



ABSTRACT

Restaurants have two strategic revenue management levers to control: meal duration and price. Many restaurant managers control their revenue by offering promotions (e.g., happy hour, vouchers, discounts), adding surcharges for special treatments (e.g., earlier booking, seats with best views, special room) or by controlling its peak and off-peak prices. While another strategic lever, meal duration, is rather difficult to count on because restaurant managers do not know exactly to which extent duration should be reduced. Though many researches have been conducted on these issues, but they were still independently discussed. In order to understand and to generate a restaurant revenue model considering both strategic levers, this research made an adjustment in the pricing term. Since the model is built to see the overall relationship as well as the contribution of meal duration and price to revenue, the term “reference price” is used to replace the usual “demand-based price”. Reference price is used to learn the spending behavior of customers from average check per customer without focusing on particular menu.

In this research, mathematical models for demand function and meal duration function are developed separately for peak and off-peak periods by using a simple linear regression while reference price function can be applied for both peak and off-peak. Demand functions were built using deterministic models after compared with stochastic models whereas meal duration functions and reference price function were built using deterministic models. Through a thorough study, it was found that there is a direct effect of price to revenue, while meal duration’s effect is indirect. After validating these models using paired samples t-test, they are used to optimize. Meal duration function and reference price function are substituted to find meal duration function in term of reference price.

By using first derivative of revenue function, the optimal reference price can be derived and the value of optimal reference price will be inserted into meal duration function (in term of price) to find the optimal meal duration as well as the optimal revenue during a specific peak or off-peak hour. As a result, revenue could be increased by 27% during peak periods and 68% during off-peak periods using these models.

Keywords: restaurant revenue management, meal duration, reference price.



ABSTRAK

Restoran mempunyai dua strategi *revenue management* untuk dikontrol: harga dan durasi makan. Manajer restoran pada umumnya mengontrol pendapatan melalui promosi (contoh: *happy hour*, *voucher*, diskon), mengenakan biaya tambahan untuk perlakuan khusus (contoh: pemesanan, posisi tempat duduk terbaik, ruangan khusus) atau dengan mengatur harga pada saat restoran penuh dan sepi. Sedangkan strategi yang lain, durasi makan, cukup sulit untuk dikontrol karena manajer restoran tidak pernah tahu seberapa lama durasi makan dapat dipercepat. Meskipun telah banyak riset terkait hal ini, tapi riset-riset tersebut masih dibahas secara independen. Untuk memahami dan menemukan model pendapat restoran dengan mempertimbangkan kedua strategi, riset ini melakukan *adjustment* dalam segi harga. Karena model ini dibangun untuk melihat keseluruhan hubungan dan kontribusi dari durasi makan dan harga terhadap pendapatan, maka digunakan *reference price* untuk mengganti *demand-based price*. *Reference price* digunakan untuk mempelajari perilaku konsumen dari rata-rata pengeluaran per konsumen tanpa fokus ke menu tertentu.

Pada penelitian ini, model matematis untuk fungsi permintaan dan fungsi durasi makan dibangun secara terpisah untuk periode penuh (*peak*) dan periode sepi (*off-peak*) dengan menggunakan regresi linear sederhana, sedangkan fungsi *reference price* dapat digunakan untuk kedua periode. Fungsi permintaan dibangun menggunakan model deterministik setelah dibandingkan dengan model stokastik dan fungsi durasi makan dibangun menggunakan model deterministik. Melalui analisis yang menyeluruh, didapati bahwa permintaan memiliki hubungan langsung dengan pendapatan, sedangkan durasi makan tidak langsung. Setelah validasi model menggunakan *paired samples t-test*, model-model tersebut digunakan untuk optimasi. Fungsi durasi makan dan fungsi *reference price* kemudian disubstitusi untuk mendapatkan fungsi durasi makan dalam bentuk *reference price*.

Dengan mencari turunan pertama dari fungsi pendapatan, didapatkan *reference price* yang optimal dan nilai tersebut dimasukkan ke dalam fungsi durasi makan untuk mencari durasi makan yang optimal hingga akhirnya didapati pendapatan optimal untuk periode penuh (*peak*) dan periode sepi (*off-peak*). Hasil penelitian menunjukkan bahwa pendapatan dapat ditingkatkan hingga 27% selama periode penuh dan 68% selama periode sepi.

Kata kunci: *restaurant revenue management*, durasi makan, *reference price*.