Crowdfunding via Revenue-Sharing Contracts

We analyze a new model of crowdfunding recently introduced by Bolstr, Localstake, and Startwise. A platform acts as a matchmaker between a firm needing funds and a crowd of investors willing to provide capital. Once the firm is funded, it pays back the investors using revenue sharing contracts, with a pre-specified investment multiple (investors will receive $M \geq 1$ dollars for every dollar invested) and a revenue-sharing proportion, over an investment horizon of uncertain duration. Our paper is the first, to our knowledge, that studies revenue-sharing crowdfunding as a source of operations financing and shows that this novel approach is superior to other financing models.

Traditional loans, such as from banks and the U.S. Small Business Administration (SBA), have low approval rates and typically take 2-3 months to fund. However, revenue-sharing contracts can fund very fast in practice; there are many examples of revenue-sharing crowdfunding campaigns that have raised targets of more than $50,000 in less than 30 minutes. Firms can alternatively raise investments from other online lenders such as Lending Club, Prosper, and Kabbage, but loans from these lenders have annual percentage rates as high as 80%, whereas revenue-sharing loans have annual percentage rates of $8 - 25\%$. Therefore, revenue-sharing contracts have advantages over traditional and alternative funding sources such as having flexible payments, fast funding time, and lower equivalent interest rates.

This new model helps firms in need of investment to survive and thrive with a flexible contract whose terms depend on the firm's performance. If the revenue performance of the firm goes well, then the monthly payments to investors increase, which results in higher effective interest rates for investors. If revenue performance is poor, payments are lowered to reduce
financial stress on the firm. Indeed, when these contracts are used optimally, we provide evidence that the likelihood of firm bankruptcy is small, even for highly variable cash flows, due to the flexible monthly payments facilitated by the contract.

The proposed revenue-sharing contract bears some superficial similarity to performance-sensitive debt (e.g., step-up bonds and performance-pricing loans) studied by Manso 2010, where the debt payments depend on the borrower's performance: the borrower pays higher interest rates during low performance and lower interest rates during high performance. However, this approach has the opposite behavior of our proposed revenue-sharing contract, since, under the latter, a high performing firm will have high debt payments and will pay off the fixed loan amount early, resulting in a higher effective interest rate. Performance-sensitive debt has been shown to harm both the borrower and investors via earlier borrower default (Manso 2010), whereas our new model can result in positive outcomes for all parties.

We analyze the revenue-sharing contract approach to crowdfunding, and we assist the firm to determine its optimal contract parameters to maximize its expected net present value, subject to investor participation constraints and platform fees. A natural multi-period formulation for the firm's problem results in an intractable stochastic optimization model, which we approximate using a deterministic model. In the approximation model, we use a cash buffer for dealing with cash-flow uncertainties. We are able to solve the approximation model analytically. We show that as cash-flow variability increases, the cash buffer should increase to provide a larger cash buffer to absorb the additional variability. Parametrized on real data from Bolstr campaigns, our approximation solutions give an NPV, in the stochastic problem, that is within 0.2% of the simulation-based optimal NPV, for all levels of cash-flow uncertainty. Furthermore, the
approximation solutions result in approximately the same bankruptcy probabilities as the optimal stochastic solutions, providing further evidence of the quality of the approximation.

We show that as cash-flow uncertainty increases, the optimal investment amount increases, the revenue-sharing percentage decreases, resulting in a stochastically larger investment horizon (e.g., larger mean and variance). However, the firm's maximized NPV is rather insensitive to cash-flow uncertainty. Thus, while the details of the optimal revenue-sharing contract can change considerably with cash-flow uncertainty, the bottom line NPV is rather robust to this uncertainty.

We compare revenue-sharing contracts with equity crowdfunding and observe that a firm can attain a higher NPV and a comparable probability of bankruptcy under a revenue-sharing contract than under equity crowdfunding. We show that the NPV benefit of revenue-sharing increases as the firm's cashflow volatility increases.

We also compare revenue-sharing contracts with fixed-rate loans, and find that, for most cases considered, a firm can attain a higher NPV and a lower probability of bankruptcy under a revenue-sharing contract than under a more traditional fixed-rate loan. This holds even for a pool of investors with high opportunity costs and fixed-rate loans with an annual interest rate as low as 7%. We also show that these benefits are more significant for firms with higher levels of cash-flow uncertainty. Intuitively, these benefits are due to the more flexible nature of the revenue-sharing contract.

In summary, revenue-sharing contracts are a novel approach to crowdfunding, which we show are superior to other financing models.

Reference: