

Detecting price and search discrimination on the Internet

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Customers buy the same product for different prices



We may not be aware that this could happen on the Internet as well

Price difference does not necessary
equal price discrimination

Price discrimination

practice of pricing identical goods to different people based on the highest price they are willing to pay (reservation price)

Why study price discrimination?



double
click



Privacy, Economics, and Price Discrimination on the Internet

[Extended Abstract]

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Revised version, July 27, 2003

Abstract. The rapid erosion of privacy poses numerous puzzles. Why is it occurring, and why do people care about it? This paper proposes an explanation for many of these puzzles in terms of the increasing importance of price discrimination. Privacy appears to be declining largely in order to facilitate differential pricing, which offers greater social and economic gains than auctions or shopping agents. The thesis of this paper is that what really motivates commercial organizations (even though they often do not realize it clearly themselves) is the growing incentive to price discriminate, coupled

Market sizes

Sponsored  See All

 Alitalia posted an offer.

 → -20% EN TODOS
LOS VUELOS A
EUROPA Y BRASIL♥

 Get Offer · 4,380 claimed

Los animales de la granja
planetadeagostini.es

 Juega con tus hijos
mientras aprenden con
esta exclusiva
colección de libros y
figuras.



\$71B

\$934B*

* according to Goldman Sachs, by 2013

Search Discrimination

202 Hotels found in San Francisco, 181 available. Showing 1 – 20

Show map

Sort by: **Recommended** Stars Location Price Review Score



Villa Florence Hotel ★★★★★

Union Square, San Francisco, CA • [Show map](#)

This California boutique hotel, half a block from Union Square, features Italian-design influences in the heart of San Francisco. There are 4 people looking at this hotel. [More](#)

Latest booking: 1 hour ago

Very good, 8.1

Score from 659 reviews

Book now

Double Room Save 46%	200 ft ²	Only 2 left	US\$ 317 US\$ 173.60
Deluxe Queen Room Save 45%	200 ft ²	Available	US\$ 323 US\$ 178.40
Double Room with Two Double Beds Save 48%	200 ft ²	Available	US\$ 357 US\$ 186.40

> 2 more room types

202 Hotels found in San Francisco, 181 available. Showing 1 – 20

Show map

Sort by: Recommended **Stars** Location Price Review Score



Queen Anne ★★★

San Francisco, CA • [Show map](#)

This historic, Victorian boutique hotel is in downtown San Francisco, 1 mile from Union Square. There is 1 person looking at this hotel. [More](#)

Latest booking: 8 hours ago



The Fairmont San Francisco ★★★★★

Nob Hill, San Francisco, CA • [Show map](#)

Featuring a full-service spa and 2 unique dining experiences, this historic downtown San Francisco hotel is a 10-minute walk from the closest cable car stop. Concierge services are provided daily. There is 1 person looking at this hotel. [More](#)

Latest booking: 24 minutes ago

Excellent, 8.6

Score from 387 reviews

Book now

Standard King or Queen Room Breakfast included	300 ft ²	Only 2 left	
Deluxe King Room Breakfast included	300 ft ²	Only 2 left	
Deluxe King Room with Fireplace Last one! Breakfast included	300 ft ²	Last chance! Only 1 left	

> 3 more room types

Queen Room FREE cancellation	275 ft ²	Only 5 left	US\$ 359
King Room with City View Save 36% FREE cancellation	275 ft ²	Available	US\$ 599 US\$ 389
Queen Room with Two Queen Beds and City View Save 34% FREE cancellation	275 ft ²	Available	US\$ 649 US\$ 429
Deluxe Queen Room with Two Queen Beds with City View Save 30% FREE cancellation	275 ft ²	Available	US\$ 709 US\$ 499
Signature King Room with Bay View FREE cancellation	275 ft ²	Available	US\$ 749 US\$ 539
Signature Room With Two Queen Beds with Bay View FREE cancellation	275 ft ²	Available	US\$ 799 US\$ 579
King Suite with Parlor - Main Building FREE cancellation	275 ft ²	Available	US\$ 849 US\$ 609
King Suite with Bay View - Tower Building FREE cancellation	275 ft ²	Available	US\$ 999 US\$ 759
Standard Room Save 37% FREE cancellation	275 ft ²	Only 5 left	US\$ 519 US\$ 329

> 6 more room types



Taj Campton Place ★★★★★

Union Square, San Francisco, CA • [Show map](#)

Just steps from Union Square, this historic yet modernized hotel features classic

Excellent, 8.8

Score from 92 reviews

Search Discrimination



- e.g. Bobble: filter bubble due to search personalization @ GTech

Economic implications



TECHNOLOGY | Updated August 23, 2012, 6:07 p.m. ET

On Orbitz, Mac Users Steered to Pricier Hotels

Article

Video

Stock Quotes

Comments (262)

By DANA MATTIOLI

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[Orbitz Worldwide Inc.](#) OWW +2.35% has found that people who use [Apple Inc.](#)'s AAPL -1.17% Mac computers spend as much as 30% more a night on hotels, so the online travel agency is starting to show them different, and sometimes costlier, travel options than Windows

Most Pop

Start-Up Skin

New Trackin

Nokia Seals

Google Poun

Facebook Se

How do we do it and what did we find?



Information vector: system



No PD, no SD

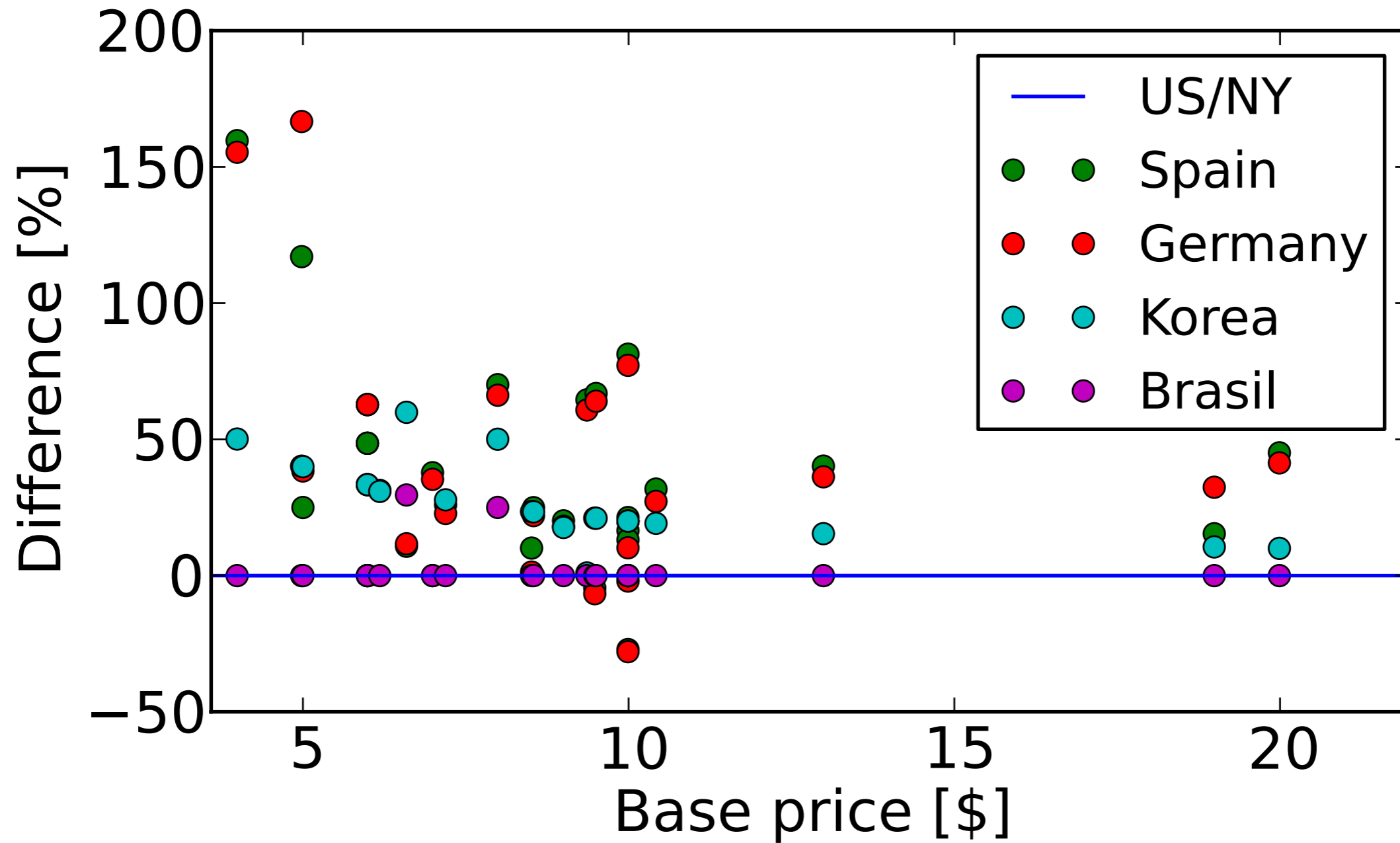
Information vector: location



Information vector: location

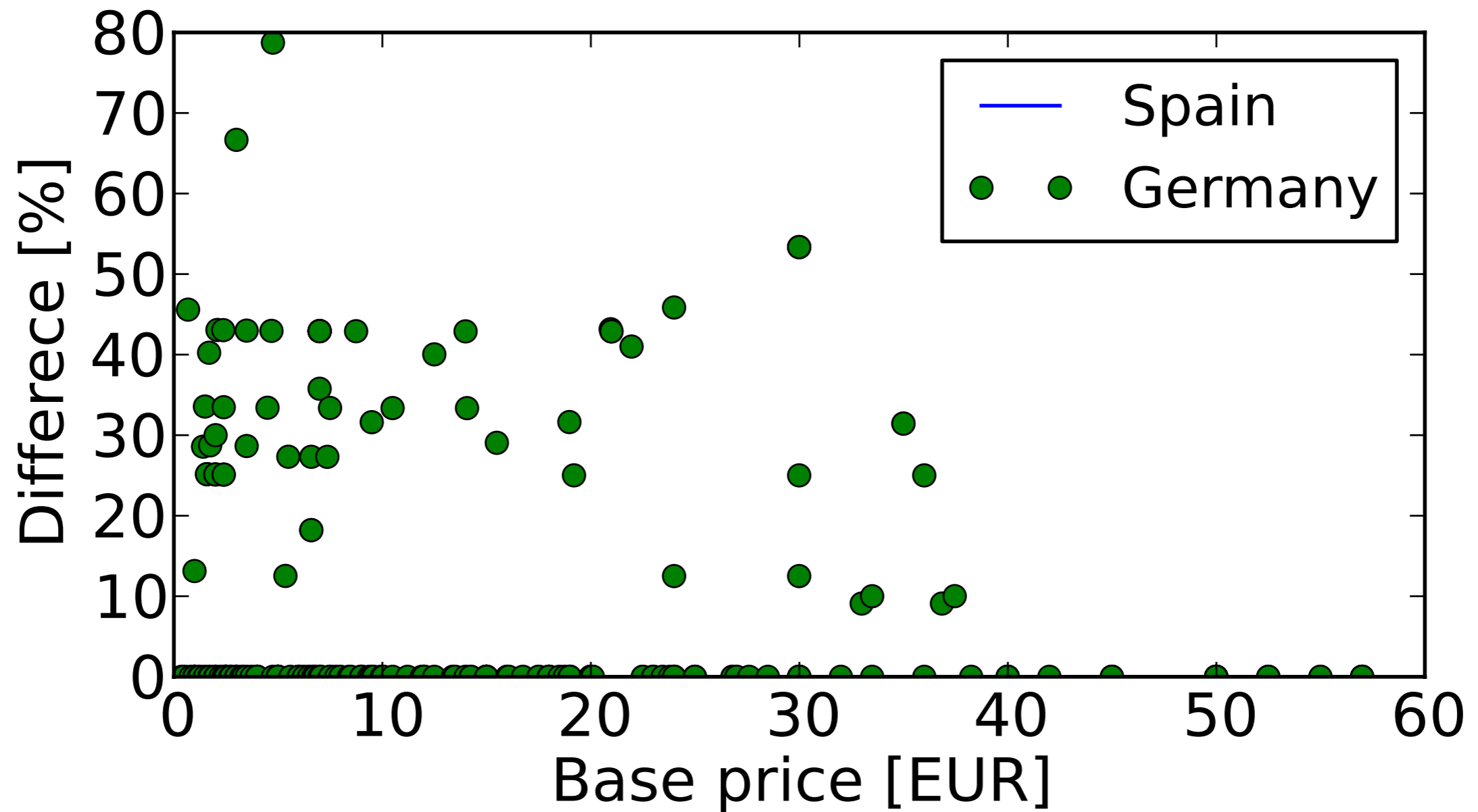
- 6 Locations: NY, LA, DE, SP, SK, BR
- Everything same except IP address
- NTP synchronized
- NO discrimination.. except..

