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Cherry-picking restaurant reservation customers

Jiana-Fu Wang [a, *], Yi-Chiun Lin [a], Chen-Feng Kuo [b], Shao-Jen Weng [c]

[a] Department of Marketing, National Chung Hsing University, Taichung, Taiwan, ROC
[b] Institute for Tourism Studies, Colina de Mong-Ha, Macau, China
[c] Department of Industrial Engineering and Enterprise Information, Tunghai University, Taichung, Taiwan, ROC

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ABSTRACT

This study first identifies the mismatch between size and value when a restaurant that receives booking requests from customer parties elects to cherry-pick among the intending parties, and second proposes that SPM (average spending per person per minute) is a better indicator for evaluating any intending party's real value. The results obtained through discrete-event simulation techniques confirm that the proposed SPM policy outperforms policies based on party size and traditional first-come-first-served practices and the alternative recommendation is that focus should rest on more profitable strategies that improves SPM value rather than simply on going for size, that is, looking only for larger or smaller parties.

1. Introduction

The chief goal for any company - in this case a restaurant - is to increase revenue. However, if resources are at times so constrained that not all incoming customers can be served, the provider may try to increase revenue by cherry-picking among intending customers. It is a common practice in some sectors of industry. A ready example is the airline sector in which a number of full-fare tickets for a flight are set aside for high-value business passengers and prevent the full complement of seats being taken up by discount-fare passengers (Talluri & van Ryzin, 2005). The assumption is that it is reasonable company policy to set aside a portion of resource (i.e., seats) to meet the demand for non-discounted full-fare seats from high-value customers. In the case of American Airlines, such a set-aside scheme yields more than 100 million dollars annually (Smith, Leimkuhler, & Darrow, 1992). Similarly, banks always evaluate the credit worthiness of loan applicants and only lend to those deemed reliable. The above practices in airlines and banks are two examples of the cherry-picking technique.

Turning to the restaurant sector, it is apparent that dining parties can be evaluated in different ways, especially when there is a significant range of spending possibilities. Thompson (2011) points out that some restaurants actually cherry-pick customers by party size, though noting that larger parties mainly tend to stay longer but spend less per person. Kimes and Robson (2004) find that the pay-off from customers with certain distinct characteristics can vary. In other words, different customers may have different values.

When faced with heavy booking demands - perhaps reaching full capacity - is it a reasonable restaurant policy to elect to maximize revenue by going for higher-value customers? Could it be indeed that by choosing to prioritize serving an earlier low-value dining party rather than a high-value one that arrives second, that restaurant revenue could inevitably suffer? In light of such consideration, deciding on how to assess customer value becomes an important issue. If a restaurant maintains historical spending data for all customers, identifying high-spending or loyal customers is easy, but that is true in few cases. To best evaluate how the customer consumes restaurant resources, it is necessary to assess first how much (s)he spends and how long (s)he stays. Hence, in this study, we adopt “spending per person per minute” (SPM), as proposed by Kimes and Robson (2004), to measure the value of a dining party. In the measure, if the size of the party is fixed, the party that spends less time but spends more money contributes more to restaurant revenue. The trade-off between meal duration and spending makes cherry-picking of customers a topic well worth exploring. The fundamental of using “party size” to cherry-pick, as in Thompson (2011), is also based on this relationship.

* Corresponding author.
E-mail address: jfwang@nchu.edu.tw (J.-F. Wang).
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Studies show that larger parties tend to stay longer and spend less per person (Bell & Pliner, 2003; Kimes & Robson, 2004; Sommer & Steele, 1997). In reality, however, spending and meal duration vary greatly (even for parties of the same size), especially in Chinese-style restaurants, which makes us suspect that there might be a disconnection between size and SPM, and suggest instead that SPM alone could be the better measure for customer cherry-picking.

In addition, this study places emphasis on booked- rather than walk-in parties, which was also the focus of Thompson (2011). Reservation cherry-picking has the following three advantages. First, it can be operated during the whole reservation period until all seats set aside by management are booked. Second, at the time an intending customer is requesting a booking slot, only management knows the state of the reservations and has the option of deciding whether or not to agree the request, or the option of offering an alternative slot, if that is what best benefits the restaurant. In the end, a decision to turn down a booking is a decision the party has no way of disputing. If the party is willing to wait for a vacant slot, the request can be assigned to a waiting list, which if the restaurant has underestimated customer volume is of potential benefit to the restaurant.

