

# Primary-Market Auctions for Event Tickets: Eliminating the Rents of “Bob the Broker”?

Eric Budish

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*“It is nevertheless true that gangs of hardened ticket speculators exist and carry on their atrocious trade with perfect shamelessness” [NYT Editorial, 1876].*

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*"Several decades ago I asked my class at Columbia to write a report on why successful Broadway theaters do not raise prices much; instead, they ration scarce seats, especially through delays in seeing a play. I did not get any satisfactory answers, and along with many others, I have continued to be puzzled by such pricing behavior." - Gary Becker (1991)*

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- ① Underpricing reduces revenues
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- 1860s rent-seeking technology: a young boy is paid \$30 in gold for a good spot in line
  - Localized activity, few scale economies ("diggers", "scalpers")
- 2000s rent-seeking technology: software bots
  - No geographical constraints, large scale economies (scalpers replaced by eBay)
  - 20% of primary-market tickets resold in secondary market, on order of \$4bn annually
  - 90% in extreme cases ("All hell broke loose with Hannah Montana." - Arkansas AG)

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- This paper studies TM's effort, using primary-market auction data from TM, and secondary-market resale data scraped from eBay
  - Basic finding: the auctions work (as auctions should!)

# Plan of Talk

- ① Describe the TM auction design
- ② Data
- ③ Main results: price discovery, revenues, no arbitrage
- ④ Experienced vs. inexperienced bidders
- ⑤ Concluding remarks

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    - etc.
  - Winning bidders pay their bid amount

## TM's Auction Design: Relation to Position Auctions

TM's auction design is similar to *position auctions* used widely in internet advertising markets (Edelman et al., 2007; Varian, 2007). In both cases, goods are vertically differentiated

- Google Ad Auction: 1st slot, 2nd slot, ...
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Generalized Second Price

- ① Successful bidders pay their bid, rather than next-highest bid
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Paper shows theoretically that TM's auction design is “sensible”  
(efficiency, revenue, no arbitrage results)

# TM's Auction Design: Screenshot

Event



The Police - Premium Seat Auction  
Fenway Park, Boston, MA  
Sun, Jul 29, 2007 07:00 PM (Local venue time)

Auction Start: Sun, 02/18/07 12:00 PM EST  
Auction End: Fri, 02/23/07 12:00 PM EST

Additional information

Winning bidders will receive 2 tickets to see The Police.

Auction Status	Help
Auction time remaining: 5 mins	
Ticket Groups	Low Bid Per Ticket
Section A3, A4 or A5, Row 2	US \$540.00
Section A3, A4 or A5, Row 3	US \$420.00
Section A3, A4 or A5, Row 4	US \$390.00
Section A4, Row 5	US \$380.00
Section A3, A4 or A5, Row 6	US \$360.00
Section A3, A4 or A5, Row 7	US \$350.00
Section A3, A4 or A5, Row 8	US \$330.00
Section A3, A4 or A5, Row 9	US \$320.00
Section A3, A4 or A5, Row 10	US \$310.00

*As of Fri, Feb 23, 2007 11:55 AM EST  
Starting Bid was US \$250.00 per ticket*

[Refresh Status](#)

[Learn about Ticket Groups](#)

Bid on tickets  
Bid on tickets [Auctions 101](#)

Already bid on this auction? Already bid on this auction?

Quantity:

Bid Per Ticket: US \$

Bids must be in multiples of US \$10.00

Send me e-mails regarding my bid status.

[Place Bid](#)

(You must confirm your bid on the next page)



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- ② **Data**
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# Primary-Market Data

Proprietary data from Ticketmaster

- Full bidding history for all auctions for concert tours that started in 2007
- 22 concert tours, 576 concerts, 759 auctions,  $\sim 56,000$  tickets
- Focus on winning bids. We observe:
  - bid amount per ticket
  - number of tickets required (2 or 4)
  - section, row and seat numbers assigned to bid
  - customer identification number
- We also observe counterfactual face value of each ticket, based on face value of other tickets in same pricing tier
  - E.g. for Police concert on July 29, 2007, all tickets on Floor had face value of  $\sim \$250$ , but not all of these were sold by auction
  - Caution: face value  $\neq$  optimal fixed price

## Secondary-Market Data

Resale value data – scraped from eBay

- Perl scripts capture auction webpages for all listings in category Event Tickets that include artist's name
- 300,000+ html files
- Additional Perl script extracts data from each auction webpage
- Focus on successful eBay listings. We observe
  - Event data: artist, date
  - Ticket data: number of tickets, section, row (not seat)
  - Selling format: opening bid, buy-it-now price, etc.
  - Price per ticket (we adjust for fees)
- Note: eBay has sellers post information in highly structured way: “Category Specific Information”

# Example eBay Listing

## 2 The Police Tickets Boston Fenway FLOOR A3 ROW 3 7/29

Bidder or seller of this item? [Sign in](#) for your status

Bidding has ended for this item

[Sign In >](#)

Buyer or seller of this item? Sign in for your status.

