

# Quantifying Foreclosure: The Live Nation - Ticketmaster Merger

Fernando Luco      Kyle Wilson      Mo Xiao\*

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Extended Abstract

In 2010, Live Nation – the largest promoter in the live music industry – merged with Ticketmaster, the leading primary ticketing agency. Following the merger, numerous complaints emerged alleging that independent venues were pressured to contract with Ticketmaster in order to access concerts promoted by Live Nation. In 2024, the U.S. Department Justice filed an antitrust lawsuit against the Live Nation Entertainment, stating “Live Nation puts a ‘choice’ to venues: use Ticketmaster and potentially receive a significant payment for long-term exclusivity or use another ticketer and risk losing access to the vast array of Live Nation assets, including lucrative concerts.”

We consider Live Nation’s conduct as input foreclosure, where the victims were concert venues that must adopt a vertically integrated input to access another essential input controlled by the same firm. Venues, however, are neither the upstream nor the downstream of this vertical integration; rather, they represent a crucial link in the live concert supply chain, complementing performing artists to create the concert experience. The extent to which these venues were subject to Live Nation’s monopolizing behavior reveals a **new channel of anti-competitive harm** arising from vertical integration. This channel is increasingly relevant in modern, platform-dominated industries, where numerous third-party suppliers—such as

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healthcare providers, online sellers, or app developers—depend on a dominant platform’s infrastructure and are exposed to its market power.

To evaluate empirical relevancy, we compile a comprehensive dataset on artists, concerts, and venues from 2008 to 2013, covering a six-year window surrounding the merger. Using these data, we document a sharp change in Live Nation’s venue choice behavior immediately after the merger. Specifically, we find that Live Nation became significantly more likely to use venues with Ticketmaster contracts. This pattern is consistent with both a merger-specific efficiency gain and Live Nation sacrificing short-run profits to exclude non-Ticketmaster venues in pursuit of the long-run gain of coercing venues into contracting with Ticketmaster.

Motivated by these stylized facts, we develop a model of promoters’ venue choice that allows for the possibility that, post-merger, Live Nation chose venues from a **restricted consideration set** consisting only of venues with Ticketmaster contracts. We augment this framework with a revenue-performance model for live concert events, in which the promoter’s venue choice affects the expected latent profits of the event. In our specification, a venue’s ticketing contract status influences both the promoter’s expected profits and the consideration set itself. Thus, Live Nation’s increased reliance on Ticketmaster venues may reflect both a genuine preference for Ticketmaster and **strategic foreclosure incentives** aimed at coercing venues into Ticketmaster contracts. To disentangle these two forces, we build on the identification insights of Abaluck and Adams (2021) and Agarwal and Somaini (2024).

Our results indicates that, post-merger, Live Nation foreclosed non-Ticketmaster venues with a probability of roughly 12% per concert. We estimate that foreclosure behavior accounted for about 20% of the merger’s overall impact on Live Nation’s shift toward Ticketmaster-contracted venues. The estimated cost of foreclosure to Live Nation was approximately 2% of Live Nation’s post-merger revenues.

In summary, we develop a methodology to quantify the extent of foreclosure against non-Ticketmaster venues **without requiring data on profit allocations among stakeholders**. As profit split data among stakeholders are typically proprietary and difficult to obtain, our method can be useful to both antitrust practitioners and researchers trying to distinguish pro-competitive and anticompetitive reasons of an exclusionary conduct. Our findings reveal a novel mechanism of anti-competitive harm from vertical integration,

where the affected parties—independent venues—neither compete directly with Live Nation’s promotion services nor with Ticketmaster’s ticketing operations. By restricting itself to Ticketmaster-contracted venues, Live Nation forgoes short-run gains from choosing freely among all venues in favor of a long-run strategy to entrench and extend its dominance in the ticketing market—illustrating the classic dynamics of monopolization.

# Quantifying Foreclosure: The Live Nation - Ticketmaster Merger

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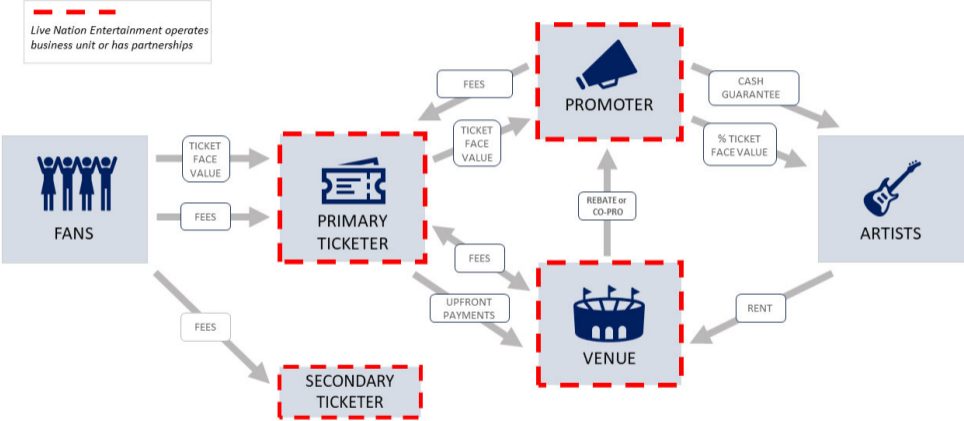
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<sup>a</sup> This project is work in progress. Please do not cite, post, tweet, or distribute.

# Foreclosure, a concept well defined, but not well measured

- Foreclosure: a prominent concept in economics and antitrust
  - *“Foreclosure refers to a dominant firm’s denial of **proper** access to an essential good it produces, with the intent of extending monopoly power from that segment of the market (the bottleneck segment) to an adjacent segment (the potentially competitive segment)”*  
— Rey and Tirole (2006, A Primer on Foreclosure)
- Foreclosure analysis, however, is complicated
  - What is “**proper**”? How do we measure the extent of foreclosure? At which threshold should antitrust concerns be triggered?
- We put **foreclosure** at the center, in the context of the 2010 **Live Nation - Ticketmaster** merger

# Today's Live Concert Ecosystem



Source: DOJ Complaint 2024

## Live Nation's dominance in live concerts

- Shaped by the 2010 LN-TM merger: largest ticketer joining largest promoter
  - *"Live Nation's business model is to control the entire interface between the artist and their fan."* — public comments on DOJ decision
- Rivals alleged LN influenced artists' venue choices, and the merger would exacerbate this influence:
  - LN's control of venue choice may extend to venues NOT using TM (**this paper!**)
  - LN may learn information on rival venues/events through TM (not this paper)

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  - LN's control of venue choice may extend to venues NOT using TM (**this paper!**)
  - LN may learn information on rival venues/events through TM (not this paper)
- DOJ approved the merger with behavioral remedies, prohibiting LN from threatening and retaliating against venues based on ticketing contracting decisions

▶ 2010 Consent Decree

## ... then DOJ regretted it

- In 2019, DOJ listed numerous incidents in which LN repeatedly violated the Consent Decree
  - **Implicit threat:** TM brings LN managers along to attend venue's meeting requesting proposals on ticketing
  - **Explicit threat:** TM VP stated "if you move (to another ticketer), you won't see any Live Nation shows"; "(response) would be 'nuclear'" if venue switched ticketers
  - **Cold war retaliation:** LN stopped its weekly meeting with venue after venue switched to a competing ticketer
  - **Nuclear war retaliation:** venue received zero LN shows (instead of the typical 3 to 4 per year) after switching to a competing ticketer

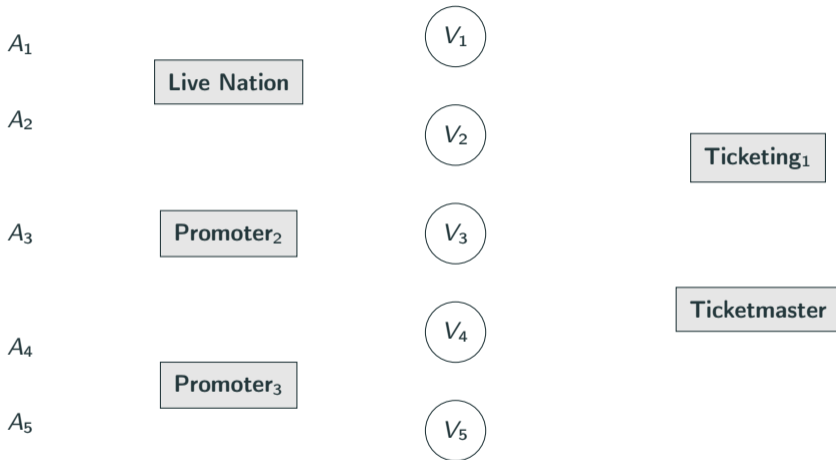
## Fast-forward to 2024

- LN CEO (Michael Rapino):
  - *'Regarding venues that don't want to use Ticketmaster, he said: "If you do that, we won't put shows in your building . . . we have to put the show where we make the most economics, and maybe that venue [that wants to use a different ticketing platform] won't be the best economic place anymore because we don't hold the revenue.'* (The American Prospect, 2024/05/24)
- DOJ's 2024 complaint:
  - *"Live Nation puts a 'choice' to venues: use Ticketmaster and potentially receive a significant payment for long-term exclusivity or use another ticketer and risk losing access to the vast array of Live Nation assets, including lucrative concerts."* (p. 87)

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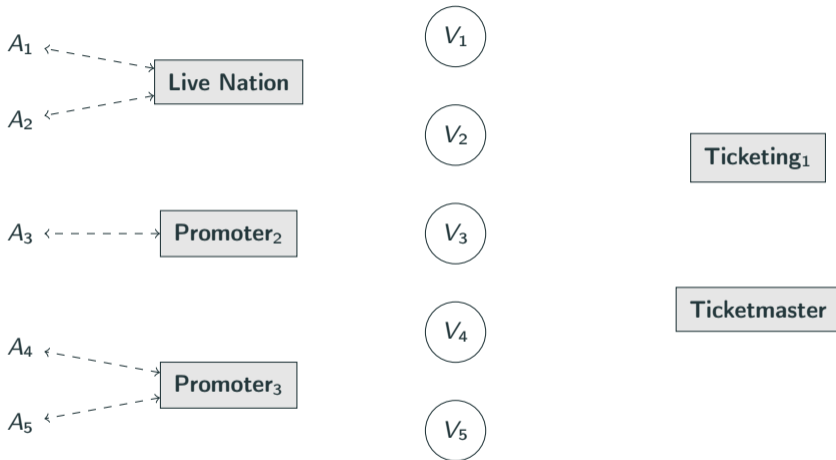
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- **How do we quantify this?**

# How live concerts work (very simplified)



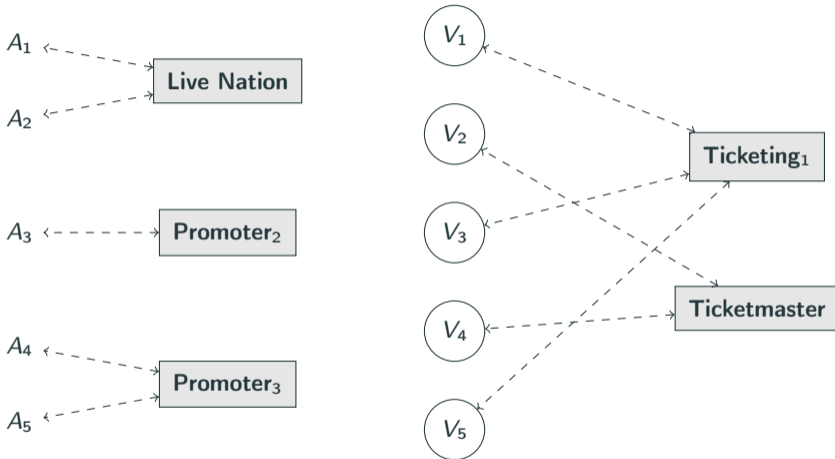
▶ Details on how the industry works

# How live concerts work (very simplified)



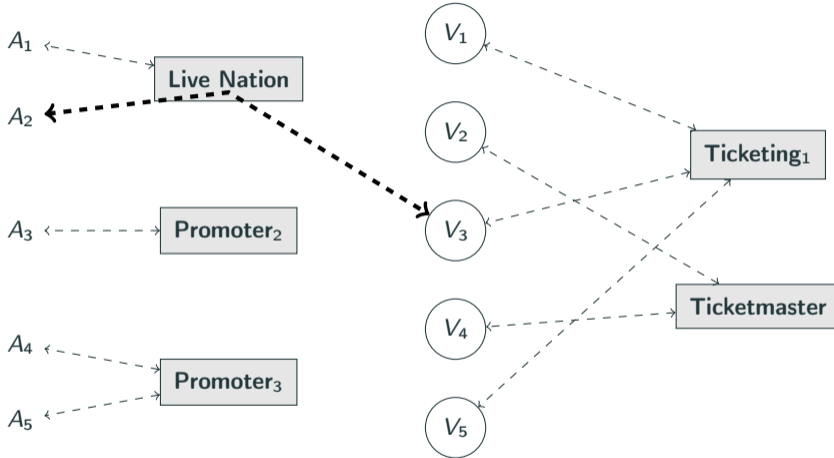
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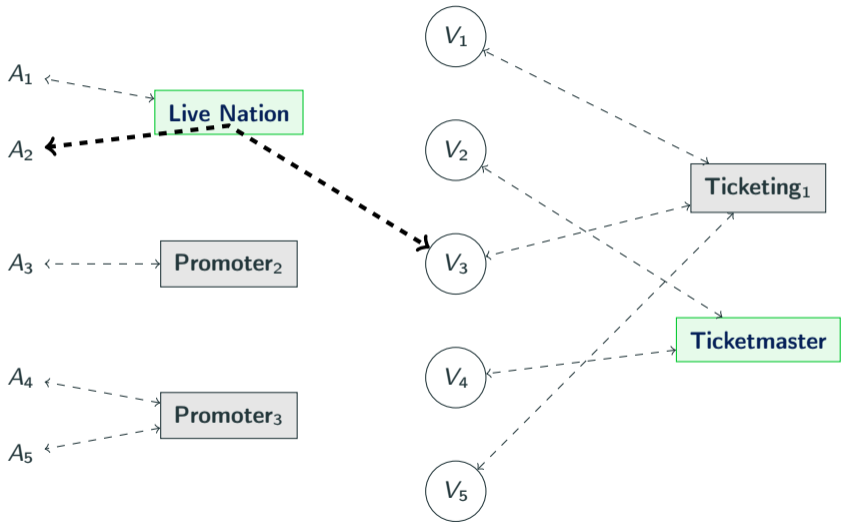
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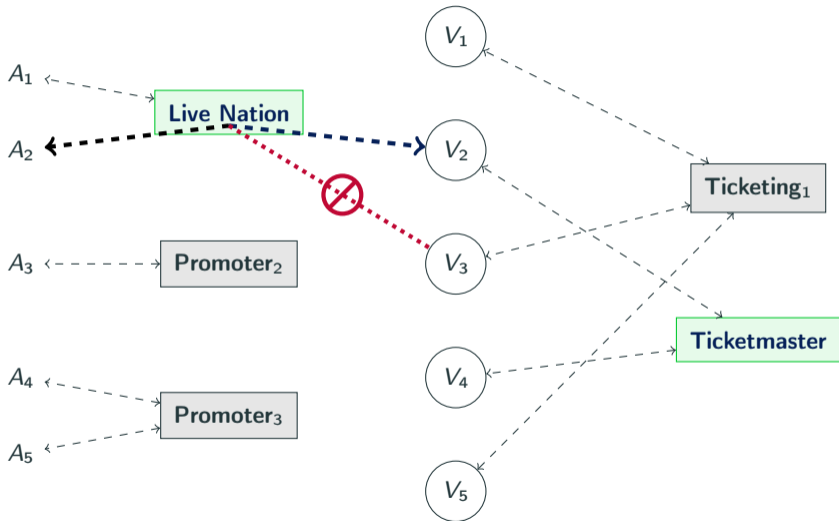


