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Voluntary Payments, Privacy and Social Pressure on the Internet: A Natural Field Experiment*

Tobias Regner[†] and Gerhard Riener[‡]

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Abstract: The emergence of Pay-What-You-Want (PWYW) business models as a successful alternative to conventional uniform pricing brings up new questions related to the task of pricing. We investigate the effect of a reduction of privacy on consumers' purchase decisions (whether to buy, and if so how much to pay) in a natural experiment at an online music store with PWYW-like pricing. Our study extends the empirical evidence of the reduced anonymity effect, previously established for donation or public goods contexts, to a consumption environment. We find that revealing the name of the customer led to slightly higher payments, while it drastically reduced the number of customers purchasing. Overall, the regime led to a revenue loss of 15%. The experiment suggests that even low levels of social pressure without face to face interaction on customers leads to a reduction of welfare.

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1 Introduction

How to price what you want to sell has always been a major task. In contrast to conventional uniform pricing recently emerging Pay-What-You-Want (PWYW) business models do not require the decision what price to set: customers choose by themselves how much to pay. The band Radiohead, for instance, released their album “In Rainbows” under a PWYW regime on their own web site and attracted hundreds of thousands of paying customers. While part of this success should be attributed to the publicity Radiohead received for their pioneering efforts, Kim et al. (2009), Regner and Barria (2009), Gneezy et al. (2010) and Riener and Traxler (2012) show that PWYW can indeed be a successful and sustainable business model. The continuing success of the PWYW platform Humble Bundle – all five humble indie bundles (each consisting of several video games) offered so far surpassed \$1M in revenue – suggest that this type of payment regime is a viable option especially for digital content.¹

While the task of setting the right price becomes superfluous under a PWYW pricing scheme, the innovation brings along new questions that are relevant for business success. Why do (at least some) people pay more than they have to in these circumstances (and how to attract those willing to pay as customers)? What factors affect their payment decision? The underlying motivations for paying voluntarily have been analyzed recently. Gneezy et al. (2012) argue that self-image motivations are the driving force behind positive payments, while Regner (2010) finds that reciprocity is a determinant of generous payments. Social pressure may be another possible source of influence on the payment in a PWYW setting. In this study we investigate the effect of social pressure on *participation* and *payment behavior* at Magnatune, an online music store with PWYW-like pricing.

¹ Digital content has negligible marginal costs of reproduction, but it can be very difficult to exclude non-payers from consuming it. Hence, the pricing of digital content received quite some attention in recent years leading to developments of ideas on pricing regimes that may help to prevent the infringement of property rights of digital content (see Varian, 2005; Domon and Yamazaki, 2004; Cremer and Pestieau, 2009). However, how to price digital content is still a puzzle, while ever more of it becomes available. For an overview see also National Research Council (2000). Details about the Humble Bundle platform can be found under <http://www.humblebundle.com/> (accessed November 5, 2012).

The behavior of people under scrutiny or social pressure has been studied mainly in contexts of social norms, altruism and charitable giving. In a seminal paper Hoffman, McCabe and Smith (1996) study the effect of social distance on giving which started a series of experiments about the role of anonymity on pro-social behavior.² The central result of this literature is that average donations in dictator games (respectively, contributions in public goods games) would rise under less anonymity. These findings may be seen as an indication that reduced anonymity also has a positive effect on voluntary payments for a consumed product/service. However, in the cited experiments subjects are asked to take a decision at a certain level of anonymity and do not have the possibility to opt out and avoid making the donation/contribution choice.³ Hence, it remains unclear how people would react to reduced anonymity in a consumption setting, that is, when they make a purchase (in return for the buyer's payment the seller provides a product/service) and when alternative sellers may be around. Would they prefer to rather not buy at all, when they know their anonymity will be lifted? If a substantial amount of people chooses to forgo to make a purchase under lowered anonymity, then the overall effect of reduced anonymity on total revenues may not be positive anymore. In fact, research on the role of privacy in online transactions suggests this is the case. In a survey study over attitudes towards privacy in the Internet Acquisti and Grossklags (2005) conclude that "privacy is precious to people".

In order to answer this empirical question we analyze the effect of an exogenous variation of the payment regime in an online store for music, Magnatune.⁴ For a limited period,

² See the lab experiments of Bohnet and Frey (1999), Andreoni and Petrie (2004), Charness and Gneezy (2008) and the field evidence from Soetevent (2005) and Alpizar, Carlsson and Johansson-Stenman (2008).

³ The question of sorting out in the context of donations has in fact received some attention recently, see the work of DellaVigna, List and Malmendier (2012) and Andreoni, Rao and Trachtman (2011). These studies analyze avoidance and charitable giving in response to social pressure. The focus of our study is on market interactions in which a buyer makes a payment and the seller delivers a product or service. Hence, we investigate how sensitive potential consumers react to a reduction of privacy in terms of purchasing at all and (voluntary) payment.

⁴ At the time of our study the company - Magnatune - used a PWYW-like business model selling music albums over an internet platform. Customers were free to choose how much they want to pay, as long as the price was between 5\$ and 18\$. Magnatune recommended a price of 8\$.

Magnatune deviated from their anonymous payment interface and reduced the privacy of customers by announcing that the name and email address of the customer will be transmitted to the artist of the purchased music album. This was mentioned prominently during the payment process. Our study evaluates the behavioral reactions and their consequences on average payments and total revenue for the company.

We find that customers under the new regime pay insignificantly more (8.02\$ instead of 7.91\$, two sided t-test, p-value: 0.324). This positive effect on payment is offset by a sharp drop of 17% in the number of customers (two sided t-test, p-value < 0.001). Overall, the regime led to a revenue loss of 15%. When their names were being reported, customers seemed to step back from making a purchase and mutually beneficial transactions did not take place. The experiment suggests that the effect of social pressure on customers leads to a reduction of welfare even in an online market context without face to face interaction.

The paper is organized as follows. Section 2 provides an overview of the related literature. In section 3 we describe our natural experiment and in section 4 we present results. Section 5 concludes and discusses our findings.

2 Related literature

This section provides more background on the two motivations that affect the decision we analyze: the established positive effect of social pressure on the donation/contribution decision, and the potentially negative effect on the decision whether to purchase at all due to privacy concerns. The main body of this literature is concerned with charitable donations and the provision of public goods and not markets for consumer goods.

Hoffman, McCabe and Smith (1996) show that giving in isolation in dictator games - guaranteed through a double blind procedure - significantly reduces transfers from the dictator to the recipient. Bohnet and Frey (1999) replicate the results of Hoffman, McCabe and

Smith (1996) and add treatments on one and two way identification of recipients and find increases in dictator giving once anonymity is lifted. Andreoni and Petrie (2004) show in a series of laboratory experiments of five-subject groups who play eight rounds of a standard linear public good/VCM game that revealing contributions *with* photographs positively and significantly affects the level of contribution. Similar results are reported by Charness and Gneezy (2008) who analyze giving in dictator games and find that revealing the name of the recipient increased the amount transferred. Soetevent (2005) reports a field experiment in 30 churches on open and closed donations. He finds that after initially increased contributions due to open baskets, this effect vanishes over time. In a similar study on donations to a National Park in Costa Rica, Alpizar, Carlsson and Johansson-Stenman (2008) find that donations are 25% higher when made in front of a solicitor than contributions made in private. This body of work on the private provision of public goods and closely related, charitable giving, suggests that lifting of identity can be classified in unilaterally revealing the (potential) donor's identity (i) to her peers, (ii) to other donors, (iii) to the general public, (iv) to middle-men or solicitors, (v) to the recipient. This lifting of anonymity of the donor comes often in combination with lifting of the identity of the recipients. Within this classification it seems reasonable to assume that average donations increase, the more the anonymity of the donor is lifted.

A naturally relevant question is, how decreasing anonymity between donor (dictator) and collectors acting on behalf of the recipient affects the number of positive donations? This aspect of sorting out has only recently received some attention. DellaVigna, List and Malmendier (2012) conduct a door-to-door fund-raising campaign and test whether potential donors avoid the social pressure of being asked for donations by a solicitor. Informing people that a solicitor will visit reduced people opening the door (or indicating that they do not want to be disturbed) by 10 to 25 percent (the ones who were present by chance or decided to be present at that time gave significantly more). Andreoni, Rao and Trachtman (2011) set up a

natural field experiment by manipulating the campaigning activities of a charitable organization at the two entrances to a large supermarket in the U.S. They report that over 30% of shoppers avoid the entrance with a campaigner who asks passers-by to give, while average donations increased by 75% per giver.