Additional options:

≡ [Sell an item like this one.](#)



[View larger picture](#)

Winning bid: US \$999.99

Ended: Mar-21-07 14:41:40 PDT

Shipping costs: US \$20.00  
Other (see description)  
Service to [United States](#)

Ships to: United States

Item location: Boston, MA, United States

History: [1 bid](#)

Winning bidder: [zeis23 \(1042\)](#)

You can also: [Email to a friend](#) | [Sell one like this](#)

### Meet the seller

Seller: [ed201 \(1425\)](#)

Feedback: 100% Positive

Member since Jun-08-09 in United States

- ≡ [Read feedback comments](#)
- ≡ [Ask seller a question](#)
- ≡ [Add to Favorite Sellers](#)
- ≡ [View seller's other items](#)

### Buy safely

1. Check the seller's reputation  
Score: 1425 | 100% Positive  
[Read feedback comments](#)
2. Learn how you are protected  
**PayPal** Free PayPal Buyer Protection.  
[See eligibility](#)

Listing and payment details: [Show](#)

### Description (revised)



#### Item Specifics - Tickets

Stock Photo

Event Name: **The Police**

Number of Tickets: **2**

Event Type: **Concerts**

Section: **A3**

Rock/Pop/Altern..

Row: **3**

Venue State/Province: **Massachusetts**

Month: **July**

Venue City: **Boston**

Day: **29**

Venue Name: **Fenway Park**

Year: **2007**

[Click to View Map](#)

Time: **TBA**

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Number of Tickets: 2

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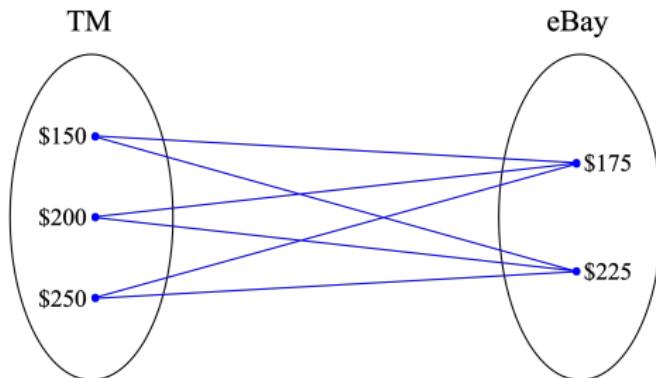
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# Matching Primary- and Secondary-Market Data I

- Goal: match TM primary-market data to eBay secondary-market data
  - Three issues
- ① eBay data at section-row level, not section-row-seat level
- Seller privacy
  - Quality heterogeneity within row typically negligible
  - We match data at concert-section-row (c-s-r) level
    - E.g. "Police, July 29, 2007, Section A3, Row 3"
- ② eBay section and row data input by eBay sellers, non-standardized
- E.g.: "1", "#1", "\*\*1\*\*", "1st", "1 !!!!", "First", "one", "1 WOW!", etc.
  - We create dictionaries that translate eBay section and row inputs into standardized terms to match with TM (e.g. "1")
    - For section names, dictionary is venue-specific

## Matching Primary- and Secondary-Market Data II

- Methodological challenge: how do we match multiple TM and / or eBay observations in same c-s-r?



- Main specification: aggregate eBay transactions at c-s-r level
  - In figure: treat eBay secondary-market value as \$200, then match to each of 3 TM primary-market observations
- Alternate specifications: aggregate TM transactions, aggregate both

## Matched Data: Summary Statistics

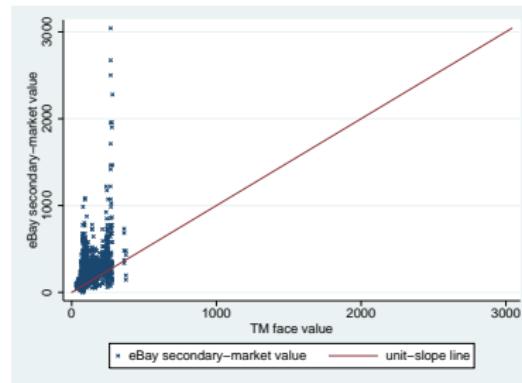
	Full TM Data Set	Matched Data Set	% Matched
Concerts	576	464	80.6%
c-s-r tuples	5,796	1,645	28.4%
TM transactions	22,348	8,425	37.7%
eBay transactions	N/A	3,532	N/A
<b>Matched Data Set</b>		Mean	Std. Dev.
TM transactions per c-s-r tuple	5.12	7.45	
eBay transactions per c-s-r tuple	2.15	5.92	

