Creators and Backers in Rewards-based Crowdfunding

Will Incentive Misalignment Affect Kickstarter's Sustainability?

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Abstract

Incentive misalignment in rewards-based crowdfunding occurs because creators may benefit disproportionately from fundraising, while backers may benefit disproportionately from the quality of project deliverables. The resulting principal-agent relationship means backers rely on campaign information to identify signs of moral hazard, adverse selection, and risk attitude asymmetry. We analyze campaign information related to fundraising, and compare how different information affects eventual backer satisfaction, based on an extensive dataset from Kickstarter. The data analysis uses a multi-model comparison to reveal similarities and contrasts in the estimated drivers of dependent variables that capture different outcomes in Kickstarter's funding campaigns, using a linear probability model (LPM), which is a special case of the binary probability model. Our results reveal inconsistencies in funding information compared to backers' satisfaction, and a platform-wide trend of decreasing satisfaction. The findings broadly suggest fundraising is influenced by information disclosure and backer feedback, while eventual backer satisfaction is closely potentially caused by information about deferred compensation and long-term relationship-building.

1. Introduction

Crowdfunding platforms have become a popular means of launching new ventures, bringing together large crowds of potential investors (hereafter termed *backers*) around projects. The global crowdfunding market was valued at US$13.9 bn in 2019 and is predicted to triple by 2026 [31]. Crowdfunding allows creators to access critical funding, while also helping them to find others with whom they share common interests [6]. Entrepreneurs (hereafter termed *creators*) are increasingly turning to crowdfunding, and not traditional financiers, because a well-executed crowdfunding campaign can help to create a strong community of backers for a new venture even before it is presented to the broader public [29]. So, entrepreneurs (hereafter termed

creators), are turning to crowdfunding not traditional financiers, with a global crowdfunding 2025 market of US$28.8 bn predicted.

The benefits of crowdfunding depend on projects receiving the resources they need. This explains why existing crowdfunding research has put emphasis on the fundraising process. Fundraising is only the first step. Once backers have committed the required funds, creators must deliver on the promises of the project. Yet rewards-based crowdfunding, where backers donate in return for future rewards, typically requires full down-payment by backers often months or even years in advance of the intended project outcomes.[1]

The arrangement between creators and backers is something mainstream management theory considers naïve. Crowdfunding platforms create natural conditions for goal, information, and risk asymmetries, though there is little formal governance to manage the resulting agency problem. Instead, backers must trust that creators have the skills and benevolence to act in their shared interests. Existing research has spent considerable effort exploring how creators build crowdfunding campaigns with characteristics to generate this trust [24]. However, that research has not addressed whether the trust generated by these characteristics is deserved. This is an oversight, due to an incentive misalignment that disproportionately rewards creators for attracting funds, even if they do not generate positive outcomes for backers.

Our study explores the problem of *incentive misalignment in rewards-based crowdfunding.* We performed a review of the rewards-based crowdfunding literature to identify campaign characteristics that predict fundraising success. We used a data-gathering process that yielded 377,778 fundraising campaigns from Kickstarter. They support comparisons of campaigns according to fundraising and eventual backer satisfaction. Our results show characteristics that predict fundraising, counterintuitively, do not predict backer satisfaction. More worryingly, several exhibit negative correlations, which require that we assess the robustness of the estimated models, and limitations in our empirical design.

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[1] This is like a *down-payment contract* that assumes high trust [16].

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We also show trends toward increasingly effective fundraising, but decreasing backer satisfaction, and decreasing platform activity.

2. Intellectual foundations for crowdfunding and incentive misalignment

We next discuss several bodies of knowledge from Strategy, Economics, Management, Accounting and IS that offer intellectual foundations for this research.

2.1. Rewards-based crowdfunding

Crowdfunding platforms connect commercial, social, and artistic projects with potential backers, affording them an alternative to traditional sources of financing, such as banks or venture capitalists [27]. Different platforms facilitate different types of crowdfunding. Some focus on interest-based loans, and others on purchase of equity or donations [2]. Rewards-based crowdfunding has produced disruptive outcomes, from cultural projects to new technologies though.

Rewards-based crowdfunding appeals to creators and backers for a variety of reasons. It allows mutually-beneficial short-term financial benefits – creators get revenue at a time of need, and backers get valuable discounts or assets. Crowdfunding also can contribute to viral marketing and generate interest among potential consumers and user groups. And some backers and creators believe the grass-roots approach is more likely to create shared value with wide-ranging social benefits [18]. Policy-makers encourage the growth of these platforms, building on evidence that crowdfunding campaigns boost innovation [32], stimulate local economies, and create opportunities for entrepreneurs [20].

