

Unwillingness to Pay for Privacy: A Field Experiment*

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Abstract

We measure willingness to pay for privacy in a field experiment. Participants bought at most one DVD from one of two competing online stores. One store consistently required more sensitive personal data than the other, but otherwise the stores were identical. In one treatment, DVDs were one Euro cheaper at the store requesting more personal information, and almost all buyers chose the cheaper store. Surprisingly, in the second treatment when prices were identical, participants bought from both shops equally often.

Key words: privacy; willingness to pay; field experiment.

JEL Codes: C93, D12

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1. Introduction

The economics of privacy is controversial. The Chicago School (Posner, 1981) argues that privacy protection harms efficiency. In contrast, it has been asserted that property rights over the private data of individuals lead to the efficient outcome (Shapiro and Varian, 1997). But this view is contested too. First, privacy may lead to efficient equilibrium outcomes even if people do not appreciate it individually (Hermalin and Katz, 2006; Wathieu 2009). Second, many contracts involving personal data are incomplete or highly opaque, as they typically lack clear-cut information about secondary uses and sharing of personal information. Consumers' limited ability to understand uses of their data, even retrospectively, could turn electronic retailing into a lemons market (Vila et al., 2003). Until now, economists have not systematically studied choices regarding privacy in such environments.

Previous studies have shown that consumers express concerns regarding misuse of personal data, yet continue to provide personal data on social networks and online shopping sites (see, for instance, Acquisti and Grossklags 2005). To understand this behavior, observations from a natural environment have the disadvantage that the (unobservable) cost of switching to another supplier affects choices. In our experiment, we are able to control for this cost. Moreover, buying at the more privacy-friendly store does not prolong shopping time nor does it affect delivery time.¹ We simply confront consumers with different data requirements at two otherwise similar stores. Thus, unlike in the experiments of Tsai et al., 2007, Egelman et al., 2009, and Gideon et al., 2006, consumers are not guided by privacy ratings (e.g. in search engine results).

¹ In an experiment by Berendt et al. (2005) with a monopoly online store, present-biased preferences are a potential source of observed privacy choices.

2. Experimental design

Participants were given the opportunity to buy one DVD from one of two online stores, named “SilverDisc Frankfurt” and “SilverDisc Cologne”. SilverDisc is a multichannel retailer of DVDs selling through Amazon, its own online shop, and a local branch in Berlin. The two branches in Frankfurt and Cologne are fictitious, but were chosen (with consent from SilverDisc) to minimize any differences between the two stores. All personal data provided by participants were given to SilverDisc and to Amazon as part of the transaction to purchase the DVD; this was explained in the instructions. On the order form, participants ticked a box to confirm that they agreed with the data protection regulations and general terms and conditions of SilverDisc and Amazon, which were available upon request from the experimenters.

A selection of DVDs were presented to the participants in a folder together with two printed order forms, one for “SilverDisc Frankfurt” and one for “SilverDisc Cologne”.² Two treatments were conducted. In both treatments, the mandatory data items common to the two online shops were kept constant: last name, first name, postal address and email address. In addition, “SilverDisc Frankfurt” asked for date of birth and monthly income, whereas “SilverDisc Cologne” asked for year of birth and favorite color as mandatory fields.³ The required data items were clearly listed on the two order forms given to the participants. In treatment EQ, the prices at the two shops were equal, whereas in treatment DIF all prices at “SilverDisc Frankfurt” were exactly one Euro less than the prices at “SilverDisc Cologne”. Thus in DIF there was a trade-off between data requirements and prices as subjects found information on personal income more sensitive than on favorite color (see Section 3).

² Instructions and order forms are posted on <http://www.wzb.eu/mp/vam/publications/journals.de.htm>.

³ Typically, neither Amazon nor SilverDisc ask for income and favorite color. Thus, these data items had not been provided before by subjects who had already shopped at the online stores (75% with Amazon and 11% with SilverDisc) and represent a true privacy cost as they were fully disclosed to SilverDisc after the experiment. As expected, we do not find a significant correlation between previous purchase history with SilverDisc or Amazon and the decision to buy at the Cologne or the Frankfurt branch.

After subjects had made their purchase decision, they were asked to answer a post-experimental questionnaire. All 225 participants in the experiment (students from the Technical University Berlin) received a show-up fee of 6 Euros. In addition, all orders were subsidized by a discount of 7 Euros. The quoted price on the order form corresponded to the Amazon.de retail price plus the Amazon.de shipping costs (3 Euros) minus 1 Euro for “SilverDisc Frankfurt” in treatment DIF.

3. Results

Of the 225 participants, 74 made a purchase. Lack of interest in the products and their properties were decisive for 77% of the non-buyers, and only 9% (14 out of 151) were put off by privacy concerns or lack of trust. Table 1 provides an overview of the results. In DIF, 39 of the 42 purchases were made at “SilverDisc Frankfurt” where prices were 1 Euro lower. Thus, participants predominantly chose the firm with the lower price and the more sensitive data requirement, indicating that they are willing to provide information about their monthly income and date of birth for a 1 Euro discount.

To establish a benchmark of privacy concerns in purchasing decisions, we conducted treatment EQ in which the two firms asked for the same price, but differed with respect to the data items required for the transaction. In this treatment, approximately the same number of participants purchased a DVD at “SilverDisc Frankfurt” and “SilverDisc Cologne”. Thus, the more privacy-friendly firm failed to attract more customers even though prices were equal at both stores.

The results of treatment EQ are surprising given the preferences over mandatory data items provided by subjects in the post-experimental questionnaire (Table 2). In treatment DIF, the fact that 32 out of 39 participants shopped with Frankfurt but reported a lower willingness to report income (required by the Frankfurt branch) than favorite color (required by the Cologne

branch) can be rationalized with the price difference. However in EQ, 8 of the 15 customers of Frankfurt said they were less happy providing the data required by Frankfurt than by Cologne (with 6 being neutral and 1 preferring to provide the data asked for by Frankfurt).⁴

We asked customers to rate their satisfaction with the chosen store (see Table 3). 13 of 15 the Frankfurt buyers in EQ were dissatisfied with the privacy practices.⁵

One may argue that our sample (mainly students) is unconcerned about privacy issues. However, in the post-experimental questionnaire 75% of the participants indicated that they have a very strong interest in data protection, and 95% said that they are interested in the protection of their personal information, suggesting even higher concerns than those reported in the Eurobarometer Survey (Gallup, 2008).

Providing false information is one method of protecting personal information. With the exception of one student who did not indicate his income, all subjects provided valid values that were reasonable in magnitude.

4. Conclusion

The experiment demonstrates an unwillingness to pay for privacy as the vast majority of subjects provide their monthly income for a price discount of one Euro. Even without a price discount, only half of the subjects shopped with the more privacy-friendly branch of the DVD retailer. This result is surprising given that most subjects who provide sensitive information are dissatisfied with it. Thus, observed behavior can neither be explained by a lack of awareness of privacy issues, nor can it be rationalized as a resolution of the trade-off between price and data protection in favor of price.

⁴ This is evidence against the hypothesis of private benefits or indifference but collective costs when providing personal information (Wathieu 2009).

⁵ Table 3 also shows that participants noticed the difference in data requirements and prices between the two firms. Those who shopped with Cologne in treatment EQ were significantly more satisfied with the firm's privacy policy than those who shopped with Frankfurt. In treatment DIF, those shopping with Frankfurt were significantly happier with the prices than those shopping with Cologne.

Two interpretations are possible: either the stated dissatisfaction with data collection and privacy protection can be regarded as uninformative as it is uncorrelated with choices, or behavior in the experiment is not in line with revealed-preference theory. In the latter case, the results shed doubt on the view that pure assignment of property rights in personal information is sufficient to achieve efficiency.

References

Acquisti, A. and J. Grossklags (2005). Privacy and Rationality in Individual Decision Making. *IEEE Security and Privacy*, p. 24-30.

Berendt, B., Günther, O. and S. Spiekermann (2005). Privacy in E-Commerce: Stated Preferences vs. Actual Behavior. *Communication of the ACM (CACM)*, vol. 48, no. 3.

Egelman, S., Tsai, J., Cranor, L. and A. Acquisti (2009). Timing Is Everything? The Effects of Timing and Placement of Online Privacy Indicators. *CHI'09: Proceedings of the SIGCHI conference on Human Factors in Computing Systems*.

Gallup Organization: Data Protection in the European Union – Citizens' Perceptions (2008). Analytical Report. Flash Eurobarometer Series.

Gideon, J., Egelman, S., Cranor, L. and A. Acquisti (2006). Power Strips, Prophylactics, and Privacy, Oh My! *Proceedings of the 2006 Symposium on Usable Privacy and Security (SOUPS)*.

Hermalin, B. E. and M. L. Katz (2006). Privacy, Property Rights and Efficiency. *Quantitative Marketing and Economics*, 4, pp. 209–239.

Posner, R. A. (1981). The Economics of Privacy. *American Economic Review*, 71, pp. 405-09.

Shapiro, C. and H. Varian (1997). US Government Information Policy. Mimeo. University of California, Berkeley.

Tsai, J., S. Egelman, L. Cranor and A. Acquisti (2007). The Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study. Workshop on the Economics of Information Security (WEIS).

Vila, T., Greenstadt, R. and D. Molnar (2003). Why We Can't Be Bothered To Read Privacy Policies: Privacy as a Lemons Market. Fifth International Conference on Electronic Commerce (ICEC 2003).

Wathieu, L. (2009). Privacy as Resistance to Segmentation. Mimeo.

TABLES

Table 1. Number of purchases at the two stores per treatment.

Treatment	“SilverDisc Frankfurt” (income/date of birth)	“SilverDisc Cologne” (favorite color/year of birth)
EQ	15	17
DIF	39	3

Table 2. Sensitivity of mandatory data items.

		Less willing to provide data mandatory at		
Treatment	Bought at	Cologne	Frankfurt	Neutral
EQ	Cologne	0	17	0
	Frankfurt	1	8	6
DIF	Cologne	0	3	0
	Frankfurt	0	32	7

Note: This table reports on the answers to the question “When you are asked for data, how willing are you to provide the following items?” Income and favorite color were listed among a number of other items.

Table 3. Absolute frequencies of satisfaction after purchase decision.

Treatment		Bought at	Satisfaction	Satisfaction	Significance (Fisher's Exact)
			High	Low	
EQ	Price	Frankfurt	2	10	p=0.67
		Cologne	4	12	
	Privacy	Frankfurt	0	13	p=0.05
		Cologne	5	11	
DIF	Price	Frankfurt	24	12	p=0.05
		Cologne	0	3	
	Privacy	Frankfurt	10	27	p=0.21
		Cologne	2	1	

Note: This table reports on the answers to the question “How satisfied are you with the chosen store regarding price and privacy?” (Satisfaction values z-transformed; missing data for participants exactly between high and low; p-values two-tailed).