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Abstract

We provide novel evidence on voting practices used by the investment committees of prominent venture capital investors in the US. A substantial share of these VCs use a voting rule for seed and early stage investments where a single 'champion' is sufficient for the entire partnership to make an investment, even if other members are not as favorable. However, the same VCs migrate to more conventional 'majority' or 'unanimous' voting rules for their later stage investments. We show theoretically that a 'champions' model can emerge as the optimal voting rule when outcomes follow a sub-exponential distribution (resembling the investments of early stage VC), but also requires that partners have sufficiently common objectives to prevent strategic overchampioning for pet projects. More traditional voting rules are robust to overchampioning but are more likely to systematically miss the best early stage investments.

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Some VCs have all their partners score a deal's potential. We've learnt that those aggregate scores don't correlate strongly with ultimate returns. With that approach, you get the mush in the middle, with no big flaws but no great strengths.

– Marc Andreessen, co-founder of VC firm Andreessen Horowitz[1]

1 Introduction

One of the central elements of investment decisions, whether made by financial intermediaries or large corporations, is that they are often made by an *investment committee* – a group of people tasked with the go/no-go investment decision, who typically each vote their view, given the information signal they get on the prospective investment.

Most academic work in corporate finance abstracts away from the fact that a committee of individuals makes investment decisions. The unspoken assumption is that the committee effectively aggregates information into a decision with expected positive net present value. Theoretical work on information aggregation in voting, going back to the famous Condorcet's jury theorem, has provided compelling evidence of the benefits of the 'majority voting rule' (Condorcet (1785); Ladha (1992); Feddersen and Pesendorfer (1997), Feddersen and Pesendorfer (1998)). Such voting practices also fit conventional wisdom, where voting is often considered valuable as a way to 'trim outliers' and emphasize the wisdom of the majority.

Motivated by the quote above and related anecdotes suggesting a deviation from a 'majority rule' by Venture Capital investors in certain instances, we study the voting practices at investment committees of some of the largest venture capital investors in the U.S. This survey revels an interesting result: nearly all the VCs we surveyed employ some version of a 'champions' rule when voting on whether to fund startups at their

[1] Eisenmann and Kind (2014), page 8.

earliest ("seed" and "early") stages of financing. Specifically, both the formal and informal voting practices used by the investment committees at these VC firms allow for a single committee member's strong positive signal to over-ride a majority of individuals who show skepticism about the investment opportunity. We further document that these same VC investors tend to change their voting practice for later stage investments, using either a 'majority rule' or 'unanimous agreement' voting model when deciding whether to make a late stage investment in a startup. This *within* VC change in the voting rule strongly suggests that the use of a 'champions model' in early stage investing is related to the stage of the startups being funded, as opposed to anything systematic about the VC investors who might focus on one stage or another.

Conventional wisdom and a large body of theoretical work suggests that an investment committee that aggregates the information of all members should systematically outperform decision making that stems from information signals of any single individual as would be the case with a champions voting model. So why would VC investors use a champions voting model when making certain investments? Moreover, given the fact that VCs rely on champions voting primarily for seed and early stage investments but not others, could it be that such an approach to aggregating information signals may even be optimal in the contexts it is used?

We next examine theoretically whether contexts that fit the early stage VC setting, in which returns are believed to be disproportionately *driven* by outliers, may require a different approach to aggregating information signals. For example, as documented by Hall and Woodward (2010) and Kerr, Nanda, and Rhodes-Kropf (2014), over half of startups receiving VC investment fail completely while a few generate enormous returns. Scherer and Harhoff (2000) provide evidence that returns in venture capital, and for technological innovation more generally have 'heavy right tails' and there have been explicit suggestions among practitioners that early stage VC returns follow a power law (Pareto) distribution (Thiel and Masters 2014).

As with standard models of information aggregation, we assume that committee members receive signals with (at least some) different information and are unable to perfectly communicate their information to others. For example, one could think of investment success as stemming from different components such as team, product, market (Kaplan, Sensoy, and Stromberg 2009; Bernstein, Korteweg, and Laws 2017) and each committee member as having expertise in evaluating some but not all elements. The total expected value of the project is a sum of signals that committee members observe, in addition to a number of signals that they may not observe.

A key insight of our model is that if information signals come from subexponential (heavy tailed) distributions that correspond to the outcomes we see from innovative early stage investments, then the optimal voting rule can in fact be equivalent to a 'champions' voting model observed among VC investors.[2]

The intuition for this result comes from a combination of two effects. First, note that voting rules that require many affirmative votes for investment (such as majority or unanimous agreement) result in the funding of ventures that tend to be good on many dimensions. Importantly, they are likely to miss projects that are *exceptional* on few dimensions but are mediocre on many other dimensions. Conversely, the champions rule results in the acceptance of projects that have one superstar characteristic but miss projects that are quite good on many dimensions without being superstar on any one of them. The reason this is relevant for whether information signals come from subexponential distributions is because of an important property of such distributions, known as

[2]Subexponential distributions are a subclass of heavy-tailed distributions to which most commonly-used heavy-tailed distributions (including power law distributions) belong and is used frequently in the analysis of insurance claims and rare events.

the "catastrophe principle". In our context, this property of subexponential distributions implies that *a superstar venture is more likely to driven by one exceptional characteristic and many mediocre ones rather than by many very good characteristics.* This property of superstar ventures is also consistent with an observation made by famed entrepreneur and venture capital investor, Marc Andreessen, that *"Google, Facebook, eBay and Oracle all had massive flaws as early-stage ventures, but they also had overpowering strengths"* (Eisenmann and Kind 2014). Interestingly, in such a setting, a median committee member will likely receive a mediocre signal even for superstar project, which is consistent with the relative low correlations between scores given by investors and the ultimate outcome of ventures noted by Andreessen in the quote above, and also documented in Kerr, Nanda, and Rhodes-Kropf (2014).

Second, the fact that the distribution of signals and project payoffs exhibits fat right tails implies that much of the potential value from investment comes from maximizing the probability of finding a superstar project. In contrast, finding projects of low but positive NPV is of secondary importance. Together these two effects – the importance of getting decisions on superstar projects correct and the fact that a superstar project is likely to be driven by one superstar characteristic rather than many good ones – implies that the champions rule dominates other voting rules in contexts where the distribution of information and returns have heavy right tails. Other decision rules, such a majority rule or unanimous agreement would vote down superstar projects with a high positive probability – because it is possible and even likely that they have sufficiently many weak characteristics. This is consistent with Marc Andreessen's comment above, that with those voting rules, *"you get the mush in the middle, with no big flaws but no great strengths".*

A related result is that the optimal rule for aggregating information signals depends on the underlying signal distribution, F, from which information is received by the committee members. If F has light tails (e.g., is a Normal distribution), a superstar project will typically be driven by many characteristics that are very good rather than by one exceptionally good characteristic. In this case, the advantage of the champions rule over other decision making rules in identifying superstar projects is lost and more traditional voting rules dominate. In light of this insight, the declining use of 'champions' voting among the same VC investors in later stage investments could arise if information signals for early rounds of financing were heavy-tailed while those in later rounds were less so. Although we cannot directly validate this premise, we use novel data on venture capital return multiples at the level of each startup's round of financing to calculate the distribution of return multiples for different investment stages. We are therefore able to directly corroborate the intuition that returns of late stage investments are substantially less skewed than 'seed' and 'early stage' investments. To the extent that the *ex ante* information signals for these stages are distributed in a manner similar to the *ex post* returns, this would provide a rationale for why venture capital investors use the champions model primarily in the seed and early stage investments and migrate to more traditional voting models for later stage investments.

In the final part of the paper, we evaluate the quantitative importance of using a champions model instead of traditional voting in contexts such as seed and early stage venture capital, by analyzing a numerical example of the model whose inputs fit the VC context and where we consider a fund with 5 partners that make 25 investments. In our numerical example, the model-implied probability that the VC will be able to "catch a unicorn" (specifically, have at least one of the investments deliver a multiple that is 10X or more) is 55.7% for the champions rule, 20.2% for the majority rule, and 15% for the unanimity rule.

The lower chance of selecting exceptional ideas in early stage settings when the champions model is not used is useful to put into context, because we also show theoretically that the dominance of the champions model for subexponential distributions is only true in our model when conflicts of interest between committee members, resulting in strategic championing, are not too extreme. If individual committee members have private benefits (e.g. Scharfstein and Stein (2000)), then the cost of 'over championing' poor projects over-rides the potential benefits from selecting outlier projects. In such an instance, more traditional voting models are likely to be second best alternative, providing a potential rationale for the limited observed use of this type of voting – which we document for venture capital but does not appear to be widely used when selecting between potential projects within corporate R&D of large companies.

Our work builds on a long literature that has examined venture capital's role in financing innovation. In particular, this research has fleshed out many of the tools venture capital investors use to improve the outcome of the startups they back, such as staged financing (Gompers 1995; Bergemann and Hege 1998), securities that have state-contingent cash flow and control rights (Hellmann 1998; Cornelli and Yosha 2003; Kaplan and Strömberg 2003) and the active role of venture capital investors on boards of portfolio companies (Hellmann and Puri 2000, 2002; Lerner 1995). Our work builds on the nascent literature on understanding decision making in venture capital partnerships including how venture capital investors select investments (Kaplan, Sensoy, and Stromberg 2009; Gompers et al. 2020), which is an important element to understanding the role of venture capital investors in financing innovation (Lerner and Nanda 2020).

Our paper is also related to the broader literature on the incentive, agency and organizational frictions among intermediaries financing innovation (Manso 2011), the role this can play in surfacing transformational ideas (Bloom et al. 2020) and the fact that radical innovations that upend existing firms often arise from venture capital despite the much larger R&D expenditure directed towards the financing of innovation in large companies across the world (Kortum and Lerner 2000).

Lastly, the paper is related to a large literature on decision making in committees whose members have dispersed information. We discuss this literature in Section 3 after describing our empirical results. The novel aspect relative to this literature is the focus on distributions driven by tail events.

2 Empirical Evidence from Venture Capital

Venture capital provides a unique context within which to examine empirical patterns related to financing innovation for several reasons. First, VC partnerships view project selection as among the most important determinants of their success (Gompers et al. (2020)) and in addition appear to exhibit substantial heterogeneity in the ways in which they make investment decisions.

Second, it has been well-documented that venture capital returns are driven by a few outliers (e.g., Hall and Woodward (2010) and Scherer and Harhoff (2000)), often referred to as 'home runs' by practitioners. Indeed, there has even been explicit suggestions among practitioners that early stage VC returns follow a power law (Thiel and Masters 2014).

We follow the examples of Graham and Harvey (2001) and Gompers et al. (2020) to survey VC investors on their voting practices. While our empirical approach builds on and is most similar to Gompers et al. (2020), we note some key differences. Gompers et al. (2020) have an extensive survey of over 650 VC investors across a wide range of topics. Our approach focuses in more detail on voting practices within investment committees, and also aims to look at those who invest across multiple stages so as to get within-VC variation in voting practices across rounds. Since it is only larger VC funds that typically have the ability to invest across seed, early and late stage, we focus our survey on U.S based managing partners at 55 the largest VC firms that make investments into U.S startups. Our measure of size is based on the cumulative fund raising over the 2016-2018 period as calculated from Pitchbook. Figure 1 documents the key questions used for this analysis as they were posed in the survey. As can be seen from the questions, we asked about both the formal voting process used in these VC firms as well as the informal process. We received responses from 35 of these 55 firms, implying a response rate of nearly two-thirds.

As noted above, the VC firms we targeted were larger investors. Despite our focus on a narrow sample of VCs, it is important to recognize that these investors are responsible for a disproportionate share of the dollars invested into VC-backed startups in U.S. and hence are more representative of VC investing than might be expected. For example, Lerner and Nanda (2020) examine fund raising by VC investors between 2014 and 2018 and find that the top 50 VCs (or approximately 5% of those who raised funds in that period) accounted for half of the total capital raised over that period.

The average investment committee at the VC firms we surveyed had 10.4 partners compared to an average of 4.8 partners in the VC firms surveyed by Gompers et al. (2020). Despite this difference and the fact that over half our sample comprised VCs investing from funds over $500 million, the partnership size in VCs remained relatively small. VC firms in the 75th percentile in our sample had 13 partners on their investment committee. In other words, the size of investment committees in VC firms appears not to scale proportionately to the size of the funds. This lack of scaling among the partners on investment committees is an interesting fact, one that seems different from partners at other professional service firms such as lawyers and management consultants.

Having documented the characteristics of the VC firms and the questions asked of the respondents, we turn next to outlining the key results. The charts report results broken down by the stage of the investment being considered when the partners are voting. The first bar corresponds to "Seed" stage investments, which are the earliest investments into startups and are believe to have the most skewed returns. The next bar corresponds to "Early Stage" investments, typically considered to be Series A and at times, Series B investments. The final bar corresponds to later stage or "Growth Stage" investments, which are typically made into more mature startups which have already shown some degree or product market fit, are often generating some revenue and hence are the least skewed in terms of the profile of returns.[3]

Within each of these stages, we further break down the results by share of the firms that report using different types of voting rules. As can be seen from the bars in Figure 2, 60% of all VCs in our sample decide whether to deploy capital into a Seed stage startup by using a champions voting model in their investment committee, where a single partner can go ahead and do the deal regardless of what the others feel. A further 30% of VCs use a variant of the champions model, where a single champion can do the deal as long as there is no veto. For investments into early stage ventures, the share of VCs using champions voting falls to 20% and a much larger proportion of VCs use some form of majority or consensus to decide which investment to make. By the growth stage, this share has falls even further. It is worth emphasizing that since most of these VCs invest across all stages, a shift in the share of VCs voting using the champions model across the different stages is evidence of the same VCs changing their voting model across stages. This provides compelling evidence of voting models shifting by stage, as the variation being documented is "within VC" as opposed to "across VCs", the latter of which is much more subject to concerns about unobserved heterogeneity.

[3] We use novel data to validate the difference in skew across rounds of financing in Section 5.

In Figure 3, we further document that this pattern continues to exist in a very similar manner when one examines the informal voting practices within the investment committees. At the Seed stage, an enthusiastic champion is sufficient for others to vote in favor of the deal in 90% of investment committees regardless of the formal voting model in place, implying that in practice the veto is rarely used. However, this deference to the enthusiastic champion on the investment committee falls within the *same VC firm* by the Early stage, with a greater proportion of investment committees requiring either a majority of individuals to be enthusiastic, or all individuals to be enthusiastic. By the growth stage, the informal process reflects even less deference to an enthusiastic champion.

We turn next to understanding why these different voting practices might be undertaken at VC firms, in particular the emphasis on champions voting when investing in extremely early stage startups.

3 Related Literature

3.1 Interpreting Empirical Evidence through Classic Models of Voting

The previous section documents a striking relation between the decision making rule of a VC partnership and the stage of investment considered. For a seed stage startup, VC partnerships tend to use the champions rule, where a single positive vote is sufficient for the partnership to go ahead with the investment. However, the same partnerships tend to move to the majority rule when analyzing later-stage investment decisions. It is interesting to see whether classic models of committee decision-making predict this behavior.

The classic setting of committee decision making is a binary signal and state environment, in which the state (e.g., project quality) can be good or bad, and each committee member gets a noisy binary signal about the state. Sah and Stiglitz (1988) present a theory of optimal committee voting rules in this environment. In this framework, the problem of finding the optimal voting rule reduces to a statistical problem of finding the number of positive signals at which the committee is just indifferent between investing and not investing. The optimal voting rule is determined by the unconditional probability that the project is good and by the costs of Type-I and Type-II errors.

Venture capital maps into this classic setting in the following way. First, there is a very low ex-ante probability of the project being good (a typical VC partnership accepts less than 2% of projects it considers, and the majority of accepted projects do not return anything, as the empirical analysis below confirms). Second, the cost of Type I error is much higher than the cost of Type II error: It is much costlier for a venture capital partnership to miss the next unicorn than to lose money on a bad investment. According to Sah and Stiglitz (1988) and other models with the binary structure, the optimal size of consensus required for investment is the higher the lower the ex-ante probability of the project being good, approaching full consensus in the limit. Intuitively, if the prior that the project is good is very low, one needs many affirmative signals to overcome it. This is the opposite of the observation that VC partnerships do not require any consensus for seed stage investments. The property that the cost of Type-I error is much higher than the cost of Type-II error works in the opposite direction, favoring rules requiring consensus less than majority. Since these two effects work in the opposite directions, classic models based on binary states and binary signals do not make clear predictions for the VC setting.

3.2 Possible Explanations of the Evidence

So why do VC investment committees use the champions model for seed and early stage investments but not for later stage investments? Two natural explanations come to mind. The first explanation is via either the costs of or incentives for information acquisition. Given the relative small size of investment (compared to later stage investments), a partnership optimally decides that it is too costly to have more than one partner spend time on a project.[4] Alternatively, giving full power to approve the investment may encourage the partner to spend more effort on analyzing the project (relatedly, this mechanism is the reason for optimality of delegation in Aghion and Tirole (1997) and for the beneficial role of herding in Khanna and Mathews (2011)).

The second explanation is that only one partner has information relevant for the project, because the expertise of other partners lies elsewhere. According to this explanation, startups at early stages are specialized, and thus few partners have sufficient expertise to competently evaluate them. In contrast, at later stages, there is a greater variety of aspects to be evaluated, so the expertise of more partners is relevant, making aggregation of different opinions more relevant.

We think these explanations are plausible, but in the next section we propose a different one. The idea is that there are many different kinds of "good" projects, and the voting model a partnership uses affects the return profile that the VC partnership will get on its investments. It is based on two premises. First, the returns of a VC partnership are disproportionally driven by outliers, so that "catching a unicorn" is much more important than finding many moderately good projects. Second, even superstar investments have many flaws, consistent with Marc Andreessen's quote that "Google, Facebook,

[4] See **?** for a model that features this effect and shows that costly information production by investors can explain why underwriters limit the pool of investors in IPOs.

eBay and Oracle all had massive flaws as early-stage ventures, but they had overpowering strengths." Thus, what distinguishes a potential superstar project is not that it does not have flaws, but that it has some overpowering strength. Then, if a typical superstar investment has some overpowering strengths but also many flaws, then conventional voting models will be inefficient because partners who do not see the strength but see the flaws will vote it down. In contrast, a champions model will be very good at picking up such superstar projects.

3.3 Other Related Literature

Two other strands of the literature on committee decision-making are related. First, several papers analyze models with a continuum of states (project types) with the same signal structure: the value of a project is a linear function of multiple signals, and each committee member learns one of them (Moldovanu and Shi (2013); Malenko (2014); Name-Correa and Yildirim (2019)). The element that we focus on is the analysis of the relation between the tail behavior of the state and signal distributions and the optimal voting rule.

Second, several existing papers establish the optimality of the unanimity rule in various environments (Coughlan (2000); Bond and Eraslan (2010); Jackson and Tan (2013); Chan et al. (2018)). In Coughlan (2000), unanimity can be optimal if committee members can communicate prior to the vote and they have similar preferences. In Bond and Eraslan (2010), the unanimity rule is beneficial because it incentivizes the proposer to make a proposal that is attractive to the rest of the group. In Jackson and Tan (2013), the unanimity rule is beneficial because it encourages committee members to disclose verifiable information prior to the vote. Finally, in Chan et al. (2018), the unanimity rule can be beneficial because in an environment with committee members with heterogeneous discount factors unanimity makes makes patient members pivotal, leading to more information acquisition and more precise decisions. However, since the unanimity rule is the opposite of the champions model, the forces highlighted in these papers work against explaining the use of the champions model by VC investment committees.

4 A Simple Model of Investment

In this section, we develop a simple model of committee decision making that highlights the fact that a decision-making rule affects the return profile that the committee gets. To highlight the role of tail events, we keep the model as close to classic models of information aggregation as possible, abstracting in the baseline model from factors, such as information acquisition and conflicts of interest.

Suppose that there are N partners at a venture capital firm, who need to decide whether to accept ($a = 1$) or reject ($a = 0$) a project. The project has an upfront investment cost $I > 0$ and yields a payoff V upon success. The payoff of the project is determined by the values of a set of M-many characteristics where $M \geq N$. Specifically, we assume that

$$V = \theta_1 + \theta_2 + ... + \theta_M. \tag{1}$$

All M characteristics are independently distributed over $[-l, \infty)$ (for some constant $l \in \mathbb{R}$) according to a distribution function $F(\cdot)$ with density $f(\cdot)$. Let $G(\cdot)$ denote the implied distribution of V. We assume that each partner i receives a perfectly informative signal about the value of characteristic i. Partner i learns θ_i but only knows the distribution of other characteristics. Because of its tractability, such additive specification is popular in the literature on committee decision making (e.g., Moldovanu and Shi, 2013; Malenko, 2014; Name-Correa and Yildirim, 2019).