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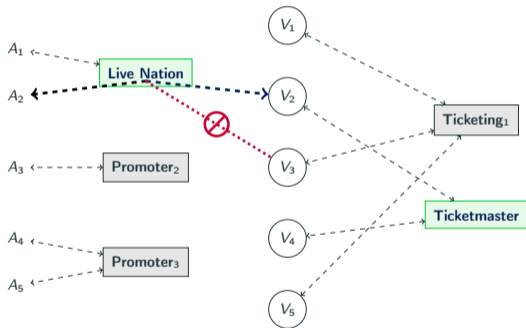
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# Empirical challenge



Can we separately identify

- **Preference for TM**
  - Internalization
  - Cost efficiencies
- **Foreclosure** LN's incentive to exclude rival non-TM venues post-merger
  - At a short-run loss for a long-run gain

- How do we quantify foreclosure?
- What was the short-run cost of foreclosure to LN?

- How do we quantify foreclosure?
  - Estimate a venue-choice model, allowing for limited consideration set:  
Post-merger, a non-TM venue faced an average probability of being foreclosed by LN of 12%
  - Decomposition exercise:  
Foreclosure accounted for about 20% of the combined preferences and foreclosure effects of the merger
- What was the short-run cost of foreclosure to LN?

# Research questions, methods, and findings

- How do we quantify foreclosure?
  - Estimate a venue-choice model, allowing for limited consideration set:  
Post-merger, a non-TM venue faced an average probability of being foreclosed by LN of 12%
  - Decomposition exercise:  
Foreclosure accounted for about 20% of the combined preferences and foreclosure effects of the merger
- What was the short-run cost of foreclosure to LN?
  - Estimate an event revenue-generating model that embeds venue choice:  
Foreclosure reduces LN's post-merger revenues by about 2% of total revenues —  
Lower bound for future gain attributed to conduct!

## Where else is this relevant?

Any time an agent needs to use an integrated supplier to access another (essential) input controlled by the integrated firm.

- **Healthcare:**
  - Every patient undergoing surgery at the [East Jefferson Hospital] must use anesthesiology services provided by [Roux and Associates]
  - Healthcare providers must use Illumina's integrated cancer detection tests to access its DNA sequencing platform
- **e-commerce:** Third-party sellers must use Amazon's fulfillment services to gain the "Prime" label
- **Mobile Apps:** Apps distributed in the iOS App Store must use Apple's own In-App Payments solution

- Extensive literature on the effects of vertical integration
  - Hortaçsu and Syverson (2007), Luco and Marshall (2020), among others. Summarized by Beck and Scott Morton (2021).
- Most previous works look for *evidence of* foreclosure and efficiencies
  - Cable TV: Waterman and Weiss (1996), Chipty (2001), Chen and Waterman(2007), Suzuki (2009) – yes on evidence
  - Movie theaters: Chen, Yi and Yu (2024), Gil, Ho, Xu, and Zhou (2024), Hodgson and Sun (2024), Chung, Kim and Yi (2018), Gil (2009) — mixed evidence

## Positioning in the Literature II

- Full-fledged structural work to assess welfare trade-offs due to vertical integration:
  - Crawford, Lee, Whinston and Yurukoglu (2018), model and estimates on
    - Integrated firms' incentives to foreclose rivals' access to inputs
    - Potential for double marginalization
    - **Imperfect coordination and internalization within an integrated firm**
  - Cuesta, Noton and Vatter (2024): insurers and hospitals, both ends facing competition and can be foreclosed by a VI firm
- Imposes high demand on data
  - **Requires profit splits** between upstream and downstream
- Raises the question: what can we do if we don't see the profit splits?

## Positioning in the Literature III

- We use a **consideration set** framework to identify foreclosure effects from preference effects using choice data
  - Foreclosure: the probability of **excluding** some venues for a specific event
  - **We require much less from the data, but at a cost**
- We examine a new channel of the anti-competitive effects of VI
  - Victims: venues, stakeholders in the supply chain, must use integrated input to access another (essential) input controlled by the integrated firm
  - Venues do not compete with LN's promoting business, nor with TM's ticketing business

The rest of the talk:

1. Data
2. Model and identification
3. Estimation and results
4. Quantifying the cost of foreclosure

Data

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## Data (1): Event-level performance data from Pollstar Box office

- Pollstar Box Office
  - Self-reported at the event level
  - Used by DOJ in 2010 and in 2024; best industry source on live performance
- We restrict attention to:
  - U.S concerts, musical genres, 2007 to 2013
  - Venues that we observe in “Pollstar Venue Directories” (wait one slide for this!)
- Final sample: 78,334 events
- We observe artists, promoters, revenues, and venue characteristics

# Data: Venue data from Pollstar Directories

- Published Semi-annually
- Including all major U.S. venues, 3,000 to 4,000 per year

