Startup Fundraising and Equity Split: Do the Number of Investors and Contract Form Matter?

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We study equity division between an entrepreneur and one or more potential investors. The investor(s) and the entrepreneur negotiate how much equity (ownership) in the startup the investor(s) should receive in exchange for their investment. The value of that equity is uncertain at the time of the negotiations. We examine how the allocation of startup equity between the entrepreneur and the investors is affected by the following: (1) the number of investors, (2) whether the investors are approached sequentially or simultaneously and (3) whether investors receive downside protection via "Preferred Stock", as is sometimes done in practice. Our theoretical results suggest that the entrepreneur would be better off with two investors relative to the single investor case, particularly when bargaining with two investors simultaneously. This prediction is not supported by experimental data which instead suggest that neither the number of investors, nor the timing of the negotiations affect the entrepreneur's profits. In contrast, contractual details matter: across all bargaining regimes, Preferred Stock contracts lead to a 22 to 36% drop in entrepreneur's profits relative to Common Stock. Additional experiments show that this result persists even as teams gain more practice with contract types, and suggest that it is driven by more aggressive investor bargaining tactics under Preferred Stock contracts.

Key words: Innovation, Bargaining, Experiments

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1. Introduction

Early-stage startups often have limited access to capital and need to raise funds by soliciting investments from wealthy individuals and Venture Capital firms. The terms of the investment usually manifest in a "term sheet", which specifies the amount of equity given to the investors in exchange for their capital. Separately, a term sheet includes information about "liquidation preferences"; i.e., whether and which investors get paid first, and how much they get paid (usually up to a multiple of their investment) in the event that the startup must be liquidated, or that its sale generates insufficient proceeds to repay all shareholders.

While liquidation preferences for early-stage investors are quite common, their usage is far from universal. For example, in North America only about a third of startup investors hold preferred stock (i.e., stock with liquidation preferences), prioritizing the investors for earlier payout (CB Insights 2017). The rest hold common stock with no such protection. Indeed, in recent years the terms of investment agreements have become somewhat more balanced between founders and investors (Wagner 2020, Graham 2021). This appears to be driven at least in part by the rise of startup accelerators, incubators and other entrepreneurial programs that have increased founders' access to investments and opened possibilities for negotiating with multiple investors.

Being able to access a large number of potential investors and a range of different financial instruments to structure the terms raises several questions related to entrepreneurial financing: Is it better for the startup to go after one large investor, or after multiple small ones? Conversely, should investors prefer ventures that already have other investors, or is it better to be the first investor? How do different contractual forms (Common vs. Preferred Stock) affect the negotiated equity shares and the returns to the entrepreneur and investors?

We study these questions analytically and experimentally. Our study is the first attempt that we are aware of to explicitly consider the relevant features of the entrepreneurial setting in negotiations: (1) the value of the startup can increase both in the number of investors that the startup can secure, and in the size of those investments, (2) the true value of the owned shares is uncertain at the time of negotiations, (3) the contract terms may treat investors and entrepreneurs equally ("Common Stock"), or may instead prioritize investors for earlier payout ("Preferred Stock"). While some of these features have been studied in other contexts (See Section 2), their interactions produce new theoretical and behavioral insights, offering meaningful takeaways for startups and their investors.

In our model a single entrepreneur negotiates with one or two (depending on the scenario) investors about the allocation of startup equity. To model and solve this bargaining problem, we extend the classic Nash bargaining framework (Nash 1950), incorporating the multiple investor case, sequential bargaining, uncertainty and liquidation preferences. Consistent with the Nash solution, the negotiating parties choose jointly the actions (in our case, investment amounts and equity allocation) that maximize the social value function (the product of their expected profits, less the disagreement payoffs, weighted by their relative bargaining powers). If the negotiations are successful, a random draw from a known distribution determines the value of the startup and the parties divide that value according to the negotiated shares, with possible consideration of liquidation preferences.

Within our modeling framework we examine the allocation of startup equity under a varying number of potential investors. When there is only a single investor, the problem reduces to the classic Nash bargaining solution (Nash 1950). However, when there are multiple investors, each bilateral negotiation cannot be treated independently, but rather is embedded within a larger game. This is because any agreement between any two negotiating parties affects the total size of the bargaining surplus for the remaining negotiations. In other words, each bilateral negotiation creates externalities for the other negotiations. To make predictions in this richer environment, we adopt the "Nash-in-Nash" framework. In this framework each bilateral negotiation has a solution given by the Nash bargaining solution, while at the same time, the outcome of the larger strategic game between the entrepreneur and all investors is itself a Nash equilibrium. Further, the solution depends on the negotiation timing: does the entrepreneur bargain with each investor sequentially or simultaneously?[1]

Our model provides several testable predictions. First, holding the total investment amount constant, the entrepreneur is always better off negotiating with two smaller investors than with one large investor. This is because, with multiple investors, the entrepreneur has a stronger outside option and can credibly threaten to walk away from a negotiation with one investor and still secure an agreement with the other. In contrast, with only one investor, walking away leads to zero profit for the entrepreneur. Second, the timing of the negotiations matters: the entrepreneur prefers bargaining with multiple investors simultaneously, rather than sequentially. This is because in simultaneous bargaining, the implicit threat to walk away and reach an agreement with the other investor is more credible and can be used against *both* investors. In contrast, with sequential bargaining, if the entrepreneur and the first investor fail to reach an agreement, then the entrepreneur no longer has the leverage against the second investor. Lastly, in sequential negotiations there is a first-mover advantage for investors: the first investor receives more equity than the second one.

We test these predictions in two experiments. Our first experiment is a 3 x 2 design consisting of three between-subject treatments and two within-subject conditions. The between-subject treatments examine three scenarios: single investor negotiations (SI), sequential two investor negotiations (SEQ) and simultaneous two investor negotiations (SIM), while holding the total potential investment amount constant between treatments. The within-subject conditions examine "Common Stock" contracts (in which all parties are treated equally when the proceeds are distributed) and "Preferred Stock" contracts (in which investors receive downside protection and are prioritized when the proceeds do not cover the sum of the claims). Our second experiment tests the robustness of our main result to order effects and learning.

[1] Both sequential and simultaneous negotiations are found in practice. For example, of the 233,362 registered early-stage (pre-seed, seed and series A) investment deals in North America, 56,984 (approximately 26%) involve more than one investor; i.e., require simultaneous negotiations with multiple investors (Crunchbase 2021).

Our experimental results offer mixed support for the model predictions. First, while the model predicts that the entrepreneur would prefer multiple investors to a single investor, our data suggest no significant differences in expected profits for the entrepreneur between all three bargaining regimes (SI, SEQ and SIM). That is, neither the number of the investors, nor the timing appear to matter. Second, consistent with predictions, there is a (small) first-mover advantage for the earlier investor. Lastly, while our theory predicts that contracts should have no to a minimal effect on the entrepreneur's profits (between 0 and 11% reduction under Preferred relative to Common Stock), the data show that that effect is quite large (between 22 to 36% reduction). Additional experiments and the analysis of post-experimental survey data suggest that this is not explained by a shift in fairness norms or by a failure to understand how different contracts work. Rather, Preferred Stock contracts appear to shift upward the investors' earnings expectations, leading to more aggressive bargaining strategies and more advantageous outcomes.

These results have several implications in practice. The result that entrepreneurs are unable to leverage multiple investors to their advantage suggests that "endogenous" outside options (e.g., a threat to walk away from one investor and instead negotiate with another) are viewed as less credible than "exogenous" outside options (e.g., the investor's endowment). To improve their outcomes negotiators should thus seek out hard leverage. Further, contract structure matters more than the number of investors or the timing of bargaining. With Common Stock contracts entrepreneurs earn significantly more than with Preferred Stock contracts, and vice versa for the investors. Thus, entrepreneurs and investors should pay as much (or more) attention to contract type as they do to the number of investors.

2. Related Literature

Bargaining problems (both structured and unstructured) have attracted significant interest in the academic literature (Roth 1995). Most of these studies examine, theoretically and empirically, the problem of splitting a pie of a given size, and do not consider the relevant features of the entrepreneurial setting such as multiple investors, size of investment, uncertainty, or equity contract types. We will next survey the relevant bargaining literature in economics, its applications in operations management, as well as the entrepreneurship literature on equity contracting.

Cooperative Bargaining

The early experimental economics literature focused mainly on testing Nash solution predictions for bilateral negotiations with complete information (Nydegger and Owen 1974, Roth and Rothblum 1982, Murnighan et al. 1988). Two features of the entrepreneurial setting, that the entrepreneur may bargain with multiple investors, and that the size of the pie (value of startup equity) is both endogenous and uncertain, have attracted relatively little attention. The extant studies of multilateral bargaining in economics (see, e.g., Frechette et al. 2003, 2005a,b) are focused on legislative bargaining and have highly structured bargaining formats in order to test features of interest to these models: agenda setting, proposer power and majority/super-majority voting rules. Nevertheless, these papers find, similarly to bilateral bargaining, strong tendencies towards equal splits. Embrey et al. (2021) is related in that, like us, they study bargaining over risky pies where risk exposure is asymmetric, but do not consider multilateral bargaining or different contracts. The literature on splitting pies of endogenous size (Gantner et al. 2001, Bolton and Karagözoğlu 2016, Rodriguez-Lara 2016, Baranski 2019) is similarly small, with the main insight that players often take self-serving bargaining positions. No studies that we are aware of examine the types of equity division contracts that are prevalent in entrepreneurial practice (Common vs. Preferred Stock), or compare the outcomes of single vs. multiple investor bargaining.

Bargaining Applications in Operations Management

While there has been extensive research on bargaining in operations management – both theory and experiments – much of it has focused on highly stylized and structured bargaining environments (Davis Forthcoming). Notable recent exceptions are Davis and Leider (2018) and Davis and Hyndman (2019). The latter paper revisits a standard two-party supply chain contracting problem through the lens of Nash bargaining, with asymmetric exposure to risk between the parties, and finds that the party responsible for inventory risk is not fully compensated for that risk. Remarkably, Embrey et al. (2021) who study a similar problem in a more abstract context, show the opposite, that residual claimants are able to negotiate a high premium compensating them for risk exposure. Together, these results suggest that the institutional context (i.e., operational environment) matters, even for problems that are mathematically equivalent, and that negotiation behaviors and outcomes may be domain specific. In the entrepreneurship domain, investors must put money on the table for the startup to have a chance of success (with the contract type determining exposure to risk) and it is a priori unclear what fairness norms will prevail.

Two of the scenarios examined in our study involve bilateral negotiations with *multiple* investors. There are few problems of this structure that have been studied in the literature, with the closest being Lovejoy (2010) and Leider and Lovejoy (2016) who study simultaneous bargaining with horizontal competition within a supply chain tier. Different from these studies, which assume single sourcing/contracting within a tier, entrepreneurs may contract with multiple investors. To analyze the case in which the entrepreneur engages in a series of bilateral negotiations with multiple investors we adopt the "Nash equilibrium in Nash bargains", or simply "Nash-in-Nash" framework, which takes a cooperative bargaining approach in the bilateral bargaining stage, and embeds it in a larger strategic game across the market participants. The Nash-in-Nash approach was pioneered in economics by Davidson (1988) and Horn and Wolinsky (1988) (see also more recent surveys by Grennan and Swanson (Forthcoming) and Yurukoglu (Forthcoming)) and has been used in models of procurement (Feng and Lu 2012, 2013, Chu et al. Forthcoming, Mu et al. 2019). Different from this stream of literature we focus on the startup equity contract features, and use both analytical and experimental tools to answer our research questions.

The final feature of our model is that the entrepreneur can, potentially, contract with two investors, and can do so simultaneously or sequentially. Davis et al. (Forthcoming) examine a similar question in the supply chain setting, with the key difference (in addition to a different operational context) that the manufacturer is operating an assembly system and so must contract with *both* suppliers in order to be able to produce and sell the final product. In contrast, the entrepreneur has the option to contract (or not) with each investor, resulting in quite different strategic dynamics.[2]

Firm Ownership and Entrepreneurship

Although firm ownership and financing is one of the classic microeconomic questions (Grossman and Hart 1986, Hart and Moore 1990, Aghion and Tirole 1994), there is some renewed interest in this question with a focus on technology startups (De Bettignies 2008, Akerlof and Holden 2019, Halac et al. 2020, Cui et al. 2020). These studies often focus on informational/incentive asymmetries between the players and do not study the bargaining dynamics. The common modeling assumption is that of ultimatum bargaining – one of the parties (the entrepreneur or the investor) makes take-it-or-leave-it offers and extracts most of the rents from the other party. Studies that take a more cooperative approach to bargaining are Hellmann and Wasserman (2017), Hossain et al. (2019) and Kagan et al. (2020). Different from us they study ownership allocation *within* the entrepreneurial team and not *between* the entrepreneur and investors.

Lastly, we note that entrepreneur-investor bargaining has not been investigated in the innovation and product development literature (Krishnan and Ulrich 2001, Kavadias and Hutchison-Krupat 2020). However, there is a sizable practitioner literature geared towards helping founders design more effective (and fair) equity agreements (Metrick and Yasuda 2010, Wasserman 2012, Feld and Mendelson 2019). Our study informs this literature by studying the bargaining dynamics and behaviors that affect the allocation of profits between entrepreneurs and their investors.

3. Model of Entrepreneur-Investor Bargaining

In this section we develop analytical benchmarks for equity contracting outcomes for three negotiation regimes: Single investor (SI), Simultaneous negotiations with two investors (SIM), Sequential negotiations with two investors (SEQ) and two contracts: Common and Preferred Stock.

[2] Despite the differences in the models Davis et al. (Forthcoming) arrive at a similar theoretical result: the manufacturer earns more when contracting simultaneously than sequentially.

Bargaining with a Single Investor An entrepreneur has a business whose current value is zero. To grow the business the entrepreneur needs to secure funding from the investor who has an endowment of $2e$ units of capital. We use "Investor 0" when referring to the investor in the single investor case to distinguish it from investors 1 and 2 in the two investor case. If Investor 0 invests $I_0 \in [0, 2e]$, the value of the business becomes $V = \alpha I_0$, where α is the random multiplier on the investment and can be (H)igh or (L)ow with commonly known probabilities. Specifically, $\alpha = \alpha_H$ with probability p and $\alpha = \alpha_L$ with probability $1-p$. The uncertainty in α (and hence in V which will be the basis for repaying the equity holders) comes from the technological and market unknowns typical for early-stage ventures.[3]

The entrepreneur and the investor bargain over the investment amount I_0 and the share μ_0 that the investor receives in exchange for the investment. If the negotiations are successful, a random draw determines the value of α, and the parties split the realized value of V based on the negotiated shares (with possible consideration of liquidation preferences in the Preferred Stock contract case, defined below). If the negotiations fail, the entrepreneur receives 0, and the investor keeps $2e$.[4]

Simultaneous / Sequential Bargaining with Two Investors In the two investor case the entrepreneur bargains separately with Investor $i = 1, 2$, each of whom has an endowment of e units of capital, over investment $I_i \in [0, e]$ and Investor i's share μ_i. The value of the startup after the bargaining is $V = \alpha(I_1 + I_2)$. Note that the maximum total investment is equal to $2e$ in both the single investor and the two investor cases. We consider both simultaneous and sequential bargaining. In the simultaneous case, both negotiations happen in parallel. In the sequential case, the entrepreneur first negotiates with Investor 1, and the investment amount and shares agreed upon with Investor 1 become common knowledge prior to negotiating with Investor 2. In the event of full (partial) disagreement, each (disagreeing) Investor i keeps their endowment e and does not contribute to the value of the startup; i.e., $I_i = 0$.[5]

Common vs Preferred Stock contracts We investigate two types of contractual arrangements: Common Stock and Preferred Stock contracts. With Common Stock contracts, once the

[3] The high and low states of the world represent the scenarios that a startup succeeds ($\alpha = \alpha_H$), or fails ($\alpha = \alpha_L$) in the market. While more complex valuation techniques with richer representations of uncertainty are sometimes used, the "Method of Multiples" with a fixed failure probability is one of the most common valuation methods used in practice (Metrick and Yasuda 2010).

[4] We do not model potential information asymmetries between the entrepreneur and the investors, nor do we consider moral hazard. In other words, the return on investment, α is determined by a random draw whose distribution (and later, realization) are common knowledge among the negotiators.

[5] We focus on the two investor case because it captures many of the first-order bargaining dynamics relative to the single investor case, for example the improved bargaining position of the entrepreneur with multiple investors, or the differences in bargaining timing (simultaneous vs. sequential bargaining). However, much of the theoretical analysis can be readily extended to an arbitrary number of investors.

uncertainty about the value of the business is resolved, each party is rewarded according to the negotiated shares regardless of the state of the world. In the high state of the world ($\alpha = \alpha_H > 1$), investor(s) will generally earn a positive profit (or else they would have disagreed to the split). However, in the low state of the world ($\alpha = \alpha_L = 1$) investor(s) will generally suffer a loss since the total proceeds are just enough to cover the initial investment. Thus, under Common Stock contracts, investors put their investment at risk.

With Preferred Stock contracts investors receive downside protection in the form of liquidation preferences. Specifically, we set downside protection to be *exactly equal* to the investment amount. This means, in the high state of the world ($\alpha = \alpha_H > 1$), the value V is divided according to the negotiated shares as long as the investors' share is sufficient to cover their investment amount (if it is not, investor(s) receive their investment amount back). Further, in the low state of the world ($\alpha = \alpha_L = 1$) investor(s) receive their investment back, earning 0 profit. Thus, under Preferred Stock contracts investor(s) are insured against potential losses in both states of the world.[6]

Equilibrium Characterization The characterization of equilibria for these bargaining problems depends on (p, α_H, α_L), the contract (Common or Preferred Stock), and on the relative bargaining power of the players. Below we develop results for the $\alpha_L = 1$ and $\mathbb{E}[\alpha] = 3$ case. These parameters will be used in our experiments (specific parameter choices are discussed in Section 4). Further, we assume equal bargaining powers. Under these parameters all equilibria are unique. However, under general bargaining power and problem parameters, multiple equilibria are possible in the two investor models: equilibria in which only one or both investors invest may sometimes exist. A more complete characterization of the equilibria under general $\mathbb{E}[\alpha]$ and general bargaining powers is relegated to Appendix EC.1. Lastly, we assume risk neutrality; however, we also provide some discussion on how risk aversion affects bargaining in Appendix EC.1.3.

3.1. Common Stock Contracts

3.1.1. Single Investor In the single investor case, Investor 0 and the entrepreneur bargain over the size of the investment made by the investor, I_0, and the share of the startup, μ_0, that the investor will receive in exchange for making the investment. It follows that the share of the entrepreneur μ_e is $1 - \mu_0$. Let d_e (d_0) denote the disagreement point of the entrepreneur (Investor 0); i.e., their respective profits if the negotiation breaks down. In the single investor scenario $d_e = 0$, since the value of the business to the entrepreneur is 0 without investment, and $d_0 = 2e$ since the investor has $2e$ units of capital as the endowment. Thus, the expected profit of the entrepreneur

[6] In practice, the extent to which the investor is protected from potential losses (sometimes referred to as "Liquidation Multiple") may be set endogenously by the negotiators. To simplify the analysis and the experiment, we assume an exogenous liquidation multiple of 1.

(resp., Investor 0) is $\pi_e(I_0,\mu_0)=\mathbb{E}[\alpha]I_0(1-\mu_0)$ (resp., $\pi_0(I_0,\mu_0)=\mathbb{E}[\alpha]I_0\mu_0+2e-I_0$). If a deal is settled, the investment I_0 and the share μ_0 maximize the following Nash product:

$$\begin{aligned}\max_{I_0\in[0,2e],\ \mu_0\in[0,1]} \quad & [\pi_0(I_0,\mu_0)-d_0]\,[\pi_e(I_0,\mu_0)-d_e] \\ & \pi_0(I_0,\mu_0)\geq d_0,\ \pi_e(I_0,\mu_0)\geq d_e.\end{aligned} \tag{1}$$

Solving (1), we obtain the following bargaining outcome.

PROPOSITION 1 **(Single investor bargaining)**. *The investor invests $I_0^{SI}=2e$. The shares are as follows:*

$$\mu_0^{SI}=\frac{\mathbb{E}[\alpha]+1}{2\mathbb{E}[\alpha]},\quad \mu_e^{SI}=1-\mu_0^{SI}=\frac{\mathbb{E}[\alpha]-1}{2\mathbb{E}[\alpha]}.$$

Proposition 1 reproduces the standard result from the Nash Bargaining literature: converted to expected profits, the shares equalize the negotiators' earnings relative to their disagreement payoffs.

3.1.2. Two Investors: Simultaneous Bargaining In the two investor scenarios, investors $i=1,2$ engage separately in bilateral bargaining with the entrepreneur about the investment amounts I_i and the shares, μ_i, received in exchange for their investment. We adopt the Nash-in-Nash solution approach to determine the negotiation outcome; i.e., the negotiation outcomes are derived as a Nash equilibrium of two simultaneous (or sequential) Nash bargaining problems. We denote the outcome of each bargaining unit i (the bargaining between the entrepreneur and Investor i) by (I_i,μ_i) and the collective outcomes by $\boldsymbol{I}=(I_1,I_2)$ and $\boldsymbol{\mu}=(\mu_1,\mu_2)$. Then, the expected profit of the entrepreneur is $\pi_e(\boldsymbol{I},\boldsymbol{\mu})=\mathbb{E}[\alpha](I_1+I_2)(1-\mu_1-\mu_2)$ and the expected profit of Investor i is $\pi_i(\boldsymbol{I},\boldsymbol{\mu})=\mathbb{E}[\alpha](I_1+I_2)\mu_i+e-I_i$.

With two investors, the disagreement point of the entrepreneur is no longer 0: even if bargaining with one investor breaks down, the entrepreneur may still earn a positive profit from bargaining with the other investor. Denote by d_e^{-i} the disagreement point of the entrepreneur when bargaining with Investor i. Then $d_e^{-1}=\pi_e(0,I_2,0,\mu_2)$ is the profit of the entrepreneur when Investor 2 is the only investor (with simultaneous bargaining Investor 2 would not be aware of a potential disagreement with Investor 1; thus, neither the negotiated outcome nor the disagreement payoff can condition on the possibility that a disagreement has occurred). Similarly $d_e^{-2}=\pi_e(I_1,0,\mu_1,0)$. Further, the disagreement point of Investor i is $d_i=e$ since each investor has e units of capital as the endowment. Then, the investments $\boldsymbol{I}$ and the shares $\boldsymbol{\mu}$ maximize the following Nash product simultaneously:

$$\begin{aligned}\max_{I_i\in[0,e],\ \mu_i\in[0,1]} \quad & [\pi_i(\boldsymbol{I},\boldsymbol{\mu})-d_i]\,\left[\pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_e^{-i}\right] \\ & \pi_i(\boldsymbol{I},\boldsymbol{\mu})\geq d_i,\ \pi_e(\boldsymbol{I},\boldsymbol{\mu})\geq d_e^{-i},\ i\in\{1,2\}.\end{aligned} \tag{2}$$

Solving (2), we obtain the following proposition:

Proposition 2 **(Simultaneous bargaining)**. *There exists an equilibrium bargaining outcome in which both investors invest; i.e., $I_i^{SIM} = e$ for $i \in \{1,2\}$. The equilibrium shares are as follows:*

$$\mu_i^{SIM} = \frac{\mathbb{E}[\alpha]+1}{5\mathbb{E}[\alpha]}, \ i = 1,2, \quad \mu_e^{SIM} = 1 - \mu_1^{SIM} - \mu_2^{SIM} = \frac{3\mathbb{E}[\alpha]-2}{5\mathbb{E}[\alpha]}.$$

3.1.3. Two Investors: Sequential Bargaining In this case, the entrepreneur first bargains with Investor 1, and then with Investor 2, with the bargaining outcome of the first stage being common knowledge in stage 2. The disagreement point of the entrepreneur in the second stage (when bargaining with Investor 2) as a function of the agreed investment and share in the first stage is unchanged relative to the simultaneous case (Section 3.1.2). That is, $d_e^{-2} = \pi_e(I_1, 0, \mu_1, 0)$. However, the disagreement point of the entrepreneur in the first stage (when bargaining with Investor 1) is different. This is because both the entrepreneur and Investor 2 know that if an agreement with Investor 1 is not reached, Investor 2 would become the only investor and would thus receive a larger share. Specifically, $d_e^{-1} = \pi_e(0, e, 0, {}^{(\mathbb{E}[\alpha]+1)}/_{(2\mathbb{E}[\alpha])})$, where ${}^{(\mathbb{E}[\alpha]+1)}/_{(2\mathbb{E}[\alpha])}$ is the entrepreneur's share when bargaining with a single investor. The disagreement point of Investor i remains $d_i = e$. Together, these changes in disagreement payoffs reduce the entrepreneur's share of the surplus relative to the simultaneous case, and also lead to a first-mover advantage for Investor 1.

