

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

*... the tale and the vision for a Data Transparency Lab*

Nikolaos Laoutaris  
Telefonica Research

iSocial, May 2015, Crete



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)?



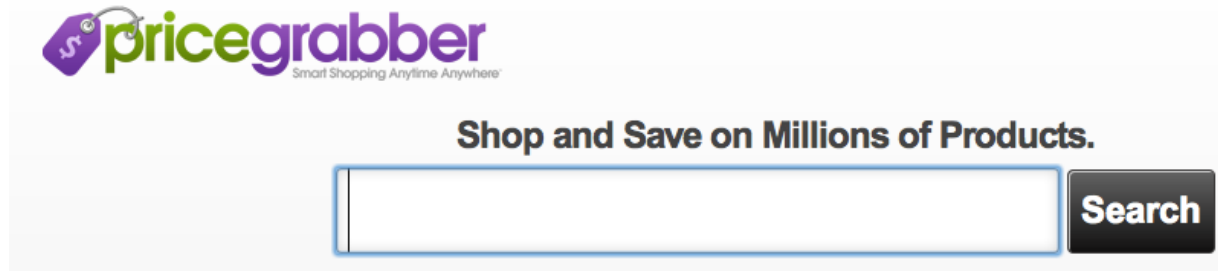
- Situation where two consumers are charged differently for the same product
- Based on how much are they willing to pay (reservation price)



Fixed prices is a “recent” thing



# Could E-commerce backfire for customers?



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



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?

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## Privacy, Economics, and Price Discrimination on the Internet [Extended Abstract]

Andrew Odlyzko

Digital Technology Center, University of Minnesota  
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

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# Would e-retailers do such a thing?



## Robinson–Patman Act

From Wikipedia, the free encyclopedia

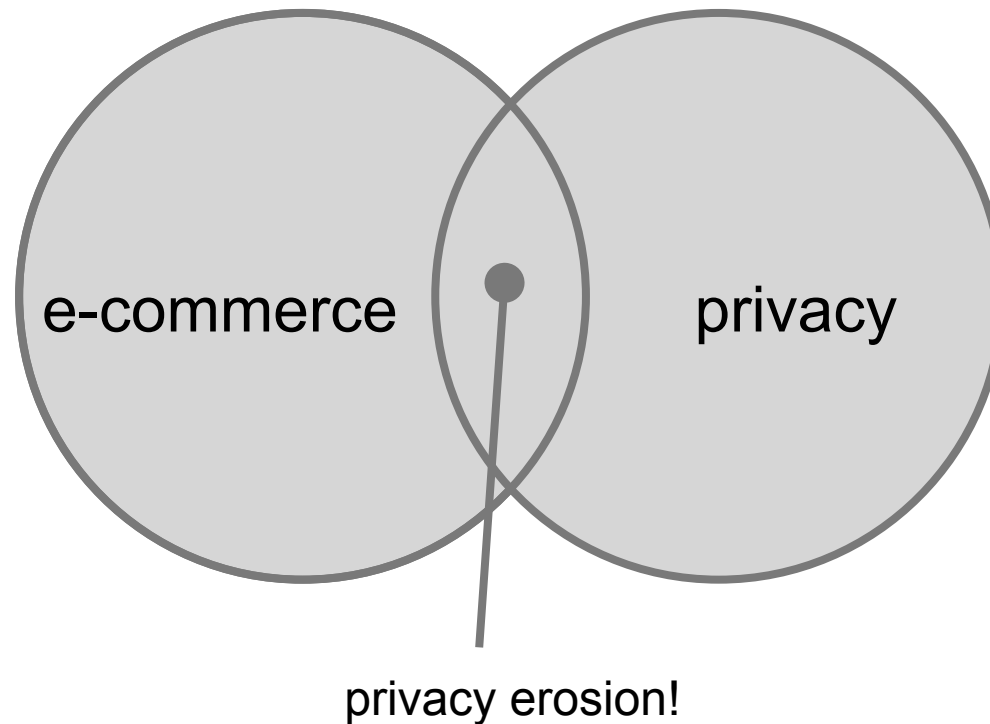
The **Robinson–Patman Act** of 1936 (or **Anti-Price Discrimination Act**, Pub. L. No. 74-692, 49 Stat. 1526 (codified at [15 U.S.C. § 13](#))) is a [United States federal law](#) that prohibits anticompetitive practices by producers, specifically [price discrimination](#). It grew out of practices in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



# Sheriff

Detecting Price  
Discrimination



Jakub Mikians  
UPC (now Amazon)

## 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 \$92.48

## 2. Check it

189.00

Check it

## 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

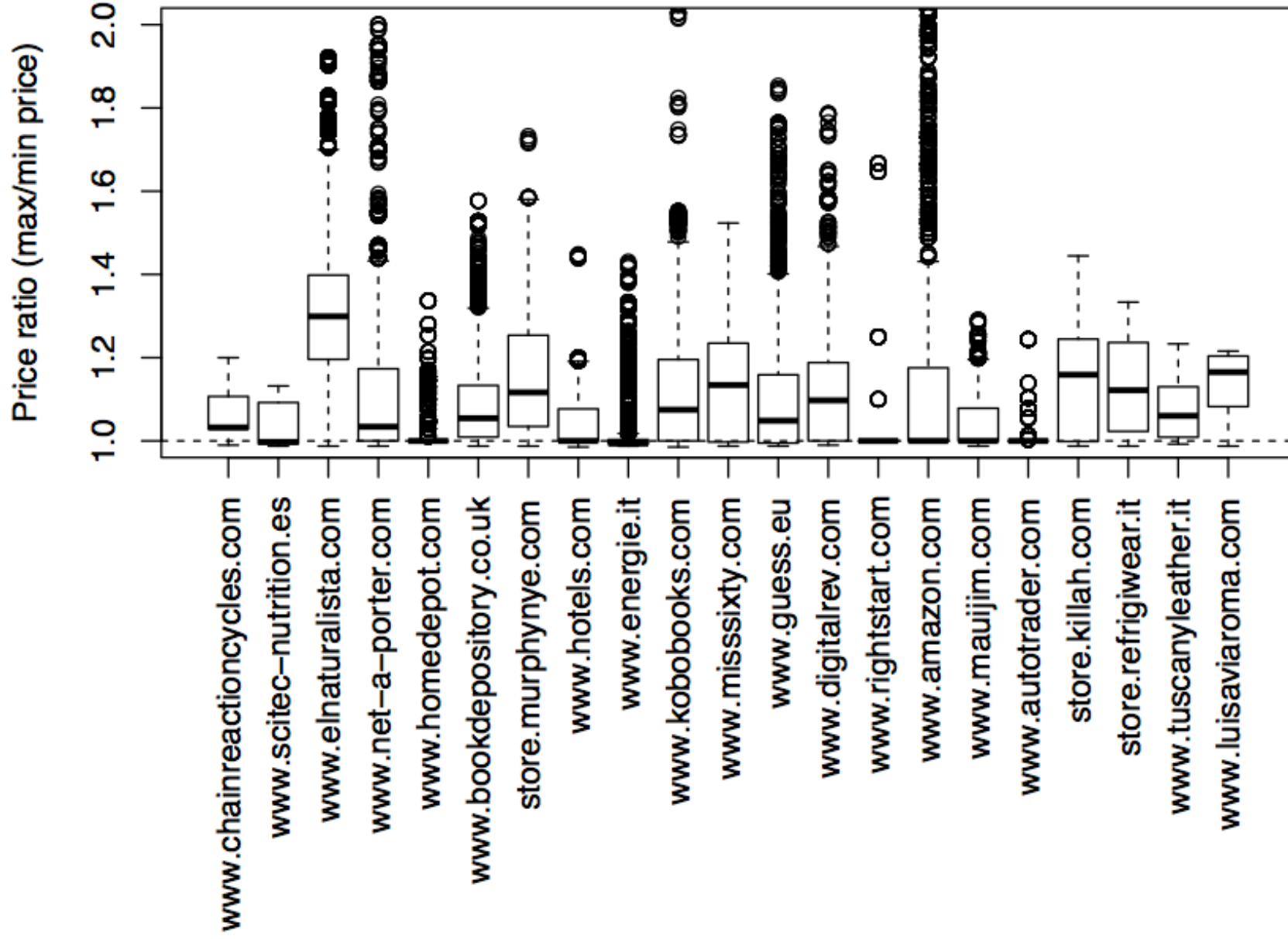
You will

Sheriff

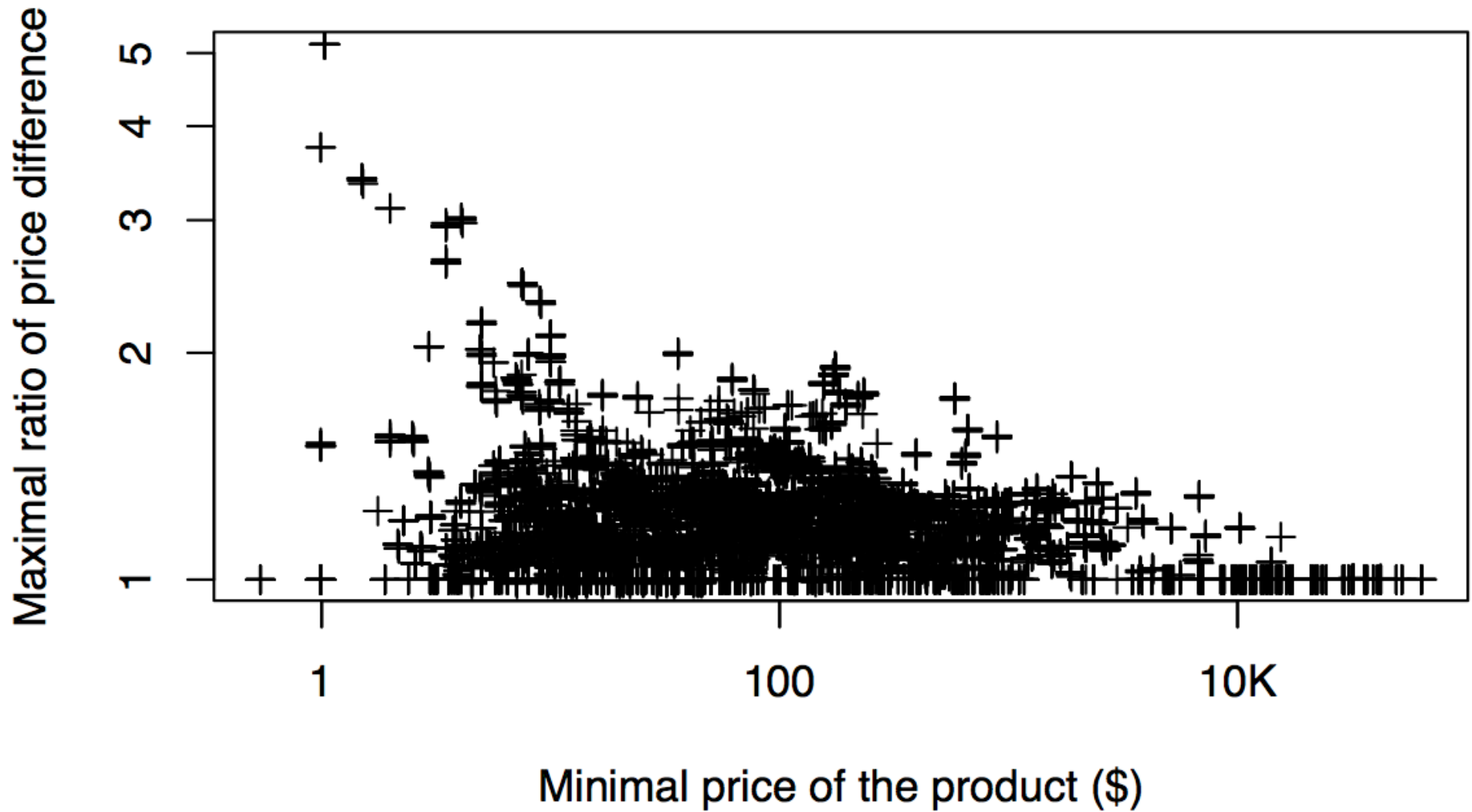
★★★★★ (0) | [Shopping](#) | [from Jakub Mikians](#)



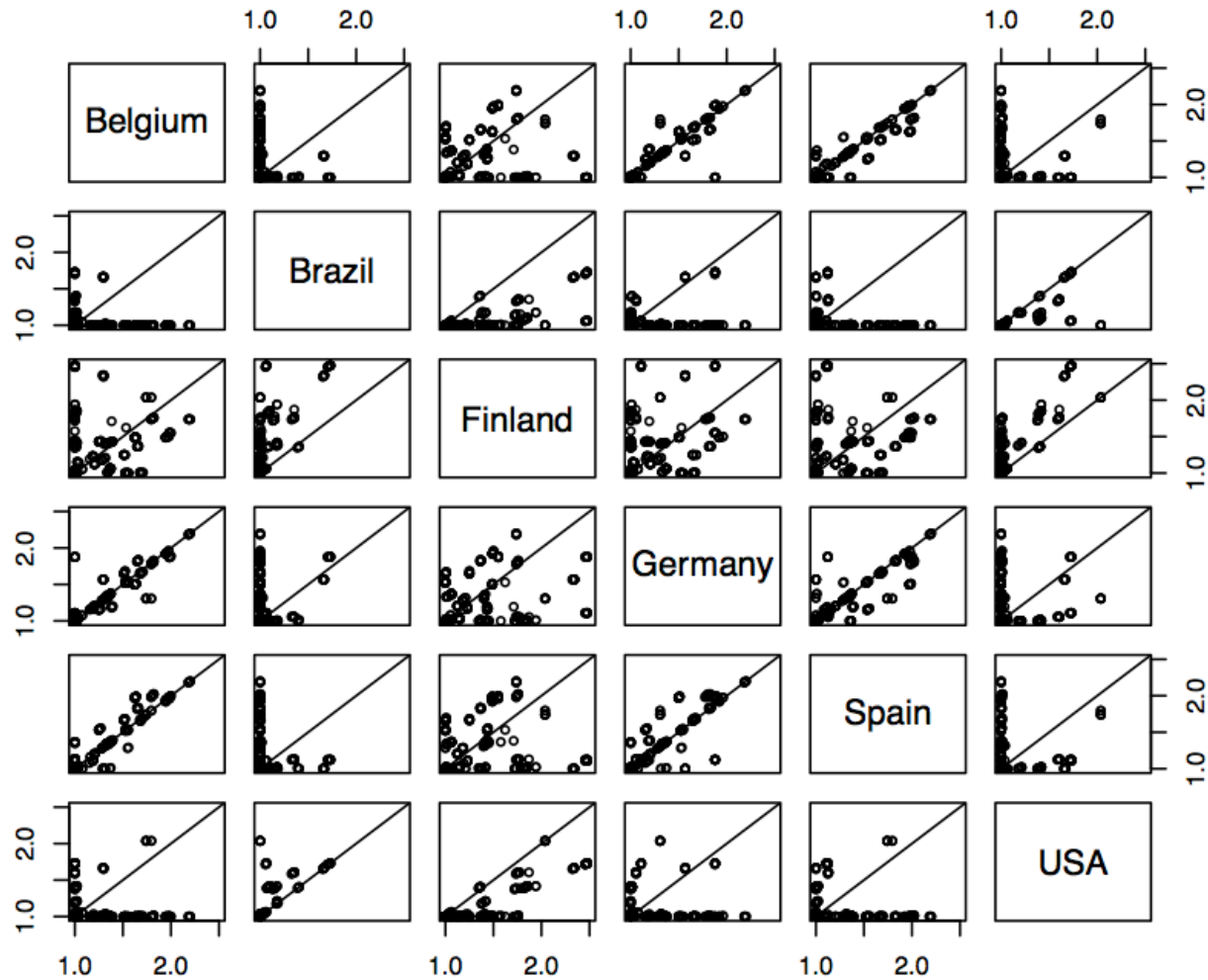
# Which retailers?



# Which products?



# Which countries?



(b) [www.amazon.com](http://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](#)



