TECHNOLOGY POLICY INSTITUTE
Studying the Global Information Economy

June 1, 2010

National Telecommunications Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW.
Room 4725
Washington, DC 20230

Re: Docket No. 100402174–0175–01

Dear Sir/Madam:

We hereby submit the attached study, *In Defense of Data: Information and the Costs of Privacy*, by Thomas M. Lenard and Paul H. Rubin in response to NTIA's April 23, 2010 Notice of Inquiry, "Information Privacy and Innovation in the Internet Economy."

Thank you.

Respectfully,

Thomas M. Lenard
President and Senior Fellow
Technology Policy Institute

Paul H. Rubin
Samuel Candler Dobbs Professor of Economics and Law
Emory University

Before the
OFFICE OF THE SECRETARY
UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
INTERNATIONAL TRADE ADMINISTRATION
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

In the Matter of:	)	
	)	
Information Privacy and Innovation in the Internet Economy	)	
	)	**Docket No. 100402174–0175–01**
	)	
	)	

COMMENTS OF

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In Defense of Data: Information and the Costs of Privacy

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Abstract

The commercial use of information on the Internet has produced substantial benefits for consumers. But, as the use of information online has increased, so have concerns about privacy. This paper discusses how the use of individuals' information for commercial purposes affects consumers, and the implications of restricting information availability in the interest of privacy. It lays out a range of information benefits to consumers of the commercial use of online information, including targeted services, cost reductions through targeted advertising, efficient search engines, differential pricing and re-use of information. It argues that firms have incentives to satisfy customers' privacy preferences and that restrictions in the legitimate use of information may not lead to further privacy benefits. It discusses a number of policy proposals geared at maximizing privacy, arguing that benefits to consumers would be outweighed by the information costs.

Keywords: Internet, privacy, personal information, online advertising, behavioral advertising, search engines, identity theft, opt-in, opt-out

Author Notes: Thomas M. Lenard is president and senior fellow at the Technology Policy Institute. Paul H. Rubin is senior fellow at TPI and Dobbs Professor of Economics and Law at Emory University. The authors thank Arlene Holen and Scott Wallsten for helpful comments, and James Riso for very able research assistance. This study does not address categories of sensitive information, such as health information, personal financial information, or information about children. These types of information present separate issues and are subject to specific regulatory programs tailored for them (e.g., the Health Insurance Portability and Accountability Act of 1996 and the American Recovery and Reinvestment Act of 2009 for health

information, The Gramm-Leach-Bliley Act of 1999 for financial records, and the Children's Online Privacy Protection Act of 1998 for children's information). We also do not cover government collection and use of information, which involves a different set of issues.

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Introduction

You are an avid Washington Redskins fan and a frequenter of sports web sites. While catching up on national news on *The New York Times* website, you see ads for golf clubs. Based on your interest in football and *The New York Times*, perhaps combined with other characteristics, advertisers have determined that you are likely to be a golfer.[1] This is one example of a common phenomenon. Firms and consumers collected information about each other long before the advent of the Internet. Without knowing something about their customers, firms would have no idea what goods and services to produce, or where and how to sell them. Similarly, customers need information about firms and what they sell to know what is available, as well as to compare prices and other product attributes. The information economy has made these types of information more readily available. Firms can better satisfy their customers' needs, and consumers are able to find what they want more easily.

As the Internet has developed, firms have introduced innovative new business models that make better use of user information. These new business models have supported an array of new goods and services, often provided free of charge. For example, search engines place a wealth of information at individuals' fingertips that was unimaginable a few years ago. These services would likely not be available (or would be of greatly inferior quality) were it not for the ability of Google, Microsoft, Yahoo! and others to develop new revenue sources based on targeted advertising.

As online information has increased, so have concerns about privacy. In the current context, privacy can be viewed as the withholding of information—where there is more privacy there is less information available for use in the marketplace. There is a tradeoff between the benefits of increased privacy and the benefits of increased information in the marketplace. Quantifying the benefits and costs of privacy—or conversely, the use of personal information for commercial purposes—is difficult. Nevertheless, more information about these benefits and costs is needed before we are able to make an informed decision about whether new regulations that limit the use of information are in the interest of consumers.

We now consider these issues in more detail. The next section lays out some economics of information, looking at the role of the Internet and

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[1] This is a hypothetical example, but it reflects a common phenomenon. See, for example, Jennifer Slegg. 2006. "What's the Buzz Behind Behavioral Advertising," http://searchenginewatch.com/3605361, May 11.

the public good nature of information in gearing markets more efficiently to consumers' preferences. The third and fourth sections outline the advantages for consumers of online advertising, search engines and other services freely available on the Internet. The fifth section discusses the benefits of differential pricing, made possible through consumer information. The sixth section illustrates how these benefits rely on aggregated, anonymous information, rather than individualized personal information. The seventh section puts forward the argument of privacy advocates against the collection of consumer information, particularly concerns over identity theft, and argues that most policy solutions are counter-productive. The final and concluding sections discuss policy proposals geared at maximizing privacy, arguing that the information costs outweigh the benefits.[2]

Some Economics of Information

The standard textbook economic model of perfect competition assumes perfect information. In reality, of course, information is never perfect because it is not costless. Individual firms and consumers make (often implicit) cost–benefit calculations, as they do with other economic goods, to determine how much information to obtain for decision-making. As the cost of information falls, market participants obtain and use more of it and are able to make better decisions. One of the major benefits of the Internet, and information technology in general, is that it has reduced the cost of obtaining all kinds of information and therefore has increased its availability.

Better information makes markets work more efficiently and do a better job of satisfying individuals' wants. For example, if merchants can better estimate demand, they are less likely to purchase excess or insufficient inventories, thereby reducing costs to consumers. Geographic computer-based information can enable brick-and-mortar merchants to build new stores where they best serve consumers, and stock those stores with the most locally relevant merchandise. Consumers searching for a particular

[2] This study does not address categories of sensitive information, such as health information, personal financial information, or information about children. These types of information present separate issues and are subject to specific regulatory programs tailored for them (e.g., the Health Insurance Portability and Accountability Act of 1996 and the American Recovery and Reinvestment Act of 2009 for health information, The Gramm-Leach-Bliley Act of 1999 for financial records, and the Children's Online Privacy Protection Act of 1998 for children's information). We also do not cover government collection and use of information, which involves a different set of issues.

product—say, a flat screen TV—can visit websites that provide detailed information about product characteristics and features. Moreover, Internet advertisers may use the fact that a consumer has searched for a TV to provide additional information about other features or brands through advertising associated with further searches. There are numerous such examples—all agents in the economy typically benefit from better information.

An important economic characteristic of information is its "publicness."[3] Once produced, information can be used multiple times by multiple parties without being "used up." Advertisers, credit institutions, and insurance companies may all use the same information.[4] Indeed, various information users cooperate in generating information because they all find it valuable. This public good characteristic of information is a major reason for its productivity. Some argue that information should be used only for the purpose for which it was collected, as called for in the European Union Directive on the Protection of Personal Data. However, such a restriction on information use would preclude many productive uses, including uses associated with increased security.

The public good nature of information means that the externalities associated with the commercial use of information are more likely to be positive than negative. This in turn implies that it is more likely that not enough, rather than too much, information is available. This is why most advanced countries subsidize information production such as scientific research. Regulation that would reduce the availability and use of information would exacerbate the underproduction of information.

There is another relevant characteristic of information. Information production has high fixed and low marginal costs. It is often expensive to gather or produce information but relatively inexpensive (or even free) to use it additional times once it is obtained. Such a cost structure creates difficulties for markets. Pricing at marginal cost means the good won't be produced because the price is not sufficient to cover its fixed costs. Pricing above marginal cost can produce deadweight losses due to reduced consumption by those who are priced out of the market. As we discuss

[3] Public goods are not diminishable and not excludable. Information is not diminishable, but is typically excludable—which is where information security and privacy come in.

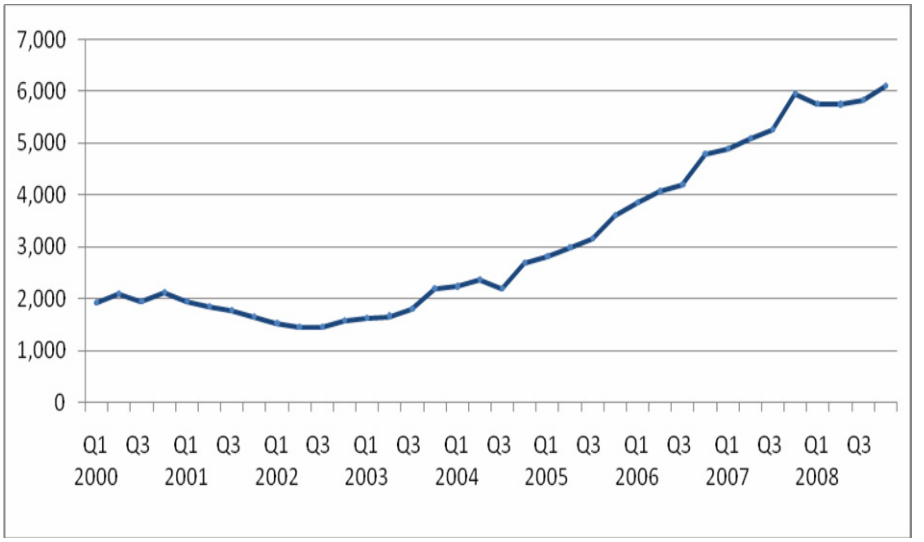
[4] The FTC has recently studied the use of credit data in automobile insurance markets and found that it is predictive of risk. See *Credit-Based Insurance Scores: Impacts on Consumers of Automobile Insurance: A Report to Congress* (July 2007).

below, differential pricing (price discrimination) is sometimes an answer to this problem.

The Benefits of Online Advertising

The revenues of online advertising have been growing rapidly, reaching more than $23 billion in 2008 (see Figure 1), and are predicted to grow to $42 billion by 2013 (eMarketeer 2008) although spending is only about 9 percent of total media advertising spending.

Figure 1. Quarterly Internet Advertising Revenue 2000–2008, in Millions USD



Source: PwC/IAB Internet Advertising Revenue Report, March 2009.

Search advertising is the largest component of online advertising spending at just under half of the total, followed by display ads at one sixth. To some extent all types of online advertising (search, display ads, video, rich media, classifieds, lead generation, sponsorships and email) use individuals' information, such as browsing behavior, to improve marketing success.

Advertising is a major source of information for consumers, as well as a major user of information to determine how to reach a target audience (Rubin 2008). Advertisers facilitate trade and, in general, there are gains from trade. Advertisers value information because it helps them match products with consumers who are good candidates for those products. This is

why businesses are willing to pay for opt-in lists, which identify consumers interested in receiving certain types of messages.[5] Consumers value learning about products they are likely to buy. In order to receive useful messages consumers are willing to opt-in to these lists (or refrain from opting-out). When advertisers engage in targeted advertising they make it easier for consumers to get information on relevant products. Similarly, there is an active market for catalog mailing lists. Consumers who are interested in one sort of product may be interested in related products, so catalog vendors will often buy or trade lists in order to better target their catalogs.

If information can be used to target ads more inexpensively to blocks of individuals more likely to purchase the advertised product, then the information has benefited both the buyers and the sellers.[6] Recommendation systems are a well-known example of this practice, such as the feature provided by Amazon. When a regular customer visits the website, she is greeted with a list of products based on past purchases and browsing. This feature has helped Amazon sell many useful books and other items consumers otherwise might not have found, to the benefit of both parties. And even if the information does not lead directly to a sale, it may still be valuable to the consumer. For example, it may help consumers compare prices or determine what products are available.

As advertising becomes more targeted, recipients avoid the nuisance and inefficiency of being confronted with ads that are of no interest—in the marketing jargon, 'consumer-borne marketing costs' (Petty 2000, pp. 42–53). Both advertisers and consumers gain from advertisers having access to information to reduce these nuisance costs. As a result, consumers receive fewer irrelevant messages, and advertisers deliver more messages that are actually read. For example, a mortgage lender trying to reach potential borrowers through email messages or by placing ads on websites must decide how widely to spread the message. If she chooses wide dissemination, many consumers will see the message, but most will be indifferent or even annoyed by it. If she can target an audience more narrowly—for example, by advertising to individuals who have been looking at online real estate ads—fewer consumers will see the message, but it will be relevant to more of them and a higher percentage will respond.

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[5] A Google search of "opt in list" provides many websites that advertise that they specialize in providing or building such lists.

[6] For an important discussion of the value of information from an economic perspective see Shapiro and Varian (1999).

If the marginal cost of spreading a message to more recipients is zero, it might appear that the seller should spread her message as widely as possible, perhaps through the use of "spam," because there is some increased probability, even if small, of additional sales. However, consumers may in the future disregard this seller's messages, or even program their email clients' spam filters to delete such messages. If in the future the seller has some product that is of interest to these buyers, she will have more difficulty contacting them. In other words, there is a reputation cost to a seller from screening the audience for a message insufficiently. The cost is higher for more "reputable" sellers—for sellers who invest more in reputation and plan to continue selling.

The value of a seller's reputation provides an incentive to spend resources to identify the best recipients for her message. It may be simple geographic information: if the seller is local, zip codes of potential customers are useful. It may be product-specific "contextual" information, as when an advertiser puts banner or text ads for automobiles on automobile-related websites. It may be sending mortgage ads to people who are in the market for a new house, as suggested above. Or it may be more complex information based on interrelations between various sites visited by individuals. For example, it is claimed that people interested in romantic movies are more likely to rent cars for the weekend (Baker 2008). Advertising based on past search and browsing behavior is called "behavioral" advertising.

Such information is valuable to a seller because it enables her to target consumers and avoid diminishing the value of her reputation by communicating with uninterested consumers. But like any other business investment, the amount of information that a seller uses depends on its price. As information becomes more costly, the seller uses less and accepts a greater diminution in reputation. As information is easier to obtain, a seller uses more and targets ads more carefully.

Additionally, much of the information that sellers use for targeting consumers is for statistical purposes. For example, information is more useful if collected from a large number of consumers. Information about a single consumer is only one data point for performing the statistical calculation. If sellers have information about fewer consumers, then it will be more difficult to measure such relationships with precision, and therefore advertising will be less targeted, with the associated social costs.

Such information also has a public good component. Recipients of irrelevant messages do not only hold the particular seller accountable; there is a spillover to other sellers (Loeser 2000). Every time an irrelevant message is received the expected value of future messages from all senders

is reduced, because consumers are more likely to simply ignore all messages. Thus, the lack of information for targeting consumers creates a public harm (or, alternatively, the ability of sellers to use such information creates a public good). One email service provider has made this externality argument explicit. In discussing the optimal rate for email, this firm recommends no more than one message per week; the firm believes that too many messages from any sender can be harmful and that 'one of our biggest challenges' is that 'we can't control what other people are doing out there.'[7] The issue of excess messages leading consumers to ignore all messages is called 'marketing clutter' (Petty 2000). The same issue arises for search engines. If a search engine shows many irrelevant or annoying ads, users may well decide to ignore ads ("ad blindness"), stop clicking on ads, or even switch search engines. This gives the search engines a strong incentive to manage the relevance of ads that users are shown.

The Value of Search Engines and Other Free Services

Search engines provided by Google, Yahoo!, Microsoft, and others—fueled by $10 billion in search advertising revenues—generate a wealth of information that would have been inconceivable just a few years ago. Current web search technology relies on a range of information about individual users' interactions with the search engine. Although search engines *could* operate in today's Web without access to any user information, collection of information such as IP addresses, search queries, and result click-through history greatly improves their functioning, and is necessary for technological innovation. Search engines use data collected from their users to optimize search results, target advertisements, and protect against a variety of threats.

For example, a search firm can observe if searchers click on the first link in the results (a successful search) or if they must go further into the results (a less successful search). This information can then be used to refine search algorithms. Moreover, when a search algorithm is changed, to determine if the change is beneficial, it is necessary to compare the success of current searches with past searches, based on an examination of search history.[8] Past history can also be used for seemingly simple but important

[7] Thomas E. Weber, "Why Companies Are So Eager To Get Your E-Mail Address." *The Wall Street Journal*, February 12, 2001.
[8] See Hal Varian, "Why Data Matters," March 24, 2008, http://googleblog.blogspot.com/2008/03/why-data-matters.html.

tasks, such as the spelling query that often precedes search results ("Did you mean…?"). These queries are based on the extent to which searchers responded favorably to similar questions in the past, and this history is used to refine future suggestions.

The practice of IP logging allows Google and other search engines to record search histories for unique IP addresses. Almost all websites keep some internal user log. A persistent tracking cookie placed on each user's hard drive contains both user preferences—things like SafeSearch settings, number of results to display per page, and language settings—along with a unique alphanumeric identifier. When combined with logged IP data, this pseudonymous identifier gives Google the ability to compile search histories for individual users across several different IP addresses—for example, if a user's home Internet connection assigns dynamic IP addresses, or if a user visits Google from several different wireless connections. Google stores log data for nine months (recently reduced from 18 months), during which software engineers extensively mine and analyze it. Yahoo! recently announced it would anonymize its log data after 90 days. MSN saves data for 18 months before redacting IP information. Data on user searches and clicks are used to improve the performance of the search and ad algorithms, just as data on consumer shopping behavior improves the layout and display of products in a physical store.

Search history is only one component in the search engines' complex proprietary algorithms. Search providers tightly control information on search engine algorithms, but firms offering "search engine optimization" services have deduced the basic principles of most search systems, both by examining patent information and through trial and error. Google, for example, still bases searches on the PageRank link analysis algorithm, which has been refined over time to account for approximately 200 other weighting factors to prevent enterprising website operators from manipulating page rankings. Search engines constantly update their algorithms to address new manipulation techniques and increasingly rely on user information to provide customized search results.

Search logs are also used to protect against a variety of threats: search spam (the efforts to insert spurious results into the search stream),[9] click-fraud (fraudulently clicking on advertisements in order to drive up the

[9] See, for example, Matt Cutts, "Using data to fight webspam," June 27, 2008, http://googleblog.blogspot.com/2008/06/using-data-to-fight-webspam.html.

costs to advertisers),[10] and other threats such as malware and phishing.[11] When search engines design methods of protecting against these threats, they can test their tools using past searches to determine if they are effective and if they eliminate too many useful results. Without sufficient policing, these threats could virtually shut down the search process, or in the case of click-fraud, seriously undermine the business model on which searching is based. These are also examples of the public good characteristic of information since search log information can be used for multiple purposes once collected.

Different applications run by search services—toolbars, email accounts, desktop search, personalized homepages—may collect different and more extensive information that can be combined with personal data collected by search engines themselves. Typically, separate privacy policies cover collection and use of information by these different services.

At the highest level of data collection, users can opt in for Google's "Web History" service for users with Google accounts (those who use Gmail, Google Documents, Google Reader, or most other Google services), which tracks, indexes, and archives search history. Data are available both to the user for future reference and to Google itself for analysis. Yahoo! offers a similar service, called "Personal Search," and uses data collected by these applications for behavioral targeting in advertising.

Users concerned about ensuring personal privacy when using search engines have a variety of technological tools at their disposal to choose a level of activity monitoring with which they are comfortable. Search engines provide some of these themselves; for example, users can opt out of Google's Web History (which is opt-in to begin with), pause monitoring, or delete their collected search and browsing history altogether. Yahoo!, AOL, and MSN also allow users to opt out of similar behavioral targeting systems. Other privacy protections rely on client-side techniques. Users of Internet Explorer and Firefox can easily delete Google's tracking cookie, which is essential for tying together separate personal data streams. In addition, several free browser extensions and utilities can clear the cookie or require Google to provide a new one at the start of each browsing session. Web proxies and anonymizing applications like Tor easily conceal user IP addresses, although because of their architecture they often reduce

[10] See Shuman Ghosemajumder, "Using data to help prevent fraud," March 18, 2008, http://googleblog.blogspot.com/2008/03/using-data-to-help-prevent-fraud.html.

[11] See Niels Provos, "Using log data to help keep you safe," March 13, 2008, http://googleblog.blogspot.com/2008/03/using-log-data-to-help-keep-you-safe.html.

bandwidth speeds. At the most basic level, a dedicated user could potentially even "spoof" TCP source addresses to prevent Google from monitoring immediately previous search results. The costs in time and difficulty of implementing these solutions tend to increase as the desired level of privacy increases, but minor actions can have huge marginal effects on privacy protection. For example, opting out of Web History takes only a few clicks but prevents collection of a significant amount of personal data, whereas browsing entirely anonymously requires more effort to set up.

Finally, all major search engines offer privacy policies in compliance with the requirements of both United States and European data security laws. These policies disclose the companies' use of personal information and require user notification and consent before transferring personal information to others. More recently, a consortium of advertisers has agreed to add a symbol (a circle with an "i") to indicate that behavioral targeting is occurring (Clifford 2010).

