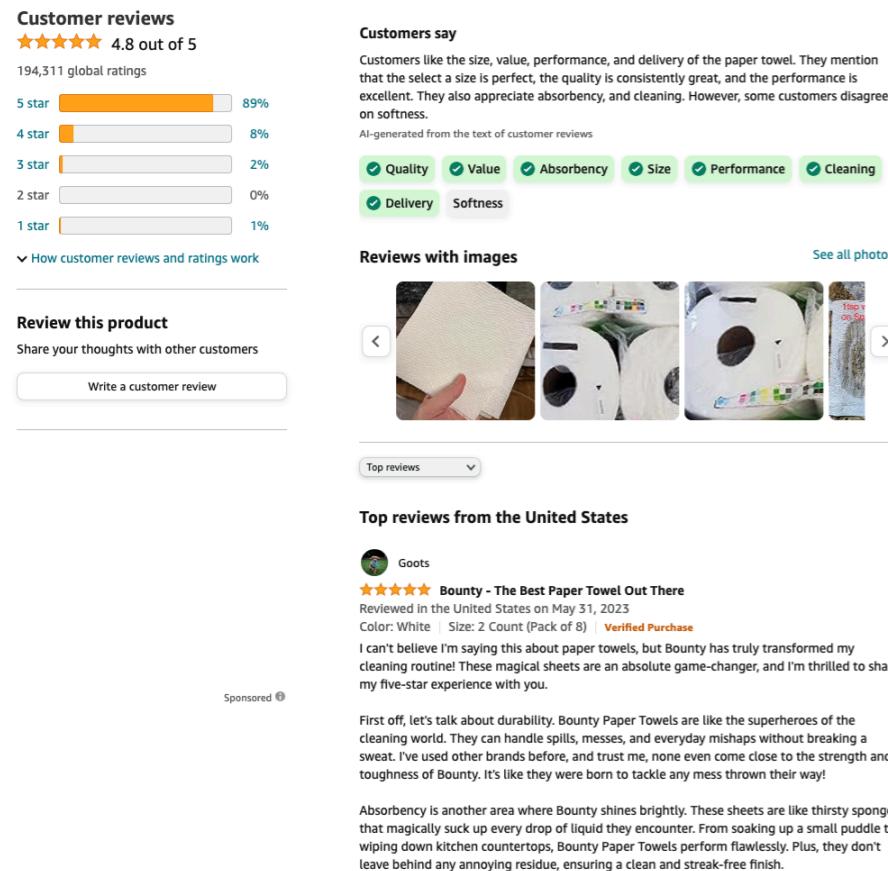


# Digital Reputation Systems

Andrey Fradkin (Boston University)

# Digital platforms use reputation systems



## Opinie o produkcji

Rewelacyjny

4,97 /5

5099 ocen i 660 recenzji  
4 usunięte



 Wszystkie opinie są potwierdzone zakupem. [Dowiedz się więcej](#)

## Entire townhouse in Scituate, Massachusetts

10 guests · 5 bedrooms · 6 beds · 3.5 baths

 Guest favorite

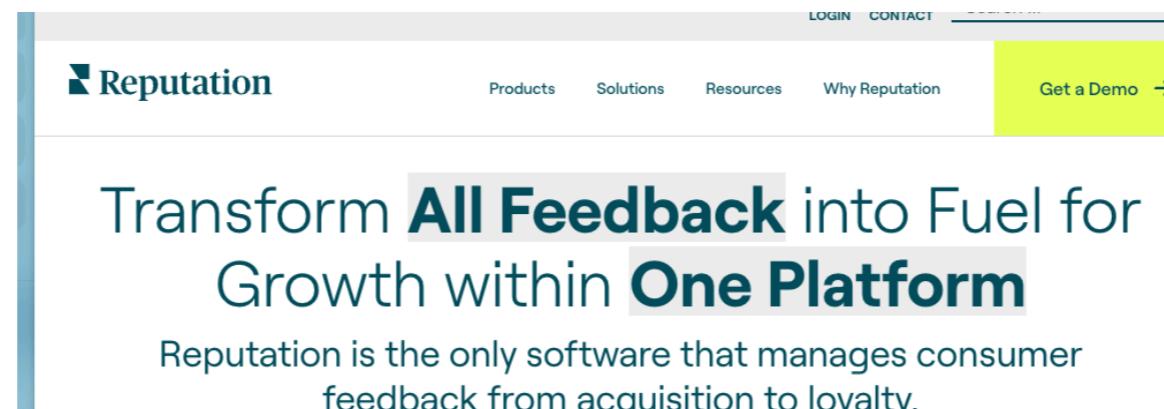
5.0  
★★★★★

9  
Reviews

# What is a reputation system?

- A system in which information generated by users about products / services / users is displayed on the platform to other users.
- Key components:
  - Users provide information to the platform through ratings, reviews, and other types of engagement.
  - The platform collects information, and chooses to display something based on it, which could be an average, a list, or something else.

# Businesses live or die by their reputation



The screenshot shows the Reputation software homepage. At the top, there's a navigation bar with links for LOGIN, CONTACT, and a search bar. Below the navigation is the Reputation logo and a menu with four items: Products, Solutions, Resources, and Why Reputation. A prominent yellow button labeled "Get a Demo →" is located on the right side of the menu. The main content area features a large, bold headline: "Transform All Feedback into Fuel for Growth within One Platform". Below the headline is a subtext: "Reputation is the only software that manages consumer feedback from acquisition to loyalty."

## Transform All Feedback into Fuel for Growth within One Platform

Reputation is the only software that manages consumer feedback from acquisition to loyalty.