# Plan of Talk

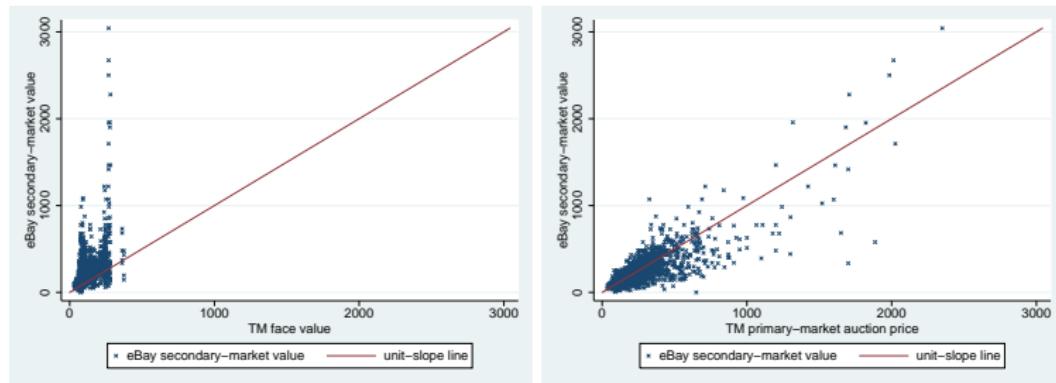
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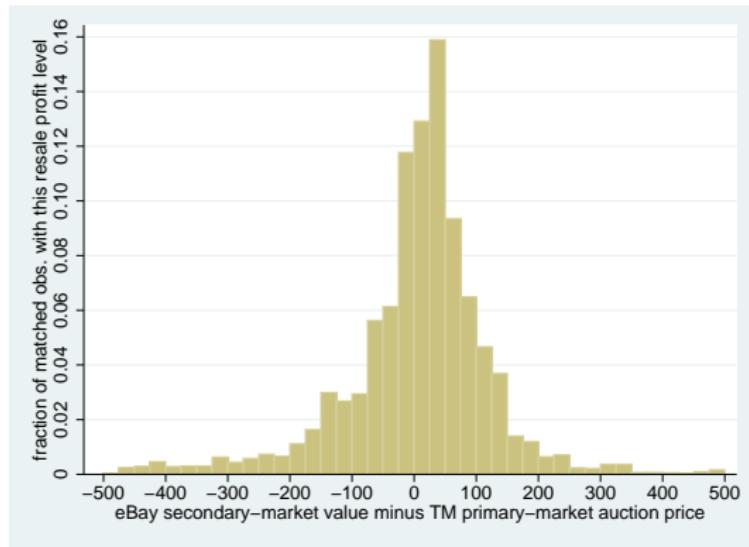


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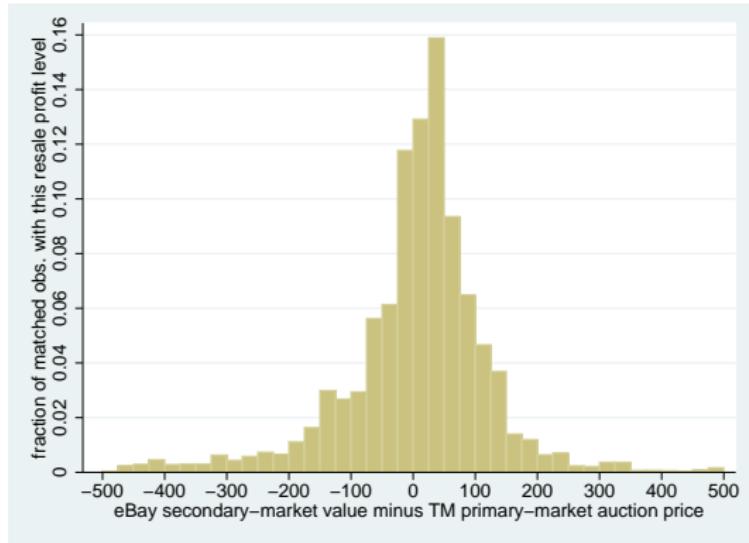


