

Online Auctions, Posted Fixed Price, and *Name Your Price*



A Comparison

Samuel E. Bodily

Darden Graduate Business School

University of Virginia

BodilyS@virginia.edu

Auctions and *Name your Price* are Becoming Huge Online

- According to Forrester Research of Cambridge, MA, the B2B online auction industry is expected to grow to approximately \$52.6 billion by 2002
- Most of the major airlines now sell excess seat inventory in a *Name Your Price* online channel
- Sellers will need to evaluate how these channels compare to posted fixed-price channels

Name your price —Priceline

- Jay Walker sought and obtained a patent on the PriceLine process
- Technically www.priceline.com is not an online auction. A customer names their price and priceline responds within an hour whether the bid is taken (exceeds their reserve price).
- Use of un-branded products from multiple vendors prevents losses of brand equity. Like private labeling, Priceline provides a complementary channel.
- An ancillary benefit is the ability to collect consumers' bid information.
- Can employ smart coupons or promotions generated in real time based on customer bid.
- Priceline stock opened at \$16 on March 30, went to \$86 on March 31, 1999

priceline.comSM

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How attractive is *Name Your Price*?

- Attractive to the seller
 - Buyers can't complain about a price they quote themselves
 - The buyer does the work of deciding how much to offer
 - Seller can capture some of the consumer surplus—compare to a posted fixed price
 - The seller never quotes a price for a potentially branded item
- Unattractive to the (aware) buyer
 - limited awareness of what is available
 - no awareness of other would-be buyers
 - small chance to get a "good deal"
- The bid taker can collect "named price" data to shed light on willingness-to-pay

How sales channels stack up will depend on several things:

- The rules of the auction—how it's determined who wins and what price the winner pays, how much bidders know about each other and their bids
- Characteristics of the random process for demand, and the value buyers place on a product.

A Simple Starting Example

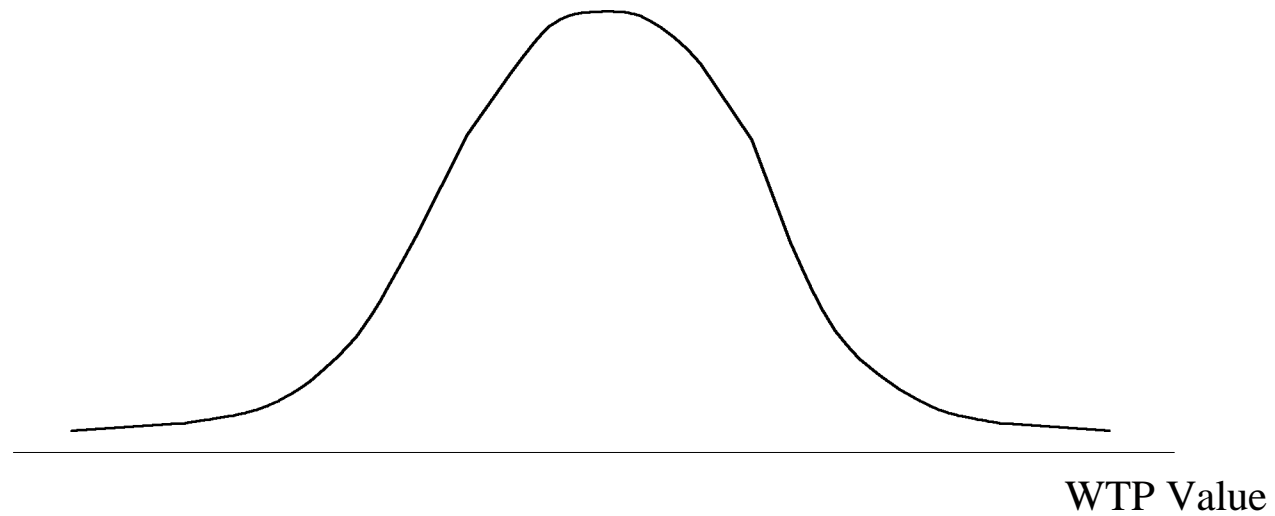
- Assume the WTP value of a potential buyer of a seat on a particular flight is an integer with a uniform distribution in the range \$201 to \$300
- Assume 10 such buyers are interested in that airline seat.
- Using that distribution, an example realization of 10 WTPs is:

Potential Buyer	A	B	C	D	E	F	G	H	I	J
Willingness to Pay	254	243	269	213	277	232	298	290	227	204
Sorted WTP	204	213	227	232	243	254	269	277	290	298

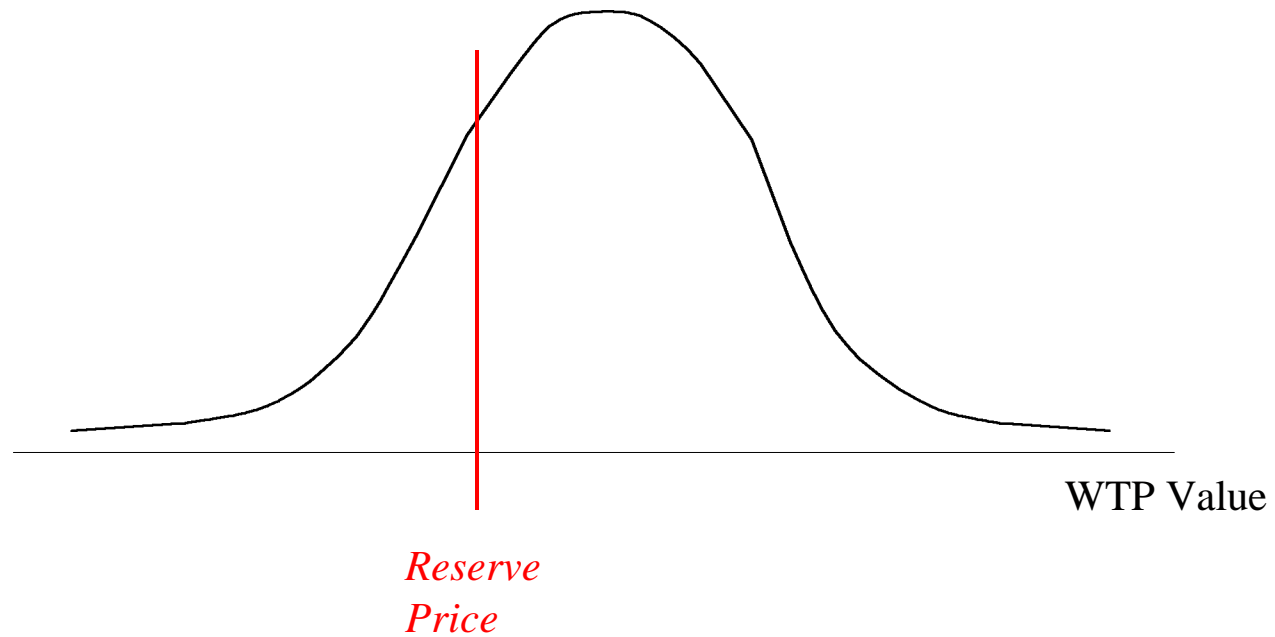
Posted Fixed Price

- Assume you have enough seats for everyone who wants them.
 - A. If you were to sell seats for a posted fixed price online, how would you come up with an appropriate price, assuming you know the WTP distribution? What price would you recommend?
 - The optimal fixed price would be 260^[1], which bisects the range from the reservation price of 220 and the maximum WTP of 300. The average payoff over the customers for a fixed price of 260 would be $16 = (260 - 220) * \text{Prob}(\text{WTP} > 260) = 40 * .4 = 16$.
 - B. Using the price in a), would you be better off selling your seats with a posted fixed price or using *name your price* (wherein you would accept the buyer's named price only if it exceeded the reserve price of 220)?
 - If participants bid their WTP, then the payoff for *name your price* would be the difference between the expected WTP of a winning bidder and the reserve price. For those participants that exceed the reserve price of 220, the expected WTP would be 260. So the expected payoff would be 40.
 - ^[1] The expected payoff may be written
 - $E(\text{payoff}) = (x - 220) * \text{Prob}(\text{WTP} > x)$ for a price of x
 - $= (x - 220)[1 - (x - 200)/100]$
 - Taking the derivative with respect to x and setting to 0 gives the optimal x at 260.

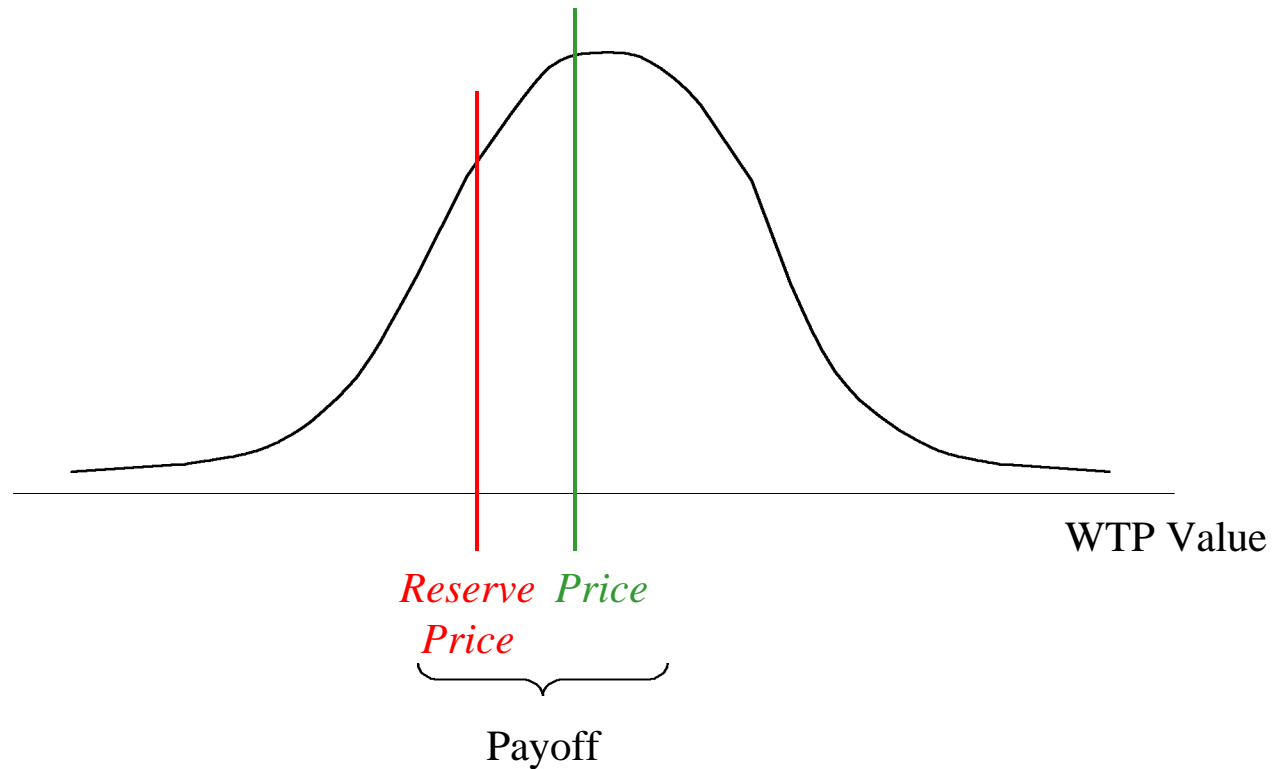
The willingness-to-pay of a buyer has a distribution



The Seller has some reserve price

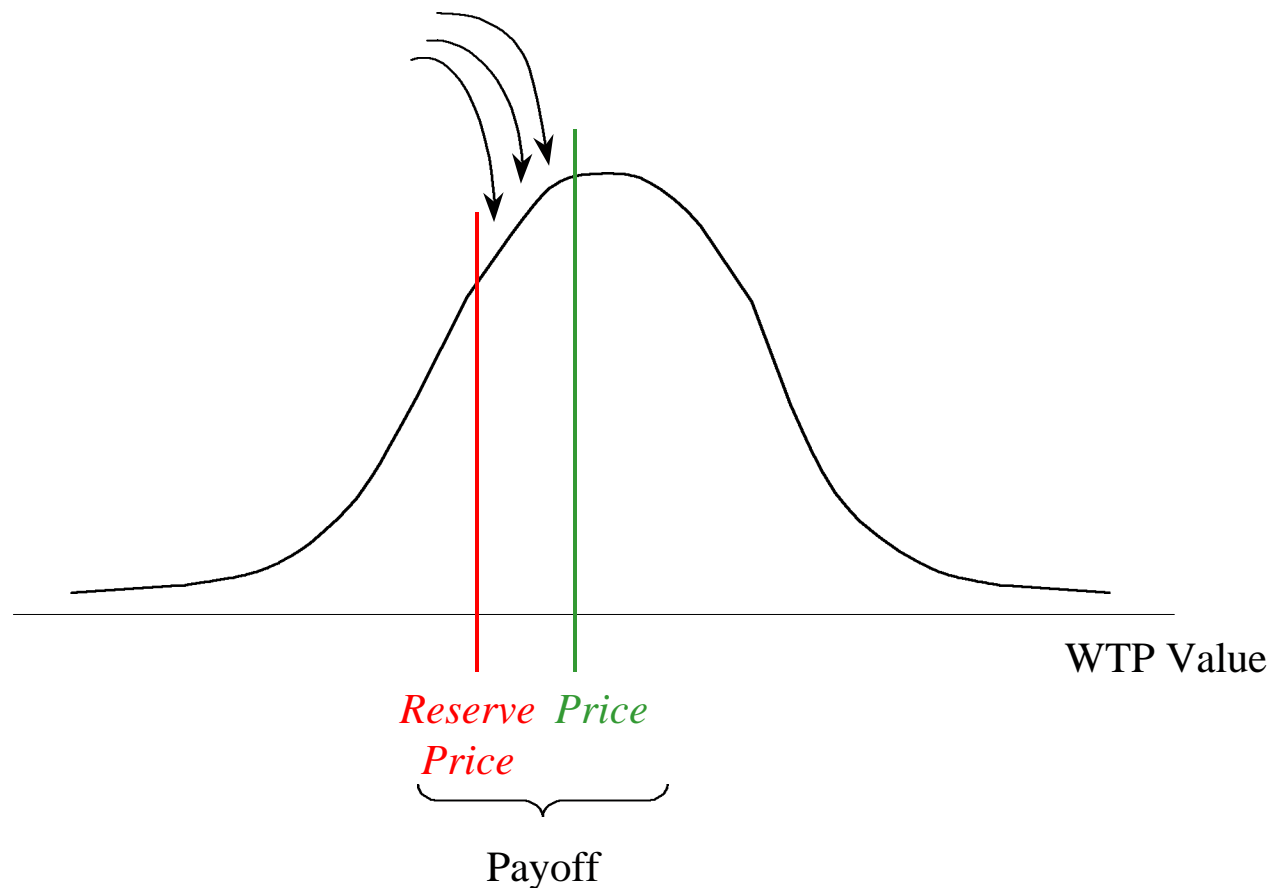


The Seller may post a fixed price to get the highest expected payoff from the product