ENTREPRENEURS

## You Just Got Attacked By Fake 1-Star Reviews. Now What?

Ryan Erskine Former Contributor ©

I write about digital branding and online reputation management.

Follow

# Goal for today

- Situate reputation systems within the broader context of platform design.
- Discuss several frameworks for thinking about reputation systems.
- Discuss several of the most interesting papers in literature.
- Discuss the future of reputation systems.

# Situating reputation systems within platform design

# What is the goal of platform design?

# What is the goal of platform design?

- Create a system in which the value to users from interacting with each other is maximized.
- Important sub-objectives:
  - Platform: maximize long-term profit
  - Users: optimal actions (marketing, content production, etc...) to take as a function of platform design.
- Why is this hard?
  - Externalities across users abound.
  - Most platforms cannot impose matches.

# Elements of platform design

- Collecting information about users.
- Providing users with the information and tools to find the best match.
- Structuring the interaction between users.

# Collecting information

- Provided by users about themselves through structured prompts or collected passively through digital traces.
- Provided by third-party.
  - <https://checkr.com>
- Business data.
  - Prior transaction history
  - User feedback about others.

The screenshot shows a web browser window for Airbnb's listing creation page. The URL in the address bar is <https://www.airbnb.com/rooms/new>. The page title is "List Your Space" with the subtitle "Airbnb lets you make money renting out your place." Below the title are several input fields:

- Home Type:** A dropdown menu with options: Apartment (selected), House, Bed & Breakfast, and Other.
- Room Type:** A dropdown menu with options: Entire home/apt (selected), Private room, and Shared room.
- Accommodates:** A dropdown menu showing "2" (selected) and other options like 1, 3, etc.
- City:** A text input field containing "San Francisco, Rome, Shibuya..." with a location pin icon.

A large red "Continue" button is at the bottom of the form.

# Providing users with information

- The information displayed and the order of displayed information.
  - Rankings
  - Recommendations
  - Ads
- The context around the information.
  - Explanations
  - Badges

Estimated Arrival Any time ▾   All Filters



Coffee Mug Japanese Hand-crafted Handmade...

★★★★★ (427)

\$39.47 \$43.86 (10% off)

SobokuMugs

FREE shipping

More like this →



Various Colors Available!

Personalized Photo Coffee Mug, Personalized ...

★★★★★ (3,683) ★ Star Seller

\$12.99 \$25.98 (50% off)

Sale ends in 17 hours

LesBleus

More like this →



CHOOSE FROM 12 BIRTH FLOWERS

Birth Flower Mug Floral Mug Personalized Gifts...

★★★★★ (3,799) ★ Star Seller

\$24.59 \$27.33 (10% off)

AlunaDesignCo

More like this →



Pottery Mug - 12oz (approximate)- Coffee + Tea ...

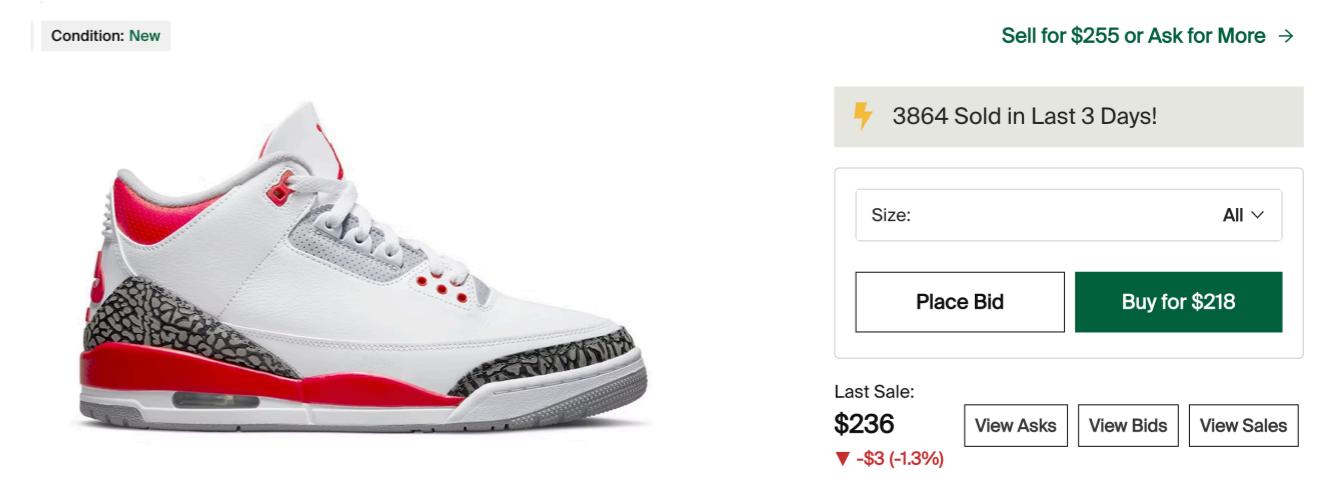
★★★★★ (1,303)

