On Pricing and Composition of Bundles

Gabriel R. Bitran • Juan-Carlos Ferrer
Sloan School of Management, Massachusetts Institute of Technology, 30 Wadsworth St., Office E53-355, Cambridge, Massachusetts 02142, USA
School of Engineering, Pontificia Universidad Católica de Chile, Casilla 306, Correo 22 Santiago, Chile
gbitran@mit.edu • jferrer@ing.puc.cl

This paper addresses the problem of how to determine the composition and price of a bundle so as to maximize the total expected profit. To motivate the problem, we use as a setting a high-tech manufacturing company that operates in a competitive environment, is not a leader in the industry, and is constantly reacting to bundles introduced by the leader. Bundles are sets of components that must meet technical constraints. The company’s objective is to build a bundle and offer it in a market where it will compete with other bundles. Consumers purchase the bundle that maximizes their utility after examining all available bundles. The company selection of the bundle’s components and its price is made in light of the bundles against which it will be competing and the uncertainty in the consumer choice process. The optimal decision could be found by solving a nonlinear mixed integer program, which is difficult to solve. Instead, we propose an efficient solution procedure to determine the optimal composition of the bundle and the price at which it should be offered. The paper concludes with a brief discussion of extensions of the research to cases that consider multiple segments of customers and/or multiple bundles.

Key words: bundling; consumer choice models; pricing; product line selection

Submissions and Acceptance: Received September 2005; revision received June 2006; accepted August 2006.

1. Introduction

A bundling strategy is an important tool for companies that serve customers with heterogeneous preferences. When explicit price discrimination is not possible, companies must rely to a great extent on pricing and design policies in order to maximize their profits. In its simplest form, bundling consists of collecting goods or services in a package and selling them at a usually discounted package price. In order to understand the effectiveness of bundling, assume that a customer’s reservation price (the maximum amount of money that customers are willing to pay) for a bundle is the sum of all individual reservation prices of the bundle’s components (very realistic and common assumption in the literature). Since the reservation prices for individual components varies from customer to customer, bundles allow companies to capture more consumer surplus from the buyers because excess consumer surplus is transferred from one component of the bundle to another. In this way, companies implicitly price discriminate. When implemented effectively, bundling strategies can accomplish a number of objectives such as extension of monopoly power, implicit price discrimination, reduction in complexity costs, reduction in transaction costs, creation of barriers to entry, and economies of scope and scale.

According to Simon and Wuebker (in Fuerderer et al. 1999), bundling plays an increasingly important role in many industries. Some companies even base their business strategies on their bundling strategies. A renowned example is Microsoft. By smartly combining its application software into the “Office” bundle, Microsoft increased the market share of Access and PowerPoint. These two less attractive components were bundled with the more attractive components Word and Excel. Simon and Wuebker (in Fuerderer et al. 1999) also mention that bundling is particularly popular in the service sector. Some examples are vacation packages (airline ticket, hotel accommodation plus rent-a-car), insurance packages, restaurant menus (appetizer, entrée, dessert), and telecommunication.