California		U.S. CONCERT VENUES	
<b>San Mateo Co. Event Ctr.</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.sanmateoeventcenter.com">www.sanmateoeventcenter.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.sanmateoeventcenter.com">www.sanmateoeventcenter.com</a> Possible In-house: 0/500	<b>Star Mart Center</b> MGT: Ken Krieger 1000 Main Street Fremont, CA 94539 Tel: 510-771-5000 <a href="http://www.star-mart.com">www.star-mart.com</a> Capacity: 500-547-3018 Box Office: 500-547-3018 Venue Website: <a href="http://www.star-mart.com">www.star-mart.com</a> Possible In-house: 0/500	<b>The Show At Agua Caliente Casino Resort Spa</b> MGT: Steve Krieger 1000 Main Street Fremont, CA 94539 Tel: 510-771-5000 <a href="http://www.showatagua.com">www.showatagua.com</a> Capacity: 500-547-3018 Box Office: 500-547-3018 Venue Website: <a href="http://www.showatagua.com">www.showatagua.com</a> Possible In-house: 0/500	<b>AGUA CALIENTE</b> MGT: Steve Krieger 1000 Main Street Fremont, CA 94539 Tel: 510-771-5000 <a href="http://www.aguacaliente.com">www.aguacaliente.com</a> Capacity: 500-547-3018 Box Office: 500-547-3018 Venue Website: <a href="http://www.aguacaliente.com">www.aguacaliente.com</a> Possible In-house: 0/500
<b>Santa Barbara Bowl</b> MGT: Sandy Barlowe Davis 1121 Santa Barbara Street Santa Barbara, CA 93103 Tel: 805-962-1300 <a href="http://www.santabarababowl.com">www.santabarababowl.com</a> Capacity: 805-962-7411 Box Office: 805-962-7411 Venue Website: <a href="http://www.santabarabowl.com">www.santabarabowl.com</a> Possible In-house: 0/200	<b>SOS Open Air Theatre</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.sosopenair.com">www.sosopenair.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.sosopenair.com">www.sosopenair.com</a> Possible In-house: 0/500	<b>Shrine Auditorium &amp; Expo Center</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.shrineauditorium.com">www.shrineauditorium.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.shrineauditorium.com">www.shrineauditorium.com</a> Possible In-house: 0/500	<b>Spaulding Shavers</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.spauldingshavers.com">www.spauldingshavers.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.spauldingshavers.com">www.spauldingshavers.com</a> Possible In-house: 0/500
<b>Santa Clara Performing Arts Center</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.santaclearperformingartscenter.com">www.santaclearperformingartscenter.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.santaclearperformingartscenter.com">www.santaclearperformingartscenter.com</a> Possible In-house: 0/500	<b>Skidway Cultural Center</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.skidwayculturalcenter.com">www.skidwayculturalcenter.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.skidwayculturalcenter.com">www.skidwayculturalcenter.com</a> Possible In-house: 0/500	<b>Spokane Theatre</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.spokane-theatre.com">www.spokane-theatre.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.spokane-theatre.com">www.spokane-theatre.com</a> Possible In-house: 0/500	<b>Star Palace</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.star-palace.com">www.star-palace.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.star-palace.com">www.star-palace.com</a> Possible In-house: 0/500
<b>Santa Cruz Civic Auditorium</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.santacruz-civic-auditorium.com">www.santacruz-civic-auditorium.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.santacruz-civic-auditorium.com">www.santacruz-civic-auditorium.com</a> Possible In-house: 0/500	<b>Shorewood Hall</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.shorewood-hall.com">www.shorewood-hall.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.shorewood-hall.com">www.shorewood-hall.com</a> Possible In-house: 0/500	<b>Star Palace</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.star-palace.com">www.star-palace.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.star-palace.com">www.star-palace.com</a> Possible In-house: 0/500	<b>Star Palace</b> MGT: Joe Vito 1100 S. Main Street San Mateo, CA 94403 Tel: 650-711-5000 <a href="http://www.star-palace.com">www.star-palace.com</a> Capacity: 600-675-2047 Box Office: 600-675-2047 Venue Website: <a href="http://www.star-palace.com">www.star-palace.com</a> Possible In-house: 0/500
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# Data: Venue data from Pollstar Directories

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► Comparing with DOJ data

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<b>San Mateo Co. Event Ctr.</b> MGT: Joe Vito 1100 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.sanmateoeventcenter.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Star Mart Center</b> MGT: Ken Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.star-mart.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>The Show At Agua Caliente Casino Resort Spa</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.showatagua.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>AGUA CALIENTE</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.aguacaliente.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house
<b>Santa Barbara Bowl</b> MGT: Sandy Davis 1101 Santa Barbara Santa Barbara, CA 93101 Tel: 805-962-1000 www.santabarababowl.com City Capacity: 805-962-7411 Seat Capacity: 805-962-7411 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>AGUA CALIENTE</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.aguacaliente.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house
<b>Santa Clara</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.santacleara.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house
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<b>Santa Monica Civic Auditorium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.santamonica.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house	<b>Spokane Stadium</b> MGT: Tom Kohn 1000 S. Bascom San Mateo, CA 94403 Tel: 650-711-5000 www.spokanestadium.com City Capacity: 600-617-2041 Seat Capacity: 600-617-2041 Use: Multi-Purpose Capacity: 1,500 Remarks: In-house

# Data: Venue data from Pollstar Directories

U.S. CONCERT VENUES	
925-692-2400 www.sleeptrainpavilion.com Tim Anderson ..... 925-692-2403 GM Jozee Perrelli ..... 925-692-2461 Box Office Mgr. Aaron Hawkins ..... 925-692-2435 Oper. Mgr. <b>Exclusive Talent Buyer:</b> Live Nation - San Francisco ... 415-371-5500 Ticketmaster ..... 415-951-7900 <b>Capacity:</b> ..... 12,500 <b>Facility Mgmt:</b> Live Nation Promotes In-House, Has exclusive promoter	Cara Vanderhook ..... 213-742-7273 Communications / PR <b>Exclusive Talent Buyer:</b> AEG Live / Concerts West ... 323-930-5700 Goldenvoice ..... 323-930-7100 Ticketmaster ..... 310-360-3300 <b>Capacity:</b> ..... 20,000 <b>Rent:</b> \$75,000 <b>Tax:</b> 3.5% <b>Box Office:</b> \$3,000 <b>Merchandising:</b> 30% <b>Facility Mgmt:</b> AEG Facilities Co-promotes, Promotes In-House, Rental
<b>Spartan Stadium</b> MKT: Bay Area San Jose State University 1393 S. 7th St. San Jose, CA 95112 Location: San Jose State University 1257 S. 10th St. San Jose, CA 95112 408-924-6690 Ryan Lester ..... 408-924-6692 Marketing Mgr. Ticketmaster ..... 415-951-7900 <b>Capacity:</b> ..... 30,000 Co-promotes, Rental	<b>Star Palace</b> See Warnors Centre For The Perf. Arts
	<b>The State Theatre Of Modesto</b> MKT: Sacramento-Stockton P.O. Box 1492 Modesto, CA 95353 Location: 1307 "J" Street Modesto, CA 95354 <b>fax</b> 209-527-4520 shows@thestate.org www.thestate.org Sue Richardson ..... 209-527-4697 GM / Booking <b>Capacity:</b> ..... 570

- Published Semi-annually
- Including all major U.S. venues, 3,000 to 4,000 per year
- Recover TM-venue relationship by hand.

► Comparing with DOJ data

### Include

- Year-by-year popularity measures
- Year-by-year production (i.e., albums, singles, and others)
- Stock of production accumulated up to year  $t$
- Other artist characteristics: group vs person, gender, genre, tags

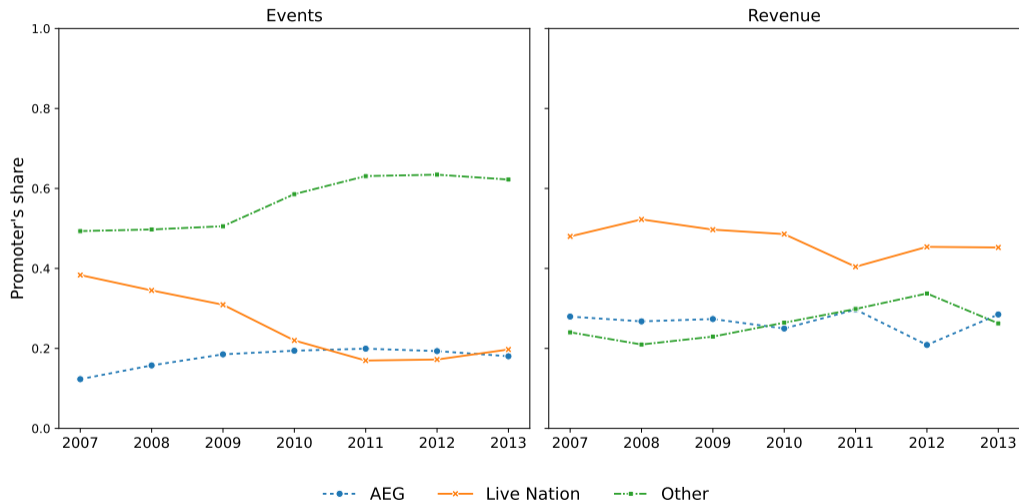
## Data: From the entire dataset to the estimation sample