\$37.00

AmyGentryPottery

# Structuring interaction

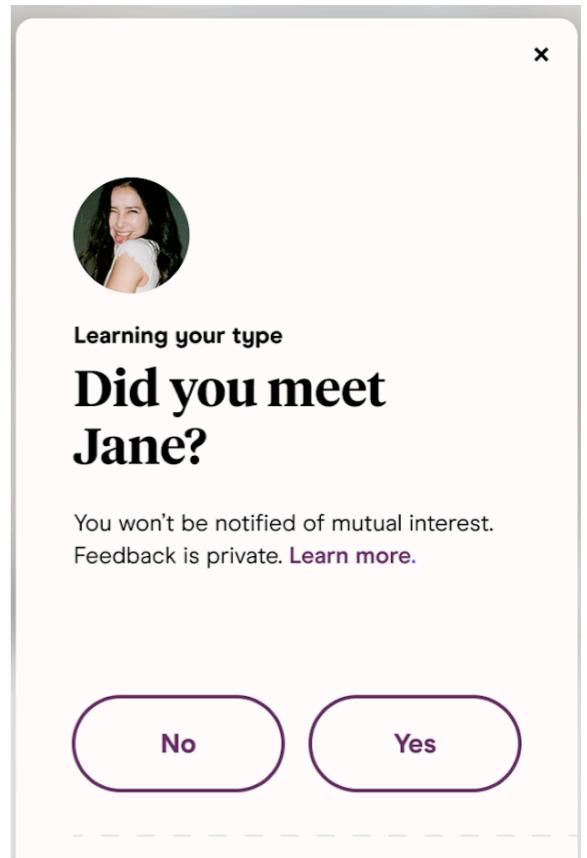
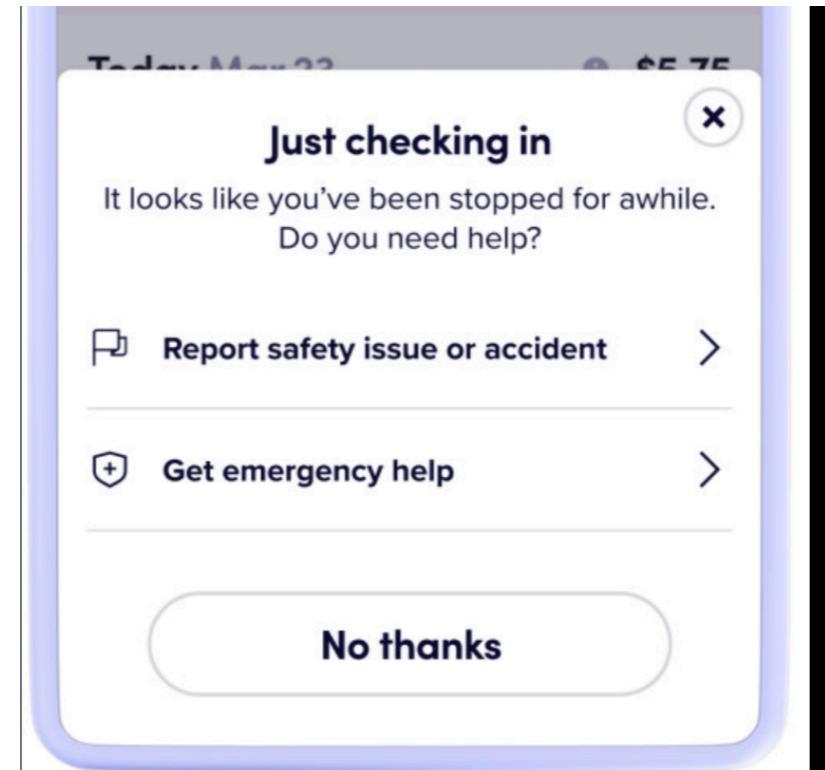
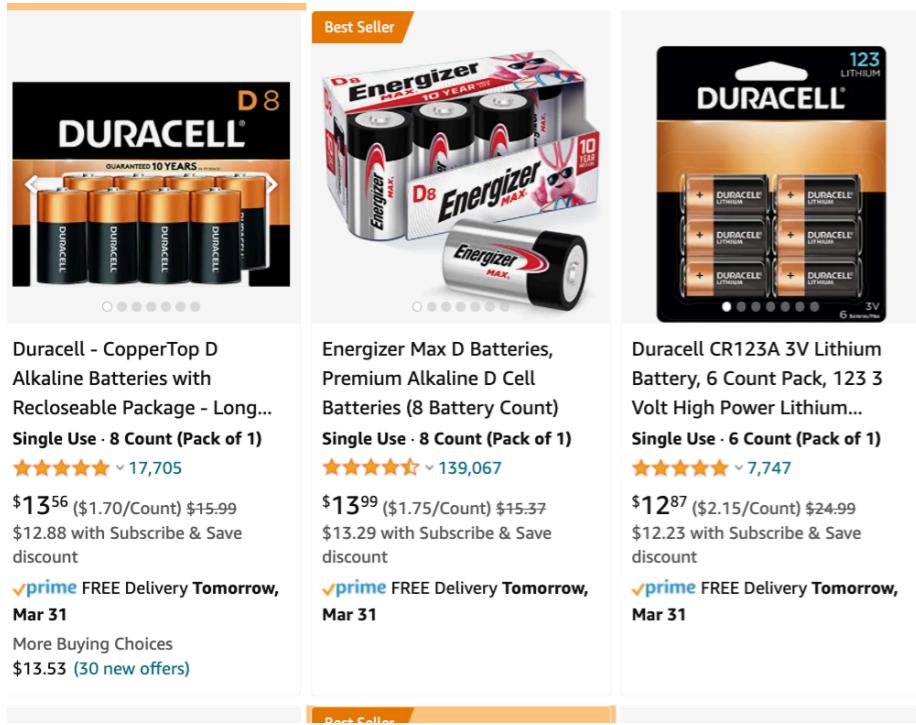
- Communication rules.
- Price discovery mechanism:  
auctions, bargaining, etc...
- Cancelation, refunds, and  
dispute resolution.



# Role of reputation system

- Information asymmetries and moral hazards abound.
  - What if the seller shirks or misrepresents a product or service?
- Post-transaction feedback / ratings / reviews capture this otherwise hard-to-observe information about vertical and horizontal characteristics.
- Data collected by the reputation system used in several ways:
  - Directly displayed to users.
  - Influences algorithmic scores and badges.
  - Influences who is allowed to participate at all.

# What are some design choices here?



48 Reviews

Summary	Accuracy	Communication	Location	Check In	Cleanliness	Value
Monica						

Anders was quick to reply and helpful before I arrived and also accommodating given my delayed flight.  
The room is as described and the photos show. The chairs are very comfortable to sit in. It was also excellent to have a private bathroom. It + More  
September 2014

Showing 1-3 of 536 reviews.

Sort By	Most relevant
TW	10/29/2021
Atlanta	
Verified Buyer	
	Fabric: Navy Velvet It needed pillows! It's actually pretty comfortable to sit and lounge on. The arms are easy to take off if you want to take them off. It's easy to put together and the tools come with it. I use it in my game room/loft area (don't mind the pink chest. It's filling in for now).

See photos See inside

Four Barrel Coffee

Website Directions Save Call

4.5 2,290 Google reviews

\$\$ · Coffee shop

99% Match TV-MA 2 Seasons HD

Exciting · Fantasy TV · Visually Striking

SPARK REVIEW PROGRAM

# Meta-comment

- Huge literature on whether reviews ‘matter’ and whether reviews are ‘biased’.
  - Spicy take 1: it will be very hard to publish well with this framing.
  - Spicy take 2: much of this literature has been written because reviews are easy to scrape and researchers need data. Literature needs to focus more on being useful or answering deep questions, while building on the above.
- Little of the reputation systems literature takes a market design approach.
- Key questions:
  - How do we design reputation systems to be better and to what extent do better reputation systems matter?
  - Should reputation systems be regulated by the government?
  - How should agents (firms and users) react to reputation system information?

# Empirical Studies of Reputation Systems

# Methodologies

- Virtual market (See the work of Bolton, Ockenfels and co-authors).
- Field experiments:
  - Run own experiment on platform (Pallais (2014 AER), Bai et al. (2022 WP))
  - Use field experiment conducted by platform (Fradkin et al. (2021 MktSci, 2023 MktSci))
- Quasi-experimental:
  - Scrapped data: Chevalier and Mayzlin (2006, JMR; 2014, AER).
  - Firm data: Hui et al. (2021 AEJ:Micro), many of the Ebay papers.
- Structural:
  - Value of reviews: Reimers and Waldfogel (2021, AER), Wu et al. (2015, MktSci); Fang (2022, MS).
  - Reputation coarseness: Liu, Shiller, and Zanjan (2022, WP).
  - Interaction with rankings: Bai et al. (2022, WP) - Experiment + Structural, very nice!

# Incentivizing reviews

# Motivation

- ‘Cold-start’ problem. Hard for new sellers to compete without reviews.
- Selection bias problem. Many transactions are not reviewed, worry about selection bias in reviewers. (Dellarocas and Wood, 2007 MS).
- Review rate is a positive signal of quality (Nosko and Tadelis, 2015 WP).
- Incentives and nudges can increase review rates (Burtsch et al. 2018 MS; Marinescu et al., 2021 JEP:A; Karaman, 2020 MS).
- Rebates for reviews (Li 2010 JEMS, Li and Xiao 2014 MS, Cabral and Li 2015 MS, and Li, Tadelis and Zhou 2020 RAND)

**Do more reviews help the market?**

# Pallais (2014)

- ‘Cold-start’ problem. Hard for new sellers to compete without reviews.
  - Labor paper: So framed as ‘young workers’.
- Experiment in which the author
  - Randomized hiring of inexperienced workers on oDesk (now Upwork). Task: data-entry.
  - Randomized evaluation provision.
  - IRB prevented detailed negative ratings.

