

Econ 805 – Advanced Micro Theory I

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Lecture 1

- I'm Dan Quint, this is Econ 805, Micro Theory.
- Who are you? (Name, program, year)
- Office hours: by appointment
- Website: <http://www.ssc.wisc.edu/~dqint/econ805/>
 - Syllabus is online, with links to papers
 - I'll post my lecture notes after each class
- Grading: occasional problem sets, student presentations at end of semester
 - Point of the presentation will be to focus on one interesting paper, but also put it in context, explain how it relates to the literature, and judge whether it's a good paper
 - I'll circulate a list of suggestions early in the semester, but you can pick any paper you like
- Outline of the semester
 - First half will be auction theory
 - Second half will likely be on two-sided matching markets
 - But if you all are more interested in other topics, we could do something else – game theory models of bargaining; screening models; ?
- Readings: Milgrom book recommended for first half, but not required; Klemperer book available online; papers are all available online
- Today:
 - Why study auctions?
 - Review of Bayesian games/equilibrium

Why Study Auctions?

Since we'll be spending half the semester on auction theory, I thought I'd start by addressing the question, why study auctions? I'll give several reasons.

- First answer is captured in the title of a working paper Paul Milgrom and others are writing: "How we saved our client \$1.2 Billion."
 - Lots of recent work on FCC spectrum auctions – auctions for a license to use a particular range of frequencies in a particular area to transmit data wirelessly
 - SpectrumCo was a participant in a recent spectrum auction
 - Milgrom and several others worked for them as advisors, and are documenting that, following their advice, SpectrumCo paid almost \$1.2 Bn less than their competitors were paying for comparable bandwidth.
- The point: there are auctions going on in the world, and the amount of money at stake is sometimes huge
 - Christy's and Sotheby's art auctions – billions annually
 - Auctions for rights to natural resources (timber, oil, natural gas), government procurement, electricity markets
 - eBay: \$52 Bn worth of goods traded in 2006; eBay itself had \$6 Bn in revenue, current market cap around \$30 Bn
 - European 3G spectrum auctions raised over \$100 Bn in 2000-2001; US spectrum auctions have raised tens of billions
 - U.S. treasury holds auctions for **trillions** of dollars of securities annually
- And equally importantly, design matters
 - Yahoo! and Google both used auctions to place ads next to search results
 - But Google's were better designed and raised more revenue, to the point where I believe Yahoo! at one point was using Google's services to serve ads on their own search page
 - 3G spectrum auctions in UK and Germany raised over 600 euro per capita!
 - Later the same year, auction in Switzerland raised less than 20
 - Rules in the Swiss auction discouraged participation by marginal bidders and new entrants, and allowed for easy collusion among the primary competitors
 - So based on having worse design, the Swiss auction raised $\frac{1}{30}$ the revenue of comparable auctions in other places

So the first answer is, there's lots of money at stake, and results can be very sensitive to auction design.

- The second reason is that auctions can be seen as a useful microcosm/laboratory for markets in general
 - As economists, one of the great mysteries we face is where do prices come from
 - We have a few silly models – Walrasian auctioneer, etc.
 - Auctions give us a setting where price formation is explicit
 - Auctions tend to generate very extensive data, lending itself to empirical work
 - And auctions lend themselves naturally to experiments
 - So seeing what affects price realizations in auctions – information, asymmetries, etc – may tell us something about what happens in larger, unstructured markets
- And even if we're not trying to explain the whole world, techniques/insights from auction theory are useful in other areas
- Paul Klemperer, in his book chapter “Why Every Economist Should Learn Some Auction Theory,” shows insights from auction theory applying to...
 - Comparison of different litigation systems
 - “All-pay” tournaments such as lobbying, political campaigns, patent races, and some oligopoly situations
 - Market frenzies and crashes
 - Online auto sales versus dealerships
 - Monopoly pricing and price discrimination
 - Rationing of output
 - Patent races
 - Value of new customers under oligopoly
- And finally, auction theory turns out to be a good way to introduce a number of useful/interesting/elegant mathematical tools, some of which will also come in handy in other areas

So that's the basic motivation for studying auctions.

For the rest of today, a quick review of some game theory, and in particular, Bayesian games, since that will be our primary tool for modeling auctions.