Revenue Management in Crowdfunding

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Crowdfunding, a mechanism by which funds are raised online using small donations from a large number of donors, has emerged as a popular approach for funding new ideas. Many new products, services, and projects have been successfully funded on online crowdfunding platforms such as Kickstarter, IndieGoGo, and GoFundMe. For example, on Kickstarter alone, more than 14 million individuals have pledged over $3.5 billion since the platform’s inception in 2009.

Despite the popularity of crowdfunding in recent years, the recipe for creating and operating successful projects is not well understood. In fact, a majority of ventures on crowdfunding platforms fail to reach their funding goals. For instance, on Kickstarter fewer than 140,100 projects out of more than 393,000 projects launched over the last decade (i.e., fewer than 36% of the projects) achieved their fundraising goals. What attributes define a project that successfully reaches its goal? How do the fundraising goal, timeline, and the dynamics of a given crowdfunding process affect its outcome? This paper sheds light on these fundamental questions about the design and mechanism of crowdfunding campaigns.

Our model has distinctive features that align with empirical observations: (a) in our stochastic model, the total pledges may go up or down during a campaign; (b) our informational requirements are mild; (c) finally, our heterogeneous backer population model explains the empirically observed U-shaped and L-shaped pledging curves.

The key feature of our approach is a focus on dynamics of the pledging process within the campaign duration, by employing a continuous-time, finite-horizon framework. Using a diffusion approach based on the classical Bass model (Bass, 1969) and the structure of observed empirical data, we study how best to set pledges and durations to yield a successful crowdfunding campaign. We thus address the main question that vexes project creators and platforms alike: How should one set the pledge level and the duration of a funding campaign to maximize the expected total pledge amount over the funding horizon?

Previous literature and data show the heterogeneity in backers’ pledging behaviors. We model the heterogeneity by distinguishing two groups of potential backers: “Ordinary” and “herding”
backers. “Ordinary” backers pledge throughout the campaign if their discounted utility from the project exceeds the requested pledge level. “Herding” backers, on the other hand, are influenced by the pledging decisions of others. They arrive later in the campaign, often close to the end. Herding backers prefer to back a campaign that is already successful or is nearly succeeding. In our analysis, we study how the optimal design of a successful project depends on the characteristics of the two types of backer populations. Our paper makes three main contributions:

1. We develop a theoretical framework for revenue management of crowdfunding campaigns. We model the pledging dynamics by decomposing the backer population into two groups: “ordinary” and “herding”. Our distinctive feature is the parsimony of our model, that imposes minimal informational structure on individual decision makers. Yet, our model closely captures the dynamic pledging patterns observed on real-life platforms. Using our model, we can measure the impact of goal setting, pledge optimization, and duration planning on project success. For instance, we demonstrate the inverse relationship between pledge level and project duration (i.e., a project with a shorter duration should have a higher pledge level). Finally, we can calibrate the loss in revenue from sub-optimal project settings.

2. We find that when the pledging process is stochastic, the optimal pledge level and duration could be non-monotone in fundraising goal. For instance, the optimal pledge level does not increase for higher project goals. When the campaign goal is very low or very high, the optimal pledge level (optimal duration) is a decreasing (an increasing) function of the goal. When the goal is low, the optimal pledge level should be decreased to attract a sufficient number of early backers, which secures the project from failure due to low activity. On the other hand, when the project goal is high, decreasing the pledge level triggers more participation from late-arriving, herding backers.

3. Typically, the uncertainty in pledging activity is thought of an impediment to fundraising, as uncertainty increases the chances of failure (i.e., missing the project goal). We show that uncertainty can aid the success of crowdfunding projects, particularly those with substantially large goals.
REFERENCES