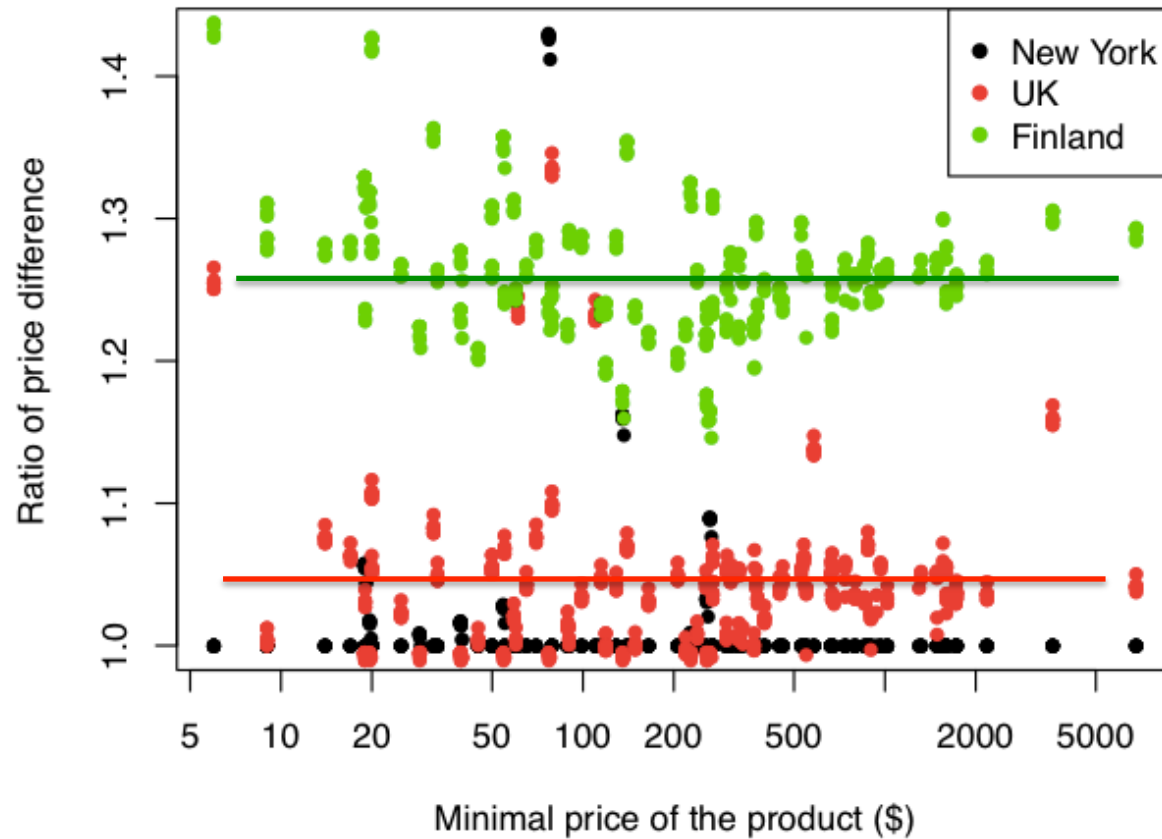
2 [Two Very Different Saints Come Marching In](#)



3 [The Scarcity Fallacy](#)

# What types of pricing policies do we see?

[MULTIPLICATIVE]

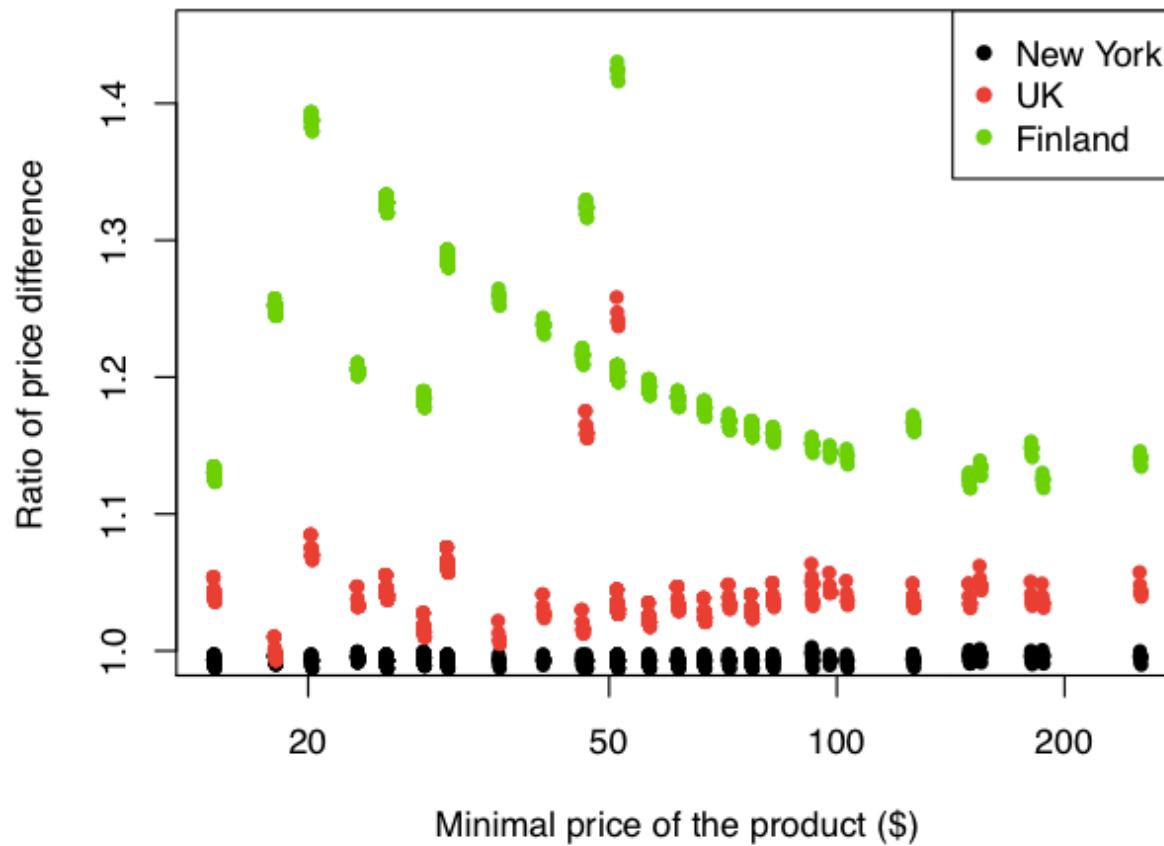


(a) [www.digitalrev.com](http://www.digitalrev.com)



# What types of pricing policies do we see?

[MULTIPLICATIVE with an ADDITIVE TERM]



(b) `www.energie.it`

# Ok location seems to play a role

OFFICE OF FAIR TRADING



DG Internal Market and Services



Do we have price discrimination based on personal information?

**A:** Yes

**B:** No

**C:** Who cares ...

**D:** Need to do more work



# ADD-ONS

EXTENSIONS | THEMES | COLLECTIONS | MORE...

Q search for add-ons →

Home » Extensions » \$heriff\_v2



## \$heriff\_v2 1.2

by [Costas Iordanou](#)

\$heriff - 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

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

Ex Tax: \$90.00

Price in reward points: 400

10 or more \$105.40

20 or more \$92.48

Medium (+\$25.50)

**189.00**

**Check it**

checkbox:

Checkbox 3 (+\$:

Checkbox 4 (+\$:

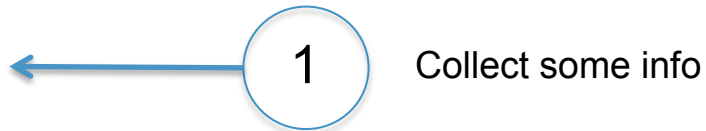
ext:

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

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

Do P2P checks



Ok enough with online price discrimination

**LET'S STEP BACK A BIT**

## **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



# Making the web economy sustainable

Online advertising  
E-commerce / recommendation  
Personalized analytics

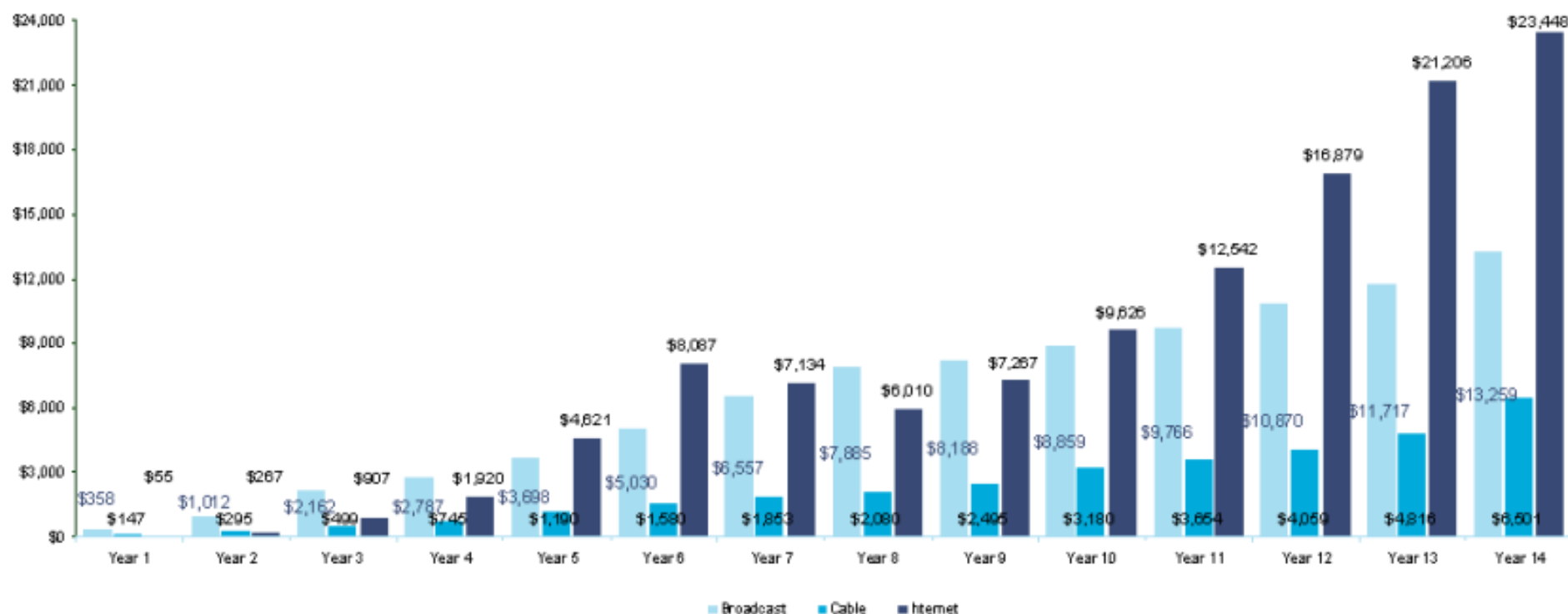


# Newspapers and TV used to be king



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

## Annual \$ Ad Revenue Growth—First 14 Years



# Tech or Greed behind the fall?



# Can the web (economy) be dethroned?



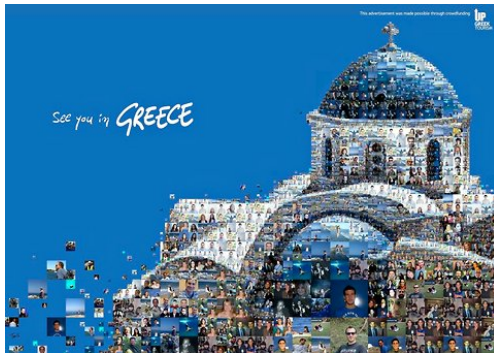


# PRIVACY seems to be the #1 threat for the web



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

More

The French give great head  
- More

The Lotus C-01 brings another galaxy to Earth. A fantastic one.  
- More

The Lotus position  
- More

MÁS DE 1.000.000 de PERSONAS EN ESPAÑA VEN AFECTADA SU VIDA POR RAZONES de PIEL...

... POR LA PSORIASIS. MEJORAR ES POSIBLE.