These benefits assume crowdfunded projects can deliver their promised rewards. This has been controversial though. Many commentators have demonstrated why crowdfunding projects disappoint backers, with the risk of fraud [10], inexperience or poor planning creating delays or unforeseen problems [30], and systemic coordination and communication challenges as projects grow in size [22]. All of these assume creators are at fault. However, it is also possible backers are disappointed because of unrealistic expectations, or because they misunderstood the intentions of the project.[2]

Crowdfunding differs from other forms of crowdsourcing in two notable ways. First, the crowd in crowdfunding platforms do not usually participate directly in the co-creation process. Instead, they entrust design and development to the creator, limiting the role of backers to onlookers who only make suggestions [15]. Second, the crowd must commit their support to a project at the outset, not when they are satisfied with the project's outcome. So, they are committing to risky outcomes subject to change.

2.2. The incentive-misalignment problem

This type of arrangement is a *principal-agent relationship*.[3] It creates conditions wherein the goals of the principal and agent diverge and the principal has limited means to verify the agent is acting appropriately. Eisenhardt [11] notes three related issues: (1) *moral hazard*, where the agent can pursue opportunistic and selfish behaviors invisible or poorly understood by the principal (2) *adverse selection*, where the agent presents to the principal as being more capable than they actually are; and (3) *risk attitude asymmetry*, where the principal and the agent may prefer contrasting actions because they are impacted differently by risk.

Rewards-based crowdfunding is susceptible to *incentive misalignment*. A fundraising campaign is a contract of sorts, but backers cannot negotiate specific commitments with creators. They provide funding at the project start and have little legal ability to enforce penalties or rewards once the campaign is underway.[4] A counter-argument suggests this structure is not problematic though. Backers and creators are invested in the desirability of the project. However, previous management research suggests that when principals lack the ability to monitor agents' activities, the sharing of short-term benefits may have an adverse effect [26]. It may encourage agents to use the principals' resources to maximize short-term earnings.[5]

A benefit for creators is the ability to gauge demand for subsequent products and services, rather than make premature long-term commitments [2]. Backers lack this ability, as they have already committed their resources. This leaves them at the mercy of creators, should the latter choose to leverage the backers' funds for maximum short-term gain.

Crowdfunding makes creators focus disproportionately on fundraising (which may not impact backers, if a project has met its targets) and backers to focus on outcome quality (which may not benefit creators). So how, then, can principal-agent relationships deal with incentive misalignment? We consider four strategies.

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[2] The threat of backers becoming dissatisfied is not only a problem for projects. It may harm crowdfunding platforms as a whole, if backers become disillusioned over time. For instance, platform-wide funding activity may decrease when individual campaigns are suspended [10].
[3] An *agent* takes actions and make decisions to reflect the interest of an invested *principal* in the presence of some information asymmetry.

It allows the agent to hide certain actions and information.
[4] This is true even if creators have delivered rewards, and backers are upset with the quality, timeliness, customer support, and discounts relative to subsequent consumer releases [4].
[5] Agents can walk away from a long-term relationship, so they weigh short-term benefits and long-term costs / risks, which is not abstract.

2.3. Contracts, disclosures, and compensation

A basic means to address these issues is to align the incentives between principals and agents, so each works toward the same outcomes [26]. Principals, first, do this with a *contracting strategy*. They allocate some or all of the reward to an agent, based on adherence to some behaviors and outcomes.

This is complicated though: the goals specified for complex endeavors are often vague, evolving, and even paradoxical [5]. Crowdfunding campaigns are especially vulnerable to these challenges. The projects are often early-stage and backers are less knowledgeable and experienced than traditional investors are. This makes it challenging to build a shared understanding for specifying the goals – let alone balancing an appropriate portfolio of incentives.

Information asymmetry is at the heart of incentive misalignment, and information disclosure, thus, is valuable: detailed communication will make it difficult for a principal to mislead an agent. The second, *a voluntary disclosure strategy*, is especially powerful: managers and insiders cannot hide information to obtain more trust from financiers [17].

The manner in which creators make voluntary disclosures can vary though. For example, creators can communicate via offline relationships or social media [33]. Yet most crowdfunding campaigns take place on platforms that act as shared spaces for different groups of backers. Collectively, they rely heavily on information, and creators choose to provide it within the platform to evaluate projects [34]. Thus, it is unsurprising that voluntary disclosure on crowdfunding platforms may influence fundraising success (though excessive disclosure may become problematic) [25].

The third is a *feedback strategy* for managing incentive misalignment. Feedback is a key component of monitoring activities in agency relationships. It allows the principal to express encouragement or dissatisfaction to the agent. This helps an agent gauge the intent and priorities of the principal. And, it allows the agent to judge the effectiveness of their communication and respond to the principal in iterative negotiation [15].

