An Experiment in Crowdfunding: Assessing the Role and Impact of Transaction-Level Information Controls

Completed Research Paper

Gordon Burtch
Carlson School of Management
University of Minnesota
gburtch@umn.edu

Anindya Ghose
Stern School of Business
New York University
aghose@stern.nyu.edu

Sunil Wattal
Fox School of Business
Temple University
swattal@temple.edu

Abstract

Crowdfunding has received a great deal of attention of late, as a promising avenue to fostering entrepreneurship and innovation. A notable aspect of shifting these financial activities to an online setting is that this brings increased visibility and traceability to a potentially sensitive activity. Most crowdfunding platforms maintain a public record of transactions, though a good number also provide transaction-level information controls, enabling users to conceal information as they see fit. We explore the impact of these information control mechanisms on crowdfunder behavior, acknowledging possible positive (e.g., comfort) and negative (e.g., privacy priming) impacts, employing a randomized experiment at a leading crowdfunding platform. Reducing access to information controls increases conversion rates (by ~5%), yet it also decreases average contribution amounts ($5.81 decline). We offer interpretations for these effects along with some empirical support, and we discuss implications for crowdfunding platform design.

Keywords: crowdfunding, privacy, priming, anonymity, randomized experiment
Introduction

Over the last seven to eight years, a growing proportion of the venture finance gap has been filled by novel funding mechanisms. In particular, online crowdfunding has received a great deal of attention from entrepreneurs and policymakers as a promising avenue to fostering entrepreneurship and innovation. Crowdfunding has been defined as “a collective effort by individuals who network and pool their money together, usually via the Internet, to invest in or support the efforts of others” (Ordanini et al. 2010).

One of the primary hurdles typically faced by new entrepreneurs is the identification and sourcing of capital (Wetzel 1987). Crowdfunding simplifies this process by providing entrepreneurs with broader reach and visibility, effectively ‘democratizing access to capital’ (Agarwal et al. 2013; Kim and Hann 2013). However, a notable implication of shifting the fundraising process online is that it brings with it increased visibility and traceability of transactions. Most crowdfunding platforms maintain a public record of all transactions, variably including information about a contributor’s identity, the amount of their contribution and the campaign they chose to support. Perhaps cognizant of the potential that some crowdfunders may shy away from scrutiny, while others may prefer greater attention, many crowdfunding platforms now provide users with transaction-level information controls, which enable them to conceal or reveal their identity or contribution amount as they see fit.

On the surface, it seems likely that providing crowdfunders with the ability to manipulate the visibility of their actions or identity in this dynamic fashion would increase their level of satisfaction, and thus their willingness to transact (Culnan and Armstrong 1999), resulting in increased fundraising success and improved economic outcomes. Indeed, a large number of studies in recent years have sought to quantify the value of website features like privacy assurances, policies and seals in this regard, demonstrating how they variably facilitate engagement and conversion, in the form of product purchase or personal information sharing (Hui et al. 2007; Tsai et al. 2011). In parallel, a number of studies have demonstrated the value that online users frequently place on social recognition and reputation, inducing increases in user contributions (Wasko and Faraj 2005; Zhang and Zhu 2011).

However, there are also potential costs associated with providing users with information control (privacy) mechanisms. Recent work suggests users may ignore these features if they perceive that they are inflexible, difficult to understand or a challenge to use (Das and Kramer 2013; Sleeper et al. 2013), opting instead to withdraw from transacting entirely (e.g., self-censoring posts on Facebook). Further, it has been shown that questions or prompts related to scrutiny or privacy, when presented to a user during the course of a transaction, can elicit an increase in privacy concerns via priming effects (Acquisti et al. 2012; Goldfarb and Tucker 2012; Joinson et al. 2008; Tucker 2014). This, in turn, can have a negative influence on users’ willingness to engage with a purveyor, platform or other users, causing them to withdraw from a transaction.

Bearing the above in mind, in this work, we set out to understand the impact that transaction-level information (privacy) controls might have on crowdfunders’ willingness to transact, as well as their subsequent behavior, conditional on conversion. In essence, we hope to understand whether crowdfunding, given that it is undertaken in an online space, can be further facilitated through the provision of online privacy controls. More specifically, we seek to identify and quantify the causal relationship between a crowdfunding platform’s provision of privacy controls and contributors’ willingness to transact. Further, we look to understand any associated shifts in crowdfunder behavior, conditional on a transaction.

Typically, evaluating the impact of information (privacy) control provision is inherently challenging. This is because of various biases that are associated with observational and survey-based attempts to evaluate privacy sensitive individuals who frequently are, by definition, unwilling to be scrutinized or profiled. Further, as Strandburg (2005) notes, concerns about privacy may not be accurately reflected in interview or survey-based settings because of the gap between consumers’ claimed privacy concerns and their actual behavior in response to those concerns. Participants also willingly take part in surveys and experiments, volunteering for them. As such, it is likely that the subjects of these past studies are systematically less wary of providing information about themselves to the experimenter, or of engaging in a given transaction, because they fully expect the experimenter to collect their information. Further, they are unlikely to have concerns about receiving unwanted solicitations from third party organizations or
individuals down the line (e.g., requesting charitable donations), because standard data collection policies in experimental protocols prohibit the sharing of data without explicit consent (Wattal et al. 2012).

Because of these issues, privacy-centered research employing surveys and controlled experiments generally must contend with biases that arise from under- and misreporting by subjects (Tourangeau and Yan 2007), self-selection, unrealistic conditions, etc. Although some computer-based efforts (e.g., web-based surveys) have helped to relieve some of the issues around reporting biases, by offering subjects a relative increase in anonymity (Turner et al. 1998), such methods remain incapable of completely eliminating the problem.

Meanwhile, observational (archival) studies are also confronted with their own, comparable issues. Researchers must contend with a lack of available data, as subjects strive to conceal their actions. Further, issues of endogeneity stemming from self-sorting and self-selection (Heckman 1979) are also likely to arise from any changes in user privacy conditions. To clarify, consider the example of the privacy sensitive consumer. Such consumers may opt to exit a marketplace entirely following, for example, the removal of a privacy assurance. Unless this selection effect were to somehow be accounted for explicitly, either in the data or through estimation techniques, it would be impossible to draw valid, generalizable conclusions about the effect that such a change had on user behavior. While various econometric techniques are available to address these issues (e.g., propensity score matching, instrumental variables, selection equations), each is heavily laden with assumptions. Further, data based adjustments are often challenging if not impossible to implement, as subjects who do not participate will often go unobserved.

Fortunately, employing web-based randomized experimentation in tandem with impression- or session-level data can alleviate these concerns. A unique feature of the present study is that users in our sample were observed while making real-life decisions, with real economic consequences. We partnered directly with the purveyor of a global online crowdfunding platform (Agarwal et al. 2013; Ordanini et al. 2010) to design and execute a large-scale, web-based in vivo, randomized control trial. This was done unbeknownst to the subjects under study (i.e., website visitors). Our results therefore are not subject to the reporting biases inherent in survey research of privacy issues, nor are they subject to issues of self-selection, as we observe subjects, whether or not they chose to engage with the platform during the course of their visit to the platform website.

In our experiment, we randomly manipulated the timing of presentation for an information control question, displaying it either prior to, or following the completion of payment. This intervention allows us to understand what impact these website features have on users’ willingness to engage with a platform in terms of transacting with other users (contributing to crowdfunding campaigns). Further, this intervention allows us to assess the impact on transaction characteristics (dollar amounts), conditional on conversion.

We found, counter to intuition, that randomly delaying the presentation of privacy controls drove a 4.9% increase in users’ probability of completing a transaction. At the same time, we discovered that, conditional on transacting, the dollar amount of the average campaign contribution declined in the post-payment condition ($5.81), to a statistically significant degree. Fortunately for the purveyor of this platform, the increase in the rate of participation was sufficient to offset the decline in average contributions, resulting in an immediate net benefit from the intervention. Accordingly, the purveyor has since adopted the post-payment setup on a permanent basis.

Our subsequent analyses suggest that the decline in average contributions with the intervention was driven by a reduction in the variance of contributions (i.e., the presence of fewer extreme contributions, where extreme contributions initially tended to be those that were larger). We submit that this occurred because contributors, who were less cognizant of privacy controls in the post-payment condition, perceived greater publicity for their actions and thus sought to conceal their contributions to avoid attention (e.g., because they wished to avoid unsolicited requests from other crowdfunding campaigns or out of privacy concerns). This result provides empirical evidence of the impact of publicity on individuals’ behavior, which has seen theoretical consideration in the prior literature on monetary donations to public goods (Daughety and Reinganum 2010), and which has also been demonstrated in regard to other types of online contributions, such as user-generated content in the form of restaurant reviews (Wang 2010). These results have important implications for the design and provision of online platforms with respect to privacy and information controls, across a wide variety of online contexts. In particular, our results
suggestion that a careful balance must be maintained between users’ privacy concerns and the behavior that can ensue from accommodating those concerns.

This work contributes to a number of streams of literature. The first is that pertaining to the growing literature on crowdfunding (Agarwal et al. 2013; Burtch et al. 2013a). We consider a novel aspect of the crowdfunding process, namely the provision of information controls and the impact these have on users’ perception of publicity or scrutiny for their actions. As well, the prior literature on crowdfunding has spent a great deal of time considering peer influence amongst contributors, as well as the importance of differences in the characteristics of crowdfunders, campaigns and campaign organizers. Our work adds to these efforts in a novel way, considering the underlying context and mechanisms that enable observation and response to these details, namely privacy controls and contributors’ decisions to employ them (or not).

Second, our work contributes to the literature on anonymity in charitable contribution and private contributions to public goods. A number of studies in recent years have noted the role of perception management and social image in pro-social behavior (Andreoni and Bernheim 2009; Daughety and Reinganum 2010). Our results indicate that these types of concerns similarly play into crowdfunder behavior, which in turn speaks to the presence of altruistic motives in online crowdfunding markets. Moreover, our work considers a novel scenario, in that past work has largely examined scenarios wherein anonymity or identification has been imposed on participants. Here, crowdfunders are given control over what information is revealed.

Lastly, this work builds on the prior literature dealing with information controls and online privacy by considering the dual, potentially countervailing impacts of privacy feature provision on user behavior: the effect on conversion rates and conditional contributions, which have not previously been examined in tandem. Of course, from a practical standpoint, it is also notable that we consider a relatively new website privacy feature implementation that is growing in prevalence, namely dynamic, transaction-level information controls and the manner of their provision.

Before presenting our experimental design, analysis and results, we offer a review of the literature dealing with crowdfunding and anonymity in charity, in order to provide the reader with an understanding of the role that privacy or information controls may play in this setting. We then provide a review of the literature dealing with online privacy and information hiding, before delving into our methods.

Literature Review

Crowdfunding & Charitable Contribution

In recent years, entrepreneurial financing has begun to shift, at least in part, into the digital realm. A number of crowdfunding platforms have arisen online that enable capital fundraising, with many receiving a fair amount of attention from researchers. Loan-based crowdfunding markets, such as Prosper and Lending Club have seen greatest consideration in the crowdfunding literature to date (Herzenstein et al. 2011a; Herzenstein et al. 2011b; Lin et al. 2013; Lin and Viswanathan 2013; Zhang and Liu 2012). Studies have variously looked at aspects of herding behavior amongst contributors, project pitch framing, and the roles of borrower social capital and lenders’ geographic biases. Only one study to date has considered an example of equity-based crowdfunding: Ahlers et al. (2012) leverage data from an Australian crowdfunding platform to examine issues of disclosure and the impact of said on fundraising outcomes, referring to notions of signaling theory.

There are also a number of studies that have examined entrepreneurs’ use of reward-based crowdfunding (the context of the present study). Agarwal et al. (2011) study Sellaband.com, reporting on the role of physical distance between contributors and fundraisers. Mollick (2014) examines Kickstarter.com, quantifying the impact of various campaign and organizer attributes on fundraising success, such as the size of the fundraiser’s social network, the duration of fundraising and the size of the fundraising target. Further, he looks at the role of geography and the degree to which funded projects deliver promised outputs on schedule.
Finally, other work has examined the use of donation-based platforms, which tend to enable campaigns that draw upon individuals' desire to help and support causes. Burtch et al. (2013b; 2014a) study two such donation-based crowdfunding platforms. In their first study, the authors find evidence of social influence and crowd-out between contributors in the crowdfunding process. In their second study, these authors examine the role of cultural differences between contributors and fundraisers, finding that these differences negatively impact contributors' selection of borrowers, over and above the effects of geographic distance.

Although donation-based crowdfunding platforms bear the greatest resemblance to traditional forms of charity, reward-based campaigns often elicit contributions from individuals via similar motivations (Gerber and Hui 2013). Accordingly, it is useful to consider the large body of literature that has touched on the role of anonymity in charitable contributions. There are two particularly notable studies in this space. First, Alpizar et al. (2008) find that individuals are generally more generous in donations in the presence of an observer. Further, those authors report that individuals are more likely to contribute when they can see others contributing in small amounts, but they also note that conditional contributions become smaller in that scenario. Conversely, they report that the likelihood of conversion goes unchanged when individuals observe others giving in relatively large amounts (e.g., $10), but conditional contributions significantly increase. Second, Croson and Marks (1998) perform a lab experiment involving contributions to a threshold public good. The authors study the effect of revealing individual contribution amounts and contributor identities on subject contribution behavior. They find that doing so leads to a lower variance in contributions (lesser variance), and higher average contribution amounts.

**Costs & Benefits of Information Controls**

The value of information controls in online social settings has been extensively discussed across many fields of study. In offering information controls, users are provided with the ability to determine where and when their actions will be publicly revealed or concealed, allowing them to optimize social outcomes.

The literature pertaining to user contributions in online communities has frequently noted that users place a certain value on reputational benefits and social recognition for their contributions. Zhang and Zhu (2011) demonstrate this in the context of Chinese Wikipedia, showing that users' contributions are markedly increased in the presence of a larger audience. Similarly, Wasko and Faraj (2005) report that professional reputational benefits are a key motivator for individual contributions to an electronic network of practice. There is even evidence in the crowdfunding literature itself that crowdfunders may draw reciprocal contributions for others, suggesting an incentive to reveal their activities to others (Zvilichovsky et al. 2013).

In contrast, the online privacy literature provides numerous examples wherein individuals prefer to avoid observation. For example, this literature is replete with studies of users' positive response to the provision of privacy features, such as assurances and seals. Hui et al. (2007) demonstrate via a field experiment that users' willingness to share personal information increases in the presence of privacy assurances, whether written or in the form of a privacy seal. Tsai et al. (2011) employ an experiment to show that customers are more likely to buy products from a website where privacy assurances are displayed in a more prominent, visible manner. These sorts of findings are generally in keeping with earlier studies in the online privacy literature, which has repeatedly noted information hiding as a primary user response to perceived privacy risks (Milne et al. 2004; Son and Kim 2008). In providing information hiding options to users, this effectively enables them to respond to perceived privacy risks in a manner they prefer.

It is important to note, however, that even though numerous studies report on users' demand for online privacy (Dinev and Hart 2006) and for privacy control mechanisms in particular (Acquisti and Grossklags 2004), that desire frequently does not translate into the privacy protective actions that one would expect (Jiang et al. 2013). This is because a number of other factors can influence behavioral outcomes (beyond the aforementioned desire for reputational gains). Scholars have noted that subjects' response to privacy risks will depend on their ability to perceive those risks. This, in turn, is driven by informational cues about the presence of privacy risk (John et al. 2011). For example, it has been shown that individuals react negatively to being explicitly identified by name in e-mail marketing, while reacting positively to the provision of tailored recommendations, an activity that is implicitly indicative of the collection and use of data about the customer's preferences (Wattal et al. 2012).
Scholars have also noted that merely posing questions to users about their privacy or simply highlighting their privacy control options can prime them to become privacy sensitive (Acquisti et al. 2012; John et al. 2011; Tucker 2014). Moreover, it has been shown that users may reject privacy controls that they perceive to be inflexible, ineffective or overly complicated, out of a fear that they will produce unexpected outcomes – in these scenarios, users may instead employ other tactics, such as withdrawing from the platform entirely (Das and Kramer 2013; Sleeper et al. 2013). Taken together, these results indicate that the mere provision of privacy controls can have countervailing effects, as they may increase user comfort, while at the same time potentially stimulating concerns.

The literatures on privacy, publicity, public goods and charitable contributions have also discussed the impact that audiences can have on individual behavior in public settings (Andreoni and Bernheim 2009; Daughety and Reinganum 2010). In particular, it has been noted that a perception of publicity or scrutiny could drive increases in individuals’ concerns about social approval or disapproval by others. As such, with a lack of privacy, individual behavior conditional on contribution (or transaction) may change – e.g., conforming to established norms. This notion has seen treatment in other empirical contexts as well, beyond charitable donations and public good contributions (Soetevent 2005). In particular, it has also been noted in the context of online reviews (Wang 2010).

Unsurprisingly, reward-based crowdfunders often desire to conceal details of their campaign contributions (Burtch et al. 2014b). To achieve this, users are often provided with information (privacy) control features during the course of their contribution transaction. Crowdfunding platforms thus provide an ideal setting in which to examine transaction-level information controls.

**Methods**

**Study Context**

Our study focuses on one of the world’s largest global platforms for reward- or donation-based crowdfunding. This marketplace enables anyone, in any location, to raise money for his or her project or venture. The marketplace is highly trafficked, attracting upwards of 200,000 visitors on an average day, and facilitating millions of dollars in campaign contributions each month. Since founding, which took place slightly more than five years ago, the platform has attracted over 1 million registered users from more than 200 countries around the globe.

This marketplace allows submission of any and all ventures, regardless of subject matter (except for prohibited content). Thus, rather than vetting campaign submissions, as is done in certain crowdfunding contexts, this marketplace operates as a meritocracy, with no gate keepers, allowing any and all submissions to be posted. When campaign owners submit their project to the marketplace for posting, they must define a number of campaign characteristics. These characteristics include the rewards the organizer plans to offer, what the organizer intends to do with the money, how much money they are attempting to raise, the planned funding duration and the “funding format.”

Campaigns are presented to website visitors in order of popularity (measured algorithmically by the purveyor, based on organizer effort, contribution activity, media coverage, etc.), though there are a variety of filtering and sorting mechanisms available to support campaign search efforts (e.g., location-based, recency-based). The home page also highlights new campaigns and campaigns that are ending soon. The visitor is presented with the ability to filter ongoing campaigns based on location (city) or proximity (“near me”), or by category (e.g., technology, small business, causes)\(^1\).

Once an individual has decided to contribute to a particular campaign, they must then indicate how much they wish to contribute. Contributors are then asked to provide an e-mail address and (if a perk is being claimed) a shipping address. At this point, in the baseline condition, the contributor is presented with a question about how they want their contribution record to appear on the campaign’s Funder tab. The

---

1 The campaign organizer (rather than the marketplace purveyor) determines the campaign category. As such, there are no strict rules around the assignment of categories, thus these groupings are fuzzy and may overlap.
contributor is given the option to conceal their identity or the amount of the contribution (but not both). Importantly, a contributor’s identity and amount will always be viewable to the campaign organizer; the hidden information is masked only from third parties (e.g., other contributors).

**Experimental Design**

Figure 1 presents a design mockup of the information control question that is posed to users during the course of a contribution transaction. The user is asked to specify which pieces of information about their contribution they would like to display (or conceal) from public view. Our experimental treatment imposes a delay in the presentation of this question within the contribution flow, from before payment to after payment, with the aim of mimicking removal of the mechanism from the platform, though in a watered down form.

This is done in order to assess the economic impact of information hiding mechanism provision, both in terms of users’ willingness to participate on the platform and in terms of users’ contribution amounts, conditional on participation. Ultimately, we aim to assess whether these mechanisms deliver a net benefit or detriment to campaign fundraisers and the purveyor of the platform.

As noted above, in the pre-payment (control) condition the information control question is presented to the user in the third step of the contribution process, just prior to payment. In the post-payment (treatment) condition, the mechanism is not presented until after payment has been completed. Figure 2, below, provides a visual comparison of the experimental flow experienced by subjects in our treatment and control conditions.

The positioning of the information control question in the contribution process (i.e., before vs. after payment) has two foreseeable, countervailing impacts on user behavior. On the one hand, placing the mechanism after payment may reduce any potential privacy or scrutiny priming effects, as the user is not prompted to consider these issues before making their payment. In turn, this effect could be expected to increase conversion rates. On the other hand, however, delaying presentation of the information control question might reduce willingness to transact amongst those users who already have privacy and potential scrutiny in mind (e.g., privacy sensitive individuals), or amongst those users who generally prefer to decide when their actions will and will not be visible to others (i.e., those who wish to optimize their publicity and privacy across transactions – impression management).

---

2 Information-hiding mechanisms of this sort are relatively common in online crowdfunding. Some other prominent platforms that employ these features include GoFundMe.com, GiveForward.com, and CrowdRise.com.

3 Although it is possible for users to create an account using a pseudonym, the high frequency with which these information control mechanisms are used (in approximately 50% of contribution instances) indicates that a majority of users reveal their true identity in their user profile.
This may therefore reduce willingness to engage and transact on the platform. Because of these competing effects, which both seem reasonable, it is not immediately clear what impact our treatment will have on user behavior, or which of these effects will dominate in the user population.
Our treatment allows us to gain insights into the economic impacts of providing information control mechanisms. This is because our treatment results in reduced access to, and salience of the information controls on this platform. Because we only delay the presentation of the mechanisms and do not fully remove them, any identified effects are presumed to be conservative estimates of the true effects that would arise following complete removal. Further, because we cannot ensure that impressions are associated only with first-time contributors\(^4\), it is possible that some subjects in our treatment condition may anticipate the availability of information hiding mechanisms, even though they are not presented up front following our intervention. This anticipatory behavior could also mute the effects of our treatment, resulting in conservative estimates.

**Econometric Specification**

Our estimation approach relies primarily on Linear Probability Models (LPMs) to estimate the conversion models (i.e., where the dependent variable is whether the user converted or not), and standard OLS to estimate the contribution models (i.e., where the dependent variable was the dollar amount of the user’s contribution). All of our estimations incorporate campaign and time fixed effects (both in terms of the absolute day on which the observation took place, as well as the day of week). In addition, we include a variety of other control variables\(^5\) pertaining to the contributor and the campaign.

We estimate our models in a stepwise fashion, beginning with a baseline estimation that simply includes our treatment effect, *Treatment*, campaign fixed effects and time fixed effects. We then incrementally incorporate the other controls, including the campaign funding status at the time of the observation – i.e., the funds raised to date, *Campaign Balance*, and the number of days of elapsed fundraising, *Campaign Days*. Additionally, we include controls for whether the user is on a mobile device, *User Mobile*, their browser of choice, *User Browser*, their browser language, *User Language*, and their country (based on IP-address), *User Country*. Equation 1, below, captures our econometric specification.

\[
\text{Conversion}_{ijt} = \beta \ast T_{ijt} + \gamma \ast X_{jt} + \lambda \ast Z_{ijt} + \Phi_j + \Omega_i + \epsilon_{ijt} \quad (1)
\]

Here, we index users with \(i\), campaigns with \(j\), and time, in days, with \(t\). The coefficient of interest is \(\beta\), capturing the effect of our treatment on conversion rates. \(X\) is a vector of dynamic campaign controls for fundraising and duration, \(Z\) is a vector of user controls, including browser, language, country and device, \(\Phi\) is a vector of campaign fixed effects, \(\Omega\) is a vector of day fixed effects and day of week fixed effects and, lastly, \(\epsilon\) is our error term.

We employ a similar econometric specification in our evaluation of the impact of our treatment on conditional and unconditional contribution, except that our dependent variable is the dollar amount contributed. One distinct difference in our conditional contribution estimations, however, is that we are able to identify all users in the sample. Accordingly, we are able to incorporate additional contributor controls that are associated with the user account, such as the user’s tenure on the platform (i.e., duration of time since registering), *User Tenure*, and an indicator of whether they have an explicit organizer relationship with the campaign, *Organizer*. Equation 2, below, details our econometric specification for the conditional conversion estimations. Our unconditional contribution estimations are essentially identical, except that they exclude these account-based contributor controls.

\(^4\) We do offer one robustness check in which we examine our treatment’s effect on conditional contribution amongst new users (i.e., those registering in the 24 hours prior). We can be reasonably sure that such users are first time contributors, and thus are unlikely to hold any prior expectations about the availability of information control features on the website. Notably, our results remain consistent in this subsample estimation.

\(^5\) It should be noted that we do not incorporate user fixed effects. This is because are unable to identify users unless they are converted. Notably, however, this is not a major concern, because our treatment is randomized, and thus extremely unlikely to be correlated with omitted variables, including user characteristics. Moreover, our estimations demonstrate that incorporating the various controls at our disposal does little to influence the magnitude or significance of our treatment effect estimates.
\[
\text{Contribution}_{ij} = \beta^* T_{ij} + \gamma^* X_{ij} + \lambda^* Z_{ij} + \varphi_j + \omega_t + \epsilon_{ij} \ (2)
\]

After we report on our main regression results, we offer a series of robustness checks employing alternative estimators and sample splits, in addition to manipulation checks (i.e., what happens to the proportion and type of information hiding activities between our treatment and control conditions). Finally, we report on efforts to rule out alternative explanations for the identified treatment effect.

**Data & Descriptive Statistics**

Our experiment was conducted over a 14-day period, during which time 128,701 visitor impressions arrived that entered the campaign contribution flow, and thus joined our subject pool. Of these, 62,332 received the treatment condition (48.4%) and 37,328 were converted (29%)—completeing a contribution transaction. Table 1 provides a breakdown of notable descriptive statistics across each stage of the contribution flow, split between our treatment and control conditions, while Table 2 provides sample-wide descriptive statistics for all of our variables, including controls.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>N</th>
<th>Tot. N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion</td>
<td>0.259</td>
<td>0.438</td>
<td>66,369</td>
<td>0.323</td>
<td>0.467</td>
<td>62,332</td>
<td>128,701</td>
</tr>
<tr>
<td>Conditional</td>
<td>89.337</td>
<td>260.948</td>
<td>17,222</td>
<td>85.939</td>
<td>263.440</td>
<td>20,106</td>
<td>37,328</td>
</tr>
<tr>
<td>Organizer</td>
<td>0.017</td>
<td>0.128</td>
<td>17,222</td>
<td>0.019</td>
<td>0.136</td>
<td>20,106</td>
<td>37,328</td>
</tr>
<tr>
<td>Binary Hide</td>
<td>0.470</td>
<td>0.500</td>
<td>17,222</td>
<td>0.208</td>
<td>0.406</td>
<td>20,106</td>
<td>37,328</td>
</tr>
</tbody>
</table>

Table 1. Descriptive Statistics: Control vs. Treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.48</td>
<td>0.50</td>
<td>0.00</td>
<td>1.00</td>
<td>128,701</td>
</tr>
<tr>
<td>Conversion</td>
<td>0.29</td>
<td>0.45</td>
<td>0.00</td>
<td>1.00</td>
<td>128,701</td>
</tr>
<tr>
<td>Unconditional Contribution</td>
<td>25.38</td>
<td>146.73</td>
<td>0.00</td>
<td>1,000.00</td>
<td>128,701</td>
</tr>
<tr>
<td>Campaign Balance</td>
<td>148,134.60</td>
<td>253,854.80</td>
<td>0.00</td>
<td>1,142,523.00</td>
<td>128,701</td>
</tr>
<tr>
<td>Campaign Days</td>
<td>25.77</td>
<td>22.74</td>
<td>1.00</td>
<td>252.00</td>
<td>128,701</td>
</tr>
<tr>
<td>User Mobile</td>
<td>0.22</td>
<td>0.42</td>
<td>0.00</td>
<td>1.00</td>
<td>128,701</td>
</tr>
<tr>
<td>User Organizerx</td>
<td>0.02</td>
<td>0.13</td>
<td>0.00</td>
<td>1.00</td>
<td>37,328</td>
</tr>
<tr>
<td>User Tenurex</td>
<td>43.15</td>
<td>127.49</td>
<td>0.00</td>
<td>1,835.00</td>
<td>37,328</td>
</tr>
</tbody>
</table>