Considering the current availability and ease of use of tools for protecting personal information, the greatest threat to individual privacy is not search engines themselves, but the governments that may seek their records. Companies vary in the degree to which they have protected data from government requests. In 2006, Google resisted a Justice Department subpoena for millions of user search records, while Yahoo!, AOL, and MSN complied and handed over detailed server logs. It is unclear whether search engines have aided government agencies in other surveillance efforts.

Could search engines exist and organize information without collecting any personal information? They could—consider Google's early years, when search rankings were based primarily on analysis of incoming links. However, Google attributes much of its success in developing better search algorithms to careful analysis of consumer behavior that is stored in its logs. Going forward, it is likely that user information will continue to be useful in providing searchers with relevant results and sustaining the business model that makes free search engines viable.

In addition to search engines, the $24 billion Internet advertising industry supports many other services provided free to consumers. They include customized pages from firms like Yahoo! with information of direct interest to the particular individual, and also free email services from many providers. The major Internet advertising firms cooperate with operators of lower volume websites to provide customized advertising, and the revenues from this advertising enable many firms to remain in business and support their websites. Moreover, some bloggers earn sufficient revenues from advertising that they can devote more time to blogging. Table 2 lists some of the services available.

Table 2. Online Advertising-Supported Content

Video (e.g., Hulu)	Phone	Weather
TV	Internet portals	Donation sites (freerice.com)
Webmail	Maps	Translation services
Newspapers	Social networks	Online dictionaries
Games	Dating websites	Local event calendars
Educational services	Travel planning	Music (Pandora)
Blogs	Search	Job boards
Product rating and pricing services (e.g., CNET)	Information websites (About.com, etc.)	Classified ads (e.g., Craig's list)

Firms are actively developing new technologies based on available data which may facilitate new kinds of free service in the future. For example, businesses with access to cell phone data are using technologies that enable the tracking of subscribers' locations, movements and other patterns of behavior.[12] Even when used anonymously such data can be useful for a range of purposes including emergency response, epidemic prevention, and urban planning. Likewise, Google uses search data (for flu-related words) to facilitate a flu-tracking service that shows flu activity around the country. This could be useful to public health officials and perhaps consumers.[13]

Differential Pricing and the Availability of Goods

Other consumer benefits from online information can arise from its effect on the ability of sellers to engage in differential pricing, or price discrimination, where different prices are charged to different consumers based on their

[12] The technology is described in Marta C. Gonzalez, Cesar A. Hidalgo and Albert-Laszlo Barbasi, "Understanding individual human mobility patterns," Nature, V. 453, no. 5, June, 2008, pp. 779–782. Popular discussions are in Robert Lee Hotz, "Cellphone Data Track Our Migration Patterns," *Wall Street Journal*, June 10, 2008; Page A12, and Michael Fitzgerald, "Predicting Where You'll Go and What You'll Like," *New York Times*, June 22, 2008, p. Business 4.

[13] Google Flu Trends, which uses search engine queries, and is not based on cell phone data. Service available at http://www.google.org/flutrends. See discussion in the November 12, 2008 *Wall Street Journal,* http://online.wsj.com/article/SB122644309498518615.html.

willingness to pay (Shapiro and Varian 1999). This strategy enables firms to increase profits relative to charging a single price. There are constraints to price discrimination. First, the firm must have some market power. In competitive industries, all units of a good sell for the same price, and no firm can charge more than the market price to any consumer. Second, firms must be able to segment the market between consumers with different demand characteristics. Third, the firm must be able to prevent low-price consumers from reselling the product to high-price consumers.

By making pricing more transparent—for example, when a website provides a price that anyone can see—the Internet can make price discrimination more difficult. Also, consumers can use the Internet to more easily communicate among themselves and thus learn about ways to obtain lower prices.[14] On the other hand, online information can make price discrimination easier, because sellers can gather information about consumers' preferences and use this information to charge discriminatory prices. Moreover, if purchases are made online, it may be more difficult for consumers to learn what other consumers are buying or see the prices they are paying. This facilitates price discrimination. We speculate that overall the availability of online data makes discrimination easier, not more difficult.[15]

Economists distinguish three basic forms of price discrimination. In Type I discrimination (perfect discrimination) each consumer pays his or her reservation price for each unit of the good purchased. This type of discrimination is efficient, in that there is no deadweight loss in the market, although what was consumer surplus is now entirely captured by sellers. In second-degree discrimination, different units sell for different prices, but the same price schedule is available to all; an example is a volume discount. Personal information is less useful for this type of discrimination since all consumers face the same schedule. In third-degree price discrimination, different categories of consumers pay different prices. Discounts to students or senior citizens are examples.

In general, the welfare effects of price discrimination are indeterminate.[16] Some consumers lose and some gain, and there is no general

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[14] For one example, the website PreCentral is a chat site for consumers interested in the Pre line of mobile phones. One perennial topic is pricing of both phones and plans. Information about discriminatory low prices is available, and some consumers can learn about ways to get better deals.

[15] Most Pre owners do not monitor PreCentral.

[16] For a discussion in the context of information see Kai-Lung Hui and I.P.L. Ping, "The Economics of Privacy," available at SSRN.com.

way of determining the net effect. However, whenever price discrimination leads to increased sales of a product it is efficient (Varian 1996). Price discrimination is particularly useful if it allows additional markets to be served. A common example is "niche" markets—small markets that would not be served absent discrimination.

Price discrimination is clearly welfare enhancing when the good could not otherwise be produced. This is especially likely for goods with high fixed costs and low marginal costs, because pricing at marginal cost (the competitive outcome) doesn't cover the fixed costs of producing the good. While many classes of goods have this cost pattern, informational goods are perhaps the most prominent category. For example, it costs Microsoft billions of dollars to produce a new version of Windows, but only a few cents to duplicate the program once it is produced. In markets with high fixed costs, efficiency requires that marginal willingness to pay should equal marginal cost. This is also the profit maximizing condition for a firm able to engage in price discrimination.

Therefore, to the extent that online discrimination deals with informational goods such as software it can be efficient. With a high-fixed, low-marginal cost structure, price discrimination can make it profitable to develop new products that otherwise would not be produced. That is, price discrimination can lead high-demand buyers to pay a higher price, which helps cover the high fixed costs of producing the good. Then low-demand consumers may pay something closer to marginal cost. Welfare will be higher relative to situations where the good is not produced at all.

The Anonymous Use of Information

The major categories of online advertising that rely on user behavior—search advertising, display ads, and email advertising—use that information anonymously. The process of targeting messages based on an understanding of users' interests, derived from information collected about their activities on the Internet, is entirely automated. No human is directly involved.

Different industries use information differently. Credit agencies, insurance companies, and potential employers are interested in data about particular individuals, requiring such information before deciding whether to provide a loan or insurance, or to hire an individual applicant. In contrast, advertisers are interested in locating consumers who have an interest in their product, but they have no interest in the identity or behavior of any individual. The transaction unit in the advertising market is often a block of 1,000 people who are good targets for a particular ad. This focus on aggregates shows up in pricing—ad prices are usually quoted in CPM: cost

per thousand ad views. Some privacy concerns may arise from confusion about these different uses; consumers are aware that some companies use information about individuals but not that others use only aggregated information.