Formally, given the first-stage bargaining outcome (I_1, μ_1), the investment I_2 and the share μ_2 maximize the following Nash product:

$$\begin{aligned} \max_{I_2 \in [0,e], \ \mu_2 \in [0,1]} \ & [\pi_2(\boldsymbol{I}, \boldsymbol{\mu}) - d_2] \left[\pi_e(\boldsymbol{I}, \boldsymbol{\mu}) - d_e^{-2}\right] \\ & \pi_2(\boldsymbol{I}, \boldsymbol{\mu}) \geq d_2, \ \pi_e(\boldsymbol{I}, \boldsymbol{\mu}) \geq d_e^{-2}. \end{aligned} \tag{3}$$

The solution to (3) depends on the value of the startup remaining to be distributed after the first negotiation stage. If $\mathbb{E}[\alpha](1-\mu_1) \geq 1$, we have $I_2^{SEQ}(I_1, \mu_1) = e$ and $\mu_2^{SEQ}(I_1, \mu_1) = {}^{(\mathbb{E}[\alpha]e(1-\mu_1)+e)}/_{(2\mathbb{E}[\alpha](e+I_1))}$; Otherwise, $I_2^{SEQ}(I_1, \mu_1) = 0$ and $\mu_2^{SEQ}(I_1, \mu_1) = 0$. Taking the bargaining outcome $I_2^{SEQ}(I_1, \mu_1)$ and $\mu_2^{SEQ}(I_1, \mu_1)$ back to the first stage, the investment I_1 and the share μ_1 maximize the following Nash product:

$$\begin{aligned} \max_{I_1 \in [0,e], \ \mu_1 \in [0,1]} \ & \left[\pi_1(I_1, I_2^{SEQ}(I_1, \mu_1), \mu_1, \mu_2^{SEQ}(I_1, \mu_1)) - d_1\right] \left[\pi_e(I_1, I_2^{SEQ}(I_1, \mu_1), \mu_1, \mu_2^{SEQ}(I_1, \mu_1)) - d_e^{-1}\right] \\ & \pi_1(I_1, I_2^{SEQ}(I_1, \mu_1), \mu_1, \mu_2^{SEQ}(I_1, \mu_1)) \geq d_1, \ \pi_e(I_1, I_2^{SEQ}(I_1, \mu_1), \mu_1, \mu_2^{SEQ}(I_1, \mu_1)) \geq d_e^{-1}. \end{aligned} \tag{4}$$

Solving (4), we obtain the following proposition.

Proposition 3 **(Sequential bargaining)**. *There exists an equilibrium bargaining outcome in which both investors invest; i.e., $I_i^{SEQ} = e$ for $i \in \{1,2\}$. The equilibrium shares are as follows:*

$$\mu_1^{SEQ} = \frac{4\mathbb{E}[\alpha]+3}{12\mathbb{E}[\alpha]}, \quad \mu_2^{SEQ} = \frac{8\mathbb{E}[\alpha]+9}{48\mathbb{E}[\alpha]}, \quad \mu_e^{SEQ} = 1 - \mu_1^{SEQ} - \mu_2^{SEQ} = \frac{8\mathbb{E}[\alpha]-7}{16\mathbb{E}[\alpha]}.$$

3.2. Preferred Stock Contracts

Much of the analysis is analogous to the Common Stock contracts (Section 3.1). Therefore, we only present the main results below. Detailed formulation and analysis are in Appendix EC.1.2.

Single Investor Under Preferred Stock contracts Investor 0 is paid up to I_0 before the entrepreneur receives any proceeds. This is true in both states of the world. Recall that the low state multiplier $\alpha_L = 1$ in our experimental implementation. Thus, in the low state of the world Investor 0 receives exactly I_0 while the entrepreneur receives nothing. As before, the disagreement point of the entrepreneur (Investor 0) is $d_e = 0$ ($d_0 = 2e$). The following proposition summarizes the bargaining outcome.

PROPOSITION 4 **(Single investor bargaining)**. *The investor invests $\tilde{I}_0^{SI} = 2e$. The shares are as follows:*

$$\tilde{\mu}_0^{SI} = \frac{\alpha_H + 1}{2\alpha_H}, \quad \tilde{\mu}_e^{SI} = 1 - \tilde{\mu}_0^{SI} = \frac{\alpha_H - 1}{2\alpha_H}.$$

Two Investors Under Preferred Stock contracts both investors, if they choose to invest, receive at least their endowments back in both states of the world.[7] The following propositions summarize the equilibrium bargaining outcomes in these scenarios.

PROPOSITION 5 **(Simultaneous bargaining)**. *There exists an equilibrium bargaining outcome in which both investors invest; i.e., $\tilde{I}_i^{SIM} = e$ for $i \in \{1, 2\}$. The equilibrium shares are as follows:*

$$\tilde{\mu}_i^{SIM} = \frac{\alpha_H + 1}{5\alpha_H}, \ i = 1, 2, \quad \tilde{\mu}_e^{SIM} = 1 - \tilde{\mu}_1^{SIM} - \tilde{\mu}_2^{SIM} = \frac{3\alpha_H - 2}{5\alpha_H}.$$

PROPOSITION 6 **(Sequential bargaining)**. *There exists an equilibrium bargaining outcome in which both investors invest; i.e., $\tilde{I}_i^{SEQ} = e$ for $i \in \{1, 2\}$. The equilibrium shares are as follows:*

$$\tilde{\mu}_1^{SEQ} = \frac{4\alpha_H + 3}{12\alpha_H}, \quad \tilde{\mu}_2^{SEQ} = \frac{8\alpha_H + 9}{48\alpha_H}, \quad \tilde{\mu}_e^{SEQ} = 1 - \tilde{\mu}_1^{SEQ} - \tilde{\mu}_2^{SEQ} = \frac{8\alpha_H - 7}{16\alpha_H}.$$

Propositions 3-6 provide existence results for two investor scenarios. For the parameter values used in our experiments these equilibria are also *unique*. Details are provided in Appendix EC.1.

[7] If Investor i were to obtain a very large share, the profit of Investor $-i$ may be lower than $-i$'s investment even in the high state of the world. In this case, Investor $-i$ is protected and receives I_{-i} back. Further, the negotiated share may not be enough to cover the initial investment when only Investor i invests. In that case, Investor i is also protected and receives I_i back. We assume that each investor is always first compensated out of the profit of the entrepreneur and then, if needed, is compensated out the profit of the other investor. In Appendix EC.1.2 we show that the latter scenario cannot occur in equilibrium so that we can restrict attention to the case where the investor who is protected will be compensated out of the profit of the entrepreneur.

3.3. Equilibrium Share and Profit Comparisons

We next present relative comparisons of equilibrium shares and profits in each scenario. We begin by ranking the shares across the three regimes (Single investor, Sequential/Simultaneous negotiations with two investors) under each contract. To distinguish between contracts, we use μ_i^j and π_i^j to denote the equilibrium share and expected profit for Common Stock contracts and $\tilde{\mu}_i^j$ and $\tilde{\pi}_i^j$ to denote those for Preferred Stock contracts, with $i \in \{e, 0, 1, 2\}$ and $j \in \{SI,\ SIM,\ SEQ\}$.[8]

Corollary 1 **(Share comparison under Common/Preferred Stock contracts)**.

(1) The entrepreneur obtains the largest share when he bargains with two investors simultaneously and the smallest share when he bargains with a single investor. That is, $\mu_e^{SIM} > \mu_e^{SEQ} > \mu_e^{SI}$ *and* $\tilde{\mu}_e^{SIM} > \tilde{\mu}_e^{SEQ} > \tilde{\mu}_e^{SI}$.

(2) Investor 1 (resp., investor 2) obtains a larger (smaller) share when negotiating sequentially than when negotiating simultaneously, and the single investor obtains the largest share. That is, $\mu_2^{SEQ} < \mu_2^{SIM} = \mu_1^{SIM} < \mu_1^{SEQ} < \mu_0^{SI}$ *and* $\tilde{\mu}_2^{SEQ} < \tilde{\mu}_2^{SIM} = \tilde{\mu}_1^{SIM} < \tilde{\mu}_1^{SEQ} < \tilde{\mu}_0^{SI}$.

Part (1) of Corollary 1 states that the entrepreneur prefers both scenarios with two investors to the single investor scenario. This is because with two investors, the entrepreneur benefits from multiple bargaining units which give the entrepreneur a larger disagreement point with each of the two investors. Among the two investor scenarios, the entrepreneur obtains a smaller share when negotiating sequentially than when negotiating simultaneously. In the sequential setting the entrepreneur's disagreement point when bargaining with Investor 1 is smaller than that in the simultaneous case. This is because, in sequential bargaining, if the entrepreneur and Investor 1 fail to reach an agreement, then the entrepreneur is in a weaker position with Investor 2, because the entrepreneur cannot go back and try again to reach an agreement with Investor 1. In contrast, in the simultaneous case, the entrepreneur always has a credible threat of walking away and reaching an agreement only with the other investor.

Part (2) of Corollary 1 states that Investor 1 prefers sequential to the simultaneous format, and vice versa for Investor 2. This is because in the sequential case, having committed a larger share to Investor 1, the entrepreneur bargains with Investor 2 over a smaller leftover pie, resulting in a smaller equilibrium share for Investor 2. Lastly, the single investor receives a larger share relative to the first investor in the sequential case since the disagreement point of the entrepreneur in the single investor case is 0.

Notably, the results in Corollary 1 hold under both Common and Preferred Stock contracts. In Corollary 2 we rank the equilibrium expected shares and profits of the entrepreneur by contract.

[8] Corollary 1 is presented in terms of shares received by each party; however, the ranking of the expected profits is the same as the ranking of shares since, in equilibrium, investors invest their full endowment in all scenarios, and the expected profit of each stakeholder increases linearly in their negotiated share.

Corollary 2 **(Entrepreneur's shares and profits by contract)**.

(1) The entrepreneur obtains a smaller share under Common Stock contracts than under Preferred Stock contacts. That is, $\mu_e^j < \tilde{\mu}_e^j$, $j \in \{SI,\ SIM,\ SEQ\}$

(2) The entrepreneur obtains a weakly higher profit under Common Stock contracts than under Preferred Stock contacts. Specifically, $\pi_e^{SI} = \tilde{\pi}_e^{SI}$ *and* $\pi_e^j > \tilde{\pi}_e^j$, $j \in \{SIM,\ SEQ\}$.

Part (1) of Corollary 2 states that the entrepreneur receives a higher equilibrium share under Preferred Stock contracts relative to Common Stock contracts. This is because under Preferred Stock contracts, the investors' investments are fully protected when the startup fails, leaving the entrepreneur with nothing in this state. To compensate, the entrepreneur's share of the startup – which the entrepreneur receives only in the high state – must increase.

Part (2) of Corollary 2 states that the entrepreneur's profit is the same under both contracts when negotiating with a single investor, but lower under Preferred Stock contracts when negotiating with two investors. In the single investor scenario, since the disagreement point of the entrepreneur remains 0 under both contracts, the expected profits are the same for the entrepreneur. Thus, the increase from μ_e^{SI} to $\tilde{\mu}_e^{SI}$ fully compensates the entrepreneur for the 0 profit in the low state of the world under Preferred Stock contracts. But in the two investor scenarios, the disagreement points of the entrepreneur are lower under Preferred Stock contracts since the entrepreneur will only be able to earn a positive profit when the state of the world is high; thus a higher equilibrium share does not fully compensate the entrepreneur.

4. Experiment Design and Hypotheses

We test the effects of different negotiation environments and contracts on the allocation of equity between the entrepreneur and the investor(s) in two laboratory experiments. Our experimental approach is summarized in Table 1. We next discuss the details of the design for Experiment 1 and state our experimental hypotheses. The details of Experiment 2 are postponed until Section 6.

4.1. Experiment Design

In Experiment 1 we examine three between-subject treatments. In the first treatment (labelled SI) a single investor negotiates with an entrepreneur. In the second treatment (labelled SEQ) two investors negotiate with an entrepreneur sequentially. In the third treatment (labelled SIM) two investors negotiate with an entrepreneur simultaneously. Within each treatment we examine behavior under Common and Preferred Stock contracts. With Common Stock contracts the negotiated split applies to both the high and the low states of the world, while with Preferred Stock contracts the negotiated split applies only in the high state of the world, and the investor(s) receive(s) their investment amount back in the low state of the world. The contract (Common or Preferred) is

Table 1 Summary of Treatments

Study objectives	Treat-ment	Rounds (incl. Training)	Training Phase?	Phase 1	Phase 2	Sessions/ Subjects
Experiment 1: How do the number of investors, timing and contract type affect shares and profits?	SI	9	Yes	Common Stock	Preferred Stock	4/40
	SEQ	6	Yes	Common Stock	Preferred Stock	6/69
	SIM	6	Yes	Common Stock	Preferred Stock	6/72
Experiment 2: Are results robust to order effects and learning?	SI	10	No	Common Stock	Preferred Stock	3/42
	SI	10	No	Preferred Stock	Common Stock	3/32

imposed exogenously and cannot be changed by the negotiating parties. To avoid framing effects contracts were not labeled as “Common” or “Preferred” Stock to participants, but rather were described in neutral language. Our experimental instructions are reproduced in Appendix A.

Negotiation Format The negotiation format is semi-structured: players can make, accept or reject offers specifying a share of the realized startup value (between 0 and 100%) that the investor will receive in exchange for their investment.[9] Players may not exchange messages. All negotiations are bilateral, including the two investor cases. That is, in the SIM and SEQ treatments the entrepreneur negotiates separately (and privately) with each investor. Therefore, Investor 1 cannot see the offers exchanged between the entrepreneur and Investor 2, and vice versa. In the SEQ treatment, Investor 2 learns whether or not an agreement was reached between the entrepreneur and Investor 1, and the terms of that agreement. At the end of every round, the results of the negotiations are shared with all players in a dyad/triad.

If the entrepreneur cannot secure an agreement with *any* investor within the specified time (90 seconds in SI and each stage of SEQ, or 180 seconds in SIM), then the entrepreneur receives nothing. In the two investor cases, if negotiations fail with one investor, the entrepreneur can try to secure a deal with the other investor. Any investor who is unable to reach an agreement with the entrepreneur receives their outside option (i.e., their endowment).

Parameters Consistent with our theoretical development in Section 3 we set $\alpha_L = 1$, such that the value of the firm in the low state of the world is exactly equal to the investment. We set $e = 100$,

[9] We do not test our theoretical prediction that under our parametrization all investors invest their full endowment in equilibrium. That is, in the experiment players negotiate over a single parameter: the share(s) received by the investor(s). If players reach an agreement, the investment amount is equal to the endowment. If they fail, the investment amount is 0. We choose this format, because of known biases in multidimensional bargaining (e.g. parameter neglect), which may complicate our understanding of behaviors (see Davis and Hyndman 2019, for two parameter bargaining in the supply chain setting).

such that the total available investment is 200 in all treatments. Further, we set the probability of the high state of the world (i.e., that $\alpha = \alpha_H$) to be $p = 0.2$, and the multiplier $\alpha_H = 11$. A low value of p and a high value of α_H are reflective of the entrepreneurial context, in which there is a small probability of large profits and a large probability of failure. Lastly, we note that the total expected return on investment is $\mathbb{E}[\alpha] = 0.2 \times 11 + 0.8 \times 1 = 3$ and thus the expected size of the pie is also held constant at $200 \times 3 = 600$ in all treatments and under all contracts, provided that all agreements are secured. The expected return on investment of 3 is chosen to make the investment sufficiently attractive for all parties.

Additional measurements At the end of the experiment we elicited subjects' risk preferences, both in the gains-only and in the gains-and-losses domain (Eckel and Grossman 2002, 2008). Additionally, we administered a short survey, which included a non-incentivized measure of the subjects' fairness perceptions. The survey questions were based on Babcock et al. (1995) and asked subjects: "According to your opinion, from the vantage point of a non-involved neutral arbitrator, what would be a 'fair' share of the business that should go to the investor (to Investor 1/Investor 2 in SEQ and SIM)?" This question was asked separately for Common and Preferred Stock contracts.

Experimental procedures and protocols The experiment was programmed in oTree (Chen et al. 2016) and conducted virtually via Zoom, using a protocol that was adapted from Zhao et al. (2020) and Li et al. (2020). Further details are provided in Appendix EC.2. We recruited a total of 255 participants using the subject pool of a large, public US University. At the beginning of the experiment, subjects were randomly assigned a role as either an entrepreneur or a specific investor, and that role was maintained throughout the experiment. At the beginning of each round subjects were randomly matched into a dyad (SI treatment) or triad (SEQ and SIM treatments).

In Experiment 1 subjects participated in 9 (6) rounds of the experiment in the SI (SEQ and SIM) treatment. In all treatments and rounds we set $\mathbb{E}[\alpha] = 3$. In the first, "training" phase of the experiment, which lasts 3 rounds in SI (2 in SEQ/SIM) the contract is "Common Stock" and $(\alpha_L, \alpha_H, p) = (0, 10, 0.3)$. In these rounds the size of the pie is either $I \times \alpha_H$ or 0, which makes negotiations relatively simple. We do not report the results of the training phase in our analysis; however including these rounds does not change any of our findings (results available from the authors upon request). In the remaining rounds we set $(\alpha_L, \alpha_H, p) = (1, 11, 0.2)$ such that in the low state of the world the size of the pie is equal to the total investment amount.

The total number of rounds was chosen such that sessions would last approximately 60 minutes (Actual session duration varied between 45 and 80 minutes). Subjects were paid for one randomly selected round and we did not reveal the realized startup value in any round until after all rounds were completed. This was to avoid wealth effects. Average earnings were $16.88 (min. $5; max. $48.40) including the show-up fee of $8.[10]

4.2. Hypotheses

Table 2 shows the equilibrium shares and expected profits of all players based on Propositions 1-6. We next use these shares and profits to formulate our experimental hypotheses.

Hypothesis 1 **(Number of investors)**

Hypothesis 1a: *The entrepreneur receives a higher share with multiple investors (SIM and SEQ) than with a single investor (SI), under both contracts.*

Hypothesis 1b: *The entrepreneur enjoys a higher profit with multiple investors (SIM and SEQ) than with a single investor (SI), under both contracts.*

Hypothesis 1a results from the entrepreneur having stronger outside options in scenarios with multiple investors (SIM and SEQ) relative to SI. Hypothesis 1b follows from 1a because in equilibrium all investors invest their full endowment. However, if there are disagreements, then one part of Hypothesis 1 may be rejected while the other part may not be. Note that the predicted gap between the entrepreneur's share in SI and SEQ is relatively small (between 0.5 and 2.1 percentage points depending on contract), and so may not be detected. In contrast, the predicted gap between SI and SIM is substantial (between 10.9 and 13.4 percentage points).

Hypothesis 2 **(Timing of Negotiations)**

Hypothesis 2a: *When negotiating with two investors the entrepreneur receives a higher share with simultaneous bargaining (SIM). Further, with sequential negotiations (SEQ) there is a first mover advantage among the investors (higher share for Investor* 1 *than Investor* 2*), under both contracts.*

[10] It was possible to earn less than the show-up fee because of the possibility of losses in the risk-elicitation task.

Table 2 Predicted Shares and Profits For $\theta = 0.5, e = 100, \alpha_H = 11, \alpha_L = 1, p = 0.2$

Treatment, Contract	Entrepreneur Share (%)	Entrepreneur Expected profit	Investor 0/1 Share (%)	Investor 0/1 Expected profit	Investor 2 Share (%)	Investor 2 Expected profit
SI, Common stock	33.3	200.0	66.7	400.0	n/a	n/a
SI, Preferred stock	45.5	200.0	54.5	400.0	n/a	n/a
SEQ, Common stock	35.4	212.5	41.7	250.0	22.9	137.5
SEQ, Preferred stock	46.0	202.5	35.6	236.7	18.3	160.8
SIM, Common stock	46.7	280.0	26.7	160.0	26.7	160.0
SIM, Preferred stock	56.4	248.0	21.8	176.0	21.8	176.0

Notes Investor 0/1 column refers to Investor 0 to SI treatment and to Investor 1 in SEQ and SIM treatments. The shares and profits are computed assuming risk neutrality and equal bargaining powers.

Hypothesis 2b: *When negotiating with two investors the entrepreneur receives a higher profit with simultaneous bargaining (SIM). Further, with sequential negotiations (SEQ), there is a first mover advantage among the investors (higher profit for Investor* 1 *than Investor* 2*), under both contracts.*

Among SIM and SEQ the entrepreneur prefers SIM. This is because in SIM the entrepreneur has stronger outside options and can use the simultaneous nature of bargaining for leverage against the investors. In SEQ, Investor 1 can exploit the fact that, without an agreement between Investor 1 and the entrepreneur, the entrepreneur will be in a weaker position against Investor 2 (since the entrepreneur's disagreement payoff then would be 0). Further, once the entrepreneur moves on to the second stage bargaining, the entrepreneur and Investor 2 will be splitting a smaller pie because a large share has been committed to Investor 1. Together these dynamics result in the entrepreneur being better off in SIM than in SEQ, and in Investor 1 being better off than Investor 2 in SEQ.

Hypothesis 3 **(Contracts)**

Hypothesis 3a: *The share received by the entrepreneur is higher under Preferred Stock contracts than under Common Stock contracts, in all three cases (SI, SEQ, SIM).*

Hypothesis 3b: *The entrepreneur's profit is unaffected by contract type in the single investor case (SI). However, Preferred Stock contracts reduce the entrepreneur's profits relative to Common Stock contracts in the sequential case (SEQ) and in the simultaneous case (SIM).*

Hypothesis 3a states that the entrepreneur should receive a higher share under Preferred Stock contracts to be compensated for not receiving any returns in the low state of the world. However, Hypothesis 3b states that the effect on profits depends on the number of investors and timing. Specifically, while the entrepreneur's expected profit does not depend on contract under SI (200 under both contracts), it drops slightly under SEQ (from 212.5 with Common Stock to 202.5 with Preferred) and drops substantially under SIM (from 280 to 248). Under Preferred Stock, the entrepreneur and investors effectively only bargain over the realized outcome in the high state, since in the low state the investors are able to recoup all their investment, leaving nothing for the entrepreneur. This leads to lower disagreement payoffs for the entrepreneur when negotiating with two investors under Preferred Stock contracts and thus to lower entrepreneurial profits.

5. Results

We begin the discussion of results by exploring the patterns in the raw data. We then conduct formal tests of Hypotheses 1-3. Lastly, we examine in more detail the relevant negotiation behaviors and elicited fairness beliefs of the players. We use nonparametric methods (Wilcoxon Rank sum and/or Signed rank tests on subject averages) for most of our analysis; more detailed regression analyses with additional controls are presented in Appendix EC.3.

5.1. Data Summary

Figure 1 shows the distribution of shares received by the entrepreneur in each treatment and contract for Experiment 1, together with the normative predictions. Several observations are in order. First, while our theory predicts that the entrepreneur should obtain the highest share with simultaneous bargaining (SIM), the data suggest the opposite: the share is actually the lowest in SIM. Further, the disagreement rates differ between treatments. Specifically, while there are virtually no full disagreements (i.e. neither investor reaching an agreement with the entrepreneur) in either SEQ or SIM, there are substantially more partial disagreements in SEQ than in SIM. Second, turning to the contracts, we observe a smaller than predicted gap between shares in Common and Preferred Stock contracts. The observed gap ranges between -0.22 (SIM) and 2.01 (SI) percentage points, while the predicted gap ranges between 9.71 (SIM) and 12.12 (SI) percentage points. That is, entrepreneurs' negotiated shares do not increase sufficiently to compensate for their additional risk exposure under Preferred Stock contracts.

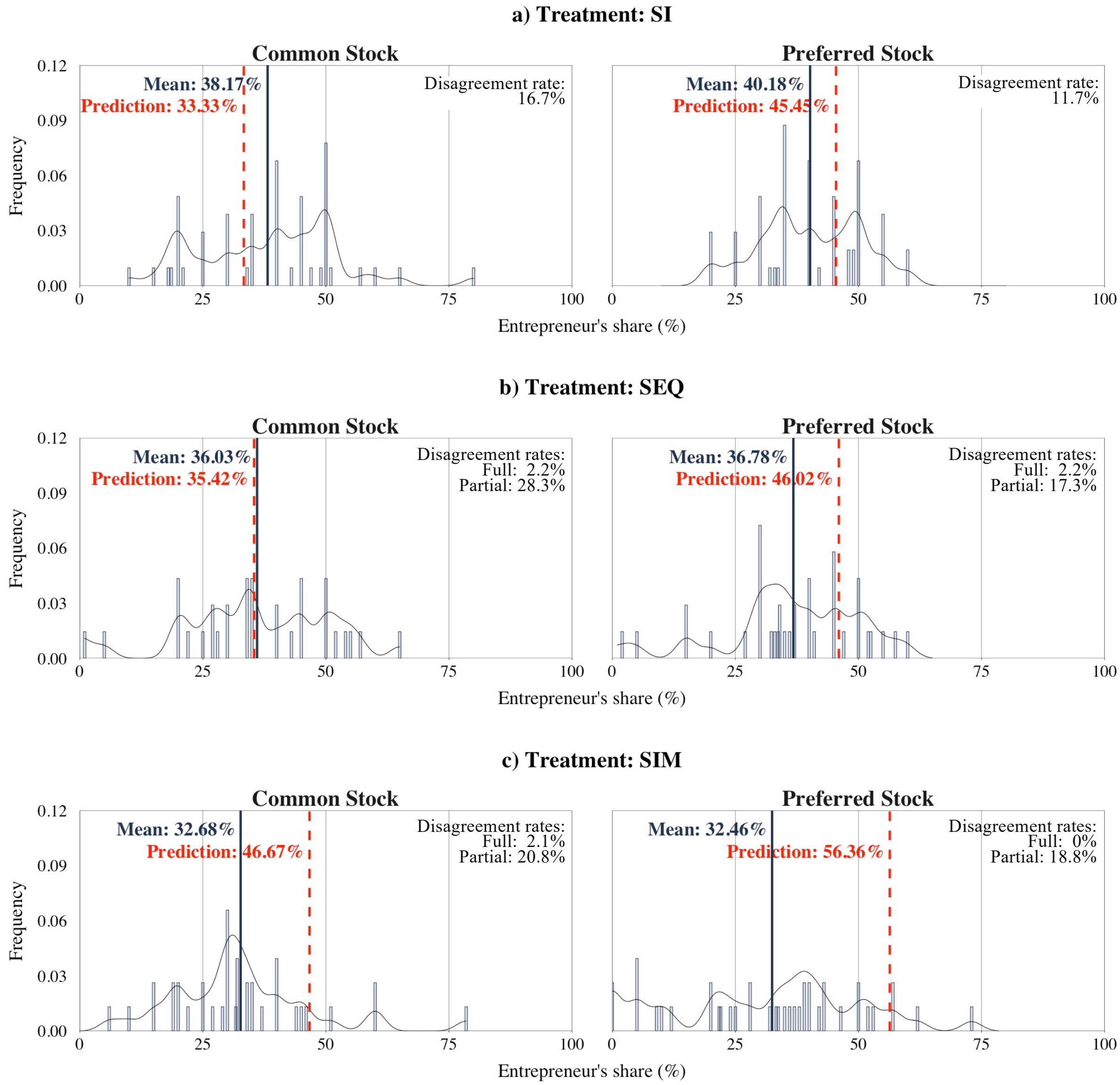
More generally, Figure 1 suggests that the bargaining outcomes are closer to the theoretical predictions with Common Stock contracts, and with SI/SEQ treatments; i.e., when the entrepreneur bargains with one investor at a time. Further, there appear to be some focal points near the 50% mark (SI, SEQ treatments) and near the 33% mark (SEQ, SIM treatments). Lastly, under simultaneous bargaining (SIM treatment), shares are more spread out and do not seem to follow a recognizable pattern, suggesting that bargaining outcomes may be driven by individual differences of the bargaining parties. We will revisit the discussion of model fit and individual differences in bargaining behaviors in Sections 5.5 and 7.

The entrepreneurs' and investors' average expected profits in each treatment and contract are shown in Figure 2, along with the theoretical predictions (dashed arrows). The profit data again suggest significant deviations from theoretical predictions, especially in regimes with more than one investor. In all treatments entrepreneurs earn less than predicted by theory; however, the gap is especially large in the SIM treatment. Furthermore, the differences in disagreement rates appear to compensate for the differences in the entrepreneur's share, so that conditional on contract type the entrepreneur would be approximately indifferent between the three treatments. Lastly, in all treatments there appears to be a robust negative effect of Preferred Stock contracts on the entrepreneur's earnings.

5.2. Hypothesis Tests

We first examine Hypotheses 1A and 1B; i.e., the effect of the number of investors on the entrepreneur's shares and the resulting earnings. Both measures are predicted to be ordered $SI < SEQ < SIM$. However, Figure 1 suggests that, conditional on agreements, we have the exact opposite comparative static: average shares are ordered $SI > SEQ > SIM$. The differences between

Figure 1 Entrepreneur's Share (Conditional on full agreement)



Note: Histograms and kernel densities (Gaussian, bandwidth = 2) show relative frequencies of the entrepreneur's share conditional on full agreement.

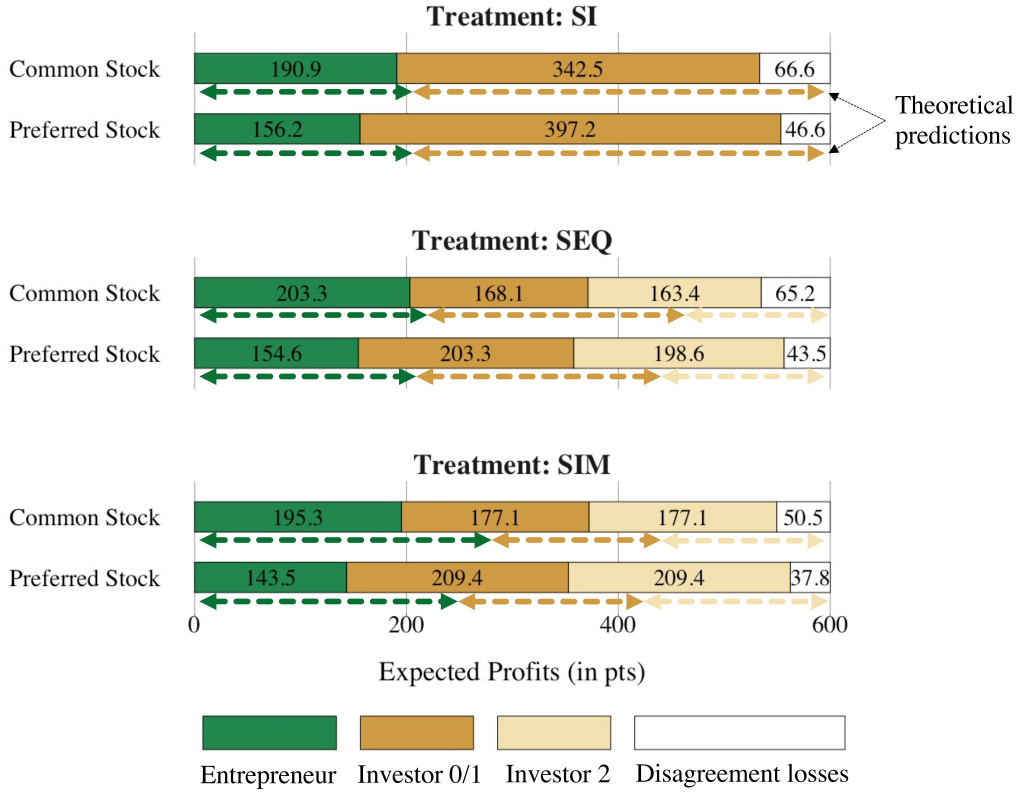
the shares are only marginally significant if we compare SI to SIM (Rank sum test, $p = 0.099$, pooling both contracts) and not significant for SI and SEQ comparison ($p = 0.667$). Further, Figure 2 shows virtually no differences in the entrepreneur's unconditional earnings across treatments ($p > 0.604$). Therefore, Hypothesis 1 is rejected.[11]

Result 1 **(Number of investors)**

Hypothesis 1 is rejected: The entrepreneur's share does not increase with the number of investors.

[11] We use Rank sum tests of subject averages in the main text; for robustness we replicate the analysis using t−tests, pooled comparisons in which we merge SIM and SEQ, and random effects regressions in which we control for the contract. All of these reject Hypothesis 1.

Figure 2 **Expected Profits and Disagreement Losses**



Further, the entrepreneur's earnings are the same in all three scenarios (SI, SEQ and SIM).

To test Hypothesis 2 we again pool both contracts. Comparing within-subject averages, we are unable to reject the hypothesis that simultaneous bargaining increases the entrepreneur's share (Rank sum test, $p = 0.204$) or expected profits ($p = 0.565$) relative to the sequential case. Further, although the average Investor 1 share (34.03%) and profits (185.73) are slightly higher than the Investor 2 share (30.20%) and profits (181.02), the differences are not significant with Rank sum tests ($p = 0.503$). However, conditional on agreement, Investor 1 earns marginally significantly more than Investor 2 if we use one-sided t-tests or random effects regression analysis that controls for contract ($p = 0.069$ and $p = 0.050$).

Result 2 **(Timing of Negotiations)**
Hypothesis 2 is partially supported: Contrary to H2, the entrepreneur's share and profits do not increase in SEQ relative to SIM. However, consistent with H2 there is a small first-mover advantage for the first investor in SEQ.

Lastly, to test Hypothesis 3, we compare the entrepreneur's average shares and profits under Common and Preferred Stock contracts. These comparisons reveal that the differences in entrepreneur's share are indistinguishable from 0 if we compare the two contracts under any of the three treatments (Signed rank tests, $p > 0.1$). Further, if we compare entrepreneurial profits under Common

Stock (pooled average: 196.7) and Preferred Stock (pooled average: 151.0), the differences are statistically significant unconditionally ($p = 0.000$) and conditional on treatment, for two of the three treatments (SI: $p = 0.123$, $SEQ : p = 0.000$, $SIM : p = 0.000$).[12]

RESULT 3 **(Contracts)**

Hypothesis 3 is partially supported: Contrary to H3A, the entrepreneur's share does not increase under Preferred relative to Common Stock contracts. Further, contrary to H3B, the entrepreneur's profits are directionally lower under Preferred Stock contracts in SI treatment. Consistent with H3B, the entrepreneur's profit drops under Preferred Stock contracts in SEQ and SIM treatments.[13]

In sum, contrary to our predictions neither the number of investors, nor the timing of the negotiations affect the distributive outcomes. In contrast, when it comes to contracts we find significant differences where none are predicted and effect sizes larger than predicted. Preferred Stock contracts hurt the entrepreneur whose profits drop by 22 to 36% drop relative to Common Stock.

5.3. Negotiation Dynamics

The offer exchanges between the negotiators provide additional insight into the drivers of Results 1-3. Figure 3 (a) suggests substantial concessionary behaviors in all treatments. If we pool all contracts and treatments, and compare first and final offers, entrepreneurs increase their offer to the investor(s) by 11.04 percentage points, while investors lower their (combined) demands by 16.74 percentage points. Further, there are some differences between two investor treatments (SIM and SEQ) and the single investor case (SI). In SIM (SEQ) combined initial demands of the investors are 16 (17.5) percentage points higher than in SI ($p = 0.013$, Rank sum test using session averages). Even though some of that gap is made up by investors conceding more than entrepreneurs under SIM and SEQ (sign rank test at subject average level, both $p < 0.01$), the outcome, conditional on agreement, is still less attractive for entrepreneurs under SIM and SEQ relative to SI. Further, the gap between Investor 1 and Investor 2 shares exists not only at the outcome level (Result 3), but also at the offer level suggesting a common fairness norm regarding the relative investor shares.

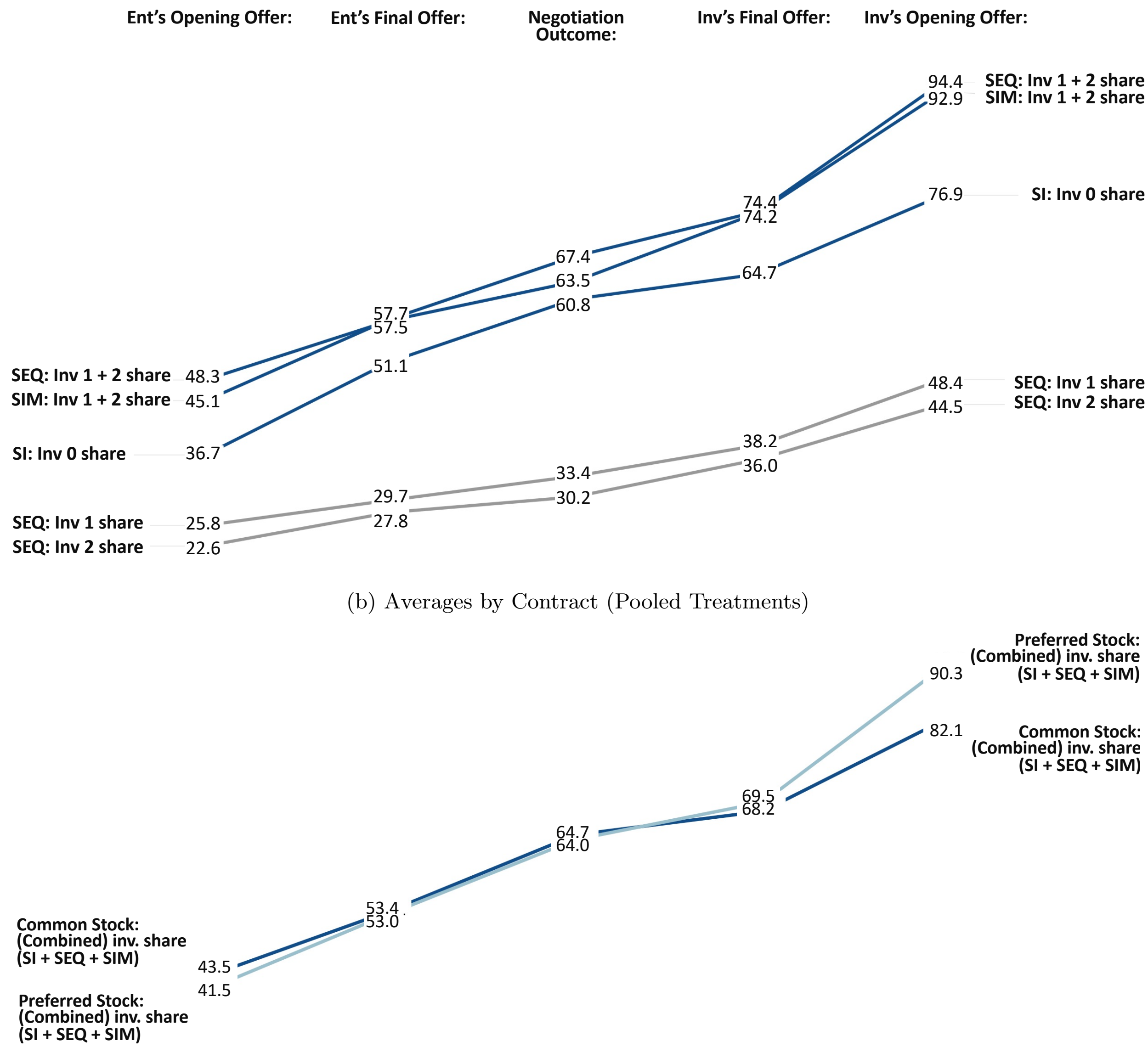
In panel (b) we present a different split of the data, this time focusing on contract types to examine the negotiation dynamics leading to Result 3 (Preferred Stock contracts disadvantage entrepreneurs). Comparisons of concessionary behavior show that, pooling across all treatments, investors significantly increase their initial demands under Preferred Stock contracts, relative to Common Stock contracts (Signed rank test, 7.8 percentage point difference, $p = 0.016$). In contrast,

[12] The reported $p-$values are obtained using Signed rank tests on within-subject averages. We replicate these tests using Rank sum tests, $t-$tests, and regression analysis and find no substantive differences in $p-$values.

[13] In Experiment 2 we replicate the SI treatment with a larger sample size and find that the entrepreneur's profits are not only directionally but significantly lower under Preferred relative to Common Stock contracts ($p \ll 0.01$, see Section 6 for details).

Figure 3 Average Offers and Negotiation Outcomes

(a) Averages by Treatment (Pooled Contracts)



(b) Averages by Contract (Pooled Treatments)

entrepreneurs offer approximately the same share under both contracts ($p = 0.318$). While the final outcomes are not statistically distinguishable between contracts, this analysis suggests that investors inflate their initial demands under Preferred Contracts, presumably in hopes of getting a larger portion of the pie. We will discuss potential motives driving this behavior in Section 7.

While we omit many details of the negotiation process, we briefly highlight two that are key to our results (Appendix EC.3 contains a detailed analysis of negotiation behaviors). First, there is substantial anchoring of final outcomes on the opening offers so that, on average, a more aggressive offer helps the person making that offer. Second, the gap in the opening offers between the bargaining parties is related to disagreements. Specifically, the wider the gap between the investor's and the entrepreneur's opening offer, the more likely is disagreement. In our second experiment (Section 6), we will see that these behaviors are relatively robust even as subjects gain more experience with the negotiation environment.

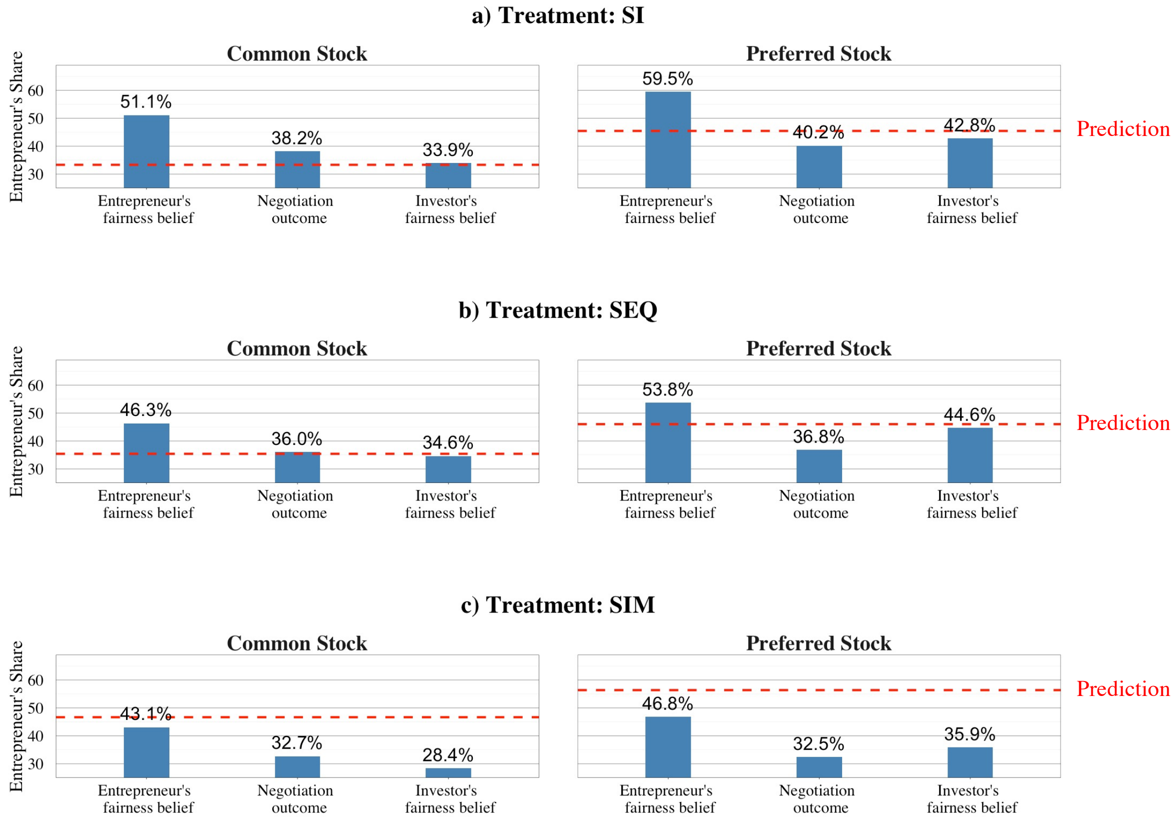
5.4. Fairness Beliefs

One of our main results so far is that entrepreneurs earn substantially less under Preferred than under Common Stock contracts (Result 3). This earnings gap is inconsistent with our theoretical predictions of no earnings gap in the SI case, and is 1.6 to 5 times larger than the predicted gap in the SEQ/SIM cases. To better understand this result we next examine subjects' beliefs about what would constitute a fair split under Common and Preferred contracts (Babcock et al. 1995).

One plausible explanation for Result 3 is that different contracts carry different signals about what is fair. For example, a Common Stock contract may suggest a more egalitarian fairness norm, while Preferred Stock contracts may suggest a more hierarchical relationship with the investor "deserving" to earn more. Alternatively, negotiators' behavior may be insensitive to contractual differences, perhaps because they fail to understand that entrepreneurs should be compensated for risk in the Preferred Stock case. If either of these explanations holds, we should see only a small difference in stated fairness beliefs between contracts, both for entrepreneurs and investors.

Figure 4 shows the average elicited beliefs by treatment, contract and role. Two observations are in order. First, consistent with our predictions, in all scenarios all players believe that it is fair to allocate a greater share to the entrepreneur under Preferred than under Common Stock (all $p \ll 0.01$). Second, the relationship between fairness norms and negotiation outcomes differs by contract. In particular, while the negotiation outcomes in Common Stock contracts (left half of Figure 4) are somewhere in between the entrepreneur's and the investors' fairness beliefs, the outcomes in Preferred Stock contracts (right half of Figure 4) are below *both* the entrepreneurs' and the investors' beliefs (Signed rank tests on subject averages, across all treatments: $p \ll 0.01$ for entrepreneurs, $p = 0.015$ for investors). That is, under Common Stock contracts negotiation outcomes are a compromise between what the negotiators' consider fair. But, under Preferred Stock contracts investors' behavior is more strategic and less aligned with what they consider fair. Taken together, these analyses suggest that Result 3 is not driven by contract detail neglect or by a shift in fairness norms. Rather, it appears to be driven by the investors' deliberate move towards more aggressive bargaining.[14]

Figure 4 Fairness Beliefs about Entrepreneur's Share



Note: Bars show only observations with full agreements. In SEQ/SIM treatments investor's beliefs are averages across both investors.

Table 3 Estimated Bargaining Power Parameters

	Estimates of Bargaining Power (θ_i)		Implied Shares		
Treatment, Contract	Investor 0/1	Investor 2	Entrepreneur	Investor 0/1	Investor 2
SI, Common Stock	0.43	n.a.	38.17	61.83	n.a.
SI, Preferred Stock	0.56	n.a.	40.18	58.82	n.a.
SEQ, Common Stock	0.24	0.83	36.03	33.52	30.45
SEQ, Preferred Stock	0.34	0.88	36.78	33.22	30.00
SIM, Common Stock	1.00	0.96	33.79	33.80	32.41
SIM, Preferred Stock	0.99	1.00	33.59	32.82	33.59

Notes Investor 0/1 refers to Investor 0 in the SI treatment and to Investor 1 in the SEQ and SIM treatments. Bargaining powers are estimated separately for each treatment and contract combination. Implied shares are the shares that would be predicted given those bargaining power estimates. Bootstrapped distributions of bargaining power estimates are in Appendix EC.3.

5.5. Bargaining Power Parameter Estimation

Our analytical development in Section 3 and our hypothesis development in Section 4.2 rely on the assumption that the negotiators have equal bargaining powers ($\theta_i = 0.5,\ i = \{e, 0, 1, 2\}$). In

[14] While we omit the discussion of beliefs about Investor 1's vs. Investor 2's fair share, those elicited beliefs are on average very close to the negotiation outcomes. For the SEQ case, this means that fairness beliefs are much more egalitarian than our theory would predict. This is consistent with theories of peer-induced fairness, suggesting a

Appendix EC.1 we also present equilibrium share predictions for the general bargaining power case. We next use those predictions to examine what bargaining powers would be most consistent with our experimental data.[15]

The best fitting bargaining power parameters for each treatment and contract are shown in Table 3. The estimates suggest that the bargaining power of the investors is on average higher under Preferred Stock contracts than under Common Stock contracts. That is, the difference in profits can be interpreted as an increase in the investors' bargaining power under Preferred relative to Common Stock contracts (by 16.2% on average). However, the differences in bargaining power cannot explain all of the variation in the data. Indeed, the estimates for the two investor treatments (SEQ and SIM) are close to 1 in six out of eight cases, yet the entrepreneur's share in those cases is close to 33%. This is because our theory predicts that in the two investor treatments the entrepreneur has the additional leverage from the (endogenous) outside option to walk away and bargain with the other investor. The fact that we can only reconcile the data with the model if the investor's bargaining power is close to 1 suggests that the threat to walk away is less credible than our theory would predict. We discuss the implications of this result in Section 7.

6. Experiment 2: Order Effects and Learning

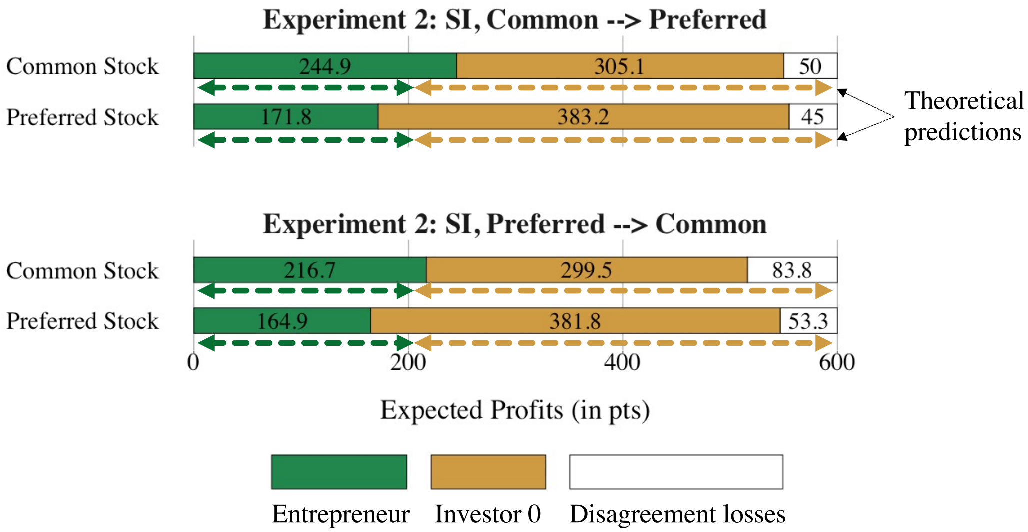
Our results so far indicate that while the number of investors and the timing have little effect on the relative allocation of profits between entrepreneurs and investors, contract structure matters. To solidify our results we conducted a second experiment, in which we (i) focused on the single investor game; (ii) simplified the experiment by removing the training rounds (i.e., rounds in which we set $\alpha_L = 0$); and (iii) increased the number of main rounds ($\alpha_L = 1$) to be five under each contract. Additionally, the sequence of contract types was reversed in half of the sessions to control for potential order effects (see Table 1 for details). 72 subjects were recruited for Experiment 2. The remaining protocols and measurements were unchanged relative to Experiment 1.

The allocation of profits for each contract ordering in Experiment 2 is summarized in Figure 5. Consistent with Experiment 1, we find robust evidence to reject Hypothesis 3A, that entrepreneur receives a higher share under Preferred than under Common Stock contracts and Hypothesis 3B that expected profits are the same under both contracts. Indeed, the entrepreneur's share is essentially the same under both contracts (two-sided signed rank test: $p = 0.143$). Further, entrepreneurs earn substantively less under Preferred contracts. Specifically, under Preferred Stock contracts

disutility incurred from the earnings differences between peer negotiators (Ho and Su 2009, Ho et al. 2014).

[15] To perform this estimation we first express the theoretically predicted shares, μ_i^* with $i \in \{e, 0, 1, 2\}$ in terms of the bargaining power parameters θ_i with $i \in \{0, 1, 2\}$. We then calculate the squared distance between the observed shares and the predicted shares and find the θ_i's that minimize the sum of squared distance, while constraining each $\theta_i \in [0, 1]$. Estimation details are provided in Appendix EC.3.

