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Auction hosting site pricing and market equilibrium with endogenous bidder and seller participation [☆]

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Abstract

This paper characterizes the payoffs and pricing policies of auction hosting sites when both the bidders' and the sellers' participation is endogenous. Sellers have heterogeneous opportunity costs and make a listing decision depending on the listing fee and the expected revenue from the sale. On the other side of the market, factors such as facility in navigating an interface layout and prior bidding experience result in bidder heterogeneity with respect to participation costs. Bidders participate if their *ex ante* expected payoff from searching the site exceeds their participation costs. The auction site earns revenue by setting positive listing fees, trading off the increased revenue per seller resulting from a higher fee with the revenue reduction from the loss of sellers. Though this appears to be a classic monopoly problem, there are important differences. The reduction in the number of sellers participating in a site has feedback effects, as it affects the number of bidders who choose to visit that site, which in turn again affects the attractiveness of the site to sellers, and thus further reduces seller participation. In this environment the monopolist's ability to extract rents is severely limited, even if one considers rent extraction from the seller side of the market only. It is demonstrated that the inverse demand curve is flatter than the demand curve obtained from the (inverse) distribution of seller costs. Moreover, the inverse demand curve has at least one and possibly multiple flat segments, leading to discontinuities in the profit function. Thus, small changes in the environment can lead to large changes in the optimal fee and market participation.
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1. Introduction

Auction hosting sites, whether of the brick-and-mortar or Internet variety, are intermediaries whose product is the provision of a marketplace in which buyers and sellers can transact. Their product is essentially a platform that connects two sides of a market rather than a traditional physical product.[1] Much of the early literature on auctions abstracted from the presence of auction hosting sites and considered auctions to be an interaction between the owner of an item (the seller) and many potential buyers (the bidders).[2] Moreover, the bulk of the recent auction literature that focuses on Internet auctions is primarily concerned with seller vs. buyer issues and the dynamics of prices (within a series of auctions or across time) rather than optimal host site policies (see Bajari and Hortacsu, 2004; Ashenfelter and Graddy, 2003, for two recent excellent surveys of this literature and associated issues).

Some of the recent literature recognizes that auctions are not merely interactions between a seller and a set of bidders. Rather, bidders have a choice of whether or not to attend the auction and, if so, for which possible seller's item to compete. The first question is considered in the literature on bidder entry, while the second question is considered in the (much smaller) literature on competing sellers.[3] Nearly absent is the recognition that sellers also have "outside" options (see Hernando-Veciana, 2005 and references for some relatively rare exceptions), and that sellers may not be competing with each other for a pool of potential bidders, but may be synergistic in creating a market place that fosters bidder participation.[4]

This paper provides critical insights into filling the gap between the literature of endogenous entry and seller competition and the literature on platforms and intermediaries. Unlike the extant literature discussed above, we explicitly recognize the nature of the auction hosting site as a strategic intermediary, whose "product" is access of bidders to sellers and sellers to bidders. As a result, in contrast to the competing sellers literature, sellers need not be substitutes to each other; rather a site that attracts more sellers may be more valuable to sellers because it is a thicker market in terms of bidder participation. Our paper also explicitly recognizes heterogeneity among both sellers and buyers in terms of the value they attach to participating in the auction hosting site. Finally, we take into consideration the empirical regularity that auction hosting sites obtain revenue from sellers rather than from bidders. Unlike the literature on intermediaries and platforms which focuses on different market environments, we explicitly consider the structure of bidding competition and the associated extraction of revenue by the sellers.

We develop a model with the features described above and study the analytics of the equilibrium bidder entry and seller listing decisions, conditional on the auction site's listing fees. We then derive the comparative statics of this entry equilibrium with respect to bidder heterogeneity, participation costs, and the auction site's listing fee. This allows us to derive the auction site's demand curve and its comparative statics. We show that this derived demand curve

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[1] See Rochet and Tirole (2006), Armstrong (2006), Hagiu (2006), and references therein for a recent discussion on platforms and platform pricing, and Spulber (1999, 2006) for discussion on the broad literature on intermediaries.

[2] See McAfee and McMillan (1987a) and Klemperer (1999) for surveys of the early auction literature and Wolfstetter (1996) and Krishna (2002) for a textbook-style treatments of the subject.

[3] Early contributions on endogenous bidder entry include see Samuelson (1985), Engelbrecht-Wiggans (1987), McAfee and McMillan (1987b), Engelbrecht-Wiggans (1993), and Deltas and Engelbrecht-Wiggans (2001). See McAfee (1993), Peters (1997), Peters and Severinov (1997), Burguet and Sakovics (1999), Schmitz (2003), Damianov (2005), and Parlane (2005) for models of seller competition.

[4] Anderson et al. (2004) and Ellison et al. (2004), explicitly recognize the platform nature of auction hosting sites, but do not consider strategic behavior by the sites, or heterogeneity of seller/bidder preferences towards participation in them.