Independence of characteristics is a strong assumption, but is used in this case to highlight the value of additional information that each partner brings; also note that as signals become perfectly correlated then voting is no longer needed. One can more generally interpret θ_i as the portion of partner i's information about residual uncertainty of the project's value. For example, if the value of each characteristic were a sum of the common factor Z and an idiosyncratic factor and each partner learned the values of both, the model becomes similar, as we can simply subtract the common factor from the investment cost. Intuitively, the idea behind (1) is that different partners at a firm might have different, and orthogonal areas of expertise in assessing a companies value, and will be better placed to assess the values of those characteristics. For example, one partner can be an expert in assessing the technology, another partner can be an expert in assessing potential demand for the product, while the third partner can be an expert in assessing the quality of managerial team of the start-up.

Assume that the status quo (uninformed) decision is to (weakly) not invest: $\mathbb{E}[V] = M\mathbb{E}[\theta] \leq I$. In the context of early stage investment, it is natural to model F as having heavy tails. As we show in the next section, this assumption fits the empirical evidence: heavy tails of the signal distributions imply in the model heavy tails of the return distribution, which is strongly supported by the data, especially for early-stage investments. Further, venture capital firms find it very important to "catch the unicorn" (i.e., find and invest in projects with very high Vs). In contrast, in later stage investments, it is natural to expect that the distribution of valuations has thinner tails: a project is unlikely to be superstar if it does not already have high profile by then. Each partner has linear utility from investment and all partners share the common objective of maximizing the value of an investment. Specifically, utility is given by:

$$U_i = U = V - I \tag{2}$$

Under this setting, if partners could communicate, they would reveal their signals truthfully to each other, obviating the need for a voting mechanism. While we consider the implications of settings with imperfect communication in subsequent sections, we first lay out the simplest version of the model, assuming that a voting mechanism is the only way that partners aggregate private information into the decision. We consider voting mechanisms where every partner simultaneously submits a binary vote $v_i \in \{0, 1\}$. The project is deemed worthy of investment if and only if the total number of votes exceeds some cut-off k, i.e., $\sum_{i=1}^{N} v_i \geq k$. This voting mechanism captures as special cases the three following decision making models:

1. Champions model ($k = 1$): The fund undertakes the investment if and only if there is at least one partner that votes ("champions") for it.

2. Simple majority rule ($k = \frac{N+1}{2}$): The fund undertakes the investment if and only if $\frac{N+1}{2}$ or more partners vote for it.

3. Unanimity model ($k = N$): The fund undertakes the investment if and only if no partner objects to it.

The questions we study next is: What is the optimal k is and how does it vary with the characteristics of the project (the signal distribution F)? We are particularly interested in the conditions under which the champions model is optimal.

4.1 Simple Model solution

Consider a voting model that requires k positive votes for approval of the project. Under this model, each partner will vote for the project if and only if her signal exceeds some cut-off $\hat{\theta}_k$. $\hat{\theta}_k$ is the value such that each partner is exactly indifferent between investing and not investing, given her signal and the fact that her vote is pivotal:

$$\hat{\theta}_k + (k-1)\,\mathbb{E}\left[\theta|\theta \geq \hat{\theta}_k\right] + (N-k)\,\mathbb{E}\left[\theta|\theta \leq \hat{\theta}_k\right] + (M-N)\,\mathbb{E}\left[\theta\right] = I. \tag{3}$$

Equation (3) pins down the voting threshold $\hat{\theta}_k$. It satisfies the intuitive property that $\hat{\theta}_k$ is decreasing in k. This follows from monotonicity of $\mathbb{E}\left[\theta|\theta \geq \hat{\theta}\right]$ and $\mathbb{E}\left[\theta|\theta \leq \hat{\theta}\right]$ in $\hat{\theta}$. Intuitively, each partner is more aggressive about voting for the project if more votes are needed to approve the project.

From (3), it is easy to see the pros and cons of the champions model and more conventional voting rules, such as simple majority. On the one hand, a good project but with only few "superstar" characteristics will be rejected by the majority rule, if its other characteristics are weak. In contrast, the committee will invest in this project under the champions model, because the partner with a very strong signal will champion for it. On the other hand, a good project with many good characteristics will not be invested in under the champions model, if none of its characteristics are of superstar quality. Since these two types of projects potentially result in very different return profiles, the choice of the information aggregation rule is akin to the choice of the return profile implied by each rule.

Our first proposition shows that the champions model does particularly well in picking "superstar" projects if the distribution of characteristics has sufficiently heavy tails (formally, it is subexponential):

Proposition 1. *Suppose that F is subexponential. Then, the champions rule accepts a project with $V \to \infty$ with probability $\frac{N}{M}$. In contrast, any $k \geq 2$ rule rejects such a project with a strictly higher probability.*

Subexponential distributions is a subclass of heavy-tailed distributions whose tails decrease slower than any exponential tail. Almost all commonly-used heavy-tailed distributions are subexponential: for example, Pareto (power law), Weibull (with $\alpha < 1$), and lognormal distributions. This class of distributions is used frequently in the analysis of insurance claims and rare events. The reason for Proposition 1 comes from an important property of subexponential distributions called the "catastrophe principle." The catastrophe principle says that the distribution of a sum of N subexponential random variables in the tail is similar to the distribution of the maximum element in the sum. Informally, it means that a superstar project is much more likely to be driven by one superstar characteristic and many mediocre ones rather than by all very high characteristics. This property is consistent with the fact that Facebook, Google, eBay, and other superstar companies all had many flaws as early-stage ventures but also some overpowering strengths. Note that the fact that F is subexponential is an important condition for Proposition 1. Specifically, if F has light tails (e.g., Normal), a superstar project is typically driven by many characteristics that are pretty good rather than by one superstar characteristic. In this case, the advantage of the champions rule over other decision making rules in identifying superstar projects is lost.

While Proposition 1 implies that the champions model is more likely to identify projects with superstar payoffs than any other voting rule if the distribution of characteristics is subexponential, it does not imply that it leads to a higher expected payoff because it may be more likely to miss non-superstar good projects, and a typical project is the latter. However, we argue that this will be the case if the right tail of the characteristic distribution[5] are sufficiently important. We have two formal results about this. The first result is weaker, but it follows naturally from Proposition 1, so we start with it:

Proposition 2. *Suppose that F is subexponential and projects in the upper tail of the distribution are sufficiently important: $\frac{\lim_{\hat{V}\to\infty}\int_{\hat{V}}^{\infty} V d(G(V))}{\int_0^{\infty} V d(G(V))} \geq C$, where constant C is defined in the appendix. Then the champions rule has a higher expected value than any other voting rule.*

The intuition for Proposition 2 naturally follows from Proposition 1. Recall that Proposition 1 shows that when the distribution of characteristics has heavy tails, the champions model is better at identifying superstar projects than any other decision making rule. Proposition 2 shows that if identifying projects in the tail is sufficiently important, then the advantage of the champions rule outweighs the advantage of other decision making rules.

While Proposition 2 helps at showing the intuition, it relies on the condition that sufficient value comes from projects with infinite payoffs. The next result shows that this strong condition is not needed. Specializing to the case of Pareto (power law) distribution, which is a popular distribution to depict returns on venture capital investments, it obtains a specific cut-off $\hat{\alpha}$ on the spare parameter, such that the champions model is optimal for any $\alpha \leq \hat{\alpha}$.

Proposition 3. *Suppose that θs are distributed according to the Pareto Type 1 distribution with shape parameter α. For any fixed and finite mean level of the characteristic $E[\theta]$, there exists cut-off shape parameter $\hat{\alpha}$, such that the champions voting model is optimal for any $\alpha \leq \hat{\alpha}$.*

[5] And consequently, of the return distribution, since for subexponential distributions, the tail distributions of the characteristic and the sum coincide.

The argument for Proposition 3 is related to Proposition 2, but more involved, since under Pareto distribution the part of value that comes from projects with infinite returns is equal to zero even for distributions with low α, unless α is so low that the mean does not exist. Nevertheless, the broad intuition remains the same. If the tails of the distribution are sufficiently fat (i.e., α is sufficiently low), then (1) correctly identifying projects with very high payoffs is a bigger driver of value than correctly identifying projects with moderately high payoffs; and (2) these projects are more likely to be driven by one very high realization of θ rather than by multiple moderately high ones.

We next contrast this situation with two different scenarios in which the champions model performs poorly. The next proposition shows that if the distribution of characteristics has thin tails and is symmetric in the sense that the project has zero NPV on average and is equally likely to have positive and negative NPV, then the simple majority rule is optimal:

Proposition 4. *Suppose that the distribution of θ is not subexponential and satisfies $E[\theta] = \frac{I}{M}$ and $F\left(\frac{I}{M}\right) = \frac{1}{2}$. Further, suppose that N is odd. Then, the optimal voting rule is simple majority ($k = \frac{N+1}{2}$).*

Proposition 4 confirms the standard intuition that the simple majority rule works well for conventional decisions with relatively symmetric outcomes. It is similar to the result of Sah and Stiglitz (1988) that simple majority is optimal if the individuals type-1 and type-2 errors are equal, though theirs is in a binary signal setting, while Proposition 4 is for continuous signals.

Finally, it is worth contrasting the case in which superstar projects are driven by few superstar characteristics with the opposite case in which for a project to be successful, all its characteristics must be of sufficiently high quality. Specifically, suppose that the mapping of project characteristics into project value is not additive, as in (1), but rather $V = \min\{\theta_1, ..., \theta_M\}$. In other words, the value of each project is determined by its worst characteristic. This specification can be motivated in the same way as the O-ring theory of economic development (Kremer (1993)): one bad component can make an otherwise successful project fail, as in the case of the O-ring imperfection leading to a collapse of the space shuttle Challenger. The next proposition shows that the consensus rule is optimal for projects of this type:

Proposition 5. *Suppose that $V = \min\{\theta_1, ..., \theta_M\}$. Then, regardless of the distribution of characteristics, the optimal voting rule is consensus ($k = N$).*

Intuitively, unlike any other decision rule, the consensus rule ensures that all characteristics are above a certain bar, which is very valuable when the value of the project is determined by its weakest characteristic.

5 Empirical Evidence and Quantitative Importance

5.1 Empirical Evidence

Our model suggests that the champions model dominates other voting models, but only in settings where the distribution of information signals has heavy right tails. The model can therefore also rationalize the fact that VCs start with a champions model for early stage investments and migrate to more conventional voting models for later stage investments. This would be the model's prediction if the distribution of signals for early stage had heavy right tails, but that this was not as true for late stage investments.

While it is not possible to validate the distribution of information signals received by partners, we are able to examine the *ex post returns* across a wide cross section of venture capital investments. If we find that the returns of later stage investments are less skewed, this would certainly be consistent with the premise the information signals for these investments are potentially also less skewed. In the model, if signals are subexponentially distributed, then the return distribution is also subexponential with the same tail as the signal distribution. Thus, the empirical evidence on the return distribution across different stages will be consistent with the premise of the model.

Systematic data on returns at the investment level is not available from standard datasets. We received anonymized data on round level returns from Correlation Ventures, a venture capital firm that collects and makes investments in venture capital startups based on quantitative investment strategies. As such, they have a strong incentive to collect, improve and validate the quality of the data they get from standard commercial databases.

The data filter used for the analysis was to first select startups whose headquarters were in the US and had received at least one round of institutional venture capital financing between January 1 2006 and December 31, 2015, and had a realized exit by December 31, 2019. We were provided data on 19,882 rounds of financing in this period with labels corresponding to whether the round of financing was "Seed", "Series A", "Series B", "Series C" or "Series D+". In other words, which there were slightly more than 19,882 rounds of financing, the rounds including Series D and beyond were aggregated together. Correlation ventures imputes multiples where these are missing, but for the analysis we conduct, we focus on the subset of 8,603 rounds of financing where the multiple is not missing.

For these rounds, we show the distribution of multiples in Figure 4. As can be seen, nearly 50% of all (non-imputed) returns at the round-level are zero, consistent with the very high failure rates reported in Kerr, Nanda, and Rhodes-Kropf (2014). Table 1 breaks the returns by round, further aggregating those that are in Series C and beyond into a "Series C+" bucket. As can be seen from this, the Seed rounds (and to some extent Series A) stands apart from the other rounds in terms of the skewness of returns. While the median round in the later stages returns a gross return multiple of 0.3, the gross return for even the 75th percentile Seed round is zero. On the other hand, looking at the 99th percentile shows that which the 99th percentile Series C+ investment returns a gross return of 20, the 99th percentile gross return of a Seed round of financing in the data is 125.

In Figure 5 we compare the distributions of return multiples for each round of financing. For a given point (percentile) in the distribution, we divide the return multiple for each round at that percentile by the return multiple for the overall dataset at the same percentile. We then plot these ratios for all points in the distribution. If the resulting curve for a round has a positive slope, it is because that round has a fatter right tail than the overall distribution. If the resulting curve has a negative slope, it is because that round has a thinner right tail than the overall distribution. The level of the curves (as opposed to the slope) indicate the average return multiple of the round as compared to the overall distribution, and center around 1. We find that Seed is the steepest upward sloping, followed by Series A, while the slopes of Series B and Series C+ are decreasing - indicating that the distribution of returns has the fattest tail at the earliest stage and is less so as the rounds progress.

Our results on the round level returns therefore provide suggestive evidence that is consistent with early stage – and in particular seed stage – information signals being much more skewed than those at later (Series C and beyond) stages. Under the assumption that information signals follow a similar relative pattern, our model can rationalize the use of champions model for seed and early stage investments as well as a shift towards majority or unanimous voting models for later stage investments.

5.2 Quantitative Importance

While the pros and cons of the champions decision making rule are quite general, theoretical results about its optimality rely on the limit case and may lead to questions about applicability beyond the limit case. To address this concern as well as to more generally assess quantitative importance of alternative decision making rules, we analyze a numerical example of the model, whose inputs fit the VC context reasonably well.

Specifically, we assume that individual signals are driven from Pareto (power law) distribution with tail parameter 1.7. This implies that the right tail of the return distribution also follows Pareto (power law) distribution with the same tail parameter 1.7. The committee consists of five members. The total number of relevant signals is 20, which implies that at most the committee can learn a quarter of the value-relevant information about the project. The other parameter of the Pareto distribution is calibrated so that under the champions rule 1% of projects are accepted on average. Regardless of its quality, each project is assumed to fail with probability 50% returning zero payoff and to return a non-zero payoff equal to the sum of signals with probability 50%. Overall, this distribution means that a typical project considered by the committee is clearly bad, but a very small fraction of projects are exceptionally promising. We keep the assumption that signals of partners are independent.[6] Three decision rules are compared in this setting: (1) champions (one positive vote out of five is needed for investment); (2) majority (three out five); (3) unanimity (five out of five).

This example produces the following results. In this example, the champions rule is

[6] The assumption of independent signals exaggerates the difference between the champions rule. We are currently working on incorporating positive correlation of signals in this example.

optimal, yielding higher values to the partnership than the alternatives. More interestingly, it leads to investment in projects with a very different profile than the majority and unanimity rules. Projects funded under the champions rule have significantly higher average payoffs, higher variance, and higher skewness. For example, the standard deviation of payoffs (conditional on the payoff being above zero) for the champions, majority, and unanimity rules are 6.36, 1.73, and 1.37 per dollar of investment, respectively. Skewness (also normalized per dollar of investment) are 42.1, 15.5, and 11.5, respectively. The 95th quantile of the realized per-investment multiple is 4.96 for the champions rule, 3.19 for majority, and 2.97 for unanimity. The corresponding numbers for the 99th quantile are 11.1, 5.74, and 5.1, respectively. In other words, the payoff distribution is right-skewed under any decision rule, which is simply due to the nature of investments, but it is significantly more right-skewed under the champions rule. Different project profile implies that the probability of "catching a unicorn" is significantly higher for the champions rule than the alternatives. The model-implied probability of getting a realized payoff per investment exceeding multiple 10x, adjusted for the time value of money, is 1.18% for the champions rule, 0.29% for the majority rule, and 0.2% for the unanimity rule. The model-implied probability of getting a realized payoff per investment exceeding multiple 10x, unadjusted for the time value of money,[7] is 3.2% for the champions rule, 0.9% for the majority rule, and 0.65% for the unanimity rule. For example, if we consider a fund with 25 investments, then the probability that it least one of these investments will deliver such a multiple is 55.7% for the champions rule, 20.2% for the majority rule, and 15% for the unanimity rule.

[7] Assuming a 5-year investment horizon and the discount rate of 12%, this implies the adjusted multiple of 6.2.

6 Extensions

6.1 Model with Heterogeneous Preferences

Given the apparent value to investors using the champions models in such contexts, it seems interesting that this practice is observed in VC but has not been noted in other contexts such as corporate R&D. In this extension of the model, we provide one potential explanation: the fact that the champions model loses its value if each committee member may prefer to vote for the project for a private, rather than common, reason.

Consider the following variation of the baseline model. Suppose that with probability π each partner wants to either do the project or not do a project (with equal probabilities) for a private reason irrespectively of its quality (i.e., the project is a private benefit or private cost project). This may be due to agency conflicts or due to career concerns in the organization. In contrast, with probability $1-\pi$, the partner is unbiased and wants to maximize the expected value. Suppose that the realizations of whether the project is partner i's private benefit project are independent across partners.

On one extreme, if $\pi = 0$, then all partners have common objectives of maximizing the value of the project - which reverts to the model of the previous section. On the other extreme, if $\pi = 1$, then all partners have private values.

Under this model, each partner will vote for the project in two scenarios. First, she will vote for the project with probability $\frac{1}{2}\pi$, irrespectively of the realization of her signal. Second, with probability $1-\pi$, she will vote for the project if and only if it exceeds some cut-off $\hat{\theta}_k(\pi)$. Cut-off $\hat{\theta}_k$ is implicitly defined by the following equation:

$$\hat{\theta}_k + ((k-1)\,\mathbb{E}\left[\theta_i|i \text{ votes for}\right] + (N-k)\,\mathbb{E}\left[\theta_i|i \text{ votes against}\right]) = I \tag{4}$$

To see the role of private benefits, consider what happens in the extreme case of $\pi \to 1$. In this case, the vote of each other partner is determined fully by private benefits (or costs) of the project. Thus, these votes are uninformative about the partners' signals, so the equilibrium cut-off of the benevolent partner will be $\hat{\theta}_k = I - (N-1)\,\mathbb{E}[\theta]$. In particular, her voting strategy is independent of the rule k. Consider $k = 1$. Compared to the case of $\pi = 0$, each partner will now overchampion for the project for two reasons. First, she will overchampion if she wants to do the project for a private benefit reason, since the probability of approval vote in this case ($\frac{1}{2}$) exceeds that of p_1 in Proposition 3 (below $\frac{1}{N}$ for any α). Second, and more interestingly, she will overchampion even if she is benevolent: This will happen because the negative votes of others do not reveal negative information about other characteristics of the project when the votes occur primarily for private benefit reasons.

It is easy to see why the champions model will be suboptimal for a sufficiently high π in this case. While the champions model is still useful at identifying tail projects if the champion happens to be benevolent, most projects get championed for private benefit reasons. Since ex-ante an average project has negative NPV, it is optimal to increase k to reduce the probability of investment for private benefit reasons. Decision making rules that require more consensus among committee members are better in this case, because they curb overchampioning.

6.2 Communication

Til now we have precluded agents from communicating with each other prior to voting. Such an assumption is required to set up any voting model - if agents could perfectly communicate, there would be no need to vote, as they would always perfectly agree on the correct course of action. However, we can also accommodate partial communication in our framework. Specifically we consider two extensions to our model. In the first every agent i can noisily communicate their private θ_i to their colleagues. In the second, every agent has a positive but non-guaranteed probability of perfectly communicating their private θ_i to their colleagues.

6.2.1 Voting with Noisy Communication

Suppose that agents are allowed communicate with their partners, but can only do so noisily. As before, assume that $V = \theta_1 + ... + \theta_M$, and that agent i sees θ_i perfectly. For simplicity, assume that there are as many agents as dimensions of valuation ($N = M$).[8] Each θ_i is distributed independently over $[-l, \infty)$ with $l > 0$ as before, with distribution function $H(\cdot)$ and density $h(\cdot)$, such that $E[\theta_i] = 0$ for all i. Each agent i communicates a signal t_i about θ_i to all of her colleagues. Signals have distribution function $S(\cdot)$ and density $s(\cdot)$, where $E_s[t_i] = \theta_i$. The signal is common to all of her partners - which is to say that communication is not bilateral, but public. Therefore, all agents $j \neq i$ will have posterior beliefs about θ_i that can expressed with the distribution $F(\cdot)$ and density $f(\cdot)$, where

$$f(\cdot) = p(\theta_i | t_i)$$

The important assumptions here are distributional: we assume that F and H are both subexponential.[9] Call the posterior expectation of θ_i by any agent j, $\tilde{\theta}_i$ - this posterior expectation is common to all agents other than agent i herself. We continue to hold that under the prior H, an agent j will have common beliefs over all θ_i where $i \neq j$, $E_{Hj}[\theta_i] = 0$. However, after communication, it can be the case that $E_{Fj}[\theta_i] \equiv \tilde{\theta}_i \neq 0$.

[8]Relaxing this assumption will change nothing besides some notation.

[9]one way to satisfy this condition is if F and S are both Pareto distributions

Therefore, before communication, $E_i[V] = \theta_i$ for all i, while afterwards $E_i[V] = \tilde{\theta}_1 + ... + \tilde{\theta}_{i-1} + \theta_i + \tilde{\theta}_{i+1} + ... + \tilde{\theta}_M = \sum_j \tilde{\theta}_j + (\theta_i - \tilde{\theta}_i) \equiv \tilde{V} + \epsilon_i$.

