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The role of customer expectations in name-your-own-price markets ☆

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ABSTRACT

This research analyzes how consumers' bidding costs and expectations about the threshold price impact a Name-Your-Own-Price (NYOP) retailer. We find that an NYOP retailer's profit may increase if consumers learn the product's true price threshold distribution. Inaccurate expectations can be detrimental to the firm either if consumers are too optimistic (i.e., expect the threshold price to be lower, on average, than really is) OR if consumers are overly pessimistic (i.e., expect the price threshold to be much higher than it is in reality). Furthermore, if customers accurately anticipate the true distribution of threshold prices, a seller may benefit from either (1) rejecting profitable bids in order to induce higher expectations of the threshold price (and thus higher bids) or (2) accepting bids below its costs (in order to raise participation rates). Using data from a real-world NYOP retailer, we find that bidding behavior is consistent with our analytical predictions.

1. Introduction

Under the Name-Your-Own-Price (NYOP) business model, a retailer sets a hidden threshold price (P_{NYOP}) and interested consumers place bids for units of the product, where any bid that exceeds the threshold price is accepted. Since P_{NYOP} is the retailer's private information, consumers must form expectations about the threshold price and these expectations play a critical role in determining their bidding strategies. This paper considers how consumers' expectations about the threshold price impact an NYOP seller and how the seller can optimally use its pricing policy to manipulate expectations. Specifically, we introduce an analytical model to explore whether an NYOP retailer is more profitable when consumers' expectations about the threshold price are, on average, correct. We also analyze how an NYOP retailer should optimally choose its threshold price when such choices impact bidders' expectations.

Understanding how an NYOP retailer is impacted as consumers become better informed is critical since such understanding helps assess the long-run viability of the NYOP business model. Furthermore, this research provides insight into whether an NYOP retailer should try to encourage consumers to become better informed (e.g., by advertising and/or supporting web forums that convey information about past bids) or should attempt to curb such information flows. The current paper seeks to understand how an NYOP retailer is impacted if consumers become more knowledgeable. Note that, in a variety of market situations, firms benefit from consumers' lack of information. For instance, Morton, Silva-Risso, and Zettelmeyer (2011) find that consumers who have not learned the dealer's invoice price pay substantially more for a new car than do informed consumers, thus enhancing the dealer's surplus by eight percent per transaction, on average. Other examples from the literature include uninformed consumers being less price sensitive (Salop & Stiglitz, 1977; Varian, 1980); incomplete information about a product's attributes creating brand loyalty (Anand & Shachar, 2004); and store loyalty contributing to shoppers not fully considering alternatives (Dwyer, Schurr, & Oh, 1987). Finally, this paper identifies strategies a retailer can use in order to adapt to an environment in which consumers' expectations concerning the threshold price are accurate.

The analysis is conducted by comparing two extreme cases: (1) Consumers have full information about the threshold price distribution; and (2) consumers only have an exogenously given prior about the threshold price distribution. A "knowledgeable" consumer is defined as one who knows the true distribution from which P_{NYOP} is drawn. An "unknowledgeable" consumer is one who, on average, overestimates or underestimates P_{NYOP} (i.e., the consumer's expected value of P_{NYOP} does not match the mean value of the true distribution of P_{NYOP}). Consumers tend to be knowledgeable if they have considerable experience with a particular NYOP site or have learned from other users via word-of-mouth. In contrast, a consumer is likely to be unknowledgeable when the consumer has very limited prior experience with the NYOP retailer.

Our results indicate that, under several plausible conditions, an NYOP seller benefits from having consumers know the true distribution of its threshold prices. Two critical factors are (1) consumers' current expectations of the threshold prices, and (2) consumers' bidding costs

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(i.e., the frictional costs associated with visiting an NYOP site and placing a bid). In particular, an NYOP retailer benefits from consumers becoming informed if either (a) current consumers consistently underestimate the actual threshold price and have low-to-moderate bidding costs; or (b) consumers consistently overestimate the actual threshold price and have sufficiently large bidding costs. In the former case, optimistic expectations result in low bids, and bid levels would increase if customers knew the true distribution of prices. In the latter case, pessimistic expectations dissuade consumers from bidding, but they would be willing to bid if they knew the true distribution of threshold prices. These results suggest that, in markets characterized either by low bidding costs and optimistic expectations or by relatively high bidding costs and pessimistic expectations, an NYOP seller should take steps to alert consumers to the actual distribution of price thresholds.

Furthermore, we find that, if consumers are knowledgeable, the NYOP retailer should not passively accept all bids that exceed its wholesale cost, but should instead be more strategic in setting its pricing rule. Specifically, rejecting some bids that exceed its costs can be a desirable means to increase (future) bid levels. It may even be optimal to establish a negative markup (i.e., accept some bids that are below cost) in order to encourage customers to bid who otherwise would not — customers who would be very profitable when wholesale costs turn out to be low.

