

# **Trust and Reputation Systems**

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# Review Platforms



Angie's list.



tripadvisor®  
get the truth. then go.®



大众点评  
dianping.com

# Online Marketplaces

- Transactions increasingly moving online



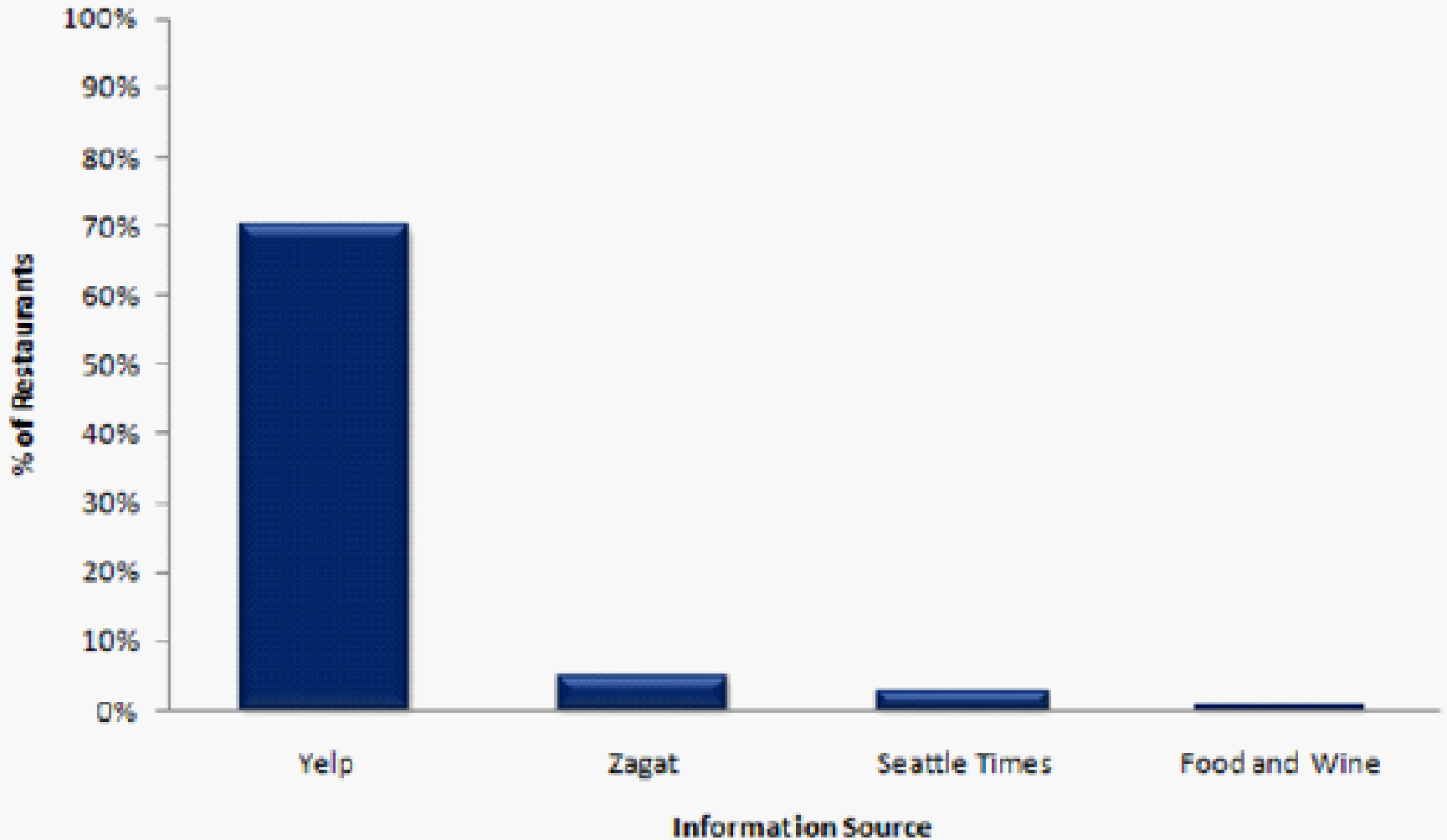
airbnb



amazon.com

Upwork

## Seattle Restaurants Reviewed by Source



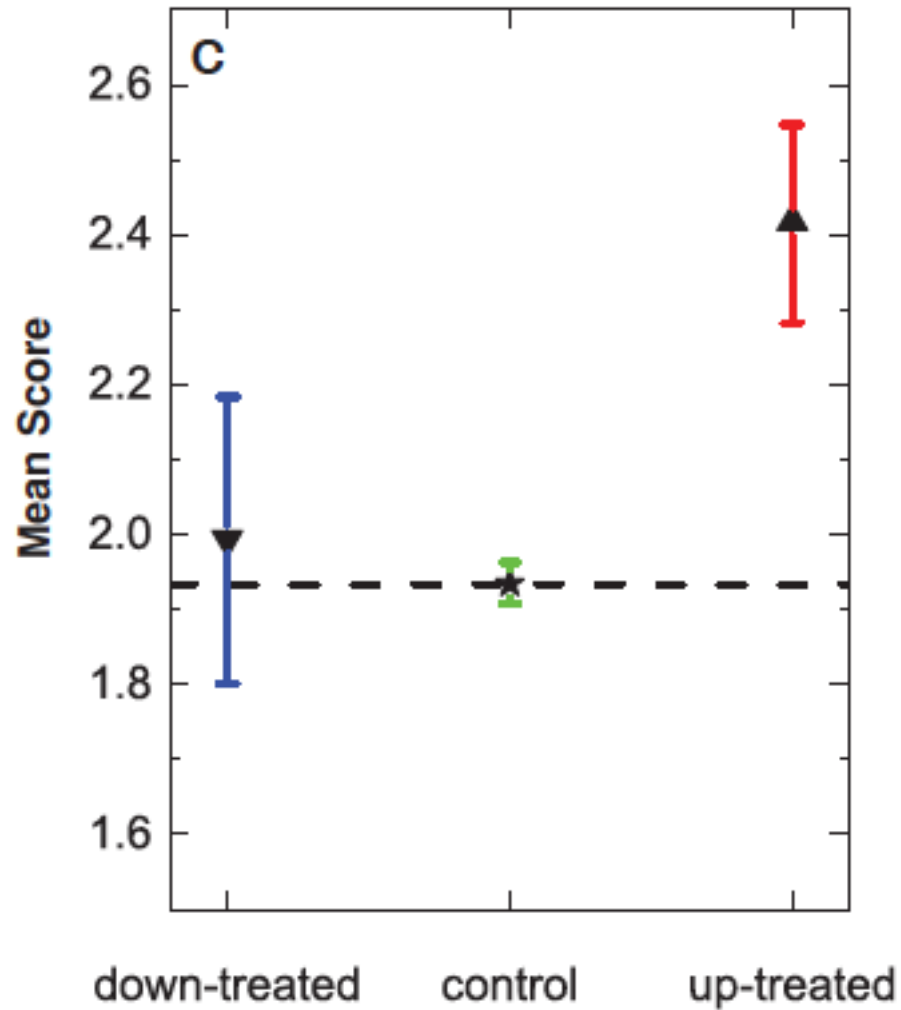
# Impact of online reviews

- Reviews impact demand
  - Online markets (Chevalier and Mayzlin 2006 – books on Amazon and Barnes & Nobel, Resnick et al 2006 – postcards on eBay)
  - Offline markets (Luca 2011, Anderson and Magruder 2012, Ghose 2012)
- But less so for branded places (Luca 2011)
- Market effects (many open questions):
  - Product differentiation (Li and Hitt 2010)
  - Welfare effects (Lewis and Zervas 2016)

# Social influence

- News aggregator (similar to Reddit)
- Randomly upvoted or downvoted stories
- Looked at total vote scores (upvotes-downvotes)

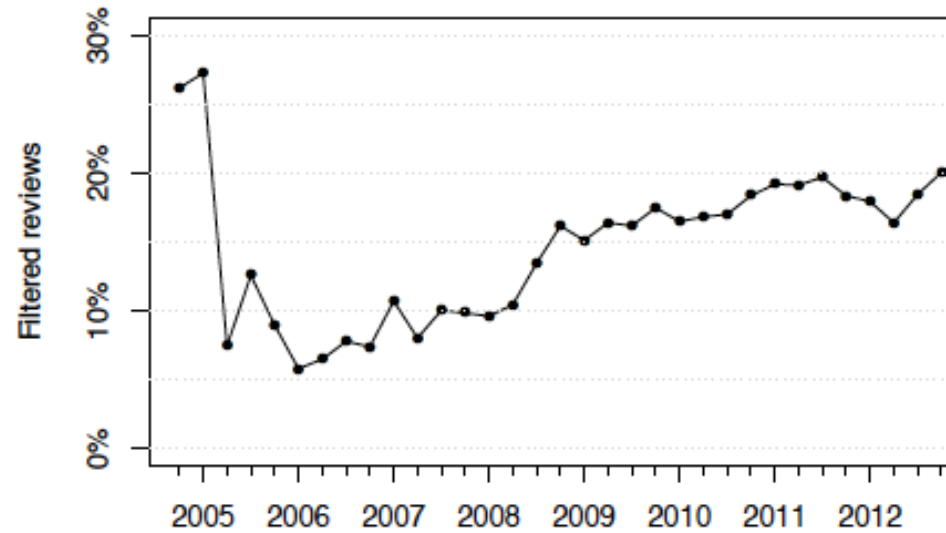
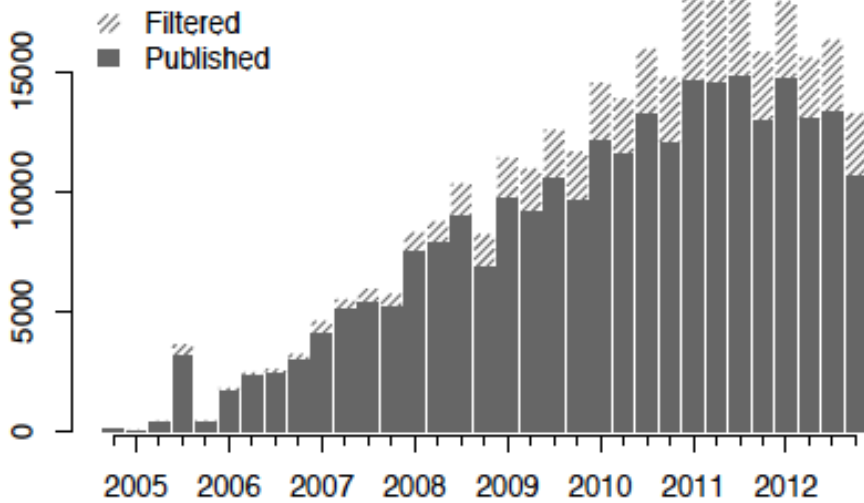
# Social influence







# Boston Yelp reviews over time



# Biases to online reviews

- Selection bias (Hitt and Li 2008, Masterov et al 2015)
- Fake reviews (Luca and Zervas 2016; Mayzlin, Dover, and Chevalier 2014)
- Reciprocal reviewing (Bolton, Greiner, Ockenfels 2013; Fradkin, Grewal, Holtz, Pearson 2014)
- Herding (Muchnik et al 2013; Dai, Jin, Lee, Luca 2013)
- Grade inflation (Horton and Golden 2015)

How to improve quality?

# The aggregation problem

## Crema Cafe

★★★★☆ 889 reviews [Details](#)

\$\$ · Coffee & Tea, Cafes [Edit](#)

★ [Write a Review](#)

[Add Photo](#)



27 Brattle St  
Cambridge, MA 02138

[Edit](#)





# The aggregation problem

While viewing company's grades on their profile, you'll notice that member reviews are organized into two columns. The **Recent** column shows the average grade a provider has earned over the past 3 years in a category. The **All** column averages all the grades a service provider has received across all service categories.

We decided to use this 3 year window after surveying our members; this time frame encompasses the most relevant information, but also is a fair reflection of a provider's recent body of work. Learn how to [view all reviews](#).

Grades & Reviews in

	Recent	All
Overall	A	A
Price	B	A
Quality	A	A

 **Apple list**

# The aggregation problem

- La La Land



## TOMATOMETER



**93%**

Average Rating: 8.6/10  
Reviews Counted: 332  
Fresh: 309  
Rotten: 23

All Critics | Top Critics



Critics Consensus: *La La Land* breathes new life into a bygone genre with thrillingly assured direction, powerful performances, and an irresistible excess of heart.

## AUDIENCE SCORE



**84%**  
liked it

Average Rating: 4.2/5  
User Ratings: 56,392

# The aggregation problem

Dai, Jin, Lee, Luca:

- Need restrictive assumptions for arithmetic averages to be optimal
- Given a stock of reviews, and model of reviewing, can derive weights / adjustments to reviews
- In ours:
  - Reviewers get noisy signal of quality
  - Preferences: (differentially) care about expressing themselves and reporting best estimate of the truth, given prior reviews
  - Some reviewers more stringent (negative) than others
  - Some reviewers better guessers of the truth than others
  - Restaurants: quality follows random walk
  - Structurally estimate weights

# The incentive problem

- Amazon Vine
- Yelp Elite
- TripAdvisor Top Contributor
- Review of the day
- ...















































































# A call from Handy

- Wanted to have better reviews.
- Want people to be indifferent between providers
- What should they do?

# Some thought experiments:

- Should Amazon allow non-verified reviews?
- Should TripAdvisor require names?
- Should Airbnb show hosts each rating?

	1-5 star Ratings?	Text Required?	Sub-ratings (e.g., Atmosphere)?	Opinion Attributes (e.g. Good for Groups)?	Photos/Video?	Reviewer purchase required?	Reviewers use Real Name?	Reviewers reputation/profile?
								
								
								
								
								
								
								
								
								
								
								
								

And now for something completely different...



# Level of anonymity

- Early platforms – arms length transactions
  - eBay, Amazon, Priceline
- Less discrimination (Scott Morton and Zettelmeyer 2003)
- But, over time...



- Short-term rental marketplace
  - Roughly 2 million active listings
  - Compare to Marriott (roughly 500,000)
- Total 40 million guests
- \$900 million revenue per year
- \$25 billion valuation
- 20% of NYC listings!



- Hosts
  - Posts a room or apartment
  - Can rent out entire property or a room
  - Sets a price
  - Can accept or reject guests
- Guests
  - Search for room or apartment
- Airbnb
  - Allows hosts and guests to find each other
  - Allows hosts and guests to build reputation
  - Facilitates payment

# Searching on Airbnb



Sai Kung, Hong Kong

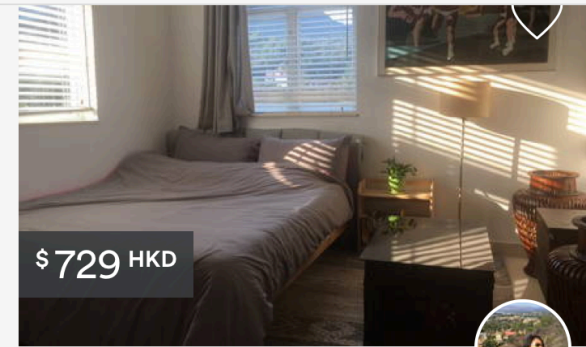
Become a Host

Help

Sign Up

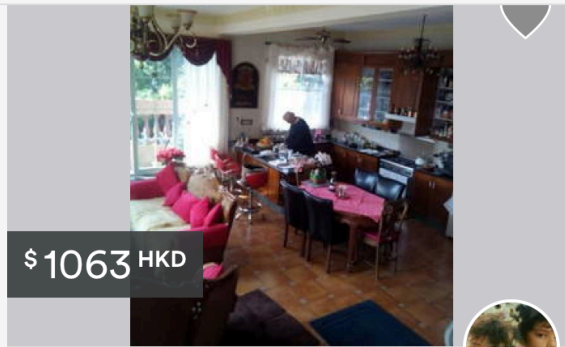
Filters

Only 15 listings left for these dates.  
We recommend booking a place soon.



\$729 HKD

Mountain view bedroom in Sai K...  
Private room · ★★★★★ · 19 reviews



\$1063 HKD

Susanna's Homestay  
Private room · ★★★★★ · 34 reviews





**Room type** ▼

- Entire home/apt 1000+
- Private room 1000+
- Shared room 250

[Show More...](#)

**Price** ▼

\$10 \$1000+

**Neighborhood** ▼

- Manhattan 1000+
- Brooklyn 1000+
- Harlem 243
- Williamsburg 231

[Show More...](#)

**Amenities** ▼

- Wireless Internet 1000+
- TV 1000+
- Kitchen 1000+

[Show More...](#)

**Keywords** ▼

Enter Keywords

- Smoking Allowed 244
- Pets Allowed 288
- TV 1000+
- Cable TV 1000+
- Internet 1000+
- Wireless Internet 1000+
- Air Conditioning 1000+
- Heating 1000+
- Elevator in Building 786
- Handicap Accessible 321
- Pool 65
- Kitchen 1000+
- Free parking on premise 405
- Doorman 343
- Gym 229
- Hot Tub 137
- Indoor Fireplace 140
- Buzzer/Wireless Intercom 1000+
- Breakfast 245
- Family/Kid Friendly 817
- Suitable for Events 255
- Washer 972
- Dryer 950

# Booking at Airbnb



\$702 HKD

Per Night



## Mountain view bedroom in Sai Kung

Sai Kung , New territory, Hong Kong ★★★★★ (19)



Check in

Check out

Guests

03/18/2016

03/20/2016

1

\$702 HKD

\$1404

# Suppose you're HUD

- You have a hunch that there's discrimination on Airbnb

# But Airbnb disagrees

“I can assure you that the incidents where you've been declined by hosts has absolutely nothing to do with your race or ethnicity.”

- response from Airbnb to a guest who claimed to be declined due to his race.

# How would you confirm your suspicion?

- At Airbnb?
- If Airbnb won't cooperate?

# Here's what we did:

- Randomly draw 6,400 properties with listed availability eight weeks out.
- Send message inquiring about availability, varying only name.
- No pictures.
- For a weekend 2 months away.
- Track:
  - Response (Yes, no, maybe).
  - Host and listing characteristics.
  - Whether room ultimately filled.

# Treatment Names

Allison

Brad

Anne

Brent

Kristen

Brett

Laurie

Greg

Meredith

Todd

Lakisha

Darnell

Latonya

Jamal

Latoya

Jermaine

Tamika

Rasheed

Tanisha

Tyrone

- Treatments: African-American and White *sounding* names
- Drawn from Bertrand and Mullainathan (2004)
- Based on birth certificates 1974-1979 in MA
- Vetted through survey.

# Sample Cities

- LA
- Washington, DC
- St Louis
- Dallas
- Baltimore



# Here's what we found:

- Guests with distinctively African-American names are accepted roughly 16% less often than those with distinctively white names.
- Persistent discrimination:
  - Black and white hosts
  - Experienced and new hosts
  - Shared and separate properties
  - Expensive and cheap properties
  - Diverse and homogenous neighborhoods

# More findings...

- Host who rejects has ~35% chance of finding another guest; expected revenue loss of ~ \$60
- Experimental behavior mirrors observational patterns.
  - Driven by hosts who have never had an African-American guest.

# Some context

- Suppose we ran on Priceline or Orbitz
- As market designer – or choice architect! - Airbnb makes important choices about what information to give, and when and how to provide it

# Airbnb's response

- Hired AG Eric Holder and others
- Created task force to propose solutions

# Now, you're on the task force...

- What would you propose?

# The (32 page) report

- Plan to increase number of properties that use “instant booking”
- Make people acknowledge discrimination policy
- Help people find alternative lodging after being rejected due to discrimination

# Takeaways on market design

- Online marketplaces are changing the world...
- ... but market design challenges abound - well beyond pricing, etc.
- Seemingly innocuous design choices may have unintended consequences.
- Goal: Maximize value of reputation system while minimizing unintended consequences.

Thank you!