

**From: Price Discrimination
to: Data Transparency**

(aka The Vision for a Data Transparency Lab)

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Telefonica Research

TMA2015, Barcelona

BASED ON A
TRUE STORY



Checking from SPAIN:

- Hotel I*****k
- on H***s.com

... was quoted 150e / night



Checking from Sweden:

- at the same time
- for the same hotel
- on the same web site
- for the same days
- and the same room

... was quoted 120e / night

Could it be Price Discrimination (PD)?



- Situation where two consumers are charged differently for the same product
- Based on how much are they willing to pay (reservation price)



Fixed prices is a “recent” thing



Could E-commerce backfire for customers?



Shop and Save on Millions of Products.

Search

We shop millions of products to find the best one for you at today's lowest price



Nextag®



[electronics](#) [computers](#) [home & garden](#) [clothing & accessories](#) [health & beauty](#) [jewelry](#) [video games](#) [sports](#) [see more](#)

Pricewatch®

est. 1995

Street Price Search Engine

Compare millions of prices from the most trusted stores and auctions!

Could E-commerce backfire for customers?

Privacy, Economics, and Price Discrimination on the Internet

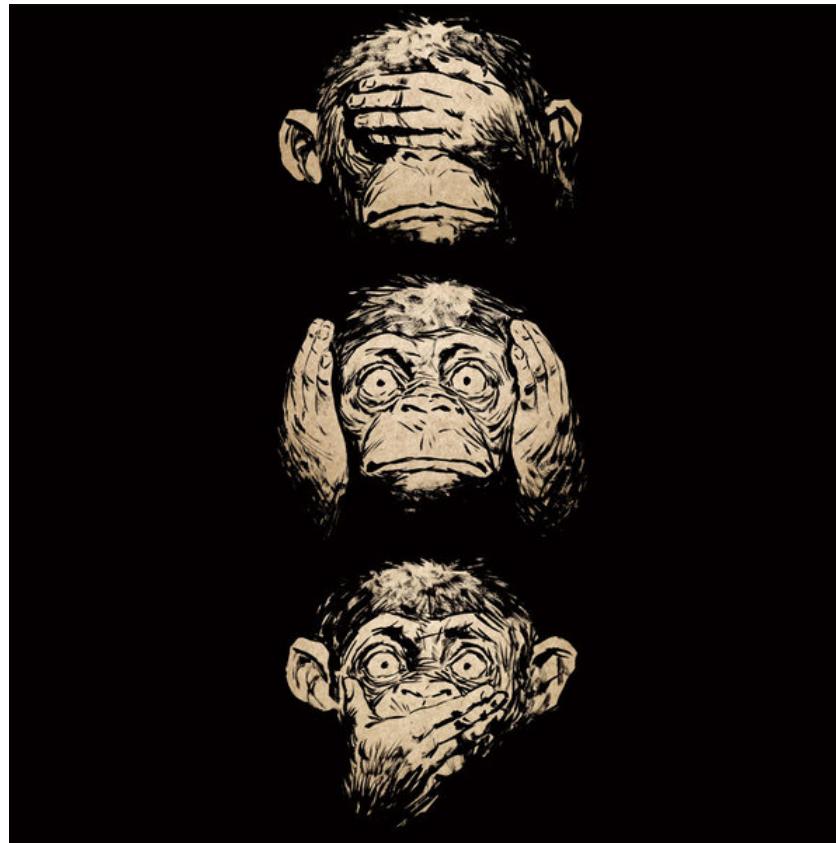
[Extended Abstract]

Andrew Odlyzko

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499 Walter Library, 117 Pleasant St. SE
Minneapolis, MN 55455, USA
odlyzko@umn.edu
<http://www.dtc.umn.edu/~odlyzko>
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

Would e-retailers do such a thing?



Robinson–Patman Act

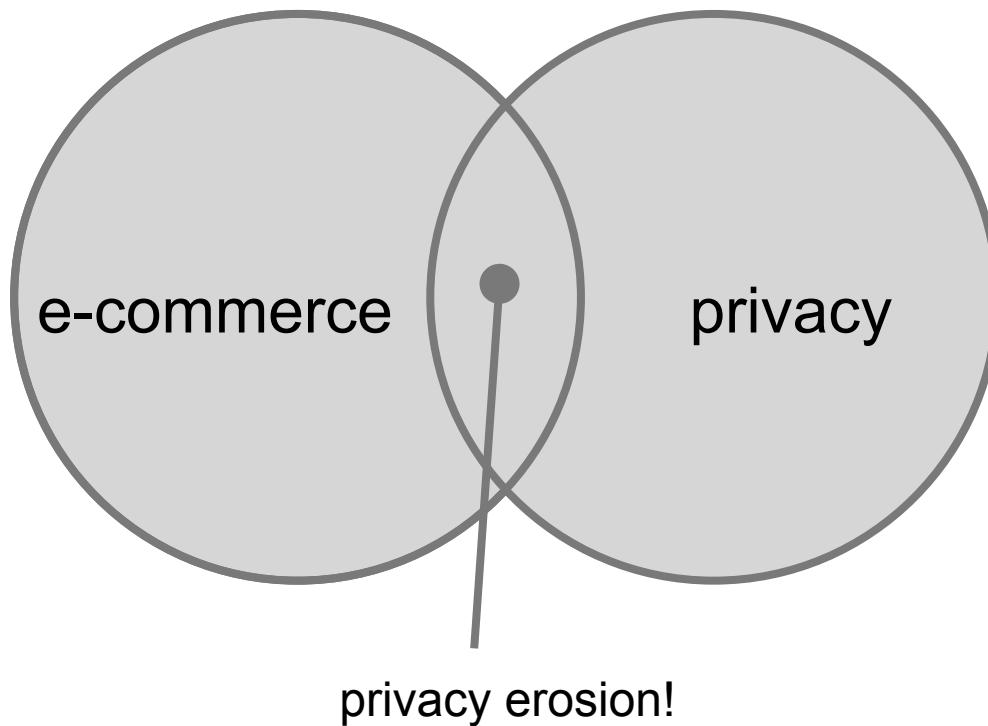
From Wikipedia, the free encyclopedia

The **Robinson–Patman Act** of 1936 (or **Anti-Price Discrimination Act**, Pub. L. No. 74-692, 49 Stat. 1526 (codified at [15 U.S.C. § 13](#))) is a [United States federal law](#) that prohibits anticompetitive practices by producers, specifically [price discrimination](#). It grew out of practices in which [chain stores](#) were allowed to purchase goods at lower

Article 20.2 of the European Union

Directive 2006/123/EC on Services in the Internal Market (the “Services Directive”) prohibits discrimination based on grounds of the nationality or place of residence of service recipients

e-commerce dwarfs online advertising

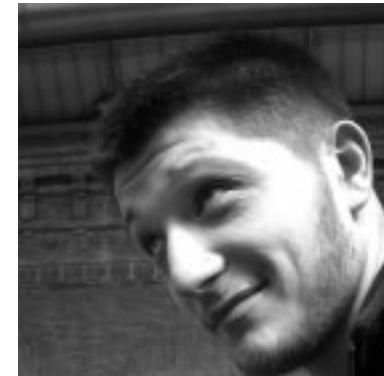


- e-commerce market in 2012 > \$1,000,000,000,000
- 10 x larger than online advertising (\$100bn)



\$heriff

Detecting Price Discrimination



1. Select price

Availability: In Stock

Price: ~~\$200.50~~ \$189.00

Ex Tax: \$90.00

Price in reward points: 400

10 or more \$105.40
20 or more \$92.40

2. Check it

189.00

Check it

Jakub Mikians
UPC (now Amazon)

3. Examine differences

S, Safari, Spain	\$189.00
Firefox, Spain	\$189.00
m, Liège	\$165.99
São Paulo	\$189.00
d, Tampere	\$189.00
any, Berlin	\$201.50

chrome web store

Search the store

Home Popular

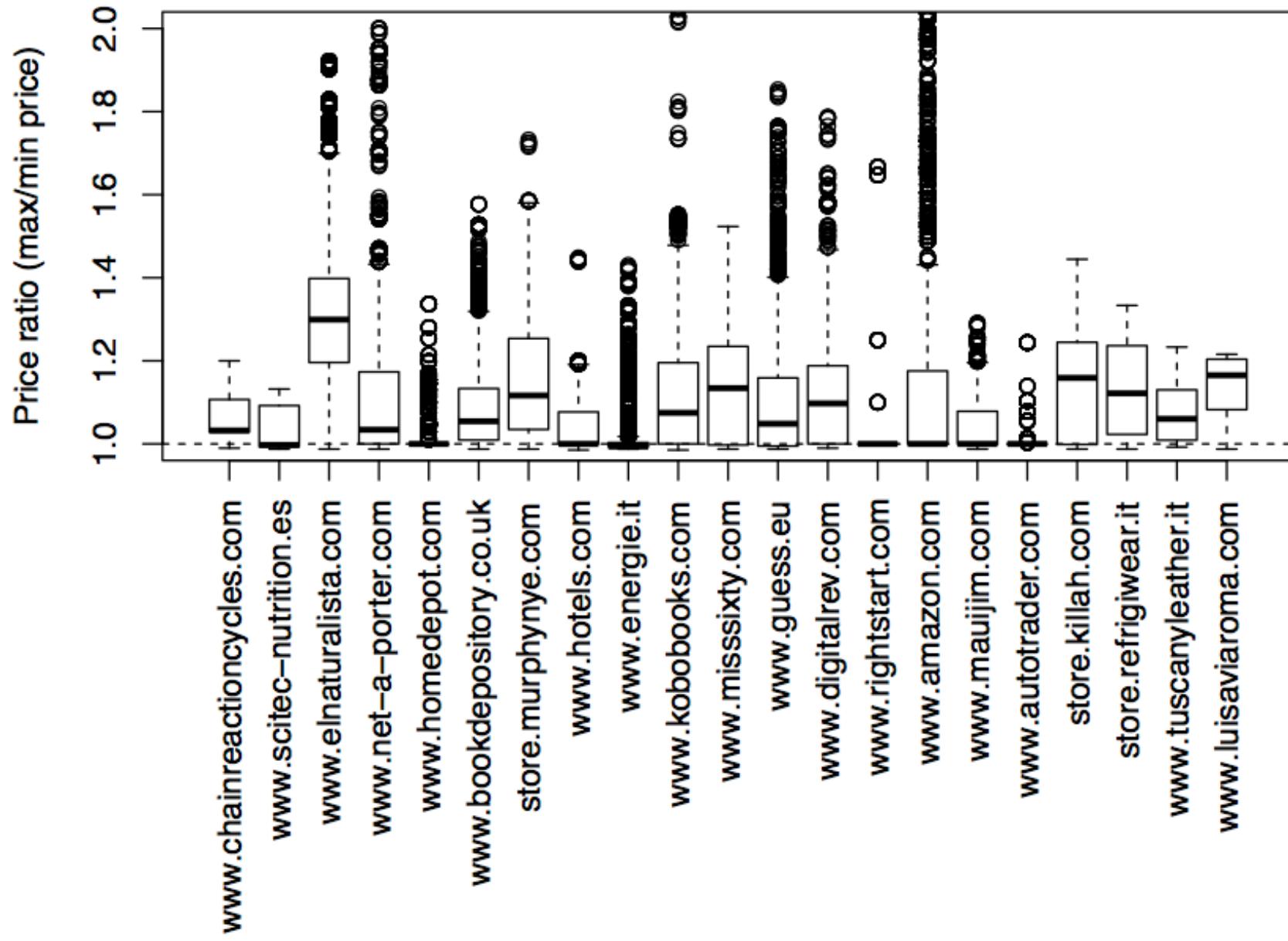
You will

Sheriff

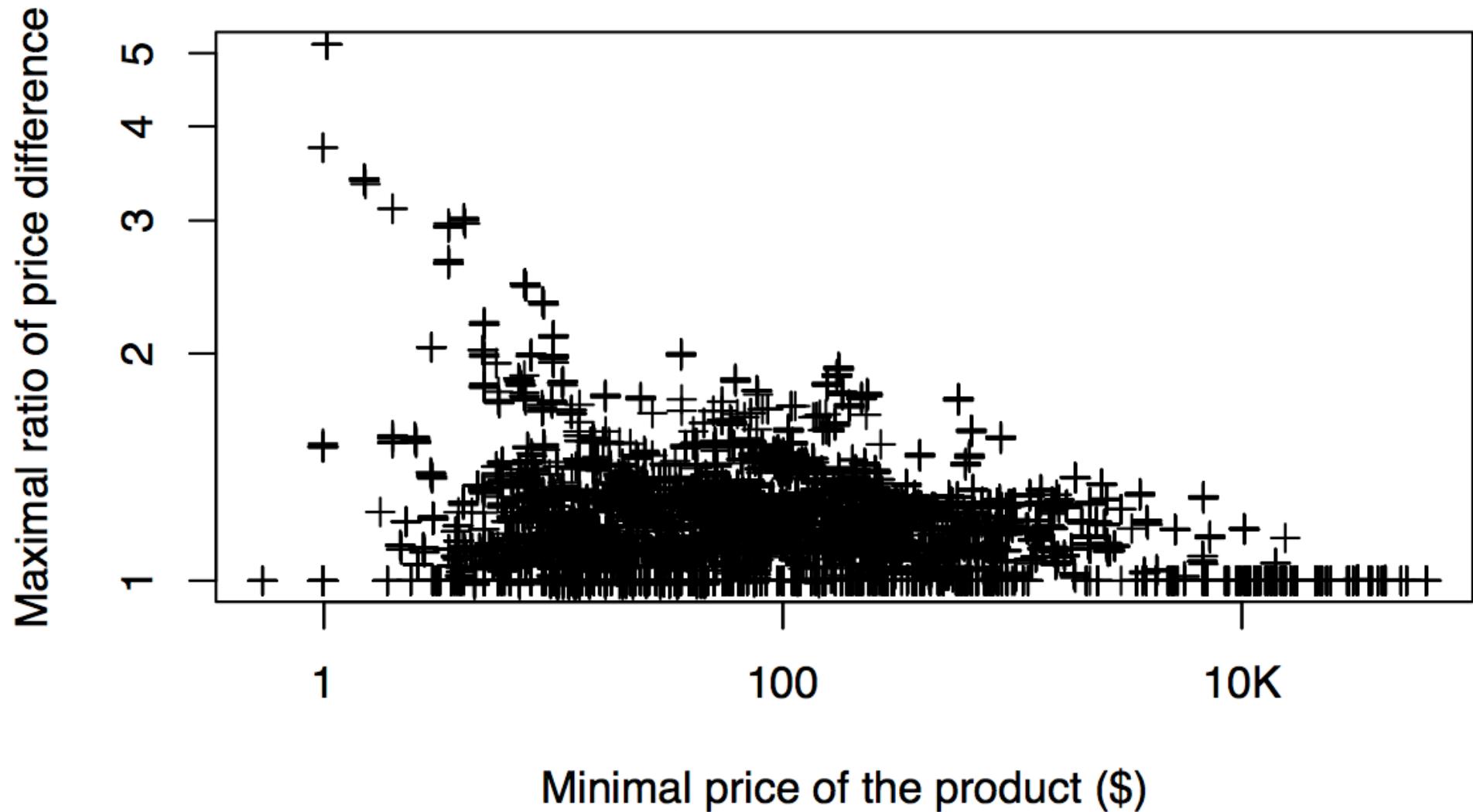
★★★★★ (0) Shopping from Jakub Mikians



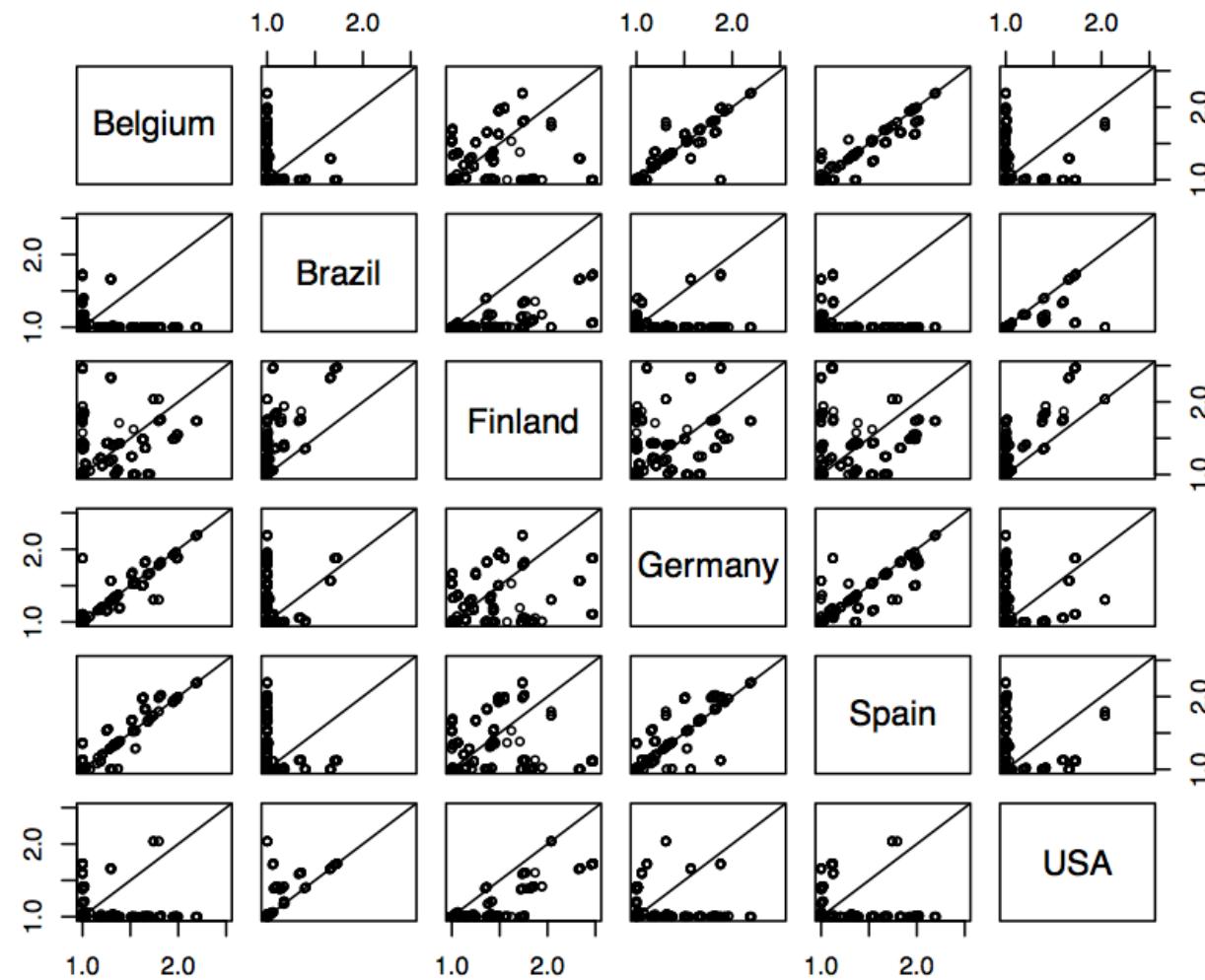
Which retailers?



Which products?



Which countries?



(b) www.amazon.com

More complex policies seem to exist

THE WALL STREET JOURNAL.  TECH

TOP STORIES IN TECH

1 of 12  Microsoft Plots Original Shows for Xbox

2 of 12  Apple Will Fix Faulty iPhone 5 Sleep Bu...

3 of 12  Apple Will Fix Faulty iPhone 5 Sleep Bu...



WHAT THEY KNOW

Websites Vary Prices, Deals Based on Users' Information

 Email  Print  Save  146 Comments



By JENNIFER VALENTINO-DEVRIES, JEREMY SINGER-VINE and ASHKAN SOLTANI

December 24, 2012

It was the same Swingline stapler, on the same [Staples.com](#) SPLS +1.53% website. But for Kim Wamble, the price was \$15.79, while the price on Trude Frizzell's screen, just a few miles away, was \$14.29.

A key difference: where Staples seemed to think they were located.

A Wall Street Journal investigation found that the Staples Inc. website displays different prices to people after estimating their locations. More than that, Staples appeared to consider the person's distance from a rival brick-and-mortar store, either [OfficeMax](#) Inc. or [Office Depot](#) Inc. ODP -2.12% If rival stores were within 20 miles or so, Staples.com usually showed a discounted price.

Popular Now

ARTICLES

1 [Afghan Leader, Baltimore Restaurateur](#)



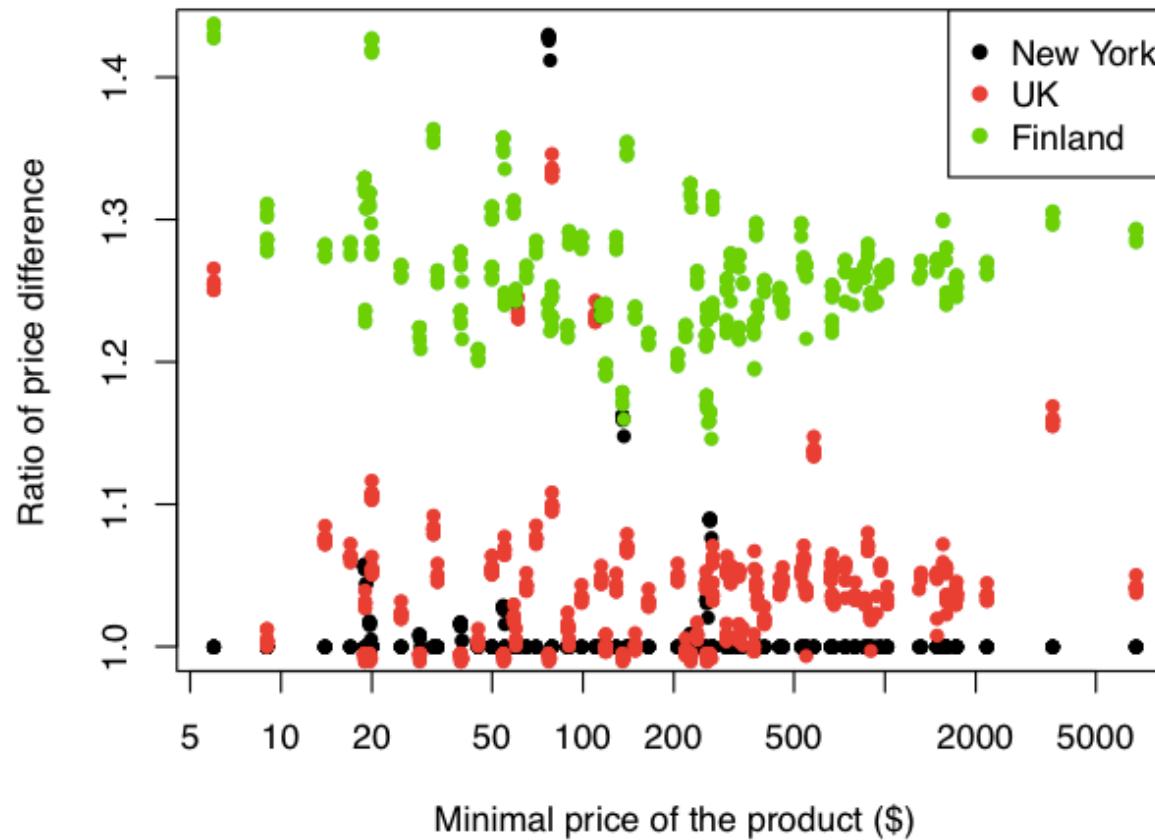
2 [Two Very Different Saints Come Marching In](#)



3 [The Scarcity Fallacy](#)

What types of pricing policies do we see?

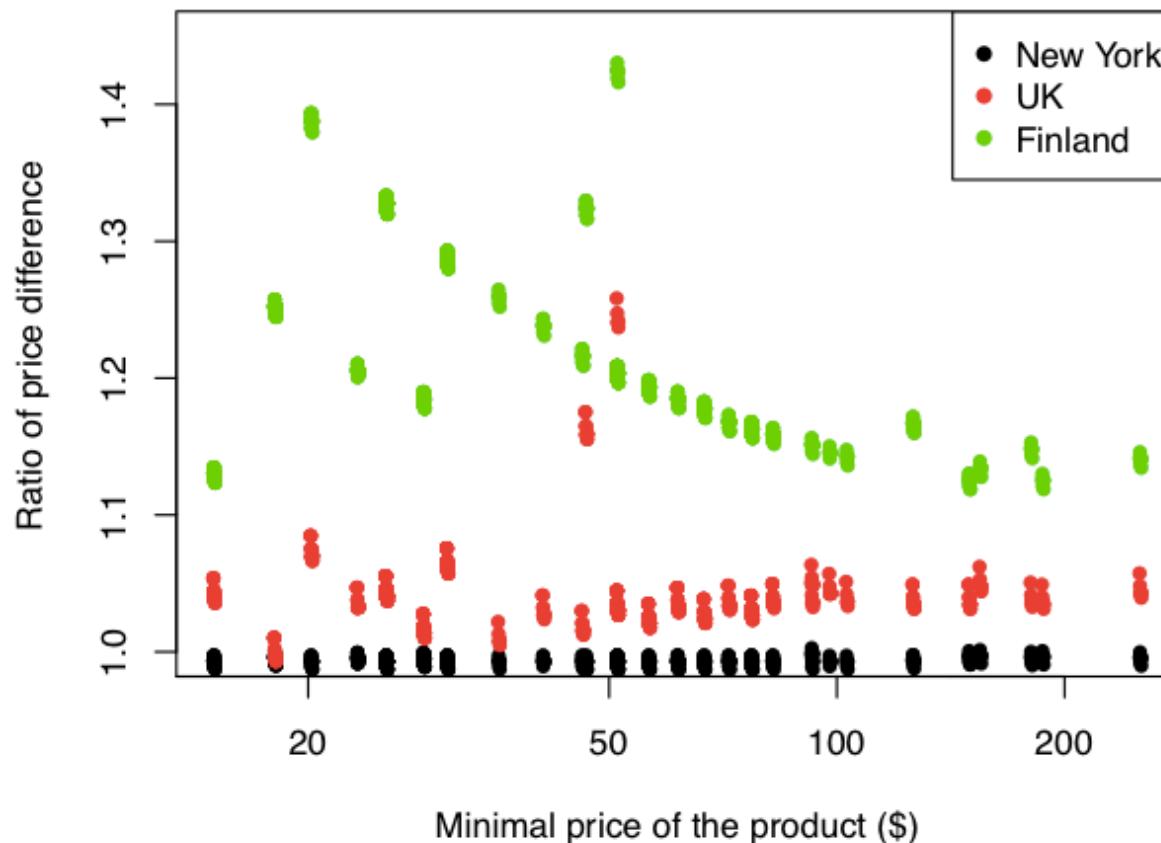
[MULTIPLICATIVE]



(a) www.digitalrev.com

What types of pricing policies do we see?

[MULTIPLICATIVE with an ADDITIVE TERM]



(b) www.energie.it





ADD-ONS

[EXTENSIONS](#) | [THEMES](#) | [COLLECTIONS](#) | [MORE...](#) [Home](#) » [Extensions](#) » [\\$sheriff_v2](#)

\$sheriff_v2 1.2

by [Costas Iordanou](#)

\$sheriff - The price discrimination (PD) add-on.

This is an experimental add-on for research purposes only. It measures the extent PD and what factors can trigger it.