The consequences of a change from an anonymous voluntary payment regime to a non-anonymous one are less clear, especially when clients have the possibility to easily substitute for a product/service with similar characteristics but a payment mechanism that does not involve social pressure. The effect of reduced anonymity seems to be particularly ambiguous in the domain of online consumption. In a survey study over attitudes towards privacy in the Internet Acquisti and Grossklags (2005) report that more than 90% of respondents agree to a definition of privacy as ownership and control of personal information. Generally, respondents are either moderately or very concerned about privacy (89.2% of their sample). Requests for identifying information (such as name or email address) lead to higher concerns than requests for profiling information (such as age, weight, or professional, sexual, and political profiles). Acquisti and Grossklags (2005) also find that people tend to overweight short term gains (the instant gratification of a purchase) at the expense of long term losses (the potential negative consequences from a privacy breach).

Empirical evidence on the behavioral effects of privacy is rather scarce. In a recent field experiment, Beresford, Kübler and Preibusch (2010) find that people are not willing to pay for privacy when they are asked for “second-degree”, in their case birth date, identifying information. Subjects could purchase one DVD at a subsidized price of 7 Euro from two shops that differed with respect to the mandatory data they collected. One required the exact date of birth and monthly income, whereas the other asked for the year of birth and the favorite color as mandatory fields. Common mandatory fields were last name, first name, postal and email address. When the DVD price at the more privacy-respecting shop was 1 Euro higher, approximately 90% of subjects bought at the other shop. Tsai et al. (2011) experimentally vary

Table 1: Descriptive statistics

	Obs	Mean	Median	Std. dev.	Min	Max
Payment (in USD cent)	5503	799.60	800	219.16	467	1800
CD Dummy	5495	0.14	0	0.35	0	1
PayPal Dummy	5503	0.28	0	0.45	0	1

the salience and accessibility of privacy information and compare purchase decisions. They find that some consumers are willing to pay a premium to purchase from privacy protective websites.

3 The Magnatune Policy Experiment

We use a unique data set from individual payments for albums from September 1, 2005 until December 31, 2005. Within this time period we observe 5503 individual transactions. We have the exact time of the transaction (to the second) and with the help of a unique buyer ID we can track individual buyers, which leaves us with an unbalanced panel. In total we have 2553 unique customers of which 63.6% purchased once, 17.7% twice, 7.5% three times, 3.8% four times and 7.4% five or more times within the observation period. We face an ex-post evaluation problem of policy which lends itself to an analytical framework of regression discontinuity.

The mean payment was 7.996 US\$ and the median 8 US\$ which corresponds to the figures in previous years as reported by Regner and Barria (2009). 28% of the purchases have been made via PayPal, while the rest was paid by credit card (these figures correspond as well to the figures of previous years). 14% of customers bought a CD instead of an album download which is around three times more than in Regner and Barria (2009).

Change in Payment Procedure In November 2005 Magnatune decided to disclose the *name* of and the *amount paid* by the buyer to the respective artist of the purchased album. This was announced by adding the sentence “FYI the artist will see your name and how much you decided to pay.” to the text “50% goes directly to the artist, so please be generous!” that appeared as a standard feature on the payment page. The payment policy change took effect on November 16, 2005 and the new regime lasted until November 30, 2005.

This experimental design allows us to investigate how reduced privacy may affect revenue: via the i) decision to purchase (potential sorting out) and ii) size of the payment. The message of the social distance experiments was that a reduction of anonymity by revealing identifying information of the donor (such as name or email address) increases average donations/transfers. However, the reduced anonymity might also keep potential customers from actually deciding to buy (even though they can set the price themselves) and the number of purchases decreases. The relative importance of these effects is an empirical question and our study is set up to provide an answer.

4 Results

Payments

We first report the raw average treatment effects on payments, not taking into account the panel structure of the data. Table 2 reports the averages. Although we observe an increase of over 10 US\$ cents per transaction comparing the treatment period (*Name shown*) with the period *before* the non-anonymous payment mechanism was introduced (Column 2), this difference is not significant in a two sided t-test (p-value: 0.324). The same is true if we pool the anonymous payment mechanism before and after (Column 1). We also use a non-parametric approach to test for differences reported in column (1) by generating the empirical distribution of average payment differences using 200 placebo treatments of 14 connected

Table 2: Average Payment in US\$ cents by Treatment

	(1) All	(2) Before
Anonymous	799.1 (218.3)	791.9 (203.7)
Name shown	804.5 (228.9)	802.0 (226.9)
Total	799.6 (219.2)	793.1 (206.5)

Note: This table reports average payments in US\$ cents by payment condition. The observation period is September 1, 2005 until December 31, 2005. The payment condition *Name shown* was in place from November 16, 2005 until November 30, 2005.

days. The 95 percentile of the distribution of differences is 21.061, so we also do not find significant difference.

While comparing the raw coefficients gives a first impression of the direction of the effect, we can use the panel structure of our data to get a more accurate picture of the effect. We find that showing the name increases payments by around 14c\$, which is around 1.5%. This effect is not significant controlling for genre, album and artist of song purchased, day of the month and day of the week. The results are presented in Table 3. Column 1 shows the raw differences, taking into account the panel structure, in Column 2 the results are shown, controlling for the genre of the music purchase, in Column 3 controlling for artist and album purchased. Finally, results reported in Column 4 take account of weekday and day of month effects. The result of the raw comparison in Column 1 is robust to the inclusion of all this available controls.

Number of Customers and Revenue

As the marginal costs of the retail firm and the producer (artist) are negligible, the economically interesting variable for the firm is the number of customers and the revenue they gener-

Table 3: Random effect regressions on Payment

	(1)	(2)	(3)	(4)
Name shown	14.32 (1.46)	12.47 (1.27)	12.87 (1.25)	13.37 (1.28)
Constant	809.2*** (188.62)	827.5*** (78.16)	747.7*** (8.88)	779.9*** (39.63)
Genre	No	Yes	No	No
Album	No	No	Yes	No
Artist	No	No	Yes	No
Day of month	No	No	No	Yes
Day of week	No	No	No	Yes
<i>N</i>	5503	5503	5503	5503

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

ate. Table 4 on page 11 reports OLS regression on the number of daily customers. Columns 1-3 show when pooling data from the periods before and after the “Name Shown” policy, while columns 4-6 report only the differences before the policy change and skips the after policy change data, in order not to pick up a loss of reputation effect that may have occurred. Under the regime we see a drop of on average 20% (11 customers) per day and revenues dropped by 25% (around 100US\$) per day. These effects get stronger, when controlling for week day (column 2) and the day of the month (column 3). We can conclude that the result is not driven by week day effects. This is also reflected in the revenues, presented in Table 5 on page 12, where it results in a drop of around 100US\$ per day, which is also robust to the introduction of controls.

We can therefore conclude that the negative effects of reducing privacy on the number of customers appears to dominate the positive effects of higher payments, constituting an overall loss of welfare.

Table 4: OLS Regression: Number of Daily Customers

	(1)	Pooled (2)	(3)	(4)	Before (5)	(6)
Name shown	-13.19*** (-4.38)	-13.11*** (-4.20)	-17.40*** (-4.40)	-10.77*** (-3.78)	-10.91*** (-3.69)	-12.77** (-2.90)
Constant	46.62*** (27.45)	46.54*** (12.03)	40.38*** (6.51)	45.70*** (24.90)	50.37*** (14.72)	45.08*** (7.08)
Week day	No	Yes	Yes	No	Yes	Yes
Day of month	No	No	Yes	No	No	Yes
<i>N</i>	122	122	122	89	89	89

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The table presents the results of linear regression on Customers per day per day.

Regression Discontinuity Specification To assess the robustness of the simple OLS results in Table 4, calculate the Wald estimators in a regression discontinuity design.⁵ In Figure 1 we show the results of a sharp regression discontinuity specification. The optimal bandwidth was chosen according to the algorithm by Imbens and Kalyanaraman. (2009) We report the results for 50%, 100% and 200% of the optimal bandwidth, at 6.9, 13.8 and 27.7, respectively. These results corroborate the results from Table 4 that reporting names and email addresses of customers to artists reduces the number of paying customers significantly.

