



Sequential auctions with budget constraints: Evidence from fantasy basketball auction drafts



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ABSTRACT

We study bidding behavior in sequential auctions in a unique dataset drawn from a natural field experiment: fantasy basketball auction drafts. As auctions, they are novel in that they feature publicly “recommended” but non-binding bid prices and bidders with identical budget constraints. Recommended prices prove to be reasonable forecasts of player value and bidding on average tends to follow those recommendations. Individual bidding behavior, however, follows a distinct pattern of overbidding followed by underbidding (relative to recommended value). Participants tend to overbid early, paying more than the recommended value for the first two or three players they win, irrespective of who those players are. Underbidding for the next few picks then follows, with some overbidding occurring for the last pick. This behavior suggests a new variety of declining price phenomenon which we believe is reflective of the auction environment.

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1. Introduction

Budget constraints are likely to be important considerations in multiple object auctions in which bidders desire multiple goods. Auction theory suggests that bidders’ budgets link goods strategically even if the goods themselves are not linked in other ways (e.g., as substitutes or complements, or through bidders’ multi-unit demands) and provides the intuition that bidders in sequential auctions might compete aggressively over early items with the aim of diminishing rivals’ resources and, hence, competition for items to be auctioned later.¹ Despite the sizable empirical literature on auctions, however, little is known about bidder behavior under budget constraints in sequential auctions because the most-frequently studied auctions are of a single item and because researchers often cannot observe, let alone control, bidders’ budget constraints in field empirical settings.² The laboratory experiments

of Pitchik and Schotter (1988) on sequential auctions with budget-constrained bidders are important exceptions to the above, and show that, indeed, bidders respond to the strategic incentives due to rivals’ budget constraints.

What is the nature of budget-constrained bidder behavior in sequential auctions in the field? This paper contributes to the literature on sequential auctions with budget-constrained bidders by reporting results from a natural field experiment in a novel empirical setting: fantasy basketball auction drafts. Though some details of auction drafts are rather unique, making them slightly different from other real world auctions, auction drafts place real bidders (fantasy sports team managers) in a complex strategic environment. Auction draft data therefore provide insights into how real bidders behave in a sophisticated auction format in the field. We provide evidence suggesting that bidders use their budgets strategically in a complex field environment, thereby complementing the laboratory results of Pitchik and Schotter (1988) from simpler two-bidder, two-object sequential auctions.

Our data comes from a series of auctions that bidders participated in to draft fantasy basketball teams in online leagues. In fantasy sports leagues, ordinary individuals compete against one another by using the statistics of professional athletes. Each fantasy team manager makes use of a limited budget to obtain a set of players through a draft, and the performance of those players in

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¹ See Pitchik and Schotter (1988), Benoit and Krishna (2001), and Pitchik (2009) for models of multiple object and sequential auctions with budget-constrained bidders.

² See Kagel and Levin (2014) for a review of the experimental auction literature.

real life determines the fantasy team's performance. The drafts we observed were in the form of sequential ascending auctions with budget-constrained bidders.

Fantasy sports leagues provide an important source of field experimental data because they offer environments which are hybrids of laboratory and field experiments.³ As is the case with laboratory experiments, many leagues with the same controlled parameters but with different participants can be reliably compared. At the same time, all fantasy sports participants play because of genuine interest and the desire to compete. The strategic decisions they make are accordingly genuine.

The case of fantasy sports auction drafts is especially interesting because an auction draft involves a unique collection of strategic elements in terms of timing and capabilities. The draft is a sequence of ascending auctions in which all participants have identical and common knowledge budget constraints, a combination of features difficult to encounter in field settings. This combination of sequential auctions and auctions with budget constraints leads to a surprisingly complex economic setting. Adding to the complexity is the fact that the players being sold via auction have heterogeneous values. To assist fantasy team managers in ascertaining player value, the online platform provides suggested valuations for each player based upon projected performance, but these valuations are mere recommendations and are therefore non-binding.

Studying auction drafts therefore allows us to study bidding behavior in the strategic environment of sequential auctions with budget-constrained bidders. We analyze auction draft data from 49 fantasy basketball leagues comprising the drafts of 6,370 players set up via ESPN.com and obtain two main empirical findings: (i) average bids follow suggested valuations closely and decline over the sequence of auctions, and (ii) individual bidding behavior follows a pattern of initial overbidding and then underbidding. Participants tend to overbid early, paying more than the recommended value for the first two or three players that they win, irrespective of who those players are. This is followed by underbidding relative to recommended value for the next few picks, with some overbidding occurring for the last pick, essentially to exhaust (henceforth useless) draft budgets.

Our empirical findings suggest a novel type of declining-price phenomenon in sequential auctions. The phenomenon we observe is different from the original declining price anomaly described by Ashenfelter (1989), but is analogous in the unique setting that is an auction draft. Ashenfelter (1989) noted that identical bottles of wine being sold sequentially in auctions tended to fetch lower prices the later on in the process they were sold.⁴ This observation was reaffirmed by McAfee and Vincent (1993) for the case of wine auctions, and has also been noted in auctions for condominium units (Ashenfelter and Genesove, 1992), roses (van den Berg, van Ours, and Pradhan, 2001), and even ancient Chinese porcelain recovered from shipwrecks (Ginsburgh, van Ours, 2007). In all of these cases, the objects being sold are purportedly identical except for the order in which they are sold. In marked contrast, in auction drafts the objects (players) being auctioned off are heterogeneous in value and are typically sold in an order of declining value. Thus, in this case we should expect winning bids to decline as well, but more striking is that we observe the propensity to overbid

relative to suggested valuations to decline, both at aggregate and individual levels.

After presenting our empirical results on bidding behavior, we put our results in the context of the sequential auction literature based on the structural features of the auction draft format. Based on those features, we then discuss possible explanations for the phenomenon we observe. Though a full theoretical characterization of the auction drafts we observe is beyond the scope of this paper, we explain why the pattern of over-then-underbidding may reflect strategic behavior on the part of fantasy sports team managers. There exist, however, alternative explanations for the bidding patterns we observe, which we also discuss. Our bidding behavior results might provide insights into behavior in other real world settings beyond auctions such as labor markets, which we discuss in the paper's conclusion.

2. Fantasy basketball and auction drafts

The concept of fantasy sports is fairly simple: any individual can form a team of professional athletes and then compete, based on the statistics of those athletes in real life, with the teams of other "fantasy managers." Groups of fantasy managers compete within their own leagues, and the rules of just how players' real-world statistics combine to score points for a manager's team depend on which league the manager is in. Although fantasy leagues did exist before the Internet, their popularity has increased dramatically in recent years thanks to the ease of keeping track of statistics, and therefore scoring online. It is now incredibly easy for individuals either to join an existing league in need of new managers, or create their own league with their own guidelines.

Virtually all fantasy sports leagues prohibit a (real-world) player from being on the roster of more than one team within a league. Since the composition of each manager's team is what determines their success, and since talent is scarce even in the pros, a key element to teams' performance in any league is the way in which players are initially allocated. The traditional mechanism for player allocation in fantasy sports leagues is a draft process in which managers take turns picking their players, mimicking practice in professional sports drafts.⁵ On each turn, managers simply select their most-desired player from the remaining pool of unselected players. A common complaint about traditional draft processes, however, is that participants are forced to follow an exogenously imposed and fixed order. Trades involving draft positions are generally not permitted in fantasy sports leagues, and, even if they were, much as in professional sports drafts such trades would undoubtedly entail high transaction costs. For example, trading draft positions does not guarantee obtaining a specific player since any available player may be selected at any time.

ESPN.com, an online platform which hosts fantasy leagues for a variety of sports, recently began to offer an alternative draft mechanism in the form of an *auction draft*. In an auction draft, each team manager in a fantasy league has a fixed budget for use in drafting players, and any manager can bid on any player. Thus, team managers have the ability to obtain any player they want, as long as they are willing and able to pay. Upon learning of this mechanism, we recognized a fascinating opportunity to observe bidding behavior in a field setting among bidders with binding budget constraints.

To study behavior in auction drafts, we set up 49 fantasy basketball leagues via ESPN.com and carefully observed the auction

³ Trautmann and Traxler (2010), for example, provide a related study of bidding behavior in online fantasy football (soccer) leagues in which team managers use auctions to trade players they develop over the course of a season. Their study differs from the present paper in that Trautmann and Traxler focus on how reserve prices impact closing prices in single-item auctions, while this paper focuses on the effect of bidders' budget constraints on prices in a sequence of related auctions.

⁴ These observations of declining prices have been dubbed an anomaly because, according to Weber (1983), sequential auctions of identical objects should result in either constant or increasing prices.

⁵ Specifically, one of the most common draft mechanisms is the *randomly ordered snake draft*. This is a multiple-round draft in which the order of the first round is determined randomly, and successive rounds go back and forth through the initial order. The manager with the first pick in the first round therefore has the last pick in the second round, the first pick in the third round, and so on.

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