[Download Now](#)

This add-on has been preliminarily reviewed by Mozilla. [Learn more](#)

Works with Firefox 4.0 - 37.* · [View other versions](#)



Kostas Iordanou
Telefonica-UC3M

Availability: In Stock

Price: ~~\$200.50~~ \$189.00

Ex Tax: \$90.00

Price in reward points: 400

10 or more \$105.40

20 or more \$92.40

Medium (+\$25.5)

checkbox:

189.00

Check it

Checkbox 3 (+\$):

Checkbox 4 (+\$):

ext:

st

S, Safari, Spain	\$189.00
Firefox, Spain	\$189.00
m, Liège	\$165.99
São Paulo	\$189.00
d, Tampere	\$189.00
any, Berlin	\$201.50

Detection of personalized PD



Variant	Converted Value	Original Text
>You	€ 1378.12	€ 1,378.12
Windows 7, Chrome, Spain	€ 1378.12	€ 1,378.12
Mac OS, Safari, Spain	€ 1378.12	€ 1,378.12
Linux, Firefox, Spain	€ 1378.12	€ 1,378.12
United States, Tennessee	€ 1147.83	US\$ 1,299.00
United States, Washington	€ 1147.83	US\$ 1,299.00
Canada, British Columbia	€ 1274.79	C\$ 1,798.99
Canada, Ontario	€ 1274.79	C\$ 1,798.99
Canada, Ontario	€ 1274.79	C\$ 1,798.99
Israel, Beer-Sheva	€ 1411.83	US\$ 1,597.77
Sweden, Scandinavia	€ 1469.22	US\$ 1,662.72
Japan, Tokyo	€ 1205.22	US\$ 1,363.95
Japan, Hiroshima	€ 1205.22	US\$ 1,363.95
Czech Republic, Praha	€ 1377.40	US\$ 1,558.80
Korea, Seoul	€ 1492.18	US\$ 1,688.70
New Zealand, Dunedin	€ 1608.01*	NZ\$ 2,398.99

Results from local users

Do P2P checks

2

Source ID	Converted Value	Original Text
Local User 0	€ 1378.12	€ 1,378.12
Local User 1	€ 1378.12	€ 1.378,12

Ok enough with online price discrimination

LET'S STEP BACK A BIT



SMART Internet Monitoring Study

Expert Council Workshop 1

Brussels, 3-4 October 2013

Scope of the Workshop:

This workshop, on April 22, 2015, welcomes researchers, regulators and operators, each of whom has a stake in ensuring a fair, transparent internet with steadily increasing performance. But there are many different definitions of fair, transparent, and performance, and varying opinions on where the most important benefits of these will accrue. We have been hearing these views as we have collected information on the latest measurement technologies for the past year, on behalf of the FIRE+ unit of the Net Futures directorate of the EC. Our draft report and recommendations will be made available online to workshop registrants about a month before we meet. We want your reactions and ideas before we present the final report, with community feedback, to its sponsors in May. Invited speakers will present the views of regulators and researchers in both the US and Europe. We will briefly present our study conclusions. A technical session will discuss new opportunities for measurements on very large scales. We invite comments and technical discussion by attendees. We will provide a mechanism for this when you register, and devote time to it during the workshop.

Network neutrality → Transparency → Data transparency

- Who is tracking me?
- How am I being tracked?
- How is the collected information being used?
 - Advertising
 - PD
 - Profile trading ...

My Epiphany Moment



-----> **This is TOO BIG of a problem for me to handle <-----**
(no matter how many brilliant PhD students, postdocs, interns I am given)



Birth of



the Data Transparency Lab

Participants included:

Northeastern University, MIT Human Dynamics Lab, Microsoft, Telefonica Innovation, Max Planck Institute for Software Systems, Mozilla, and more.



Downloads:

[DTL2014 Workshop Summary Report](#)

[DTL Vision](#)

[DTL Organization](#)

What is DTL?

According to our web-site:

DATA TRANSPARENCY LAB

A community-based effort to reveal the flow and usage of personal data online, and to explore ways towards a transparent and respectful data trade in the future.

What we really meant:

- understanding privacy leakage on the web
- figuring out who is tracking us and how
- empowering end users to “track the trackers”

Members



Max
Planck
Institute
for
Software Systems

Microsoft

News UK



mozilla

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK



Northeastern University

Making the web economy sustainable

Online advertising
E-commerce / recommendation
Personalized analytics

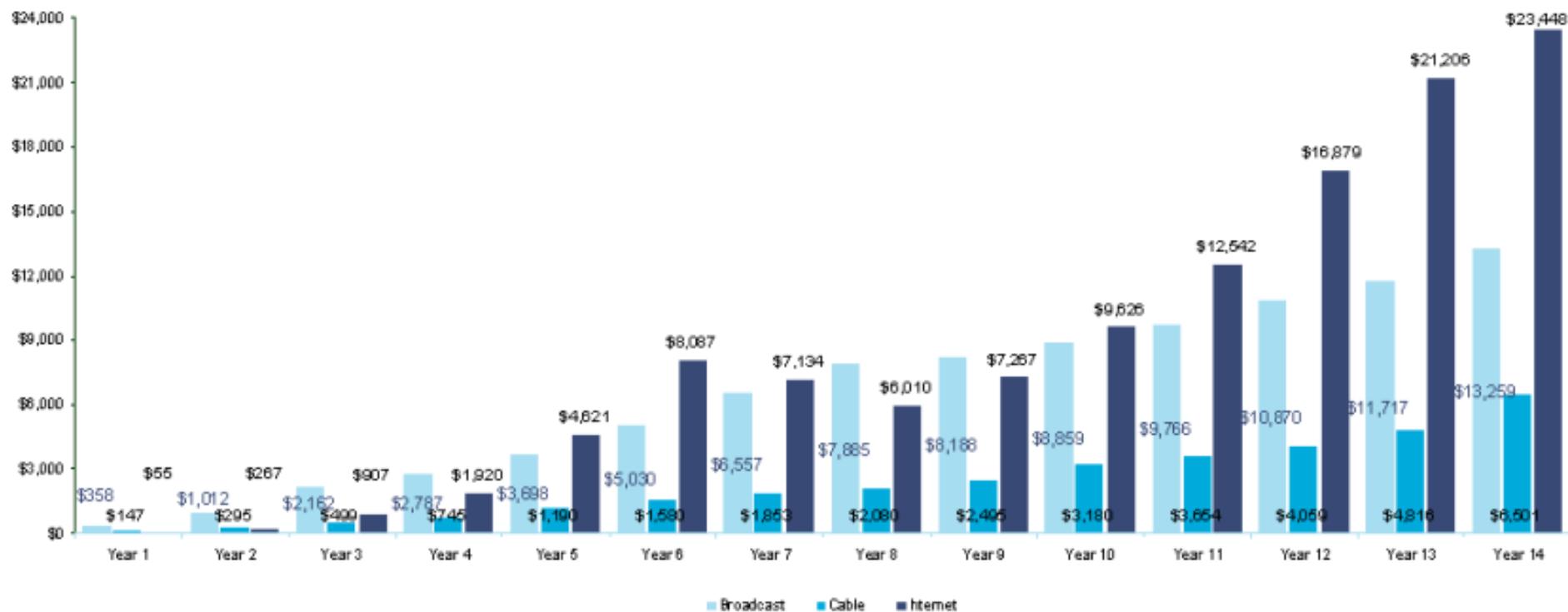


Newspapers and TV used to be king



Initial Year Growth Comparisons—Internet Advertising vs. Broadcast and Cable Television

Annual \$ Ad Revenue Growth—First 14 Years

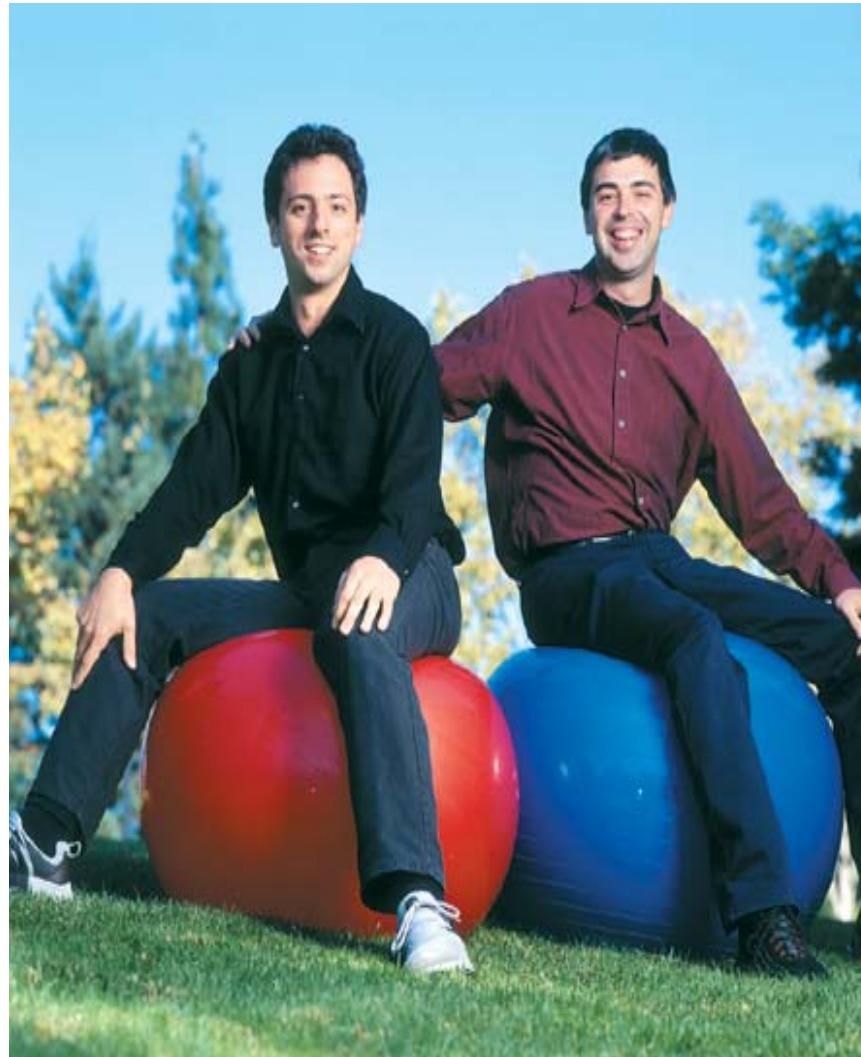


Sources: IAB Internet Ad Revenue Report; PricewaterhouseCoopers LLP, Universal McCann

Tech or Greed behind the fall?



Can the web (economy) be dethroned?



PRIVACY seems to be the #1 threat



What we search – The sites we visit – Who we befriend – What we buy ... everything is tracked

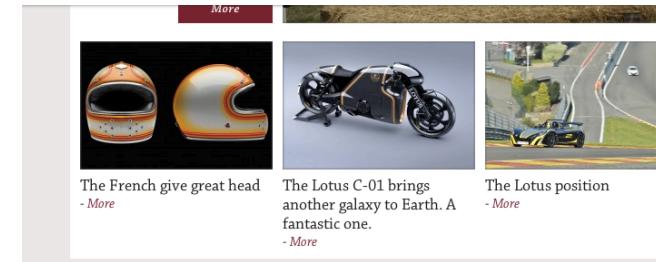
Where is your red thin line?



OK



NOT OK



Online tracking goes beyond advertising







60 MINUTES OVERTIME

SHOCKED TO LEARN HOW DATA BROKERS ARE WATCHING YOU?

**"IT'S NOT ABOUT WHAT WE KNOW WE'RE SHARING, IT'S ABOUT WHAT WE
DON'T KNOW IS BEING COLLECTED AND SOLD ABOUT US."**

Steve Kroft: **Alcoholism?**

Tim Sparapani: Yes. Absolutely.

Steve Kroft: **Depression?**

Tim Sparapani: Certainly.

Steve Kroft: **Psychiatric problems?**

Tim Sparapani: No question.

Steve Kroft: **History of genetic problems?**

Tim Sparapani: Yes. **Cancer, heart disease, you name it, down to the most rare and, and most unexpected maladies.**

Steve Kroft: **Sexual orientation?**

Tim Sparapani: Of course.

Trackers are analyzing
our web trace for signs of

Horror stories keep piling up

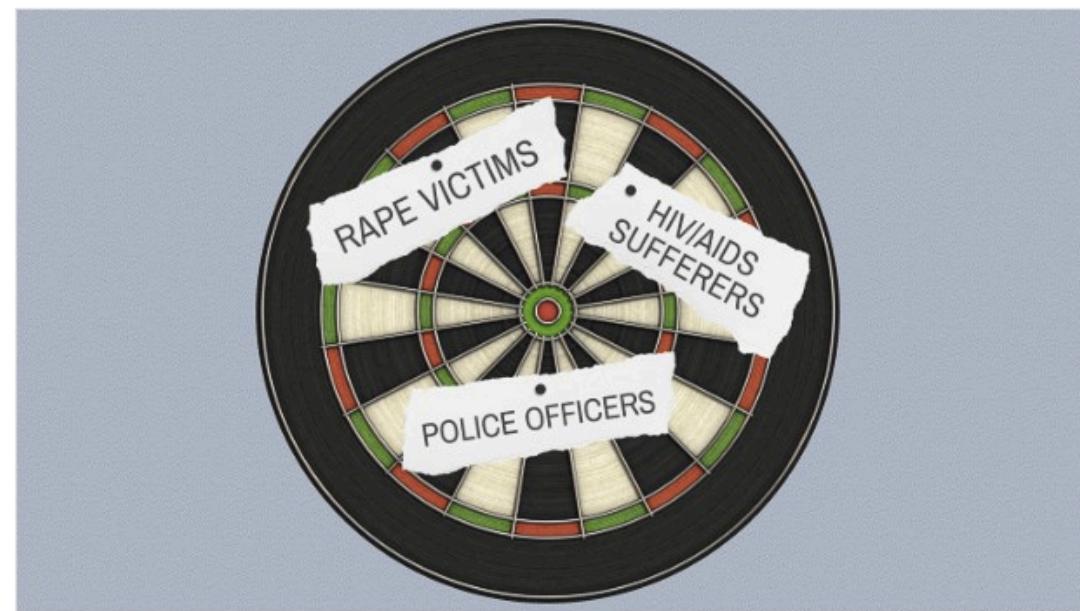
CNN Money

Home | Business | Markets | Investing | Economy |

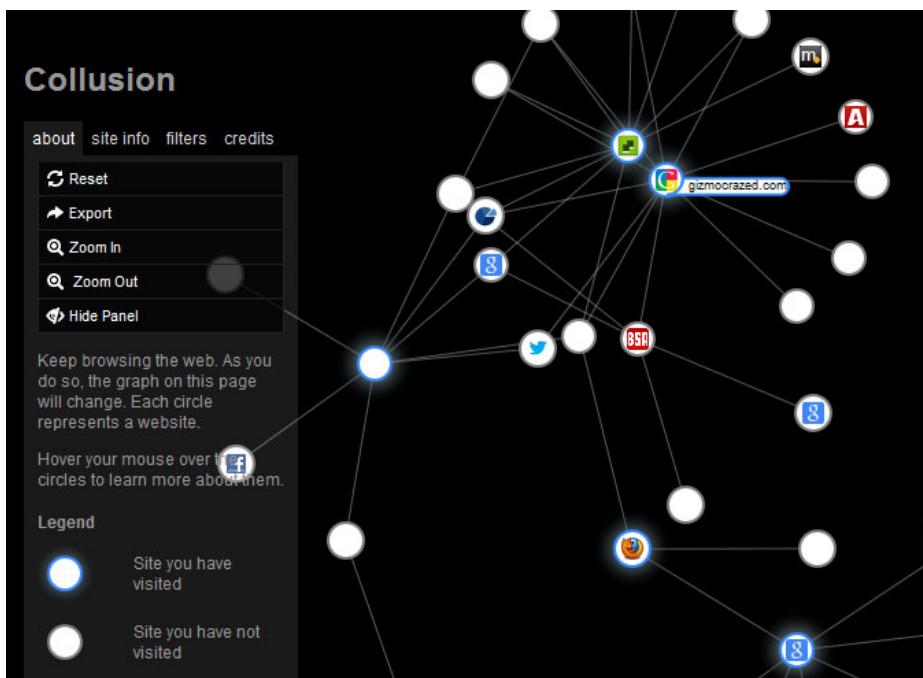
Real Estate Retirement Jobs Autos Taxes College Insurance Video Calculators

Data brokers selling lists of rape victims, AIDS patients

By Melanie Hicken @melhicken December 19, 2013: 12:38 PM ET



Users are reacting



Add-ons for Firefox > Collections > Holger_D > top10 most popular add-ons

top10 most popular add-ons
by Holger_D

About this Collection

list of the most popular add-ons

Share this Collection

10 Add-ons in this Collection

Sort by: Popularity

ABP Adblock Plus
by Vladimir Palant

Blocks annoying video ads on YouTube, Facebook ads, banners and much more.

Adblock Plus blocks all annoying ads, and supports websites by not blocking unobtrusive ads by default (configurable).

Video DownloadHelper
by mig

The easy way to download and convert Web videos from hundreds of YouTube-like sites.

This works also for audio and picture galleries.

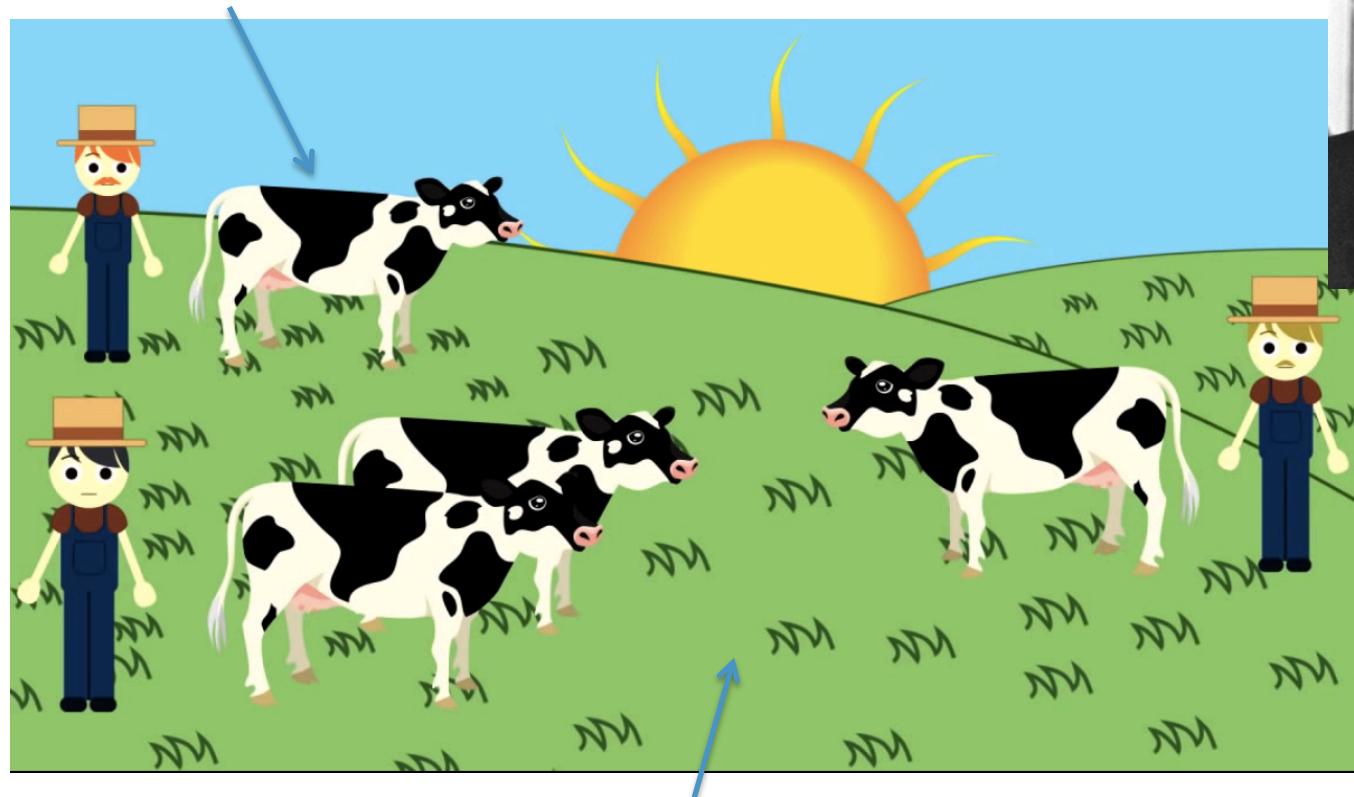
The figure is a screenshot of a Firefox add-on collection titled 'top10 most popular add-ons' by Holger_D. The collection page shows a list of 10 add-ons. The first add-on listed is 'Adblock Plus' (ABP), developed by Vladimir Palant. It has a popularity of 1, 0 reviews, and 2 followers. The description states: 'Blocks annoying video ads on YouTube, Facebook ads, banners and much more.' The second add-on listed is 'Video DownloadHelper', developed by mig. It has a popularity of 1, 0 reviews, and 2 followers. The description states: 'The easy way to download and convert Web videos from hundreds of YouTube-like sites. This works also for audio and picture galleries.' Both add-ons have a green 'Add to Firefox' button.

and this will harm (kill?) the web economy

An impeding web “Tragedy of the commons”

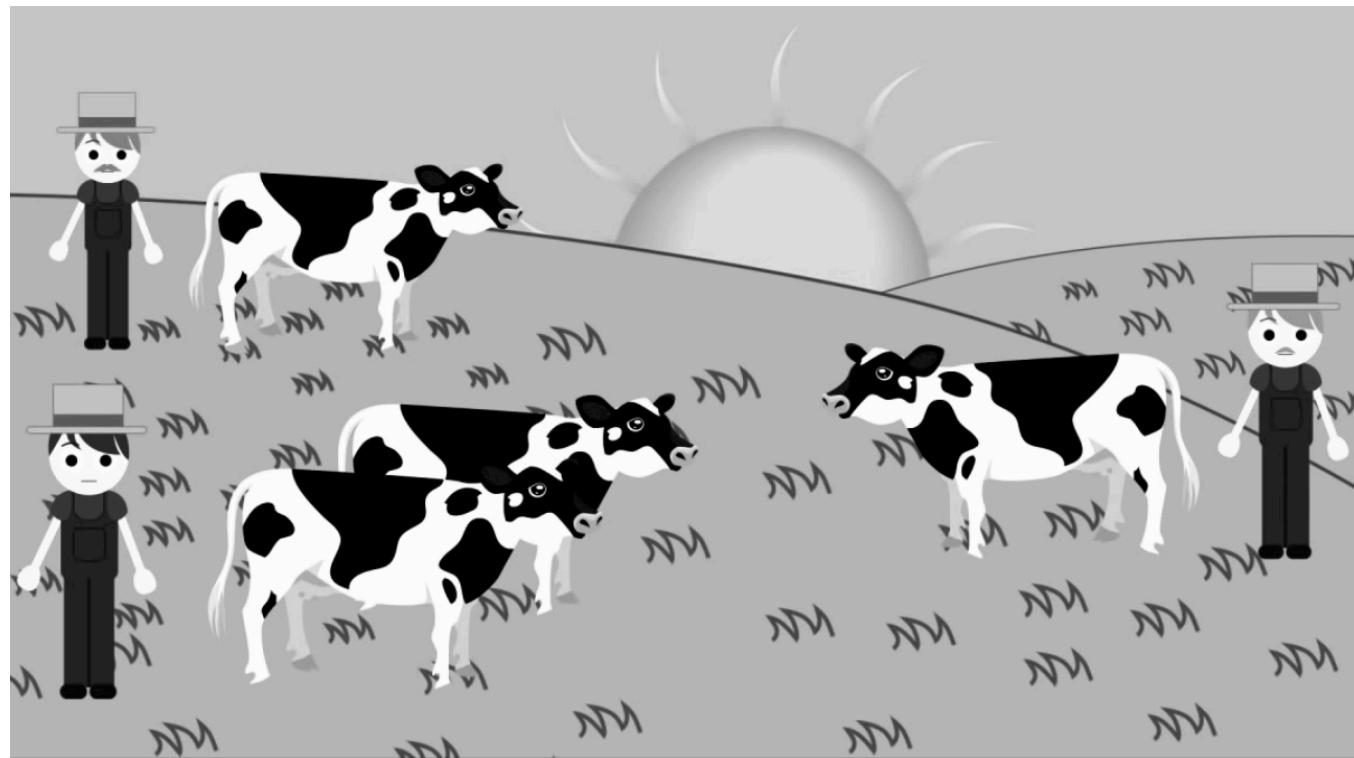
Garrett Hardin, 1968

Internet company in
Web Economy ... crossing **red lines**



The “commons”: consumer trust on the web and its business models

No trust – No grass to graze – No Free services – No innovation



No traffic to carry

No jobs

No growth

No No No No ...

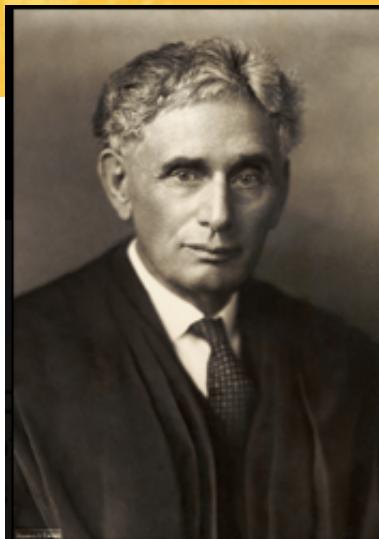
Are we going back to newspapers, or

IS THERE SOMETHING WE CAN DO?



**“Sunlight is the
best disinfectant.”**

-LOUIS BRANDEIS



**“Publicity is justly commended as a
remedy for social and industrial diseases.
Sunlight is said to be the best of disinfectants;
electric light the most efficient policeman.”**

**—U.S. Supreme Court Justice Louis D. Brandeis,
“What Publicity Can Do,” *Harper’s Weekly*,
December 20, 1913**

The Data Transparency Lab

- **MISSION:** Save the web from a privacy Tragedy of the Commons
- **APPROACH:** Establish transparency to what happens to our digital trace
- **HOW:**
 1. By developing easy to use tools
 2. By releasing datasets
 3. By supporting research in the area
 - Grants
 - Infrastructure
 - Shaping a research agenda
 - Sharing results

Data Transparency Lab Call For Proposals

April 2015

The Data Transparency Lab is a collaborative effort between universities, businesses and institutions to support research in tools, data, and methodologies for shedding light on the use of personal data by online services, and to empower users to be in control of their personal data online. In order to support research in these areas, DTL will award research grants to academic institutions worldwide. Such grants come in the form of a lump sum of up to 50K euro that is awarded to successful applicants for pursuing DTL related research in any of the following topics:

Topics

Tools, Platforms, Measurements, and Methodologies for:

[Reverse-Engineering Personal Data Usage in Online Services \(e.g., advertising, recommender services, pricing and availability of goods & information\):](#)

- Behavioral targeting
- Context / Location-based targeting
- Social graph-based targeting
- Involuntary (or implicit) customization / targeting

[Detecting Personal Data Gathering by Online Services:](#)

- Techniques for finger-printing and tracking users
- In-app tracking and targeting
- Information leakage from applications and platforms
- Cross-platform/domain information/profile trading, aggregation, fusion

[Privacy-preserving Personal Data Analytics/Management:](#)

Proposal submission deadline: May 15, 2015

[Download the Call for Proposals 2-pager](#) 

[Download the Grants Program Handbook.](#) 

[Submission Website](#)

This link takes you to the DTL HotCRP Website.

Tool curation program ... coming



Thank you!
Let's make the web economy sustainable!



To probe further

- \$heriff extension available at <http://sheriff.dynu.com/views/home>
- DTL at <http://www.datatransparencylab.org/>
- Publications
 - J. Mikians, L. Gyarmati, V. Erramilli, N. Laoutaris, "Crowd-assisted Search for Price Discrimination in E-Commerce: First results," **ACM CoNEXT.13.** [\[full version\]](#)
 - J. Mikians, L. Gyarmati, V. Erramilli, N. Laoutaris, "Detecting price and search discrimination on the Internet," in Proc. of **ACM HotNets'12.** [\[pdf\]](#)
- Blog
 - Cows, privacy, and tragedy of the commons on the web
<http://www.thedigitalpost.eu/2015/channel-data/cows-privacy-tragedy-commons-web>