⁵ We implemented this in Stata using the module *rd* by Nichols (2011)

Table 5: OLS Regression: Daily Revenue

	(1)	Pooled (2)	(3)	(4)	Before (5)	(6)
NameShown14	-10363.7*** (-4.20)	-10294.6*** (-4.04)	-13918.6*** (-4.23)	-8177.1*** (-3.42)	-8362.9** (-3.36)	-10031.3** (-2.74)
Constant	37256.4*** (26.91)	37101.8*** (11.94)	30901.2*** (6.03)	36187.1*** (24.19)	39780.4*** (13.94)	34799.1*** (6.25)
Week day	No	Yes	Yes	No	Yes	Yes
Day of month	No	No	Yes	No	No	Yes
<i>N</i>	122	122	122	89	89	89

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

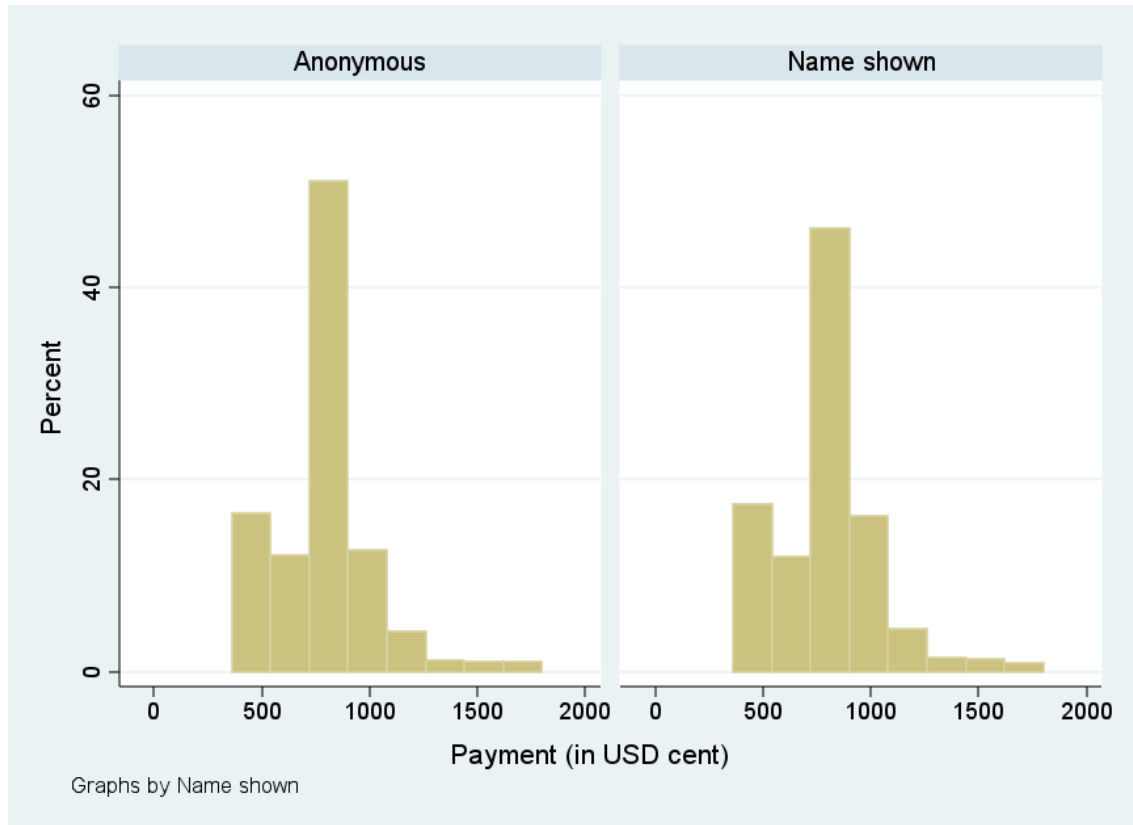
Note: The table presents the results of linear regression on revenue per day (in USD cents).

Figure 1: Regression Discontinuity on Daily Customers



Note: This graph reports the results of a regression discontinuity specification at different bandwidths. The 0 on the x-axis specifies the date of the policy change (Nov 16, 2005). For a bandwidth of 6.9 the coefficient is -17.72 (p-value: 0.034), of 13.8 the coefficient is -10.64 (p-value: 0.060) and of 27.7 the coefficient is -17.04 (p-value: 0.002). We compare the time before the change happened and during the change.