Kindle e-books



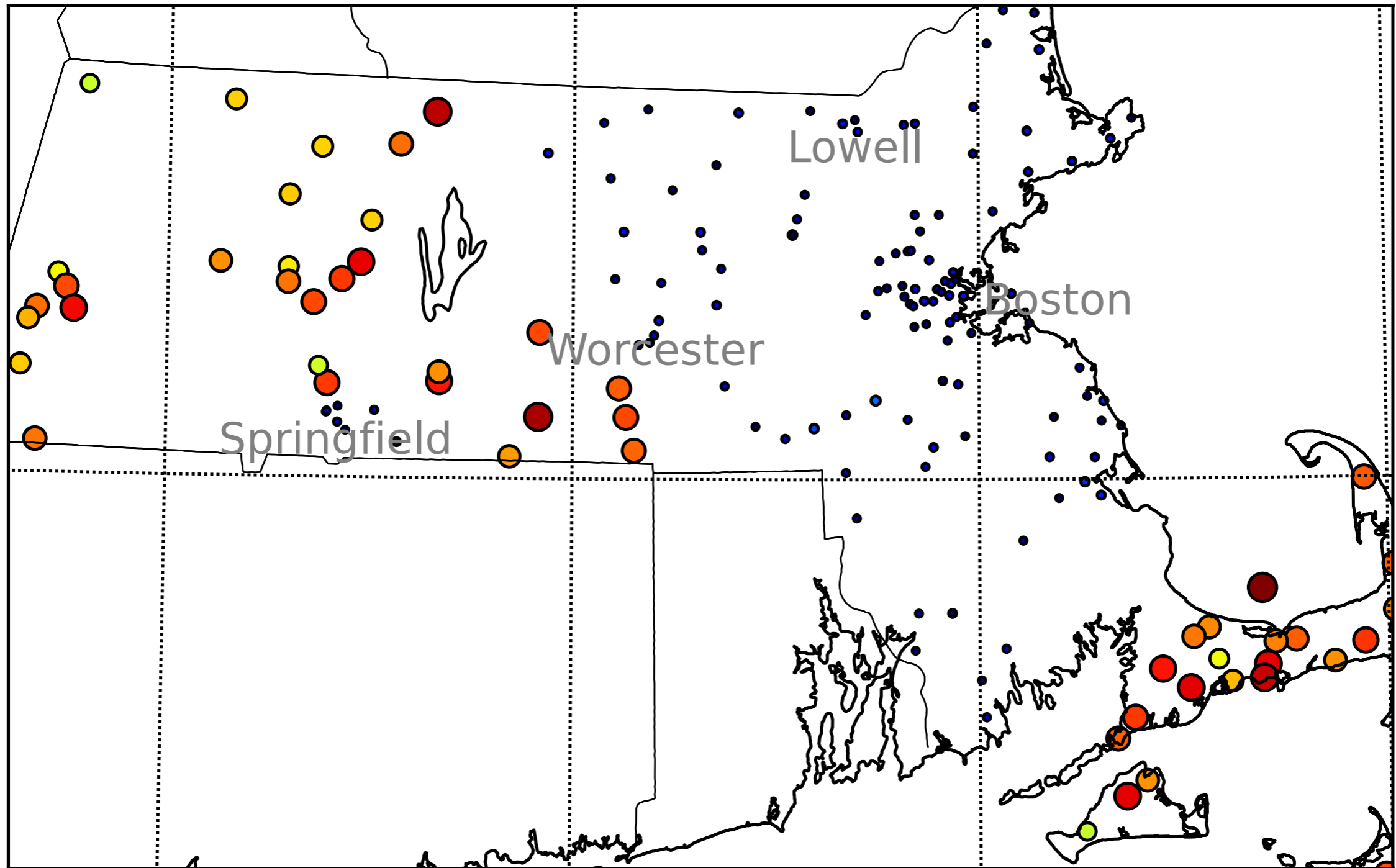
Difference: 21% to 166%

Steam



Mean difference: 20%

Staples



Information vector: personal information

Does your PI/interests, inferred via browsing information, cause PD?