The remainder of the paper is organized as follows: Section 2 provides a summary of related literature. In Section 3, we describe our model of knowledgeable and unknowledgeable consumers. Section 4 analyzes the seller, first assuming that the seller maximizes profit over a single transaction, i.e., is "myopic," and then considering a forward-looking seller who takes into account how consumers respond to its pricing rule. Section 5 presents data from a real-world NYOP retailer to examine how bidding behavior changes as consumers form more accurate expectations about the price threshold distribution. Section 6 offers concluding remarks, including managerial implications and directions for future research. The Appendix A contains proofs of the Propositions.

2. Literature review

While it is clear from the auction literature that consumers do not always bid in a fully informed, fully rational manner, it is important to be careful in applying these results to NYOP markets because the NYOP channel differs significantly from traditional auctions. Most notably, in an NYOP auction, a consumer is not bidding directly against other consumers, but is instead only interacting with the supplier, which can lead to significant differences in the impact of a variety of factors on bidding behavior. For example, Massad and Tucker (2000) propose that bidders will be willing to bid more as they garner more information about previous sales. This is reasonable for traditional auctions because, by definition, the winning bid for a given auction will always be at least as high as the bid any particular consumer submitted. Thus, consumers are learning how much more they would have needed to bid in order to have won. In contrast, for NYOP auctions, since a participant is not directly competing against other consumers, information does not always lead to higher bids in the future. While a bid rejection informs a consumer that she may have underestimated the true price threshold, a bid acceptance essentially tells her that she overpaid for the product (Elkind, 1999). By examining bids accepted and rejected in NYOP auctions for similar products, the consumer may end up revising her estimates of the price threshold either upward or downward.

A literature is emerging that examines various aspects of the NYOP channel. In the current literature, however, a fundamental divergence exists in how consumers' expectations of the threshold price are modeled. Some studies assume consumers' expectations are exogenously given (e.g., Spann, Skiera, & Schafers, 2004; Spann & Tellis, 2006; Terwiesch, Savin, & Hann, 2005). This corresponds to our case of unknowledgeable consumers and is representative of markets for which the NYOP retailer has just recently entered or ones in which information flows between customers are very limited. Furthermore, a consumer would be unknowledgeable if she chooses not to avail herself of market information (e.g., due to search costs). Lack of information can lead to biases. A consumer may have pessimistic expectations (i.e., underestimate the true probability of acceptance of any particular bid) or optimistic ones (i.e., overestimate the probability of a successful bid).

Other research in the NYOP literature (such as Fay, 2004; Wilson & Zhang, 2008) assumes that consumers form accurate expectations. This corresponds to our case of knowledgeable consumers and is representative of markets in which consumers have acquired information about the price threshold distribution via their own past experience and/or interactions with other consumers. In a related paper, Spann, Zeithammer, and Haubl (2010) also consider the impact of consumer learning (although this issue is not the primary focus of their paper). However, several key differences are of note. First, the current paper accounts for the fact that consumers incur non-monetary costs from bidding, while Spann et al. (2010) does not incorporate such bidding costs in their model. Non-monetary bidding costs in NYOP markets have been empirically measured and have been shown to influence bidding behavior strongly (please see Section 3.1 for more details). Second, and more importantly, the two papers differ substantially in what a consumer is learning. Spann et al. (2010) examine the impact of having consumers learn the price threshold that is in place at each point in time. In contrast, the current paper considers consumers who only learn the distribution from which the price threshold is drawn. Below, we discuss why it is more likely that consumers would learn the distribution rather than gain knowledge of the current price threshold.

Over time, consumers may become better informed about the average threshold price. Internet word-of-mouth could hasten such information flows as third-party information sites are introduced, become better structured, and induce greater participation among customers. For example, Priceline (www.priceline.com), an e-tailer of travel services, is the most prominent example of an NYOP firm. Several third-party sites such as flyertalk.com, betterbidding.com, and biddingfortravel.com allow users to post their winning and losing bids from Priceline. Such communications enable consumers to form unbiased expectations about the threshold price of a given service/product (Kannan & Kopalle, 2001). Hinz and Spann (2008) provide an analysis of how consumers can gradually update their expectations on the basis of the bids previous consumers have had accepted or rejected. However, even if consumers learn the distribution of price thresholds, it seems unlikely that they could know the price threshold being used at any given moment. As Fay and Laran (2009) note, price thresholds frequently change. Furthermore, a previous consumer's successful bid would remove that unit from the NYOP market and potentially change the threshold price (which depends on the inventory that is still available). Finally, even in information-rich environments, it is unlikely that a consumer could obtain information about a price threshold that is currently in place. For example, using biddingfortravel.com on June 7, 2013, a consumer seeking to book a 5-star hotel in Las Vegas for the night of June 25 would have found 5980 posts regarding Las Vegas hotels over the past 6 years, with approximately one-third devoted to 5-star properties. Yet, the most recent post is nearly four days old and does not involve this particular travel date. In fact, there are no posts for this particular travel date. Thus, while this collection of information might allow a consumer to estimate the distribution of threshold prices accurately, it certainly does not reveal the value of P_{NYOP} for the specific travel services currently sought.

3. Model

The NYOP retailer obtains products at a wholesale price of w, where w is uniformly distributed on the interval $[\overline{w} - d, \overline{w} + d]$. The wholesale price is not observed by customers, but is observed by the retailer before the latter selects its threshold price, P_{NYOP}. The threshold price is also not