



# Signaling



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## *Agenda*

- ◆ Introduction to Signaling
- ◆ Common examples
- ◆ Signals everywhere
- ◆ Auctions as Signals
- ◆ Conclusion



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# Introduction to Signaling



A paradox of market design that as communication gets easier and cheaper, it sometimes also gets less informative



 *Qualification*

 *Interest*



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# Common Examples

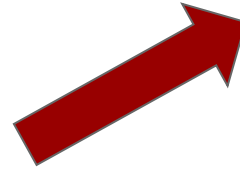


## *Common Examples*

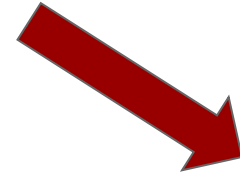
### **College Admission**

- ◆ Normally done on common platform
- ◆ Supplementary essays
- ◆ Admissions exams on same day

Meaning of  
Signals?



Interest in  
the sport?



Interest in  
the school?







## *Common Examples*

### **Signaling For Love**

- ◆ Superficial messages = ‘cheap talk’
- ◆ Eg. roses on dating sites
- ◆ Scarce resources



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# Signals Everywhere



*Signals as mark of desirability*





- ◆ Costly/scarce signals are usually more effective
- ◆ Other than interest, signals can show desirability
- ◆ In a congested market, signals must show both interest and desirability to be effective



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# Auctions as Signals



## Auctions as Signals

Auctions: matching markets that match sellers with buyers who most value what is being sold

High bidder sends a costly signal that he values the painting more than other bidders





## Ascending Bid

Bidder pays the last, highest price called by the auctioneer

Profit = What the object is worth to him - What he has to pay



## Sealed Bid

Each bidder submits a bid without hearing the other bids, all bids are opened at the same time and the highest bidder wins

Bidders bid the object's full true value to them





## Example

Suppose an oil company bids on the right to drill:

- ◆ Each bidder has their own estimates on the amount of oil
- ◆ Oil company is able to get a signal of how much it should be willing to pay by hearing the bids of other bidders



## Example

### Sealed Bid

Bidders cannot learn anything from how the other bidders behave  
Risky to bid, unrealistic estimates may result in the “winner’s curse”

### Ascending Bid

When other bidders drop out, it may signal that the estimate is unrealistic



# Radio Spectrum License Auction

Government decided to sell license for businesses to use radio spectrum:

- ◆ Requires signals from buyers about the uses of the scarce resource
- ◆ Seller knew less about the value of item sold than did the potential buyers
  - Price discovery



# Radio Spectrum License Auction

Issues to consider:

- ◆ Auction format must be flexible enough that businesses using spectrum in different ways can bid for what they wanted
- ◆ Businesses require a package of licenses covering a broad spectrum to provide services



# Radio Spectrum License Auction

Bad Market Design:

If licenses are auctioned one at a time, it is too risky to assemble the packages bidders need



# Radio Spectrum License Auction

Change in auction design:

“Simultaneous ascending” auctions with rule that no auction would close until they all closed

Bidders can adjust the package of licenses they were bidding on right to the end of the auction



# Radio Spectrum License Auction

“Simultaneous ascending” auctions:

- ◆ Risks of being the highest bidder on many licenses was dissolved with allowance for some substitution on most packages
- ◆ Bids determined how the mix of winning packages should be divided among competing uses to create the most value



# Radio Spectrum License Auction

Problem:

- ◆ Bidders are not willing to bid as it risks revealing confidential information to competitors
- ◆ If everyone waited, “sniping” occurs





# Radio Spectrum License Auction

Change in auction design:

- ◆ “*Activity rules*”
- ◆ Prevent bidders from making late bids unless they had made bids on equivalent number of licenses



# Radio Spectrum License Auction

Simultaneous Ascending Auction w *Activity Rules*:

- ◆ Creating a thick market in which price discovery can take place
- ◆ Kept the auctions from dragging on interminably - a possible side effect of thick markets with the congestion of many possible transactions