Put differently, we can reframe posterior expectations such that the common value to all voters is not the unconditional expectation $E_H[V] = 0$, but the expectation conditional on communication $\tilde{V} = \sum_j \tilde{\theta}_j$. Then each agent i's private information is not their signal θ_i, but the *uncommunicated* part of that signal $\epsilon_i = \theta_i - \tilde{\theta}_i$. $\epsilon_i|\theta_i$ is distributed subexponentially, which means that the propositions of the baseline model will continue to hold. Therefore, noisy communication in our baseline could be thought of as an unmodeled first stage interaction between agents without altering the conclusions of the model.

6.2.2 Voting with Imperfect Communication

Another way to think of communication is to instead assume that each agent i, with some probability p_i, is able to perfectly communicate the value of θ_i to her colleagues. With probability $1-p_i$, agent i communicates nothing, and her colleagues maintain their prior beliefs about θ_i. Therefore, after communication of all agents, some subset $S \subset \{1, ..., N\}$ of agents will have communicated their beliefs perfectly, (where $|S| = n$) while the remaining subset $T = \{1, ..., N\} - S$ have failed to communicate at all. Therefore, for each agent $i \in S$, their estimate of the value V will be:

$$E_i[V] = \sum_{j \in S} \theta_j$$

While for each agent $i \notin S$, their estimate of the value V will be:

$$E_i[V] = \theta_i + \sum_{j \in S} \theta_j$$

We next argue that Proposition 1 extends to this model. Again, we focus on the case $M = N$. Consider a project with $V \to \infty$. Since $F(\cdot)$ is subexponential, the distribution of V in the right tail coincides with the distribution of $Z = \max\{\theta_1, ..., \theta_n\}$. There are two possible cases. With probability $\bar{p} = \sum_{i=1}^{N} \frac{1}{N} p_i$, $\theta_k : \theta_k = \max\{\theta_1, ..., \theta_n\}$ is communicated successfully prior to voting. With probability $1-\bar{p}$, it is not communicated prior to voting.[10] In the former case, the project is accepted with certainty under any voting rule. In the latter case, the project is accepted with certainty under the champions model ($k = 1$), but with probability strictly below one for any $k > 1$. This follows directly from the proof of Proposition 1 and the fact that no signal is communicated with strictly positive probability. Thus, the result of Proposition 1 also holds in this model.

Next, to show that Proposition 2 also holds in this model, note that rule $k = 2$ rejects a tail project ($V \to \infty$) with probability exceeding $F\left(\hat{\theta}_2\right)^{n-1} \Pi_{i=1}^{n} (1 - p_i)$. Applying the same argument as in the proof of Proposition 2, a sufficient condition for $k = 1$ dominating $k = 2$ is

These two extensions should reassure the reader that communication does not negate the fundamental conclusions of our model.

7 Conclusion

We provide novel empirical evidence on the voting practices of venture capital investors in the US, showing that investors use different voting rules for different types of investments. For early stage investments, they tend to favor champion voting rules, where one partner can unilaterally make the decision to invest, while for later stage investments, their strategies shift towards more consensus based models, like majority or unanimity. We

[10]Here $\bar{p} = \sum_{i=1}^{N} \frac{1}{N} p_i$, because each agent's signal is equally likely to be the highest and agent i's signal is communicated with probability p_i.

rationalize this behavior by showing that a committee can choose different voting models based on the distribution of the valuation of the underlying investment opportunity. Distributions with fat right tails (similar to the distribution of early-stage investments) are ones where a champions voting model is optimal, while later stage investments where distributions have significantly less fat tails imply that 'majority' or 'unanimous' voting rules are optimal.

A second insight from our model is that the dominance of the champions model for fat right tailed distributions is only true when agents have relatively common objectives. If individual committee members have private benefits, then the cost of 'over championing' poor projects over-rides the potential benefits from selecting outlier projects. In such an instance, more traditional voting models are likely to be second best alternatives, providing a rationale both for the limited observed use of this type of voting, and perhaps the small size of investment committees among VC firms that do use such models.

More generally, we show that optimal rules for information aggregation in the financing of innovation might need to be systematically different because of stark differences in the information environment for early stage, highly innovative projects.

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8 Figures and Tables

Figure 1: Key Survey Questions used in Analysis

3. Please indicate the formal process that best describes your investments in (a) seed stage, (b) early stage, and (c) later/growth stage.

	Seed	Early stage	Later/growth stage
Not applicable (don't make this kind of investment)	○	○	○
Require unanimous agreement to do the deal	○	○	○
Require majority of votes to do the deal	○	○	○
Require majority of votes as long as no veto	○	○	○
A single partner can do the deal	○	○	○
A single partner can do the detail as long as no veto	○	○	○

4. Leaving aside your formal investment process, what is the culture you feel best describes your partnership?

	Seed	Early stage	Later/growth stage
Not applicable (don't make this kind of investment)	○	○	○
An enthusiastic champion is usually sufficient for others to vote 'yes'	○	○	○
Majority of the partners have to be enthusiastic to do the deal	○	○	○
Only deals where *all* partners are enthusiastic get done	○	○	○
Other (please describe below)	○	○	○

If you selected "other" above, please describe in the box below.

Figure 2: Breakdown of Formal Voting by stage of investment

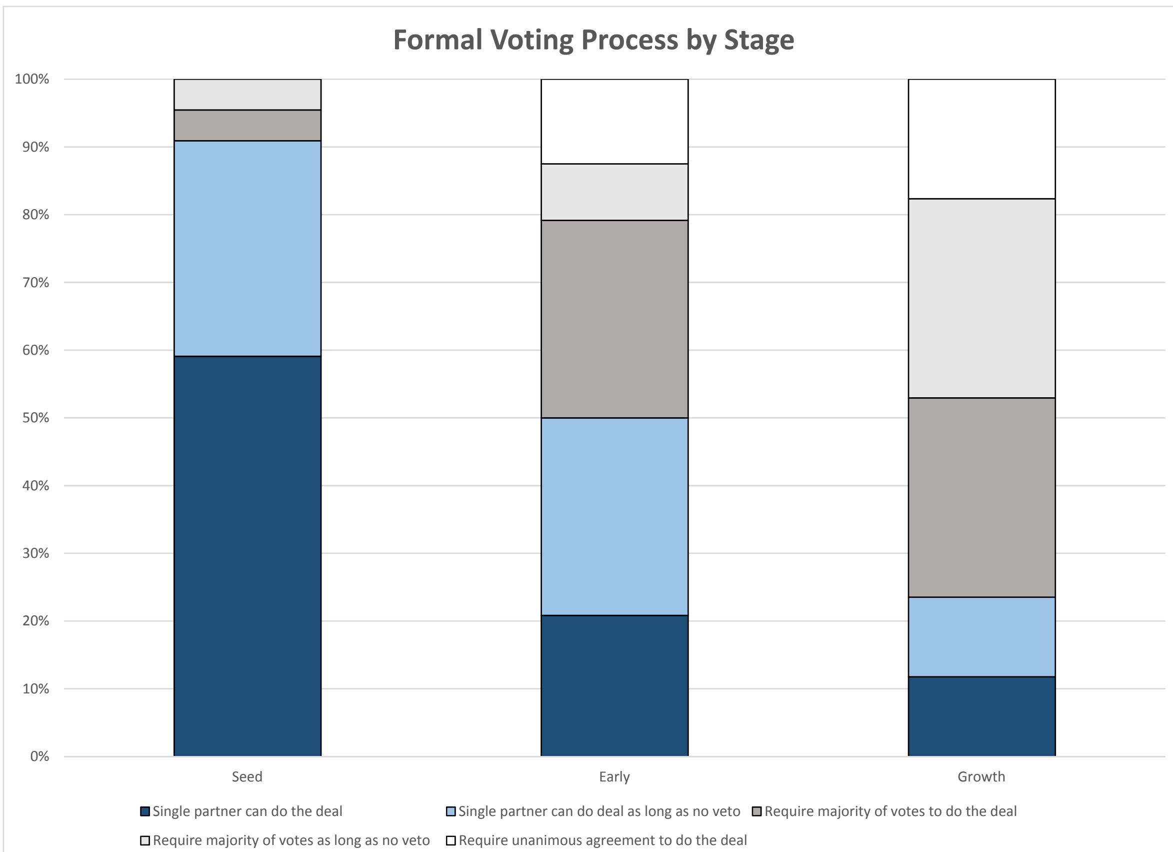


Figure 3: Breakdown of Informal Voting by stage of investment

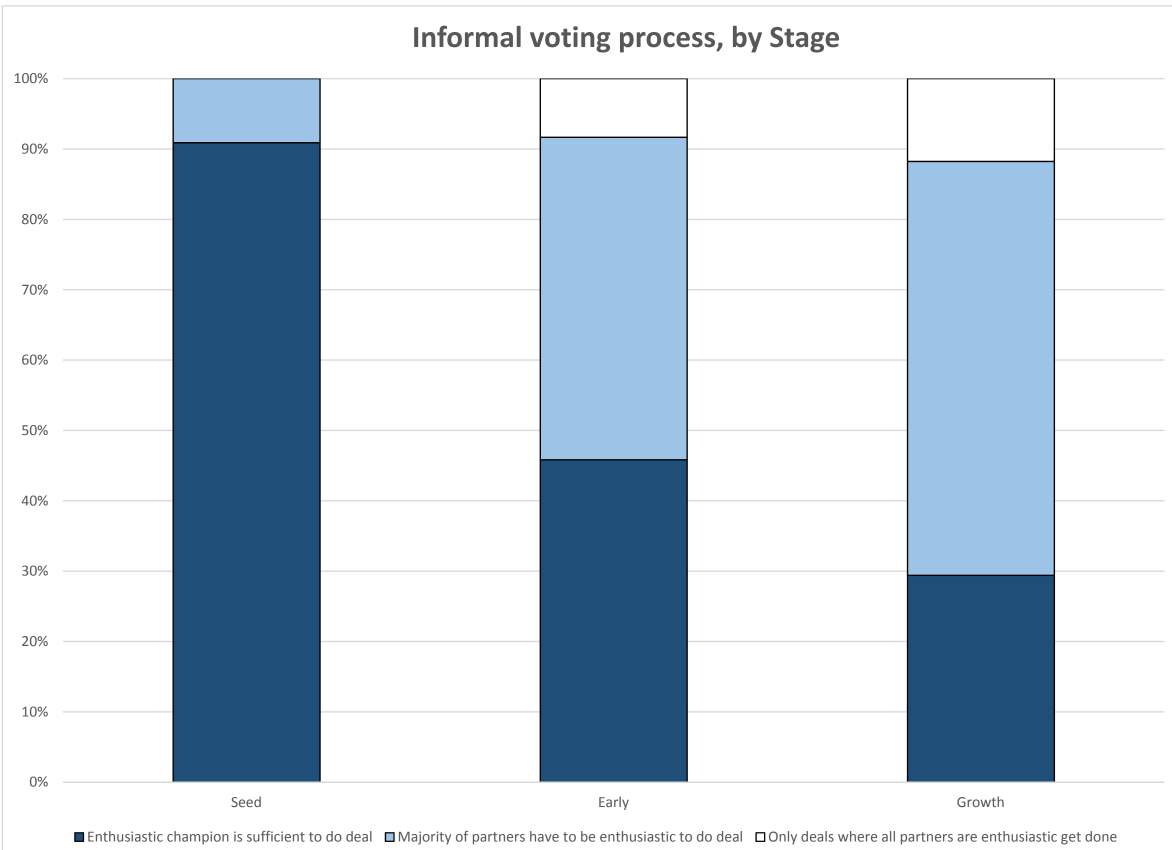


Figure 4: Distribution of Return Multiples for Overall Sample

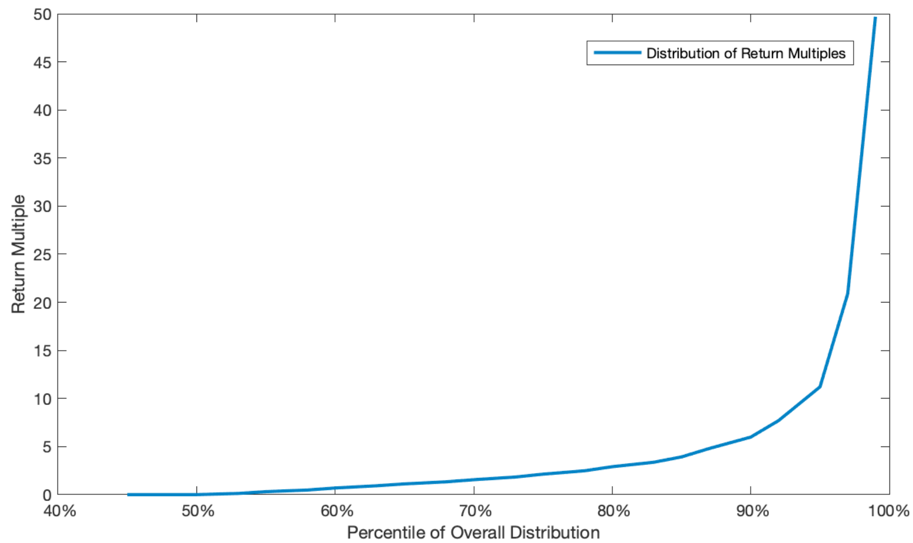
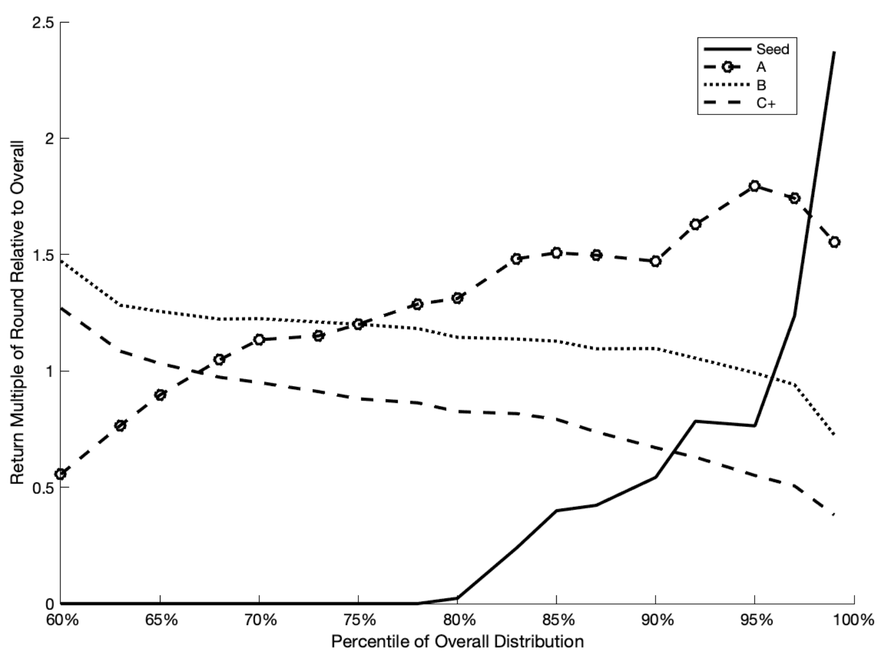


Figure 5: Ratio of round-level distribution to overall



	Percentile					
	25th	50th	75th	90th	95th	99th
Seed	0.00	0.00	0.00	3.25	8.81	124.58
Series A	0.00	0.00	2.56	8.80	20.15	77.65
Series B	0.00	0.26	2.56	6.56	11.14	36.10
Series C+	0.00	0.30	1.87	4.01	6.23	19.76
Total Sample	0.00	0.00	2.13	5.98	11.21	49.71

Table 1: Return multiple percentiles for overall data, as well as by round of financing.

9 Appendix

9.1 Proofs

Proof of Proposition 1 Assume, without loss of generality, that the N partners receive signals about the first $N < M$ characteristics. That is, that partner i learns about characteristic i, and for all $j > M$ characteristic j is unlearned. Because F is subexponential, it satisfies the catastrophe principle:

$$\begin{aligned}
\frac{\Pr\left\{\max\left(\theta_1, \theta_2, ..., \theta_M\right) > t\right\}}{\Pr\left(\theta_1 + \theta_2 + ... + \theta_M > t\right)} &\to 1 \\
\Pr\left(\max\left(\theta_1, \theta_2, ..., \theta_M\right) > t | \theta_1 + \theta_2 + ... + \theta_M > t\right) &\to 1
\end{aligned}$$

as $t \to \infty$. Two cases are possible: either $\max_{i\in\{1,...,M\}} \theta_i = \max_{i\in\{1,...,N\}} \theta_i$ or $\max_{i\in\{1,...,M\}} \theta_i > \max_{i\in\{1,...,N\}} \theta_i$. Since draws of θ_i are i.i.d., the first case occurs with probability $\frac{N}{M}$, and the second case occurs with probability $\frac{M-N}{M}$. Consider the first case:

$$\begin{aligned}
\frac{\Pr\left\{\max\left(\theta_1, \theta_2, ..., \theta_N\right) > t\right\}}{\Pr\left(\theta_1 + \theta_2 + ... + \theta_M > t\right)} &= \Pr(\max(\theta_1, \theta_2, ..., \theta_M) = \max(\theta_1, \theta_2, ..., \theta_N)) \times \\
&\quad \frac{\Pr\left\{\max\left(\theta_1, \theta_2, ..., \theta_M\right) > t\right\}}{\Pr\left(\theta_1 + \theta_2 + ... + \theta_M > t\right)} \\
&\to \frac{N}{M}
\end{aligned}$$

$$\Pr\left(\max\left(\theta_1, \theta_2, ..., \theta_N\right) > t | \theta_1 + \theta_2 + ... + \theta_M > t\right) \to \frac{N}{M}$$

Therefore:

$$\begin{aligned}
\int_{\hat{t}}^{\infty} V dF\left(V | V = \theta_1 + \theta_2 + ... + \theta_M\right) &\approx \frac{N}{M} \int_{\hat{t}}^{\infty} V d\Pr\left(\max\left(\theta, \theta_2, ..., \theta_N\right) > t\right) \\
&= \frac{N}{M} \int_{\hat{t}}^{\infty} \max\left(\theta_1, \theta_2, ..., \theta_N\right) dF\left(\max\left(\theta_1, \theta_2, ..., \theta_N\right)\right)
\end{aligned}$$

when $\hat{t}$ is large. Let $Z \equiv \max(\theta_1, \theta_2, ..., \theta_N)$. Then, $\Pr(Z \leq z) = \Pr(X_i \leq z)^N = F(z)^N$. Hence, the above integral is equal to:

$$\frac{N}{M}\int_{\hat{t}}^{\infty} zd\left(F(z)^N\right) = \frac{N}{M}\int_{\hat{t}}^{\infty} zNF(z)^{N-1} f(z)\, dz$$

For any decision-making rule D, let $p_D(V)$ denote the probability of investment in a project of value $V = \theta_1 + \theta_2 + ... + \theta_M$. The expected value of decision rule D is therefore:

$$\int_0^{\infty} p_D(V)(V - I)\, dG(V)$$

which is less than the expected values of the first best decision rule $\int_I^{\infty}(V - I)\, dG(V)$. Consider a very high valuation Z. Its distribution is similar to $\max(\theta_1, \theta_2, ..., \theta_M)$. Let us consider two cases, one where the max is learned about, and one where it is not. In the first instance, without loss of generality suppose $\max\{\theta_1, ..., \theta_M\} = \max\{\theta_1, ..., \theta_N\} = \theta_1$. This instance occurs with probability $\frac{N}{M}$. Then, the conditional distribution of any other θ_i is F truncated at Z. Given a voting rule k, the probability that this project gets rejected is:

$$C_{N-1}^{N-k+1}\left(\frac{F\left(\hat{\theta}_k\right)}{F(Z)}\right)^{N-k+1}\left(1 - \frac{F\left(\hat{\theta}_k\right)}{F(Z)}\right)^{k-2}$$

namely, that there are $N - k + 1$ many signals that are below the threshold for acceptance. The probability of rejection is zero when $k = 1$ and strictly positive when $k > 1$. Therefore, conditional on the maximum characteristic being learned about (which occurs with probability $\frac{N}{M}$), the champions rule never rejects high value projects, while other voting rules will reject with some positive probability.

Consider the second case and assume without loss of generality that $\max\{\theta_1, ..., \theta_M\} = \theta_M$. The instance occurs with probability $\frac{M-N}{M}$. θ_M is distributed similarly to Z, and θ_M is not learned about. Then, the conditional distribution of any other θ_i is F truncated at Z, and given a voting rule k, the probability that the project gets rejected is:

$$C_{N-1}^{N-k+1}\left(\frac{F\left(\hat{\theta}_k\right)}{F\left(Z\right)}\right)^{N-k+1}\left(1-\frac{F\left(\hat{\theta}_k\right)}{F\left(Z\right)}\right)^{k-2}$$

This is strictly positive for all values of k and increasing in k. Therefore, the champions rule rejects high value projects strictly less than any other rule.

