DESIGNING CROWDFUNDING PLATFORM RULES TO DETER MISCONDUCT

Introduction. In reward-based crowdfunding, a cash constrained entrepreneur attempts to raise the funds she needs to finalize development of a product by asking customers for money, and promising them a unit of that product once it will become available. More specifically, the entrepreneur can posts her product idea and specifications on a crowdfunding platform, set a funding goal, which represents the amount of money needed to move the project forward, and choose a pledge price. Potential backers (customers) may then decide to pay the pledge price before the campaign ends in exchange for the promise of a unit of the product. Reward-based crowdfunding has strongly grown in popularity over the last years. Kickstarter, the largest platform, has since its inception been able to raise 2.9 billion dollars, for a total of 120 thousand projects successfully funded. The objective of our work is to shed light on how two sources of misconduct risk characteristic of the contemporary crowdfunding environment, performance opacity and funds misappropriation (described later) affect the effectiveness of reward-based crowdfunding, when alternative funding channels (e.g. bank funding) are available to the entrepreneur, and to suggests improved campaign designs to attenuate their adverse consequences.

The set up. Our model takes the form of an extensive-form game with imperfect information. We model an entrepreneur who needs to decide whether to invest a given sum in order to The product has an attribute, performance, that is valued by all customers (more is better) and is private information to the entrepreneur. Performance is exogenous and drawn at the beginning of the game from a general distribution. The market comprises of customers whose valuation for the product is equal to the product’s performance, and whose total mass (market size) is uncertain (high or low) and unknown. Development is profitable in the high market state but not in the low market state. Only a fraction of the customers can be reached via crowdfunding (online customers). Development of the product is successful with a certain probability; in case of failure, funds are lost and development is abandoned. The entrepreneur has two alternative options to seek funds. In bank funding, the bank offers to fund the development of the product in exchange for an interest rate that makes the bank break even in expectation over all possible outcomes (we make the standard assumption that the banking industry is competitive). Alternatively, the entrepreneur may resort to crowdfunding.

We first examine crowdfunding in the absence of any forms of misconduct risk (product performance is common knowledge and funds are never misappropriated). In this case, first the entrepreneur sets
the campaign goal (equal to the amount needed to attempt development) and chooses the pledge price. Then, online customers observe the performance of the product, the goal and price, and decide whether to pay the price during the campaign, or wait after the end of the campaign. If the total amount pledged during the campaign is less than the capital needed for development, customers are refunded the money and the product is not developed. Else, the entrepreneur collects the money pledged and invests the funds required for development. If development fails, all remaining money is given back to customers. If development succeeds, the product is delivered at no cost to all online customers who pledged during the campaign, and offered for sale at a profit-maximizing price to all other customers (see figure).

Then, we introduce performance opacity and funds misappropriation in crowdfunding campaigns. Performance opacity captures the fact that performance claims during a crowdfunding campaign are non-verifiable (e.g., the speed or autonomy of a drone), so that entrepreneurs can claim a false performance. Funds misappropriation captures the inability of platforms to enforce good behavior on entrepreneurs. We thus consider that if an entrepreneur raises money, attempts development and fails, she may decide to keep the remaining funds instead of refunding customers (for example claiming that they have been spent). Appropriating the funds entails a penalty cost (this is a parameter of the model that captures reputation cost, expected cost of a litigation, etc.).

**Major Results.** We first establish that, in the absence of performance opacity and funds misappropriation, crowdfunding has an informational advantage over bank funding—an unsuccessful campaign reveals that the market is in the low state, thus averting the development of an unprofitable product.

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1 Performance opacity and funds misappropriation are stronger in crowdfunding than in bank funding. The bank can, for instance, request to see a functioning prototype of the product, while in crowdfunding there is, at most, a video that shows some features of the product, and a bank has dedicated resources for prosecuting who defaults on loans, while customers don’t. We simplify by assuming that there is no performance opacity or fund misappropriation when borrowing from the bank.
When performance opacity alone is present, performance claims are not believed (a babbling equilibrium arises) and all entrepreneurs raise the same funds regardless of true performance. While in principle this is a 'mere' transfer of money, and should therefore not hurt welfare, we find that total crowdfunding profit and total welfare are reduced due to the presence of the alternative funding channel—bank funding. Adverse selection arises: top performing entrepeneurs who cannot raise the money they would deserve in crowdfunding, prefer to choose bank funding. In equilibrium only entrepeneurs whose performance is low enough choose crowdfunding.

When funds misappropriation alone is present, we observe that it reduces profit in crowdfunding for some entrepeneurs but not others. Specifically, profit decreases if product performance is high, but not if it’s low, since the latter case not enough funds are collected to encourage misconduct.

We then study the joint effect of performance opacity and funds misappropriation. We show that, when the penalty cost for misconduct is low (this is arguably the current state of crowdfunding, characterized by a week regulation) performance opacity and funds misappropriation are complements with respect to profit loss, that is, the combination of performance opacity and funds misappropriation reduces crowdfunding profit to a larger extent than the sum of each effect in isolation. The result is reversed when the penalty cost is high.

We then focus on finding a potential solution to deter entrepreneurial misconduct by redesigning platform rules. We first consider two designs that implement deferred payments. In the Platform Escrow (PE) design, any funds raised beyond the goal are kept by the platform, and released only conditional on the successful development of the product. In the Maximum Aftermarket (MA) design, instead, the campaign stops as soon as the funding goal is reached, and customers who could not back the campaign are given a chance to purchase the product only after it has been developed. We show that while both MA and PE can fully curb the inefficiencies arising from funds misappropriation, both designs fail, in part (MA) or in total (PE), when it comes to dealing with performance opacity.

To overcome this problem, we propose a new design that, at a high level, complements deferred payments with a performance contingency. Recognizing that such contingency can be both too strict and too costly to implement in practice, we dive into the details of the implementation challenges of this design, and suggest two practical solutions to relax the requirements on the entrepreneur’s end, and to allow for a nearly costless implementation. In particular, we show that a design that combines a platform verification mandate with customer feedback to punish performance over-claims has the ability to alleviate both sources of misconduct risk and fully restore crowdfunding efficiency.