The Digital Divide

• **Individuals:** High-income educated urbanites have adopted the internet earlier and at higher rates.

• **Businesses:** Urban businesses in high-income high-education counties have adopted more advanced internet technologies, and generated a greater benefit from them.

• **Hospitals:** Urban hospitals in high-income high-education counties have adopted more advanced Electronic Medical Records systems, and generated a greater benefit from them.

Sources: Goldfarb and Prince 2008; Forman, Goldfarb, and Greenstein 2005, 2012; Dranove, Forman, Goldfarb, and Greenstein 2014
Market Failures and the Digital Divide

• Academic research and various policy initiatives emphasize two potential market failures driving the digital divide:

1. Weak Education

2. Weak Competition

• Education is covered by other sessions at this conference.

• Competition solutions have been well-researched.

Sources: Greenstein and Prince 2007; Goldfarb and Prince 2008; Federal Communications Commission 2010; Council of Economic Advisors 2016; World Bank 2016
A different source of digital inequality
The Market for Data

• Everything that occurs online is easily recorded, stored, and analyzed.

• Much of the digital economy is based on the collection, storage, and analysis of data.

• Companies and governments can now observe actions at an extraordinarily detailed level.

• Recent advances in ICTs have made data collection sufficiently scalable that almost everyone is of sufficient commercial interest to warrant electronic tracking.
Designing the market for data

- Privacy regulation is the main policy instrument over the market for data.

- The existing policy discussion does not focus on the inequality.

- It reflects a desire to ensure that personal information flows in accordance with expectations.

- The key challenge is that, once created, digital information is non-rivalrous.

- Digital information therefore biases toward openness, making it difficult to restrict the flow of information without explicit rules or legislation.

- Most standard economic models view information flows as positive, leading to more efficient exchange.

Sources: Nissenbaum 2010; Gans 2012; Goldfarb and Tucker 2011; Posner 1981; Stigler 1980
Privacy policy is redistributive

• Privacy policy, by definition, restricts information flows.

• The provision of information in the digital economy has been transformative but unequal.

• Information flows help some and hurt others.

• Privacy policy will affect inequality if the direct benefits or negative externalities of information flows differ across socioeconomic groups.

Sources: Posner 1981; Acquisti, Taylor, and Wagman 2016
Data flows, privacy, and inequality
Regulation of data flows to information providers
Advertising-supported information

• European privacy regulation has reduced the effectiveness of European online advertising.

• General interest sources (e.g. news, games) were affected more than specialized websites (e.g. automotive, beauty, travel).

• Advertising to higher-income people generates higher revenue.

• If restrictions on data use mean that higher-income people cannot be identified on general-interest websites, then it is likely that advertising will shift to specialized websites that cater to higher-income people.

• Restrictions on data usage might lead to relatively more content that serves higher-income individuals.

➤ Regulation exacerbates inequality

Source: Goldfarb and Tucker 2011
Data and manipulation

• Individual decisions to share information may be marked by behavioral biases, leading to suboptimal decisions.

• If these biases are known to firms, manipulation becomes feasible.

• Less educated people may be more susceptible to these biases and manipulations.

➢ Regulation alleviates inequality

Source: Acquisti and Grossklags 2005
Regulation of data flows to goods and services providers
Price discrimination

• Information enables price discrimination.

• Restricting information flows is likely to reduce price discrimination.

• Higher income consumers are less price sensitive.

• People with higher willingness to pay will hesitate to purchase items if their purchase can be used as a signal of their higher willingness to pay for items in the future.

Sources: Acquisti and Varian 2005; Taylor 2004; Gordon, Goldfarb, and Li 2013
Price discrimination examples

• The Wall Street Journal reported in August 2012 that Orbitz showed Mac users used higher-priced (and higher-rated) hotels.

• Another report from the Wall Street Journal, documented price discrimination at a variety of websites based on consumer information such as location.

• The key driver of discrimination was price at local stores. If prices are higher in wealthy neighborhoods than data use increases prices for the wealthy.

➢ Regulation exacerbates inequality
Price discrimination examples

• In 2015, John Hancock announced an insurance discount for ratepayers that wear a Fitbit to enable exercise tracking.

• Such discounts will disproportionately benefit the wealthy given that
  • The wealthy are more likely to adopt such technology.
  • The wealthy are more fit.

➤ Regulation alleviates inequality

Sources: Pew 2016; Deaton and Paxson 1999; ComputerWorld 2015
Regulation of data flows in healthcare and the public sector
Healthcare

• Electronic medical records can improve health outcomes.

• For example, they reduce neonatal mortality by enabling data flows between doctors, hospitals, and other points of care.

• Less educated, unmarried, black, and Hispanic mothers benefit most.

• Privacy regulation slowed the diffusion of electronic medical records to hospitals.

➤ Regulation exacerbates inequality

Sources: Miller and Tucker 2009, 2011
Place-based policy

- Census data informs the allocation of state or federal funds across counties; and the launch of particular programs across locations.

- To respect respondent confidentiality, information on low-population counties is often hidden, either through cell suppression or noise infusion.

- Information about low-population (often poorer) counties is worse, likely leading to lower-quality decisions that affect people in those counties.

- Regulation exacerbates inequality

Source: Abowd and Lane 2004
Privacy regulation can exacerbate or alleviate inequality

• Exacerbate:
  • Online information provision through ad-supported websites
  • Price discrimination for goods and services
  • Healthcare
  • Place-based policy

• Alleviate:
  • Manipulation of information
  • Price discrimination for insurance
Designing privacy policy with an eye to inequality
Current approaches to privacy regulation

• Sectoral:
  • The United States uses a sectoral approach, with different laws for financial services, credit reporting, cable television, and other sectors.

• Omnibus:
  • Europe uses an omnibus approach, where the same regulation applies to any use of personal data.

• Generally, privacy advocates favor the omnibus approach as more complete and more protective of a fundamental right to privacy. There is an implication that the omnibus approach better-protects the vulnerable.

Source: Hoofnagle 2016
Strengths of a sectoral approach

• In the context of privacy and inequality, heterogeneity across contexts is particularly relevant.

• It might enable vulnerable populations to pay lower prices in insurance while preventing them from receiving price discounts in other settings.

• It might lead to less exploitation by firms while reducing the quality of healthcare and government services.

• Thus the impact of privacy regulation for low income individuals in insurance will be different from the impact for low-income individuals in consumer packaged goods.

• A one-size-fits-all approach may exacerbate inequality.
Open research questions (everything!)

• None of the above-mentioned studies focused on inequality.

• Given that privacy policy is redistributive, what models can help inform the nature and breadth of privacy regulation in each sector?

• The above discussion treats each case as separate: insurance vs. healthcare vs. online advertising. Is there a unifying framework that can help identify whether regulating data flows will benefit rich or poor?

• What does market-focused regulation look like? Can markets for information be designed that alleviate rather than exacerbate inequality?
Thank you.

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