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- Mean resale profit: \$6.07, or 2.2% of mean TM auction price of \$274.35. 95% CI:
  - clustering at concert level: [-\$7.57, \$18.59]
  - unclustered: [\$2.93, \$9.20]
- Notes: high variance, positive mode, fat left tail

## Magnitudes: Auctions vs. Face Values

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- Takeaway: auctions discover substantially different prices from face values ... and these prices are essentially correct on average

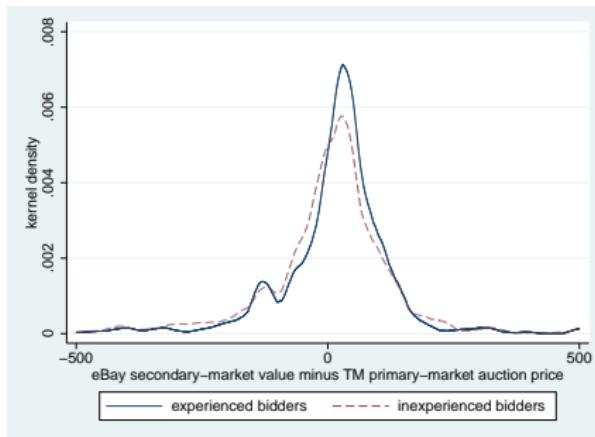
# Plan of Talk

- ① Describe the TM auction design
- ② Data
- ③ Main results: price discovery, revenues, no arbitrage
- ④ **Experienced vs. inexperienced bidders**
- ⑤ Concluding remarks

## Bidder Experience

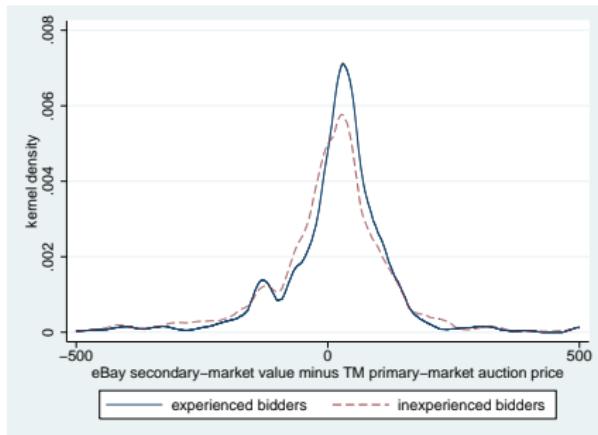
- Do “professional resellers” do better in the auction than “casual fans”?
- Important for assessing claim that TM’s auctions work
  - If profits small/negative on average, but large for “Bob the Broker”, casts results in different light
- Use unique bidder identifier in TM data to define a measure of experience
  - “Experienced” = win at least 10 TM auctions
    - Top 1% of bidders, accounting for 16% of transaction volume
  - “Inexperienced” otherwise
  - Also consider alternative classification: “experienced” = win at least 2 auctions in at least 2 cities. Results similar

# Bidder Experience



- Inexperienced bidders: +\$2.47 (95% CI: [-\$12.26, +\$15.65])
- Experienced bidders: +\$19.49 (95% CI: [+5.32, +\$33.04])
- Difference in profits is significant at 1% level
- Reassuring that experienced bidders earn small positive profits on average

# Bidder Experience



- Experience accounts for some of asymmetry in distribution of arbitrage profits. Specifically:
  - ① Experienced bidders more likely to generate profits of \$0-\$100 per ticket: 53.0% vs. 42.4% (significant at 1%)
  - ② Experienced bidders less likely to generate losses that exceed -\$100 per ticket: 11.7% vs. 14.7% (significant at 5%)
- That is: mode is disproportionately experienced, fat left tail is disproportionately inexperienced

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- Results suggest that auctions can eliminate rent-seeking behavior that has been associated with this market since 19th century, and that seems to have exploded in 21st century
- May be some modest room to improve the auction design, specifically to reduce strategic complexity for inexperienced bidders
  - Sandeep Baliga and Jeff Ely's recent "Purple Pricing" auction design quite interesting in this respect

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- Auctions “work” ... yet are discontinued.
- In use from 2003 to around 2011, with peak in 2005-2008.
- Why?

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- “Substitute” 3: Ticketmaster has expanded aggressively into secondary market
  - 2015: \$1.2B volume, 34% y-o-y growth
  - TM barely in this business at time of auction data
  - Perhaps eliminating rents of Bob the Broker less profitable than taking a cut?