Why We Can't Be Bothered to Read Privacy Policies: Models of Privacy Economics as a Lemons Market

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Motivation

- People claim valuation for privacy
  - 92% of consumers concerned about misuse of their info.
  - Privacy concerns #1 reason people stay off the internet
- People seem to not value privacy
  - Consumers don't read privacy policies
  - Consumers will give away info for small discounts.

What is going on?

- Corporations gather and sell consumer data
- Consumers annoyed, embarrassed and overcharged
- Consumers distrust corporations

Why is this Occurring?

- Consumers pay the cost of privacy invasion
- Corporations get the benefit
- Consumers don't know if a corporation will sell their info
- Other Internet systems have dealt with this problem of asymmetric information (PKI, eBay, PayPal).

The Privacy Game: Players

- Consumer Alice wants to buy a good from Bob, Inc.
- Alice can buy or not buy
- If Alice buys, she loses personal info
- Bob, Inc. can either respect Alice's privacy or defect and sell her info
- All consumers and all corporations are identical

The Privacy Game: Matrix

$$\begin{pmatrix} & Respects & Defects \\ Buys & +X, +Y & +X - V, +Y + I \\ Doesn't & 0, 0 & 0, 0 \end{pmatrix}$$

Bob, Inc. should defect (weakly dominant strategy).

Modelling Markets With Asymmetric Information

- Akerlof modeled markets with asymmetric information
- Example: Used Cars
- Car: Good or a Lemon?
- Consumers can't tell so pay less
- No one will sell a good car for less
- Result: All cars are lemons

Privacy as a Lemons Market

- Different because privacy is not the good sold
- Website: respect or defect?
- Consumers can't tell so pay less.
- All corporations sell information.

Fixing the Lemons Market

- Lemons markets often fixed by signalling
  - Alice reads consumer reports or hires independent mechanic
  - Expensive for Bob, Inc. to sell lemon and send a good signal
  - Alice willing to pay for car signalled "good"
  - Bob, Inc. willing to sell good car
- Perhaps signalling will work for privacy?

Ideal Privacy Market with Signalling

- Alice only buys if Bob signals
- Bob can only signal if he respects
- Bob now has incentive to respect

Signals For Privacy

- Privacy policies
- P3P
- trust seals
- reputation

Problems With Privacy Signals

- Privacy Policies
  - Costly to read and understand
  - Moving target
  - Hard to tell if followed
- P3P
  - Expensive for corporations
- Seals
  - Doesn't indicate the right things
    "We have a privacy policy and we follow it"
- Reputation
  - Costly to figure out
  - Who to trust?

Testing in the Privacy Game

- Bob,Inc. pays S to send a signal
- Alice pays T to read Bob, Inc.'s signal (to test)

$$\begin{pmatrix} & Respects & Defects \\ Tests & +X - T, +Y - S & -T, -S \\ Doesn't & +X, +Y & -V, +Y + I \end{pmatrix}$$

More Concretely

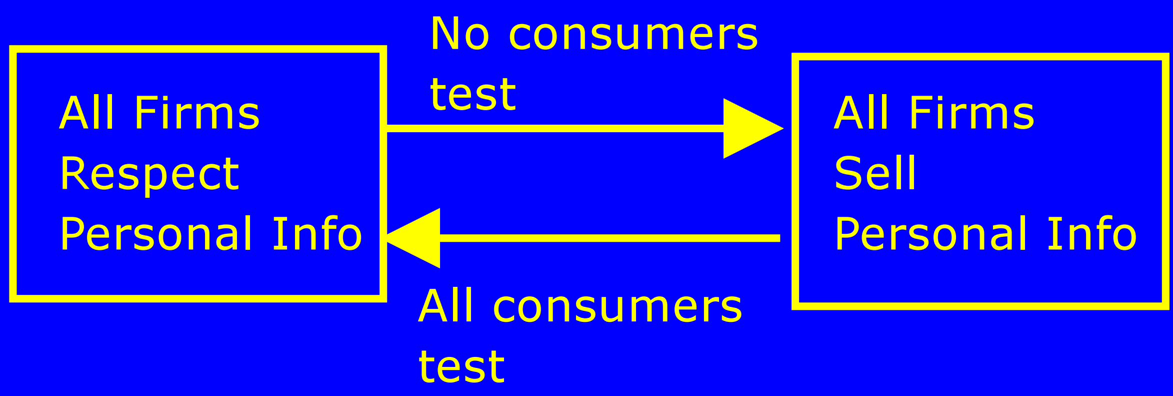
- Alice buys a book, worth \$40 to her, she pays \$30
- The site gets \$8 profit from transaction
- It costs Alice \$5 in time to test
- It costs the site \$1 to send a signal
- Alice's info can be sold by the site for \$3
- The cost of a privacy violation to Alice is \$20