Figure 5 Experiment 2: Expected Profits and Disagreement Losses



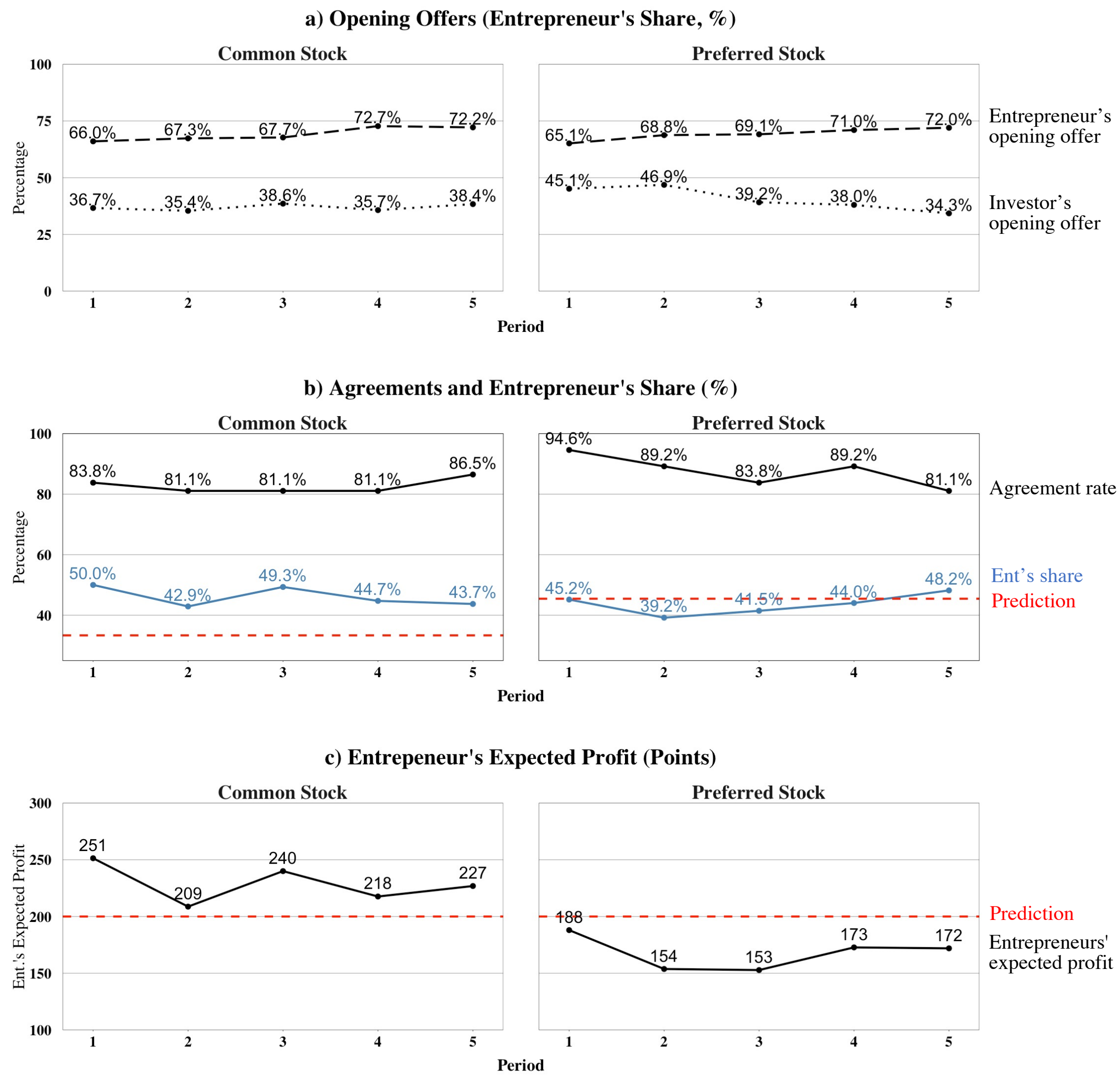
entrepreneurial profits drop by 52 to 73 points, which corresponds to a 24 to 30 percent drop relative to Common Stock contracts ($p \ll 0.01$). A comparison of panels (a) and (b) of Figure 5 suggests no order effects ($p > 0.4$ for both entrepreneurs and investors). Therefore, we pool both orderings in the remainder of our analysis.[16]

We next examine changes in behavior over time under each contract. Given that Preferred Stock contracts are more complex (in that the equity split is state-contingent) it may take the bargaining parties more time to understand the consequences of their decisions for payoffs. In Figure 6 we plot the opening offers, outcomes and entrepreneurial profits under each contract by period. Figure 6(a) shows that opening offers are relatively stable under Common Stock contracts (Nonparametric trend tests, $p = 0.150$ for investor, and $p = 0.562$ for entrepreneur). However, both entrepreneurs and investors increase their demands over time under Preferred Stock contracts ($p = 0.011$ and $p = 0.028$). Indeed, if we compare the opening offers made the first and the last period in which teams bargained under Preferred Stock contracts, the increase is 10.8 percentage points for entrepreneurs and 6.9 percentage points for investors. These results suggests that both parties adopt more aggressive bargaining strategies over time.

Figure 6(b) shows that the negotiation outcomes (shares and agreement rates), are more stable under Common than under Preferred Stock contracts. Specifically, the growing gap in opening offers under Preferred contracts appears to lead to fewer agreements and higher entrepreneurial shares in later rounds of the experiment (see Appendix EC.3 for a more formal analysis of the negotiation process). However, Figure 6(c) suggests that under Preferred Stock the drop in agreement rates essentially offsets the increased share of the entrepreneur in the later rounds, so that

[16] To examine order effects we compute the difference in expected earnings for Common and Preferred Stock and then test whether this difference is different depending on which contract subjects saw first.

Figure 6 Experiment 2: Outcomes by Period



the entrepreneur's profits remain quite low, relative to both the Common Stock contracts and to the model predictions. Taken together, these analyses confirm that Preferred Stock contracts disadvantage the entrepreneur (Result 3) and suggest that this result is not mitigated by learning or other changes in behavior over time.

7. General Discussion and Conclusions

In this study we have examined entrepreneur-investor negotiations under three negotiation regimes and two different contracts common in the industry. We used the Nash-in-Nash framework to develop hypotheses regarding the split of shares and expected profits between the entrepreneur and the investors, and then tested those hypotheses in two laboratory experiments. Our investigation offers several novel insights into equity bargaining behaviors and outcomes.

First, our theory predicts that the entrepreneur should be able to benefit from negotiating with multiple investors, especially when negotiating simultaneously. However, our data show that the entrepreneur is essentially indifferent among all three regimes. In the single investor case the split of the pie roughly resembles Nash bargaining solution, with the investor (who has stronger outside options) receiving a larger share than the entrepreneur. In contrast, in the two investor case negotiation outcomes do not support our theory, which again relies on the idea that the party with stronger outside options (now, the entrepreneur) should receive a larger share. Instead, with two investors the splits are much more egalitarian; i.e., each negotiator receives a similar share.

Second, with sequential negotiations the first investor is predicted to earn substantially more than the second investor. Here too, the data are not entirely aligned with theory and show only a modest first-mover-advantage for the earlier investor. Indeed, our fairness belief elicitation shows that differences in earnings among investors may be viewed as unfair, suggesting a strong sense of peer-induced fairness (Ho and Su 2009, Ho et al. 2014).

Third, because Preferred Stock contracts expose entrepreneurs to greater risk, in theory entrepreneurs should receive a higher share under Preferred than under Common Stock contracts. Here, again, our experimental results deviate from theory: the entrepreneur's share is virtually the same under Common and Preferred Stock contracts, which results in a 22 to 36% drop in entrepreneurial profits. This is particularly striking given that both the entrepreneur and the investors report fairness beliefs that are much more consistent with theory than the actual negotiation outcomes. That is, there is a common understanding that the outcomes under Preferred Stock contracts are not fair. Indeed, additional analysis of the offer exchanges and of the post-experimental survey data suggests that a large proportion of the investors adopt more aggressive bargaining strategies under Preferred Stock contracts. Thus, the profit gap between contracts is not driven by a misunderstanding/neglect of contract details or a shift in fairness norms, but rather appears to be a result of deliberate calculations and bargaining tactics.[17]

Taken together, these results advance our understanding of both theory and human behavior in multi-party negotiations. In theory, negotiators can leverage two types of outside options: exogenous outside options (such as the investor's capital endowment), and endogenous outside options (such as the entrepreneur's profits from negotiating with another investor). Then, the residual variation in bargaining outcomes can be explained by the variation in bargaining power parameters, as is

[17] Investors who reported engaging in risky/more aggressive bargaining strategies under Preferred Stock contracts also scored marginally higher on our risk aversion elicitation measure (one-sided $t-$test, $p = 0.056$). Further, a large share of investors (approximately 25%) reported demanding a *greater* share under Preferred Stock, and report wanting to receive a larger share in the high state of the world because their earnings in the low state had gone up (relative to Common Stock). This indicates a possible difference in reference points between Common and Preferred Stock contracts for evaluating the outcome of the negotiations.

often done in the industrial organization literature of collective bargaining (see, e.g., Grennan and Swanson Forthcoming, Yurukoglu Forthcoming, for a review). Our experimental results suggest that this approach may oversimplify behaviors. Indeed, we show that the party whose outside option is exogenous – the investor in the single investor case – can use that outside option to their advantage. In contrast, the party whose outside option is endogenous and depends on actions of others – the entrepreneur negotiating with two investors, or Investor 1 in sequential negotiations – may not be able to extract as much benefit from that outside option. That is, endogenous outside options may be viewed as a less credible (or a less fair) form of leverage by the negotiators.[18]

Our results have meaningful implications for entrepreneurial teams and their investors. The result that the number of investors and the timing of bargaining does not significantly affect the distribution of profits suggests that startups should focus less on the size of the investor or on the amount of capital the investor is willing to provide. Further, being the first investor within an investment round may pay a premium. However, that premium is modest: with multiple investors contributing similar amounts, each investor will expect a similar reward. Lastly, the result that contractual details significantly affect bargaining outcomes suggests that entrepreneurs should pay attention to contract structure, which can significantly affect their earnings.

Our investigation does not consider several bargaining features that may play a role in negotiations. Our theoretical model is agnostic about the bargaining/equilibration process. In our experiment bargaining outcomes are public once bargaining is completed, but the bilateral offer exchange is private. It may be interesting to explore behavior in a setting where the offer exchanges with the other investor can be observed prior to making a decision in the simultaneous case. This may also be more reflective of entrepreneurial pitch competitions where offers to invest can be made publicly and observed by everyone. Other interesting extensions include richer negotiation settings where the parties can bargain about multiple parameters, or settings with an additional collaboration stage that may include potential incentive and informational asymmetries.

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Appendix

A. Experimental Instructions

Below we reproduce the instructions for Single Investor treatment (SI). The instructions for the remaining treatments and Preferred Stock contracts are analogous. The reproduced text omits the quiz questions as well as the additional measurements (risk aversion and fairness norm elicitation). The entrepreneur's view of instructions is shown (The investor's view is analogous). Indentation and fonts have been adapted for clarity of exposition.

This study is about startup ownership. There are two parties: the entrepreneur and the investor, who must together decide how to divide the ownership of the startup. You will participate in 10 rounds of this study.

In each round you will be the entrepreneur. n each round you will be matched at random with another person participating in this session, and that person will be the investor. Each round will consist of an interactive negotiation exercise between you and the investor. In each round you will have an opportunity to earn "points". At the end of the study one of the 10 rounds will be selected at random. Then, your point earnings from that round will be converted to US Dollars at the rate of 2 cents per point, and added to your participation payment of 8USD.

The investor has 200 points that she/he can invest in your startup. However, the share of the startup that the investor will receive in exchange for her/his investment is not known. Rather, you and the investor will negotiate the share that the investor receives. Then, the following can happen:

- *Negotiations succeed. If negotiations succeed, there are two possible outcomes:*
  - *Startup succeeds: If the startup succeeds, it will be worth* $200 \times 11 = 2200$ *points, and that value will be divided between you (the entrepreneur) and the investor depending on the outcome of the negotiations.*
  - *Startup fails: If the startup fails, the value of the investment is multiplied by 1. This means, if the startup fails, it will be worth* $200 \times 1 = 200$ *points, and that value will be divided between you (the entrepreneur) and the investor depending on the outcome of the negotiations.*
- *Negotiations fail. If the negotiations fail, the investor gets to keep her/his 200 points and you (the entrepreneur) receive 0.*

Note: the investor cannot invest partial amounts (any amount less than 200 points). In other words, either all 200 points are invested or nothing is invested. As mentioned on the previous screen, it is possible that

the startup fails. In particular,if the investor and the entrepreneur come to an agreement, there is an 80% chance that the startup fails and a 20% chance that it succeeds. If the startup fails, its value is equal to 200 points. If the startup succeeds, the value of the investment is multiplied by 11 as explained on the previous screen. That is, the startup will be worth $200 \times 11 = 2200$ *points. Once the startup value is known, it will be divided between the investor and the entrepreneur according to the outcome of the negotiations.*

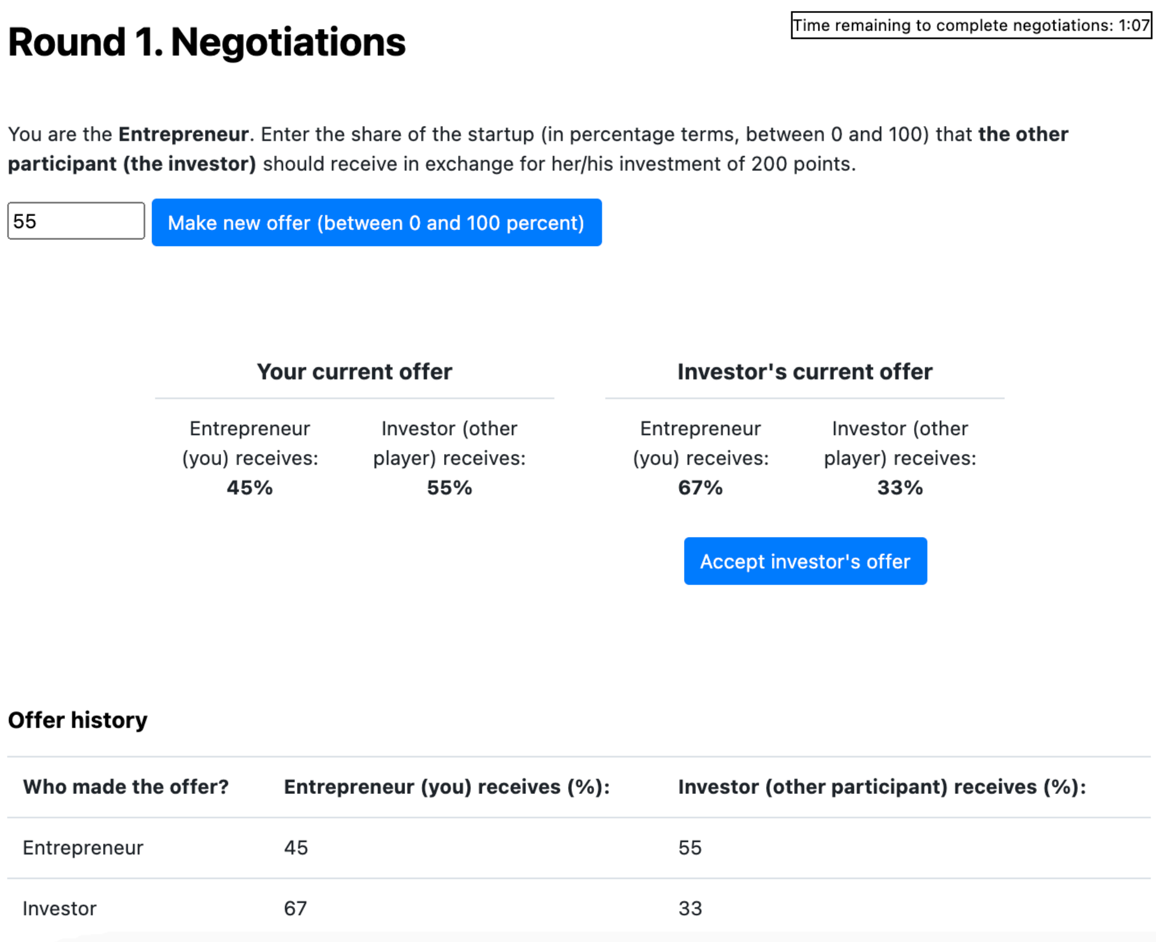
For example, suppose you have accepted an offer that gives the other participant (the investor) 65 percent of the startup and gives you (the entrepreneur) 35 percent of the startup. Then, if the startup succeeds, the other participant (the investor) will receive $2200 \times 0.65 = 1430$ *points, and you will receive the remainder; i.e., 770 points. In contrast, if the startup fails, the investor will receive* $200 \times 0.65 = 130$ *points and you will receive 70 points.*

Alternatively, suppose you made an offer that gives the other participant (the investor) 25 percent of the startup and gives you (the entrepreneur) 75 percent of the startup, and that offer has been accepted. Then, if the startup succeeds, the other participant (the investor) will receive receive $2200 \times 0.25 = 550$ *points, and you will receive the remainder, 1650 points. In contrast, if the startup fails, the investor will receive* $200 \times 0.25 = 50$ *points and you will receive 150 points.*

[...Proceed to Quiz Questions...]

On the next screen, you will have 90 seconds to reach an agreement between you (the entrepreneur) and the other participant (the investor). Specifically, you will make and receive offers regarding the percentage amount that the investor receives in exchange for her/his investment of 200 points. Both you and the other participant can make as many offers as you wish in the 90 seconds available for negotiations. If you wish, you can also accept the most recent offer made by the other participant (the investor). If time expires without an offer being accepted, then the round ends and no investment is made. In this case, the investor keeps her/his 200 units and you (the entrepreneur) receive 0.

Figure A1 Screenshot of Experiment



Note: Sample negotiation screen of the entrepreneur in SI treatment, Common Stock contract.

Supplementary Materials (Electronic Companion)

EC.1. Proofs and Additional Analysis

We present the results and the proofs with the general bargaining powers of the investor(s) relative to the entrepreneur. Specifically, let $\theta_0 \in (0,1)$ denote the bargaining power of the single investor relative to the entrepreneur (i.e., the entrepreneur's bargaining power is $1-\theta_0$) in the single investor setting. Let $\theta_i \in (0,1)$, $i \in \{1,2\}$, denote the bargaining power of Investor i relative to the entrepreneur (i.e., the entrepreneur's bargaining power is $1-\theta_i$) in the simultaneous/sequential bargaining settings. To obtain the results when the investor(s) have equal bargaining power relative to the entrepreneur, we set $\theta_i = 1/2$, $i \in \{s,1,2\}$. Recall that the return of the investment α follows a two-point distribution: $\alpha_H > 1$ w. p. $p \in (0,1)$ and $\alpha_L \leq 1$ w.p. $1-p$.

Assumption EC.1. *Assume that the expected return* $\mathbb{E}[\alpha] = \alpha_H p + \alpha_L(1-p) \geq 2$.

In the analysis, if the bargaining unit between the entrepreneur and Investor i is indifferent among multiple investment levels in equilibrium, we assume that the largest investment level is made. In Section EC.1.1, we consider the scenario of the common stock contracts. In Section EC.1.2, we consider the scenario of the preferred stock contracts with $\alpha_L = 1$.

EC.1.1. Common Stock Contracts

We consider the setting of Common Stock contracts in this section.

EC.1.1.1. The Single Investor Model The investment I_0 and the share μ_0 maximize the following Nash product:

$$\max_{I_0 \in [0,2e],\ \mu_0 \in [0,1]} \ [\pi_0(I_0,\mu_0) - d_0]^{\theta_0} [\pi_e(I_0,\mu_0) - d_e]^{1-\theta_0} \tag{EC.1}$$
$$\pi_0(I_0,\mu_0) \geq d_0,\ \pi_e(I_0,\mu_0) \geq d_e.$$

The following proposition is Proposition 1 under general bargaining powers.

Proposition EC.1 **(Single investor bargaining under general bargaining powers)**. *The investor invests* $I_0^{SI} = 2e$. *The share of the investor is*

$$\mu_0^{SI} = \frac{(\mathbb{E}[\alpha]-1)\theta_0 + 1}{\mathbb{E}[\alpha]}.$$

The corresponding entrepreneur's share is

$$\mu_e^{SI} = 1 - \mu_0^{SI} = \frac{(\mathbb{E}[\alpha]-1)(1-\theta_0)}{\mathbb{E}[\alpha]}.$$

Proof of Proposition EC.1. Recall that $d_e = 0$, and $d_0 = 2e$. We also have that the expected profit of the entrepreneur is

$$\pi_e(I_0,\mu_0) = \mathbb{E}[\alpha] I_0 (1-\mu_0);$$

the expected profit of investor s is

$$\pi_0(I_0,\mu_0) = \mathbb{E}[\alpha] I_0 \mu_0 + 2e - I_0.$$

Solving the problem (EC.1) above, we have that,

$$\begin{aligned}\pi_0(I_0,\mu_0)-d_0 &= \theta_0\left(\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\right); \\ \pi_e(I_0,\mu_0)-d_e &= (1-\theta_0)\left(\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\right).\end{aligned} \tag{EC.2}$$

Recall that $\mathbb{E}[\alpha]>2$, and we have that

$$I_0^{SI}=\arg\max_{I_0\in[0,2e]}\{\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\}=2e.$$

By Eq. (EC.2), we have that

$$\mu_0^{SI}=\frac{(\mathbb{E}[\alpha]-1)\theta_0+1}{\mathbb{E}[\alpha]}.$$

□

EC.1.1.2. Simultaneous Bargaining with Two Investors The investments I_i and the share μ_i maximize the following Nash product simultaneously:

$$\begin{aligned}\max_{I_i\in[0,e],\ \mu_i\in[0,1]} \quad & \left[\pi_i(\boldsymbol{I},\boldsymbol{\mu})-d_i\right]^{\theta_i}\left[\pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_e^{-i}\right]^{1-\theta_i} \\ & \pi_i(\boldsymbol{I},\boldsymbol{\mu})\ge d_i,\ \pi_e(\boldsymbol{I},\boldsymbol{\mu})\ge d_e^{-i}.\end{aligned} \tag{EC.3}$$

The following proposition is Proposition 2 under general bargaining powers.

Proposition EC.2 **(Simultaneous bargaining under general bargaining powers)**.

- *There exists an equilibrium bargaining outcome in which both investors invest with $I_i^{SIM}=e$ for $i\in\{1,2\}$, and the equilibrium share of investor i is*

$$\mu_i^{SIM}=\frac{(3-2\mathbb{E}[\alpha])(2-\theta_i)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)}+\frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}. \tag{EC.4}$$

- *There exists an equilibrium bargaining outcome in which only Investor i invests when $\mathbb{E}[\alpha]<{}^{(2-\theta_i)}/_{(1-\theta_i)}$. The equilibrium investment level $I_i^{SIM}=e$ and $I_j^{SIM}=0$ for $i,j\in\{1,2\}$ and $i\neq j$, and the equilibrium share of Investor i is*

$$\mu_i^{SIM}=\frac{(\mathbb{E}[\alpha]-1)\theta_i+1}{\mathbb{E}[\alpha]}.$$

Proof of Proposition EC.2. Recall that the expected profit of the entrepreneur is

$$\pi_e(\boldsymbol{I},\boldsymbol{\mu})=\mathbb{E}[\alpha](I_1+I_2)(1-\mu_1-\mu_2), \tag{EC.5}$$

and the expected profit of Investor i is

$$\pi_i(\boldsymbol{I},\boldsymbol{\mu})=\mathbb{E}[\alpha](I_1+I_2)\mu_i+e-I_i. \tag{EC.6}$$

The disagreement point of the entrepreneur when negotiating with Investor 1 is

$$d_e^{-1}=\pi_e(0,I_2,0,\mu_2)=\mathbb{E}[\alpha]I_2(1-\mu_2),$$

which is the profit of the entrepreneur when Investor 2 is the only investor. Similarly, the disagreement point of the entrepreneur when negotiating with Investor 2 is

$$d_e^{-2}=\pi_e(I_1,0,\mu_1,0)=\mathbb{E}[\alpha]I_1(1-\mu_1).$$

The disagreement point of Investor i is $d_i = e$ since the investor has e units of capital as the endowment.

We first solve the bargaining problem between the entrepreneur and Investor 1 as specified in (EC.3). Following the similar analysis as in the proof of Proposition EC.1, we have that

$$\begin{aligned}\pi_1(\boldsymbol{I},\boldsymbol{\mu}) - d_1 &= \theta_1\left(\pi_1(\boldsymbol{I},\boldsymbol{\mu}) + \pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_1 - d_e^{-1}\right); \\ \pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_e^{-1} &= (1-\theta_1)\left(\pi_1(\boldsymbol{I},\boldsymbol{\mu}) + \pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_1 - d_e^{-1}\right).\end{aligned} \tag{EC.7}$$

Note that the best-response investment level

$$I_1(I_2,\mu_2) = \arg\max_{I_1\in[0,e]}\left\{\pi_1(\boldsymbol{I},\boldsymbol{\mu}) + \pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_1 - d_e^{-1}\right\} = \begin{cases} e & \text{if } \mathbb{E}[\alpha](1-\mu_2)\ge 1; \\ 0 & \text{otherwise.}\end{cases} \tag{EC.8}$$

By Eq. (EC.7), the best-response share for Investor 1 is

$$\mu_1(I_2,\mu_2) = \begin{cases} \frac{\theta_1[\mathbb{E}[\alpha]e(1-\mu_2)-e]+e}{\mathbb{E}[\alpha](e+I_2)}. & \text{if } \mathbb{E}[\alpha](1-\mu_2)\ge 1; \\ 0 & \text{otherwise.}\end{cases} \tag{EC.9}$$

Similarly, we have that the best-response investment level and share for Investor 2 are

$$I_2(I_1,\mu_1) = \begin{cases} e & \text{if } \mathbb{E}[\alpha](1-\mu_1)\ge 1; \\ 0 & \text{otherwise;}\end{cases} \tag{EC.10}$$

$$\mu_2(I_1,\mu_1) = \begin{cases} \frac{\theta_2[\mathbb{E}[\alpha]e(1-\mu_1)-e]+e}{\mathbb{E}[\alpha](e+I_1)} & \text{if } \mathbb{E}[\alpha](1-\mu_1)\ge 1; \\ 0 & \text{otherwise.}\end{cases} \tag{EC.11}$$

Solving the system of the best-response functions Eqs. (EC.8) through (EC.11), we have that if $\mathbb{E}[\alpha] \ge 3/2$, there exists an equilibrium in which both investors invest $I_i^{SIM} = e$ with the share for Investor i as

$$\mu_i^{SIM} = \frac{(3-2\mathbb{E}[\alpha])(2-\theta_i)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)} + \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}.$$

Similarly, we have that, if $\mathbb{E}[\alpha] < \frac{2-\theta_i}{1-\theta_i}$, there exists an equilibrium in which Investor i is the only investor with the investment level $I_i^{SIM} = e$ in equilibrium and the share for Investor i is

$$\mu_i^{SIM} = \frac{(\mathbb{E}[\alpha]-1)\,\theta_i + 1}{\mathbb{E}[\alpha]}.$$

□

EC.1.1.3. Sequential Bargaining with Two Investors In the second stage bargaining, the disagreement point of the entrepreneur remains the same as that in the simultaneous bargaining case. That is, given the bargaining outcome (I_1,μ_1) in the first stage, we have

$$d_e^{-2} = \pi_e(I_1, 0, \mu_1, 0).$$

The disagreement point of Investor 2 is still $d_2 = e$ since the investor has e units of capital as the endowment. The expected profit of the entrepreneur (resp., Investor 2) are the same as in Eq. (EC.5) (resp., Eq. (EC.6)).

Given the first-stage bargaining outcome (I_1,μ_1), the investment I_2 and the share μ_2 maximize the following Nash product:

$$\begin{aligned}\max_{I_2\in[0,e],\ \mu_2\in[0,1]}\ & \left[\pi_2(\boldsymbol{I},\boldsymbol{\mu}) - d_2\right]^{\theta_2}\left[\pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_e^{-2}\right]^{1-\theta_2} \\ & \pi_2(\boldsymbol{I},\boldsymbol{\mu}) \ge d_2,\ \pi_e(\boldsymbol{I},\boldsymbol{\mu}) \ge d_e^{-2}.\end{aligned}$$

Note that the bargaining problem is a bilateral bargaining problem. Therefore, similar to the analysis for Proposition EC.1, we obtain the equilibrium bargaining outcome as follows. The details are omitted for brevity.

- If $\mathbb{E}[\alpha](1-\mu_1) \geq 1$,

$$I_2^{SEQ}(I_1,\mu_1) = e;$$
$$\mu_2^{SEQ}(I_1,\mu_1) = \frac{[\mathbb{E}[\alpha]e(1-\mu_1)-e]\theta_2+e}{\mathbb{E}[\alpha](e+I_1)}; \tag{EC.12}$$

- Otherwise, $I_2^{SEQ}(I_1,\mu_1)=0$ and $\mu_2^{SEQ}(I_1,\mu_1)=0$.

Take the bargaining outcome $I_2^{SEQ}(I_1,\mu_1)$ and $\mu_2^{SEQ}(I_1,\mu_1)$ back to the first stage. The disagreement point of the entrepreneur in the first stage (when bargaining with Investor 1) is different from that in the simultaneous case. This is because both the entrepreneur and Investor 2 know that the agreement with Investor 1 is not reached, and therefore, Investor 2 knows that Investor 2 is the only investor in that scenario. Thus, if the negotiation breaks down between the entrepreneur and Investor 1, Investor 2 would behave as the only investor in the second stage negotiation, and the outcome would be similar to the single investor bargaining scenario shown in Proposition EC.1. Therefore, we have that

$$d_e^{-1} = \pi_e(0,e,0,\frac{(\mathbb{E}[\alpha]-1)\theta_2+1}{\mathbb{E}[\alpha]}). \tag{EC.13}$$

The disagreement point of Investor 1 is still $d_1 = e$.

In the first stage, the investment I_1 and the share μ_1 maximize the following Nash product:

$$\max_{I_1\in[0,e],\ \mu_1\in[0,1]} \left[\pi_1(I_1,I_2^{SEQ}(I_1,\mu_1),\mu_1,\mu_2^{SEQ}(I_1,\mu_1))-d_1\right]^{\theta_1}\left[\pi_e(I_1,I_2^{SEQ}(I_1,\mu_1),\mu_1,\mu_2^{SEQ}(I_1,\mu_1))-d_e^{-1}\right]^{1-\theta_1} \tag{EC.14}$$
$$\pi_1(I_1,I_2^{SEQ}(I_1,\mu_1),\mu_1,\mu_2^{SEQ}(I_1,\mu_1))\geq d_1,\ \pi_e(I_1,I_2^{SEQ}(I_1,\mu_1),\mu_1,\mu_2^{SEQ}(I_1,\mu_1))\geq d_e^{-1}.$$

The following proposition is Proposition 3 under general bargaining powers.

PROPOSITION EC.3 **(Sequential bargaining under general bargaining powers)**. *The equilibrium bargaining outcomes are as follows.*

Case (1): $2\theta_1+\theta_2+\theta_1\theta_2<2$.

- *There exists an equilibrium bargaining outcome in which both investors invest with* $I_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor i is*

$$\mu_1^{SEQ} = \frac{2\theta_1\mathbb{E}[\alpha]+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]}, \tag{EC.15}$$
$$\mu_2^{SEQ} = \frac{2\mathbb{E}[\alpha](2-\theta_1-\theta_2)\theta_2+(2+\theta_1\theta_2-3\theta_2)(2-\theta_2)}{4(2-\theta_2)\mathbb{E}[\alpha]}.$$

Case (2): $2\theta_1+\theta_2+\theta_1\theta_2\geq 2$.

- *When* $\mathbb{E}[\alpha]<\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $I_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor i is*

$$\mu_1^{SEQ} = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}, \tag{EC.16}$$
$$\mu_2^{SEQ} = \frac{1}{2\mathbb{E}[\alpha]}.$$

- *When* $\mathbb{E}[\alpha] \geq \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $I_i^{SEQ} = e$ *for* $i \in \{1,2\}$, *and the equilibrium share of investor* i *is*

$$\mu_1^{SEQ} = \frac{2\theta_1\mathbb{E}[\alpha] + (1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]}, \tag{EC.17}$$

$$\mu_2^{SEQ} = \frac{2\mathbb{E}[\alpha](2-\theta_1-\theta_2)\theta_2 + (2+\theta_1\theta_2 - 3\theta_2)(2-\theta_2)}{4(2-\theta_2)\mathbb{E}[\alpha]}.$$

Proof of Proposition EC.3. Note that the solution in the second stage bargaining has been shown above. In the proof we focus on deriving the first-stage bargaining outcome. Below we first derive the bargaining outcome when both investors choose to invest, and then show that the bargaining outcome in which only one investor invests cannot be sustained.

We first derive the equilibrium investment level of Investor 1 and the equilibrium share for both investors when Investor 2 invests e. Note that when Investor 2 invests e, the Nash product in problem (EC.14), denoted by $f(I_1,\mu_1)$ for convenience, is

$$\begin{aligned} f(I_1,\mu_1) :=& \Big(\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1\Big)^{\theta_1} \\ & \left(\mathbb{E}[\alpha](e+I_1)\left(1-\mu_1 - \frac{(\mathbb{E}[\alpha]e(1-\mu_1)-e)\theta_2+e}{\mathbb{E}[\alpha](e+I_1)}\right) - \mathbb{E}[\alpha]e\left(1-\frac{(\mathbb{E}[\alpha]-1)\theta_2+1}{\mathbb{E}[\alpha]}\right)\right)^{1-\theta_1} \\ =& \Big(\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1\Big)^{\theta_1}\Big(\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)\Big)^{1-\theta_1} \end{aligned}$$

Note that $f(I_1,0)<0$ and $f(I_1,1)<0$. It is trivial that there exists $\mu_1 \in (0,1)$ such that $f(I_1,\mu_1)>0$. In addition, $f(I_1,\mu_1)$ is continuously differentiable with respect to μ_1. Therefore, for a given I_1, there exists a maximizer $\hat{\mu}_1(I_1) \in (0,1)$ of $f(I_1,\mu_1)$ and the first order condition is satisfied at $\hat{\mu}_1(I_1)$.

By the first order condition with respect to μ_1, we have that

$$\frac{\theta_1(e+I_1)}{(1-\theta_1)(e+I_1-e\theta_2)} = \frac{\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1}{\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)}. \tag{EC.18}$$

Next, for the partial derivative of $f(I_1,\mu_1)$ with respect to I_1 when Eq. (EC.18) is satisfied, we have that

$$\begin{aligned} \frac{\partial f(I_1,\mu_1)}{\partial I_1} =& \left(\theta_1(\mathbb{E}[\alpha])\mu_1 - 1)\frac{\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)}{\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1} + (1-\theta_1)\mathbb{E}[\alpha](1-\mu_1)\right) \\ & \Big(\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1\Big)^{\theta_1}\Big(\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)\Big)^{-\theta_1} \\ =& \frac{1-\theta_1}{e+I_1}\Big(\mathbb{E}[\alpha](I_1+e-e\mu_1\theta_2) - I_1 - e + e\theta_2\Big) \\ & \Big(\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1\Big)^{\theta_1}\Big(\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)\Big)^{-\theta_1} \\ >& \frac{1-\theta_1}{e+I_1}(\mathbb{E}[\alpha]-1)(I_1+e-e\theta_2) \\ & \Big(\mathbb{E}[\alpha](e+I_1)\mu_1 - I_1\Big)^{\theta_1}\Big(\mathbb{E}[\alpha](e+I_1)(1-\mu_1) - \mathbb{E}[\alpha]e(1-\mu_1\theta_2)\Big)^{-\theta_1} \\ >& 0. \end{aligned} \tag{EC.19}$$

The second equality follows from Eq. (EC.18). The first inequality follows from $\mu_1<1$. The last inequality follows from $\mathbb{E}[\alpha]>2$.

By Eq. (EC.19), for any $I_1 < e$, the Nash product $f(I_1, \hat{\mu}_1(I_1))$ increases in I_1. It follows that the equilibrium investment level of investor 1 is

$$I_1^{SEQ} = e.$$

When $I_1^{SEQ} = e$, maximizing the Nash product $f(e, \mu_1)$ is equivalent to maximizing the following:

$$\left(\mu_1 - \frac{1}{2\mathbb{E}[\alpha]}\right)^{\theta_1} \left(\frac{1}{2-\theta_2} - \mu_1\right)^{1-\theta_1} \tag{EC.20}$$

It follows that the equilibrium share of investor 1 is

$$\mu_1^{SEQ} = \frac{2\theta_1 \mathbb{E}[\alpha] + (1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]} \tag{EC.21}$$

By Eq. (EC.12), we have that

$$\mu_2^{SEQ} = \mu_2^{SEQ}(e, \mu_1^{SEQ}) = \frac{2\mathbb{E}[\alpha](2-\theta_1-\theta_2)\theta_2 + (2+\theta_1\theta_2 - 3\theta_2)(2-\theta_2)}{4(2-\theta_2)\mathbb{E}[\alpha]}.$$

To verify that investor 2 should invest e in equilibrium, we note that the condition $\mathbb{E}[\alpha]\left(1-\mu_1^{SEQ}\right) \geq 1$ should be satisfied, which is equivalent to

$$\mathbb{E}[\alpha] \geq \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}.$$

Note that $\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)} \geq 2$ if $2\theta_1 + \theta_2 + \theta_1\theta_2 \geq 2$.

If $\mathbb{E}[\alpha] < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, the unconstrained interior solution is not feasible. We next verify that there exists another equilibrium with $\mu_1^{SEQ} = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}$ and $\mu_2^{SEQ} = \frac{1}{2\mathbb{E}[\alpha]}$.

By (EC.12), the second stage bargaining outcome is the best response to the first stage outcome with

$$\mu_2^{SEQ}(I_1, \mu_1) = \frac{[\mathbb{E}[\alpha]e(1-\mu_1) - e]\theta_2 + e}{\mathbb{E}[\alpha](e + I_1)}.$$

In the first stage, it is easy to check that the Nash product increases in I_1 given $\mu_1 = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}$ and $\mu_2 = \mu_2^{SEQ}(I_1, \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]})$ with $\mathbb{E}[\alpha] \geq 2$. Therefore, Investor 1 should invest $I_1 = e$. It follows that maximizing the Nash product is equivalent to maximizing Eq. (EC.20), which is concave in μ_1. Therefore, if the payoff of Investor 1 and the entrepreneur is greater than their respective disagreement point, we have verified that there exists another equilibrium with $\mu_1^{SEQ} = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]}$ and $\mu_2^{SEQ} = \frac{1}{2\mathbb{E}[\alpha]}$. Next, the payoff of Investor 1, which is $2(\mathbb{E}[\alpha]-1)e$, is greater than his disagreement point $d_1 = e$, if $\mathbb{E}[\alpha] > 3/2$. The payoff of the entrepreneur, which is e, is also greater than the disagreement point d_e^{-1} by Eq. (EC.13), if $\mathbb{E}[\alpha] < \frac{2-\theta_2}{1-\theta_2}$. Note that $\frac{2-\theta_2}{1-\theta_2} > \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$. It follows that if $2 \leq \mathbb{E}[\alpha] < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, an equilibrium bargaining outcome in which both investors invest exists; i.e., $I_i^{SEQ} = e$ for $i \in \{1, 2\}$, and the equilibrium share of investor i is

$$\mu_1^{SEQ} = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]},\ \mu_2^{SEQ} = \frac{1}{2\mathbb{E}[\alpha]}.$$

We next derive the bargaining outcome when only one investor invests. Note that it cannot be the case where only Investor 2 invests, since Investor 1 and the entrepreneur can earn a higher profit than their disagreement points as shown in the analysis above. Therefore, we focus on deriving the bargaining outcome when Investor 1 invests and then show that the bargaining unit of the entrepreneur and Investor 1 will have an incentive to deviate so that Investor 2 will also invest in the second stage.

The bargaining problem is similar to the single investor bargaining case except that the disagreement point of the entrepreneur changes from 0 in the single investor case to d_e^{-1} as shown in Eq. (EC.13). Following a similar analysis as that in Proposition EC.1, we have that

$$
\begin{aligned}
I_1^{SEQ} &= e, \\
\mu_1^{SEQ} &= \frac{(\mathbb{E}[\alpha]-1)\theta_1\theta_2+1}{\mathbb{E}[\alpha]}.
\end{aligned} \tag{EC.22}
$$

To verify that investor 2 should not invest in equilibrium, we note that the condition $\mathbb{E}[\alpha]\left(1-\mu_1^{SEQ}\right)<1$ should be satisfied, which is equivalent to

$$\mathbb{E}[\alpha] < \frac{2-\theta_1\theta_2}{1-\theta_1\theta_2}.$$

Note that we have derived three bargaining outcomes where both investors choose to invest in the first step of the proof. Below, we show that the bargaining unit of the entrepreneur and Investor 1 does not have inventive to deviate from the bargaining outcome to the one in which Investor 2 will not invest. In other words, the bargaining outcome where only Investor 1 invests will not be sustained. The analysis for each of the three bargaining outcomes is similar and therefore we only show the key steps for analyzing the first outcome and omit the details for the other two outcomes for brevity.

Consider the scenario where $2\theta_1+\theta_2+\theta_1\theta_2<2$. Recall that the Nash product in problem (EC.14) is denoted by $f(I_1,\mu_1)$. Therefore, $f(e,\mu_1^{SEQ})$ for $\mu_1^{SEQ}=\frac{2\theta_1\mathbb{E}[\alpha]+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]}$ in Equation (EC.21) is the Nash product under both investor investing while $f(e,\mu_1^{SEQ})$ for $\mu_1^{SEQ}=\frac{(\mathbb{E}[\alpha]-1)\theta_1\theta_2+1}{\mathbb{E}[\alpha]}$ in Equation (EC.22) is the Nash product under only Investor 1 investing. For notational convenience, let $x=\mathbb{E}[\alpha]$, and it follows that

$$\frac{f(e,\frac{2\theta_1 x+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)x})}{f(e,\frac{(x-1)\theta_1\theta_2+1}{x})} = \frac{\theta_2+2x-2}{2^{1-\theta_1}(2-\theta_2)^{\theta_1}\theta_2(x-1)}$$

Since $x\geq 2$, we have that

$$\frac{\partial \frac{f(e,\frac{2\theta_1 x+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)x})}{f(e,\frac{(x-1)\theta_1\theta_2+1}{x})}}{\partial x} = -\frac{1}{2^{1-\theta_1}(2-\theta_2)^{\theta_1}(x-1)^2}<0.$$

Also note that $x<\frac{2-\theta_1\theta_2}{1-\theta_1\theta_2}$. It follows that

$$\frac{f(e,\frac{2\theta_1 x+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)x})}{f(e,\frac{(x-1)\theta_1\theta_2+1}{x})} \geq \left.\frac{f(e,\frac{2\theta_1 x+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)x})}{f(e,\frac{(x-1)\theta_1\theta_2+1}{x})}\right|_{x=\frac{2-\theta_1\theta_2}{1-\theta_1\theta_2}} = \frac{2+\theta_2-\theta_1\theta_2^2}{2^{1-\theta_1}\theta_2\left(2-\theta_2\right)^{\theta_1}}>1.$$

Therefore, for all $2\leq\mathbb{E}[\alpha]<\frac{2-\theta_1\theta_2}{1-\theta_1\theta_2}$, we have that $f(e,\frac{2\theta_1\mathbb{E}[\alpha]+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]})\geq f(e,\frac{(\mathbb{E}[\alpha]-1)\theta_1\theta_2+1}{\mathbb{E}[\alpha]})$. Therefore, the bargaining unit of the entrepreneur and Investor 1 will reach a bargaining outcome such that Investor 2 will have an incentive to invest as well in the second stage.

The analysis for the other two scenarios are similar and are therefore omitted for brevity. $\square$

As a corollary of Propositions EC.2 ad EC.3, we can compare the simultaneous and sequential bargaining outcomes *when both investors invest* as follows.

COROLLARY EC.1 **(The equilibrium share comparison under general bargaining powers)**. *Assume we are in the equilibria in which both investors invest. Then:*
(1) The comparison of the share of the investor(s) is as follows:

$$\mu_1^{SIM} < \mu_1^{SEQ}$$
$$\mu_2^{SEQ} < \mu_2^{SIM}.$$

That is, investor 1 (resp., investor 2) obtains a larger (reps., smaller) share when negotiating sequentially than when negotiating simultaneously.
(2) The comparison of the share of the entrepreneur is as follows:

$$\mu_e^{SIM} > \mu_e^{SEQ}.$$

That is, the entrepreneur obtains the larger share when he bargains with two investors simultaneously than when bargaining sequentially.

Proof of Corollary EC.1. We show the analysis for the case where $2\theta_1 + \theta_2 + \theta_1\theta_2 \geq 2$. The analysis for the other case is similar and omitted for brevity.
(1) When $\mathbb{E}[\alpha] < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, by Eqs. (EC.4) and (EC.16), we have that

$$\mu_1^{SEQ} - \mu_1^{SIM} = \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]} - \frac{(3-2\mathbb{E}[\alpha])(2-\theta_1)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)} - \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]} > 0.$$

When $\mathbb{E}[\alpha] \geq \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, by Eqs. (EC.4) and (EC.17), we have that

$$\begin{aligned}
\mu_1^{SEQ} - \mu_1^{SIM} &= \frac{2\theta_1\mathbb{E}[\alpha] + (1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\mathbb{E}[\alpha]} - \frac{(3-2\mathbb{E}[\alpha])(2-\theta_1)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)} - \frac{\mathbb{E}[\alpha]-1}{\mathbb{E}[\alpha]} \\
&= \frac{\theta_1\left(2\mathbb{E}[\alpha]\theta_2\,(4-\theta_1-\theta_2) - \theta_1\theta_2^2 - 2(4-\theta_1)\theta_2 + 3\theta_2^2 + 4\right)}{2\mathbb{E}[\alpha](2-\theta_2)(4-\theta_1\theta_2)} \\
&> \frac{\theta_1\left(4 + (1-\theta_1)\theta_2^2\right)}{2\mathbb{E}[\alpha](2-\theta_2)(4-\theta_1\theta_2)} \\
&> 0.
\end{aligned}$$

The first inequality follows from $\mathbb{E}[\alpha] > 1$.

Next, we note that

$$\mu_2^i = \frac{[\mathbb{E}[\alpha](1-\mu_1^i) - 1]\theta_2 + 1}{2\mathbb{E}[\alpha]},\ i \in \{sim, seq\}.$$

Since $\mu_1^{SEQ} > \mu_1^{SIM}$, we have that

$$\mu_2^{SEQ} < \mu_2^{SIM}.$$

(2) When $\mathbb{E}[\alpha] < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, by Eqs. (EC.4) and (EC.16), we have that

$$\begin{aligned}
\mu_e^{SIM} &= 1 - \frac{(3-2\mathbb{E}[\alpha])(4-\theta_1-\theta_2)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)} - \frac{2(\mathbb{E}[\alpha]-1)}{\mathbb{E}[\alpha]}; \\
\mu_e^{SEQ} &= \frac{1}{2\mathbb{E}[\alpha]}.
\end{aligned}$$

It follows that

$$\begin{aligned}\mu_e^{SIM} - \mu_e^{SEQ} &= 1 - \frac{(3-2\mathbb{E}[\alpha])(4-\theta_1-\theta_2)}{\alpha_H p(4-\theta_1\theta_2)} - \frac{2(\mathbb{E}[\alpha]-1)}{\mathbb{E}[\alpha]} - \frac{1}{2\mathbb{E}[\alpha]}\\ &= \frac{(2-\theta_1)(2-\theta_2)(2\mathbb{E}[\alpha]-3)}{2\mathbb{E}[\alpha](4-\theta_1\theta_2)}\\ &> 0.\end{aligned}$$

When $\mathbb{E}[\alpha] > \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, for the equilibrium share of the entrepreneur, we have that

$$\begin{aligned}\mu_e^{SIM} &= 1 - \frac{(3-2\mathbb{E}[\alpha])(4-\theta_1-\theta_2)}{\mathbb{E}[\alpha](4-\theta_1\theta_2)} - \frac{2(\mathbb{E}[\alpha]-1)}{\mathbb{E}[\alpha]};\\ \mu_e^{SEQ} &= 1 - \frac{4\theta_1\mathbb{E}[\alpha] + 2(1-\theta_1)(2-\theta_2) + 2\mathbb{E}[\alpha](2-\theta_1-\theta_2)\theta_2 + (2+\theta_1\theta_2-3\theta_2)(2-\theta_2)}{4(2-\theta_2)\mathbb{E}[\alpha]}.\end{aligned}$$

It follows that

$$\begin{aligned}\mu_e^{SIM} - \mu_e^{SEQ} &= \frac{2\mathbb{E}[\alpha]\theta_1\theta_2\,(4-\theta_1-\theta_2) - \theta_1\left(\theta_1\theta_2^2 - 2(\theta_1-4)\theta_2 - 3\theta_2^2 - 4\right)}{4\mathbb{E}[\alpha](4-\theta_1\theta_2)}\\ &> \frac{\theta_1\left(4+(1-\theta_1)\theta_2^2\right)}{4\mathbb{E}[\alpha](4-\theta_1\theta_2)}\\ &> 0.\end{aligned}$$

The first inequality follows from $\mathbb{E}[\alpha] > 1$. □

Remark: Note that there exists (resp., does not exist) an equilibrium bargaining outcome where only one investor invests under simultaneous (resp., sequential) bargaining. The key reason is that the agreed outcome in Bargaining Unit 1 (of the entrepreneur and Investor 1) is *not observable* to Bargaining Unit 2 (of the entrepreneur and Investor 2) under *simultaneous* bargaining while it is *observable* under *sequential* bargaining. Therefore, under simultaneous bargaining, fixing the outcome that Bargaining Unit 2 does not reach an agreement, Bargaining Unit 1 does not have an incentive to lower their agreed share from the one-investor-investing equilibrium one. In contrast, under sequential bargaining, if Bargaining Unit 1 lowers their agreed share from the one-investor-investing one to the both-investing equilibrium one, Bargaining Unit 2 is going to observe that, and correspondingly, will reach an agreement for Investor 2 to invest, which in turn leads to a larger Nash product of Bargaining Unit 1. □

EC.1.2. Preferred Stock Contracts

We consider the setting with Preferred Stock contracts and $\alpha_L = 1$. In this case, Assumption EC.1 reduces to $\alpha_H p + (1-p) \geq 2$. It follows that $\alpha_H \geq 1 + \frac{1}{p} > 2$.

EC.1.2.1. The Single Investor Model The investment I_0 and the share μ_0 maximize the following Nash product with $\pi_e(I_0,\mu_0) = E\left[\min\{\alpha(1-\mu_0), \alpha-1\}\right] I_0$ and $\pi_0(I_0,\mu_0) = E\left[\max\{\alpha\mu_0, 1\}\right] I_0 + 2e - I_0$:

$$\max_{I_0\in[0,2e],\ \mu_0\in[0,1]} \left[\pi_0(I_0,\mu_0) - d_0\right]^{\theta_0} \left[\pi_e(I_0,\mu_0) - d_e\right]^{1-\theta_0} \tag{EC.23}$$

$$\pi_0(I_0,\mu_0)\geq d_0,\ \pi_e(I_0,\mu_0)\geq d_e.$$

The following proposition is Proposition 4 under general bargaining powers.

PROPOSITION EC.4 **(Single investor bargaining under general bargaining powers)**. *The investor invests* $\tilde{I}_0^{SI}=2e$. *The share of the investor is*

$$\tilde{\mu}_0^{SI}=\frac{\theta_0(\alpha_H-1)+1}{\alpha_H}.$$

The corresponding entrepreneur's share is

$$\tilde{\mu}_e^{SI}=1-\tilde{\mu}_0^{SI}=\frac{(\alpha_H-1)(1-\theta_0)}{\alpha_H}.$$

Proof of Proposition EC.4. Recall that $d_e=0$, and $d_0=2e$. Also we have that $\alpha_H>2$. We focus on the scenario where $\mu_0\geq 1/\alpha_H$. Otherwise the investor does not have incentives to invest. Thus, the expected profit of the entrepreneur should be

$$\pi_e(I_0,\mu_0)=E\left[\min\{\alpha(1-\mu_0),\alpha-1\}\right]I_0=\alpha_H(1-\mu_0)I_0p,$$

and the expected profit of investor s should be

$$\pi_0(I_0,\mu_0)=E\left[\max\{\alpha\mu_0,1\}\right]I_0+2e-I_0=\alpha_H\mu_0I_0p+2e-I_0p.$$

Solving the problem (EC.23) above, we have that,

$$\begin{aligned}\pi_0(I_0,\mu_0)-d_0&=\theta_0\left(\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\right);\\ \pi_e(I_0,\mu_0)-d_e&=(1-\theta_0)\left(\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\right).\end{aligned}\tag{EC.24}$$

Recall that $\alpha_H>2$, and we have that

$$\tilde{I}_0^{SI}=\arg\max_{I_0\in[0,2e]}\{\pi_e(I_0,\mu_0)+\pi_0(I_0,\mu_0)-d_e-d_0\}=2e.$$

By Eq. (EC.24), we have that

$$\tilde{\mu}_0^{SI}=\frac{\theta_0(\alpha_H-1)+1}{\alpha_H}.$$

□

EC.1.2.2. Simultaneous Bargaining with Two Investors In this case, both investors simultaneously negotiate with the entrepreneur. The bargaining outcome is a pair of the share μ_i for Investor i in return for the investment I_i. With the downside protection for the investors, when the return of the startup is realized as $\alpha_L=1$, the investors are able to recover their investment. That is, in addition to the negotiated $\alpha_L\mu_i$, Investor i is able to recover his potential loss $\alpha_L(1-\mu_i)$ from the entrepreneur. Thus, both investors obtain their investment back and the entrepreneur earns 0. When the return of the startup is realized as α_H, the protection for the investors is invoked only if one investor negotiated for a share that is significantly low. In such an event, the investor who invoked the protection will first be compensated by the profit of the entrepreneur, and then by the profit of the other investor (if the other investor invests as well).

Therefore, the expected profit of the entrepreneur is

$$\pi_e(\boldsymbol{I},\boldsymbol{\mu}) = \alpha_H(I_1+I_2)p - \sum_{i=1}^{2} \max\left\{\alpha_H(I_1+I_2)\mu_i - \left(I_{3-i} - \alpha_H(I_1+I_2)(1-\mu_i)\right)^+, I_i\right\}p, \tag{EC.25}$$

and the expected profit of Investor i is

$$\begin{aligned}\pi_i(\boldsymbol{I},\boldsymbol{\mu}) &= \max\left\{\alpha_H(I_1+I_2)\mu_i - \left(I_{3-i} - \alpha_H(I_1+I_2)(1-\mu_i)\right)^+, I_i\right\}p + I_i(1-p) + e - I_i \\ &= \max\left\{\alpha_H(I_1+I_2)\mu_i - \left(I_{3-i} - \alpha_H(I_1+I_2)(1-\mu_i)\right)^+, I_i\right\}p + e - I_i p. \end{aligned} \tag{EC.26}$$

The disagreement point of the entrepreneur when negotiating with Investor 1 is

$$d_e^{-1} = \pi_e(0, I_2, 0, \mu_2) = \alpha_H I_2 p - \max\left\{\alpha_H I_2 \mu_2, I_2\right\}p,$$

which is the profit of the entrepreneur when Investor 2 is the only investor. Similarly, the disagreement point of the entrepreneur when negotiating with Investor 2 is

$$d_e^{-2} = \pi_e(I_1, 0, \mu_1, 0) = \alpha_H I_1 p - \max\left\{\alpha_H I_1 \mu_1, I_1\right\}p.$$

The disagreement point of Investor i is $d_i = e$ since the investor has e units of capital as the endowment.

Then, the investments $\boldsymbol{I}$ and the shares $\boldsymbol{\mu}$ maximize the following Nash product simultaneously:

$$\begin{aligned} \max_{I_i\in[0,e],\ \mu_i\in[0,1]} \quad & \left[\pi_i(\boldsymbol{I},\boldsymbol{\mu}) - d_i\right]^{\theta_i} \left[\pi_e(\boldsymbol{I},\boldsymbol{\mu}) - d_e^{-i}\right]^{1-\theta_i} \\ & \pi_i(\boldsymbol{I},\boldsymbol{\mu}) \geq d_i,\ \pi_e(\boldsymbol{I},\boldsymbol{\mu}) \geq d_e^{-i}. \end{aligned} \tag{EC.27}$$

We first establish a lemma, which helps us simplify the profits in Eqs. (EC.25) and (EC.26).

Lemma EC.1. *In any equilibrium bargaining outcome* $(\boldsymbol{I},\boldsymbol{\mu})$, *the following conditions are satisfied:*

$$\alpha_H(I_1+I_2)(1-\mu_i) \geq I_{3-i},\ i = 1, 2.$$

Proof of Lemma EC.1. We first observe that $\alpha_H(I_1+I_2)(1-\mu_i) < I_{3-i}$ when the entrepreneur's profit is not enough to cover the compensation to protect investor $(3-i)$. Since $\alpha_H > 1$ and $\mu_1+\mu_2 < 1$, we note that $\alpha_H(I_1+I_2)(1-\mu_i) < I_{3-i}$ can hold for at most one bargaining unit. We next prove the lemma by showing that in any bargaining outcome $(\boldsymbol{I},\boldsymbol{\mu}) = (I_1, I_2, \mu_1, \mu_2)$, if $\alpha_H(I_1+I_2)(1-\mu_1) < I_2$ and $\alpha_H(I_1+I_2)(1-\mu_2) \geq I_1$, then $(\boldsymbol{I},\boldsymbol{\mu})$ is not feasible for the bargaining problem between the entrepreneur and Investor 1.

Since $\alpha_H(I_1+I_2)(1-\mu_1) < I_2$ and $\alpha_H(I_1+I_2)(1-\mu_2) \geq I_1$, by Eqs. (EC.25), we have

$$\begin{aligned}\pi_e(\boldsymbol{I},\boldsymbol{\mu}) =& \alpha_H(I_1+I_2)p - \max\left\{\alpha_H(I_1+I_2) - I_2, I_1\right\}p - \max\left\{\alpha_H(I_1+I_2)\mu_2, I_2\right\}p \\ =& \alpha_H(I_1+I_2)p - \left(\alpha_H(I_1+I_2) - I_2\right)p - I_2 p \\ =& 0,\end{aligned}$$

Note that the disagreement point of the entrepreneur is that

$$d_e^{-1} = \pi_e(0, I_2, 0, \mu_2) = \alpha_H I_2 p - \max\left\{\alpha_H I_2 \mu_2, I_2\right\}p = (\alpha_H - 1)I_2 p > 0.$$

It follows that $\pi_e(\boldsymbol{I},\boldsymbol{\mu})<d_e^{-1}$ and therefore, $(\boldsymbol{I},\boldsymbol{\mu})$ is not feasible for the bargaining problem between the entrepreneur and Investor 1. $\square$

By Lemma EC.1, we can further simplify the expected profit of the entrepreneur as

$$\pi_e(\boldsymbol{I},\boldsymbol{\mu})=\alpha_H(I_1+I_2)p-\sum_{i=1}^{2}\max\left\{\alpha_H(I_1+I_2)\mu_i,I_i\right\}p, \tag{EC.28}$$

and the expected profit of Investor i as

$$\pi_i(\boldsymbol{I},\boldsymbol{\mu})=\max\left\{\alpha_H(I_1+I_2)\mu_i,I_i\right\}p+e-I_ip. \tag{EC.29}$$

The following proposition is Proposition 5 under general bargaining powers.

PROPOSITION EC.5 **(Simultaneous bargaining under general bargaining powers)**.

- *There exists an equilibrium bargaining outcome in which both investors invest; i.e.,* $\tilde{I}_i^{SIM}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor* i *is as follows.*
  - *If* $\alpha_H\le\min\left\{\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2},\frac{1-2\theta_1\theta_2+\theta_2}{\theta_2-\theta_1\theta_2}\right\}$,
$$\tilde{\mu}_1^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1-\theta_1}{2\alpha_H(1-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_2-\theta_2}{2\alpha_H(1-\theta_1\theta_2)} \tag{EC.30}$$
  - *If* $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2}<\alpha_H\le\frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$
$$\tilde{\mu}_1^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1+\theta_1\theta_2-\theta_1}{\alpha_H(2-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_2-3\theta_2}{2\alpha_H(2-\theta_1\theta_2)} \tag{EC.31}$$
  - *If* $\frac{1-2\theta_1\theta_2+\theta_2}{\theta_2-\theta_1\theta_2}<\alpha_H\le\frac{2+3\theta_1-2\theta_1\theta_2}{2\theta_1-\theta_1\theta_2}$
$$\tilde{\mu}_1^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_1-3\theta_1}{2\alpha_H(2-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_2+\theta_1\theta_2-\theta_2}{\alpha_H(2-\theta_1\theta_2)} \tag{EC.32}$$
  - *If* $\alpha_H>\max\left\{\frac{2+3\theta_1-2\theta_1\theta_2}{2\theta_1-\theta_1\theta_2},\frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}\right\}$
$$\tilde{\mu}_1^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_1+\theta_1\theta_2-3\theta_1}{\alpha_H(4-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_2+\theta_1\theta_2-3\theta_2}{\alpha_H(4-\theta_1\theta_2)} \tag{EC.33}$$
- *If* $\alpha_H<{}^{(2-\theta_i)}/_{(1-\theta_i)}$, *an equilibrium bargaining outcome in which only Investor* i *invests exists; i.e.,* $\tilde{I}_i^{SIM}=e$ *and* $I_j^*=0$ *for* $i,j\in\{1,2\}$ *and* $i\neq j$, *and the equilibrium share of Investor* i *is*
$$\tilde{\mu}_i^{SIM}=\frac{(\alpha_H-1)\,\theta_i+1}{\alpha_H}.$$

Proof of Proposition EC.5. We solve the bargaining problem between the entrepreneur and Investor 1 as specified in (EC.27) for the best-response investment level and the share of the investor. We first note that if $\mu_1<\frac{I_1}{\alpha_H(I_1+I_2)}$, it follows that $\pi_1(\boldsymbol{I},\boldsymbol{\mu})=e$ and the Nash product for the bargaining between the entrepreneur and Investor 1 in problem (EC.27) is 0. In the following analysis, we restrict attention to the case where Investor 1's share $\mu_1\ge\frac{I_1}{\alpha_H(I_1+I_2)}$ and later verify that the equilibrium bargaining outcome leads to a strictly positive Nash product. In this case, by the first order condition, we have that

$$\begin{aligned}\pi_1(\boldsymbol{I},\boldsymbol{\mu})-d_1&=\theta_1\left(\pi_1(\boldsymbol{I},\boldsymbol{\mu})+\pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_1-d_e^{-1}\right);\\ \pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_e^{-1}&=(1-\theta_1)\left(\pi_1(\boldsymbol{I},\boldsymbol{\mu})+\pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_1-d_e^{-1}\right).\end{aligned} \tag{EC.34}$$

Note that the best-response investment level

$$\tilde{I}_1(I_2,\mu_2)=\arg\max_{I_1\in[0,e]}\left\{\pi_1(\boldsymbol{I},\boldsymbol{\mu})+\pi_e(\boldsymbol{I},\boldsymbol{\mu})-d_1-d_e^{-1}\right\}=\begin{cases} e & \text{if } \mu_2\le \frac{\alpha_H-1}{\alpha_H};\\ 0 & \text{if } \mu_2>\frac{\alpha_H-1}{\alpha_H}.\end{cases} \tag{EC.35}$$

By Eq. (EC.34), the best-response share for Investor 1 is

$$\tilde{\mu}_1(I_2,\mu_2)=\begin{cases} \frac{\theta_1[\alpha_H(e+I_2)(1-\mu_2)-e-\alpha_H I_2+I_2]+e}{\alpha_H(e+I_2)} & \text{if } \mu_2\le\frac{1}{\alpha_H};\\ \frac{\theta_1[\alpha_H e(1-\mu_2)-e]+e}{\alpha_H(e+I_2)} & \text{if } \frac{1}{\alpha_H}<\mu_2\le\frac{\alpha_H-1}{\alpha_H};\\ 0 & \text{if } \mu_2>\frac{\alpha_H-1}{\alpha_H}.\end{cases} \tag{EC.36}$$

Similarly, we have that the best-response investment level and share for Investor 2 are

$$\tilde{I}_2(I_1,\mu_1)=\begin{cases} e & \text{if } \mu_1\le \frac{\alpha_H-1}{\alpha_H};\\ 0 & \text{if } \mu_1>\frac{\alpha_H-1}{\alpha_H}.\end{cases} \tag{EC.37}$$

$$\tilde{\mu}_2(I_1,\mu_1)=\begin{cases} \frac{\theta_2[\alpha_H(I_1+e)(1-\mu_1)-e-\alpha_H I_1+I_1]+e}{\alpha_H(I_1+e)} & \text{if } \mu_1\le\frac{1}{\alpha_H};\\ \frac{\theta_2[\alpha_H e(1-\mu_1)-e]+e}{\alpha_H(I_1+e)} & \text{if } \frac{1}{\alpha_H}<\mu_1\le\frac{\alpha_H-1}{\alpha_H};\\ 0 & \text{if } \mu_1>\frac{\alpha_H-1}{\alpha_H}.\end{cases} \tag{EC.38}$$

Solving the system of the best-response functions Eqs. (EC.35) through (EC.38), we have that there exists an equilibrium in which both investors invest $\tilde{I}_i^{SIM}=e$ with the share for Investor i as follows.

- If $\alpha_H\le\min\left\{\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2},\frac{1-2\theta_1\theta_2+\theta_2}{\theta_2-\theta_1\theta_2}\right\}$,

$$\tilde{\mu}_1^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1-\theta_1}{2\alpha_H(1-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_2-\theta_2}{2\alpha_H(1-\theta_1\theta_2)}$$

- If $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2}<\alpha_H\le\frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$

$$\tilde{\mu}_1^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1+\theta_1\theta_2-\theta_1}{\alpha_H(2-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_2-3\theta_2}{2\alpha_H(2-\theta_1\theta_2)}$$

- If $\frac{1-2\theta_1\theta_2+\theta_2}{\theta_2-\theta_1\theta_2}<\alpha_H\le\frac{2+3\theta_1-2\theta_1\theta_2}{2\theta_1-\theta_1\theta_2}$

$$\tilde{\mu}_1^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_1-3\theta_1}{2\alpha_H(2-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_2+\theta_1\theta_2-\theta_2}{\alpha_H(2-\theta_1\theta_2)}$$

- If $\alpha_H>\max\left\{\frac{2+3\theta_1-2\theta_1\theta_2}{2\theta_1-\theta_1\theta_2},\frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}\right\}$

$$\tilde{\mu}_1^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_1+\theta_1\theta_2-3\theta_1}{\alpha_H(4-\theta_1\theta_2)},\ \tilde{\mu}_2^{SIM}=\frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_2+\theta_1\theta_2-3\theta_2}{\alpha_H(4-\theta_1\theta_2)}$$

It is easy to verify that the equilibrium shares satisfies that $\tilde{\mu}_i^{SIM}\ge\frac{I_i^{SIM}}{\alpha_H(I_1^{SIM}+I_2^{SIM})}=\frac{1}{2\alpha_H}$.

Similarly, we have that if $\alpha_H<\frac{2-\theta_i}{1-\theta_i}$, there exists an equilibrium in which Investor i is the only investor with the investment level $\tilde{I}_i^{SIM}=e$ in equilibrium and the share for Investor i is

$$\tilde{\mu}_i^{SIM}=\frac{(\alpha_H-1)\,\theta_i+1}{\alpha_H}.$$

□

EC.1.2.3. Sequential Bargaining In the second stage bargaining, the disagreement point of the entrepreneur remains the same as that in the simultaneous bargaining case. That is, given the bargaining outcome (I_1, μ_1) in the first stage, we have

$$d_e^{-2} = \pi_e(I_1, 0, \mu_1, 0) = \alpha_H I_1 p - \max\left\{\alpha_H I_1 \mu_1, I_1\right\} p.$$

The disagreement point of Investor 2 is still $d_2 = e$ since the investor has e units of capital as the endowment. Following a similar analysis as in Lemma EC.1, we have that the expected profit of the entrepreneur (resp., Investor i) are the same as in Eq. (EC.28) (resp., Eq. (EC.29)).

Given the first-stage bargaining outcome (I_1, μ_1), the investment I_2 and the share μ_2 maximize the following Nash product:

$$\max_{I_2 \in [0,e],\ \mu_2 \in [0,1]} \ [\pi_2(\boldsymbol{I}, \boldsymbol{\mu}) - d_2]^{\theta_2} \left[\pi_e(\boldsymbol{I}, \boldsymbol{\mu}) - d_e^{-2}\right]^{1-\theta_2}$$
$$\pi_2(\boldsymbol{I}, \boldsymbol{\mu}) \geq d_2,\ \pi_e(\boldsymbol{I}, \boldsymbol{\mu}) \geq d_e^{-2}.$$

Note that the bargaining problem is a bilateral bargaining problem. Therefore, similar to the analysis for Proposition EC.4, we obtain the equilibrium bargaining outcome as follows. The details are omitted for brevity.

$$\tilde{I}_2^{SEQ}(I_1, \mu_1) = \begin{cases} e & \text{if } \mu_1 \leq \frac{\alpha_H - 1}{\alpha_H}; \\ 0 & \text{if } \mu_1 > \frac{\alpha_H - 1}{\alpha_H}. \end{cases} \tag{EC.39}$$

$$\tilde{\mu}_2^{SEQ}(I_1, \mu_1) = \begin{cases} \frac{\theta_2[\alpha_H(I_1+e)(1-\mu_1) - e - \alpha_H I_1 + I_1] + e}{\alpha_H(I_1+e)} & \text{if } \mu_1 \leq \frac{1}{\alpha_H}; \\ \frac{\theta_2[\alpha_H e(1-\mu_1) - e] + e}{\alpha_H(I_1+e)} & \text{if } \frac{1}{\alpha_H} < \mu_1 \leq \frac{\alpha_H - 1}{\alpha_H}; \\ 0 & \text{if } \mu_1 > \frac{\alpha_H - 1}{\alpha_H}. \end{cases} \tag{EC.40}$$

Take the bargaining outcome $\tilde{I}_2^{SEQ}(I_1, \mu_1)$ and $\tilde{\mu}_2^{SEQ}(I_1, \mu_1)$ back to the first stage. The disagreement point of the entrepreneur in the first stage (when bargaining with Investor 1) is different from that in the simultaneous case. This is because both the entrepreneur and Investor 2 know that the agreement with Investor 1 is not reached, and therefore, Investor 2 knows that Investor 2 is the only investor in that scenario. Thus, if the negotiation breaks down between the entrepreneur and Investor 1, Investor 2 would behave as the only investor in the second stage negotiation, and the outcome would be similar to the single investor bargaining scenario shown in Proposition EC.4. Therefore, we have that

$$d_e^{-1} = \pi_e(0, e, 0, \frac{\theta_2(\alpha_H - 1) + 1}{\alpha_H}). \tag{EC.41}$$

The disagreement point of Investor 1 is still $d_1 = e$.

In the first stage, the investment I_1 and the share μ_1 maximize the following Nash product:

$$\max_{I_1 \in [0,e],\ \mu_1 \in [0,1]} \ \left[\pi_1(I_1, \tilde{I}_2^{SEQ}(I_1, \mu_1), \mu_1, \tilde{\mu}_2^{SEQ}(I_1, \mu_1)) - d_1\right]^{\theta_1} \left[\pi_e(I_1, \tilde{I}_2^{SEQ}(I_1, \mu_1), \mu_1, \tilde{\mu}_2^{SEQ}(I_1, \mu_1)) - d_e^{-1}\right]^{1-\theta_1} \tag{EC.42}$$
$$\pi_1(I_1, \tilde{I}_2^{SEQ}(I_1, \mu_1), \mu_1, \tilde{\mu}_2^{SEQ}(I_1, \mu_1)) \geq d_1,\ \pi_e(I_1, \tilde{I}_2^{SEQ}(I_1, \mu_1), \mu_1, \tilde{\mu}_2^{SEQ}(I_1, \mu_1)) \geq d_e^{-1}.$$

The following proposition is Proposition 6 under general bargaining powers.

Proposition EC.6 **(Sequential bargaining outcome under general bargaining powers).** *The equilibrium bargaining outcomes are as follows:*

Case (1). $2\theta_1+\theta_2+\theta_1\theta_2<2$.

- *When* $2\le\alpha_H<\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $\tilde{I}_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor* i *is*

$$\tilde{\mu}_1^{SEQ}=\frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H},$$

$$\tilde{\mu}_2^{SEQ}=\frac{\alpha_H(2-2\theta_1-\theta_2)\theta_2+(2-\theta_2)(1-(1-\theta_1)\theta_2)}{2(2-\theta_2)\alpha_H}. \tag{EC.43}$$

- *When* $\alpha_H\ge\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $\tilde{I}_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor* i *is*

$$\tilde{\mu}_1^{SEQ}=\frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H},$$

$$\tilde{\mu}_2^{SEQ}=\frac{2\alpha_H(2-\theta_1-\theta_2)\theta_2+(2+\theta_1\theta_2-3\theta_2)(2-\theta_2)}{4(2-\theta_2)\alpha_H}. \tag{EC.44}$$

Case (2). $2\theta_1+\theta_2+\theta_1\theta_2\ge 2$.

- *When* $2\le\alpha_H<\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $\tilde{I}_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor* i *is*

$$\tilde{\mu}_1^{SEQ}=\frac{\alpha_H-1}{\alpha_H},\quad \mu_2^{SEQ}=\frac{1}{2\alpha_H}. \tag{EC.45}$$

- *When* $\alpha_H\ge\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, *an equilibrium bargaining outcome in which both investors invest exists; i.e.,* $\tilde{I}_i^{SEQ}=e$ *for* $i\in\{1,2\}$, *and the equilibrium share of investor* i *is*

$$\tilde{\mu}_1^{SEQ}=\frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H},$$

$$\tilde{\mu}_2^{SEQ}=\frac{2\alpha_H(2-\theta_1-\theta_2)\theta_2+(2+\theta_1\theta_2-3\theta_2)(2-\theta_2)}{4(2-\theta_2)\alpha_H}. \tag{EC.46}$$

Proof of Proposition EC.6. Note that the solution in the second stage bargaining has been shown above. In the proof we focus on deriving the first-stage bargaining outcome. Below we first derive the bargaining outcome when both investors choose to invest, and then show that the bargaining outcome in which only one investor invests cannot be sustained.

We first derive the equilibrium investment level of Investor 1 and the equilibrium share for both investors when Investor 2 invests e. Note that when Investor 2 invests e, the Nash product in problem (EC.42), denoted by $g_1(I_1,\mu_1)$ and $g_2(I_1,\mu_1)$ for convenience, is

$$g_1(I_1,\mu_1):=\Big(\alpha_H(I_1+e)p\mu_1-I_1p\Big)^{\theta_1}$$
$$\left(\alpha_H(I_1+e)p\left(1-\mu_1-\frac{\theta_2\big(\alpha_H(I_1+e)(1-\mu_1)-e-\alpha_HI_1+I_1\big)+e}{\alpha_H(I_1+e)}\right)-\alpha_Hep\left(1-\frac{(\alpha_H-1)\theta_2+1}{\alpha_H}\right)\right)^{1-\theta_1}$$
$$=\Big(\alpha_H(I_1+e)p\mu_1-I_1p\Big)^{\theta_1}\Big(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_HI_1p-I_1p\theta_2\Big)^{1-\theta_1}\quad\text{if }\mu_1\le\frac{1}{\alpha_H};$$

$$
\begin{aligned}
g_2(I_1,\mu_1) :=& \Big(\alpha_H(I_1+e)p\mu_1 - I_1 p\Big)^{\theta_1} \\
&\left(\alpha_H(I_1+e)p\left(1-\mu_1-\frac{\theta_2\big(\alpha_H e(1-\mu_1)-e\big)+e}{\alpha_H(I_1+e)}\right)-\alpha_H ep\left(1-\frac{(\alpha_H-1)\theta_2+1}{\alpha_H}\right)\right)^{1-\theta_1} \\
=& \Big(\alpha_H(I_1+e)p\mu_1 - I_1 p\Big)^{\theta_1}\Big(-\alpha_H(I_1+e(1-\theta_2))p\mu_1+\alpha_H I_1 p\Big)^{1-\theta_1} \text{ if } \frac{1}{\alpha_H}<\mu_1\le\frac{\alpha_H-1}{\alpha_H}.
\end{aligned}
$$

We first consider $g_1(I_1,\mu_1)$. Note that $g_1(I_1,0)<0$ and $g_1(I_1,1)<0$. It is trivial that there exists $\mu_1\in(0,1)$ such that $g_1(I_1,\mu_1)>0$. In addition, $g_1(I_1,\mu_1)$ is continuously differentiable with respect to μ_1. Therefore, for a given I_1, there exists a maximizer $\bar{\mu}_1(I_1)\in(0,1)$ of $g_1(I_1,\mu_1)$ and the first order condition is satisfied at $\bar{\mu}_1(I_1)$. We will check later if the maximizer $\bar{\mu}_1(I_1)$ satisfies the condition that $\bar{\mu}_1(I_1)\le\frac{1}{\alpha_H}$.