	Number of events	Box-office Average	Box-office Total (billion)	Live Nation's share
Full data w/box-office	209,730	118,168	24.76	14.13
Matched to Pollstar directories	89,788	236,145	21.20	15.00
Musical genres	78,334	184,664	14.47	19.96
Rock/Pop	42,345	243,588	10.31	20.43

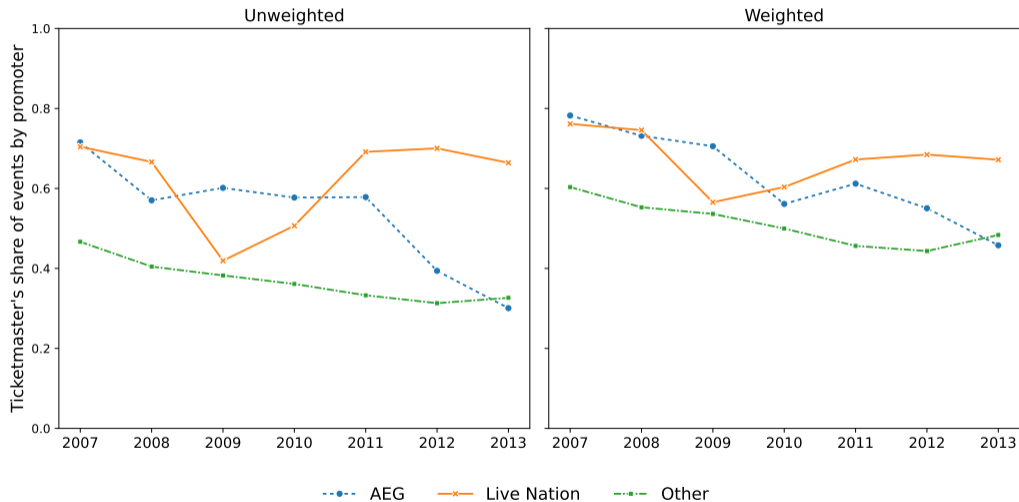
## The industry at the time of the merger

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# Share of events and box-office revenues by promoter

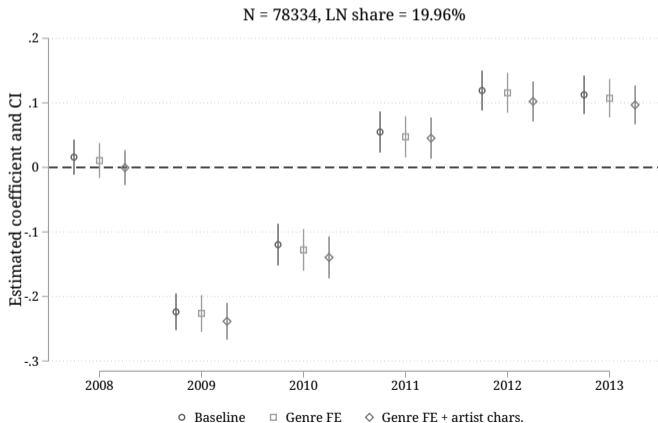


# Ticketmaster's share of events by promoter



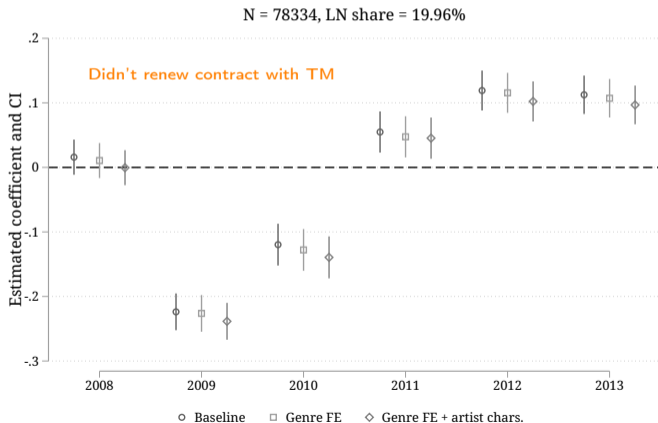
# Live Nation changes its promoting behavior over time

$$P(\text{a TM venue is chosen for event } j) = \alpha + \sum_{\tau=2007}^{2013} \gamma_{\tau} + \sum_{\tau=2007}^{2013} \delta_{\tau} \times \mathbb{1}[\text{Promoter of event } j \text{ is LN}] + X_j' \beta + \varepsilon_j$$



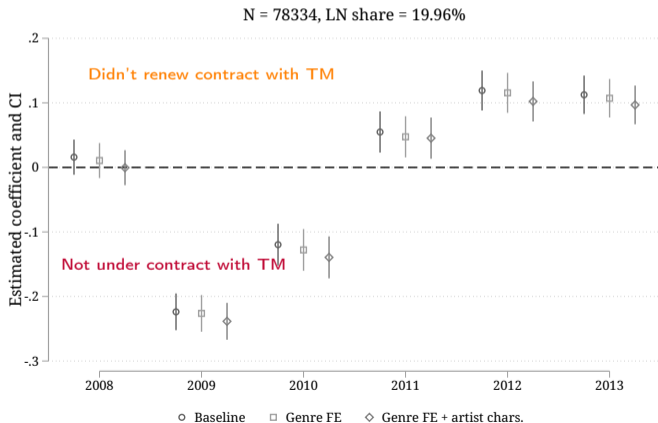
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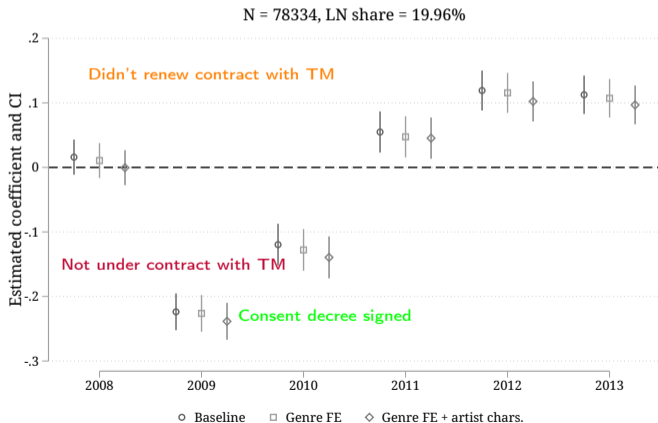
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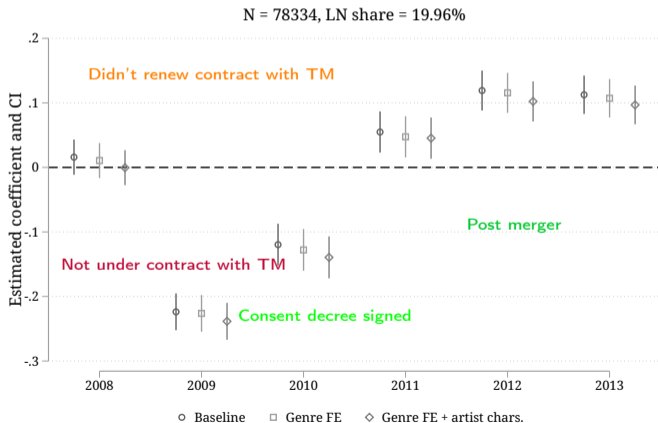
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## Summary of Facts

