Dynamic pricing in the presence of store-switching consumers

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Abstract

We introduce and analyze two-period intertemporal competitive dynamic pricing models in the presence of both store-switchers and store-loyal consumers who may be either myopic or strategic. Our analysis reveals that (i) in the presence of store-switching consumers, retailers’ profits may increase with an increase in the patience level of the strategic consumers, which never happens when consumers are store-loyal; (ii) when all consumers are store-switchers, retailers can be better off if they both ignore consumers’ strategic behavior than if neither ignores consumers’ strategic behavior, which never happens when all consumers are store-loyal; (iii) when all consumers are myopic, increased store-loyalty level increases prices and retailers’ revenues. By contrast, when all consumers are strategic, increased store-loyalty level may decrease prices and retailers’ revenues.

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Markov brand-choice models are widely used in the marketing literature to characterize consumers’ brand-switching patterns. Rao (1969) has recognized that such models could be adapted to consumers’ store-switching behavior as well. Indeed, store-switching is a commonly observed and studied phenomenon (e.g., Leszczyc and Timmermans (1997) and references therein). It is pursued even in the presence of superior alternatives (Ratner et al. (1999)), and is concerned with a wide range of patronage defections by consumers. Among its main drivers are variety-seeking behavior (Kahn (1995)), and a complete dissatisfaction with the latest store visited (McAlister (1982), Givon (1984)).

While the marketing literature is primarily concerned with estimation and understanding of variety-seeking behavior (Leszczyc and Timmermans (1997), Ratner et al. (1999)), and the operations management literature account for consumers’ store-switching upon experiencing a service failure (e.g., Olsen and Parker (2008) and Parlar (1988)), it is asserted by Seetharaman and Che (2009) that (prior to their contribution) “there exists no research on the effects of variety seeking on price competition”. Our primary goal in this paper is to evaluate the effect of store-switching behavior, which occurs after consumers fail to make a purchase, on prices and profits in two-period dynamic-pricing settings.

To understand retailers’ pricing policies in the presence of store-switching (vs. store-loyal) consumers as well as strategic (vs. myopic) consumers, we study two-period models of a market consisting of two retailers selling a homogeneous good. The retailers, each of whom can satisfy the entire demand in the market, may possess different discounting factors than the consumers and face uncertainty about consumers’ valuations. Each consumer visits one of the retail stores in the first period, and among those who did not buy the good, a proportion of the consumers are store-loyal and return to the same store in the second period, while the complementary proportion are store-switchers and switch in the second period to the competing retailer.

Our paper addresses the following research questions: (i) Are the pricing policies qualitatively different when retailers are faced with only store-switchers or only store-loyal consumers? (ii) Are retailers always better off with lower strategic consumers’ patience? (iii) Can ignorance of strategic consumer behavior be beneficial for retailers and will ignorance of such behavior, by either or both retailers, arise in equilibrium? (iv) Should retailers always increase consumers’ store-loyalty (in the absence of the associated costs)?
We derive the equilibrium pricing policies in the two scenarios, wherein all consumers are either store-loyal or store-switchers. We demonstrate that the nature of the pricing policy in both cases is quite similar. We proceed with the effects of strategic consumers’ patience, when all consumers are either store-loyal or store-switchers. Our results suggest that in the presence of store-loyal consumers retailers should attempt to enhance the initial “virtual” value of the good (i.e., without adding new features to it), while decreasing its future status. Such a strategy would mollify consumers’ strategic behavior, which would result with higher expected profits. However, the recommendation about changing the inter-temporal value of the good should be handled with care in the presence of store-switching consumers. Indeed, we demonstrate that in some situations, moderating consumers’ strategic behavior may decrease retailers’ profits. Stated equivalently, when all consumers are store-switchers, it is possible that a small increase in the strategic consumers’ discounting factor may trigger retailers to switch from one pricing policy to another, resulting with higher expected profits.

We then explore the effect of retailers’ obliviousness to consumers’ strategic behavior, which is known to be costly to retailers (see, e.g., Besanko and Winston (1990), Aviv and Pazgal (2008), and Levin et al. (2009)). We show that obliviousness in our model results with a profit loss to a monopoly. Surprisingly, however, we prove that such a behavior may provide competing retailers with profit gains, i.e., when all consumers are store-switchers, retailers may be better off by ignoring or becoming oblivious to consumers’ strategic behavior. Moreover, we find that when retailers are oblivious to consumers’ strategic behavior, retailers’ profits in such a duopoly model may exceed that of a monopoly. While obliviousness to strategic consumer behavior may be beneficial to competing retailers, an important question arises: will ignorance of strategic consumers, by either or both retailers, will be adopted in equilibrium? Interestingly, we find that in our duopoly setting, such a behavior may arise in equilibrium. That is, by contrast with the situation in the Prisoners’ Dilemma paradigm, non-ignorance by both retailers does not always arise in equilibrium.

Lastly, we focus on consumers’ store-switching behavior, while separating the analysis for myopic and strategic consumers. When all consumers are myopic, we find that increasing the store-loyalty level results with higher prices in both periods. This implies that store-loyalty behavior harms myopic consumers. On the other hand, the analysis with strategic consumers
reveals a different realization. Indeed, if the patience level of the strategic consumers is sufficiently high, as the loyalty level initially increases, both periods' prices decrease, and only after a certain level of loyalty is achieved, then, and only then, prices start increasing. This is a very surprising result, which is in stark contrast with the myopic consumers case. Indeed, this result suggests that if consumers are strategic, retailers should be very careful with their loyalty programs. If in the existing status-quo only a small fraction of the consumers are store-loyal, then retailers should carefully evaluate the perils of implementing such programs: with a small or a moderate increase in the store-loyalty levels, retailers may end up, in equilibrium, charging lower prices, and as a result, realize lower profits.

References