Feedback appears especially important in crowdfunding environments for four reasons. First, the limited monitoring activities available to backers mean they must continuously request and validate information being exchanged [14]. Second, the community of backers is likely to have a more diverse and unpredictable set of interests than traditional investors [27], creating uncertainty about those backers' expectations. Third, individual crowd members often lack the knowledge of experts [21]. So, they rely on collective judgments to spot problems. This informs their judgments of legitimacy with observed feedback from other backers [12]. Fourth, many backers attach themselves to projects because of group identity, and this feedback enables shared meaning to be created [1].

A fourth means, the *deferred compensation strategy*, incentivizes the agent to expend effort and not act opportunistically or selfishly. This is done by sharing the costs of missing the principal's goals (e.g., with delays) [23], or sharing the benefits of meeting its goals (e.g., via firm or product performance) [34]. Signaling intent is an important part of trust building in agency relationships, particularly in the early stage [8]. In addition to signaling competency and honesty, new ventures often wish to communicate strategic attitudes such as autonomy, competitive aggressiveness, and a willingness to take risks [28].

Deferred compensation, thus, is a way for the principal to manage risk; and it is a way for the agent to demonstrate confidence and commitment to long-term outcomes. Deferred compensation can take many forms but perhaps the most common includes developing additional long-term opportunities, such as career development [13].[6] This deferred compensation is also evident in crowdfunding projects, whereby fundraising may be affected by the perceived social identity of the creator and continued engagement on the platform [36].

3. Context and methods

3.1. Research context: Kickstarter

We collected and analyzed data from the rewards-based crowdfunding platform, Kickstarter. As of mid-2020, US$5 bn was raised to fund more than 182,000 projects (www.kickstarter.com). When creators set up their campaigns, they decide in which of Kickstarter's 15 categories (Art, Fashion, Games, and Technology) to launch them and set their funding goals. The latter indicates how much funding they need to move forward with their project. Kickstarter follows an *all-or-nothing funding model*, so only campaigns that reach the predefined funding threshold are considered to be successful and receive the collected funds. If the threshold is not reached, all backers will be reimbursed. Only about one-third of all its projects succeed.

Interactions among project creators and backers are publicly visible.[7] We were able to trace them from a

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[6] For knowledge-intensive agents, such opportunities can create a link between the tasks an agent is performing and their social identity. This deepens the agency relationship, assuming the agent will continue to perform the role in the future. Indeed, the goal of retaining an agent can motivate offering deferred compensation.

[7] For example, if a creator succeeds in collecting sufficient funding, they must deliver on promises given to backers. The funding deadline initiates a work-intensive time for creators when they stay in touch

campaign's launch until after rewards were to be delivered to backers. This high transparency makes Kickstarter the ideal context for studying the effects of incentive misalignment in reward-based crowdfunding. We could observe *funding success* – the outcome that benefits creators most – as well as whether backers were satisfied with the rewards delivered to them.

3.2. Dataset

We gathered a time-series dataset with a self-developed web crawler that covers the period from the launch of Kickstarter in April 2009 until April 2020. This initial dataset includes all 470,000 projects that ran on Kickstarter during that period. We limited our dataset in several ways:

(1) We excluded campaigns that did not provide an estimated delivery date for any offered rewards. This defines the start date for the period in which backers expressed their satisfaction or dissatisfaction with the rewards they were to receive.[8]

(2) We eliminated campaigns canceled by the creator or suspended for any reason by the platform.

(3) Nor did we include those with unavailable essential information (e.g., project descriptions).

Our final dataset has 377,778 campaigns, out of which 158,865 were successful. It contains basic information on all campaigns such as the funding goal, but also the text of more than 20 mm comments written by backers about these projects. (See Table 1. Descriptive statistics are in Appendix Table A.)

3.3. Measures

Dependent variables. There are two. We use a dichotomous variable for funding success, indicating whether a campaign has reached its funding goal. *FundSucc* is 1 if the project succeeded in reaching its funding goal and 0 otherwise.

We measure *BackerSatisf* by evaluating the valence of comments by backers indicating their satisfaction after the designated reward delivery date and for period of up to 6 months after the final reward was supposed to be delivered – the *reward delivery period*. A total of 5.6 mm comments were written by backers, an average of 15 comments per campaign (s.d. = 259). We examine their sentiment of these comments using the Valence Aware Dictionary and Sentiment Reasoner (VADER), a sentiment analysis tool to analyze social media text.[9] To obtain our measure, *BackerSatisf*, from VADER, we

first derived a normalized weighted composite sentiment score for each of the 5.6 mm relevant comments.[10] We then took the average of these scores per campaign.

