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**Restaurant Revenue Management:
Do perceived scarcity of space in a restaurant and the price difference matter?**

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ABSTRACT

Revenue management has been applied to the restaurant industry, but restaurant operators have been disinclined to apply various types of RM approaches, due to apprehension for customer's possible expressions of dissatisfaction. To relieve this reluctance, restaurant operators may need to understand how their customers perceive capacity limitations. While customers are more familiar with RM practices in traditional RM industries (e.g., airlines or hotels) with fixed capacities, perceptions of capacity limitations in restaurants (relatively flexible capacity) may influence customers' perceptions of RM practices. In addition, the price difference between high-demand periods and low-demand periods may have differential impacts on customers' perceptions of value of the restaurant's expected offering and the fairness of RM practice. Based on commodity theory and equity theory, this study hypothesizes that two main effects, perceived scarcity of space in a restaurant and price differences, influence perceived value of a restaurant's offering and fairness perceptions of a restaurant's RM practice. As hypothesized, the negative effects of price difference on fairness perceptions are supported by the results. Unexpectedly, the main effect of perceived scarcity of space does not influence either perceived value of a restaurant's expected offering or fairness perceptions for a restaurant's RM practice. Interesting results suggest future research directions.

Keywords: *restaurant revenue management, fairness perception, perceived scarcity, capacity limitation*

INTRODUCTION

Revenue management (RM) has become an indispensable strategic tool in capacity-constrained service industries whose total revenue often depends on firms' abilities to use capacity efficiently. RM originated in the airline industry in the 1970s and subsequently has had wide application in tourism and hospitality industries. The rationale for RM is efficient use of fixed, perishable capacities by charging customers different prices for identical services in an attempt to balance demand and revenues per capacity unit (Kimes, 1989; McGill & van Ryzin, 1999).

The restaurant business is similar enough to hotel and airline operations that restaurants should be able to apply RM practices in a strategic fashion. However, the restaurant industry also has unique characteristics and these unique characteristics pose special challenges to restaurant operators and therefore require them to be more creative in developing RM strategies. Among the unique characteristics of restaurants are the relative flexibility of capacity and the flexible duration of a meal, which are important subjects to be considered for implementing RM practices. Restaurants have fairly flexible capacities compared to airlines and hotels. For example, a restaurant may open an outdoor patio seating area during good weather to expand capacity during peak periods. Moreover, the total available seating capacity per day in a restaurant is not fixed because customers' seating durations are unpredictable. Restaurant operators may need to understand how customers perceived capacity limitations of restaurants. This is important because customers are mostly familiar with RM practice in traditional RM industries (e.g., airlines or hotels) with fixed capacities; perceptions of this relatively flexible capacity in restaurants may influence customers' perceptions of RM practice.

In addition, when a restaurant operator practices a demand variable pricing policy to adjust demand, the magnitude of the price differences may influence fairness perceptions of the policy. Customers' responses to restaurant's RM practices are critical for the successful application of RM in restaurants because revenue maximization is only attainable when customers accept the RM practices without dissatisfaction. Maintaining a good relationship with customers is a critical issue in a restaurant business. Previous literature suggested perceptions of value (e.g., Dodds, Monroe, & Grevval, 1991; Grewal, Monroe, & Krishnan, 1998; Monroe, 1990; Rao & Monroe, 1989) and fairness in service exchanges (e.g., Maxwell, 2002) are important factors for sustaining customer satisfaction, positive behavioral intentions, and, consequently, long-term profitability. To sustain customer satisfaction and maintain good customer relationships, customers' perceptions of RM, such as perceptions of value and fairness, should be considered simultaneously with industries' characteristics for successful implementation (Chiang, Chen, & Xu, 2007). The current study, therefore, focused on how customers perceive the scarcity of space in a restaurant and how customers differently react to the price difference in terms of perceived value of the restaurant's offerings and perceived fairness of RM practices.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Equity theory, proposed by Adams (1965), focuses upon a person's fairness perceptions with respect to a relationship. The theory postulates that individuals consider what they put into a

given situation relative to what they gain from the situation and then compare this with the inputs and outcomes of others. Researchers identified three major aspects of fairness: distributive, procedural and interactional fairness (Adams, 1965; Deutsch, 1975; Lind & Tyler, 1988). In the RM context, fencing conditions, framing of rate fences, familiarity with RM practices and information disclosure of rate fences have all been found to have effects on fairness perceptions (Choi & Mattila, 2005; Wirtz & Kimes, 2007).

