

Auctions for Financial E-Commerce

Lawrence Ausubel

Department of Economics

University of Maryland

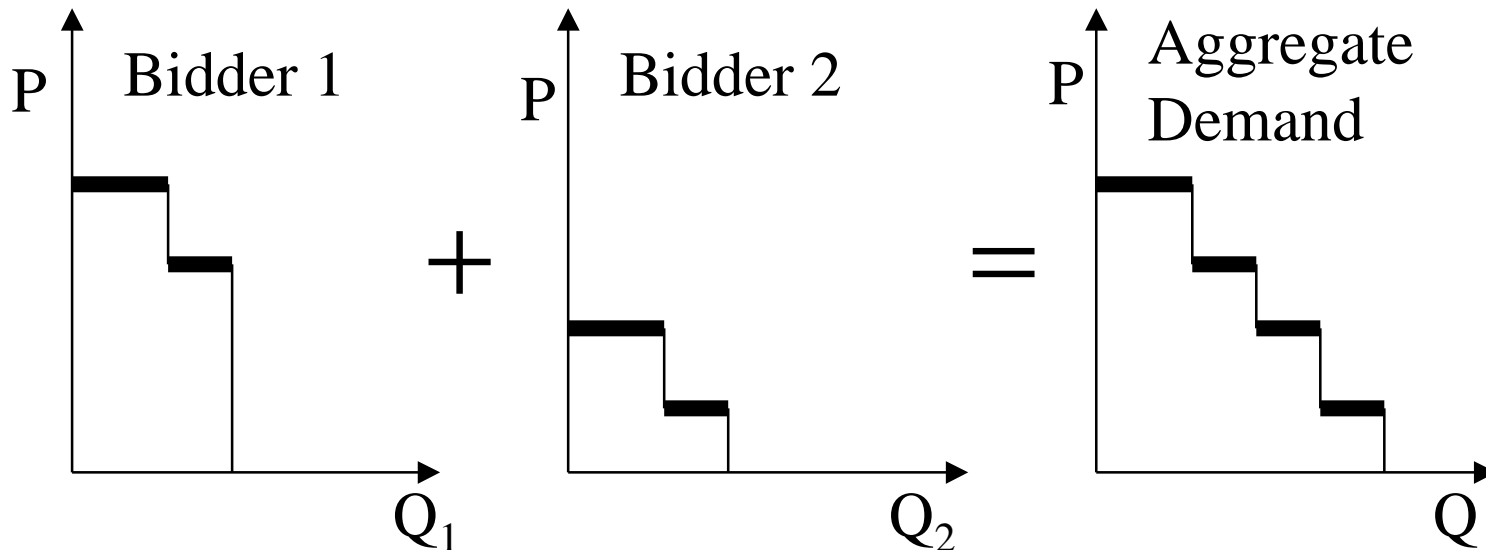
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Possibilities for E-Commerce

- Improve supply chain
- Eliminate middlemen
- Introduce dynamic pricing
- Increase revenues
- Encourage efficiency
- Reduce transaction costs