Personas. Piel. Posible.  
Con P de Psoriasis.  
Por una piel sin P.  
CONOCE TU PIEL.

janssen AFV ACCIÓN PSORIASIS

Para más información consulte a su dermatólogo o visite [www.psoriasis360.es](http://www.psoriasis360.es)



## 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.

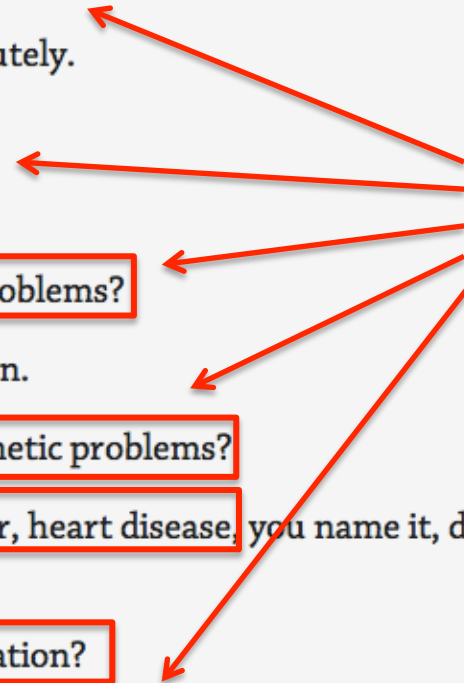
Steve Kroft: History of **genetic problems?**

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

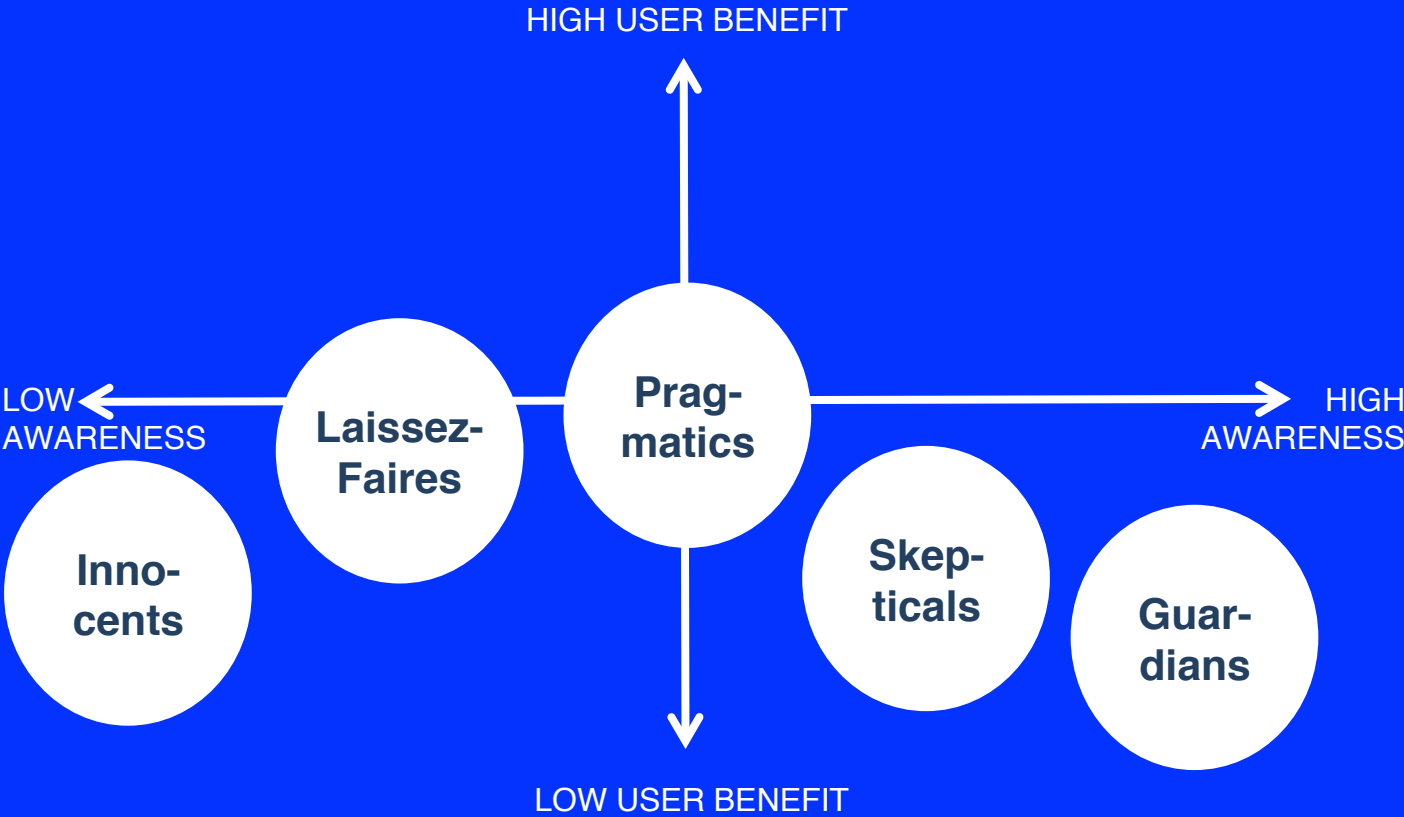


## Data brokers selling lists of rape victims, AIDS patients

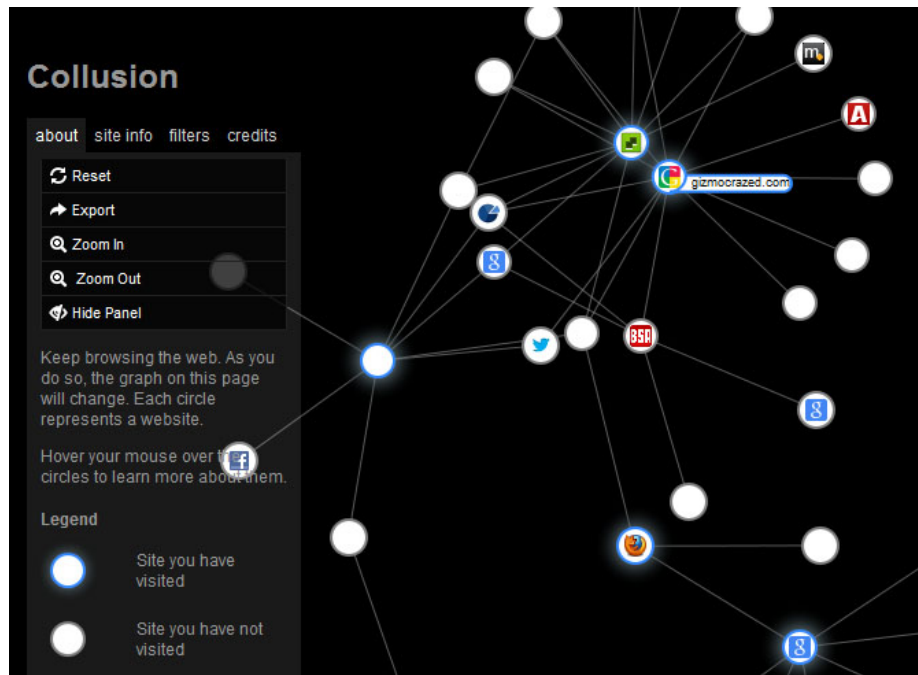
By Melanie Hicken @melhicken December 19, 2013: 12:38 PM ET



# We identified user typologies with different attitudes towards data



# 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

1 0

2 followers

Updated June 11, 2014

Share this Collection

10 Add-ons in this Collection Sort by: Popularity

**Adblock Plus**  
by Wladimir 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).

+ Add to Firefox  
Featured

★★★★★ 4,758 reviews  
20,060,933 users

**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.

+ Add to Firefox

★★★★★ 4,751 reviews  
5,402,280 users

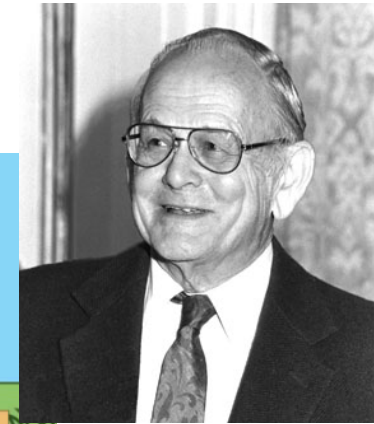
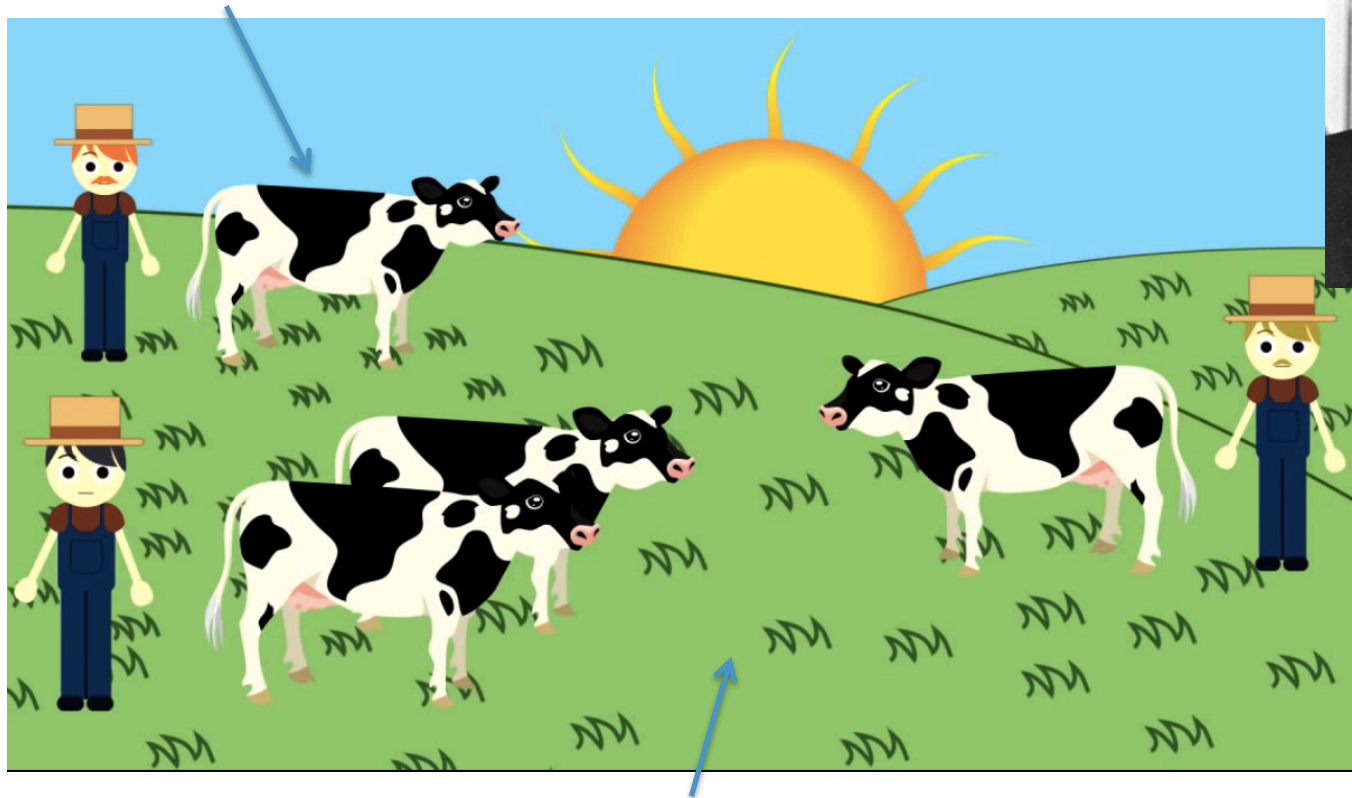
*and this will harm (kill?) the web economy*



# An impending web “Tragedy of the commons”

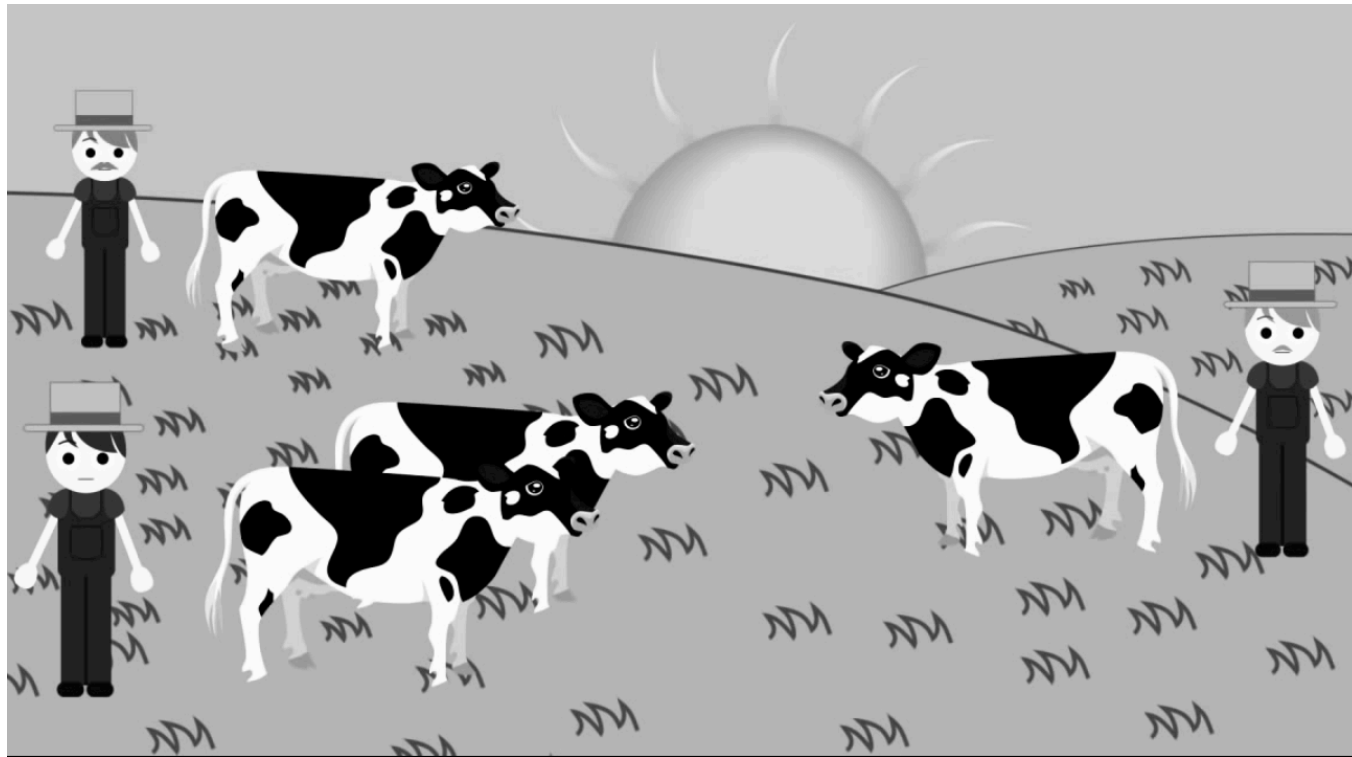
Garrett Hardin, 1968

Internet company in  
Web Economy ... crossing red lines



The “commons”: consumer trust on the web and it’s 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!



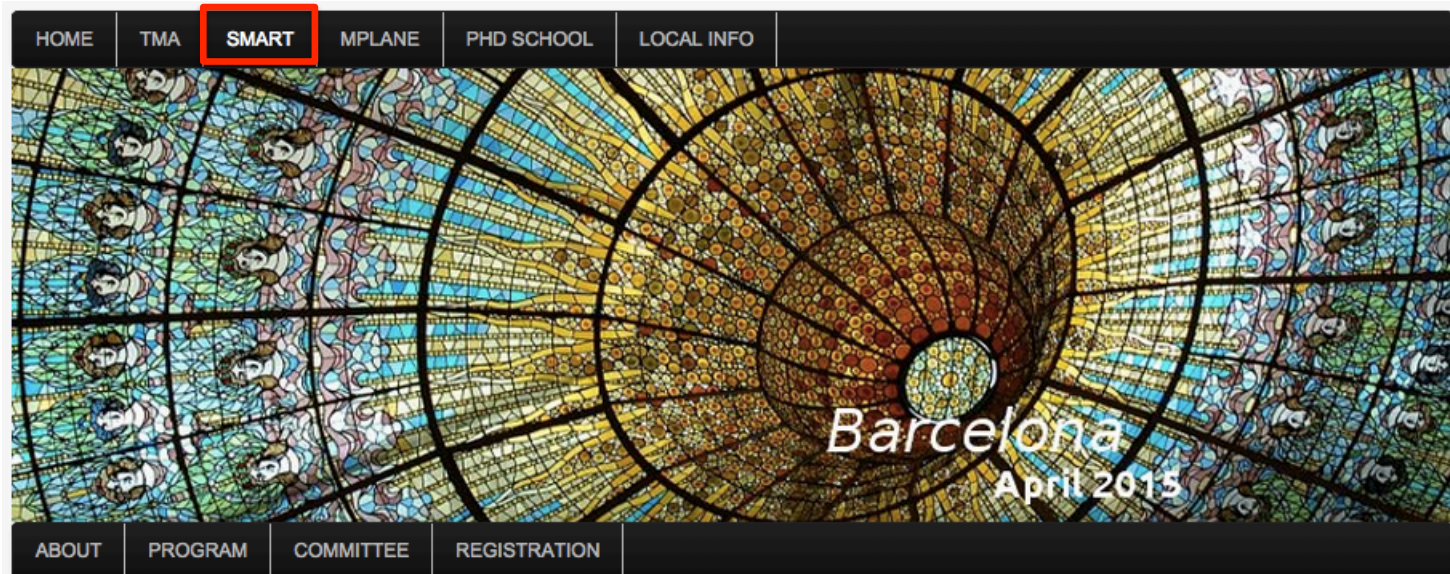


# To probe further

- Sheriff 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>



# 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.