Commodity theory provides insights into how individuals respond to the limited service products. Commodity theory argues that any commodity's value changes according to the extent that it is unavailable (Brock, 1968). The findings of the majority of research, based on commodity theory, suggest that when individuals perceive a scarce product as more unique or valuable, scarcity will elicit positive feelings about the product. Based on such a positive perspective on scarcity, commodity theory should predict an increase in the attractiveness of a restaurant's scarce space as well as the perceived value of the dining experience. Therefore, this study proposes the hypothesis:

H1: Perceived scarcity of space in a restaurant will positively influence the perceived value of the restaurant's expected offering.

However, as some studies found the appeal of scarcity does not always result in a positive influence on attractiveness of the object, conflicting accounts are also possible. In particular, if an initial affective response for the object is not favorable, scarcity-induced evaluative thinking can reduce the attractiveness of the object.

In addition, perceived scarcity of space is likely to relate to perceived fairness of RM practices. Both equity theory and the principle of dual entitlement indicate that information that provides reasons for setting a certain price may influence perceived price perception (Xia, Monroe, & Cox, 2004). Empirical studies discovered that the information for determining a price point has a significant effect on perceptions of pricing fairness (Choi & Mattila, 2004). Apprehension of scarcity of space in restaurants may enable customers to understand the reasons for RM practices, such as differential prices between high-demand and low-demand periods, and thus increase the perception of fairness. Therefore, this study proposes:

H2: Perceived scarcity of space in a restaurant will positively influence fairness perceptions of the restaurant's RM practice.

However, price differences will have a negative relationship with perceived value of the restaurant's expected offerings. Perceived value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given (Zeithaml, 1988). Thus, perceived value can be measure by the quality that the consumer received for the price paid (Monroe, 1990). When a restaurant charges different prices for the same menu on different days of the week, consumers may perceive the quality of food and service is to be the same, but the prices are different. As a result, as the price difference increase, the perceived value will decrease.

The price difference will also have negative influence on fairness perceptions of RM practice in restaurants. Assimilation-contrast theory suggests that the price differences falling within consumers' acceptable price ranges are either accepted or assimilated (Blair & Landon, 1981). In other cases, when price differences fall outside the acceptable price range, they are contrasted or rejected (Monroe & Petrosius, 1989). If the price during high-demand periods falls outside the acceptable price range, those conditions may negatively affect the perception of fairness perception from the restaurant's RM practice. Therefore, this study proposes:

H3: The price difference between low-demand periods and high-demand periods will negatively influence the perceived value of the restaurant's expected offering. In other words, the higher the price difference is, the lower the perceived value of the restaurant's expected offerings.

H4: The price difference between low-demand periods and high-demand periods will negatively influence fairness perceptions of the restaurant's RM practice. In other words, the higher the price difference is, the lower fairness perceptions of the restaurant's RM practice.

In addition, Brock and Brannon (1993) proposed perceived expensiveness is a moderator of scarcity effect, although they did not empirically test the relationships. Therefore, this study proposes:

H5: The price difference between low-demand periods and high-demand periods will moderate the relationship between perceived scarcity of space in the restaurant and the perceived value of the restaurant's expected offering.

H6: The price difference between low-demand periods and high-demand periods will moderate the relationship between perceived scarcity of space in the restaurant and fairness perceptions of the restaurant's RM practice.

RESEARCH METHODOLOGY

To test the aforementioned hypothesis, this study uses, a three (Scarcity of space: High, Low or No) by four (Price difference: 10%, 20%, 30%, or 40%) factorial, between-subjects design. The survey questionnaire used written scenarios to manipulate perceived scarcity of space in restaurants and price differences and two pretests were conducted to validate measurements and to check manipulations. The questionnaire was designed with the relevant constructs primarily based on scales taken from previous research. Some adjustments were necessary for the specific characteristics of the restaurant industry and for this research setting, and a seven-point Likert scale measures each item.

