

Auctions and Relationships

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1. Overview

I have the difficult task of commenting on two stupendous overviews of two key theoretical literatures. Jehiel and Moldovanu [2005] (henceforth JM) examine externalities and other frictions in auctions, as well as giving an overview of the entire literature on auctions. Samuelson [2005] examines repeated games, reputations and relationships – this is based on his forthcoming book with Mailath [2006], also a remarkable achievement, but fortunately one I do not have to try to discuss in the allotted time.

Faced with such a daunting task, the only reasonable thing to do is surrender. Since it is clearly impossible to discuss such compendious overviews in any sensible way, I decided instead to try to relate the two literatures – so I will talk about the role of relationships in auctions. I will attack this with a simple example that I think highlights many of the issues raised in both papers, and perhaps points the way to new research as well.

2. Relationships in Auctions

One important issue that is studied in the auction literature is the possibility of collusion. It is natural to think that relationships – repeated interactions – might enhance collusion. We usually think of collusion as taking place between bidders – as for example in government auctions where the bidders agree to submit low bids. But it is also possible to have collusion between the auctioneer and participants, and for the sake of interest I will examine that case.

The possibility that relationships lead to collusion highlights a key point about relationships – they have ambiguous implications for welfare. We think of relationships as a substitute for institutions – for example, a reputation for honesty replacing the enforcement of written contracts. But we ought to bear in mind that relationships are an imperfect substitute for institutions. For example, in developing countries, institutions such as enforcement of written contracts are often lacking and replaced by reputation. That this leads to a degradation of economic efficiency should be fairly apparent.

The examination of collusion in auctions will highlight also another point – relationships may exist between subsets of players. JM show that under certain circumstances the core of an auction may be empty. That means it is important to

understand which coalitions may form. In turn, the theory of relationships in repeated games may contain real answers to this question – those who are able to form relationships potentially being coalitions. Yet the matter is not as straightforward as might be expected. It is natural to think that those who participate in a relationship are the beneficiaries – we will see that this is not necessarily the case.

3. Two Bidder First Price Auction

I will examine the most simple-minded auction I can think of. Two bidders independently draw private values of either 1 or 17 with equal probability. If the high value is drawn, the bidder may submit a bid of either 1 or 13. A low value type always submits a low bid of 1. The auction is a first price auction in which the auctioneer must give the single item to the highest bidder and flip a coin if there is a tie. Everyone is risk neutral.

This auction has the convenient feature of being a 2x2 game, with the strategies being the bid conditional on having a high value. Since the low value type always gets zero, we look only at the payoffs of the high value type. If both bid 1, the high value type has a 50% chance of winning $17-1=16$, and the payoffs are 8,8. If player 1 bids 1 and player 2 bids 13 then player 1 wins 16 when winning the coin toss against a low value opponent – that is, 25% of the time, for an expected value of 4. The player bidding 13 always wins, and always wins 4. So both players get 4. Finally, both may bid 13. Such a bid wins 4 against a low value opponent, and has a 50% chance of winning 4 against a high value opponent, so gives a 75% chance of winning 4. The normal form of this game is

	<i>1</i>	<i>13</i>
<i>1</i>	8,8	4,4
<i>13</i>	4,4	3,3

This game has a unique dominant strategy equilibrium with everyone bidding low and payoffs of 8,8. While this is efficient in the game, it is inefficient in the auction, since there is a 25% chance the wrong bidder gets the object. This inefficiency plays a key role in the remainder of the analysis – and is obviously completely contrived. To summarize

JM – in more complex settings, inefficient mechanisms are not so contrived. So I hope that this simple contrived example captures some of the flavor of their more realistic but more complex models.

I now want to introduce the possibility of “corrupt collusion.” Suppose that after the sealed bids are submitted in the first price sealed bid auction, the auctioneer examines the bids. If both bidders bid 1, he may secretly approach one of the bidders and offer the following “deal”: if the bidder raises his bid to 13, the auctioneer will secretly compensate the bidder for his cost. We assume that the deal is always accepted – imagining that the auctioneer offers a penny more than the cost of 12. We also assume that the deal has a social cost of $c > 0$ paid by auctioneer. So far this is not terribly interesting, as the auctioneer strictly prefers not to offer the deal.