# Radio Spectrum License Auction

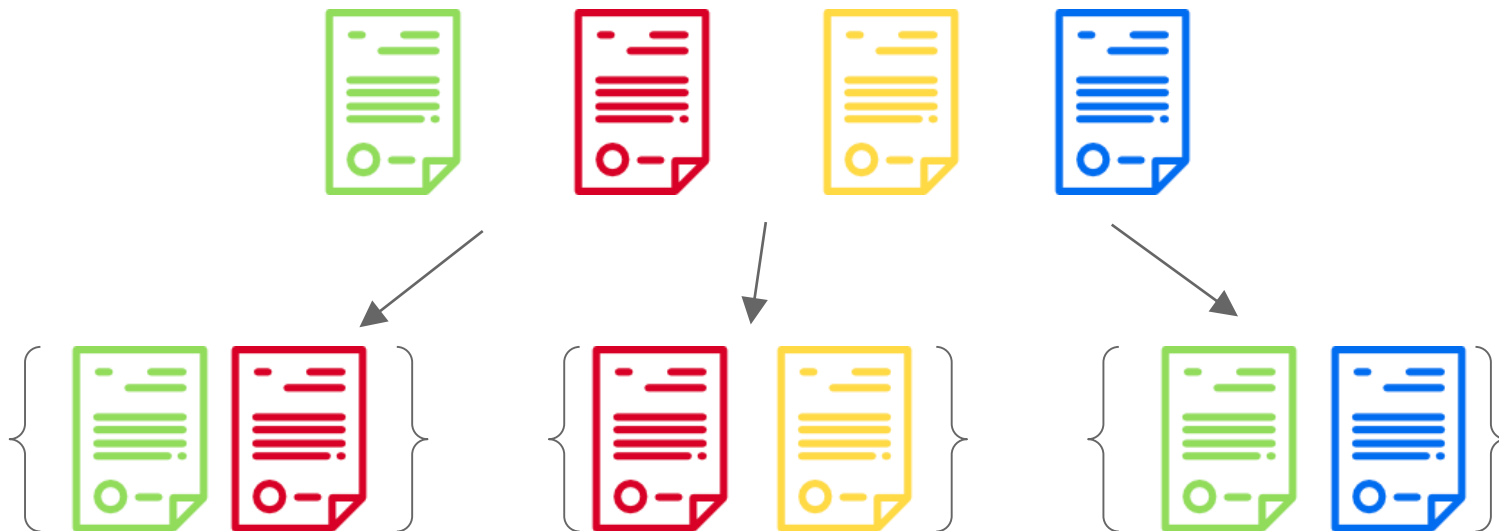
Simultaneous Ascending Auction w *Activity Rules*:

- ◆ Implemented *Package Bidding*
- ◆ Package bid allows a company to bid on exactly what it wants



# Radio Spectrum License Auction

Ascending Auction w *Package Bidding*:





# Radio Spectrum License Auction

Ascending Auction w *Package Bidding*:

- ◆ May not be possible to identify the price of each license since the licenses are all bundled in different packages
- ◆ Prices don't do all the work
- ◆ You can't choose what you want, even if you're the richest bidder



# Conclusion

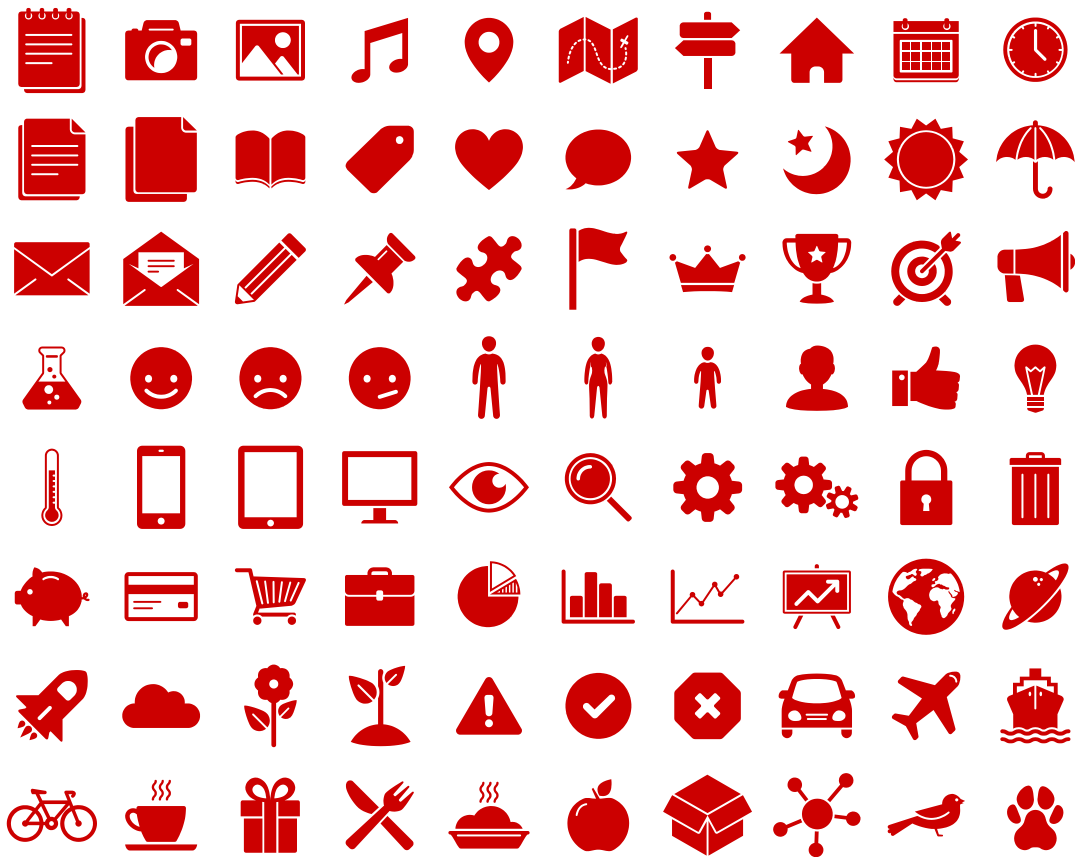
Signals transmit information and interest

- ◆ Thick market experienced and offers can be made at the same time
- ◆ Exploding offers can be eliminated



*Thanks!* ❤️

**Any questions?**



**SlidesCarnival icons are editable shapes.**

This means that you can:

- Resize them without losing quality.
- Change fill color and opacity.
- Change line color, width and style.

Isn't that nice? :)

Examples:

