Ticket Resale

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Motivation

Determinants of resale activity?

- General underpricing
- Unpriced seat quality
- Late arrivals
- Schedule conflicts

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Welfare consequences of resale?

- Consumer surplus
- Producer surplus
- Transaction costs?
- Anti-scalping laws?

Data description

Ticketmaster data (primary market sales)

- 372 concerts from summer of 2004
- 32 major artists
- 5.9 million tickets
- $282 million in revenue

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What we observe:

- If and when a ticket was sold
- Price (including fees)
- Seat quality (i.e., order in which tickets were sold)

Data description, continued

eBay and Stubhub (secondary market sales)

- 139,290 resold tickets (95% eBay)
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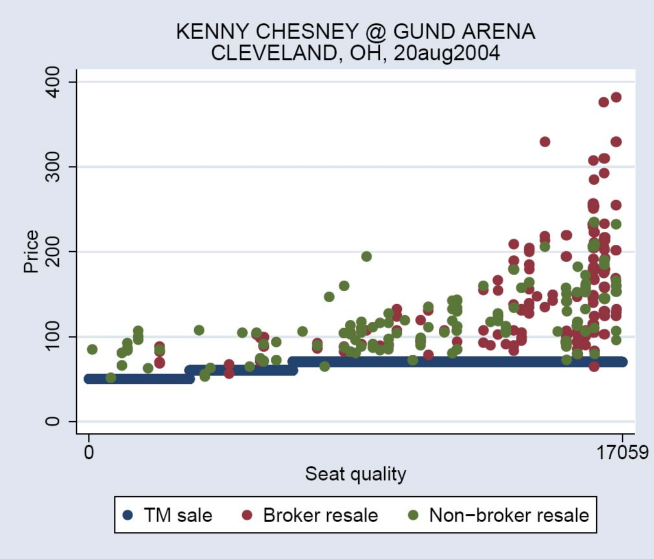
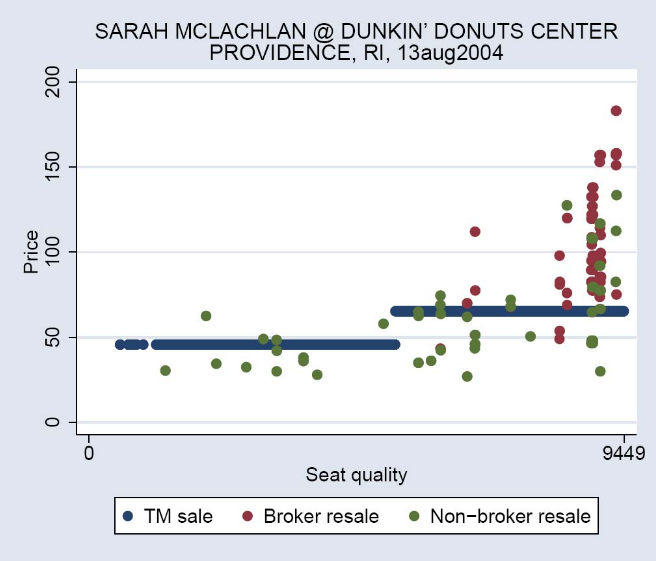
What we observe:

- Resale price (i.e., winning bid plus shipping)
- Section and row (usually)
- Seller ID
- Seller type (broker or non-broker)
- Date and time of sale

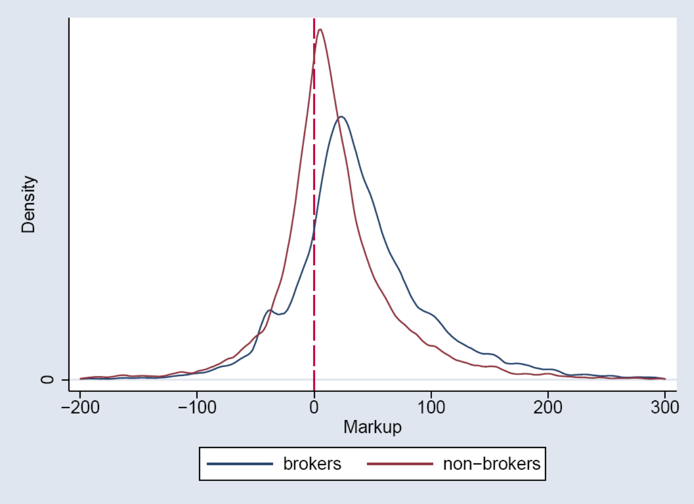
Summary statistics (across events; N=372)

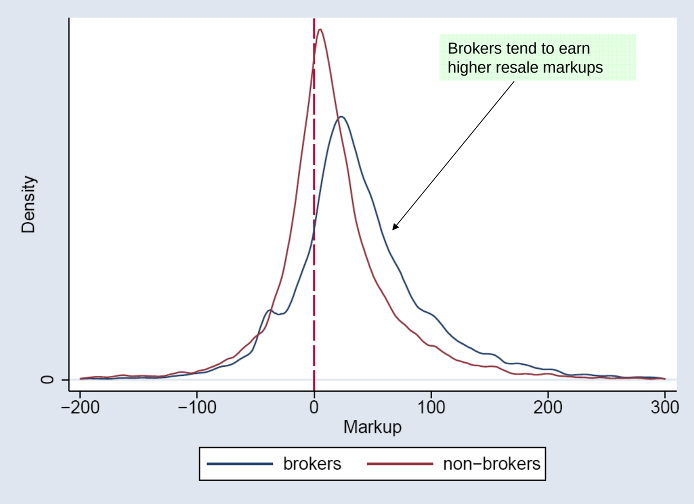
	Percentiles		
	.10	.50	.90
Primary Market:			
# Tickets sold	4,011	10,279	19,159
# comps	80	536	1,642
Total Revenue	200.8	622.1	1,452.8
Capacity	7,387	16,264	24,255
Cap. Utilization	0.47	0.87	1.00
Average price	35.83	52.03	84.54
Max price	51.90	77.50	150.29
# price levels	2	4	8
Week 1 sales (%)	0.20	0.47	0.78
Resale Market:			
# Tickets resold	65	242	833
Resale revenue	4,448.8	21,945.2	96,041.3
% resold	0.01	0.02	0.06
% revenue	0.02	0.04	0.09
Average price	64.60	97.49	138.09
Max price	144.00	286.37	610.00
Average markup	3.22	31.58	59.99
Median % markup	-0.03	0.37	0.94

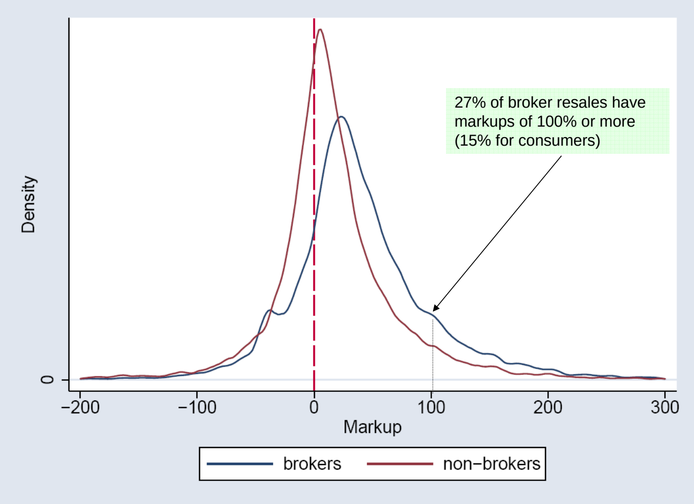

KENNY CHESNEY @ GUND ARENA
CLEVELAND, OH, 20aug2004
Price
0
100
200
300
400
0
17059
Seat quality
TM sale
Broker resale
Non−broker resale


SARAH MCLACHLAN @ DUNKIN' DONUTS CENTER
PROVIDENCE, RI, 13aug2004
Price
0
50
100
150
200
0
9449
Seat quality
TM sale
Broker resale
Non−broker resale

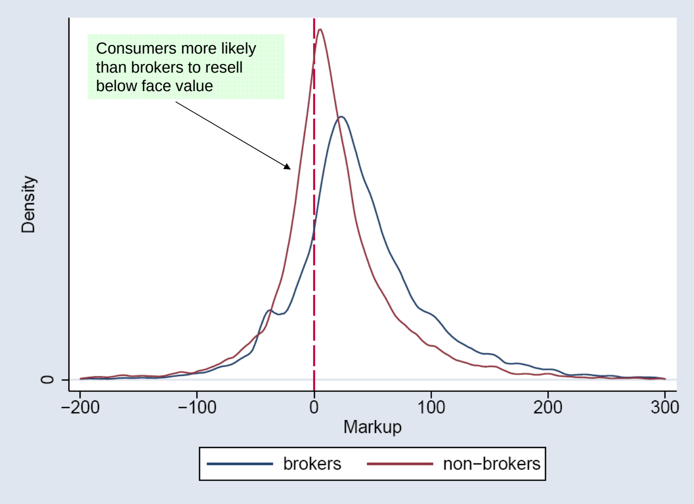

Density
2
1
0
0
1
Seat Quality
sold tickets
resold tickets
available tickets


Density
0
−200
−100
0
100
200
300
Markup
brokers
non−brokers


Brokers tend to earn
higher resale markups
Density
0
−200
−100
0
100
200
300
Markup
brokers
non−brokers



27% of broker resales have markups of 100% or more (15% for consumers)
Density
0
−200
−100
0
100
200
300
Markup
brokers
non−brokers


Consumers more likely than brokers to resell below face value
Density
0
−200
−100
0
100
200
300
Markup
brokers
non−brokers

A two-period model

Period 1 (Primary Market):

- Potential buyers arrive in a random sequence
- Seats offered in "best available" order
- Prices are taken as given

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Period 2 (Resale Market):

- Ticket-holders can sell their tickets if they choose
- Some ticket-holders have schedule conflicts (forced to resell)
- Resale prices are endogenous

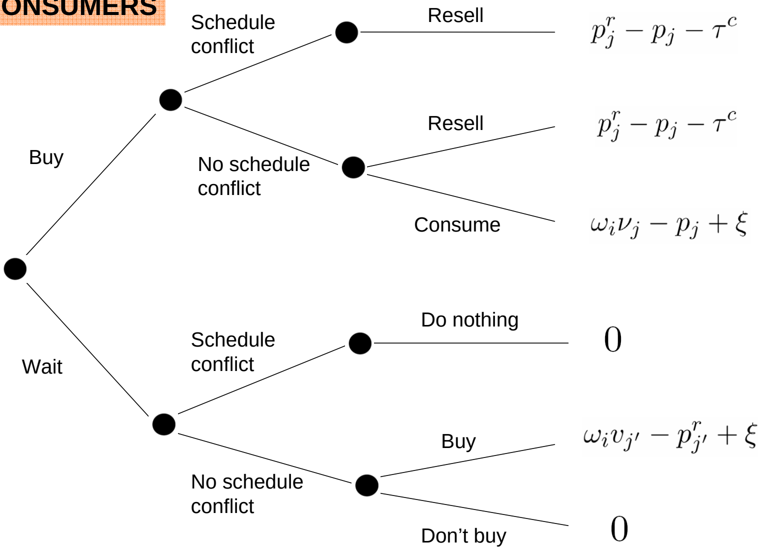
Note: Only one transaction per person per period

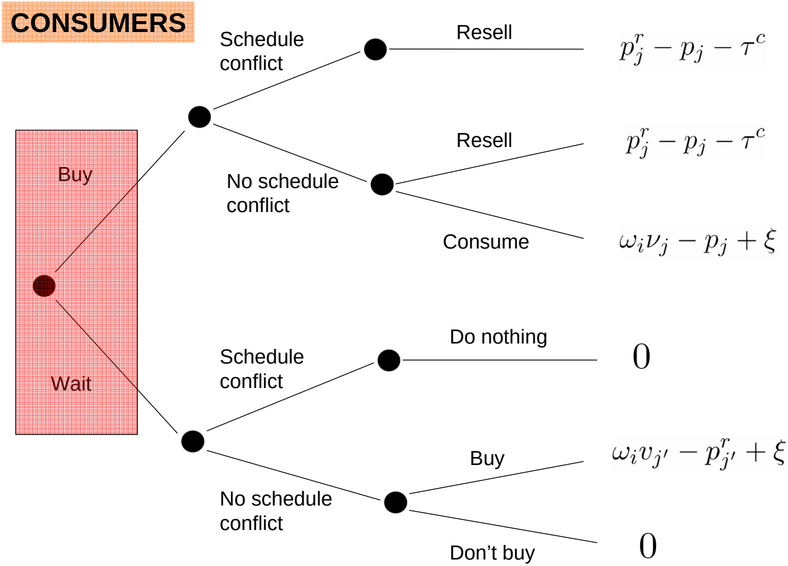
Decisions and payoffs

In period 1, consumers decide whether to buy or wait. In period 2, ticketholders either resell or consume; non-ticketholders buy or not.

Brokers either buy or not in period 1. If they buy, they *always* resell in period 2.

CONSUMERS


Buy
Wait
Schedule conflict
No schedule conflict
Schedule conflict
No schedule conflict
Resell
Resell
Consume
Do nothing
Buy
Don't buy
$p_j^r - p_j - \tau^c$
$p_j^r - p_j - \tau^c$
$\omega_i \nu_j - p_j + \xi$
0
$\omega_i v_{j'} - p_{j'}^r + \xi$
0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Don't buy
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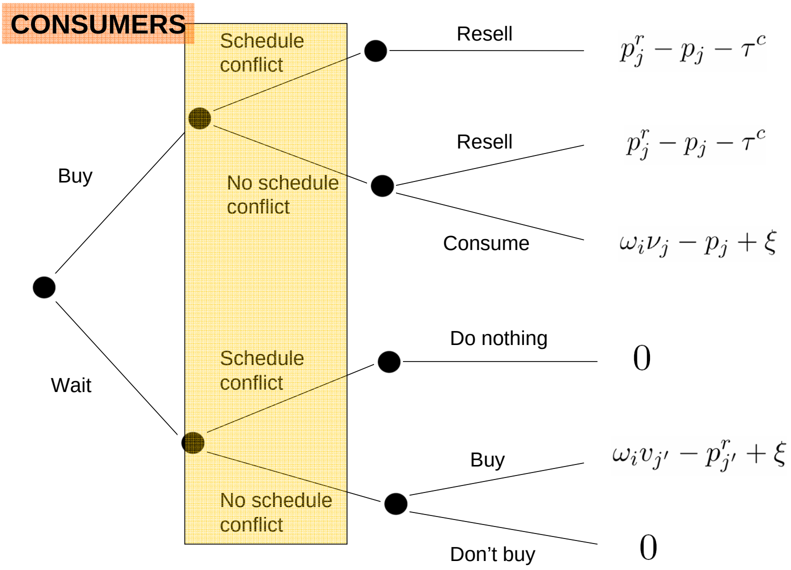
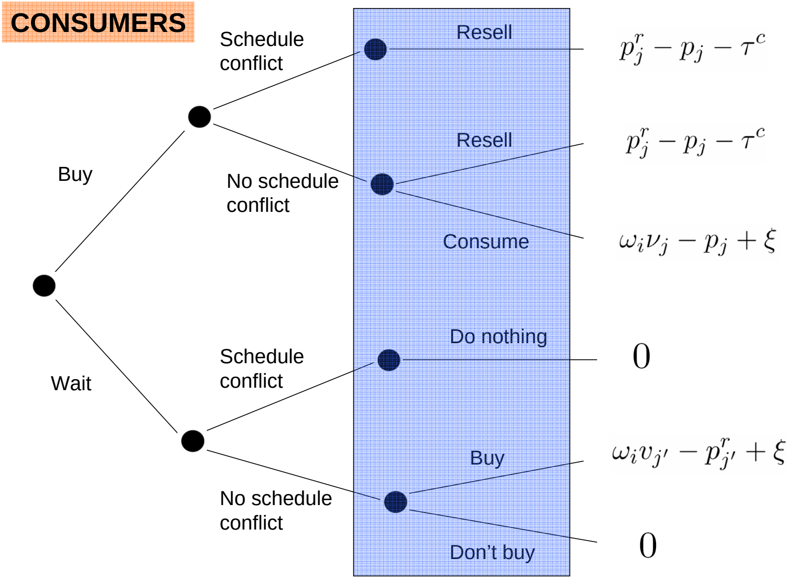
0



CONSUMERS
Buy
Wait
Schedule conflict
No schedule conflict
Schedule conflict
No schedule conflict
Resell
$p_j^r - p_j - \tau^c$
Resell
$p_j^r - p_j - \tau^c$
Consume
$\omega_i \nu_j - p_j + \xi$
Do nothing
0
Buy
$\omega_i v_{j'} - p_{j'}^r + \xi$
Don't buy
0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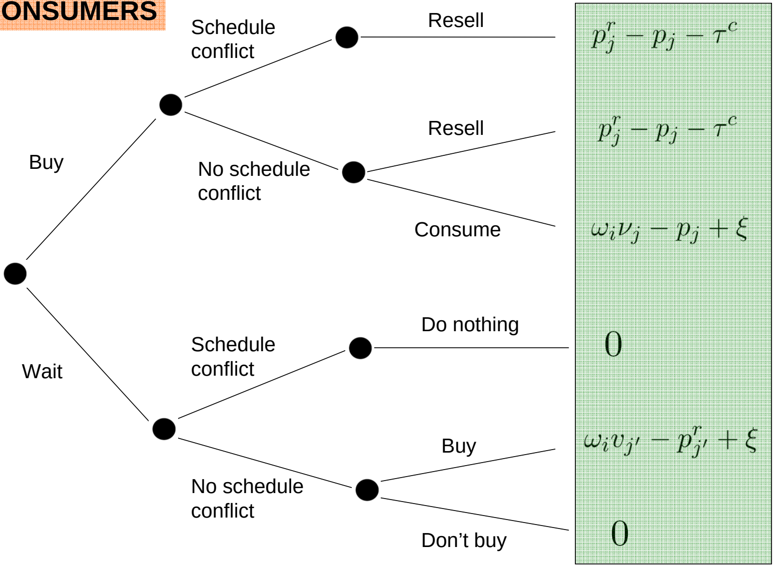
CONSUMERS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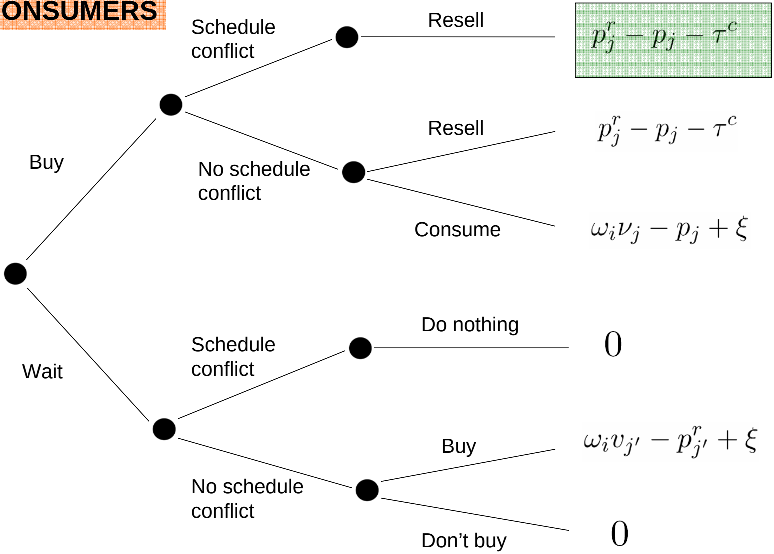
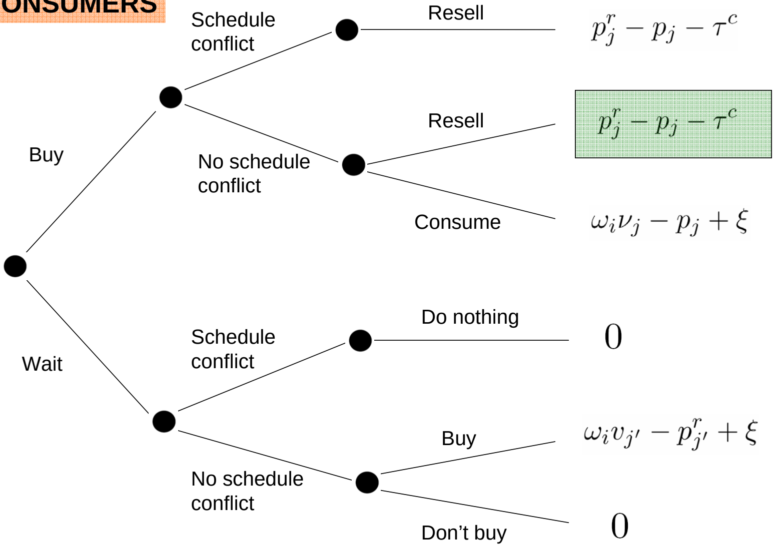
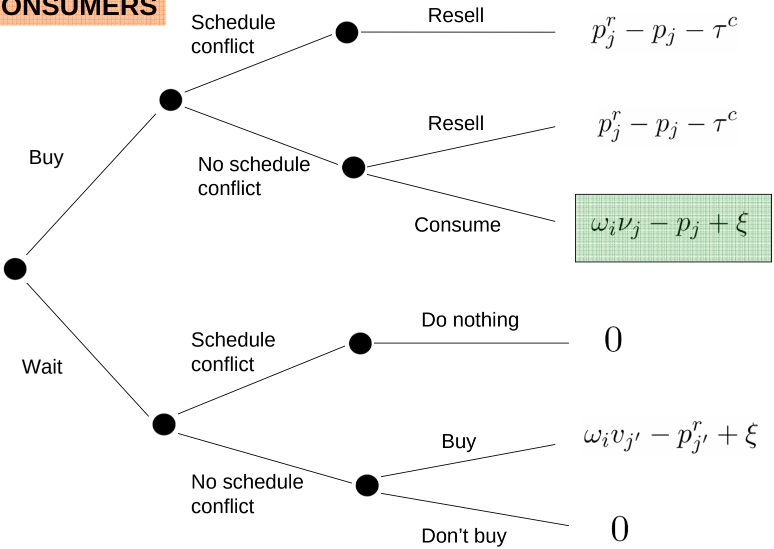

Schedule conflict
Resell
$p_j^r - p_j - \tau^c$
Buy
No schedule conflict
Resell
$p_j^r - p_j - \tau^c$
Consume
$\omega_i \nu_j - p_j + \xi$
Wait
Schedule conflict
Do nothing
0
No schedule conflict
Buy
$\omega_i v_{j'} - p_{j'}^r + \xi$
Don't buy
0

CONSUMERS



Buy
Schedule conflict
Resell
$p_j^r - p_j - \tau^c$
No schedule conflict
Resell
$\boxed{p_j^r - p_j - \tau^c}$
Consume
$\omega_i \nu_j - p_j + \xi$
Wait
Schedule conflict
Do nothing
0
No schedule conflict
Buy
$\omega_i v_{j'} - p_{j'}^r + \xi$
Don't buy
0

CONSUMERS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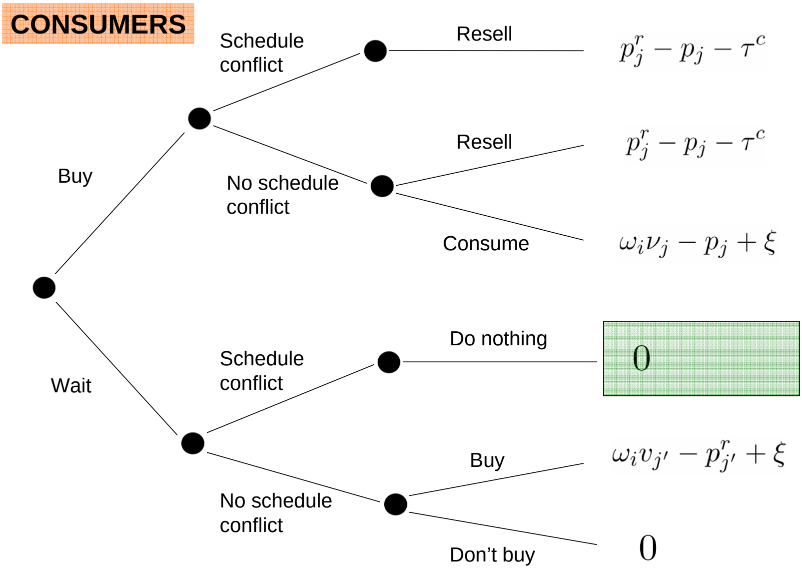
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Schedule conflict
No schedule conflict
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Consume
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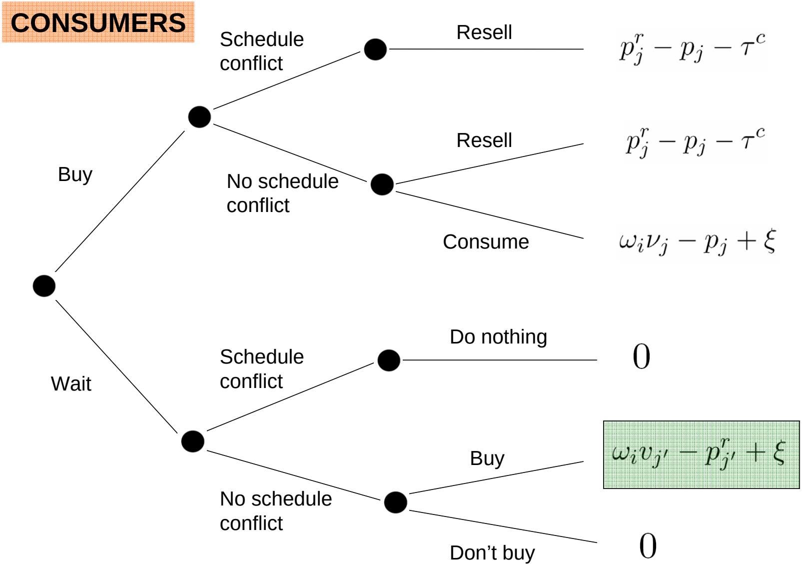
Do nothing
0
Buy
$\omega_i v_{j'} - p^r_{j'} + \xi$
Don't buy
0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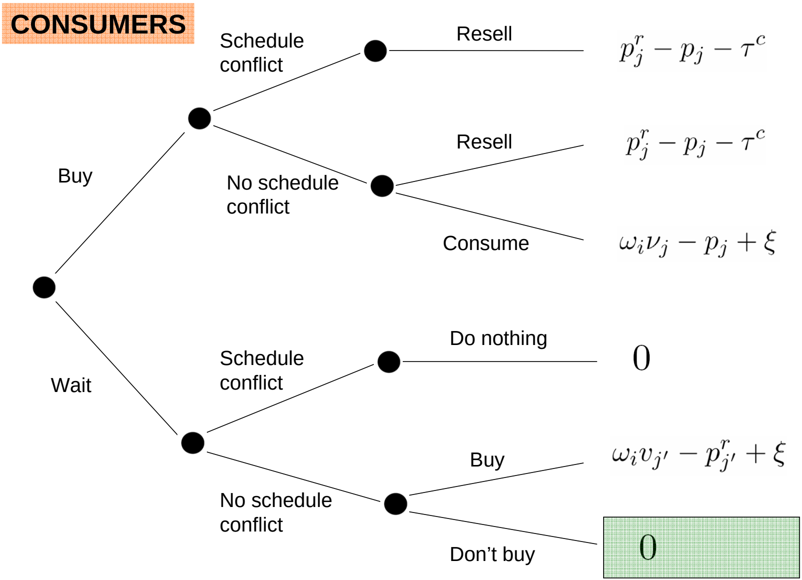
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Do nothing
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Buy
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Don't buy
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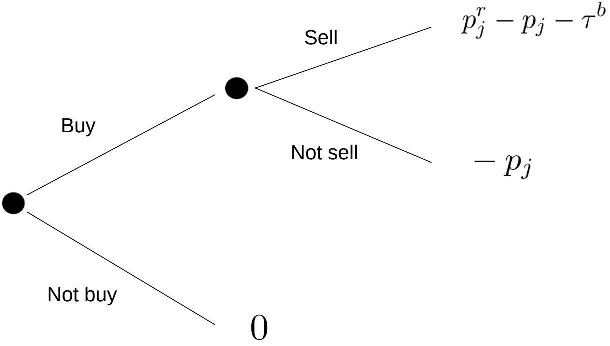
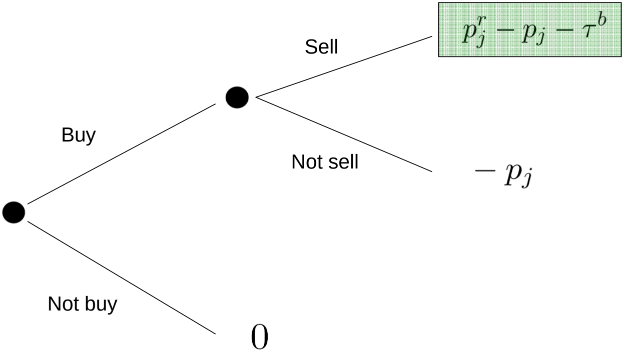
BROKERS



BROKERS



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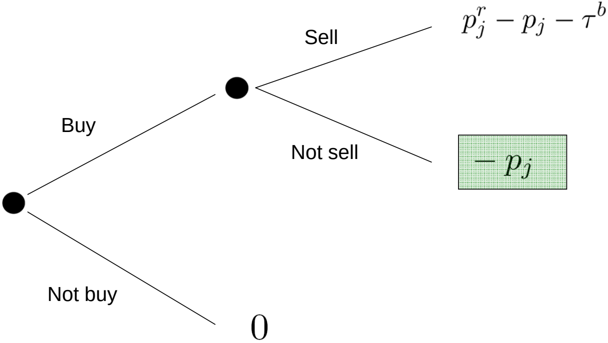

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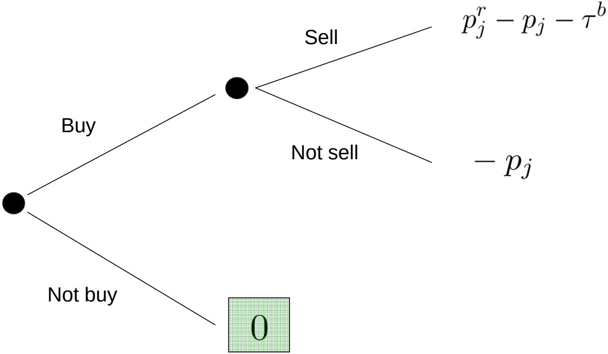

Clearing the resale market

Sequence of second-price auctions:

- Start with highest quality owned ticket
- Randomly draw K bidders and conduct a second-price auction
- Transaction occurs only if offer price exceeds buyer's reservation price
- Go to the next-highest quality owned ticket, and repeat

Note: random participation allows us to fit the observed variance in resale prices

Rational expectations

- Buyers' primary market decisions must be optimal given their expectations about the resale market

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- And those expectations must be correct (on average) given optimal behavior in the primary market

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- Buyers' primary market decisions must be optimal given their expectations about the resale market
- And those expectations must be correct (on average) given optimal behavior in the primary market
- First-period value function:

$$V(\omega_i, \nu_j, b_i) = \int U(\omega_i, \nu_j, b_i | z, s) dG_z(z) dG_s(s)$$

(Uncertainty is with respect to arrival sequence (z) and schedule conflicts (s))

Solving the model

Approximate the value function parametrically: $\hat{V}(\omega, \nu, b|\alpha)$

Solving the model

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Starting with an initial conjecture, $\hat{V}_0$:

1. For a given arrival sequence, compute primary and secondary market allocations that result from optimal decisions based on $\hat{V}_0$

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1. For a given arrival sequence, compute primary and secondary market allocations that result from optimal decisions based on $\hat{V}_0$
2. Repeat for a large number of arrival sequences

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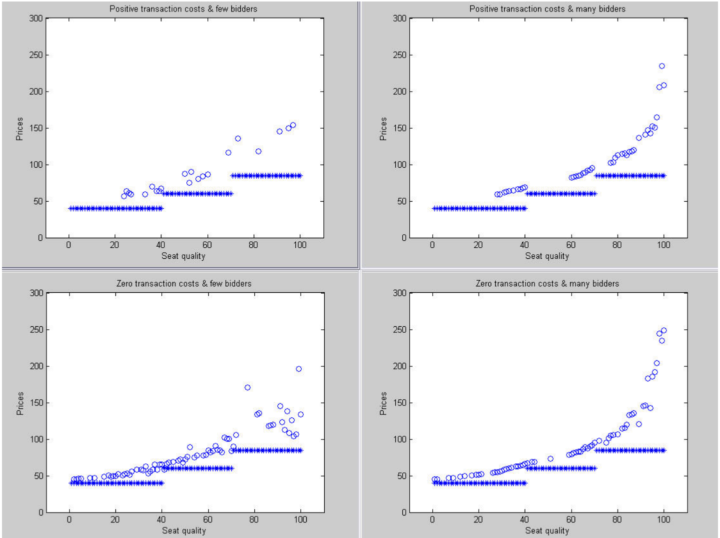
2. Repeat for a large number of arrival sequences
3. Regress realized final utilities on ω, ν, b to construct a new estimate of the value function: $\hat{V}_1$
4. Iterate until $\hat{V}$ converges to a fixed point


Positive transaction costs & few bidders
Positive transaction costs & many bidders
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Prices
Seat quality
0
50
100
150
200
250
300
20
40
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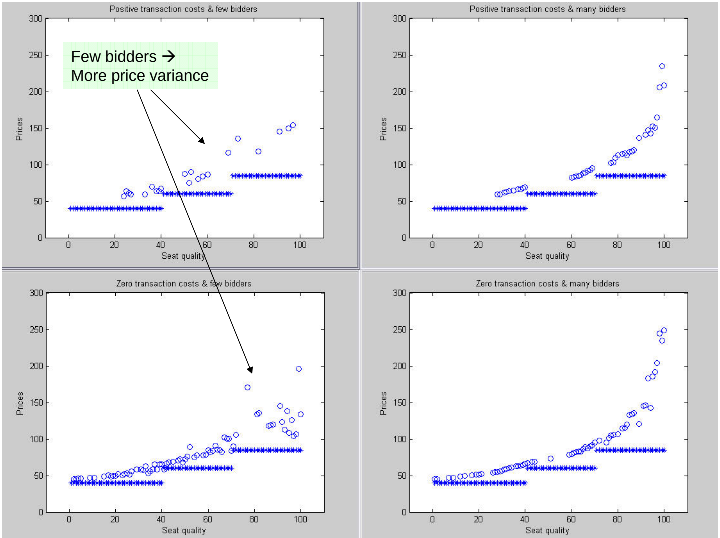
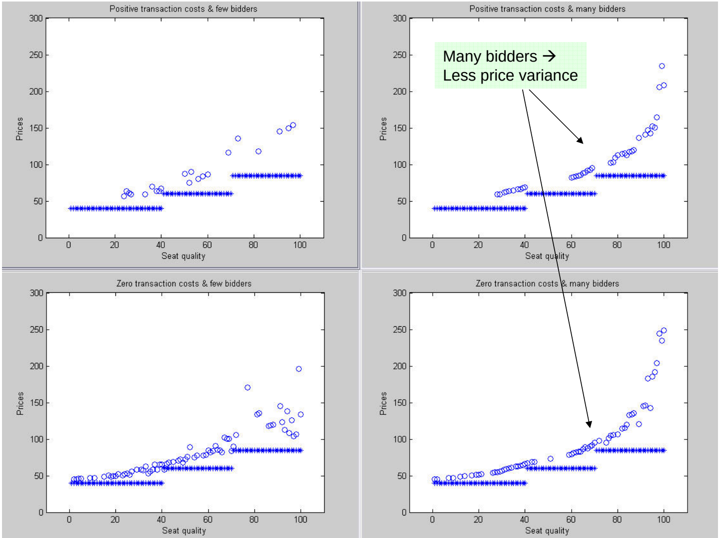
80
100



Positive transaction costs & few bidders
Positive transaction costs & many bidders
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Few bidders → More price variance
Prices
Seat quality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Seat quality
0
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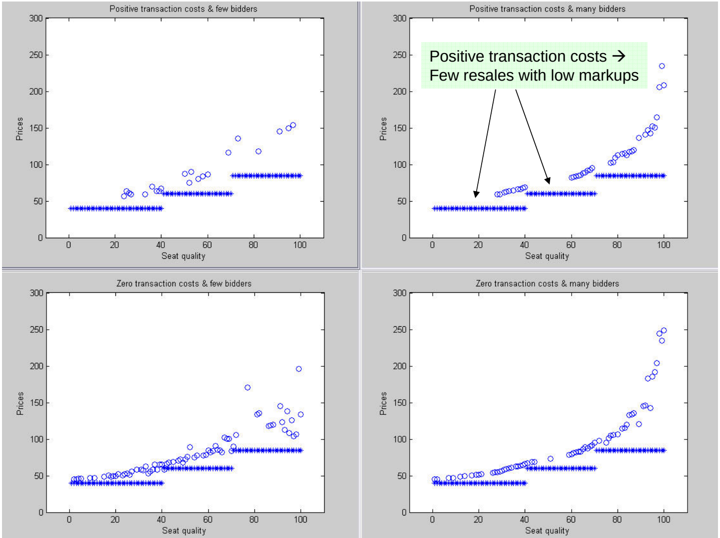
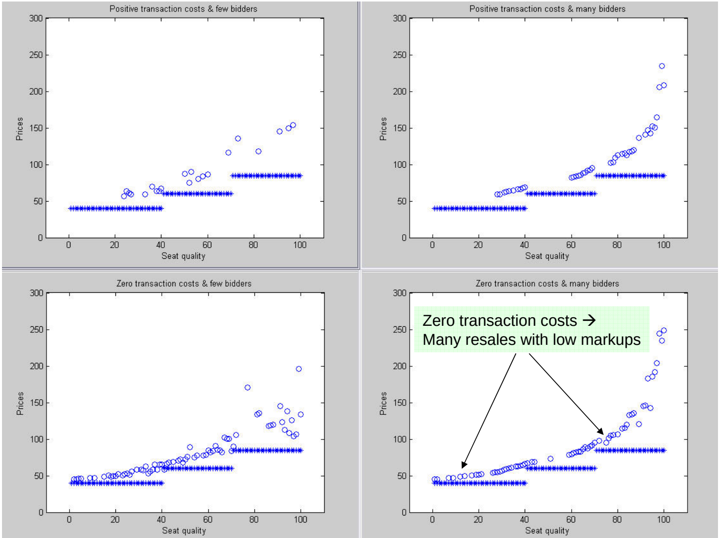
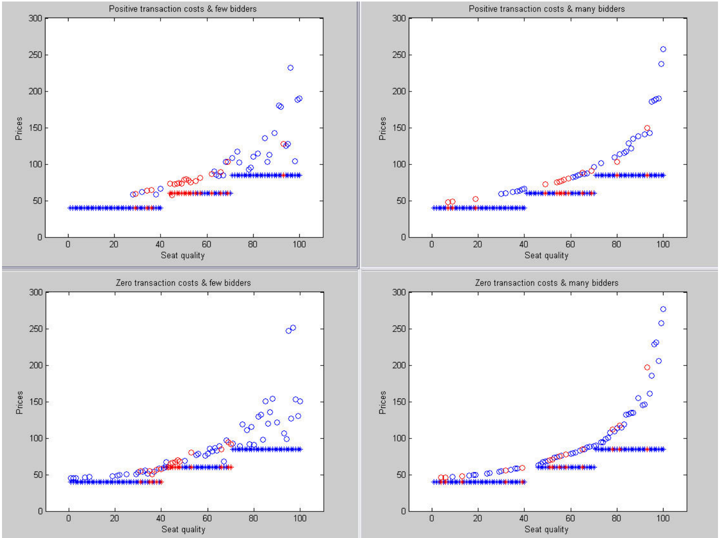
80
100
Many bidders → Less price variance