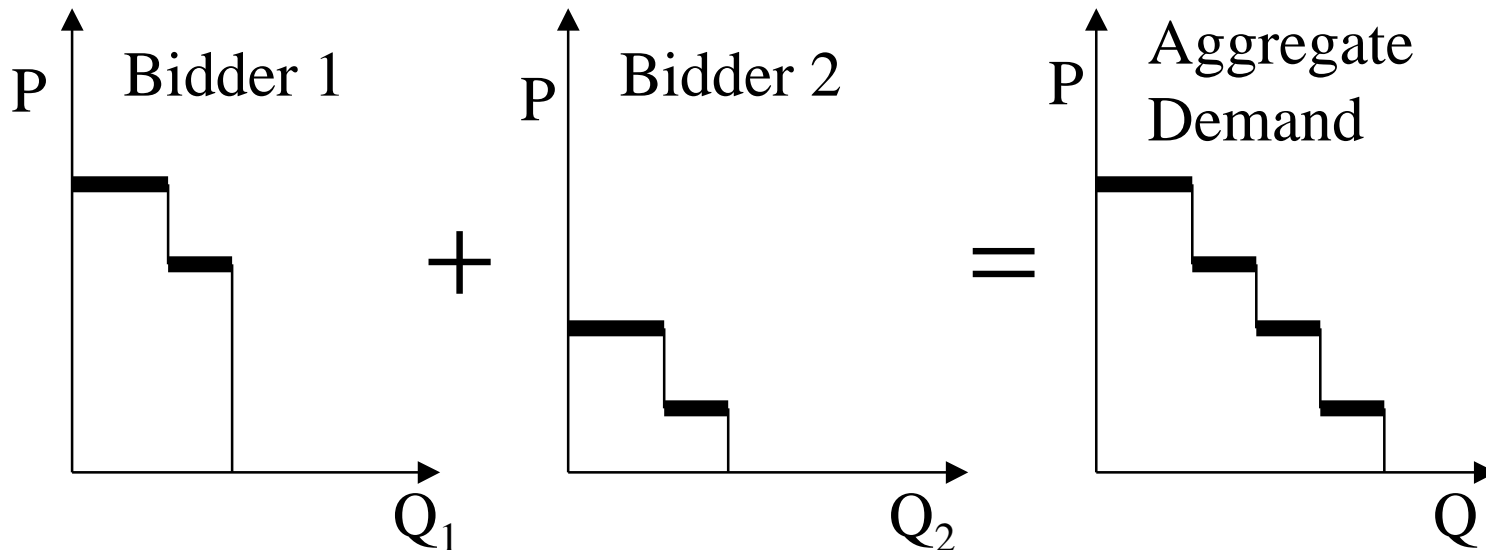
Traditional Sealed-Bid Auctions

- Sealed-bid: bidders submit demand schedules
 - Pay-your-bid auction (traditional Treasury practice)
 - Uniform-price auction (Milton Friedman, 1959; now used for all Treasury auctions)