Each of the stimuli, pretested to confirm the efficacy of the manipulations, represented the different treatment conditions of perceived scarcity of space and price difference. To manipulate perceived scarcity of space, the restaurant described in the first scenario, had tables readily available on Friday and Saturday (No Scarcity). The second restaurant scenario described tables are normally available, but not always, on Friday and Saturday (Low Scarcity). The last restaurant scenario described the tables are always unavailable on Friday and Saturday (High Scarcity). Two questions for checking manipulation were: 1) Tables at this restaurant on Friday

are readily available. And, 2) Chances of having dinner on Friday at this restaurant are very limited.

Perceived value represents “the consumers’ overall assessment of the utility of a product based on perceptions of what is received and what is given” (Zeithaml, 1988, p.14). The survey includes three direct measures to capture customers’ perceived value; three items are those of the Cronin, Brady, and Hult’s (2000) study, but modified for relevance for the restaurant RM. Consistent with Kukar-Kinney, Xia, and Monroe (2007), measurement of both procedural fairness and distributive fairness use a set of four items: fair, acceptable, unfair, and satisfactory. Kukar-Kinney et al. (2007) adapted this measure from Campbell’s (1999) study and added additional items to measure pricing policy, fairness (procedural fairness), and price fairness (distributive fairness).

Perceived scarcity of space in a restaurant may relate to customers’ perceptions of crowding. Therefore, a tolerance-of-crowding measure, adopted from Machleit, Eroglu, and Mantel (2000), is one covariate in the Factorial ANCOVA. Moreover, previous research found customers’ familiarity with RM practices has proven impact on fairness perceptions for RM (e.g., Taylor & Kimes, 2010; Wirtz & Kimes, 2007). Last, Beldona and Namasivayam (2006) examined gender differences in relation to perceived price fairness and subsequent repurchase intentions. These researchers found that females perceived significantly less fairness across all pricing scenarios in both discount and surplus frames. Thus, three covariates, tolerance of crowding, familiarity with RM and gender, are included in Factorial ANCOVA in this study.

DATA COLLECTION

The final data was collected in May, 2010. The subjects were from a general population, who requested tourism information of Arizona, Florida, and Texas. The 9,000 emails were divided into nine groups and allocated to each of the nine scenarios. Each respondent was asked to participate in one scenario. From 12,000 emails, 549 respondents participated in the survey (4.6% response rate), and the response rate for each scenario varied from 3.5% to 5.5%. Of the 549 participants, 44 participants were disqualified because they did not complete the questionnaire. As a result, 505 responses remained for analysis (4.2% valid response rate).

ANALYSIS AND RESULTS

For all constructs, reliability was above the suggested cut-off point of .70 (Nunnally, 1978), and the average variance extracted (AVE) for each construct was above the recommended value of .50 (Fornell & Larcker, 1981). To test Hypothesis, the study performs a factorial ANCOVA with the dependent variable of perceived value and fairness perceptions. For perceived value, as the dependent variable, the main effects of perceived scarcity of space and price difference were insignificant (Table 1). This means that neither the perceived scarcity of space nor price difference influence perceived value of a restaurant’s offering. Also, interaction effect between perceived scarcity of the space and price difference was insignificant. Only one of the covariates, familiarity with RM practice was significant (f-value: 44.90, p-value: .00).

The main effect of perceived scarcity of space in a restaurant on fairness perceptions was insignificant, but the main effect of price difference was significant (f-value: 4.54, p-value: .01). This means that the perceived scarcity of space does not influence fairness customers' perceptions for the restaurant's RM practice, but does influence fairness perceptions for the restaurant's RM practice. Two covariates, familiarity with RM practice (f-value: 108.18, p-value: .00) and gender (f-value: 14.07, p-value: .00) are significant. These results indicate familiarity with RM practice and gender influence on fairness perceptions of the restaurant's RM practice. Additional analysis included the 40% of price difference scenarios and excluded insignificant covariates; the results did not change.