We created two online personas



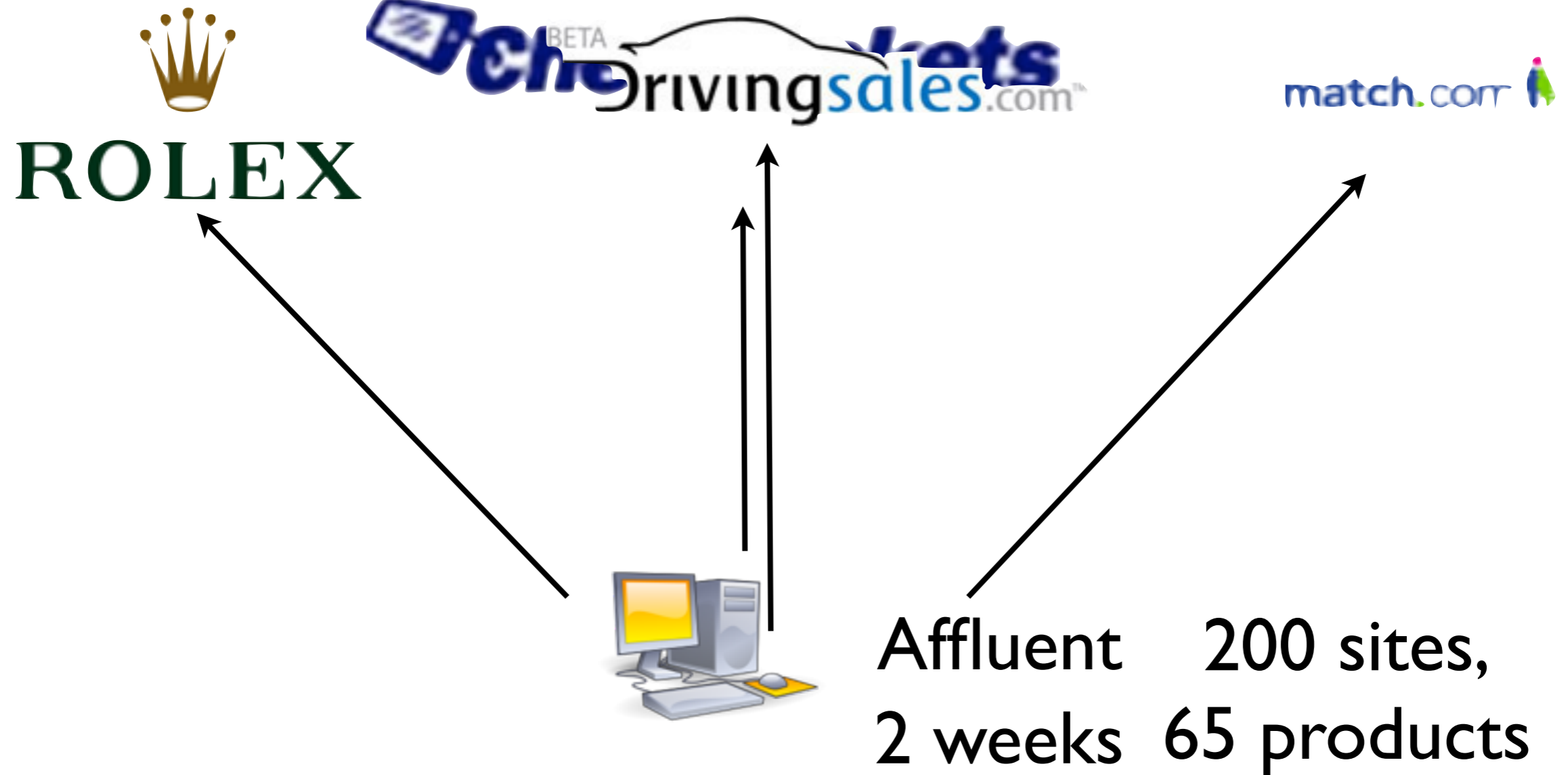
Affluent



Budget conscious

Personas based: Affluent

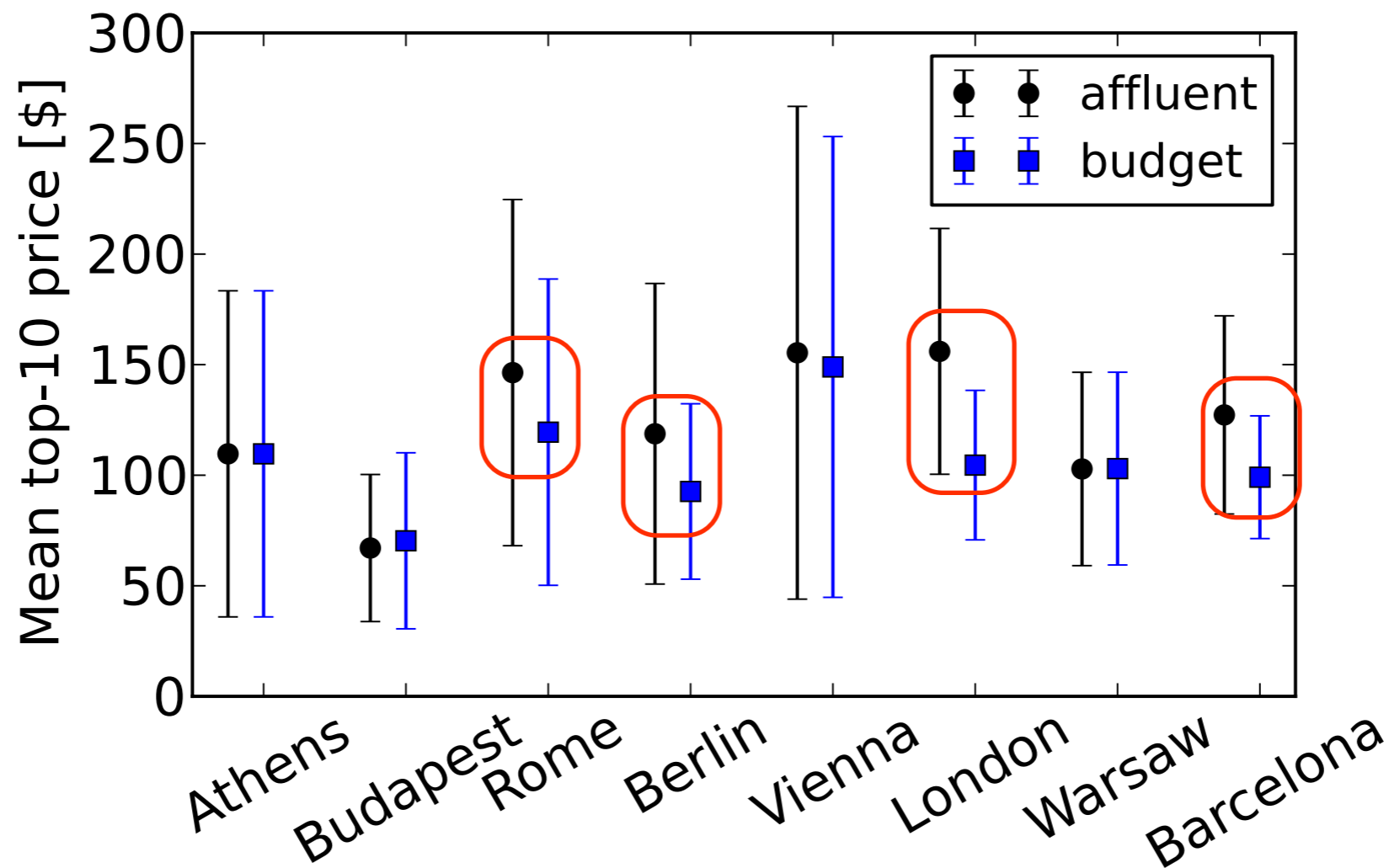
i) Visit sites that enable classifying you as 'affluent' via AudienceScience



What do we see?

- Price discrimination: NO discrimination
- Search: Some discrimination

Personas: Search Discrimination (cheaptickets)

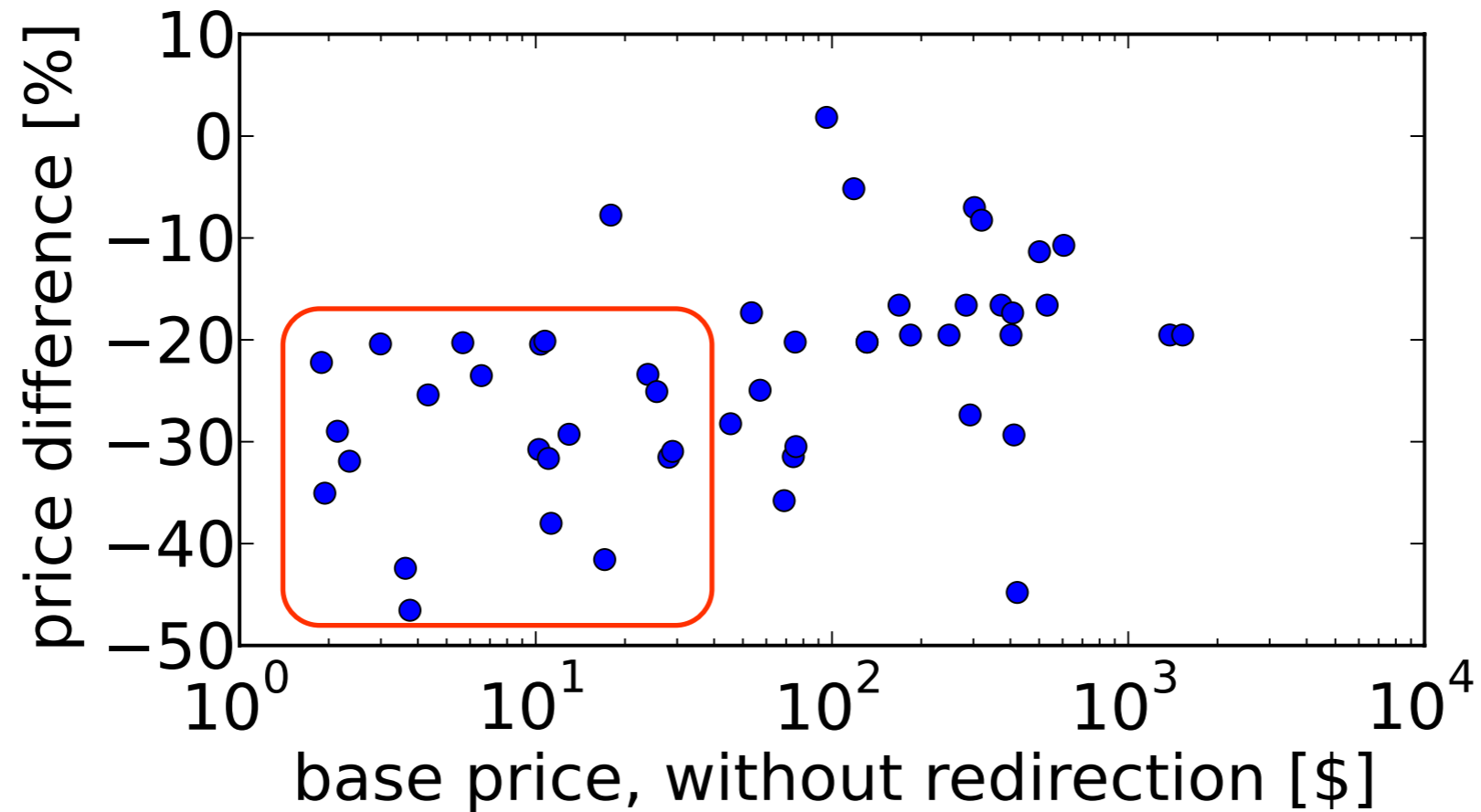


Mean difference ~ 15%

How would you do it?

- Too much infrastructure needed
- Use ad-networks?
- Idea: Use origin/referer
- Coming from a price aggregator site can out you as price sensitive

nextag -> shoplet



Mean difference ~ 26%

Can be due to special contracts

Disclaimers/Limitations

- Preliminary study, 200 online vendors, 65 product categories
- Fine scale temporal variations
- We take measurements multiple times
- Assume information vectors in isolation will trigger PD
- Underestimating PD

Summary

- Price discrimination is important tool to price
- Developed a methodology to uncover PD
- Initial results
- Tool for price comparison, available for beta testing

<http://pdexperiment.cba.upc.edu>