Search engine advertising typically consists of text-based ads that users see alongside the responses to their search queries. The selection of ads that appear is determined by an auction process where advertisers indicate the price per click they are willing to pay, together with sophisticated models that predict click-through rates. This is how search engines generate revenue. Search engines don't get paid unless they deliver ads in which consumers are interested. The models they use, as well as the selection of the ads that appear in response to any particular search query, may utilize user browsing behavior. But this is done entirely by automatic agents. Similarly, email advertising may be based on scanning for key words in the email message. Again, this is automated and does not involve human interaction with individuals' data. Aside from advertising, email services routinely scan messages for a variety of reasons, such as virus detection.

Advertisers deliver targeted display advertisements across multiple websites using information they glean from a web surfer's activity: from the immediate query that a user makes (contextual information) and from storing and aggregating queries over time (behavioral information). Interpreting the immediate query involves using the IP address information attached to the query as a proxy for physical location in order to make some assumptions about the user's demographic profile. This also involves knowing in advance something about the type of pages the person is requesting and making assumptions about the individual's interests based on the content shown in the page.

Aggregation of queries over time allows the web surfer to be identified as a unique but anonymous individual. To do that advertisers make use of cookie technology that stores a unique identifier on the web surfer's computer. The aggregation of queries, each keyed to a unique identifier, provides the data needed for statistical models that categorize users into demographic or interest profiles. These profiles are used when matching a particular type of user with a relevant advertisement. This cookie-based matching is imperfect. It is IP addresses that are matched, not individuals. Thus, if several people use the same computer, the "individual" that is recognized will be a composite. If one individual uses more than one computer (or even more than one browser on the same computer) then her

records will be fragmented. Thus, the advertising profiles used may be quite noisy.[17]

In thinking about privacy on the Internet, the metaphor sometimes used is of someone observing a consumer, learning about her personal characteristics, and trying to sell her something. A leading example of this metaphor is from a well-known (albeit somewhat dated) article by Jerry Kang from the 1998 *Stanford Law Review*.[18] Kang uses the metaphor of each consumer being "followed" as she browses the web. In fact, this is not the way it works. Businesses and advertisers do not find a particular consumer and attempt to figure out what that consumer wants to buy. Rather, the process is the opposite: a seller has goods for sale, and tries to find consumers who are more likely than average to buy those goods.

Some commentators—e.g., Daniel Solove (2001)—recognize this point:

> Since marketers are interested in aggregate data, they do not care about snooping into particular people's lives. Much personal information is amassed and processed by computers; we are not being watched by other humans, but by machines, which gather information, compute profiles, and generate lists for mailing, emailing, or calling. This impersonality makes surveillance less invasive.
>
> While having one's actions monitored by computers does not involve immediate perception by a human consciousness, it still exposes people to the possibility of future review and disclosure. In the context of databases, however, this possibility is remote. Even when such data is used for marketing, marketers merely want to make a profit, not uproot a life or soil a reputation.[19]

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[17] Emily Steel, "Mistaken Identity," *Wall Street Journal*, September 20–21, 2008, p. W5.

[18] pp. 1198–99. As of December 26, 2000, Westlaw indicated that this article had been cited 100 times—a large number for a relatively new article. Moreover, it has been cited in many or most of the law review literature on privacy in cyberspace.

[19] This paper has been the subject of a *New York Times* story: Carl S. Kaplan, 'Kafkaesque? Big Brother? Finding the Right Literary Metaphor for New Privacy,' February 2, 2001.

Deep Packet Inspection

A relatively new technology, "Deep Packet Inspection," permits ISPs to gather information by examining the contents of information—"packets"—that cross the network. This may enable sellers to obtain more specific data on consumer preferences and desires, and to better engage in behavioral marketing. A firm called NebuAd is a leader in this technology. Privacy proponents are opposed to using this technology to gather marketing-related information,[20] and Congress has held hearings on the issue. As a result, several ISPs have postponed or cancelled plans to utilize this method.[21] However, deep packet inspection has the potential to improve information flows in the economy. The information is anonymous, as is true of most online information. Indeed, NebuAd uses only a subset of information:

> The NebuAd advertising service does not collect or use any information from password protected sites (e.g., HTTPS traffic), web mail, email, instant messages, or VOIP traffic. Using only non-PII [non-personally identifiable information], NebuAd constructs and continuously updates these unique and anonymous user profiles. In the course of these business operations, NebuAd's ad optimization and serving system does not collect PII or use information deemed to be sensitive (e.g., information involving a user's financial, sensitive health, or medical matters).[22]

The Costs of Information: Arguments of Privacy Advocates

The main threat to attaining the information benefits discussed in the sections above is that of consumer privacy and the arguments of privacy advocates are prominent in the policy debates concerning the use of information online. Advocates such as the Electronic Privacy Information

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[20] See, for example, EPIC's deep packet inspection page, http://epic.org/privacy/dpi.

[21] Emily Steel and Vishesh Kumar, "Targeted Ads Raise Privacy Concerns," *Wall Street Journal*, July 8, 2008, p. B1.

[22] Testimony of Robert R. Dykes, Chairman and CEO NebuAd, Inc.before the Subcommittee on Telecommunications and the Internet, Thursday, July 17, 2008, available at: http://energycommerce.house.gov/cmte_mtgs/110-ti-hrg.071708.DeepPacket.shtml.

Center (EPIC 2008) believe that "the detailed profiling of Internet users violates the fundamental rights of individuals, diminishes the accountability of large corporations, and threatens the operation of democratic governments." This view is shared by the Center for Digital Democracy (CDD 2007), which asserts that "the online advertising industry continues to ride roughshod over basic privacy rights…."

These groups worry that consumers do not know the extent of data collected about them or how it is used. For example, according to EPIC (2008), "opaque industry practices result in consumers remaining largely unaware of the monitoring of their online behavior, the security of this information and the extent to which this information is kept confidential. Industry practices, in the absence of strong privacy principles, also prevent users from exercising any meaningful control over their personal data that is obtained."

Innovations, such as the development of search engines or, more recently, the possibility that Internet Service Providers might use deep packet inspection as an online-advertising tool, have increased apprehension. The Center for Democracy and Technology (CDT 2008a) claims "existing privacy protections have been far outpaced by technological innovation," and the collection of data by ISPs in particular "appear[s] to defy reasonable consumer expectations, could interfere with Internet functionality, and may violate communications privacy laws." CDT (2008b) expresses concern with the growing use of deep packet inspection to collect data, saying it "raises serious questions about the future of trust, openness, and innovation online."

Some privacy advocates question whether online data collection benefits consumers by giving them more relevant information. The CDD (2007) claims that personalized advertising psychologically manipulates people to buy things they would not otherwise purchase, noting that "the growing use of neuropsychological research suggests that increasingly digital marketing will be designed to foster emotional and unconscious choices, rather than reasoned, thoughtful decision making." Jeff Chester (2007), CDD's executive director, warns, "I fear that such a powerful psychosocial stealth-marketing machine, backed by the yearly expenditure of many billions of marketing dollars, will drive personal consumption to greater excess," and that "They [the ad and marketing agencies] must ensure that consumers fully understand and consent to digital techniques; make certain that approaches to target our emotions and other brain behaviors are truly safe…."

There is an extensive legal academic literature on privacy. Ohio State law professor Peter Swire (2003) suggests that comparing the advantages and disadvantages of more privacy is problematic because the

harm caused by disclosure of personal information is difficult to measure. "A variable such as the taste for privacy is 'soft' in the sense that it is difficult to quantify. In any quantitative estimates of costs and benefits, the soft variables can readily be excluded from the main analysis. Even important variables can thus be treated as an afterthought when they do not fit neatly into the analytic structure."

Swire (2003, 2) has observed that "…economists have systematically given less weight to privacy protection than academics trained in other disciplines" because of their view that "a competitive market is characterized by *perfect information*. The closer a market comes to perfect information, the better can willing buyers and sellers find each other." He notes that "the key insight for the economist is that privacy rules systematically reduce information flows." Essentially, for the economist, privacy rules "reduce the free flow of information, make it more difficult for buyers and sellers to find each other, and prevent efficient transactions from taking place."

Swire argues that the economist's "efficiency analysis leaves out much of what people actually fear in the area of privacy protection." Indeed, a complete efficiency analysis should try to accurately incorporate consumers' preferences for privacy, which would include their "privacy fears." Normally, economists try to evaluate the strength of these preferences by looking at actual marketplace behavior. Although survey results often indicate that consumers place a high value on privacy, their behavior in the market indicates they frequently trade information for a variety of benefits such as services available without charge, more useful advertising messages, and a more secure computing environment.

George Washington University law professor Daniel Solove (2008, 82–83, 118–119, 123, 173–174) acknowledges that information is socially valuable and that there are tradeoffs between privacy and information. Nevertheless, his policy recommendations generally come down in favor of increased privacy. But he does not provide data about the tradeoffs that are necessary for making an informed judgment about the desirability of policy proposals. For example, while he lists harms associated with information use, he states that harm is "difficult to describe" and "difficult to quantify" (p. 40) in terms of frequency and severity.

Solove (2008, 73) believes that consumers are not behaving in their best interest due to asymmetric information; if they knew what information was being collected and how it was being used, they would be less willing to share their information. If this were the case, however, one would think that some firms would find it in their interest to educate consumers and highlight privacy protections to gain a competitive advantage. In fact, firms are quite

sensitive to the privacy concerns of their customers. Recent episodes involving AOL and Facebook, who were punished for violating the privacy expectations of their customers, illustrate the costs to firms of deviating from acceptable practices (Nakashim 2006; Havenstein 2008). In addition, as discussed above, the market now provides numerous privacy tools that consumers can use.

Identity Theft

It is important to distinguish between consumer preferences for "security" and for "privacy," which are not the same thing. People may be comfortable with the intended uses of data collected by search engines, for example, but are worried about unintended uses of information (such as blackmail, extortion and embarrassment) and want their data to be secure. Identity theft—which involves the loss of personal data that poses a financial threat (such as a credit card number)—is perhaps the major privacy concern of individuals.[23] But the relationship between identity theft and online privacy is tenuous. Regulating the collection and use of information by legitimate firms does not appear to make it more difficult for criminals to access information such as credit card numbers, and therefore does little or nothing to deter identity theft. In fact, excessive control of information may increase the risk of identity theft by making it more difficult for sellers to determine if a potential buyer is fraudulent or not. Moreover, anything that encourages individuals to shift transactions offline is likely to be counter-productive.

The FBI defines identity theft as "the illegal use of another person's identifying information (such as a name, birth date, social security and/or credit card number)," and calls it "one of the fastest growing crimes in the United States." However, the FBI's official data contradict this assertion. The Bureau reports that identity theft represents only 2.9 percent of all crimes reported to the Internet Crime Complaint Center and that one category of crime, non-delivery of merchandise, increased by more than the whole of identity theft (see Table 3).[24] Thus, even if there were no identity theft in 2006, it could not have increased by as much as non-delivery

[23] Hal Varian, Google's chief economist, has observed that the most common privacy concern expressed by consumers in a focus group is that "someone might steal my credit card number."

[24] National White Collar Crime Center, Bureau of Justice Assistance, Federal Bureau of Investigation, *2007 Internet Crime Report*.

increased.[25] The FBI's characterization of identity theft as one of the fastest growing crimes is part of the general tendency to overstate the significance of identity theft.

Table 3. Top Ten Complaint Categories (2007)

Complaint Category	*% of Total Complaints Received*
Auction Fraud	35.7
Non-delivery	24.9
Confidence Fraud	6.7
Credit/Debit Card Fraud	6.3
Check Fraud	6
Computer Fraud	5.3
Identity Theft	2.9
Financial Institutions Fraud	2.7
Threat	1.6
Nigerian Letter Fraud	1.1

Source: Internet Crime Complaint Center. *2007 Internet Crime Report.*

Contrary to most popular perceptions, identity theft, while serious, is not a growing problem. A series of surveys by Javelin Strategy and Research between 2004 and 2007 found that both the total number of victims and overall monetary losses decreased every year during that period, presumably due to better risk management on the part of the industry (Javelin 2008). The most recent Javelin survey showed an increase in identity fraud victims in 2008 bringing it back approximately to the 2004 level, although the average cost per victim declined by 31 percent (Javelin 2009). These trends are shown in Figure 2.

[25] The Report may mean that the percentage increase in identity theft was the fastest growing, but the base is so low that even a small absolute increase would be a large percentage increase.

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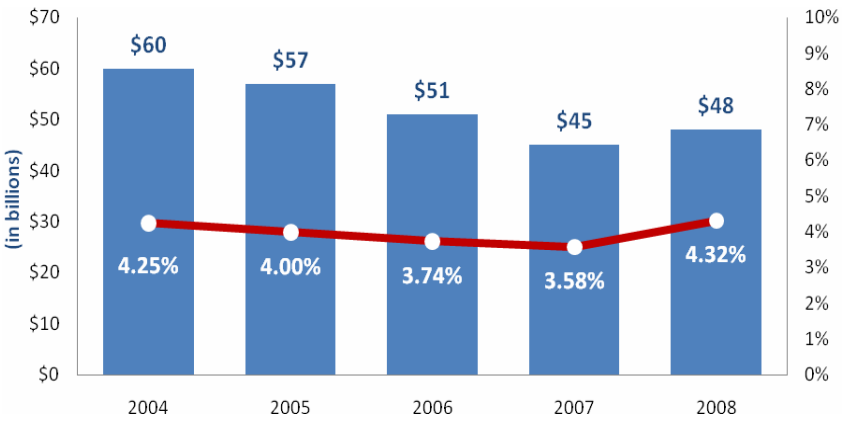
Figure 2. Overall Fraud Amounts and Incidence Rates (2004–2008)



Source: Javelin Strategy press release, February 2009.

Perhaps most importantly, the Javelin survey found that "In 2008, online access, such as using virus-afflicted computers at home or at work, accounted for only 11 percent of the total fraud. Combined with the increased speed of misuse, this trend points to more attacks of opportunity, when a fraudster takes advantage of personal information to which they suddenly have access, such as a lost wallet or watching someone enter their ATM PIN" (Javelin 2009). Earlier estimates by The Nilson Report (2005) showed the total costs of credit card fraud to issuers decreased from $882 million in 2003 to $788 million in 2004—a 10 percent decline. Moreover, over a longer period—1992 to 2004—The Nilson Report found that the costs of these frauds decreased from $0.157 to $0.047 per $100 in credit card sales.[26] This is not surprising, because credit card firms are continually updating and improving security (Bank and Clark 2005, Pacelle 2005). The constant or declining incidence of identity theft is also reported by economists at the FTC, who found an incidence rate of 4.60 percent in 2003 and 3.70 percent in 2005 (Anderson et al. 2008).

Note that most of the actual costs of identity theft are borne by businesses, not by individuals. No one is liable for more than $50 for misuse of a credit card and in many cases firms bear the entire cost. There are sometimes additional costs of being victimized, but in general only a small portion of consumers bear such costs (Anderson et al. 2008, 179).

[26] This represents costs to card issuers, and so is not comparable to the FTC numbers, which represent total costs to all businesses and consumers.

Furthermore, identity theft does not usually relate to the storage of data on consumers' online activity by firms. Credit card numbers are widely available to criminals. Data collected by Symantec (2008) show that credit card numbers can be purchased illegally online for about 40 cents each. This means that the cost of a credit card number is about equal to the transactions cost of the exchange. A group that had stolen over 40 million credit card numbers and offered them for sale was recently arrested.[27] There is no shortage of credit card numbers for those who want to purchase them. Another group used a "Trojan horse" program that took over computers and stole at least 500,000 credit card numbers and other information (Markoff 2008). This type of theft is unrelated to use or storage of data on search history, browsing behavior, and similar activities.

Finally, the use of personal information is, in fact, an important method of reducing credit card fraud. Firms use patterns of past activity to identify behavior that is inconsistent, and which may indicate that a credit card is being used without authorization. In addition, if there is some doubt about whether a number is being used fraudulently, a consumer can be questioned based on stored information about this consumer (e.g., past residential addresses). In these cases, the use of information serves to reduce risk. Rules that limit the use of information for purposes other than those for which it was originally collected thus serve to increase risk by making it more difficult to identify fraudsters.

Policymakers have made significant efforts to require firms to provide increased levels of security for electronic data, such as enacting laws mandating data encryption, recommending limitations on data collection and use and requiring consumers be notified if their data are at risk. As of 2007, 39 states had enacted laws that impose a variety of obligations on both businesses and public-sector entities in the event of a security breach, and provide remedies for individuals whose personal information was acquired by an unauthorized party (Symantec 2008). The only study (Romanoski et al. 2008) of the effectiveness of these laws shows that they do not serve to deter identity theft. In addition, notification requirements are dubious on benefit–cost grounds (discussed in Lenard and Rubin 2006). The expected benefits to consumers of such a requirement are extremely small—probably under $10 per individual whose data have been compromised. There are several reasons for this. First, most cases of identity theft involve offline security breaches, which are not affected by notification requirements.

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[27] Brad Stone, "Global Trail of an Online Crime Ring," *New York Times*, August 12, 2008.

Second, the probability of an individual compromised by a security breach becoming an identity-theft victim is extremely small. Third, most of these are victims of fraudulent charges on their existing credit accounts, for which they have very limited liability, rather than victims of true identity theft. Finally even a well-designed notification program is likely to eliminate only a small fraction of the expected costs. In related research, Cormac Herley (2009) of Microsoft has found that it does not pay for consumers to take most precautions to avoid being victimized.

There are significant costs to regulating legitimate firms that have to do with over-deterrence of various sorts. As firms increasingly concentrate on security, it can become more difficult to use data legitimately. For example, Netflix has recently cancelled its contest aimed at finding a more efficient search algorithm because of privacy issues (Albanesius 2010).

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A significant potential cost of notification requirements is that they make consumers afraid of doing business online (Fountain 2005). As consumers receive more notices and read more about the dangers of identity theft from online business, they may be more likely to avoid it. This would be a costly reaction; in fact, Javelin suggests that "consumers should move financial transactions online to eliminate many of the most common avenues fraudsters use to obtain personal information and gain more control compared to traditional channels. Moving online includes turning off paper invoices, statements and checks, including paychecks, and replacing them with electronic versions" (Javelin 2009). Javelin data also indicate that the mean time for fraud detection for paper statement review is 114 days, with a mean cost of $4,543; the comparable numbers for electronic accounts are 18 days and $551 (Javelin 2005). It is quite plausible that a continual stream of warnings could lead consumers to decide that online commerce is riskier than traditional paper commerce and, consequently, shift away from the

online mode. Such a shift would have the unintended effect of increasing the identity-theft risks to which consumers are exposed.

Technological fixes designed to increase security can also make data use more difficult, meaning that users may compensate by going around the technologies, using work-arounds such as emailing data to oneself to work at home and copying files to a USB drive in order to avoid corporate security measures, thereby diminishing security. Less stringent measures might actually be more effective if they were less susceptible to bypass by users. Recently, some states have begun to require that data be encrypted so that if it is stolen or lost it will not be usable. These requirements may cost about $100 per laptop and impose additional costs as well (Worthen 2008). Since state requirements may differ, firms will be forced to comply with conflicting state laws. Since the cost of identity theft has been overestimated, these rules may not pass a cost–benefit test. We are not, however, aware of any formal analysis of the encryption rules.

Assessing the Costs of Policy Proposals Geared at Maximizing Privacy

If one focuses on the qualitative benefits of privacy and ignores the costs of reducing the information flow, it is easy to conclude that more privacy is always better. But privacy is not a "free lunch." Reducing the flow of information would require consumers to give up things they value. There are a number of policies that would appear to give consumers more choices to enhance their privacy but would likely impose costs on consumers. Here we discuss two well-publicized examples and the possibilities for self-regulation.

The Default: Opt-In or Opt-Out

An important general issue in gathering information is the "default;" that is, if no decision is made, do consumers have the right to control the use of information, or do information gatherers have control? This issue is generally discussed as "opt-in" or "opt-out." Privacy advocates and legal privacy scholars are overwhelmingly in favor of an opt-in requirement.[28] Under opt-in, the consumer by default controls information use and the website must obtain permission from the consumer to use information.

[28] See, for example, CDD, CDT, and EPIC positions.

Under opt-out, the website has the default right to use information about the consumer, and the consumer must make an effort to change this by opting out.

Richard Thaler and Cass Sunstein discuss the importance of the choice of default in their popular book *Nudge* (2008). They argue that "humans will often consider required choice to be a nuisance or worse, and would much prefer to have a good default… When choice is complicated and difficult, people might greatly appreciate a sensible default," (86–87). They go on to cite a study of opt-in versus opt-out enrollment in 401(k) plans, for which initial participation for opt-in plans was only 20 percent, eventually rising to 65 percent over three years, compared to 90 percent and 98 percent for an opt-out plan. They conclude that "automatic enrollment thus has two effects: participants join sooner, and more participants join eventually" (109). Therefore, the choice of default has an appreciable impact on the eventual number of participants in a program.

The key insight here, as in many other situations, is that transactions costs matter. If transaction costs are zero, then the choice of the default—for our purposes, the original allocation of the right to control the use of information—does not matter. If, however, transactions costs are positive, it is efficient to give the right to the party who values it the most, or the party who would buy it if transaction costs were zero (see e.g., Posner 2007). It might appear that the transaction costs associated with making a decision about data collection are low, and therefore the default would not matter. However, as illustrated by Thaler and Sunstein, consumers have a tendency not to change the default, whatever it might be.

With respect to information usage, in testimony before the FTC a consultant indicated that with opt-out, one firm would lose about 5 percent of participants, while with opt-in they would lose about 85 percent.[29] This tendency of consumers to not change the default may be because the issue is not very important to them. Default inertia may also occur because transaction costs include learning about the nature of a choice, and may be higher than they first appear.

Businesses place a higher value on the right to use information than do consumers. Surveys show that most consumers would be willing to trade information for something specifically useful to them. As discussed above, the purpose of obtaining information about consumers is to provide them

[29] Testimony by Larry Ponemon, PriceWaterhouseCoopers, at the FTC hearing, *Wireless Web, Data Services and Beyond: Emerging Technologies and Consumer Issues*, December 12, 2000, Vol. 2, p. 232.

with targeted advertising—advertising of products likely to be of use to them—as well as with services, such as free search and email. These are the types of transactions consumers indicate they would like to engage in. This means that if transactions costs were zero, websites would end up with the information. Therefore, efficiency would argue for giving the initial right to businesses—that is, for opt-out. Noam (1997) and Varian (1997) also conclude that opt-out is the most efficient pattern. If the default were opt-in, then information would be lost—it would not flow to its highest-valued uses. This loss of information would be quite costly and would lead to price increases as firms attempt to compensate for the loss of information.

Sovern (1999), who is in favor of a mandatory opt-in system, provides an example that indicates the sort of transactions costs associated with opt-in:

> Evidence on how companies behave in an opt-in environment suggests that such a system may be more efficient for consumers than the current system. After the FCC ruled that phone companies seeking to use phone-calling patterns for marketing purposes must first obtain the consumer's permission, the telephone company in my area attempted to secure that permission. Its representatives called and sent mailings to subscribers. The company also set up a toll-free number for consumers with questions. The mailing I received was brief, printed in different colors, and written in plain English. It also promised, in words which were underlined, that "we'll never share this information with any outside company." A postage-paid envelope and a printed form were included for consumers to respond. Consumers who accept the offer need only check a box, sign and date the form, and print their name. The company also offered consumers incentives to sign up—such as a five-dollar check, two free movie tickets, or a ten-dollar certificate from certain retailers—thus increasing the likelihood that consumers will pay attention to the information. In sum, the company has done everything it can to eliminate consumer transaction costs.

Although this procedure may have reduced consumer transactions costs, it increased total transactions costs substantially. The increased transactions costs incurred by businesses trying to induce consumers to opt-

in are also a nuisance for consumers.[30] US West (using telemarketing) obtained an opt-in rate of 29 percent among residential subscribers at a cost of $20.66 per positive response (cited in Turner 2001). These higher transactions costs will ultimately be paid by consumers, either through higher prices or reduced services and benefits.

Do Not Track

Building on the popular Do Not Call List for consumers wanting to avoid telemarketing calls, a group of privacy and consumer groups proposed that the Federal Trade Commission implement a Do Not Track List that would allow consumers to block servers from tracking their online activities.[31] The proponents of a Do Not Track List assert that behavioral tracking "places consumers' privacy at risk, and is not covered by federal law," and that "it is time to move forward with something structured like the Do Not Call List to address problems we are seeing, and have now seen for seven years."

The great benefit of the Internet as an advertising medium is the ability to target ads to consumers much more precisely than can be done through other media. This targeted advertising is based on developing an understanding of consumers' interests, then matching and delivering relevant advertisements. It utilizes personal information, sometimes including the past history of Internet browsing. Consumers get ads that are more useful to them and fewer unwanted ads. By increasing unwanted ads, the Do Not Track List would have exactly the opposite effect of the Do Not Call List, which does reduce unwanted marketing messages.

Under the proposal, consumers on the Do Not Track List would still receive ads. The ads would just be less useful to them, because they would be less well targeted.

Self-Regulation

The Federal Trade Commission, which is the agency with primary jurisdiction over privacy matters, has proposed self-regulatory privacy principles, which represent a middle ground between a pure market solution

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[30]Discussed in Fred H. Cate and Michael E. Staten, "Protecting Privacy in the New Millennium: The Fallacy of 'Opt-In'," Information Services Executive Council, available at http://www.the-dma.org/isec/optin/shtml.

[31] Discussed, for example, in Ryan Singel, "Privacy Groups Ask for Online 'Do Not Track' List," *Wired*, October 31, 2007, available at http://www.wired.com/politics/onlinerights/news/2007/10/do_not_track.

and regulation (FTC 2009). Companies that agree to the self-regulatory principles would then be subject to enforcement by the FTC under the Federal Trade Commission Act. While self-regulation is more flexible than imposed regulation, it can still be quite rigorous.

Notwithstanding any specific provisions, a major adverse effect of self-regulation (or mandatory privacy legislation) would be to take privacy out of the competitive marketplace. Firms would agree to a common privacy regime that might be consistent with the preferences of a subset of consumers, but would likely not satisfy the preferences of the majority of consumers. Consumers' preferences for privacy are not homogeneous and there is no reason why firms shouldn't provide varying levels of privacy, just as they provide a variety of product and service characteristics.

Conclusions

This paper has discussed the substantial value for consumers produced by the use of consumer data for commercial purposes. The use of such data permits firms to target their marketing messages to consumers' interests, pays for a wealth of content on the Internet, and helps protect consumers from a variety of online threats. It forms the basis for many of the business models that are fueling the growth of the Internet.

Since the online marketplace is quite competitive, with many participants, we would expect that any particular consumer's preferences for privacy would be satisfied by one or another of the sellers. If the preferences of a significant group of consumers were not being satisfied and could be met at a cost they were willing pay, it would be in the interest of some firms to satisfy those preferences. At several points in this paper, we have discussed how firms respond to their customers' privacy concerns, including introducing new technologies for consumers who want to shield their information.

Some privacy advocates and scholars argue that the market isn't working well because of asymmetric information—that consumers aren't well informed about how their information is being used. Again, in a competitive market, firms willing to provide increased privacy have incentives to provide that information to consumers if they want it or would value it. Moreover, if consumers were suffering harms due to lack of privacy, they would take steps to learn the causes of these harms. Consumers' lack of information about the way their data is used is itself evidence of a lack of harm from information use.

Indeed, given the amount of misinformation—e.g., anecdotes about the incidence of identity theft that have little or no basis in fact—about

privacy-related issues, it is likely that the asymmetric information argument should go in the opposite direction. That is, the asymmetry would lead consumers to demand more privacy protection than is optimal.

Regulation should be undertaken only if a market is not functioning properly. Market failure here would mean that consumers' preferences concerning privacy are not being accurately transmitted and responded to in the market place. Good public policy requires that proposals for additional regulation be based on a showing that consumers are being harmed and that new regulation would alleviate those harms in a way that the benefits are greater than the costs. There is no analysis that shows this.

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