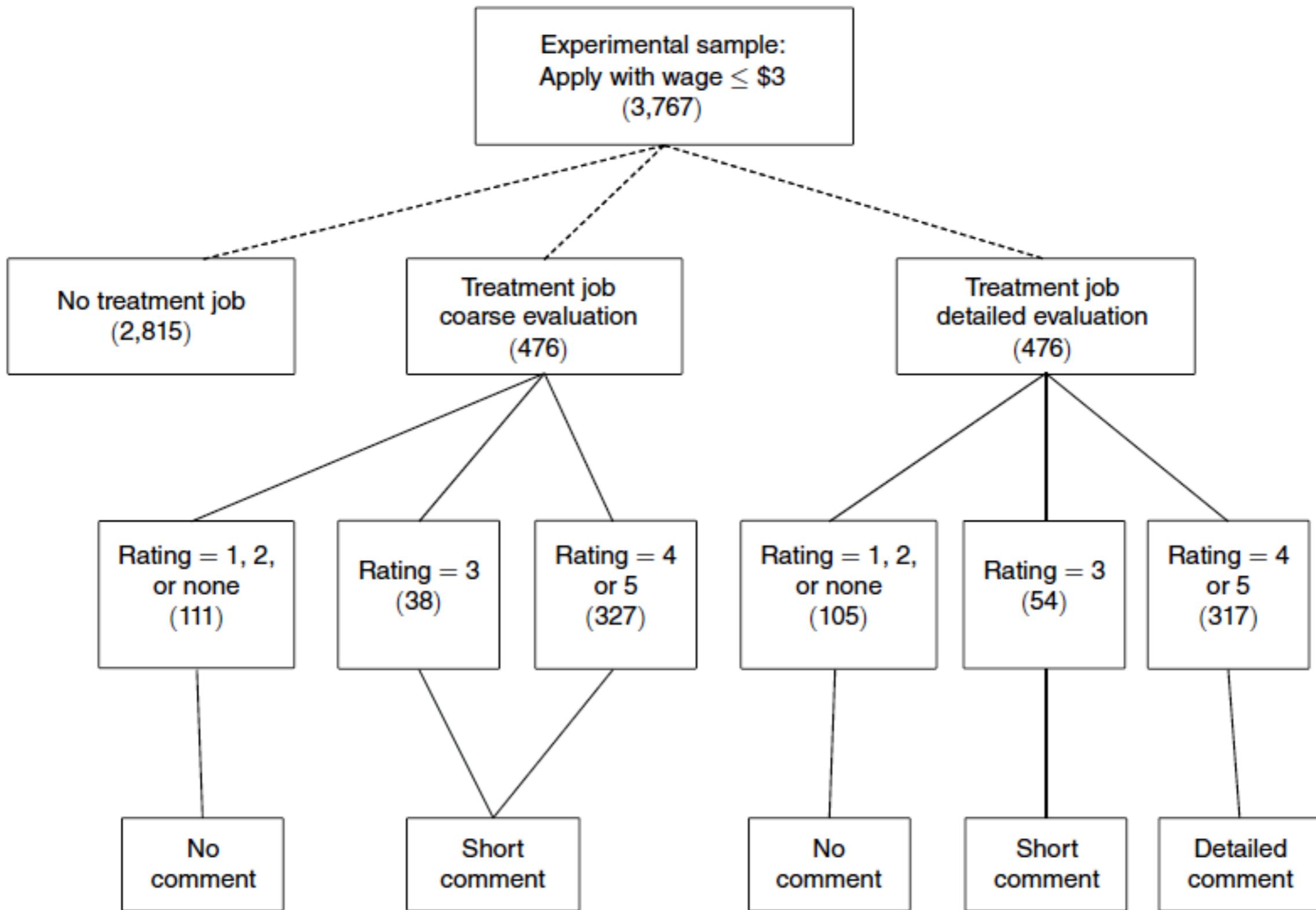
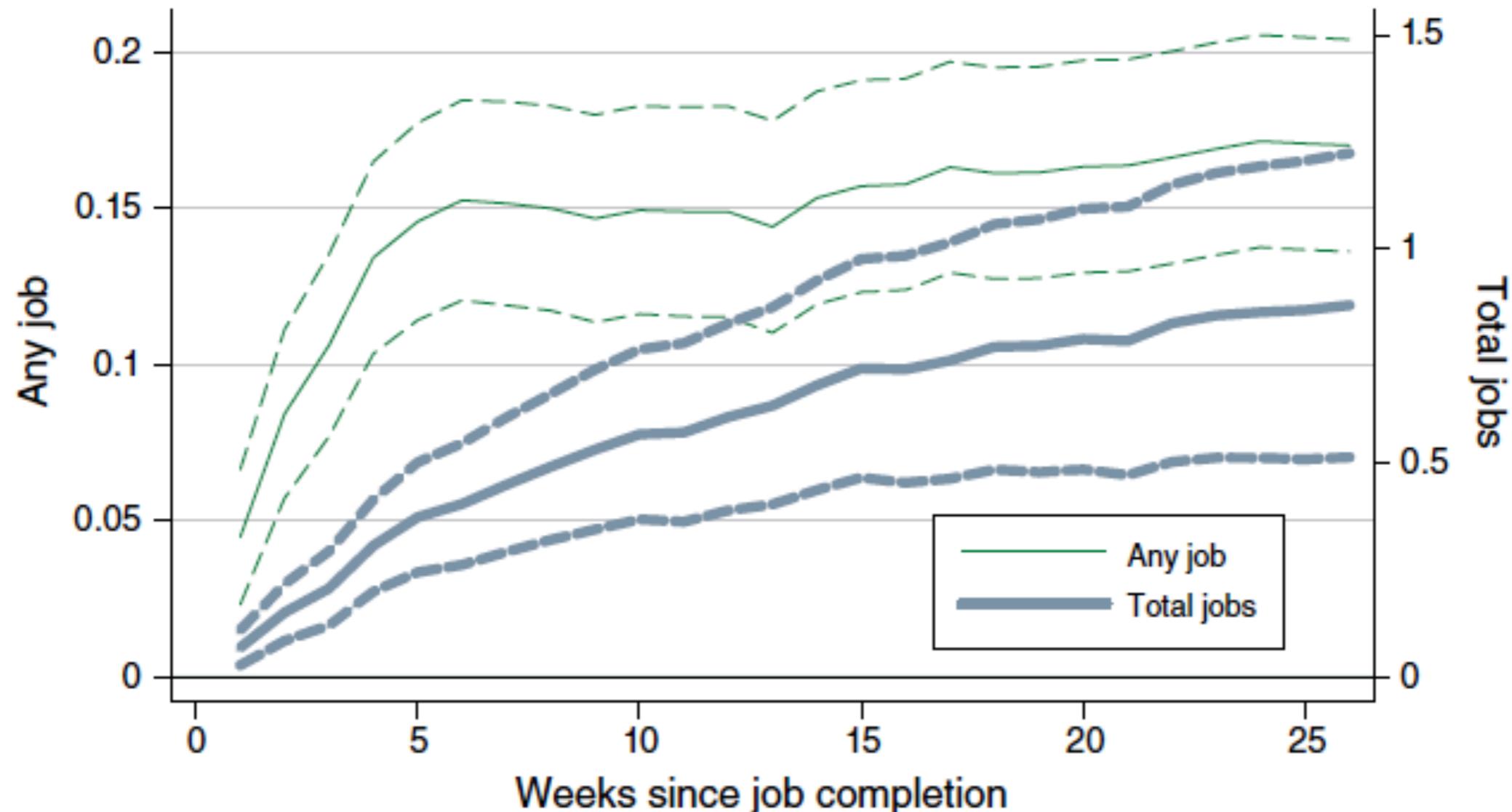


FIGURE 2. EXPERIMENTAL DESIGN

# Effects are persistent

Panel A. Any job and total jobs



# Welfare

- Experiment suffers from SUTVA violation.
- Can try to use markets not affected by experiment as controls in a DID setup.
- Finds surplus from these hires.
- Is this policy scalable or is it open to ‘gaming’ behavior?

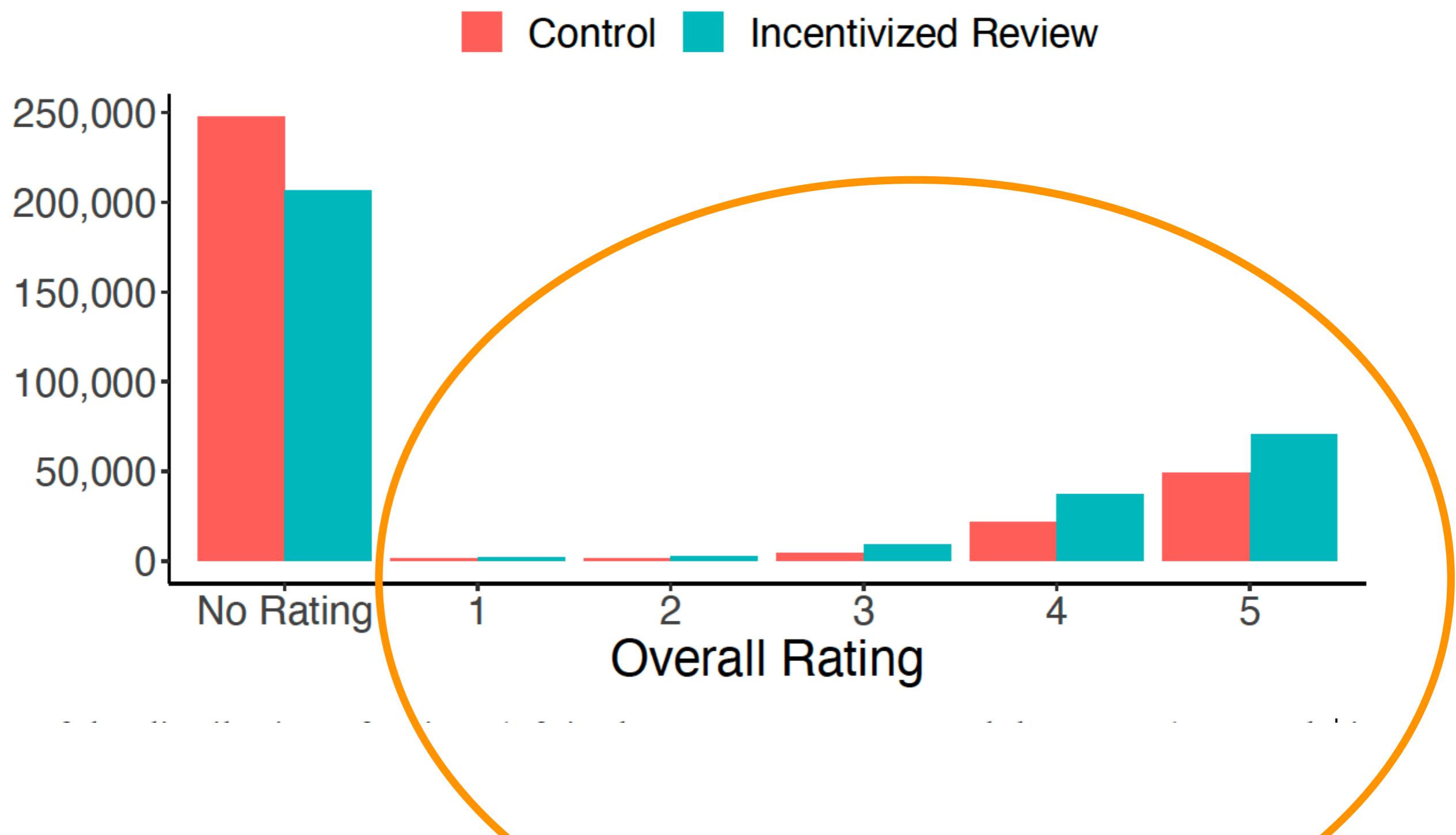
# Fradkin and Holtz (2023)

- “Found experiment”
- Airbnb recognized that missing reviews may be a problem, especially for new sellers.
- Implemented a policy of offering a \$25 coupon.
  - Randomization at a listing level.
  - Listing had no prior reviews.
  - No review within 8-9 days of checkout.

