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"Token Financing vs. Equity and Crowdfunding"

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Token Financing vs. Equity and Crowdfunding*

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Abstract

We present a stylized model of three entrepreneurial financing methods based on two trade-offs. First, token financing and crowdfunding reveal consumer-investors' demand for the product prior to investment, but upfront purchase weakens the entrepreneur's incentive to deliver. Second, token financing permits a bubble component in token value, but reduces consumer surplus because tokens are stored rather than consumed. We characterize the conditions under which entrepreneurs prefer each financing method. We show that token financing can fund socially efficient projects that cannot be funded through equity or crowdfunding, but leads to suboptimal consumption. Finally, we propose an implementable hurdle condition for regulators.

Keywords: crowdfunding; entrepreneurial financing; initial coin offering; token regulation; utility token.

JEL Codes: G32, G38, L26.

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1 Introduction

The relaxation of regulations concerning crypto assets in the United States and elsewhere in 2025, together with the launch of crypto-related investment vehicles by financial intermediaries, has renewed interest in so-called token financing, also known as Initial Coin Offerings (ICOs). In ICOs, issuers typically sell utility tokens that grant access to goods or services in a (blockchain-based) project. These tokens are publicly traded on secondary markets, distinguishing them from private equity and preorders. However, academia still grapples with the fundamental question of whether token financing can be socially efficient and how it should be regulated, if at all.

This note proposes a generic model of the entrepreneur's choice among equity, token financing, and crowdfunding, based on key trade-offs: Equity financing (especially venture capital) benefits from monitoring and strong control mechanisms embedded in contracts, but it does not reveal consumer demand. Tokens appeal to investors by offering utility-based claims and integrating product demand into investment decisions. Crowdfunding shares this feature with token financing; however, in the current institutional environment, crowdfunded claims are typically not traded, while tokens are. Tokens also embed the potential for (bubbly) storage value.

We contribute to the literature comparing ICOs with other financing methods.[1] For instance, researchers show that ICOs may dilute equity ownership (Gryglewicz et al., 2021), increase entrepreneurial effort (Chod and Lyandres, 2021; Chod et al., 2022), and lead to overproduction (Malinova and Park, 2023). Garratt and van Oordt (2021) note that consumer-investors must hold tokens, which is costly due to the time value of money. We explicitly address how holding tokens reduces consumption utility, while gains from trading increase token investors' indirect utility and thus their willingness to pay for ICO tokens.

Our model is motivated by empirical regularities observed in the literature. First, token prices are influenced by factors beyond the entrepreneur's control, such as the timing of ICOs (Gächter and Gächter, 2021), and exhibit strong momentum (Kogan et al., 2024). Further, Borri et al. (2025) find that user adoption explains only a small fraction of the variation in cryptocurrency prices, implying that token prices reflect not only consumption utility but also bubble value. Second, delivery failure risk is relatively high in ICOs, around 30% (Howell et al., 2020; Davydiuk, et al., 2023), compared to only around 10% in crowdfunding (Mollick, 2015). Our analysis builds on these

[1] Earlier literature focused on how tokens solve coordination problems or exploit network effects (e.g., Bakos and Halaburda, 2018; Catalini and Gans, 2018; Li and Mann, 2018). We add to this literature by examining why token-based platforms are financed in the first place.

findings by providing a simple framework for analyzing financing methods from the perspectives of entrepreneurs and social efficiency.

2 Model

A penniless, risk-neutral entrepreneur has a project that requires an investment of $f > 0$ and produces a good consumed by a measure-one continuum of homogeneous individuals. The variable cost is zero (e.g., digital goods, or by normalization). There are two possible product designs, and only one matches consumers' preferences. With probability $\alpha > 0$, the entrepreneur selects a good match, and consumers derive utility $u(x)$ from consuming a quantity $x \in [0, 1]$. We assume $u(0) = 0$, $u'(x) > 0$, $u''(x) < 0$, and $\lim_{x \to 0} u'(x) = \infty$. With probability $1 - \alpha$, the chosen design is a poor match, and consumers derive zero utility for all x.

We focus on symmetric equilibria in which each individual chooses a consumption level x to maximize a quasi-linear utility over consumption and money, normalizing the individual's saturated demand for the good to one. When the good is produced, it may generate positive externalities $e > 0$ (e.g., technology spillovers, network effects, and industrial policy). There are three financing methods: equity, token financing, and crowdfunding. To keep them comparable, we assume that all investor claims are competitively priced in the primary market, so investors receive a fair value of f in return for their investment, and the entrepreneur extracts the full surplus.

Under equity financing, an outside venture capitalist (VC), who is not a consumer (or has measure zero as a consumer), provides funding in exchange for a claim on cash flows. Since consumer-investors play no role, the good is sold (and profits are realized) only if it is a good match. We assume that in this case, the entrepreneur delivers the good with probability one, for two reasons: First, the VC monitors and professionalizes the startup. Second, payment is made only after delivery, giving the entrepreneur strong incentives to deliver.[2]

Under token financing, consumer-investors provide funding upfront in exchange for tokens that are fungible as product claims. A unit token enables one unit of consumption, and we normalize the token supply to one. When the entrepreneur sells tokens, consumer-investors simultaneously decide whether to invest. Token holders can sell any fraction of their tokens in a secondary market to speculators at a prevailing price $p > 0$, and speculators do not consume but instead hold tokens as a

[2]Our results continue to hold if the delivery probability is less than one under equity financing (but not so small that equity is always dominated); we make this assumption for the sake of simplicity, rather than using a compound probability $k_e\alpha$, where k_e is the delivery probability under equity.

store of value. We assume p is exogenous because various factors influence p—including ICO timing, speculative demand, and investor sentiment—that guide interpretation when analyzing variations in p. These factors are largely beyond the entrepreneur's control, motivating our modeling choice of an exogenous p.

Consumer-investors observe the quality of the match before investing. Hence, they invest only if the product design is a good match, resolving demand uncertainty prior to investment. Since payments are made upfront, the entrepreneur has weak incentives to deliver. Further, projects funded by tokens or crowdfunding typically do not benefit from the professionalization and monitoring provided by VCs that limit delivery risk. We formalize this by assuming that the entrepreneur delivers with probability $k_t < 1$ and defaults with probability $1 - k_t$.

Under crowdfunding, the entrepreneur raises funds from consumer-investors in exchange for non-tradable product claims. In principle, these claims could be traded with institutional support; however, exchanges for crowdfunded product claims do not currently exist. We thus assume that they cannot be traded or used for anything other than consumption. Crowdfunding is a hybrid of the two methods. It shares with token financing the feature that consumer-investors observe match quality, and with equity the feature that there is no secondary market trading. As in token financing, there is a risk of non-delivery: The entrepreneur delivers with probability $k_c < 1$, which we assume to be higher than under token financing ($k_t < k_c$), following the empirical regularities discussed above.

3 Analysis

Efficient Benchmark

In a first-best world, an omnipotent social planner chooses the optimal product design and ensures delivery. Given the zero production cost, consumption is maximized at $x = 1$. Thus, the social surplus from a project is $u(1) + e$, and the efficient investment decision is to fund a project if and only if $f \leq u(1) + e$.

By contrast, all three financing methods are subject to uncertainty, either regarding the product design or delivery, which reduces expected consumption utility to $\alpha u(x)$ or $k_i u(x), i \in \{c, t\}$. When consumers optimally choose $x < 1$, we refer to projects as constrained efficient, which is a subset of efficient projects.

Equity Financing

After the VC invests, the match quality is realized. Since the variable cost is zero, the entrepreneur sells the unit quantity with probability α at a price of $u(1)$, yielding an expected profit of $\alpha u(1)$. Thus, if α is sufficiently low, the VC cannot recoup the investment f. This implies that some efficient projects cannot be funded by equity if $\alpha u(1) < f < \alpha u(1) + e$. The possibility of a bad product design and the presence of externalities create inefficiencies.

Token Financing

Suppose consumer-investors hold the unit supply of tokens. As long as the secondary-market token price p is non-zero, they will not spend the entire token supply on consumption. Instead, each consumer maximizes $k_t u(x) + p(1-x)$ over x, where k_t accounts for delivery risk. There is a unique interior solution $x^*(p) \in (0,1)$ such that the individual consumes $x^*(p)$ tokens and sells $1 - x^*(p)$. Thus, the trading opportunity reduces consumption utility from $k_t u(1)$ to $k_t u(x^*(p))$.

On the other hand, trading increases consumer-investors' indirect utility above $k_t u(1)$, so they are willing to invest as long as the required funding $f \leq k_t u(x^*(p)) + p(1-x^*(p)) \equiv v(p)$, the indirect utility. For instance, a project with $f > k_t u(x^*(p)) + e$ is constrained inefficient, but it can be funded under token financing if $f \leq v(p)$. A project with $f \leq k_t u(x^*(p)) + e$ is constrained efficient and may be funded under token financing, but it cannot be funded by equity if α is sufficiently small.

Crowdfunding

The entrepreneur sells claims to the unit quantity, and consumer-investors would be willing to pay $k_c u(1)$ for these claims, given the delivery risk k_c. Hence, crowdfunding is not feasible if $k_c u(1) < f < k_c u(1) + e$, although these are efficient projects. Some of these projects may be funded with tokens if p is sufficiently large, or with equity if $\alpha > k_c$.

Proposition 1. Let $\max\{\alpha, k_c\} \equiv q$. There exists a unique threshold $p^*(q) > 0$ such that (i) the entrepreneur prefers equity if $p < p^*(q)$ and $\alpha > k_c$; (ii) the entrepreneur prefers crowdfunding if $p < p^*(q)$ and $k_c > \alpha$; (iii) the entrepreneur prefers token financing if $p \geq p^*(q)$.

Proof. The entrepreneur's expected payoff is $\max\{\alpha u(1) - f, 0\}$ under equity, $\max\{k_c u(1) - f, 0\}$ under crowdfunding, and $\max\{v(p) - f, 0\}$ under token financing. When $p = 0$, $v(0) = k_t u(1) < k_c u(1)$ since $k_t < k_c$. Since $v(p)$ is continuous and $\partial v(p)/\partial p = 1 - x^*(p) > 0$, $v(p)$ is strictly increasing and invertible. Thus, there exists a unique $p^* > 0$ such that $v(p^*) = qu(1)$. Define $p^*(q) = v^{-1}(qu(1))$. (i) If $p < p^*(q)$ and $\alpha > k_c$, equity dominates. (ii) If $p < p^*(q)$ and $k_c > \alpha$, crowdfunding dominates. (iii) If $p > p^*(q)$, token financing dominates. ■

Figure 1 illustrates that each financing method can be preferred depending on parameter values. Token financing is preferred when the maximum of α and k_c is small relative to p, and the region where token financing is preferred expands symmetrically toward $(1, 1)$ as p or k_t increases. That is, equity and crowdfunding are preferred only if the token price is below a threshold $p^*(q)$ given α and k_c. Intuitively, when p is low, the secondary market provides little additional value, so token financing works similarly to presale crowdfunding and cannot often outperform the other methods. As p increases, the entrepreneur can extract more value from token issuance because a larger fraction of tokens is held for resale rather than for consumption, expanding the set of projects for which token financing is privately optimal.

Proposition 2. (i) Equity and crowdfunding always fund efficient projects whenever they are feasible. (ii) When neither equity nor crowdfunding is feasible, token financing can fund some constrained efficient projects if both p and e are sufficiently large, but it may also fund some inefficient projects if p is large and e is low.

Proof. (i) If $f \leq \alpha u(1)$, equity is feasible and efficient, since $f < \alpha u(1) + e$. Similarly, if $f \leq k_c u(1)$, crowdfunding is feasible and efficient, since $f < k_c u(1) + e$. (ii) If $f > \max\{k_c u(1), \alpha u(1)\}$, only token financing is feasible, provided that $f \leq v(p)$. Token financing is constrained efficient if $f \leq k_t u(x^*(p)) + e$. Since $\partial v(p)/\partial p > 0$, the former condition is satisfied for a sufficiently large p. Given an arbitrary p, the latter condition is satisfied for a sufficiently large e. ■

From the efficiency standpoint, only token financing needs to be examined. A higher token price renders more projects feasible for funding, but at the same time reduces consumption utility because a larger token supply is held as bubble assets. This decreases social surplus; hence, larger externalities are required to achieve constrained efficiency. Intuitively, token financing is most relevant when equity and crowdfunding cannot support a project. A sufficiently high token price can relax funding constraints, making it possible to finance projects that are socially valuable but would otherwise go unfunded. At the same time, a higher token price increases speculative demand, diverting part of the token supply away from consumption and toward bubble-like holding. The social desirability of token issuance depends on balancing these two forces.

4 Discussion

Our analysis reveals a potential conflict between entrepreneurs' profit incentives, which favor tokens, and social welfare, which disfavors tokens, ceteris paribus, because of their storage rather than consumption value. However, the entrepreneur's profit from token sales is driven by the secondary-market price, which can exceed the marginal utility of spending a unit token on consumption, since it includes a bubble component.