Proof of Proposition 2. We start by showing that the model with $M > N$ is equivalent to the model with $M = N$ and a modified investment cost. Then, given this result, it is sufficient to prove this and the subsequent propositions for the case of $M = N$ only.

Let us decompose the value of the project into a potentially learned part and an unknown part:

$$V = V_1 + V_2 - I,$$

where $V_1 = \sum_{i=1}^{N}\theta_i$ and $V_2 = \sum_{i=N+1}^{M}\theta_i$. By independence of θ_i, the expected value of any decision rule k is equal to the expected value of the same decision rule if each project's value is given by

$$\tilde{V} = V_1 - \tilde{I},$$

where $\tilde{I} = I - (M-N)\,E\left[\theta\right]$ is the investment cost modified by the expected value of the unlearned characteristics. Indeed:

$$\begin{aligned}
& \mathbb{E}\left[\left(\sum_{i=1}^{M}\theta_i - I\right)\mathcal{D}\left(\theta_1,...,\theta_N\right)\right] \\
= \; & \mathbb{E}\left[\mathbb{E}\left[\left(\sum_{i=1}^{M}\theta_i - I\right)\mathcal{D}\left(\theta_1,...,\theta_N\right)|\theta_1,...,\theta_N\right]\right] \\
= \; & \mathbb{E}\left[\left(\sum_{i=1}^{N}\theta_i - \tilde{I}\right)\mathcal{D}\left(\theta_1,...,\theta_N\right)\right].
\end{aligned}$$

Given this result, without loss of generality, consider the case $M = N$. In the proof we will show that $k=1$ dominates $k=2$ under the conditions of the proposition. The proof that $k=1$ dominates any $k>2$ is analogous. As shown in the proof of Proposition 1, the champions model accepts tail projects ($V\to\infty$) with certainty, while $k=2$ model rejects them with probability exceeding $F\left(\hat{\theta}_2\right)^{N-1}$. Suppose hypothetically that $k=2$ accepts all positive NPV projects with $\max\{\theta_1,...,\theta_N\}\in\left[\hat{\theta}_2,\hat{\theta}_1\right]$ and no negative NPV project, where $\hat{\theta}_1$ is given by

$$(N-1)\,\mathbb{E}\left[\theta_i|\theta_i\leq\hat{\theta}_1\right]+\hat{\theta}_1=I.$$

Clearly, the payoff from the actual $k=2$ rule is lower. $\hat{\theta}_2$ is given by

$$\hat{\theta}_2+\mathbb{E}\left[\theta_i|\theta_i\geq\hat{\theta}_2\right]+(N-2)\,\mathbb{E}\left[\theta_i|\theta_i\leq\hat{\theta}_2\right]=I. \tag{5}$$

Then, the difference between the expected payoffs under $k=1$ and under $k=2$ is at least:

$$F\left(\hat{\theta}_2\right)^{N-1}\lim_{\hat{V}\to\infty}\int_{\hat{V}}^{\infty}Vd\left(G\left(V\right)\right)-\int_I^{N\hat{\theta}_1}VdG\left(V\right).$$

Therefore, if

$$\lim_{\hat{V}\to\infty}\int_{\hat{V}}^{\infty}Vd\left(G\left(V\right)\right)\geq\frac{\int_I^{N\hat{\theta}_1}VdG\left(V\right)}{F\left(\hat{\theta}_2\right)^{N-1}},$$

then the champions model dominates $k=2$.

Proof of Proposition 3. By the result at the beginning of the proof of the previous proposition, it is sufficient to consider the case of $M=N$.

Let $U\left(k,\hat{\theta}\right)$ be the expected value from a decision rule that requires k approval votes for investment, if each partner votes for if and only if her signal exceeds $\hat{\theta}$. We can re-write it as:

$$
\begin{aligned}
U\left(k,\hat{\theta}\right) &= \sum_{m=k}^{N}\binom{N}{m}\left(1-F\left(\hat{\theta}\right)\right)^{m}F\left(\hat{\theta}\right)^{N-m}\left(m\mathbb{E}\left[\theta|\theta\geq\hat{\theta}\right]+\left(N-m\right)\mathbb{E}\left[\theta|\theta<\hat{\theta}\right]-I\right)\\
&= \sum_{m=k}^{N}\left(1-F\left(\hat{\theta}\right)\right)^{m}F\left(\hat{\theta}\right)^{N-m}\left(\frac{N!}{(m-1)!\,(N-m)!}\frac{\int_{\hat{\theta}}^{\infty}\left(\theta-\frac{I}{N}\right)dF\left(\theta\right)}{1-F\left(\hat{\theta}\right)}+\frac{N!}{m!\,(N-m-1)!}\frac{\int_{0}^{\hat{\theta}}\left(\theta-\right.}{F}\right.\\
&= \left(N\mathbb{E}\left[\theta\right]-I\right)\sum_{m=k}^{N-1}\binom{N-1}{m}\left(1-F\left(\hat{\theta}\right)\right)^{m}F\left(\hat{\theta}\right)^{N-m-1}+\binom{N-1}{k}\left(1-F\left(\hat{\theta}\right)\right)^{k}F\left(\hat{\theta}\right)^{N-k-1}\left(\int_{\hat{\theta}}\right.\\
&= \left(N\mathbb{E}\left[\theta\right]-I\right)\left(1-I_{F(\hat{\theta})}\left(N-k,k\right)\right)+\left[\int_{\hat{\theta}}^{\infty}\left(N\theta-I\right)dF\left(\theta\right)\right]\left[\binom{N-1}{k-1}\left(1-F\left(\hat{\theta}\right)\right)^{k-1}F\left(\hat{\theta}\right)^{N-}\right.
\end{aligned}
$$

where $I_x\left(a,b\right)$ is the regularized incomplete beta function. Let $U^*\left(k\right)\equiv U\left(k,\hat{\theta}_k\right)$ be the equilibrium value of the project under decision rule k, i.e., $U\left(k,\hat{\theta}\right)$ evaluated at the equilibrium voting cut-off $\hat{\theta}$. Since all committee members have the same utility functions, this is the game of common interest, and thus $\hat{\theta}$ that maximizes $U\left(k,\hat{\theta}\right)$ is also its equilibrium.[11] Thus,

$$
U^*\left(k\right)=\max_{\hat{\theta}}U\left(k,\hat{\theta}\right).
$$

Introducing a change of variables $p\equiv 1-F\left(\hat{\theta}\right)$ and $u\left(z\right)=F^{-1}\left(z\right)$ (intuitively, p is the probability of an affirmative vote and $u\left(z\right)$ is the value of a characteristic in the zth quantile),

$$
U^*\left(k\right)=\max_{p}\left\{\left(N\mathbb{E}\left[\theta\right]-I\right)\left(1-I_{1-p}\left(N-k,k\right)\right)+\left[\int_{p}^{1}\left(Nu\left(z\right)-I\right)dz\right]\left[\frac{\Gamma\left(N\right)}{\Gamma\left(k\right)\Gamma\left(N-k+1\right)}p^{k-1}\left(1-p\right)^{N-k}\right]\right\}
$$

where $\Gamma\left(x\right)$ is the gamma function. Under Pareto distribution with shape α, $\int_p^1\left(Nu\left(z\right)-I\right)dz=N\frac{\alpha}{\alpha-1}x_m p^{1-\frac{1}{\alpha}}-Ip$, where $x_m=-l$, so

$$
U^*\left(k\right)=\max_{p}\left\{\left(N\mathbb{E}\left[\theta\right]-I\right)\left(1-I_{1-p}\left(N-k,k\right)\right)+\left[N\frac{\alpha}{\alpha-1}x_m p^{1-\frac{1}{\alpha}}-Ip\right]\left[\frac{\Gamma\left(N\right)}{\Gamma\left(k\right)\Gamma\left(N-k+1\right)}p^{k-1}\left(1-p\right)^{N-k}\right.\tag{6}
$$

[11] This can be verified directly by maximizing $U\left(k,\hat{\theta}\right)$ and showing that the first-order condition coincides with the equilibrium equation for $\hat{\theta}_k$.

The idea of the proof that follows is to treat k as a continuous (rather than discrete) variable and use the envelope theorem to show that $k = 1$ is optimal in the range $k \in [1, N]$ when α is sufficiently small. We first consider the case in which the project is ex-ante zero-NPV ($NE[\theta] = I$), and then consider the case in which it is negative NPV ($NE[\theta] < I$).

Case 1: $NE[\theta] = I$**.** In this case, the first term in (6) equals zero, and the value simplifies to

$$U^*(k) = \max_p \left(p^{1-\frac{1}{\alpha}} - p\right) \frac{\Gamma(N)}{\Gamma(k)\Gamma(N-k+1)} p^{k-1} (1-p)^{N-k}$$

Applying the envelope theorem

$$U^{*\prime}(k) = \left(p_k^{1-\frac{1}{\alpha}} - p_k\right) \frac{\Gamma(N+1)}{N} \frac{p_k^{k-1}(1-p_k)^{N-k}}{\Gamma(N-k+1)\Gamma(k)} \left(\ln \frac{p_k}{1-p_k} - \int_0^1 \frac{t^{N-k} - t^{k-1}}{1-t} dt\right),$$

where $p_k \equiv 1 - F\left(\hat{\theta}_k\right)$. Evaluating at $k = 1$,

$$U^{*\prime}(1) = \left(p_1^{1-\frac{1}{\alpha}} - p_1\right)(1-p_1)^{N-1} \left(\ln \frac{p_1}{1-p_1} - \int_0^1 \frac{t^{N-1} - 1}{1-t} dt\right)$$

Thus, $k = 1$ is optimal (subject to the second-order condition to be verified) if and only if

$$\ln \frac{p_1}{1-p_1} < \int_0^1 \frac{t^{N-1} - 1}{1-t} dt,$$

or, equivalently,

$$p_1 < \frac{e^{\int_0^1 \frac{t^{N-1}-1}{1-t} dt}}{1 + e^{\int_0^1 \frac{t^{N-1}-1}{1-t} dt}} \equiv \bar{p}.$$

Next, recall that p_1 maximizes $\left(p^{1-\frac{1}{\alpha}} - p\right) p^{k-1} (1-p)^{N-k}$, implying

$$\frac{1 - Np_1}{1 - p_1} \left(1 - p_1^{\frac{1}{\alpha}}\right) \alpha = 1. \tag{7}$$

Let us show that p_1 is strictly increasing in α. Differentiate the left-hand side of (7) in $p \leq \frac{1}{N}$

(the relevant range for p_1):

$$\frac{d\left[\frac{1-Np}{1-p}\left(1-p^{\frac{1}{\alpha}}\right)\alpha\right]}{dp} = -\frac{N-1}{(1-p)^2}\left(1-p^{\frac{1}{\alpha}}\right)\alpha - \frac{1-Np}{1-p}p^{\frac{1}{\alpha}-1} < 0$$

Hence the left-hand side is strictly decreasing in p. Thus:

$$\frac{\partial p_1}{\partial \alpha} = \frac{\frac{1-Np}{1-p}p_1^{\frac{1}{\alpha}}(\ln p_1)\alpha - \frac{1-Np_1}{1-p_1}\left(1-p_1^{\frac{1}{\alpha}}\right)}{\frac{d\left[\frac{1-Np}{1-p}\left(1-p^{\frac{1}{\alpha}}\right)\alpha\right]}{dp}|_{p=p_1}} \overset{\text{sign}}{=} \frac{p_1^{\frac{1}{\alpha}}(\ln p)\alpha - \left(1-p_1^{\frac{1}{\alpha}}\right)}{\frac{d\left[\frac{1-Np}{1-p}\left(1-p^{\frac{1}{\alpha}}\right)\alpha\right]}{dp}|_{p=p_1}} > 0,$$

since the numerator and the denominator are negative. Therefore, p_1 is strictly increasing in α. Furthermore, $\lim_{\alpha\to 1} p_1 = 0$, since the left-hand side of (7) converges to $1 - Np_1$. Thus, there exists a point $\hat{\alpha}$ at which $p_1 = \bar{p}$ and $p_1 < \bar{p}$ for any $\alpha < \hat{\alpha}$. Hence, the champions model is optimal if $\alpha \leq \hat{\alpha}$.

Case 2: $NE[\theta] < I$. In this case, the first term in (6) is negative. We first show that the equilibrium probability of the affirmative vote in the champions model, p_1, is the same as in the zero-NPV case. Denoting $NPV_0 \equiv NE[\theta] - I$, Pareto distribution implies $-l = (I + NPV_0)\frac{\alpha-1}{\alpha}\frac{1}{N}$. Thus,

$$\begin{aligned}
p_1 &= \arg\max_p NPV_0\left(1-(1-p)^{N-1}\right) + \left[N\frac{\alpha}{\alpha-1}x_m p^{1-\frac{1}{\alpha}} - Ip\right](1-p)^{N-1} \\
&= \arg\max_p \left[N\frac{\alpha}{\alpha-1}x_m p^{1-\frac{1}{\alpha}} - Ip - NPV_0\right](1-p)^{N-1} \\
&= \arg\max_p (I+NPV_0)\left[p^{1-\frac{1}{\alpha}} - p\right](1-p)^{N-1} \\
&= \arg\max_p \left[p^{1-\frac{1}{\alpha}} - p\right](1-p)^{N-1}
\end{aligned}$$

Next, we apply the envelope theorem at $k=1$,

$$\begin{aligned} U^{*\prime}(1) &= \left(NE[\theta]-I\right)\frac{d\left[I_p(k,N-k)\right]}{dk}|_{k=1} \\ &+\left[N\frac{\alpha}{\alpha-1}x_m p^{1-\frac{1}{\alpha}}-Ip\right](1-p)^{N-1}\left(\ln\frac{p}{1-p}-\int_0^1\frac{t^{N-1}-1}{1-t}dt\right), \end{aligned}$$

where we used the property of regularized incomplete beta function that $I_x(a,b)=1-I_{1-x}(b,a)$. Differentiating $I_p(k,N-k)$ in k,

$$\frac{d\left[I_p(k,N-k)\right]}{dk}=\frac{\left[\int_0^{p_k}\ln\left(\frac{t}{1-t}\right)t^{k-1}(1-t)^{N-k-1}dt\right]-\left(\int_0^1\frac{t^{N-k-1}-t^{k-1}}{1-t}dt\right)\left(\int_0^{p_k}t^{k-1}(1-t)^{N-k-1}dt\right)}{B(k,N-k)}$$

Evaluating at $k=1$,

$$\frac{d\left[I_p(k,N-k)\right]}{dk}|_{k=1}=(N-1)\left[\int_0^{p_1}\ln\left(\frac{t}{1-t}\right)(1-t)^{N-2}dt\right]-\left(\int_0^1\frac{t^{N-2}-1}{1-t}dt\right)\left(1-(1-p_1)^{N-1}\right)$$

Notice that $\lim_{p_1\to 0}\frac{d[I_p(k,N-k)]}{dk}|_{k=1}=0$, because both terms in the above expression become very close to zero. Combining this with the proof of the zero-NPV case, it follows that for $p_1\to 0$, as $\alpha\to 1$. Since $p_1\to 0$ as $\alpha\to 1$, as shown in case, it follows that $k=1$ for any power law distribution with sufficiently low α.

Finally, we define cut-off $\hat{\alpha}$, below which the champions rule is optimal. Let $\hat{\alpha}$ be the smallest α at which

$$\begin{aligned} 0 &= NPV_0\left((N-1)\left[\int_0^{p_1}\ln\left(\frac{t}{1-t}\right)(1-t)^{N-2}dt\right]-\left(\int_0^1\frac{t^{N-2}-1}{1-t}dt\right)\left(1-(1-p_1)^{N-1}\right)\right) \\ &+(I+NPV_0)\left[p_1^{1-\frac{1}{\alpha}}-p_1\right](1-p_1)^{N-1}\left(\ln\frac{p_1}{1-p_1}-\int_0^1\frac{t^{N-1}-1}{1-t}dt\right). \end{aligned}$$

Then, at any $\alpha\le\hat{\alpha}$, $U^{*\prime}(1)\le 0$, so the champions rule is optimal.

Proof of Proposition 4. The optimization problem for a given k is now

$$U^{*}(k)=\max_{p}\left\{\left[\int_{p}^{1}\left(Nu(z)-\tilde{I}\right)dz\right]\left[\frac{\Gamma(N)}{\Gamma(k)\Gamma(N-k+1)}p^{k-1}(1-p)^{N-k}\right]\right\}$$

By the envelope theorem,

$$U^{*\prime}(k)=\left[\int_{1-p}^{1}\left(Nu(z)-\tilde{I}\right)dz\right]\Gamma(N)\frac{p^{k-1}(1-p)^{N-k}}{\Gamma(N-k+1)\Gamma(k)}\left(\ln\frac{p}{1-p}-\int_{0}^{1}\frac{t^{N-k}-t^{k-1}}{1-t}dt\right)$$

For $k=\frac{N+1}{2}$, the optimal p satisfies

$$\max_{p}(p(1-p))^{\frac{N-1}{2}}\int_{1-p}^{1}\left(Nu(z)-\tilde{I}\right)dz,$$

which yields

$$\begin{aligned}0 &= \frac{N-1}{2}(p(1-p))^{\frac{N-1}{2}-1}(1-2p)\int_{1-p}^{1}\left(Nu(z)-\tilde{I}\right)dz\\ &\quad +p^{k-1}(1-p)^{N-k}\left(Nu(1-p)-\tilde{I}\right)\end{aligned}$$

At $p=\frac{1}{2}$, this equation holds. At $p<\frac{1}{2}$, both terms are positive, so the function is increasing. At $p>\frac{1}{2}$, both terms are negative, so the function is decreasing. Therefore, the optimal $p=\frac{1}{2}$ for $k=\frac{N+1}{2}$. Hence, $U^{*\prime}\left(\frac{N+1}{2}\right)=0$. Thus, $k=\frac{N+1}{2}$ is optimal.

Proof of Proposition 5

Consider the problem of the informed, but constrained planner who observes all N signals and decides on the investment decision. Let us define $X\equiv E\left[\min\{\theta_{N+1},...,\theta_{M}\}\right]$ to be the expectation of the minimum of the unseen factors. If $X<I$, the constrained planner will not invest, and the optimal voting rule is irrelevant. If $X>I$, then the constrained optimal decision is to invest if and only if $\min\{\theta_{1},...,\theta_{N}\}\geq I$. Next, let us show that the decision-making rule $k = N$ implements this constrained first-best investment decision. To do this, we show that voting threshold $\hat{\theta} = I$ corresponds to a Nash equilibrium in the voting game when $k = N$. Consider member i with signal θ_i. Her vote is pivotal if and only if all $N - 1$ committee members vote for the project, which implies that all of their signals exceed $\hat{\theta}$. Consider member i's forecast of V, conditional on her signal θ_i and on the information that her vote is pivotal. If $\theta_i \leq \hat{\theta}$, then

$$\mathbb{E}\left[V|\theta_i, Piv_i\right] = \mathbb{E}\left[\min\left\{\theta_1, ..., \theta_N\right\}|\theta_i, \theta_j \geq \hat{\theta}\ \forall j \neq i\right] = \theta_i \leq \hat{\theta}.$$

If $\theta_i > \hat{\theta}$, then

$$\mathbb{E}\left[V|\theta_i, Piv_i\right] > \theta_i > \hat{\theta}.$$

We can see that the strategy profile with voting threshold $\hat{\theta} = I$ constitutes a Nash equilibrium. Indeed, if $\hat{\theta} = I$ and $\theta_i < I$, player i is better off voting against the project since $\mathbb{E}\left[V|\theta_i, Piv_i\right] = \theta_i < I$; if $\hat{\theta} = I$ and $\theta_i > I$, player i is better off voting for the project since $\mathbb{E}\left[V|\theta_i, Piv_i\right] > \theta_i > I$. Since the consensus decision rule implements the first-best action, no other decision can improve on it. Further for any other voting threshold $k < M$, there is a positive probability that they will invest in a project where $\min\{\theta_1, ..., \theta_N\} < I$. Therefore $k = N$ must be optimal.

9.2 Fat Left Tails

The model can be symmetrically applied to study investments in projects with fat left tails. We can turn the parameters of the model of the previous sections on their head to analyze this question. Suppose now that, as before, the valuation of the company is as before: $V = \theta_1 + \theta_2 + ... + \theta_M$., but now suppose that each of the M characteristics is distributed independently over $[-\infty, r)$ (where $r > 0$) according to a distribution function $H(\cdot)$ with density $h(\cdot)$. Further assume, as before that G and g are such that $E[\theta_i] = 0$ for all i. This distribution is meant to capture the shape of late stage investment decisions (or, alternatively, the payoff profile of debt contracts as opposed to equity contracts). Under this profile, the conclusions of the previous section reverse:

Proposition 6. *Suppose that H is subexponential. Then, the unanimity rule rejects a project with $V \to -\infty$ with probability one. In contrast, any $k < N$ rule accepts such a project with a strictly positive probability.*

The intuition of this proposition is very similar to that of proposition 1: unanimity and champions rules are two sides of the same coin. Under unanimity only one partner needs to object to the project to reject it; under the champions rule only one partner needs to support the project to accept it.