Positive transaction costs & few bidders
Positive transaction costs & many bidders
Positive transaction costs →
Few resales with low markups
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Prices
Seat quality
300
250
200
150
100
50
0
0
20
40
60
80
100


Positive transaction costs & few bidders
Positive transaction costs & many bidders
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Prices
Seat quality
Zero transaction costs →
Many resales with low markups


Positive transaction costs & few bidders
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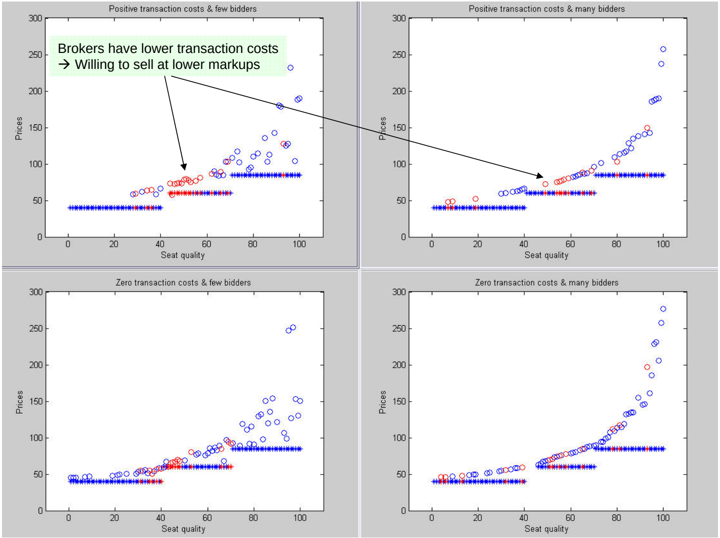
Prices
Seat quality


Positive transaction costs & few bidders
Brokers have lower transaction costs
→ Willing to sell at lower markups
Positive transaction costs & many bidders
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Prices
Seat quality
0
50
100
150
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250
300
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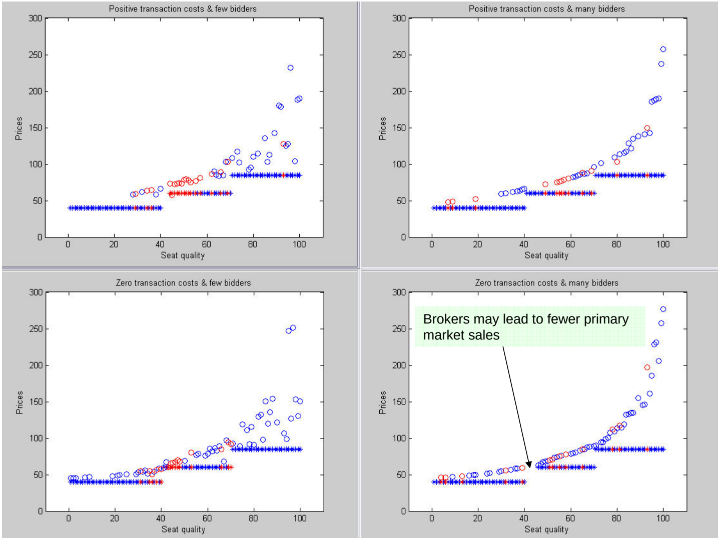
100


Positive transaction costs & few bidders
Positive transaction costs & many bidders
Zero transaction costs & few bidders
Zero transaction costs & many bidders
Prices
Seat quality
Brokers may lead to fewer primary market sales

Where we go from here

- Estimate the model (!)

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- Counterfactual analyses:

    - What if there were no resale market?

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  - What if we could reduce transaction costs?

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  - What if there were no resale market? (set $\tau^c = \tau^b = 0$)
  - What if we could reduce transaction costs? (lower τ^c or τ^b)

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- Counterfactual analyses:

  - What if there were no resale market? (set $\tau^c = \tau^b = 0$)

  - What if we could reduce transaction costs? (lower τ^c or τ^b)

  - What if we eliminate brokers?

Where we go from here

- Estimate the model (!)
- Counterfactual analyses:
  - What if there were no resale market? (set $\tau^c = \tau^b = 0$)
  - What if we could reduce transaction costs? (lower τ^c or τ^b)
  - What if we eliminate brokers? (set $b_i = 0$ for all i)