Hence, regulators may restrict post-ICO secondary market trading. Doing so would shift financing towards equity or crowdfunding. If projects can be funded by either method, tokens are not necessary. However, some efficient projects may be infeasible under equity or crowdfunding but become feasible with tokens due to their bubble value. This depends on the innovative activities that generate positive externalities.

The larger the storage (bubble) value of tokens, the more often token becomes the only feasible funding method. However, higher bubble value also reduces consumption, which can render a project inefficient even though it would be efficient at full consumption. Thus, regulators must evaluate token financing according to two criteria: First, is the secondary-market token price high enough to enable an otherwise infeasible project? Second, is the positive externality from the project large enough to compensate for the bubble-induced consumption loss?

Our model implies that regulators may approve token issuance only if it generates consumption value that exceeds the net social funding cost $(f - e)$. In practice, regulators can develop a hurdle condition requiring ICO token capitalization to exceed funding costs by a certain multiple, which can be determined using average heuristics for externalities and for the fraction of tokens redeemed for consumption.[3]

While estimating such a benchmark multiple is left for future work, our model implies that the required multiple should vary procyclically with the crypto market, because token consumption, and hence utility, decreases while token capitalization increases as token price increases. Therefore, holding constant the set of potential projects, the regulatory hurdle should be higher during a crypto bull market.

[3] A project is socially efficient if $k_t u(x^*(p)) \geq f - e$, where $k_t u(x^*(p)) = v(p) - p(1 - x^*(p))$. ICO capitalization can serve as a proxy for $v(p)$. Thus, for any given p, if the fraction $x^*(p)$ and externalities e can be estimated, the hurdle condition can be expressed as $v(p) > mf$, where m is the multiple that the regulator needs to determine.

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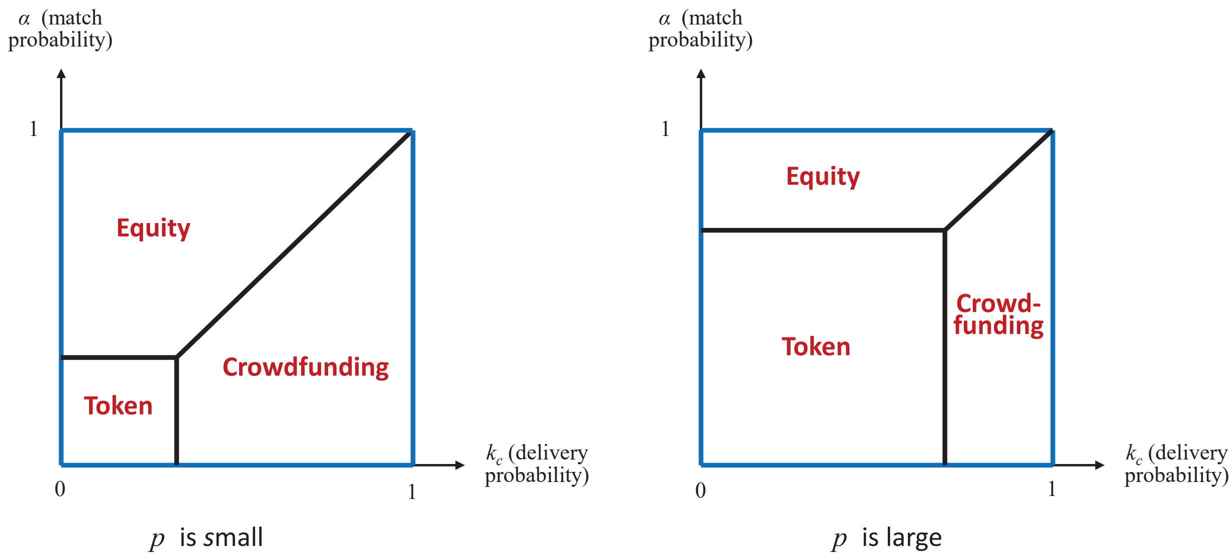

Figure 1: Regions of the Entrepeneur's Preferred Financing Method

The Equity and Crowdfunding regions are separated by the 45 degree line. The two lines delimiting the Token region are implicitly defined by $p^*(q) = v^{-1}(qu(1))$, and they shift symmetrically as p or k_t increases.