Suppose however, that the auctioneer can commit to offering the deal – to player 1, say. Then the payoffs in the game are modified, and the normal form is

	<i>1</i>	<i>13</i>
<i>1</i>	16,0	8,4
<i>13</i>	4,4	3,3

The unique equilibrium is now 8,4 – the expected revenue of seller goes up by 4, and the utility of player 1 does not change. Provided that $c < 4$ the commitment would be optimal for the auctioneer.

4. Time Consistency, Auctions and Reputation

The basic feature in this example is that the mechanism operator wishes to maximize revenue in a setting where the mechanism designer did not. For example in JM section 3.6, we find that in a multi-unit auction setting revenue maximization and welfare maximization are in conflict. So a benevolent government might well choose a non-revenue maximizing auction – leaving open the possibility that those actually operating the auction might try to “cheat” to get additional revenue. Even if the mechanism maximizes revenue and welfare there is still a potential time consistency problem. If the mechanism is not robust – the topic of JM section 5 – so that there is no dominant

strategy – then there can be an incentive to change what your bid is after you learn what other players have bid.

Examining how reputation operates with this time inconsistency problem, Mailath highlights two different types of reputation – a reputation for “who you are” and a reputation for “who you are not.” I will briefly discuss the “who you are not” case first. Suppose commitment is implemented by a legal contract, for example in a second price auction in an independent private value setting. We can imagine an “inept type” (perhaps better described as “too smart for his own good”) of mechanism designer who is good at tricky legal stuff. Such an “inept type” can effectively renege on a written legal commitment. After the sealed bids are submitted, the “inept” designer effectively throws out commitment to charge the second price and simply charges the high bidder the full price. Obviously you would not like to have a reputation for being “inept” in this sense, bearing in mind that “inept” may mean “good at doing bad things.” In this example reputation is a potentially an imperfect substitute for the effective enforcement of contracts

Coming back to our own example, we will use the more traditional model of reputation as “who you are.” That is, we will consider that you would like to be regarded as the type committed to offering the corrupt deal.

Specifically, suppose the auctioneer is a “long-run” player with discount factor near 1 and that the bidders are “short-run” players who play only one period. First suppose that both bidders can observe the past corrupt deals of the seller. The basic long-run versus short-run theory of Fudenberg, Kreps and Maskin [1990] shows that there is an equilibrium for seller in which he earns the commitment value $4 - c$.

Now we want to consider coalition formation, so we consider the possibility of an asymmetric relationship. Specifically, imagine that only player 2 (say) can observe the past history of corrupt deals. The favorable equilibrium for the seller now is to offer the corrupt deal to the player who *cannot* observe the history. That is, the reputation you want is to intimidate the bidder with whom you do have a relationship into bidding high. Notice how this works. The seller gets the commitment value, the bidder with whom the seller has a relationship gets 4, and the bidder with whom the seller does not have a relationship gets 8. Although instinctively we think it should be a good thing to have a relationship and be part of a coalition – in this example the opposite is true.

The theory of relationships of Samuelson and of Mailath and Samuelson points the way then towards a theory of which coalitions are viable. For a group to collude, there must be intertemporal information and interaction. So which groups can collude is determined by economic fundamentals. This take force in light of JM's Proposition 6: with allocative externalities the core of the auction game is empty.

References

- Fudenberg, D., D. M. Kreps and E. Maskin [1990], "Repeated Games with Long-run and Short-run Players," *Review of Economic Studies*, 57: 555-573
- Jehiel, P. and B. Moldovanu [2005], "Allocative and Informational Externalities in Auctions and Mechanism Design."
- Mailath, G. and L. Samuelson [2006], *Repeated Games and Reputation: Long Run Relationships*
- Samuelson, L. [2005], "The Economics of Relationships."