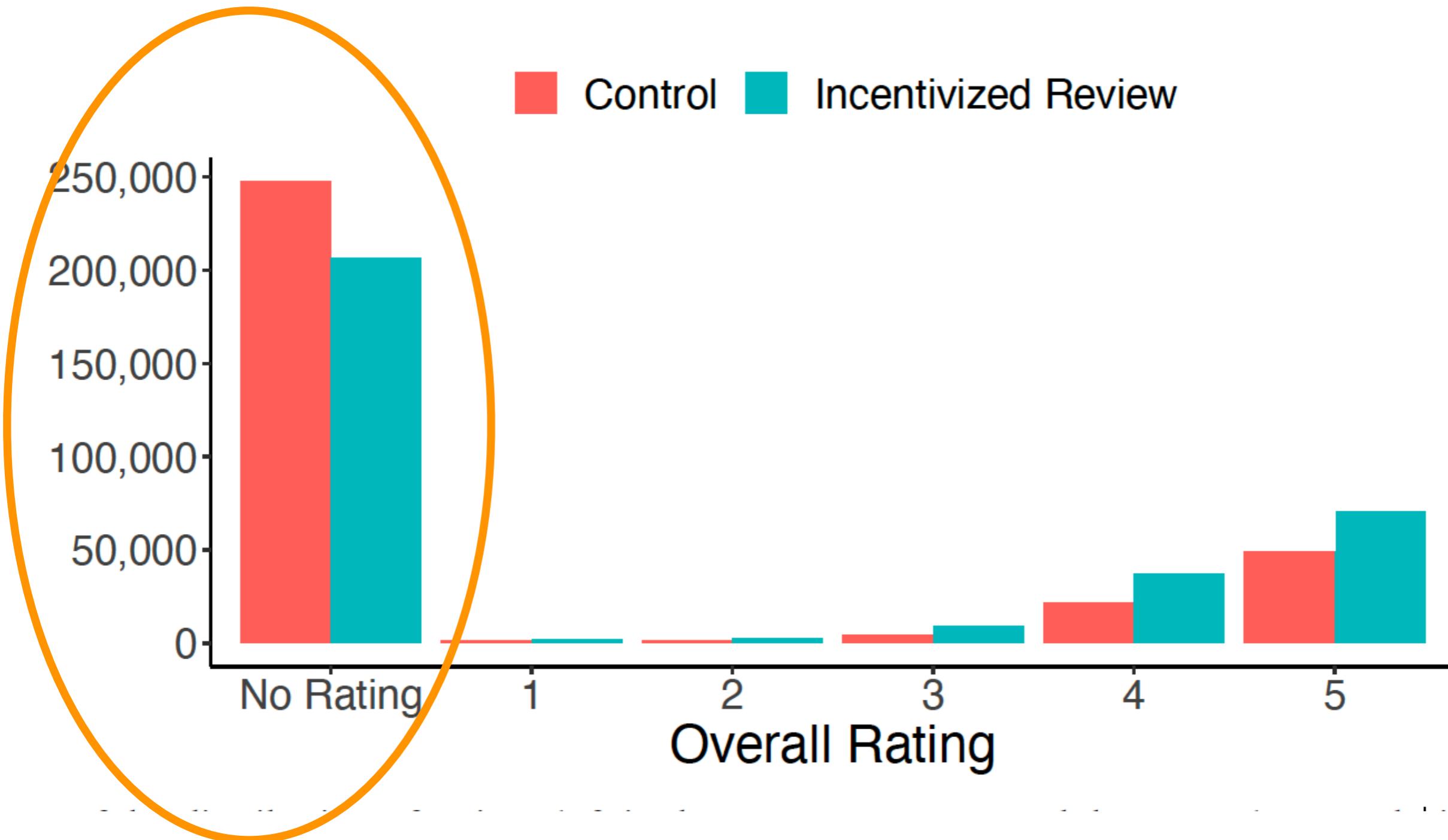
# Fradkin and Holtz (2023)

- Difference vs Pallais (2014).
  - Doesn't require the platform to 'hire' untested sellers.
  - Waits several days post-transaction for reviews.
    - Why? Saving money.
    - Remember, Airbnb has millions of listings.
  - Less obvious what an Airbnb rating should be. Data entry outcomes are objective.
- As a result, a very different policy.

# More reviews across ratings levels



# Many transactions still not reviewed



# No benefit for quantity or revenue

**Table 3:** Effects on Listing Outcomes (120 Day Horizon)

**(a) Intent to Treat**

	Views (1)	Reservations (2)	Total Nights (3)	Booking Value (4)
Constant	753.3*** (2.317)	3.665*** (0.0121)	15.04*** (0.0469)	1,638.6*** (6.525)
Assigned to Treatment	6.725* (3.359)	0.0416* (0.0171)	0.0227 (0.0661)	4.262 (9.202)
Observations	654,595	654,595	654,595	654,595

# Worse transaction quality

**Table 5:** Effects of Treatment on Transaction Quality

	Complaint (1)	Reviewed (2)	Star Rating (3)	Guest Nights (4)	Guest Nights (5)
Constant	0.0101*** (0.0001)	0.6475*** (0.0006)	4.529*** (0.0014)	5.591*** (0.0217)	
Treatment	-6.52 × 10 <sup>-5</sup> (0.0001)	0.0048*** (0.0009)	-0.0060** (0.0020)	-0.0766** (0.0296)	-0.0548* (0.0245)
R <sup>2</sup>	1.06 × 10 <sup>-7</sup>	2.52 × 10 <sup>-5</sup>	1.53 × 10 <sup>-5</sup>	6.48 × 10 <sup>-6</sup>	0.20805
Observations	2,431,085	2,431,085	1,579,132	2,431,085	2,431,085
Controls	No	No	No	No	Yes
Guest Region FE					✓
Checkout Week FE					✓
Num. Nights FE					✓
Num. Guests FE					✓

# Arguments in the paper

- Incentivized reviews are actually MORE biased conditional on rating. A 4-star incentivized review signifies worse quality than 4-star non-incentivized review.
  - Why? People don't like giving bad ratings and incentives induce those with worse experiences to review.
- All listings were already able to transact without a review. As a result, one review will not be pivotal.
- Ratings are only displayed after 3 reviews.
  - Review text is always displayed.

# Meta-comment

- Seemingly similar interventions have very different effects.
- Institutional context and constraints really matter.
- Selection bias in the literature.
  - Hard to publish a ‘reviews don’t matter’ paper.
- Platform policy implications:
  - Targeted incentives for reviews.
    - After a customer service complaint.
    - For a greater amount of cash.