Table 1. Kickstarter's campaign characteristics

Strategy	Variables	Description
Contract design	*FundGoal*	All-or-nothing project target ($)
	Duration	# days for fundraising
	TimeDeliv	# days before 1st rewards delivery
	#Rewards	# different reward levels offered
Feedback	*Backer comm*	# comments made by backers
	Backer senti	Aggregate score for sentiments
Deferred compensation	*#Updates*	# updates made by creator
	BackedOthers	# other projects creator backed
	CreatorComm	# comments by creator
	PastProj	# prior projects by creator on platform
	Authenticity	Words to convey authenticity in descript.
	FBProfile	Creator linked to Facebook profile (0/1)
Info disclosure	*Video*	Campaign had a video (0/1)
	#Images	# images/videos in descript
	Readability	Text readability in descript
	SpellingErrors	Description contains spelling errors (0/1)
	#Words	# words in the descript
	NumTerms	Proportion numeric terms in descript
Controls	*Category*	Project Kickstarter category
	Year	Year launched
	US	Creator is located in the U.S. (0/1)
	StaffPick	Platform has project on homepage (0/1)

Independent variables. Past research has examined how different campaign characteristics predict backer commitment during the fundraising process. Yet, despite the likelihood of incentive misalignment, the extent to which the same campaign characteristics predict longer-term project outcomes remains unclear. We, thus, performed a systematic literature review to ensure our characteristics comparisons make sense.

We define the review scope as identifying and synthesizing the campaign characteristics connected with fundraising in rewards-based crowdfunding. We further conceptualize the topic as those campaign characteristics that are partially or totally visible to backers during the fundraising process. Rather than exploring and interpreting the different qualities that vary according to project context, we also limit the focus to empirical studies that perform quantitative analyses of multiple projects. For our literature search process, we wanted to include studies from a range of disciplines that had achieved a high level of methodological scrutiny. We searched the fifty journals included in the list provided by the Financial Times and used to rank international business schools (the "FT50"). We limited our search for January

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with backers through Kickstarter and update them on progress toward the delivery of rewards. In turn, backers can write to inquire about project status, or deviations in the time of reward delivery.

[8] Providing this information on Kickstarter was possible for creators from August 1, 2011 onwards. We only included campaigns for which we could observe a period of six months after the last rewards were supposed to be delivered.

[9] VADER matches text against 7,500+ words, acronyms and initialisms as well as emojis – with sentiment polarity and intensity scores that have been determined with the help of human raters. This lexicon-based approached outperforms machine learning, especially for shorter texts that can be found on social media.

[10] This uni-dimensional measure of sentiment ranges between -1 (most negative) and +1 (most positive).

2010 to January 2020.[11] Search terms included keywords that could appear anywhere in an article ("crowdfunding" or "crowd funding") and popular platform names ("kickstarter" or "indiegogo"), in case empirical studies of such platforms were performed in other research streams and the authors chose not to refer to the platform type. This initially ,produced 132 articles from 22 of the 50 journals.[12] We further harvested 63 articles on rewards-based crowdfunding, but only 40 quantitative empirical studies of rewards-based crowdfunding remained after more legitimacy checks.[13]

The literature review and analysis used a concept-centric matrix to identify and synthesize common campaign characteristics linked to fundraising. This resulted in an initial set of 53 campaign characteristics with demonstrated correlations with fundraising. In the interests of parsimony, these were refined to remove characteristics that met any of the following exclusion criteria (1) they described qualities of the creator, often studied to observe bias and prejudice (e.g. age, ethnicity) (2) they were theoretical outliers that had not received widespread attention (e.g. rhetorical signals, anonymity) (3) they described the interaction between the campaign and other social contexts. Each would have to be analyzed separately (e.g., by location, early contributions from offline networks, social media interactions). This resulted in 20 characteristics grouped by the four strategies identified for managing incentive alignment (contract design, information disclosure, feedback, and deferred compensation).

Campaigns capture contract design by specifying the financial target as the collective investment required over some specific period. This is important for contracts: connecting investment directly to outcomes is important to persuade investors to prioritize particular projects. Hence, contracts also include a number of rewards which specify the different deliverables that individual backers can expect. While the details of different rewards vary, the number of rewards can be used to indicate the breadth of commitments made to backers. The timeline for the return of investment is also important in contract design [3]. Campaigns may plan to deliver different rewards by different dates, and the amount of time until their delivery is useful to assess project duration.

The manner in which campaigns capture feedback is perhaps the straightforward to measure. First, campaigns can capture feedback via the number of comments made during fundraising, which gives an indication of the amount of feedback and the willingness of backers to provide it. Second, they capture its significance via the extent of positive or negative sentiments. for encouragement or reproach [9].

Campaigns provide information disclosures and capture deferred compensation in multiple ways.[14] First, the creator's participation in other projects shows long-term commitment to a community. This is indicated via the number of previous projects they have created and backed, or the number of comments they have left. This is further indicated by the creator's willingness to embed their personal identity in the project, by linking to a Facebook account [18] or using authentic language [36]. The characteristics increase perceptions the creator will have reputational benefits or costs from the project long after the campaign has finished.

Control variables. We incorporated project-level variables in our model to account for alternative explanations. First, dummy variables represent in which of the 15 main categories on Kickstarter creators launched their campaigns. Second, our dataset spans 2011 to 2019, so we included year dummies for when a campaign was launched to control for unobservable time-varying effects of changing platform dynamics. Third, we coded for campaign location in the U.S. (*US*). Finally, when we estimated *BackerSatisfaction*, we also included *FundingPercentage*, because raising more funds than the target requires producing more rewards, which explains why creators struggle with this process.

3.4. Estimation by linear probability methods

As our dependent variables are binary indicators, we estimate *linear probability models* (LPMs), a special case of the *binary probability model*. Though logit (logistic) and probit are standard for the analysis of binary dependent variables, LPMs have distinct advantages in our setting. Coefficients derived from logit and probit regression cannot easily be compared between models that differ in their dependent and independent variables. They also have unobserved heterogeneity. We are interested in the signs and significance levels and comparing them for the dependent variables, and LPMs are appropriate for interpreting such probability change results. Thus, a coefficient can be interpreted as the change in the probability that the dependent variable is equal to 1, all else constant. We use heteroscedasticity-robust

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standard errors to avoid predicting out-of-range probability, such as $p > 1$ or $p < 0$.

We first estimated the LPM specification using *FundSucc* (Model 1), and repeated it for the alternative dependent variable by replacing dependent variable with *BackerSatisfact* (Model 2). Besides the dependent variable, the models only differed with regard to the control variable for funding percentage, *%Fund*, that we only included when the dependent variable was *BackerSatisf*. We checked the *variance inflation factors* (VIF) for potential multicollinearity. All VIF values for our independent variables matched recommended threshold values and mean VIF score requirements.

4. Main Results

The number of campaigns per month varied on Kickstarter between 2009 and 2019. (See Fig. 1) The spike in 2014 is attributable to a policy change that removed the mandatory screening by Kickstarter before a campaign's launch. Since 2015, the number of campaigns per month has been declining and is now on a similar level as it was in 2011.
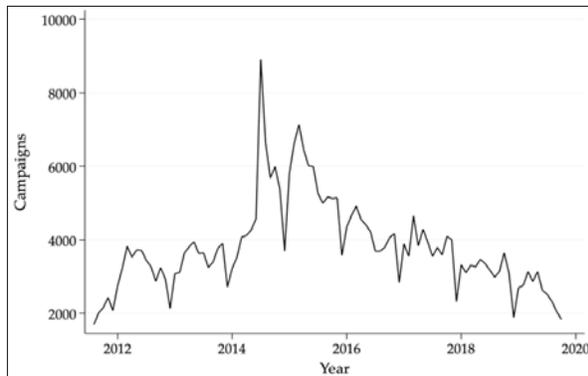

Fig 1. Number of campaigns, 2011-2019

FundSucc and *BackerSatisf* fell until 2014, when Kickstarter removed the mandatory campaign screening policy. After this, *FundSucc* grew steadily from ~30% to ~60% in 2019, while *BackerSatis* continued to decline, leading to a widening gap between both measures. (See Fig. 2.) The incentive misalignment may be the cause of these longer-term problems for Kickstarter, a relationship that deserves further investigation.

We assessed significance of differences for coefficients of the main models with this general statistic [7]:

$$z = \left(\beta_{M1} - \beta_{M2} \right) \Big/ \sqrt{ SE^2_{\beta_{M1}} + SE^2_{\beta_{M2}} }$$

Fig 2. *FundSucc* and *BackerSatisf*, 2011-2019

The LPM results are shown in Table 2.