Table 2. Descriptive Statistics: Sample-Wide

*Notes: x – sample based only on converted users.*

In addition to our sample statistics, it is also interesting to note an additional descriptive analysis we undertook, in order to understand the degree to which crowdfunders scrutinize the contributions of prior others. To achieve this, we obtained data from the platform purveyor about user navigation patterns, in order to understand the degree to which individuals on this platform examine the campaign contributions of prior others. Specifically, we obtained data about the last campaign tab viewed by a given user, before they navigated elsewhere – whether into the contribution flow (and thus into our sample), or elsewhere. We obtained this data for approximately 145,000 website visitors, and observed that nearly 30% of those visitors completed their campaign URL visit by looking at the list of past contributions. However, because
we only observe the last tab that was viewed, the proportion of visitors navigating to this tab is in fact likely to be much higher than this. This provides clear empirical evidence of the role that scrutiny and publicity may play in this setting.

**Results**

We first report results for the impact of our treatment on the probability of campaign contribution, in Table 3. Here, we see that the treatment appeared to reduce privacy sensitivity, because it resulted in an approximate 5% increase in the probability of conversion (column 2). These results indicate that the provision of information hiding mechanisms, and perhaps privacy controls in general, can have counterintuitive, detrimental impacts on user behavior from the purveyor’s standpoint, raising users’ concerns, lowering their willingness to contribute on the platform. Examining the change in dollar contributions, conditional on conversion, which are presented in Table 4, we found that the average contribution declined by approximately $5.81 with treatment (column 2). This result reinforces our earlier observation that the effect of offering information controls may be somewhat complex, in that it can have a variety of countervailing impacts on user behavior. Taken together, the above two results indicate that the provision of information hiding mechanisms, and perhaps privacy controls in general, can have counterintuitive, detrimental impacts on user behavior from the purveyor’s standpoint, raising users’ concerns, and lowering their willingness to transact on the platform.  

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>LPM-FE (1)</th>
<th>LPM-FE (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.057*** (0.007)</td>
<td>0.049*** (0.007)</td>
</tr>
<tr>
<td>Campaign Balance</td>
<td>--</td>
<td>2.09e-07*** (1.78e-08)</td>
</tr>
<tr>
<td>Campaign Days</td>
<td>--</td>
<td>-0.013*** (0.001)</td>
</tr>
<tr>
<td>User Mobile</td>
<td>--</td>
<td>-0.156*** (0.009)</td>
</tr>
<tr>
<td>User Browser</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>User Language</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>User Country</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>Day of Week Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Time Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Campaign Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Observations</td>
<td>128,701</td>
<td>128,701</td>
</tr>
<tr>
<td>F-stat</td>
<td>27.80 (20, 5077)</td>
<td>1.2e+08 (214, 5077)</td>
</tr>
<tr>
<td>R-square</td>
<td>0.14</td>
<td>0.18</td>
</tr>
</tbody>
</table>

**Notes:** *** p < 0.001, ** p < 0.01; Robust standard errors reported in brackets for coefficients, clustered by campaign; Sample includes all users who entered the contribution flow.

When we consider the above effects in tandem (i.e., the combination of increased participation and reduced contribution), we find that the increase in conversion rates dominated. These results are reported

---

6 At the same time, it should also be noted that the provision of these features could reduce consumer surplus. If opting out of a particular transaction is actually an optimal choice, removing privacy controls and thus privacy priming from the contribution process may actually drive the crowdfunder toward suboptimal behavior. As such, the treatment may impose some unobserved costs upon crowdfunders.
in Table 5. Thus, our treatment ultimately resulted in a net benefit for the platform purveyor in terms of overall fundraising outcomes. In particular, we saw an estimated increase of roughly $3.55 in the average contribution per impression, following treatment.

Table 4. Regression Results: Contribution (Conditional on Conversion)

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>OLS-FE (1)</th>
<th>OLS-FE (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>-5.472* (2.727)</td>
<td>-5.810* (2.679)</td>
</tr>
<tr>
<td>Campaign Balance</td>
<td>--</td>
<td>7.79e-07 (0.000)</td>
</tr>
<tr>
<td>Campaign Days</td>
<td>--</td>
<td>-2.954+ (1.781)</td>
</tr>
<tr>
<td>User Mobile</td>
<td>--</td>
<td>-3.095 (5.772)</td>
</tr>
<tr>
<td>User Tenure</td>
<td>--</td>
<td>-0.020* (0.008)</td>
</tr>
<tr>
<td>User Organizer</td>
<td>--</td>
<td>82.868** (25.184)</td>
</tr>
<tr>
<td>User Browser</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>User Language</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>User Country</td>
<td>Not Included</td>
<td>Included</td>
</tr>
<tr>
<td>Day of Week Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Time Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Campaign Effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Observations</td>
<td>37,328</td>
<td>37,328</td>
</tr>
<tr>
<td>F-stat</td>
<td>1.79 (20, 3581)</td>
<td>1.2e+09 (216, 3581)</td>
</tr>
<tr>
<td>R-square</td>
<td>0.17</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Notes: ** p < 0.01, * p < 0.05, + p < 0.10; Robust standard errors reported in brackets for coefficients; Sample includes only converted users; Estimation includes additional user-profile specific controls because all users are identified.

We next conducted a set of secondary analyses to understand the underlying mechanism of the observed effect. That is, we sought to determine whether average contributions were indeed declining because of a reduction in the variance of contributions (i.e., fewer extreme contributions), as we suspected. We undertook two additional analyses to achieve this. Specifically, we examined the total variance in contribution amounts between our pre- and post-payment samples and we found that the variance in contributions amongst converted users was significantly smaller in the post-payment condition, compared to the pre-payment condition ($f = 1.059, p<0.001$). The equality of variances test was performed using Stata’s `sdtest` command. Additional tests based on Levene’s robust test statistic, as well as that proposed by Brown and Forsythe were also statistically significant ($p < 0.001$). This provides further support for our conclusion that contributors regressed toward the mean when access to privacy controls was delayed, likely because of a publicity effect.

Robustness Checks

We next sought to assess the validity of our interpretations, considering possible alternative explanations beyond our suggested rationalization of privacy priming and publicity. Perhaps the most concerning confound for our intervention would be any decline in the complexity of the user interface (UI) resulting from our intervention, and the associated decline in the effort required on the part of the user to complete payment. However, this is unlikely to explain the observed effects for a number of reasons.
First, we explored the duration of time it took converted visitors to complete the contribution process, comparing our treatment and control groups, and found no evidence that the treatment group completes their payments more quickly \( t = -1.26, p = 0.21 \). This is important, because we would expect to see significantly shorter visit durations in our treatment group (post-payment condition) if complexity and effort were indeed reduced. Although a lack of evidence is not evidence to the contrary, our extremely large sample size provides us with a great deal of statistical power, thus we would expect to identify any systematic decline in visit durations. Second, it is important to keep in mind that UI complexity is completely incapable of explaining the significant decline we observe in average contribution amounts with treatment. Taken in tandem, the above points make it unlikely that UI complexity can explain our findings.

We then explored the robustness of our results in a number of other ways. We considered the impact of outlier observations, repeating our primary estimations excluding those observations that fell within the top 5% of the distribution in terms of contribution amounts, and then again excluding observations that pertained to campaigns in the top 5% of the distribution in terms of funding targets. Notably, our results remained generally unchanged. Next, we considered the use of alternative estimators. In particular, we explored the use of panel fixed effects Logit and Probit estimators for our conversion model, and we considered panel fixed effects Poisson and negative binomial estimators for our contribution models. Then, we similarly explored the results our contribution models using Poisson and Negative Binomial estimators. In all three cases, we saw results that were consistent with those reported in our LPM and OLS fixed effect estimations. This indicates that our results are not dependent on the choice of estimator.

We also re-ran our estimation using a subsample of our data, focusing only on converted visits amongst users who registered on the platform within the prior 24 hours.\(^8\) The goal of this estimation was simple.

---

\(^7\) This analysis excluded outlier observations in terms of visit durations, namely visits in excess of 1,500 seconds or 25 minutes. We exclude these observations because they likely represent visits where a browser window was left open and inactive.
Users who had registered on the platform within the prior 24 hours should be unlikely to hold any expectations about their information hiding options on the platform, and they should be less likely to notice any changes in the website design. Repeating our conditional contribution estimation on this subsample of observations, we clearly observed that the treatment effects persisted. As such, we feel confident that our results are not in any way driven by the decisions or behavior of repeat visitors in our sample.

**Manipulation Check**

As a final analysis, we undertook a manipulation check for our intervention, assessing shifts in the pattern of information hiding mechanism usage between the treatment and control conditions. Logically, delaying access to the information hiding mechanism should drive a reduction in its use if our intervention is having the anticipated effect. As such, we looked for a general downward shift in the mechanism’s usage in our treatment condition. As anticipated, the rate of information hiding was found to be much lower, indicating that our treatment did indeed have the desired effect. In particular, in the control condition approximately 47% of contributions involved information hiding, as compared to the treatment condition, where approximately 21% of contributions involved information hiding.

We next examined whether information hiding (and our treatment’s effect on information hiding) depended on campaign characteristics. We found that our treatment had a large, highly negative effect on hiding behavior, as we would expect from the model-free results above, but we found no evidence that the effect depended upon campaign category, with one exception: the Video and Web category, where the treatment effect was significantly attenuated. Our suspicion is that this is because the baseline level of information hiding is already quite low for contributions toward projects in this category, thus the potential impact of the treatment is much lower to begin with. This seems likely, when one considers that the rate of information hiding in the Video and Web category is 0.33 in the control condition, and the next lowest rate is 0.41, for the Theatre category.

**Discussion**

To our knowledge, this work is the first to examine transaction-level information controls, or the impact of such controls in general, using a randomized treatment. As a result, our study offers increased rigor over prior studies that have looked at the impact of such site features on conversion, participation and purchase, given that past studies have tended to employ either surveys or lab experiments. Although numerous studies in the literature have employed laboratory and field experiments to evaluate these issues, generally reporting that these mechanisms increase customer information sharing and transaction likelihood, it is possible (even likely) that past results cannot account for changes in the volume or composition of the converted population that are likely to arise with adjustments to a website interface.

Our results can inform crowdfunding stakeholders in a number of ways. First, for platform purveyors, our results indicate that the provision of information controls should be considered with care. While it is likely that our results would generalize to other reward- and donation-based crowdfunding platforms, or indeed, perhaps even equity-based crowdfunding contexts, this will depend heavily on a number of factors, such as the degree to which the platform enables transparency, reputation and recognition. Therefore, the design of the platform in this regard should be context-dependent. For example, a key factor to consider is the type of campaigns typically being supported on the platform. Potentially controversial campaigns are likely to induce greater cognizance of and use of information control features, thus purveyors of such platforms will likely need to take more care in regard to their design and implementation.

Crowdfunding campaign organizers might also consider offering the crowd the opportunity to participate and contribute via other, effort-based avenues. Although some contributor may shy away from potentially public monetary contributions, they may be more willing to publicly partake in the campaign on an effort basis, by volunteering expertise or ideas. Some platforms have adopted this strategy, providing

---

8 Because we can identify everyone, we are able to comprehensively determine the date on which they joined the platform.
mechanisms for crowdfunders to pledge volunteer effort, in addition to funds (e.g., Spot.us provides an option to 'Donate Talent' to a campaign). With regard to crowdfunding contributors, our work reinforces the findings of prior research that individuals are frequently unaware of the privacy risks they do or do not face, and that these perceptions are largely driven by available cues (John et al. 2011). In our context, we have shown that the mere provision of privacy and information-related prompts can severely impact conversion rates and platform contributions.