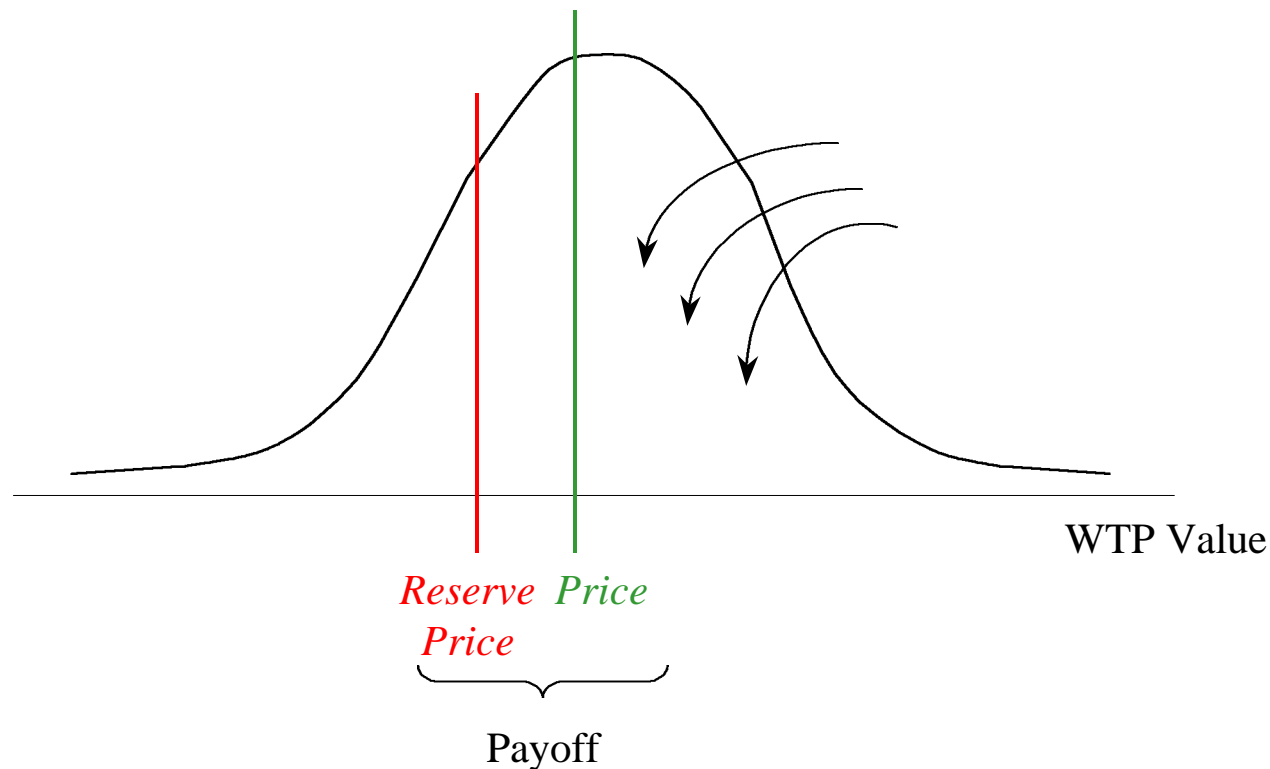
“Name your price” could do better by

- 1) Selling to people whose WTP is above the reserve price, but who wouldn't pay the posted fixed price. ...



“Name your price” could do better by

- 2) Capturing the consumer surplus of buyers whose WTP is above the posted fixed price (who actually bid their WTP)



If there is only one seat

- A. Who of the 10 potential buyers should get the seat? How much should that person pay for the seat? What method would you prefer to sell the single seat? How does that method compare to the other methods
- G gets it at 290+ from the realization, using an open-outcry, ascending, English auction. With uniform(201,300) distribution , in general the payoff could be as much as 300

<u>Offering mechanism</u>	<u>Expected Payoff</u>
Name your price	Up to 32
English auction	Up to 80
Fixed price	Up to 16

If there are 5 seats and 10 bidders

Assuming that bidders bid their WTP, How well would the seller do if the seats were sold by:

1. i) a posted fixed price
2. ii) a sealed bid auction where the 5 highest win and the amount they pay is
 1. a) the amount they bid (a discriminatory auction)
 2. b) the amount of the lowest winning bid
 3. c) the amount of the highest losing bid (the so-called Vickrey auction)
3. iii) a *name your price* mechanism

<u>Offering mechanism for 5 seats</u>	<u>Expected Payoff</u>
Sealed bid: discriminatory	\$53
Name your price	\$40
Sealed bid: lowest winning	\$35
Sealed bid: highest losing	\$27
Fixed price	\$28

Bidders may not bid their WTP?

- They would more likely try to bid at their guess of the 5th highest in a sealed bid, or their guess of the reserve price in the *name your price* mechanism, for example. This would be particularly true if the bidders were aware of the winner's curse phenomena.
- In a Vickrey auction, where the winner is the highest bidder who pays the amount of the highest losing bid, bidding their actual WTP dominates.
- Empirical evidence in a classroom *name your price* experiment was that a regression between bid and WTP gave:

$$\text{Bid} = -68 + .96 * \text{WTP}$$

[50] [.19] standard errors

using the WTP distribution uniform(201,300)

A Model to Compare Fixed-Price to Auctions

Some portion of seats are offered at posted fixed price and the rest are offered online with a sealed bid auction wherein all winners pay the price of the highest losing bid.

Assume demand is uncertain and Poisson distributed, WTP is Weibull distributed, and whether a particular potential bidder would participate in an auction is Bernoulli. We determine the following decision variables:

- x the posted fixed price, something you must determine
- k the number of seats allocated to an auction, something you must determine

using these parameters:

- c the number of seats
- r the reserve price, which is given to you
- s the fraction of the potential buyers who would participate in the auction, which is given to you

Early Results

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A Monte Carlo simulation of the model gave these results:

- Pure auction EMV exceeded posted fixed-price by 2.35%, with $RP=0$ and 100% willingness-to- auction (WTA)
- EMV improves with higher WTA (by 1.8% if WTA moves from 20% to 80%).
- With WTA at 50%, optimal allocation to auction between no auction by 28% which was better than all auction.

Future Work

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- Bring in yield management
- Think about the sequencing of the auction and discount and full-fare sales.