The aim of this study is to use discrete-event simulation techniques to explore the effects of cherry-picking restaurant reservation parties under different cherry-picking policies. Real dining data is incorporated into our dynamic simulation models, the difference being that with static models the order in which booking requests occur and the dining durations of parties do not affect the performance of the restaurant. The remainder of the study is organized as follows. First, literature about restaurant reservation, cherry-picking, customer value measurement and restaurant performance measurement is reviewed. Second, two cherry-picking policies and our simulation models are proposed. Third, the results of the simulation models are presented. Finally, the findings of the study and future extensions are discussed.

2. Literature review

2.1. Restaurant revenue management

Revenue management, also called yield management, has long been practiced in the airline industry and other service sectors. It is a technique to maximize revenue by allocating limited resources (Netessine & Shumsky, 2002). With limited resources, the restaurant has to decide to whom to sell and at what price. This is what Smith et al. (1992) pointed out: “selling the right seats to the right customers at the right prices”.

Discussion of restaurant revenue management mainly focuses on price management and meal duration management (Kimes, 1999). For price management, restaurants can use price setting or promotion discounts to shift excess demand from peak periods to elsewhere and thus serve more customers overall. In Susskind, Reynolds, and Tsuchiya’s survey (2004), p. 284 out of 367 respondents indicate willingness to transfer to off-peak periods for dinner if incentives are provided. Such moves can help relieve long waiting at peak times and bring extra revenue at off-peak. Kimes (1999) mentions that strategies such as early bird specials and special menu promotions can have similar effects. These studies indicate that directing customer segments to different dining periods to generate higher revenue is feasible.

Meal duration management includes “changing reservation policies, redesigning menus, and pacing service procedures” and “altering staffing levels” to reduce meal length (Kimes, 1999). Among further moves are arranging table mix (Kimes & Thompson, 2004, 2005), optimizing table configurations (Thompson, 2002; 2003), assigning table location (Bertsimas & Shioda, 2003; Kimes & Robson, 2004) and setting up table assignment rules (Thompson, 2014), all methods to affect meal duration and thus improve revenue. Using computer simulation, Thompson (2009) shows that a 5% reduction in meal duration can increase revenue by 1.1% and a 20% reduction in meal duration can yield a 4.9% increase.

Besides pricing and duration management, Thompson (2010) identifies dozens of unanswered research questions worthy of exploration and among them are reservation policy, customer cherry-picking and real-time accept or reject decisions. Therefore, finding a way to identify lucrative customer groups and decide whether to accept their reservations or how to arrange their reservations can be a potential approach to improve restaurant revenues. The following section will first review how restaurants can operate their reservation rules and recognize the values of their customers.

2.2. Restaurant reservation and cherry-picking

For customers, a reservation system provides a mechanism to match their demands with available restaurant slots; for restaurants, the system can help smooth demand, allocate capacity and reduce customer waiting (Dickson, Ford, & Laval, 2005; Thompson & Kwortnik, 2008). We know of only three works related to the impact of restaurant reservation on revenue management. Dickson et al. (2005) say that a reservation system works better if the provider's capacity is fixed or predictable and a customer can choose all available slots from a reservation system. Thompson and Kwortnik (2008) surveyed 357 restaurants with reservation systems. Although 81.5% of the respondents were assigned tables at the time of bookings or at the start of their serving periods (locked reservation system), their simulation results showed that pooling reservation systems (assigning tables to booked parties at time of arrival at restaurant) outperformed locked reservation systems in terms of table turnaround time, which resulted in serving more customers during peak periods.

Bertsimas and Shioda (2003) formulated restaurant reservation questions as optimization models. In their static model, to maximize revenue, they divided a restaurant's operational time into several periods and allocated available tables to booked and walk-in customers in each period. They used collected customer arrival data and assumed that excess walk-in customers in each period, those for whom no realistic prospect of having places assigned to them, would have no alternative but to leave. Turning to their dynamic model, seats for booked customers in each period were indeed reserved and walk-in customers not able to take up reserved seats must need to wait. Through their models, they estimated a 3.42% improvement in revenue compared to the first-come-first-served (FCFS) scenario in a low-demand scenario of 90 customers and of 7.26% in a high-demand scenario of 120 customers.

Cherry-picking behavior is that of “selecting the best or most desirable” (Merrian-Webster Dictionary, 2015). In fact, not only shoppers are cherry-pickers, but sellers also whenever they want to distinguish among customers and choose to serve whoever they regard as best customers - as much and as often as possible. The two examples cited above - in the Introduction - of airlines giving priority to full-price business travelers and banks favoring low-risk loan applicants, illustrate the phenomenon.

For the seller, the most important issue for cherry-picking is evaluation of customers. If individual-level purchase history is available to a company, via techniques such as data-mining, RFM (recency, frequency and monetary), and customer lifetime value estimation, the customer's contribution to the company can be analyzed (Kumar, 2006). However, this scenario only applies to businesses with registered customer accounts or membership

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