Table 2. LPM results for Models 1 and 2 (M1, M2)

VARIABLE	*FundingSucc* (M1)	*BackerSatisf* (M2)	DIFF (z)
Contract design			
FundGoal	-0.073***	0.003***	-123.58***
Duration	-0.002***	-0.000	-33.94***
TimeDeliv	-0.000***	-0.000***	10.202***
#Rewards	0.034***	-0.012***	29.383***
Information disclosure			
Video	0.036***	0.003*	17.613***
#Images	-0.010***	-0.003***	-6.885***
Readability	-0.001***	-0.000	-18.788***
SpellErrors	-0.037***	-0.005**	-12.325***
#Words	0.008***	0.005***	3.486***
NumTerms	0.001***	0.001**	2.019***
Feedback			
BackerComm	0.012***	0.002**	11.277***
BackerSentim	0.082***	0.006***	27.334***
Deferred compensation			
#Updates	0.207***	0.003***	207.352***
BackedOthers	0.065***	0.008***	31.373***
CreatorComm	0.226***	-0.028***	96.293***
PastProj	0.006***	-0.003**	4.713***
Authenticity	-0.001***	0.000***	-17.085***
FBProfile	-0.017***	0.004***	-14.813***
Control variables			
Category	Incl.	Incl.	–
Year	Incl.	Incl.	–
US (0/1)	0.004**	0.001	2.971***
StaffPick	0.099***	0.001	42.435***
%Fund	–	0.007***	–
Constant	0.765***	0.947***	–
R^2	0.56	0.02	–
Obs.	377,778	158,865	–

Notes. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; robust SEs suppressed due to space limitations.

Since *FundSucc* and *BackerSatisf* were scaled equally, unstandardized β coefficients are compared. The SE of the difference is the square root of the sum of the two squared SEs.[15]

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[15] Since we do not use the robust SEs for estimating the changes in the dependent variables, but only their differences (and page space is limited), we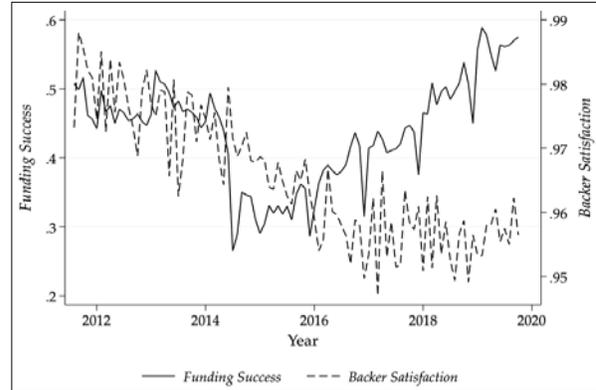 chose to not present the SEs in Table 2, and we only discuss the β estimates and their significance levels in this section.

Regarding the *contract design*, the first inherent misalignment between the goals of creators and backers is evident from the opposing coefficients for funding goal. Logically, the estimate of higher funding goals suggests a lower probability of getting funded ($\beta_{FundGoal\_M1}$ = -0.073, $p < 0.001$), but also a higher probability for backer satisfaction ($\beta_{FundGoal\_M2} = 0.003, p < 0.001$). Opposing coefficients can also be observed for the number of rewards offered. A higher number of rewards suggests a higher probability of funding ($\beta_{\#Rewards\_M1}$ = 0.034), but also with a lower probability for backer satisfaction ($\beta_{\#Rewards\_M2}$ = -0.012, $p < 0.001$).

For *information disclosure*, all coefficients align in direction across the two models, indicating that these signals do indeed help backers to discern the true quality of the respective project. For instance, a campaign that includes a video is more likely to get funded (β_{Video_M1} = 0.036, $p < 0.001$) and also more likely to satisfy backers (β_{Video_M2} = 0.003, $p < 0.05$). Similarly, a longer project description has the same positive effect for funding and backer satisfaction, suggesting more detailed descriptions reduce the creator-backer information asymmetry.

Backer comments (*BackComm*) during the funding period also potentially cause both a higher probability to get funded (M1) and deliver more *BackerSatisf* (M2).

Table 3. Summary of misalignment between *FundSucc* and *BackerSatisf*

VARIABLE	Funding Succ	Backer Satisf
Contract design		
FundGoal	-	+
Duration	-	○
#Rewards	+	-
Information disclosure		
Readability	-	○
Deferred compensation		
CreatorComm	+	-
PastProj	+	-
Authenticity	-	+
FBProfile	-	+

Finally, for *deferred compensation*, we again observed some opposing coefficients. For instance, if creators engage in a discussion with backers during the funding period (by writing and responding to comments of backers, this was observed to promote a higher probability of getting funded ($\beta_{BackerComm\_M1}$ = 0.226, $p < 0.001$), but a lower probability for backer satisfaction ($\beta_{BackerComm\_M2}$ = -0.028, $p < 0.001$). Similarly, experienced creators who launched at least one project on Kickstarter before were more likely to receive sufficient funding, but less likely to satisfy their backers. Interestingly though, we observed the opposite effect if creators

disclosed their Facebook profiles, which reduced their probability to get funded ($\beta_{PastProj\_M1}$ = -0.017, $p < 0.001$), but increased the probability to eventually satisfy backers ($\beta_{PastProjM2} = 0.004, p < 0.001$).