$$\begin{pmatrix} & Respects & Defects \\ Tests & +5,+7 & -5,-1 \\ Doesn't & +10,+8 & -20,+11 \end{pmatrix}$$

A Free Riding Problem

If everyone else tests, why should Alice?

If nobody tests, why should Bob respect privacy?



Where will it stop?

- Unique equilibrium point in privacy game
  - Alice indifferent between testing/not testing
  - Bob indifferent between respecting/defecting
- Mixed point NOT perfect privacy
  - Some consumers test, some don't
  - Some corporations respect privacy, some don't

Slow Path To Equilibrium

- If consumers could change instantly
  - oscillate forever
- Real world - delay
  - Too slow, nothing changes
  - Too fast, overshoot equilibrium
- Dampened oscillation towards equillibrium

Equilibrium Point is Sensitive

- No reinforcing factors to ensure return to equilibrium.
- Ex. news story convinces some players to change strategy
- No one immediately affected
- Result: more slow oscillation back to equilibrium.

Equilibrium Changes

- In the internet environment, costs and benefits vary
- In particular T depends on the corporations
  - Respecting firms lower T
  - Defecting firsms raise T
- The equilibrium point changes with the different firms out there, as more non-respectful firms enter the market, T increases, changing the incentives for consumers.
- If we assume non-identical consumers and firms, even more complex

Conclusions

- No perfect market for all firms respect privacy
- Eventual equilibrium, but not privacy protective unless T is 0
- Regulation is a potential solution

So what happens when this cost T enters the traditional signalling payoff matrix?

Allow for the variables representing:

B = the benefit the consumer gets from a transaction

T = the cost to test for the consumer

V = the cost for the consumer of having their privacy violated

P = the benefit the firm gets from the transaction

S = the cost to the firm to send the signal guaranteeing privacy

I = the benefit the firm gets from selling the consumer's personal information.

$$\begin{pmatrix} & Respects & Defects \\ Tests & B-T, P-S & -T, 0 \\ Doesn't & B, P-S & B-V, P+I \end{pmatrix}$$

$$
\begin{aligned}
U(Tests) &= p(B-T)+(1-p)(-T) \\
&= pB-T \\
U(Doesn't) &= p(B)+(1-p)(B-V) \\
&= B-V+pV \\
U(Tests)-U(Doesn't) &= pB-T-(B-V+pV) \\
U(Tests)-U(Doesn't) &= pB-T-B+V-pV \\
U(Tests)-U(Doesn't) &= -(1-p)(B-V)-T
\end{aligned}
$$

$$
\begin{aligned}
U(Respects) &= q(P-S)+(1-q)(P-S) \\
&= P-S \\
U(Defects) &= q(0)+(1-q)(P+I) \\
&= P+I-qP-qI \\
U(Respects)-U(Defects) &= P-S-(P+I-qP-qI) \\
U(Respects)-U(Defects) &= -S-I+qP+qI \\
U(Respects)-U(Defects) &= -(S+I)+qP+qI
\end{aligned}
$$

$$
\begin{aligned}
U(Tests) - U(Doesn't) &= 0 \\
-(1-p)(B-V) - T &= 0 \\
p^* &= \frac{B-V-T}{B-V} \\
U(Respects) - U(Defects) &= 0 \\
-(S+I) + q^*P + q^*I &= 0 \\
q^* &= \frac{S+I}{P+I}
\end{aligned}
$$