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

Eric Budish
University of Chicago, Booth School of Business

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

1868: Charles Dickens reads from *A Christmas Carol* at Steinway Hall in New York City. ~10k tickets sold out in half a day, at face value of $2. Secondary-market value reportedly $20.

2007: Disney Star Miley Cyrus tours the US as both herself and her fictional alterego, Hannah Montana. ~1mm tickets sold out in 12 minutes at face value of ≤$64. Secondary-market value reportedly $2000.

Phenomenon has long puzzled economists. "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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Puzzling due to combination of two issues:

1. Underpricing reduces revenues
2. Underpricing encourages rent-seeking by speculators

- Several stories explain 1 alone, but not 1 and 2 together
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Modern information technology has exacerbated rent seeking

- 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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What About an Auction?


2003: Ticketmaster, world’s largest distributor of event tickets, introduced primary-market auctions for premium seats. “The tickets are worth what they’re worth. If somebody wants to charge $50 for a ticket, but it’s actually worth $1000 on eBay, the ticket’s worth $1000. I think more and more our clients are saying to themselves ‘Maybe that money should be coming to me instead of Bob the Broker.’” - TM’s Chief Executive Officer [NYT, 2003]

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!)
What About an Auction?

- Auction theory 101: basic role of an auction is to discover market-clearing prices of hard-to-price goods
  - Increase revenues
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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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TM’s Auction Design

Non-trivial auction design problem: multiple heterogeneous goods, consumer population

TM focused auction on very high-quality tickets, e.g. first 10 rows

Reduces quality heterogeneity

Mispricing is most severe here (Leslie and Sorensen, 2014)

Auction rules

Bids: $ value per ticket, # tickets wanted (2 or 4)

Auction ends at a fixed time, just like eBay

At conclusion of auction, bids are sorted in descending order

Highest bid gets best tickets

Next bid gets next-best tickets

etc.

Winning bidders pay their bid amount
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  - Winning bidders pay their bid amount
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, ...
- TM Ticket Auction: 1st row, 2nd row, ...

Two main differences vs. most well-known position auction, Generalized Second Price:

1. Successful bidders pay their bid, rather than next-highest bid
   - TM thought pay-your-own-bid was simpler to explain
2. Nature of bids: $ amount per ticket, rather than per click
   - Paper shows theoretically that TM’s auction design is “sensible” (efficiency, revenue, no arbitrage results)
TM’s Auction Design: Relation to Position Auctions

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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

Auction time remaining: 5 mins

<table>
<thead>
<tr>
<th>Ticket Groups</th>
<th>Low Bid Per Ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A3, A4 or A5, Row 2</td>
<td>US $540.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 3</td>
<td>US $420.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 4</td>
<td>US $390.00</td>
</tr>
<tr>
<td>Section A4, Row 5</td>
<td>US $360.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 6</td>
<td>US $360.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 7</td>
<td>US $350.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 8</td>
<td>US $330.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 9</td>
<td>US $320.00</td>
</tr>
<tr>
<td>Section A3, A4 or A5, Row 10</td>
<td>US $310.00</td>
</tr>
</tbody>
</table>

As of Fri, Feb 23, 2007 11:59 AM EST
Starting Bid was US $250.00 per ticket

Bid on tickets

Bid on tickets

Bid Per Ticket: US $

Already bid on this auction?

As of Fri, Feb 23, 2007 11:59 AM EST
Starting Bid was US $250.00 per ticket

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)
Plan of Talk

1. Describe the TM auction design
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.

 Winning bid: US $995.30
Ended: Mar-21-07 14:41:40 PDT
Shipping costs: US $23.00
Other (see description)
Ships to: United States
Item location: Boston, MA, United States
History: 1 bid
Winning bidder: cals23 (1242 )

You can also: Email to a friend | Sell one like this

Listing and payment details: Show

Meet the seller
Seller: ed204 (1426 )
Feedback: 100% Positive
Member since Jun-08-06 in United States
- Read feedback comments
- Ask seller a question
- Add to favorites
- View seller's other items