By the first order condition of $g_1(I_1,\mu_1)$ with respect to μ_1, we have that

$$
\frac{\theta_1}{(1-\theta_1)(1-\theta_2)}=\frac{\alpha_H(I_1+e)p\mu_1-I_1p}{-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_H I_1 p-I_1p\theta_2}. \tag{EC.47}
$$

Next, for the partial derivative of $g_1(I_1,\mu_1)$ with respect to I_1 when Eq. (EC.47) is satisfied, we have that

$$
\begin{aligned}
\frac{\partial g_1(I_1,\mu_1)}{\partial I_1} =& \left(\theta_1(\alpha_H p\mu_1-p)\frac{-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_H I_1p-I_1p\theta_2}{\alpha_H(I_1+e)p\mu_1-I_1p}+(1-\theta_1)\Big(\alpha_H p(1-\mu_1)+\alpha_H p\mu_1\theta_2-p\theta_2\Big)\right) \\
&\Big(\alpha_H(I_1+e)p\mu_1-I_1p\Big)^{\theta_1}\Big(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_H I_1p-I_1p\theta_2\Big)^{-\theta_1} \\
=&(1-\theta_1)p\,(\alpha_H-1)\Big(\alpha_H(I_1+e)p\mu_1-I_1p\Big)^{\theta_1}\Big(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_H I_1p-I_1p\theta_2\Big)^{-\theta_1} \\
>&0.
\end{aligned} \tag{EC.48}
$$

The second equality follows from Eq. (EC.47).

By Eq. (EC.48), for any $I_1<e$, the Nash product $g_1(I_1,\bar{\mu}_1(I_1))$ increases in I_1. It follows that the equilibrium investment level of investor 1 is

$$
\tilde{I}_1^{SEQ}=e.
$$

When $\tilde{I}_1^{SEQ}=e$, maximizing the Nash product $g_1(e,\mu_1)$ is equivalent to maximizing the following:

$$
\left(\mu_1-\frac{1}{2\alpha_H}\right)^{\theta_1}\left(\frac{1}{2-\theta_2}-\mu_1\right)^{1-\theta_1}
$$

It follows that the equilibrium share of investor 1 is

$$
\tilde{\mu}_1^{SEQ}=\frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H}.
$$

Note that $\tilde{\mu}_1^{SEQ}\le 1/\alpha_H$ is satisfied, if

$$
\alpha_H\le\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}.
$$

Since $\alpha_H>2$, it is easy to verify that $\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}>2$ is equivalent to $2-2\theta_1-\theta_2-\theta_1\theta_2>0$.

By Eq. (EC.40), we have that

$$
\tilde{\mu}_2^{SEQ}=\tilde{\mu}_2^{SEQ}(e,\mu_1^{SEQ})=\frac{\alpha_H(2-2\theta_1-\theta_2)\theta_2+(2-\theta_2)(1-(1-\theta_1)\theta_2)}{2(2-\theta_2)\alpha_H}.
$$

We next consider $g_2(I_1,\mu_1)$. Note that $g_2(I_1,0)<0$ and $g_2(I_1,1)<0$. It is trivial that there exists $\mu_1\in(0,1)$ such that $g_2(I_1,\mu_1)>0$. In addition, $g_2(I_1,\mu_1)$ is continuously differentiable with respect to μ_1. Therefore, for a given I_1, there exists a maximizer $\hat{\mu}_1(I_1)\in(0,1)$ of $g_2(I_1,\mu_1)$ and the first order condition is satisfied at $\hat{\mu}_1(I_1)$. We will check later if the maximizer $\hat{\mu}_1(I_1)$ satisfies the condition that $\frac{1}{\alpha_H}<\hat{\mu}_1(I_1)\le\frac{\alpha_H-1}{\alpha_H}$.

By the first order condition of $g_2(I_1,\mu_1)$ with respect to μ_1, we have that

$$\frac{\theta_1(I_1+e)}{(1-\theta_1)(I_1+e(1-\theta_2))}=\frac{\alpha_H(I_1+e)p\mu_1-I_1p}{-\alpha_H(I_1+e(1-\theta_2))p\mu_1+\alpha_H I_1p}. \tag{EC.49}$$

Next, for the partial derivative of $g_2(I_1,\mu_1)$ with respect to I_1 when Eq. (EC.49) is satisfied, we have that

$$\begin{aligned}\frac{\partial g_2(I_1,\mu_1)}{\partial I_1}=&\left(\theta_1(\alpha_Hp\mu_1-p)\frac{-\alpha_H(I_1+e(1-\theta_2))p\mu_1+\alpha_HI_1p}{\alpha_H(I_1+e)p\mu_1-I_1p}+(1-\theta_1)\alpha_Hp(1-\mu_1)\right)\\&\left(\alpha_H(I_1+e)p\mu_1-I_1p\right)^{\theta_1}\left(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_HI_1p-I_1p\theta_2\right)^{-\theta_1}\\=&\frac{(1-\theta_1)p}{I_1+e}\left((\alpha_H-1)I_1+(\alpha_H-\alpha_H\mu_1\theta_2-1+\theta_2)e\right)\\&\left(\alpha_H(I_1+e)p\mu_1-I_1p\right)^{\theta_1}\left(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_HI_1p-I_1p\theta_2\right)^{-\theta_1}\\\ge&\frac{(1-\theta_1)p}{I_1+e}\left((\alpha_H-1)I_1+(\alpha_H-1)(1-\theta_2)e\right)\\&\left(\alpha_H(I_1+e)p\mu_1-I_1p\right)^{\theta_1}\left(-\alpha_H(I_1+e)p(1-\theta_2)\mu_1+\alpha_HI_1p-I_1p\theta_2\right)^{-\theta_1}\\>&0.\end{aligned} \tag{EC.50}$$

The second equality follows from Eq. (EC.49). The first inequality follows from $\mu_1\le 1$.

By Eq. (EC.50), for any $I_1<e$, the Nash product $g_2(I_1,\hat{\mu}_1(I_1))$ increases in I_1. It follows that the equilibrium investment level of investor 1 is

$$\tilde{I}_1^{SEQ}=e.$$

When $\tilde{I}_1^{SEQ}=e$, maximizing the Nash product $g_2(e,\mu_1)$ is equivalent to maximizing the following:

$$\left(\mu_1-\frac{1}{2\alpha_H}\right)^{\theta_1}\left(\frac{1}{2-\theta_2}-\mu_1\right)^{1-\theta_1} \tag{EC.51}$$

It follows that the equilibrium share of investor 1 is

$$\tilde{\mu}_1^{SEQ}=\frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H}.$$

Note that $\frac{1}{\alpha_H}<\tilde{\mu}_1^{SEQ}\le\frac{\alpha_H-1}{\alpha_H}$ is satisfied, if

$$\alpha_H>\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}\text{ and }\alpha_H\ge\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}.$$

It is easy to observe that $\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}>\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$ and $\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}<2$ if $2-2\theta_1-\theta_2-\theta_1\theta_2>0$.

By Eq. (EC.40), we have that

$$\tilde{\mu}_2^{SEQ}=\tilde{\mu}_2^{SEQ}(e,\mu_1^{SEQ})=\frac{2\alpha_H(2-\theta_1-\theta_2)\theta_2+(2+\theta_1\theta_2-3\theta_2)(2-\theta_2)}{4(2-\theta_2)\alpha_H}.$$

If $\alpha_H < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, the unconstrained interior solution is not feasible. We next verify that there exists another equilibrium with $\tilde{\mu}_1^{SEQ} = \frac{\alpha_H - 1}{\alpha_H}$ and $\tilde{\mu}_2^{SEQ} = \frac{1}{2\alpha_H}$.

By (EC.40), the second stage bargaining outcome is the best response to the first stage outcome with

$$\tilde{\mu}_2^{SEQ}(I_1, \mu_1) = \frac{\theta_2[\alpha_H e(1-\mu_1) - e] + e}{\alpha_H(e + I_1)}.$$

In the first stage, it is easy to check that the Nash product increases in I_1 given $\mu_1 = \frac{\alpha_H - 1}{\alpha_H}$ and $\mu_2 = \tilde{\mu}_2^{SEQ}(I_1, \frac{\alpha_H - 1}{\alpha_H})$ with $\alpha_H \geq 2$. Therefore, Investor 1 should invest $I_1 = e$. It follows that maximizing the Nash product is equivalent to maximizing Eq. (EC.51), which is concave in μ_1. Therefore, if the payoff of Investor 1 and the entrepreneur is greater than their respective disagreement point, we have verified that there exists another equilibrium with $\tilde{\mu}_1^{SEQ} = \frac{\alpha_H - 1}{\alpha_H}$ and $\tilde{\mu}_2^{SEQ} = \frac{1}{2\alpha_H}$. Next, the payoff of Investor 1, which is $2(\alpha_H - 1)ep + e - ep$, is greater than his disagreement point $d_1 = e$, if $\alpha_H > 3/2$. The payoff of the entrepreneur, which is ep, is also greater than the disagreement point d_e^{-1} by Eq. (EC.41), if $\alpha_H < \frac{2-\theta_2}{1-\theta_2}$. Note that $\frac{2-\theta_2}{1-\theta_2} > \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$. It follows that if $2 \leq \alpha_H < \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$, an equilibrium bargaining outcome in which both investors invest exists; i.e., $\tilde{I}_i^{SEQ} = e$ for $i \in \{1, 2\}$, and the equilibrium share of investor i is

$$\tilde{\mu}_1^{SEQ} = \frac{\alpha_H - 1}{\alpha_H},\ \tilde{\mu}_2^{SEQ} = \frac{1}{2\alpha_H}.$$

We next derive the bargaining outcome when only one investor invests. Note that it cannot be the case where only Investor 2 invests, since Investor 1 and the entrepreneur can earn a higher profit than their disagreement points as shown in the analysis above. Therefore, we focus on deriving the bargaining outcome when Investor 1 invests and then show that the bargaining unit of the entrepreneur and Investor 1 will have an incentive to deviate so that Investor 2 will also invest in the second stage.

The bargaining problem is similar to the single investor bargaining case except that the disagreement point of the entrepreneur changes from 0 in the single investor case to d_e^{-1} as shown in Eq. (EC.41). Following a similar analysis as that in Proposition EC.4, we have that

$$\tilde{I}_1^{SEQ} = e,$$
$$\tilde{\mu}_1^{SEQ} = \frac{(\alpha_H - 1)\theta_1\theta_2 + 1}{\alpha_H}.$$

To verify that investor 2 should not invest in equilibrium, we note that the condition $\tilde{\mu}_1^{SEQ} > \frac{\alpha_H - 1}{\alpha_H}$ should be satisfied, which is equivalent to

$$\alpha_H < \frac{2 - \theta_1\theta_2}{1 - \theta_1\theta_2}.$$

Following a similar analysis as that in Proposition EC.4, it can be shown that the bargaining unit of the entrepreneur and Investor 1 has an incentive to deviate from the bargaining outcome where only Investor 1 invests. The details are omitted for brevity. □

As a corollary of Propositions EC.5 ad EC.6, we can compare the simultaneous and sequential bargaining outcomes *when both investors invest* as follows.

Corollary EC.2 **(The equilibrium share comparison under general bargaining powers)**. *Assume we are in the equilibria in which both investors invest. Then:*
(1) The comparison of the share of the investor(s) is as follows:

$$\tilde{\mu}_1^{SIM} < \tilde{\mu}_1^{SEQ}$$
$$\tilde{\mu}_2^{SEQ} < \tilde{\mu}_2^{SIM}.$$

That is, investor 1 (resp., investor 2) obtains a larger (smaller) share when negotiating sequentially than when negotiating simultaneously.
(2) The comparison of the share of the entrepreneur is as follows:

$$\tilde{\mu}_e^{SIM} > \tilde{\mu}_e^{SEQ}.$$

That is, the entrepreneur obtains the larger share when he bargains with two investors simultaneously than when bargaining sequentially.

Proof of Corollary EC.2. In the proof we consider the case where $\theta_1 \geq \theta_2$ since the analysis for the other case is the same and therefore omitted for brevity.
(1) We first compare μ_1^{SIM} and μ_1^{SEQ} in two cases.
Case (i). $2\theta_1 + \theta_2 + \theta_1\theta_2 < 2$.

- If $\alpha_H \leq \frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2}$,

$$\begin{aligned}
\tilde{\mu}_1^{SIM} - \tilde{\mu}_1^{SEQ} &= \frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1-\theta_1}{2\alpha_H(1-\theta_1\theta_2)} - \frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H} \\
&= \frac{\theta_1\theta_2\Big(\alpha_H(2\theta_1+\theta_2-3)+(1-\theta_1)(2-\theta_2)\Big)}{2\alpha_H(2-\theta_2)(1-\theta_1\theta_2)} \\
&\leq \frac{\theta_1\theta_2\Big(\theta_1(\theta_2+2)+\theta_2-4\Big)}{2\alpha_H(2-\theta_2)(1-\theta_1\theta_2)} \\
&< 0.
\end{aligned}$$

  The first inequality follows from $\alpha_H > 2$.

- If $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2} < \alpha_H \leq \frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$,

$$\begin{aligned}
\tilde{\mu}_1^{SIM} - \tilde{\mu}_1^{SEQ} &= \frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1+\theta_1\theta_2-\theta_1}{\alpha_H(2-\theta_1\theta_2)} - \frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H} \\
&= \frac{\theta_1\theta_2\Big(2\alpha_H(\theta_1+\theta_2-3)+(3-\theta_1)(2-\theta_2)\Big)}{2\alpha_H(2-\theta_2)(2-\theta_1\theta_2)} \\
&\leq \frac{\theta_1\theta_2\Big(\theta_1(\theta_2+2)+\theta_2-6\Big)}{2\alpha_H(2-\theta_2)(2-\theta_1\theta_2)} \\
&< 0.
\end{aligned}$$

  The first inequality follows from $\alpha_H > 2$.

- If $\alpha_H > \frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$,

$$\begin{aligned}\tilde{\mu}_1^{SIM} - \tilde{\mu}_1^{SEQ} &= \frac{2-\alpha_H\theta_1\theta_2+2\alpha_H\theta_1+\theta_1\theta_2-3\theta_1}{\alpha_H(4-\theta_1\theta_2)} - \frac{2\theta_1\alpha_H+(1-\theta_1)(2-\theta_2)}{2(2-\theta_2)\alpha_H} \\ &= \frac{\theta_1\left(2\alpha_H\theta_2\left(\theta_1+\theta_2-4\right)+(2-\theta_2)\Big((3-\theta_1)\theta_2-2\Big)\right)}{2\alpha_H(2-\theta_2)(4-\theta_1\theta_2)} \\ &\le \frac{\theta_1\left((\theta_1+1)\theta_2^2+2(\theta_1-4)\theta_2-4\right)}{2\alpha_H(2-\theta_2)(4-\theta_1\theta_2)} \\ &< 0.\end{aligned}$$

  The first inequality follows from $\alpha_H > 2$.

Case (ii). $2\theta_1+\theta_2+\theta_1\theta_2 \ge 2$. In this case, it can be shown that $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2} > \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$.

- If $\alpha_H \le \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$,

$$\begin{aligned}\tilde{\mu}_1^{SIM} - \tilde{\mu}_1^{SEQ} &= \frac{1-\alpha_H\theta_1\theta_2+\alpha_H\theta_1-\theta_1}{2\alpha_H(1-\theta_1\theta_2)} - \frac{\alpha_H-1}{\alpha_H} \\ &= \frac{\alpha_H(\theta_1\theta_2+\theta_1-2)-2\theta_1\theta_2-\theta_1+3}{2\alpha_H(1-\theta_1\theta_2)} \\ &\le \frac{\theta_1-1}{2\alpha_H(1-\theta_1\theta_2)} \\ &< 0.\end{aligned}$$

  The first inequality follows from $\alpha_H > 2$.

- If $\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)} < \alpha_H$, the analysis is identical to the three scenarios above in Case (i) and is therefore omitted for brevity.

Next, we note that

$$\tilde{\mu}_2^i(e,\mu_1) = \begin{cases} \frac{\theta_2[2\alpha_H(1-\mu_1)-\alpha_H]+1}{2\alpha_H} & \text{if } \mu_1 \le \frac{1}{\alpha_H}; \\ \frac{\theta_2[\alpha_H(1-\mu_1)-1]+1}{2\alpha_H} & \text{if } \frac{1}{\alpha_H} < \mu_1 \le \frac{\alpha_H-1}{\alpha_H}. \end{cases}, \ i \in \{sim, seq\}.$$

Note that $\tilde{\mu}_2^i(e,\mu_1)$ continuously decreases in μ_1. Since $\tilde{\mu}_1^{SEQ} > \tilde{\mu}_1^{SIM}$, we have that

$$\tilde{\mu}_2^{SEQ} < \tilde{\mu}_2^{SIM}.$$

(2) We next compare the equilibrium share of the entrepreneur.

Case (i). $2\theta_1+\theta_2+\theta_1\theta_2 < 2$. Note that $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2} > \frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}$.

- If $\alpha_H \le \frac{(1+\theta_1)(2-\theta_2)}{2\theta_1}$,

$$\begin{aligned}\tilde{\mu}_e^{SIM} - \tilde{\mu}_e^{SEQ} &= \frac{(\alpha_H-1)(2-\theta_1-\theta_2)}{2\alpha_H(1-\theta_1\theta_2)} - \frac{\alpha_H\Big((2-\theta_2)^2-2\theta_1(1-\theta_2)\Big)-(2-\theta_2)(2-\theta_1-\theta_2+\theta_1\theta_2)}{2(2-\theta_2)\alpha_H} \\ &= \frac{\theta_1(1-\theta_2)\theta_2\Big(\alpha_H(3-2\theta_1-\theta_2)-(1-\theta_1)(2-\theta_2)\Big)}{2\alpha_H(2-\theta_2)(1-\theta_1\theta_2)}\end{aligned}$$

$$\geq \frac{\theta_1(1-\theta_2)\theta_2\Big(4-\theta_1(\theta_2+2)-\theta_2\Big)}{2\alpha_H(2-\theta_2)(1-\theta_1\theta_2)}$$
$$> 0.$$

The first inequality follows from $\alpha_H > 2$.

- If $\frac{(1+\theta_1)(2-\theta_2)}{2\theta_1} < \alpha_H \leq \frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2}$,

$$\begin{aligned}
\tilde{\mu}_e^{SIM} - \tilde{\mu}_e^{SEQ} &= \frac{(\alpha_H-1)(2-\theta_1-\theta_2)}{2\alpha_H(1-\theta_1\theta_2)} - \frac{(2-\theta_2)\Big(2\alpha_H(2-\theta_1-\theta_2)-4+\theta_1(2-\theta_2)+3\theta_2\Big)}{4(2-\theta_2)\alpha_H}\\
&= \frac{\theta_2\Big(2\alpha_H\theta_1(2-\theta_1-\theta_2)+\theta_1^2(2-\theta_2)-3\theta_1(1-\theta_2)-1\Big)}{4\alpha_H(1-\theta_1\theta_2)}\\
&\geq \frac{\theta_2\left(\theta_1\Big(5-\theta_1(\theta_2+2)-\theta_2\Big)-1\right)}{4\alpha_H(1-\theta_1\theta_2)}\\
&> 0.
\end{aligned}$$

The first inequality follows from $\alpha_H > 2$.

- If $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2} < \alpha_H \leq \frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$,

$$\begin{aligned}
\tilde{\mu}_e^{SIM} - \tilde{\mu}_e^{SEQ} &= \frac{\alpha_H(2-\theta_1)(2-\theta_2)-4+2\theta_1(1-\theta_2)+3\theta_2}{2\alpha_H(2-\theta_1\theta_2)} - \frac{(2-\theta_2)\Big(2\alpha_H(2-\theta_1-\theta_2)-4+\theta_1(2-\theta_2)+3\theta_2\Big)}{4(2-\theta_2)\alpha_H}\\
&= \frac{\theta_1\theta_2\Big(2\alpha_H(3-\theta_1-\theta_2)-(3-\theta_1)(2-\theta_2)\Big)}{4\alpha_H(2-\theta_1\theta_2)}\\
&\geq \frac{\theta_1\theta_2\Big(6-\theta_1(\theta_2+2)-\theta_2\Big)}{4\alpha_H(2-\theta_1\theta_2)}\\
&> 0.
\end{aligned}$$

The first inequality follows from $\alpha_H > 2$.

- If $\alpha_H > \frac{2+3\theta_2-2\theta_1\theta_2}{2\theta_2-\theta_1\theta_2}$,

$$\begin{aligned}
\tilde{\mu}_e^{SIM} - \tilde{\mu}_e^{SEQ} &= \frac{\alpha_H(2-\theta_1)(2-\theta_2)-4+\theta_1(3-2\theta_2)+3\theta_2}{\alpha_H(4-\theta_1\theta_2)} - \frac{(2-\theta_2)\Big(2\alpha_H(2-\theta_1-\theta_2)-4+\theta_1(2-\theta_2)+3\theta_2\Big)}{4(2-\theta_2)\alpha_H}\\
&= \frac{\theta_1\Big(2\alpha_H\theta_2(4-\theta_1-\theta_2)+\theta_2^2(3-\theta_1)-2(4-\theta_1)\theta_2+4\Big)}{4\alpha_H(4-\theta_1\theta_2)}\\
&\geq \frac{\theta_1\Big(4-(\theta_1+1)\theta_2^2+2(4-\theta_1)\theta_2\Big)}{4\alpha_H(4-\theta_1\theta_2)}\\
&> 0.
\end{aligned}$$

The first inequality follows from $\alpha_H > 2$.

Case (ii). $2\theta_1 + \theta_2 + \theta_1\theta_2 \geq 2$. In this case, it can be shown that $\frac{1-2\theta_1\theta_2+\theta_1}{\theta_1-\theta_1\theta_2} > \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$.

- If $\alpha_H \leq \frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)}$,

$$\begin{aligned}\tilde{\mu}_e^{SIM} - \tilde{\mu}_e^{SEQ} &= \frac{(\alpha_H - 1)(2-\theta_1-\theta_2)}{2\alpha_H(1-\theta_1\theta_2)} - \frac{1}{2\alpha_H} \\ &= \frac{\alpha_H(2-\theta_1-\theta_2) + \theta_1\theta_2 + \theta_1 + \theta_2 - 3}{2\alpha_H(1-\theta_1\theta_2)} \\ &\geq \frac{1+\theta_1\theta_2 - \theta_1 - \theta_2}{2\alpha_H(1-\theta_1\theta_2)} \\ &> 0.\end{aligned}$$

The first inequality follows from $\alpha_H > 2$.

- If $\frac{(3-\theta_1)(2-\theta_2)}{2(2-\theta_1-\theta_2)} < \alpha_H$, the analysis is identical to the three scenarios above in Case (1) and therefore omitted for brevity. □

EC.1.3. Model Robustness: Risk Aversion

For analytical tractability, the models above were solved under the assumption that all parties were risk neutral. However, it is natural to wonder how the results hold up, especially Corollary 1, if the parties involved are risk averse. Unfortunately, the model becomes analytically intractable to solve. We are able to show that, for the parameters that we implement in the experiment, so long as risk aversion is not too great, there will still be equilibria in which both investors choose to invest and that the entrepreneur's ranking from Corollary 1 still holds. Specifically, let $u_i = x^{1-\rho_i}$ denote player i's utility function, where $\rho_i = 0$ indicates risk neutrality and $\rho_i > 0$ indicates risk aversion. In the experiment, as we outlined in Section 4, we assume that $e = 100$ and $(\alpha_H, \alpha_L, p) = (11, 1, 0.2)$. Table EC.1 gives the entrepreneur's share under various assumptions on risk preferences, assuming equal bargaining powers of the investor(s) relative to the entrepreneur.

Table EC.1 The Entrepreneur's Share Under Risk Aversion

(a) The Common Stock contracts

Risk Parameters	Single Investor (%)	Sequential (%)	Simultaneous (%)
$\rho_e = \rho_s = \rho_1 = \rho_2 = 0$	33.33	35.42	46.67
$\rho_e = 0$; $\rho_s = \rho_1 = \rho_2 = 0.25$	31.23	33.80	44.48
$\rho_e = 0.25$; $\rho_s = \rho_1 = \rho_2 = 0$	28.57	33.22	46.44
$\rho_e = 0.25$; $\rho_s = \rho_1 = \rho_2 = 0.25$	26.98	31.89	44.32

(b) The Preferred Stock contracts

Risk Parameters	Single Investor (%)	Sequential (%)	Simultaneous (%)
$\rho_e = \rho_s = \rho_1 = \rho_2 = 0$	45.46	46.02	56.36
$\rho_e = 0$; $\rho_s = \rho_1 = \rho_2 = 0.25$	49.15	49.85	58.45
$\rho_e = 0.25$; $\rho_s = \rho_1 = \rho_2 = 0$	38.96	43.08	55.78
$\rho_e = 0.25$; $\rho_s = \rho_1 = \rho_2 = 0.25$	42.80	47.13	57.83

As can be seen, in all cases, the entrepreneur earns the least when bargaining against a single investor and the most when bargaining with two investors simultaneously. Note that entrepreneur risk aversion is detrimental to his share, but the effects are largest in the single investor case where the entrepreneur's bargaining power is weakest. It is also interesting to note that investor risk aversion is also detrimental to the entrepreneur under the Common Stock contracts but beneficial to the entrepreneur under the Preferred Stock contract. Under the Common Stock contracts, by investing in the business, the investor is putting money at risk and, therefore, requires compensation for that risk. Moreover, disagreement would also be a better outcome compared to successfully negotiating and having the business be a failure. Roth and Rothblum (1982) showed that increased risk aversion could, counterintuitively increase a player's share when disagreement is not the worst outcome. It seems that a similar result holds here. Under the Preferred Stock contracts, the investor's downside is protected and effectively the bargaining is regarding the state when the startup value is realizes as α_H. In this case, the entrepreneur is able to take advantage of the risk aversion of the investors and gain a higher share when bargaining a more risk-averse investor.