- Live Nation changed its venue choice behavior in response to letting its contract with TM expire *and* merging with TM

▶ More

- LN's post-merger behavior is consistent with both the foreclosure of non-TM venues and preferences for TM venues
- **We need a model and an identification strategy to separate these two effects**

# Model

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## Setup: Venue choice and latent profits

- A promoter must choose a venue for event  $i$ , with  $J_i$  venues available

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 $\varepsilon \sim i.i.d.$  Gumbel with location parameter  $\mu = 0$  and **scale**  $\rho$

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- Venue choice probability,

$$P_{ij} = \frac{\exp\left(X_j\left(\frac{\beta}{\rho}\right)\right)}{\sum_{k \in J_i} \exp\left(X_k\left(\frac{\beta}{\rho}\right)\right)}$$

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$$P_{ij} = \frac{\exp\left(X_j\left(\frac{\beta}{\rho}\right)\right)}{\sum_{k \in J_i} \exp\left(X_k\left(\frac{\beta}{\rho}\right)\right)}$$

- Thus,  $\log(\pi_i)$  follows a Gumbel distribution with scale  $\rho$  and location  $\mu_i = W_i\alpha + \rho \log\left(\sum_{k \in J_i} \exp\left(X_k\left(\frac{\beta}{\rho}\right)\right)\right)$  ▶ Proof

## Model: Restricted choice set

- Post-merger, Live Nation may instead choose from a restricted choice set  $\tilde{J}_i \subseteq J_i$ , where  $\tilde{J}_i$  contains only those venues contracted with Ticketmaster.

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- Venue choice probability:

$$P_{ij}^{\text{Restricted}}(\beta, \rho) = \begin{cases} \frac{\exp(X_j(\frac{\beta}{\rho}))}{\sum_{k \in \tilde{J}_i} \exp(X_k(\frac{\beta}{\rho}))}, & j \in \tilde{J}_i \\ 0, & \text{otherwise} \end{cases}$$

- Profit distribution:  $\log(\pi_i)^{\text{Restricted}} \sim \text{Gumbel}(\mu_i^{\text{Restricted}}, \rho)$

- PDF:  $f_{\log(\pi)_i^{\text{Restricted}}}(\log(\pi_i); \alpha, \beta, \rho)$
- $\mu_i^{\text{Restricted}} = W_i \alpha + \rho \log \left( \sum_{k \in \tilde{J}_i} \exp \left( X_k \left( \frac{\beta}{\rho} \right) \right) \right)$

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- $\mu_i^{\text{Restricted}} = W_i \alpha + \rho \log \left( \sum_{k \in \tilde{J}_i} \exp \left( X_k \left( \frac{\beta}{\rho} \right) \right) \right)$

- We assume Live Nation chooses from the restricted choice set with probability

$$g(Z_i; \lambda) = \frac{\exp(Z_i \lambda)}{1 + \exp(Z_i \lambda)}$$

- From the econometrician's perspective:

$$\bar{P}_{ij}(\beta, \rho, \lambda) = \begin{cases} g(Z_i; \lambda) P_{ij}^{\text{Restricted}}(\beta, \rho) + (1 - g(Z_i; \lambda)) P_{ij}(\beta, \rho), & LN_i = 1 \text{ \& Post}_i = 1 \\ P_{ij}(\beta, \rho), & \text{otherwise} \end{cases}$$
$$f_{\log(\bar{\pi})_i}(\log(\pi); \alpha, \beta, \rho) = \begin{cases} g(Z_i; \lambda) f_{\log(\pi_i)^{\text{Restricted}}}(\log(\pi); \alpha, \beta, \rho) + (1 - g(Z_i; \lambda)) f_{\log(\pi_i)}(\log(\pi); \alpha, \beta, \rho), \\ f_{\log(\pi_i)}(\log(\pi)), \end{cases}$$

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- Since we observe revenues, not profits, we assume  $\pi_i = \psi R_i$  for some  $\psi \in (0, 1)$ . Therefore,  $\log(\pi_i) = \log(\psi) + \log(R_i)$ , and we cannot separately identify  $\psi$  and  $\alpha_0$ .

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- Given observed revenues  $R_i$  and the chosen venue  $j^*(i)$ , we maximize the log-likelihood

$$L(\theta \mid j^*(i), R_i) = \sum_{i=1}^N \log(\bar{P}_{ij^*(i)}(\theta)) + \sum_{i=1}^N \log(f_{\log(\bar{\pi})_i}(R_i \mid \theta))$$

- $W$  includes artist characteristics, genre dummies, year dummies, month-of-year dummies, market size dummies, and promoter dummies
- $X$  includes venue capacity, venue type dummies, Ticketmaster, Livenation, and post-merger dummies
- $Z$  includes total number of venues, Ticketmaster share, and AEG ownership share
  - Incentive vs. ability to foreclose

# Identification

- Challenge: a venue's TM status determines both latent profits and consideration
- From the choice model alone, Abaluck and Adams (2021) show that consideration probabilities are identified from asymmetries in cross-derivatives ▶ Montecarlo
- We also specify our consideration probability as a function of market characteristics (excluded from latent profits): identification arguments from Agarwal and Somaini (2024)
- The revenue model also plays an important role: Observationally equivalent concerts generate different expected revenues under foreclosure

# Results (Selected Coefficients)

	$\beta$		$\lambda$		$\alpha$		$\alpha$	$\rho$
TM	0.384 (0.016)	Constant	-6.506 (0.741)	Constant	-7.414 (0.031)	Solo Female	0.012 (0.022)	1.211 (0.003)
LN × TM	0.160 (0.028)	TM Share	1.914 (1.459)	LN	-0.173 (0.021)	Solo Male	0.149 (0.014)	
TM × Post	-0.409 (0.020)	# Venues	6.358 (0.618)	AEG	-0.231 (0.018)	# Top 100	3.526 (0.081)	
LN × TM × Post	0.921 (0.030)			Music Festival	0.527 (0.019)	Accumulated Albums	2.146 (0.271)	
LN × LN Owned	2.123 (0.022)			Joint Event	0.528 (0.023)	Current Albums	-1.479 (0.074)	
AEG × AEG Owned	2.618 (0.024)			Has Supporting Act	0.105 (0.010)	Accumulated Singles	7.079 (0.132)	
				Medium Market	0.929 (0.012)	Current Singles	0.294 (0.097)	
				Large Market	1.466 (0.011)	Accumulated Other	-0.388 (0.144)	
						Current Other	3.131 (0.102)	

## Foreclosure vs. internalization

- Our model allows Live Nation to **internalize** Ticketmaster's profit after the merger. Any resulting efficiencies incentivize LN to give preference to TM venues
  - We do not consider this foreclosure
- However, LN choosing a venue from a subset of venues contracted with TM, excluding those that have not, serves to
  - ***entrench or extend an already dominant position**, a possible Sherman Act Section 2 violation (2023 Merger Guidelines, 2.6)*
- This is **foreclosure**: Going back to slide 1, only  $\lambda$  captures the denial of **proper** access to an essential input

- Our estimates produce a distribution of foreclosure probabilities, according to

$$g(Z_i; \hat{\lambda}) = \frac{\exp(Z_i \hat{\lambda})}{1 + \exp(Z_i \hat{\lambda})}$$