5. Robustness Assessment

To check for the robustness of our results, we conducted further analyses. Though LPMs offer advantages in our setting, especially *cross-model coefficient comparisons* and a binary variable (with a binomial data-generating distribution), our main results may be biased because the predicted values for the dependent variable are not arrived at in the same manner as those for limited dependent variable models.[16] Thus, we conducted additional robustness testing to see what issues arose, and may affect the truth behind our estimates.

For our first check, we ran our analyses for *FundSucc* and *BackerSatisf* again, using a logit model (which yielded pseudo-R^2s of 0.56 and 0.06 for M1 and M2).[17] The results are consistent with those of the LPM in terms of the direction and significance of coefficients with one exception: the positive coefficient for *PastProj* became negative in one model. Second, bias may have arisen in our analysis because *BackerSatisf* was estimated on a partial dataset (i.e., all campaigns that were successful and expected to deliver rewards to backers).

To reduce the overlap between the datasets for our two models, we extracted two random samples of 100,000 campaigns and re-estimated the models. The estimated coefficients from this robustness check aligned with those of our main model for sign directions, magnitudes, and significance levels with two exceptions. The effect for *BackerSenti* and *PastProj* lost significance in M1. Second, given the changing dynamics on Kickstarter after the prescreening of campaigns was discontinued in June 2014, we reran our models based on a dataset with only campaigns launched after the policy change, so 110,323 campaigns were dropped. The coefficients again were consistent with our main model, with the exception of *TimeDeliv*, which became insignificant in M1 also. We conjecture that reframing this research in a new quasi-experimental design that emphasizes causal inference may lead to resolution of the conflicts and possible biases we observe.

6. Discussion

This study explored incentive misalignment in rewards-based crowdfunding. Using a large sample of projects from Kickstarter, we compared whether the

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[16] We found that, based on research methods from Marketing (alternative market share estimation approaches) and Healthcare (patient healthcare expenditure driven by insurance status), typically limited dependent variables are preferred, but in Sociology (parental income

effects on high school graduation) and Criminology (delinquent peers' effects on young people's incarceration), LPMs with binary dependent variables are common and encouraged.

[17] We discuss some possible reasons for M2's weaker fit at the end.

types of information involved with fundraising are also linked to eventual backer satisfaction. Our results identified inconsistencies in these relationships and suggested this may be due to deteriorating platform participation – an unexpected observation. The findings thus make several contributions to crowdfunding research.

First, many previous studies have explored the role of campaign information in attracting funding. Crowdfunding exposes backers to disappointment though, due to weak approximation of the legal contract from campaign information. To our knowledge, this is the first study to connect the two literature streams at the campaign information level. This is a step toward explaining agency relationships in rewards-based crowdfunding.

Second, we identified types of information that appear consistent and inconsistent. Some types of campaign information have a positive relationship with both fundraising and eventual backer satisfaction. These types are thought of as being connected with information disclosure and feedback. Other types have significant relationships with fundraising but not eventual backer satisfaction, especially readability, funding duration, and staff picks. These relationships are difficult to interpret, as the lack of significance may simply be a result of lower-value coefficients for backer satisfaction.

Most importantly though, we identified types of campaign information that have opposing relationships with fundraising and eventual backer satisfaction. Two concern contract design: the number of rewards and the funding target amount. These effects make sense when we treat fundraising as a competitive process between campaigns. If these campaigns amount to bidding for backer contracts, then the creators must reveal their expected costs and willingness to share risk as agents. More money for fewer rewards thus suggests creators are allocating more time and money for each contingent outcome. This is likely to increase the outcome quality but decrease perceptions of efficiency with their "bids."

The other types of information with opposing relationships with fundraising and eventual backer satisfaction concern deferred compensation. The number of past projects by creators was positively related to fundraising but negatively to eventual backer satisfaction. Meanwhile, the use of authentic language and a Facebook profile were negatively related to fundraising but positively to eventual backer satisfaction. Consider the roles of social identity and deferred compensation. From a backer's perspective, a creator signaling platform-specific identity suggests high loyalty and low likelihood of defecting, magnifying the long-term benefits and gains. Conversely, a creator signaling non-specific platform identity may suggest low loyalty and a high likelihood of defecting. Yet crowdfunding projects are fleeting by nature on platforms like Kickstarter. This means long-term social connections between creators and backers are generally reliant on connections and identities outside these platforms. Thus, signaling these non-specific platform identities is actually more likely to magnify the importance of deferred compensation obtained via reputational cost-benefit and emerging opportunities.