Buy safely
1. Check the seller's reputation
   Score: 1426 | 100% Positive
   Read feedback comments
2. Learn how you are protected
   Free PayPal Buyer Protection
   PayPal See eligibility

Description (expanded)

Item Specifics - Tickets
Event Name: The Police
Event Type: Concerts
Rock/Pop/Altern.
Venue State/Province: Massachusetts
Venue City: Boston
Venue Name: Fenway Park
Click to View Map

Number of Tickets: 2
Section: A3
Row: 3
Month: July
Day: 29
Year: 2007
Time: TBA
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.

Winning bid: US $995.30
Ended: Mar-21-07 14:41:40 PDT
Shipping costs: US $25.00
Other (see description)
Service to United States
Ships to: United States
Item location: Boston, MA, United States
History: 1 bid
Winning bidder: zais23 (1042)

You can also:
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View larger picture

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Example eBay Listing

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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.

Winning bid: US $69.99

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 a friend | Sell one like this

Meeting the seller:
Seller: ez501 (1425 ★)
Feedback: 100% Positive
Member since Jun 03 00 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’s Free PayPal Buyer Protection.
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Listing and payment details: Show

Description (excerpted)

Item Specifics - Tickets
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Rock/Pop/Altern.
Venue State/Province: Massachusetts
Venue City: Boston
Venue Name: Fenway Park
Click to View Map

Number of Tickets: 2
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Row: 3
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Ended: Mar 21 07 14:41:40 PDT
Shipping costs: US $25.00
Other fees: Other fee description
Service to: United States
Ships to: United States
Item location: Boston, MA, United States
History: 1 bid
Winning bidder: zalis23 (1042 ★★)

You can also: Email to a friend | Sell one like this

Meet the seller
Seller: ed209 (1426 ★★★)
Feedback: 100% Positive
Member since Jun 08 08 in United States
- Read feedback comments
- Ask seller a question
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- View seller's other items

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Description (revised)

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- Number of Tickets: 2
- Section: A3
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- Month: July
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- Year: 2007
- Time: TBA

Click to View Map
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”)
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

<table>
<thead>
<tr>
<th></th>
<th>Full TM Data Set</th>
<th>Matched Data Set</th>
<th>% Matched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concerts</td>
<td>576</td>
<td>464</td>
<td>80.6%</td>
</tr>
<tr>
<td>c-s-r tuples</td>
<td>5,796</td>
<td>1,645</td>
<td>28.4%</td>
</tr>
<tr>
<td>TM transactions</td>
<td>22,348</td>
<td>8,425</td>
<td>37.7%</td>
</tr>
<tr>
<td>eBay transactions</td>
<td>N/A</td>
<td>3,532</td>
<td>N/A</td>
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</tbody>
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<th>Std. Dev.</th>
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<td>5.12</td>
<td>7.45</td>
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<td>5.92</td>
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Main Result
Main Result
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Takeaway: auctions discover substantially different prices from face values ... and these prices are essentially correct on average.
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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: +$19.49 (95% CI: [+$.532, +$33.04])
- Difference in profits is significant at 1% level
- Reassuring that experienced bidders earn small positive profits on average
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
And Yet …
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- Auctions “work” … yet are discontinued.
- In use from 2003 to around 2011, with peak in 2005-2008.
- Why?
And Yet ...

- **Substitute 1:** sophisticated fixed prices
  - Taylor Swift 2018 tour
  - MLB - all teams, varying degrees
  - Economics: another way to eliminate resale rents.
  - Tradeoff: simpler for customers, less precise pricing than an auction.

- **Substitute 2:** resale bans
  - Artists to try include: Miley Cyrus, Bruce Springsteen, Metallica, Bieber, U2
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- **Substitute 3:** Ticketmaster has expanded aggressively into secondary market
  - 2015: $1.2B volume, 34% y-o-y growth
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