<b>Min</b>	<b>25%</b>	<b>Median</b>	<b>Mean</b>	<b>75%</b>	<b>Max</b>
0.001	0.011	0.025	0.116	0.209	0.590

## Evaluating the Merger Effect

Define the marginal effect of contracting with Ticketmaster to be

$$\mathbf{TME}_{ij}(t, p, \lambda) \equiv P_i(j|t, p, \lambda, TM_j = 1) - P_i(j|t, p, \lambda, TM_j = 0)$$

Evaluate the **effect of the merger** on  $TME(\cdot)$ :

$$\begin{aligned} \mathbf{Merger\ Effect}(\lambda) &= [TME_j(t = 1, LN_p = 1, \lambda) - TME_j(t = 0, LN_p = 1)] \\ &\quad - [TME_j(t = 1, LN_p = 0) - TME_j(t = 0, LN_p = 0)] \end{aligned}$$

## Quantifying the impact of foreclosure

- **Merger Effect( $\hat{\lambda}$ )**: the impact of the merger on Live Nation's shift toward Ticketmaster-contracted venues, which combines
  - the effect of foreclosure (via  $\hat{\lambda}$ ) and
  - the effect of LN's preference for TM venues on latent profits
- Isolate the impact of foreclosure evaluating **Merger Effect( $\cdot$ )** at  $\lambda = 0$
- Quantify the relative strength of foreclosure as:

$$\text{Foreclosure Effect}(\hat{\lambda}) = 1 - \frac{\text{Merger Effect}(\lambda = 0)}{\text{Merger Effect}(\lambda = \hat{\lambda})}$$

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	Min	25%	Median	Mean	75%	Max
Pre-merger Live Nation TME	0.000	0.004	0.008	0.013	0.016	0.112
Merger Effect	0.001	0.013	0.018	0.027	0.030	0.350
Foreclosure Effect	0.003	0.031	0.101	0.199	0.418	1.000

## Revenue loss from foreclosure

- Foreclosure necessarily lowers short-run revenues by restricting the venue choice set
- Change in expected log-revenues given by

$$\mathbb{E}(\Delta \log(R_i)) = \sum_{i \in \tilde{N}} g(Z_i \lambda) (\mu_i - \mu_i^{\text{Restricted}})$$

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- $\tilde{N}$  is the set of post-merger concerts promoted by Live Nation
- Results:
  - Expected change in log-revenue: -0.021
  - ⇒ Revenue is 2% lower due to foreclosure
  - Livenation's observed post-merger total revenue: \$3.3B
- A lower bound on Live Nation's expected future gains from foreclosure?

## Wrapping Up

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## Wrapping up

- We propose a methodology to quantify the extent of foreclosure that does not require observing revenue/profit splits among agents
- We apply this to the 2010 Live Nation - Ticketmaster merger
  - Finding 1: On average, contracting with TM increases the probability that a venue is chosen by LN by 2.7pp relative to other promoters (foreclosure explains 20% of this)
  - Finding 2: Post-merger, a non-TM venue faced a 12% probability of excluded from LN's choice set, on average
  - Finding 3: Cost of foreclosure is about 2% of LN's post-merger revenues
- Next steps:
  - Refine determinants of foreclosure
  - Write the paper!

Thanks!



## Industry details

- Promoter: the “CEO” of the performer’s business activities.
  - The promoter contracts with the venue (or uses its own), arranges local production, advertising, etc.
  - The promoter is the residual claimant of the gross ticket receipts (it pays the performer, venue, and any other event-specific expenses)
- Venues provide the facilities for the event, concessions, parking, and security. Venues receive a fixed fee, as well as concession, parking, and a share of merchandise sales
- Ticketing agencies contract with venues. They pay venues a share of the ticket service fees

## Sources of market power in ticketing service

- Platforms required to provide ticketing services are technologically complex to operate and expensive to develop and deploy.
- Major concert venues are unlikely to contract with a new ticketing company because of uncertainty about its ability to handle high-volume on-sales.
- It's expensive to install and to train employees to use ticketing hardware.
- High fixed costs to develop and maintain a ticketing platform.
- Difficult to compete with TM on data-driven marketing.
- Long-term contracts limit venue's ability to switch providers.

## Claimed merger-specific efficiencies

- Fewer market participants that need to be compensated, which would allow to reduce ticket prices
- Reduce "unfilled capacity"
- More direct interface between artists and fans
- LNE's CTS would not be a rival to TM, so the merger would not result in one fewer rival

## The 2010 Consent Decree: Behavioral Remedy

“Defendants shall not: ”

1. “Retaliate against a Venue Owner because [. . .] the Venue Owner is or is contemplating contracting with a company other than Defendants for Primary Ticketing Services.”
2. “Condition or threaten to Condition the Provision of Live Entertainment Events to a Venue Owner based on that Venue Owner refraining from contracting with a company other than Defendants for Primary Ticketing Services [. . .]”
3. “Condition or threaten to Condition the provision of Primary Ticketing Services to a Venue Owner based on that Venue Owner refraining from contracting with a company other than Defendants for the Provision of Live Entertainment Events.”

## The 2010 Consent Decree: Structural Remedy

“Defendants are ordered [. . .] not to consummate the Merger until they have”

1. “entered into a binding agreement to license the Ticketmaster Host Platform to the Ticketmaster Host Platform Acquirer and to”
2. “provide private label ticketing services to the Ticketmaster Host Platform Acquirer [. . .]”

. . .

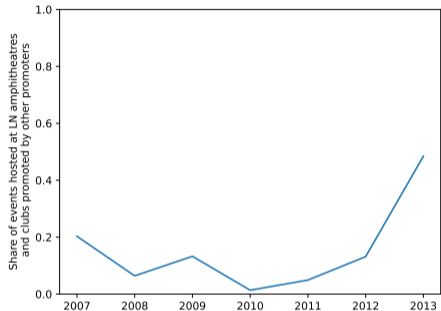
3. “Divest Paciolan to Comcast-Spectacor.” (Platform that allows venues to sell tickets through their own websites).

# The 2024 DOJ's Complaint

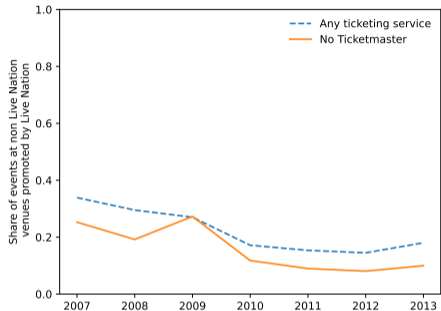
Live Nation has

- Colluded with former rivals to allocate business lines
- Threatened potential entrants to prevent entry in some markets (i.e, promotion)
- Used “carrots” and “sticks” to lock venues into contracting with TM
- Used long-term contracts with venues to prevent entry of new ticketing providers
- Restricted access to its venues, unless it is the promoter
- Strategically acquired promoters, venues, and festivals to eliminate rivals