Table 1. Factorial ANCOVA Results for Perceived Value

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	69.88 ^a	11	6.35	5.82	.00	.18	63.99	1.00
Intercept	43.68	1	43.68	40.00	.00	.12	40.00	1.00
CW	2.61	1	2.61	2.39	.12	.01	2.39	.34
FAM	49.04	1	49.04	44.90	.00	.13	44.90	1.00
Gender	2.95	1	2.95	2.70	.10	.01	2.70	.37
Scarcity	2.89	2	1.45	1.33	.27	.01	2.65	.29
Price	3.86	2	1.93	1.77	.17	.01	3.53	.37
Scarcity * Price	2.17	4	.54	.59	.74	.01	1.99	.17
Error	328.71	301	1.09					
Total	4849.67	313						
Corrected Total	398.59	312						

a. R Squared = .175 (Adjusted R Squared = .145)

b. Computed using alpha = .05

Table 2. Factorial ANCOVA Results for Fairness Perceptions

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Corrected Model	192.91a	11	17.54	13.51	.00	.33	148.65	1.00
Intercept	67.92	1	67.92	52.33	.00	.15	52.33	1.00
CW	2.92	1	2.92	2.25	.14	.01	2.25	.32
FAM	14.40	1	140.40	108.18	.00	.26	108.18	1.00
Gender	18.26	1	18.26	14.07	.00	.05	14.07	.96
Scarcity	2.93	2	1.46	1.13	.33	.01	2.26	.25
Price	11.78	2	5.89	4.54	.01	.03	9.07	.77
Scarcity * Price	5.44	4	1.36	1.05	.38	.01	4.19	.33
Error	390.63	301	1.30					
Total	3903.42	313						
Corrected Total	583.53	312						

a. R Squared = .33 (Adjusted R Squared = .31)

b. Computed using alpha = .05

DISCUSSION AND CONCLUSIONS

The most notable feature of the results is the effects of perceived scarcity of space on perceived value of a restaurant's expected offering and fairness perceptions for a restaurant's RM practice. Commodity theory claims knowledge of a product's scarcity affects consumers' perceptions and evaluations of a product's attractiveness, desirability, expensiveness, quality, and taste. However, the results of this study do not find positive effects of perceived scarcity of space in a restaurant on perceived value and fairness perceptions in the context of a restaurant's RM.

Although commodity theory has supported from many empirical studies, several researchers argued that a product's scarcity does not, in all cases, have a positive effect on consumers' evaluation of the product. Some studies argued that appeals of scarcity lead consumers to scrutinize an offer more thoroughly and do not necessarily result in favorable perceptions for the scarce product (Brock & Brannon, 1992). Brock and Brannon (1992) argued that for scarce, negatively valenced objects, for which an individual might have a clear aversion, the original notion of usefulness is discarded. Also, a negatively valenced experience would be regarded as more aversive to the extent that it was rare, because people in a situation involving scarcity are more motivated to think about the message; thus scarcity can also make negative evaluations more extreme (Brannon & Brock, 2001).

As expected, the negative effects of price difference on fairness perceptions are supported by the results from factorial ANCOVA. These results mean that as the perceived price difference between high demand periods and low demand periods becomes large, the perceived value of the restaurant's offering and fairness perceptions for the restaurant's RM practice decrease.

This study is experimental in nature and one of the first few studies exploring the effects of perceived scarcity of space in the restaurant RM context. Although this study did not find a significant effect from scarcity on perceived value and fairness perceptions, additional research is needed to investigate the effects of using different settings and other factors. To further understand the impact of scarcity on the valuation of service offerings from a restaurant, future research needs to recognize the effects of other factors that could influence consumers' evaluations of price information. A need also exists to further understand the interaction between scarcity of space and difference types of restaurants (e.g. casual vs. upscale restaurants), because Gierl and Huettl (in press) argued that the types of products relate to scarcity effects. Also further study may consider brand loyalty to or brand image of, the restaurant as a moderator between perceived scarcity of space and perceptions of the restaurant's RM practice, because Brock and Brannon (1992) claimed that initial response toward a scarce object is important for scarcity effect. In addition, future research can study cognitive procession as a mediator of scarcity effects to better understand the underlying mechanism for scarcity effects.

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