Our work is also interesting to consider in light of the research in psychology and experimental economics dealing with anonymity in charitable contributions. Some of our results closely parallel those reported in charitable contexts. For example, Alpizar et al. (2008) found that revealing contribution amounts increased the likelihood of contribution, while simultaneously lower the amount of conditional contributions (when prior contributions were already generally small). We have found a similar result here, from reducing access to information controls, and thus increasing contribution transparency. Similarly, our findings that the extremity (variance) of contributions declines in the relative absence of information controls parallels the results of Croson and Marks (1998), who report that identifying contributors and revealing contribution amounts in a lab setting leads to a lower contribution variance. Moreover, Croson and Marks report that average contributions increase in the absence of anonymity. Our results, in terms of expected contribution per visitor, exhibit a similar pattern, largely attributable to the increased probability of conversion (noted above). Thus, although average conditional contributions decline in our sample, when we account for the increase in conversion rates, the overall average contribution amount grows larger. The fact that we replicate various results from prior studies of charitable contribution and public goods provides indirect evidence of the role that altruism plays in reward-based crowdfunding.

It is also important to discuss potential limitations of our work. A key issue that arises here is the issue of user names and pseudonyms. That is, it could be argued that crowdfunders could simply employ a pseudonym if they were really concerned about being observed. However, empirically, we observe that fully one third of all contributions in our sample involve some form of information hiding on the part of the contributor. This provides a clear indication that many crowdfunders do in fact place value on their online identity and, further, that they may experience some shift in utility from others' scrutiny. As such, there are at least some parallels here between reward-based crowdfunding and offline angel investment.

More to the point, the issue is actually rather complex. First, if users wish to ever accrue recognition or reputation for their actions, it is in their interest to incorporate aspects of their true identity into their user profile. Further, even for those users who do not, online personas nonetheless tend to persist across transactions and interactions, and thus carry their own reputation (Dellarocas 2003). Notably, reputation and recognition are both factors that have proven to be quite important in offline venture capital, because, for example, high profile and well-regarded investors are better able to drive follow on investment (Hochberg et al. 2007; Sorensen 2007; Sorenson and Stuart 2001). This has been shown to be true in crowdfunding as well, where the literature has noted the role of expert investors in driving follow-on investment (Kim and Viswanathan 2014), as well as the role of organizers’ social embeddedness in the crowdfunder community as a driver of fundraiser success (Younkin and Kashkooli 2013), and reciprocal contribution in particular (Zvilichovsky et al. 2013).

In general, in crowdfunding, all transactions are tied to the user profile and these associations are viewable. Further, the potential for unsolicited funding requests remains in the online setting, thus a desire to avoid such requests can also drive a desire to conceal ones actions from public view, as noted earlier, and this has little to do with the user’s decision to use a true identity or online persona. Bearing this in mind, we expect that the observed effects would be even stronger in equity-based crowdfunding, given the increased sensitivity of transactions and their typically greater dollar amount.

**Conclusion**

Online spaces are characterized by increased visibility and traceability, and crowdfunding platforms are no exception; they make a point of publicly recording transaction records for all to see. Financial transactions tend to be sensitive in nature, thus scrutiny of this sort may actually impede transactions. Bearing in mind these issues of scrutiny and visibility, many crowdfunding platforms now offer transaction level information controls, so that contributors can decide what will be made publicly visible.
about their transactions. Unfortunately, prompting users with questions about how their actions will be viewed by others will not necessarily result in positive returns. On the one hand, prompts of this sort can prime users with privacy concerns. On the other hand, withholding these features could make privacy conscious users less comfortable. With the above tension in mind, in this study, we have examined the potential of transaction-level information controls to accommodate online crowdfunders who may prefer to keep a low profile, and to avoid public scrutiny. Employing a randomized field experiment, we consider the double-edged sword presented by the provision of these privacy controls during the course of the crowdfunder contribution process, considering both positive effects (increased comfort or security) and negative effects (privacy priming). On the one hand, we find that delaying the presentation of these mechanisms increases conversion rates. On the other hand, we find that their provision simultaneously degrades average platform contributions, following conversion.

Although we provide evidence suggesting that privacy priming and publicity effects drive these outcomes, future work can and should explore aspects of mechanism design, wording and presentation format. For example, it is possible that one or both of these effects would be moderated by specific attributes of the mechanism, such as the text that is presented to the user, the granularity of information hiding options (e.g., providing an additional option of presenting a discretized ‘range’ of the contribution, such as ‘$10-$20’, instead of simple binary hiding and revealing of the information), or the positioning of the mechanism in the user interface (Egelman et al. 2009).

It is also important to highlight the contextual nature of these results, and the degree to which they would (or would not) generalize to other, non-crowdfunding contexts. For example, it is quite possible that these results would not extend to a purchase context, where issues of social capital, reputation, etc. may be significantly less pronounced. In addition, in regard to the net positive outcome in contributions that we have observed, although a user is given complete freedom here to specify the size of their contribution, thereby allowing for a shift in the distribution of contributions that can offset the decline in participation we would observe when introducing a privacy control question, in other contexts, engagement or contribution may not be up to the user. For example, if transaction amounts are fixed (e.g., a transaction on Amazon.com that involves a product with a fixed price, or a voting type setup, where voters may issue 1 and only 1 vote), then any decline in participation could not, in fact, be offset by a parallel increase in contributions amounts. In that scenario, the impact of our intervention on participation and unconditional contribution would be strictly negative, as a matter of course. This point highlights the fact that the impact of privacy control provision on user participation and contribution is contextual in a number of different respects, which need to be evaluated in tandem.

References