# Other themes

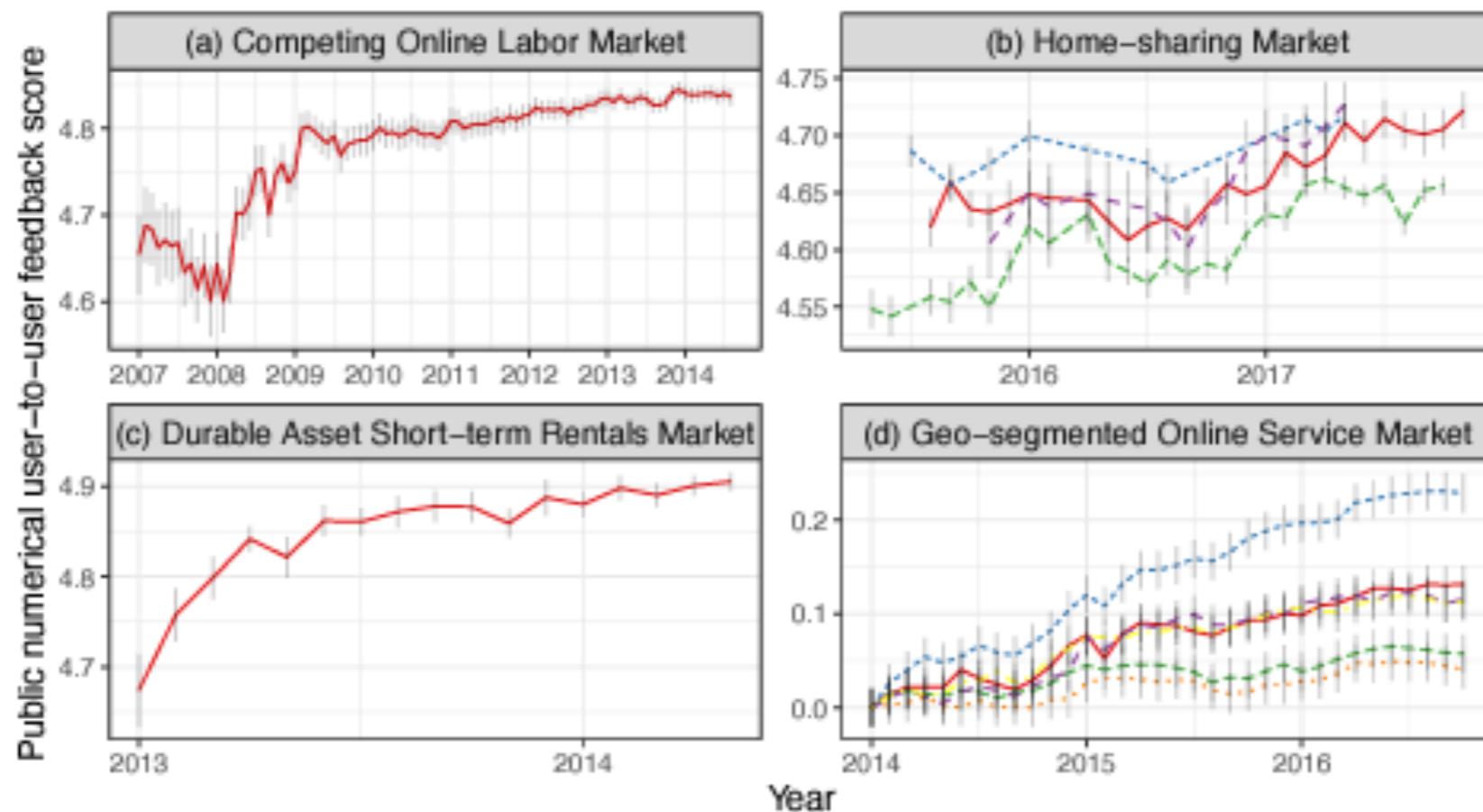
# Improving ratings informativeness

- Simultaneous reveal policy.
- Augmenting ratings with other data.
- Better ratings aggregation.

# Reputation Inflation

- The ratings are too high, and they're getting higher!
- Fillipas et al. (2021, MktSci)

Figure 2: Longitudinal buyer-on-seller feedback scores for a collection of online marketplaces



# Discrimination

- Do reviews reduce discrimination?
  - Yes on Airbnb (Laouénan and Rather 2022, AEJ: AE, Cui et al. 2018, MS).
  - Yes on labor market (Agarwal et al. JIE 2016).
  - But perhaps not fully (Ge et al. 2020 JPubEc).
- Can the process of reviewing result in discrimination?
  - Definitely, but haven't seen strong papers on this in online markets.

# Certifications

- Ex-ante screening is common in markets: licensing, permitting, etc...
- Occupational licenses vs ratings (Farronato et al. (2022)).
- Do certifications matter?
  - Hui et al. (2016, MS) and other work by Hui and coauthors.
- Optimal certification design:
  - Good direction for future research + structural model.

# Fake reviews

- Expedia vs TripAdvisor (Mayzlin et al. 2014, AER).
  - Can those who don't transact on platform submit reviews?
- Who commits review fraud? (Luca and Zervas 2016, MS).
- The market for fake reviews on Amazon (He et al. 2022, MkSci)
- **Equilibrium effects of fake reviews (Gandhi et al. (2025)). Very nice paper.**

# Next week

- Rajkumar, K., Saint-Jacques, G., Bojinov, I., Brynjolfsson, E., & Aral, S. (2022). A causal test of the strength of weak ties. *Science*, 377(6612), 1304-1310.
- Holtz, D., Lobel, R., Liskovich, I., & Aral, S. (2023+). Reducing interference bias in online marketplace experiments using cluster randomization: evidence from a pricing meta-experiment on Airbnb. Forthcoming in *Management Science*.
- At least intro of: Goli et al., Yuan to present.