Figure 2: Histogram of payments before and after the policy change



The selection of customers does not seem to be driven by customers who pay little. Figure 2 on page 13 shows the distribution of payments before and after the policy change. The distributions are not significantly different from each other (Kolmogorov-Smirnoff test, p-value: 0.412).

5 Conclusion

The economic literature on charitable giving and the private provision of public goods suggests that revealing one's identity is beneficial to the level of one's donation/contribution. In most of these studies donors were forced into a giving situation.⁶ To the best of our knowl-

⁶ Exceptions are DellaVigna, List and Malmendier (2012) who report a willingness to avoid a meeting with a door-to-door charity solicitor and Andreoni et al. (2011) who find a tendency to avoid a campaigner who asks passers-by to give.

edge the effect of anonymity on a customer's decision whether to buy and how much to pay has not been studied yet. Our natural experiment in a pay-what-you-want like online music store allows us to test these questions. While revealing the name of the customer led to slightly higher payments, it drastically reduced the number of customers purchasing. Overall, average daily revenues dropped by 25%. Hence, our study extends the empirical evidence of the *reduced anonymity effect* to a consumption environment, and it indicates that the opt-out due to a reduction of anonymity/privacy is substantial. Since less transactions took place and every transaction of a zero marginal cost information good is by default mutually beneficial, the experiment suggests that the effect of social pressure on customers leads to a reduction of welfare. Given the existing evidence of negative sort out effects due to social pressure in face-to-face interactions, it seems remarkable that even in an online context social pressure matters.

What are possible explanations for this behavior? What affects consumers' decision to purchase when anonymity is reduced and what determines how much they pay? We find that average payments do not increase when anonymity is reduced. This is in line with the results of Gneezy et al. (2012) who report that voluntary payments are lower when restaurant customers were observed. Our results support their conclusion that self-image concerns are an important determinant of voluntary payments, while social-image concerns (triggered by a public context) may have a detrimental effect. We also found that the number of customers purchasing an album drastically dropped. Customers could anticipate that they may be tempted to pay more than they actually want to due to the social pressure, and decide to avoid the payment decision. Although our data does not indicate that customers pay more under reduced anonymity we cannot exclude this explanation as we do not observe the beliefs of customers. Alternatively, customers' perceptions of the shop's intention could matter. If the intentions behind the changed payment interface come across as malevolent, namely, implemented in order to increase the payments, then a less anonymous payment scheme is

repelling customers. They may be alienated by the shop's behavior and reciprocate in a negative way by deciding against a purchase. Since Regner (2010) finds that generous payments at Magnatune are explained by customers' disposition to reciprocity, it seems reasonable that customers also react negatively to features they do not appreciate. The breach of privacy without immediate advantage for the customer – as highlighted by Acquisti and Grossklags (2005) – may strengthen this adverse effect.

It is important to note that the sorting out in real world situations depends on how substitutable the good or service is. In the case of digital music, there are very close substitutes and so the sorting sensitivity is higher. Potential consumers may quickly turn to other sellers, if they perceive the reduced anonymity as disturbing. In other circumstances people may not be able to easily substitute for a context without social pressure and the sorting out would be small. For instance, the environments analyzed in the field experiments mentioned previously, the National Park in Alpizar, Carlsson and Johansson-Stenman (2008) or the churches in Soetevent (2005), would be of that kind. In contrast, shoppers in Andreoni, Rao and Trachtman (2011) can substitute the entrance with the campaigner by walking a few extra steps to the other entrance, and it appears they tend to do so.

These results may also offer insights for the campaigning of charitable organizations and the financing of public goods. Using private data with the intention to reduce anonymity and, in turn, increase donation/contribution levels may be effective, but it also potentially decreases the donor/contributor base. This extends findings of DellaVigna, List and Malmendier (2012) who analyze a door-to-door fundraising campaign and report a substantial willingness to avoid the personal contact with the solicitor. According to our results even low-pressure approaches like online or mail solicitations (in comparison to a face-to-face contact) may result in negative welfare effects, if privacy is perceived to have been breached.

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