## Data (2): Our Data vs DOJ's

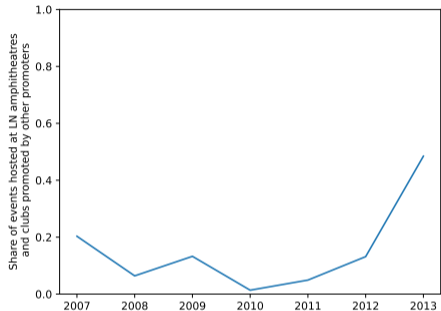


Share of events at LN clubs and amphitheatres promoted by non-LN promoters

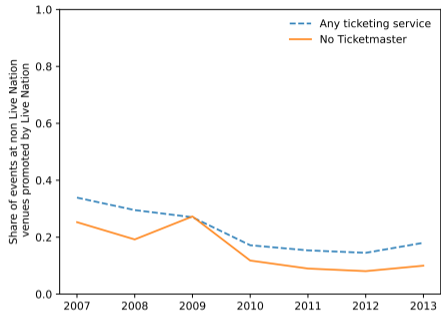


Share of LN events at non-LN, non-TM venues

## Data (2): Our Data vs DOJ's



Share of events at LN clubs and amphitheatres promoted by non-LN promoters

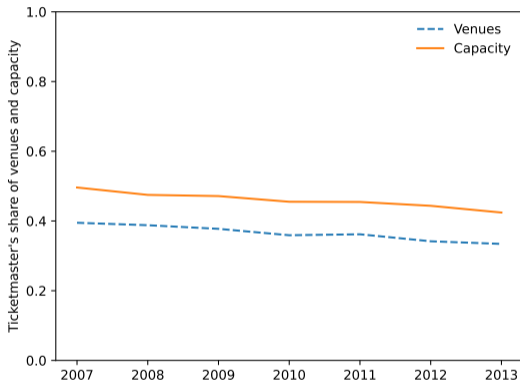


Share of LN events at non-LN, non-TM venues

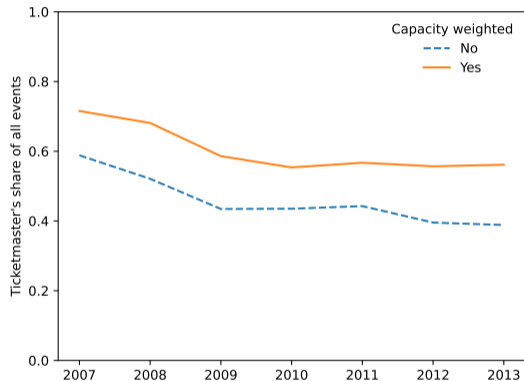
TM share among top 500 revenue-generating venues (based on capacity)

Year	DOJ's complaint	Our Data
2008	82.9%	61%
2009	TM: 66.4%, LNT: 16.5%	TM: 58%, LNT: 10%

# Ticketmaster's share of venues, capacity, and events

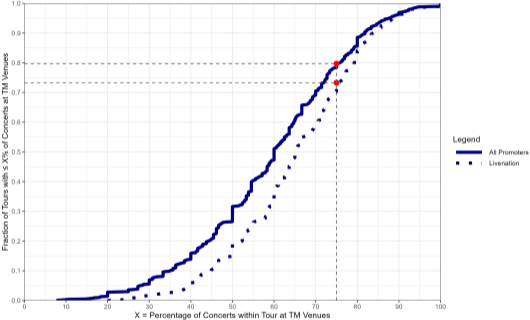


Venues and capacity

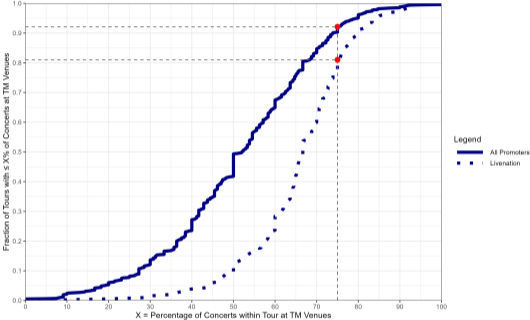


Events

# Ticketmaster's share within a tour



Pre-merger



Post-merger

## Deriving the location parameter of the revenue distribution

- Let  $X_j$  be a random variable following a Gumbel distribution with location parameter  $\mu_j$  and scale parameter  $\rho$ . Let  $Y$  be a random variable equal to the maximum of  $J$  independent draws of random variables  $X_j$ . That is,  $Y = \max\{X_1, X_2, \dots, X_J\}$ .
- Claim:  $Y$  follows a Gumbel distribution with location parameter  $\mu_Y = \rho \log(\sum_{j=1}^J \exp(\mu_j/\rho))$  and scale parameter  $\rho$ .

## Deriving the location parameter of the revenue distribution

- Proof: The CDF of each  $X_j$  is  $F_{X_j}(x) = \exp(e^{(x-\mu_j)/\rho})$ . Then, the CDF of  $Y$  is

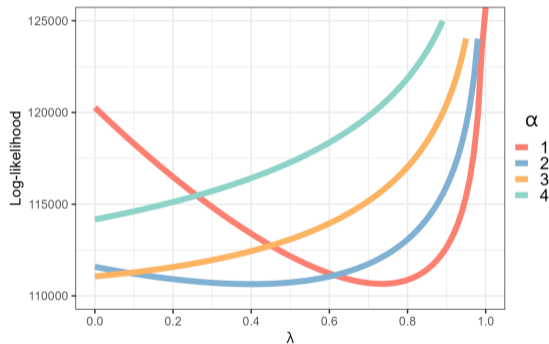
$$\begin{aligned}F_Y(y) &= Pr(Y \leq y) \\&= \prod_{j=1}^J F_{X_j}(y) \\&= \prod_{j=1}^J \exp(-e^{-(y-\mu_j)/\rho}) \\&= \exp\left(-\sum_{j=1}^J e^{-(y-\mu_j)/\rho}\right) \\&= \exp\left(-e^{-y/\rho} \sum_{j=1}^J e^{(\mu_j/\rho)}\right) \\&= \exp\left(-e^{-y/\rho} e^{\log(\sum_{j=1}^J e^{\mu_j/\rho})}\right) \\&= \exp\left(-e^{-(y-\rho \log(\sum_{j=1}^J e^{\mu_j/\rho}))/\rho}\right) \\&= \exp\left(-e^{-(y-\mu_Y)/\rho}\right)\end{aligned}$$

where  $\mu_Y \equiv \rho \log(\sum_{j=1}^J e^{\mu_j/\rho})$ . This is the CDF of a Gumbel random variable with location parameter  $\mu_Y$  and scale parameter  $\rho$  [◀ Back](#)

# Monte Carlo Simulation

- $V_j = \alpha \text{Ticketmaster}_j + \beta \text{Large}_j$
- *Large* and *Ticketmaster* are binary, thus 4 unique venue types
- Variation in choice set: 1-8 venues randomly available for each concert
- Simulate 10,000 concerts with parameters:  $\alpha = 2, \beta = 1, \lambda = .4$
- Estimate  $\hat{\alpha}, \hat{\beta}, \hat{\lambda}$
- Repeat 100 replications
- Mean (std. dev.) of estimates

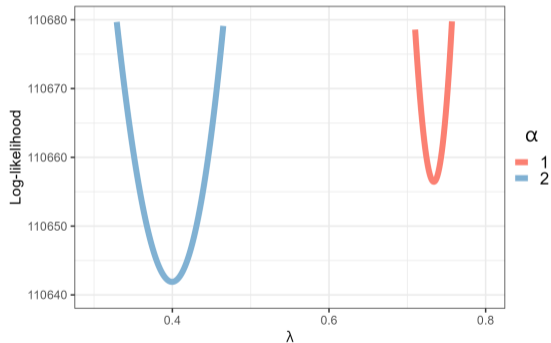
$\hat{\alpha}$	$\hat{\beta}$	$\hat{\lambda}$
1.973	1.003	0.401
(0.192)	(0.009)	(0.07)



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## Revenue model: Location parameters