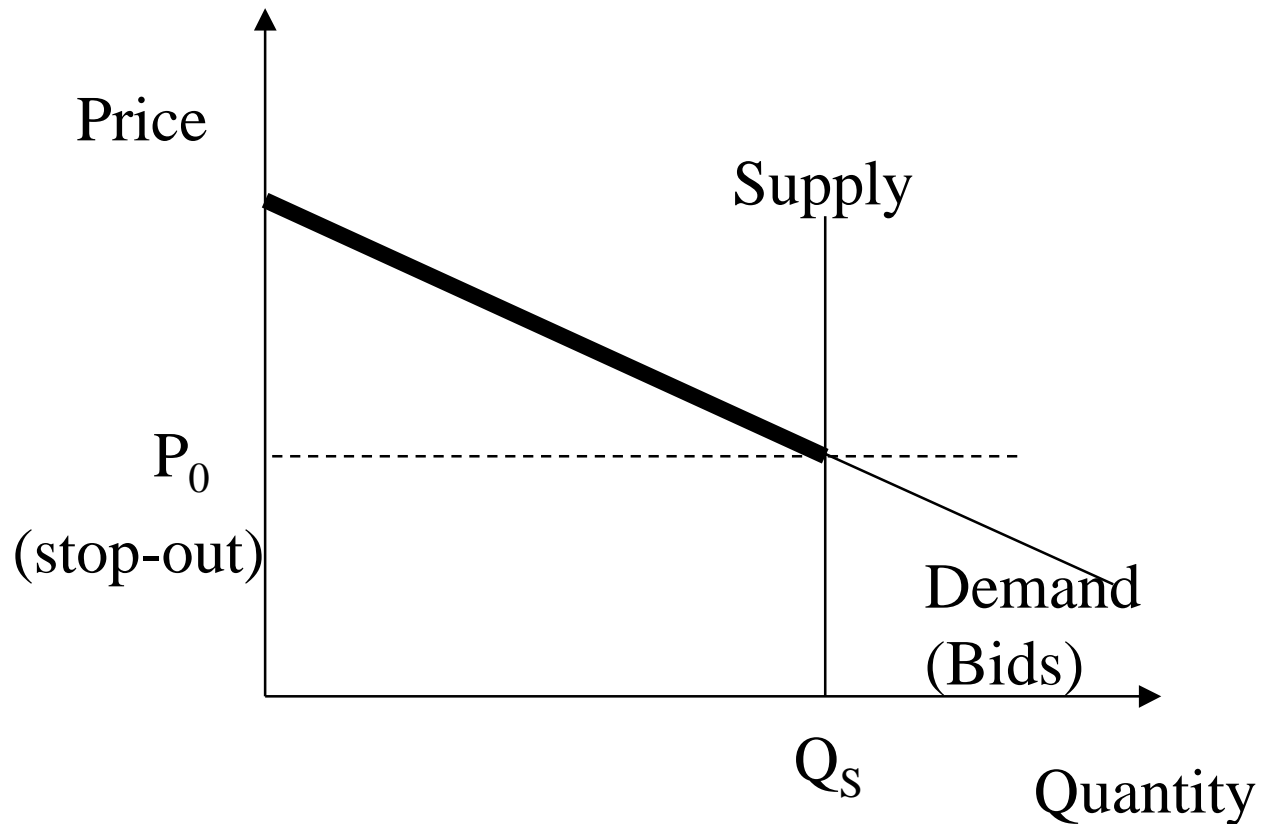
Traditional Sealed-Bid Auctions

- Procedure:
 - Bidders simultaneous and independently submit bids
 - Objects are awarded to the highest bids
 - Various possibilities for the payment rule



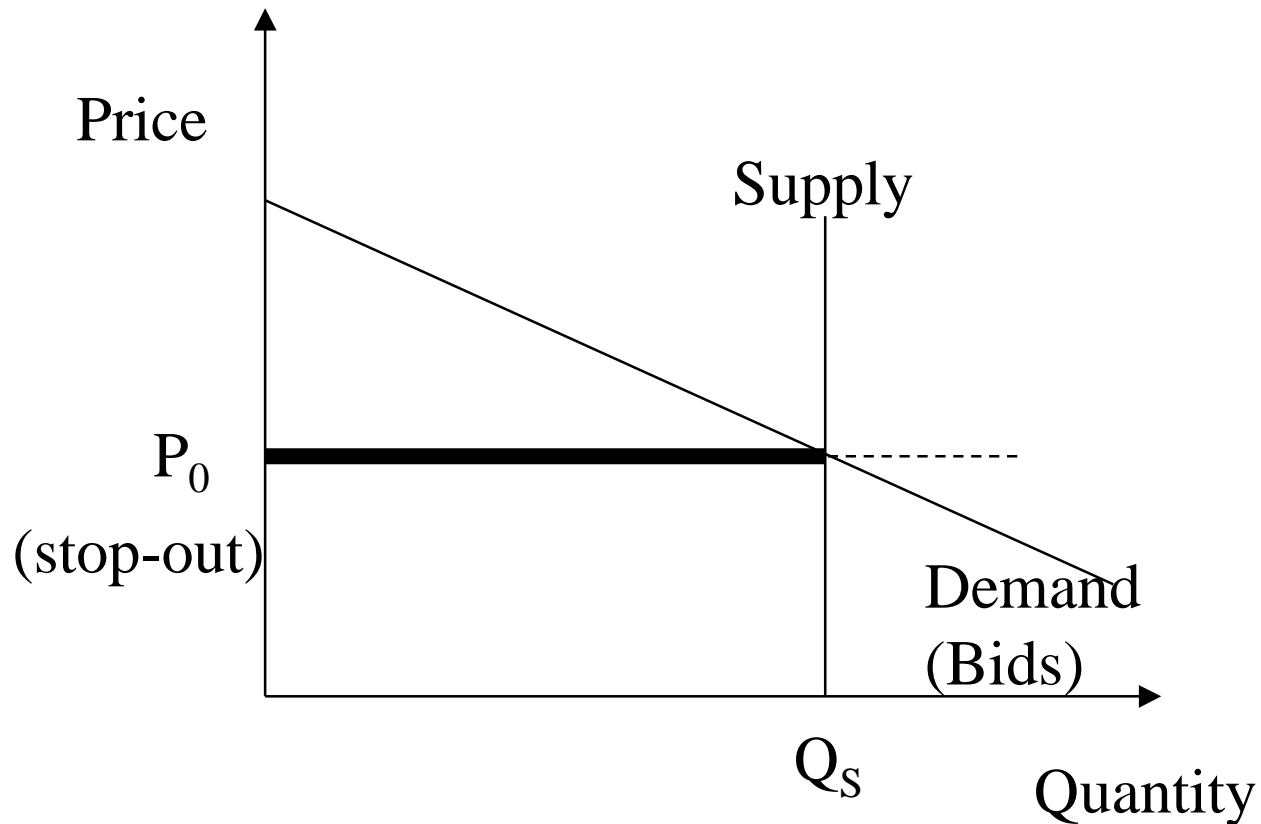
Pay-Your-Bid Auction:

All bids above P_0 win and pay bid



Uniform-Price Auction:

All bids above P_0 win and pay P_0



Critiques of Sealed-Bid Auctions

- Common-value auctions are subject to the well-known “Winner’s Curse”
 - Winners are the most “optimistic” bidders
- Ascending-bid auctions reduce the Winner’s Curse relative to sealed-bid auctions
 - Ascending-bid auctions give bidders continuous feedback about their opponents’ valuations
 - Sealed-bid auctions give bidders no feedback whatsoever
- Because of the diminished Winner’s Curse, bidders bid more aggressively in well-designed ascending-bid auctions than in sealed-bid auctions
 - This increases the seller’s expected revenues

Critiques of Sealed-Bid Auctions

- Ascending-bid auctions for government security issuance advocated as early as Joint Report on the Government Securities Market (1992)
- Current information technology makes ascending-bid auctions highly feasible
- Most recent introductions of successful auction formats have been of an ascending-bid nature
 - FCC auctions
 - European 3G auctions
 - eBay

Ascending-Bid Auction Formats for Financial E-Commerce

- Efficient dynamic auctions
 - Suitable when identical goods are available in large quantities (e.g., issuance of securities)
- Combinatorial auctions
 - Suitable when strong complementarities are present, so bidders want to purchase bundles

Efficient Dynamic Auctions

- Run as a “clock auction”
 - Auctioneer announces a price
 - Bidders respond by submitting quantities desired
 - Auctioneer raises the price
 - Bidders respond by submitting quantities desired
 - Process continues until the first price at which aggregate demand \leq supply
 - Payment rule differs from simple, uniform price

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
10	3	2	2	2

- Aggregate Demand = $3 + 2 + 2 + 2 = 9$

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
25	3	2	2	0

- Aggregate Demand = $3 + 2 + 2 + 0 = 7$
 - There is still excess demand, so auction continues

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
25	3	2	2	0

- Bidder A's opponents demand = $2 + 2 + 0 = 4$
 - Bidder A has “clinched” winning one unit, at price of 25

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
30	3	1	2	0

- Aggregate Demand = $3 + 1 + 2 + 0 = 6$
 - There is still excess demand, so auction continues

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
30	3	1	2	0

- Bidder A's opponents demand = $1 + 2 + 0 = 3$
 - Bidder A has “clinched” winning a second unit, at price of 30

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
30	3	1	2	0

- Bidder C's opponents demand = $3 + 1 + 0 = 4$
 - Bidder C has “clinched” winning one unit, at price of 30

Efficient Dynamic Auctions

- Example
 - 5 objects available
 - 4 bidders

Price	Bidder A	Bidder B	Bidder C	Bidder D
35	3	0	2	0

- Aggregate Demand = $3 + 0 + 2 + 0 = 5$
 - There is no longer excess demand, so auction ends
 - Bidders A and C each win one more unit at 35

Summary of Example of Efficient Dynamic Auction

- Bidder A
 - Wins 3 objects, at prices 25, 30 and 35
- Bidder C
 - Wins 2 objects, at prices 30 and 35
- Auction puts objects in hands who value them the most
- No incentive for resale

References on Efficient Dynamic Auctions

- Ausubel (1997), “An Efficient Ascending-Bid Auction for Multiple Objects”
- Ausubel (2000), “An Efficient Dynamic Auction for Heterogeneous Commodities”
- U.S. Patent Nos. 5,905,975 and 6,026,383
- All downloadable from www.ausubel.com; click on “Auctions”

Combinatorial Auctions

(a.k.a. “Package Bidding)

- Run iteratively, with bidders submitting package bids consisting of a set of objects and an associated price
- Say the set of objects being auctioned is $\{A,B,C,D,E,F,G,H,I,J,K,L\}$
- A bidder might submit bids of $(\{A,B,F\},100)$ and $(\{C,D,H,I,J\},125)$
- At any given time, the “provisionally-winning bids” are the collection of compatible bids that maximize revenues
- Bidders may continue to submit package bids until the auction closes

Combinatorial Auctions (a.k.a. “Package Bidding”)

- Bids are treated as all-or-nothing bids
- Useful in spectrum auctions where there are synergies between spectrum licenses
- First use for spectrum will be in the FCC’s 700 MHz Auction scheduled for September 2001
- Also useful for financial applications where a bidder would want the entire package or nothing (hedges?) or the ability to place mutually-exclusive bids

Conclusion: Auctions for Financial E-Commerce

- Improve supply chain
- Eliminate middlemen
- Introduce dynamic pricing
- Increase revenues
- Encourage efficiency
- Reduce transaction costs