Finally, this study documents platform-level evidence that collective fundraising and collective backer satisfaction have shifted to exhibit opposing trajectories. Further, we found signs that this shift has coincided with deteriorating participation by backers on Kickstarter. Further analysis is required to unpack the nuances of these platform-level patterns, as well as how they relate to project-level incentive misalignment.

7. Conclusion

The main insight from this study is that rewards-based crowdfunding may be unsustainable in its current form in the market mechanism that we investigated. We think this is true even though Kickstarter is one of the most-recognizable crowdfunding platforms. Indeed, it has established many of the fundraising dynamics for this type of crowdfunding and launched many high-profile technology and art projects. Yet systemic issues in its incentive structure seem to be contributing to a decline in campaign backers' collective satisfaction, as well as the number of projects getting funded on the platform. Surprisingly, the observed decline in satisfaction and participation coincide with Kickstarter's decision to lower restrictions on who can launch projects. This casts doubt on the likely impact of crowdfunding as an alternative channel in the future.

We contribute to research by: (1) by modeling creator-backer incentive alignment, as well as backer satisfaction – which represent a new empirical direction for the crowdfunding literature; and (2) demonstrating that it is possible to adopt an "inverse image" for empirical analysis, and move away from the over-emphasis on funds raised in crowdfunding projects. This will pave the way, we assert, for new theoretical perspectives to develop further enrich our knowledge in this area. The addition of backer satisfaction is also important for studies of the macro-impacts of crowdfunding. Causal connections between regional trends and the number of successful campaigns may be incomplete or even misleading without also modeling backers' reactions to outcomes in geospatial terms – a methods advance opportunity.

We contribute to practice with three potential remedies to address possible deterioration of rewards-based crowdfunding platforms. First, the platforms need to address the incentive misalignment at its core by adopting *staggered payment models*. This is becoming more common outside of Kickstarter, as platform like Patreon introduce subscription-based models and equity platforms

use multiple (not single) funding rounds. Second, platforms may embed fundraising in other websites and social media used by creators. Creators will then be more likely to experience the long-term reputational costs and benefits related to with project outcomes.[18]

Third, platforms may provide more explicit structure as to what information creators should provide and how backers can offer more effective input. This will encourage information disclosure by creators and feedback from backers. Kickstarter has already added some of these features that projects must include (in its "Risks and Challenges" section) [24]. More could be done, ranging from additional creator disclosure sections to scheduled and automated backer polling.

Finally, we acknowledge several limitations in this research. First, we focused on a single platform with a disproportionately North American presence. So we could not learn the extent to which backer satisfaction may be affected by the extent of national regulation in the U.S., or perhaps the cultural effects that may be present. Second, our models produced notably lower coefficients for backer satisfaction than for fundraising success. An explanation is that our model drew on literature that aimed to find indicators that enhanced the likelihood of stronger fundraising, rather than backer satisfaction. Another reason, that backer satisfaction may be dependent on more factors, expresses their impacts as project development occurs over a longer period than fundraising.

Third, perhaps sentiment analysis does not yield a sensitive enough measure, so multiple methods can be used to create and compare other backer satisfaction measures. Fourth, this could be combined with other estimation techniques to examine temporal effects over the course of individual projects. Fifth, we are also working on quasi-experimental, causal-inference methods that enable innovative estimation and in-sample propensity-score matching methods to better align the data-generating distributions for funding success and relate to the backers' characteristics [19, 35]. At the conference, we expect to share progress toward a research design that permits causal inferences that more strongly support our findings.

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[18] Projects like Star Citizen have used this approach to embed rewards-based fundraising in their website, thus extending the funding period

and building an integrated community. Wikipedia also uses website-embedded donation-style fundraising for its periodic funding calls.

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Appendix Table A. Descriptive statistics

Variable	Mean	Std. Dev.
Dependent variables		
FundSucc	0.421	0.494
BackerSatisf	0.965	0.183
Contract design		
FundGoal[†]	8.549	1.691
Duration	33.093	11.574
TimeDeliv	86.072	104.045
#Rewards[†]	2.001	0.626
Information disclosure		
Video	0.704	0.456
#Images[†]	1.244	1.263
Readability	63.457	13.203
SpellingErrors	0.090	0.287
#Words[†]	5.954	0.960
NumTerms	2.836	2.410
Feedback		
BackerComm[†]	0.788	1.344
BackerSenti	0.208	0.317
Deferred compensation		
#Updates[†]	1.096	1.122
BackedOthers	0.489	0.500
CreatorComm	0.162	0.369
PastProj	0.201	0.401
Authenticity	24.321	20.719
FBProfile	0.500	0.500
Control variables		
US (0/1)	0.718	0.450
StaffPick	0.100	0.300

Notes. 377,778 campaigns; † = log value