobweb model theory and the rational expectations theory.

The findings of this study were statistically significant and may be beneficial to hotel managers when attempting to determine the most lucrative hotel room rate according to the seasonal demand conditions of the market. Hotel managers may expect that by discounting room rates, hotel financial performance will increase as occupancy rates increase. However, these results do not suggest that discounting is a viable solution to increasing hotel financial performance over the long run.

The study not only focused on establishing the rational behavior of hotel managers in discounted room price setting, but also attempted to explain the discounting patterns or pricing scheme from the data. The results derived from the statistical analyses of this study may provide managers with valuable insight regarding how to surpass competitors in the maximization of revenue 365 days a year when properly accounting for the imbalances of supply and demand in the hotel industry.

*For more information regarding the study's results, the use of an error correction model, and industry application, please contact the corresponding author of this article at [ksemrad@mail.ucf.edu](mailto:ksemrad@mail.ucf.edu)*

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