EC.2. Experimental Protocol and Instructions

In this Appendix we provide details on our protocol for running experiments online. As noted in the main text, we adapted the procedures suggested by Zhao et al. (2020) and Li et al. (2020). Specifically, the steps from recruiting to payment were as follows:

1. Participants were recruited from the general subject population using the University's recruiting platform (SONA). Subjects were explicitly told that the study would be online and that they would be emailed a Zoom link 1-2 hours before the scheduled time. When participants connected to the Zoom meeting, they were held in a waiting room until they could be checked in.
2. 15 minutes before the start of the session, one experimenter began to check in participants one at a time, checking their ID and changing their name to "User x", where x is a number. After check-in, the participant's video was turned off and the participant was placed in a breakout room that was also monitored by another experimenter.
3. Once all participants were checked-in, general instructions were provided to all participants. Specifically, they were told that they would be placed in one of two (SI) or three (SIM/SEQ) breakout rooms, where they would be asked to turn on their video feed.[19] Participants were informed that they would never interact with another participant in the same breakout room. That is, all entrepreneurs were placed in the same breakout room, and similarly for those in the role of Investor 1 and Investor 2. Each breakout room was also monitored by an experimenter.
4. Subjects then read the instructions specific to the experiment and answered the comprehension questions. The experimenter in each breakout room was there to handle questions. If necessary, temporarily moving a participant to a private breakout room to answer questions or provide assistance.
5. Subjects participated in the main experiment in their respective breakout room.

[19] Requiring subjects to display their video is mentioned by Li et al. (2020) as an important factor in ensuring that participants remain attentive throughout the experiment.

6. At the conclusion of the experiment, all breakout rooms were closed and participants were asked to complete a separate survey with their name and address so that payments could be processed. This was done in order to de-link decisions from the experiment and personally identifying information. After participants completed the survey, they were free to leave the Zoom meeting.

7. Consistent with IRB guidelines, subjects were then mailed (within one business day) a debit card with the amount earned in the experiment.

EC.3. Additional Experimental Results

In this appendix we examine the bargaining process, with particular emphasis on how fairness beliefs and opening offers affect final outcomes. To make this self-contained, there is some repetition of information. As in the main text, we provide results separately for Experiment 1 and 2.

EC.3.1. Summary Statistics

We begin by providing some summary statistics on first offers, final offers and fairness beliefs. This information is contained in Tables EC.2–EC.4. As was noted in the main text, with one exception (Investor 2 in SEQ), entrepreneurs' opening offer is lower for Preferred Stock contracts, while investors' opening offer is higher for Preferred Stock contracts. Additionally, comparing Tables EC.2 and EC.3 we see evidence of concessionary behavior with entrepreneurs' final offer giving more to investors than their opening offer and investors' final offer demanding less for themselves than their opening offer.

Table EC.2 Average Opening Offers (To Investor)

(a) Offers Made By Entrepreneur

	SI	SEQ		SIM	
Contract		Inv. 1	Inv. 2	Inv. 1	Inv. 2
Common	37.00	26.48	23.62	23.81	23.76
Preferred	36.40	25.09	21.51	21.09	21.60

(b) Offers Made By Investors

	SI	SEQ		SIM	
Contract		Inv. 1	Inv. 2	Inv. 1	Inv. 2
Common	76.51	46.23	47.07	45.19	43.38
Preferred	78.32	50.44	42.16	51.76	48.50

Table EC.3 Average Final Offers (To Investor)

(a) Offers Made By Entrepreneur

	SI	SEQ		SIM	
Contract		Inv. 1	Inv. 2	Inv. 1	Inv. 2
Common	49.57	30.41	29.43	29.27	29.09
Preferred	52.76	29.13	25.99	26.00	31.02

(b) Offers Made By Investors

	SI	SEQ		SIM	
Contract		Inv. 1	Inv. 2	Inv. 1	Inv. 2
Common	66.02	39.50	37.91	36.69	36.18
Preferred	63.42	37.04	34.33	38.20	37.74

Table EC.4(a) shows the average fairness belief of the players, represented as the share – for themselves – that they think is fair. Summing the fairness beliefs of all player roles (separately for each treatment), we see that there is conflict about what is fair. This is because the sum of fairness beliefs is always strictly greater than 100%. We also see that – between Common and Preferred Stock contracts – all players think that the entrepreneur deserves a larger share under Preferred Stock contracts. In panel (b) we report the fraction of times that the negotiated share (full agreements only) was equal to or exceeded their fairness belief. As can be seen, entrepreneurs' negotiated shares rarely exceeded their fairness belief and they were less likely to do so under Preferred Stock contracts. On the other hand, investors were generally much more likely to exceed their fairness belief overall and the likelihood was higher under Preferred Stock contracts.

Table EC.4 Average of Fairness Belief (To Self)

(a) Share

	SI		SEQ			SIM		
Contract	Ent.	Inv.	Ent.	Inv. 1	Inv. 2	Ent.	Inv. 1	Inv. 2
Common	52.00	66.50	48.52	31.22	34.70	44.46	34.13	36.26
Preferred	60.75	57.95	56.38	28.57	30.13	49.13	30.88	30.74

(b) Frequency of Obtaining More Than Fairness Belief

	SI		SEQ			SIM		
Contract	Ent.	Inv.	Ent.	Inv. 1	Inv. 2	Ent.	Inv. 1	Inv. 2
Common	34.00	42.00	28.12	59.38	37.50	35.14	59.46	48.65
Preferred	18.87	56.60	24.32	67.57	62.16	33.33	66.67	66.67

Note: Fairness beliefs are incompatible to the extent that, within a treatment, the sum of fairness beliefs exceeds 100 (shares).

EC.3.2. First Offers and Contract Type

In Table EC.5, we provide some statistical evidence that players of both roles make more aggressive opening offers – at least in terms of shares – under Preferred Stock contracts. This is not surprising for entrepreneurs because theory predicts that their share should increase substantially. However, it is surprising for investors because they are expected to earn a lower share under preferred contracts; yet despite this, they actually demand more. Although the change in initial offers under Preferred Stock contracts appears to be stronger for investors than for entrepreneurs, the test reported at the bottom of the table shows that the difference between roles is not significant.[20] As can be seen, the result holds true whether or not we control for fairness preferences. The table also shows that investors' opening offers are significantly positively associated with their fairness belief, while there is apparently no relationship between the entrepreneurs' fairness beliefs and their opening offers.

EC.3.3. How Fairness and Offers Affects Agreements

We next provide support for two results mentioned in Sections 5.3 and 5.4: (i) that final agreements are anchored on first offers; and (ii) that fairness beliefs influence bargaining outcomes.[21] In Tables EC.6 and EC.7 we look at how outcomes – the agreed share or the agreed expected profits, respectively – are related to fairness beliefs, opening offers and other control variables. We report regression results for each player

[20] To be sure, the result that investors demand more under Preferred Stock contracts is still noteworthy since theory predicts that investors should get a lower share under Preferred Stock relative to Common Stock.

[21] We have already shown in Table EC.5 that, at least for investors, fairness beliefs and opening offers are positively correlated.

Table EC.5 First Offers by Player Role and Contract Type

Parameter	(1)		(2)	
Investor	19.037^{***}	(2.983)	9.975	(6.392)
Entrepreneur × Preferred Contract	-1.746^{**}	(0.749)	-1.695^{*}	(0.948)
Investor × Preferred Contract	2.870^{**}	(1.454)	4.001^{**}	(1.667)
Entrepreneur × Own Fair Share			−0.036	(0.056)
Investor × Own Fair Share			0.253^{**}	(0.114)
Constant	25.259^{***}	(2.208)	25.958^{***}	(3.523)
R^2	0.538		0.550	
N	936		916	
Test: Investors adjust more than entrepreneurs in preferred contract	$p = 0.447$		$p = 0.221$	

Note 1: Standard errors are corrected for clustering at the session level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.
Note 2: Additional controls for role, treatment and round within a contract setting not reported for brevity.

Table EC.6 The Effect of Fairness Beliefs and Offers on Agreed Own Share

Parameter	Entrepreneur		Single Investor		Two Investors	
Ent. Fairness	0.108^{**}	(0.051)	−0.133	(0.084)	-0.083^{***}	(0.017)
Inv. Fairness	-0.071^{**}	(0.029)	0.021	(0.090)	0.098^{*}	(0.052)
Ent. First Off	-0.292^{***}	(0.093)	0.167^{***}	(0.056)	0.318^{***}	(0.048)
Inv. First Off	-0.203^{***}	(0.060)	0.434^{***}	(0.007)	0.216^{***}	(0.055)
SI	12.636^{***}	(3.072)				
SIM	-3.994^{*}	(2.416)			2.236^{***}	(0.667)
Preferred Contract	0.750	(1.269)	−2.097	(1.934)	0.263	(0.954)
Investor 2					−0.875	(1.638)
Constant	51.550^{***}	(2.863)	28.578^{***}	(3.896)	14.288^{***}	(2.370)
R^2	0.405		0.385		0.416	
N	346		97		249	

Note: Standard errors are corrected for clustering at the session level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

role separately (Entrepreneurs, the single investor in SI and investors in SEQ/SIM). Note that while the dependent variable is the player's *own* outcome and the fairness belief is the belief about one's own fair share, the first offer explanatory variables are in terms of the *investor's* share, which was the object of negotiation in the experiment. Therefore, some care is needed when interpreting the sign of coefficients.

Consider first anchoring. As can be seen, in all cases, both the entrepreneurs' and investors' first offers are significantly associated with the final outcome. Recalling that the object of negotiation is an amount to the investor, the negative coefficients for entrepreneurs and the positive coefficients for investors are of the expected sign. We also see that fairness beliefs generally have a significant effect on negotiated shares. For entrepreneurs, the higher is their fairness belief, the higher is the agreed share, while the higher is(are) the investor(s) fairness belief, the lower is the agreed share. For investors, as expected, the effect is reversed but the coefficient on the single investor's fairness belief is not significant.[22]

[22] This does not mean that in the single investor case, fairness beliefs do not influence the final outcome. Table EC.5 showed that fairness beliefs influence the opening offers. Therefore, even for the single investor there is an indirect effect of fairness beliefs on the final outcome.

Table EC.7 The Effect of Fairness Beliefs and Offers on Agreed Expected Profits

Parameter	Entrepreneur		Single Investor		Two Investors	
Ent. Fairness	0.479^{*}	(0.261)	-0.769	(0.495)	-0.411^{***}	(0.076)
Inv. Fairness	-0.322^{**}	(0.155)	0.198	(0.522)	0.425	(0.273)
Ent. First Off	-1.348^{***}	(0.458)	0.835^{**}	(0.327)	1.603^{***}	(0.237)
Inv. First Off	-1.115^{***}	(0.323)	2.339^{***}	(0.046)	1.183^{***}	(0.297)
SI	65.103^{***}	(17.769)				
SIM	-19.739	(13.536)			11.348^{***}	(4.043)
Preferred Contract	-53.040^{***}	(5.971)	54.133^{***}	(11.239)	28.283^{***}	(5.638)
Investor 2					-4.204	(7.922)
Constant	296.376^{***}	(14.909)	190.180^{***}	(24.353)	101.658^{***}	(12.890)
R^2	0.434		0.476		0.442	
N	346		97		249	

Note: Standard errors are corrected for clustering at the session level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table EC.8 Determinants of Disagreement (Dep. Var.: Disagreement)

Parameter	(1)		(2)	
Ent. Fairness	0.002^{***}	(0.001)	0.002^{**}	(0.001)
Inv. Fairness	0.002	(0.001)	0.001	(0.001)
Ent. First Off			-0.002^{**}	(0.001)
Inv. First Off			0.003^{***}	(0.001)
Liq. Pref.	-0.045^{*}	(0.026)	-0.050^{*}	(0.028)
SI	-0.053	(0.050)	-0.123^{**}	(0.059)
SIM	-0.015	(0.045)	-0.021	(0.051)
Constant	-0.007	(0.071)	-0.087	(0.085)
R^2	0.025		0.066	
N	952		882	

Note: Standard errors are corrected for clustering at the session level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table EC.7 repeats the analysis as in the previous table but uses the expected profits (conditional on agreement) as the dependent variable. As can be seen, for both fairness beliefs and offers, the direction of all effects is the same, but the significance varies somewhat. This is to be expected because, for Common Stock contracts, there is a linear transformation from agreed shares to expected profits, while with Preferred Stock contracts, the transformation is monotone but not linear. Similar results hold for unconditional profits (details omitted for brevity).

EC.3.4. Determinants of Disagreement

In Section 5.3, it was mentioned that the gap between the entrepreneurs' and investors' opening offers is predictive of disagreement. We next provide evidence for that result. In Table EC.8, we report the results of a random effects regression where the dependent variable is a 0/1 indicator for whether the two sides disagreed and the explanatory variables are the same as previously: fairness beliefs, offers and other controls. As can be seen, the fairness belief of the entrepreneur is positively related to disagreement. That is, the more the entrepreneur considers to be a fair compensation (for the entrepreneur), the more likely the disagreement. This effect remains unchanged in both size and significance whether or not we include offers.

We also see that offers play an important role in determining disagreement. Specifically, when first offers are included, the higher is the entrepreneur's first offer – i.e., the more generous to the investor – the less likely is disagreement, while the higher is the investor's first offer – i.e., the more demanding the offer – the more likely is disagreement.

EC.3.5. Supplement to Model Fit (Section 5.5)

As noted in Section 5.5, to get a sense of the variability in parameter estimates, we conducted a bootstrap procedure. Specifically, for each of 500 trials, we drew a random sample of N subjects – where N is the number of subjects in each treatment – and then re-estimated the model as explained in Footnote 15. Figures C1–C3 report histograms of the bootstrapped θ's. Consistent with the results in the main text, in nearly all cases, there is a noticeable rightward shit in the distribution between Common and Preferred Stock contracts.

EC.3.6. Additional Analysis for Experiment 2

EC.3.6.1. Summary Statistics In Table EC.9, we provide summary statistics on agreed shares as well as expected profits – both unconditional ($E[\pi]$) and conditional ($E[\pi|A]$) on agreement – for both the investor and entrepreneur. Panel (a) contains the results where the order was Common Stock (Rounds 1–5), followed by Preferred Stock (Rounds 6–10), while panel (b) contains the results for the reverse order and panel (c) contains the pooled results.

Table EC.9 Summary Statics: Agreed Shares and Expected Profits in Study 2

(a) Common Stock First

	Entrepreneur			Investor		
Contract	Share	$E[\pi]$	$E[\pi\|A]$	Share	$E[\pi]$	$E[\pi\|A]$
Common	46.64%	244.88	279.86	53.36%	305.12	321.14
Preferred	43.99%	171.76	193.54	56.01%	383.23	406.46

(b) Preferred Stock First

	Entrepreneur			Investor		
Contract	Share	$E[\pi]$	$E[\pi\|A]$	Share	$E[\pi]$	$E[\pi\|A]$
Common	45.70%	216.74	274.19	54.76%	299.45	325.81
Preferred	43.24%	164.90	190.26	56.01%	381.77	409.74

(c) Pooled

	Entrepreneur			Investor		
Contract	Share	$E[\pi]$	$E[\pi\|A]$	Share	$E[\pi]$	$E[\pi\|A]$
Common	46.14%	228.91	276.78	53.87%	301.90	323.22
Preferred	43.57%	167.87	191.70	56.43%	382.40	408.30

As can be seen, there are no apparent order effects on any variable of interest. In particular, for none of the variables in the table, as well as for the frequency of reaching an agreement can we reject the null hypothesis that the variables are equal for both orders (in all cases, $p > 0.1$). Now, turn to the comparison between contract types. Table EC.9 examines the negotiation outcomes by contract type and shows that the entrepreneur's share is actually *lower* with Preferred Stock contracts, but the difference is not statistically significant ($p = 0.321$) However, when looking at expected profits – either conditional or unconditional on agreement – we see that entrepreneurs earn substantially and significantly less when the investor is protected by a Preferred Stock contract ($p \ll 0.01$). This confirms that our result from Experiment 1 about entrepreneur earnings with Preferred Stock contracts were not due to order effects, insufficient time to learn or the presence of a third contract type.

EC.3.6.2. Determinants of Earnings In Section 5.4 we have seen that fairness beliefs play a role in explaining agreed outcomes in Experiment 1. Table EC.10 reports the average fairness beliefs in Experiment 2. Unsurprisingly, the entrepreneur's fairness belief about the share to the investor is always less than the investor's own fairness belief. However, while the difference is about 5 percentage points absent liquidation preference, the difference grows to over 10 points when investors are protected by liquidation preference, and the difference between player roles is significant (two-sample $t-$test, $p = 0.045$). More interesting is the fact that investors' fairness beliefs change very little, while the entrepreneur's fairness belief drops substantially (as theory suggests it should), and the difference is at least marginally significant (paired $t-$test, $p = 0.058$).[23]

Table EC.10 Fairness Beliefs (Share to Investor) By Player Role and Contract Type

	Player Role	
Contract	Entrepreneur	Investor
Common	52.57	57.70
Preferred	45.27	56.14

In Table EC.11 we report a series of random effects regressions of entrepreneur earnings on fairness beliefs and first offers, while also controlling for learning effects. The variable `Round` takes values 1 – 5, corresponding to the given period for each of the two different contract types. We also interact this variable with the contract regime (i.e., Common or Preferred Stock). Because expected earnings of the investor are simply 600 minus the entrepreneur's expected earnings, we only report results for the entrepreneur in the main text.

We see that the fairness belief of the investor negatively influences entrepreneurs' earnings, and this is at least marginally significant across specifications. Given the differences in fairness beliefs between the two contract regimes noted above, this partly explains why entrepreneur's suffer under Preferred Stock contracts – yet it is only a partial explanation as the indicator variable for Preferred Stock contracts is highly significantly negative.

Turning to column (2), we see that first offers are highly significantly negatively associated with entrepreneur earnings, which makes sense because higher offers indicate a higher share to the investor and a lower share to the entrepreneur. Finally, consider the learning variables `Round` and `Preferred Stock`×`Round`. The former variable is always negative but not significant, indicating that entrepreneurs' earnings actually decline over time in the absence of liquidation preference. In contrast, the interaction term is positive and significant. This suggests that some learning does occur in the presence of Preferred Stock contracts.

[23] A Wilcoxon signed rank test gives $p < 0.01$.

Table EC.11 Determinants of Entrepreneurs' Experiment in Study 2

Parameter	(1)		(2)	
Ent. Fairness	0.025	(0.110)	-0.239	(0.211)
Inv. Fairness	-0.276^{**}	(0.139)	-0.768^{***}	(0.186)
Ent. First Off			-1.331^{***}	(0.277)
Inv. First Off			-1.934^{***}	(0.392)
Preferred Stock	-97.822^{***}	(14.557)	-106.070^{***}	(11.918)
Round	-3.190	(1.966)	-5.145	(4.157)
Preferred Stock × Round	5.856^{***}	(1.835)	9.275^{**}	(4.429)
Constant	505.949^{***}	(17.040)	527.788^{***}	(31.735)
R^2	0.678		0.563	
N	288		276	

Note: Standard errors are corrected for clustering at the session level. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Figure C1 Bootstrapped θ Estimates for Single Investor Treatment

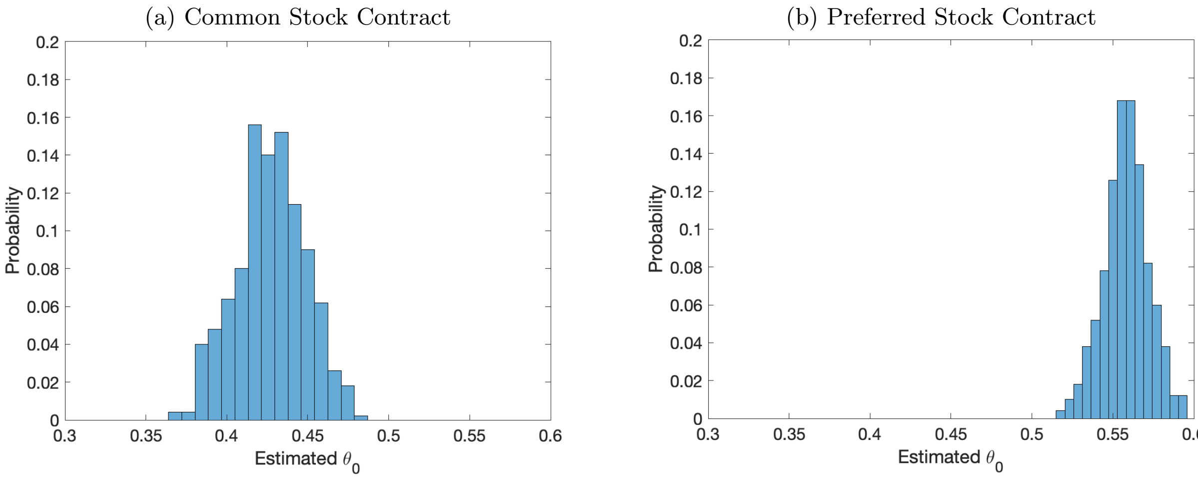


Figure C2 Bootstrapped θ Estimates for SEQ Treatment

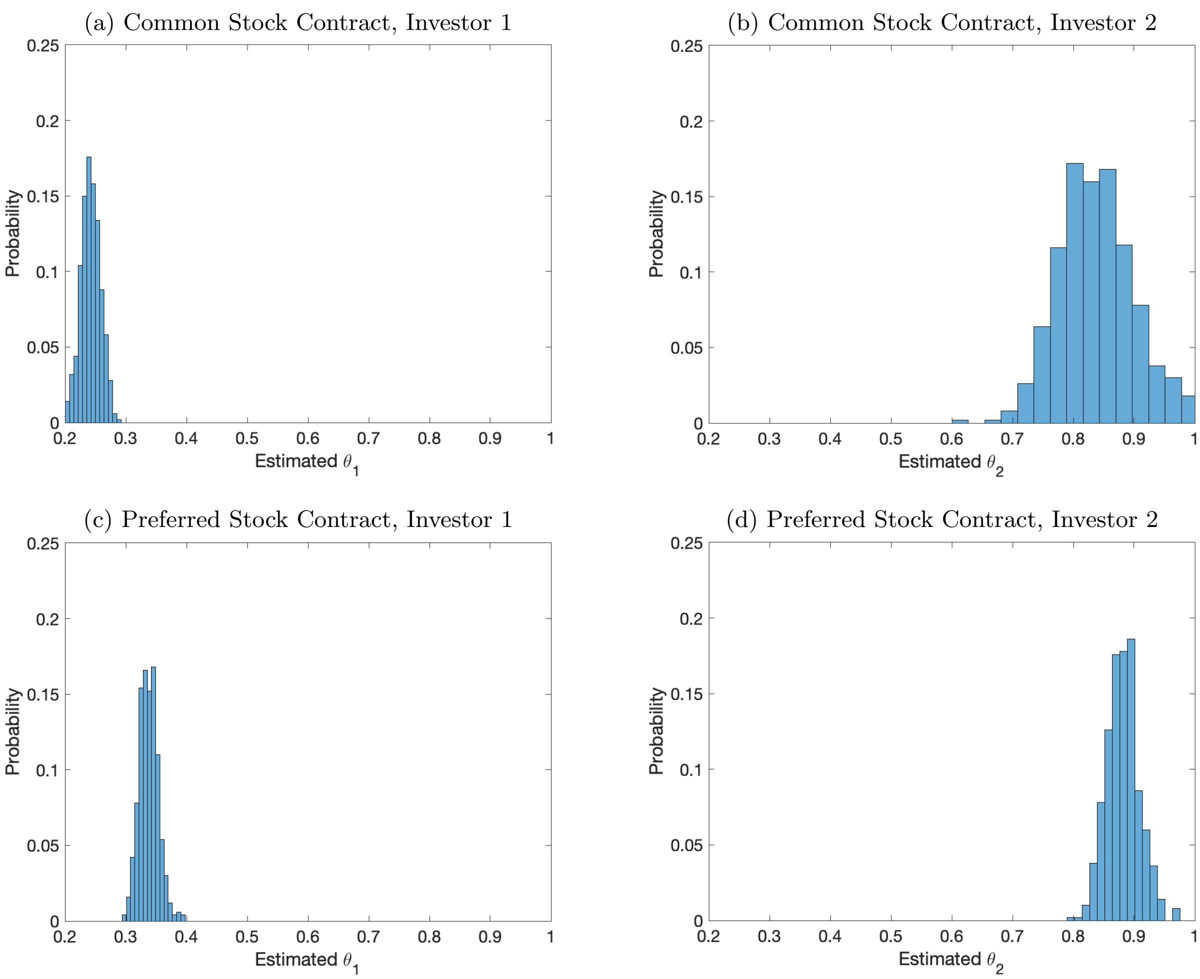
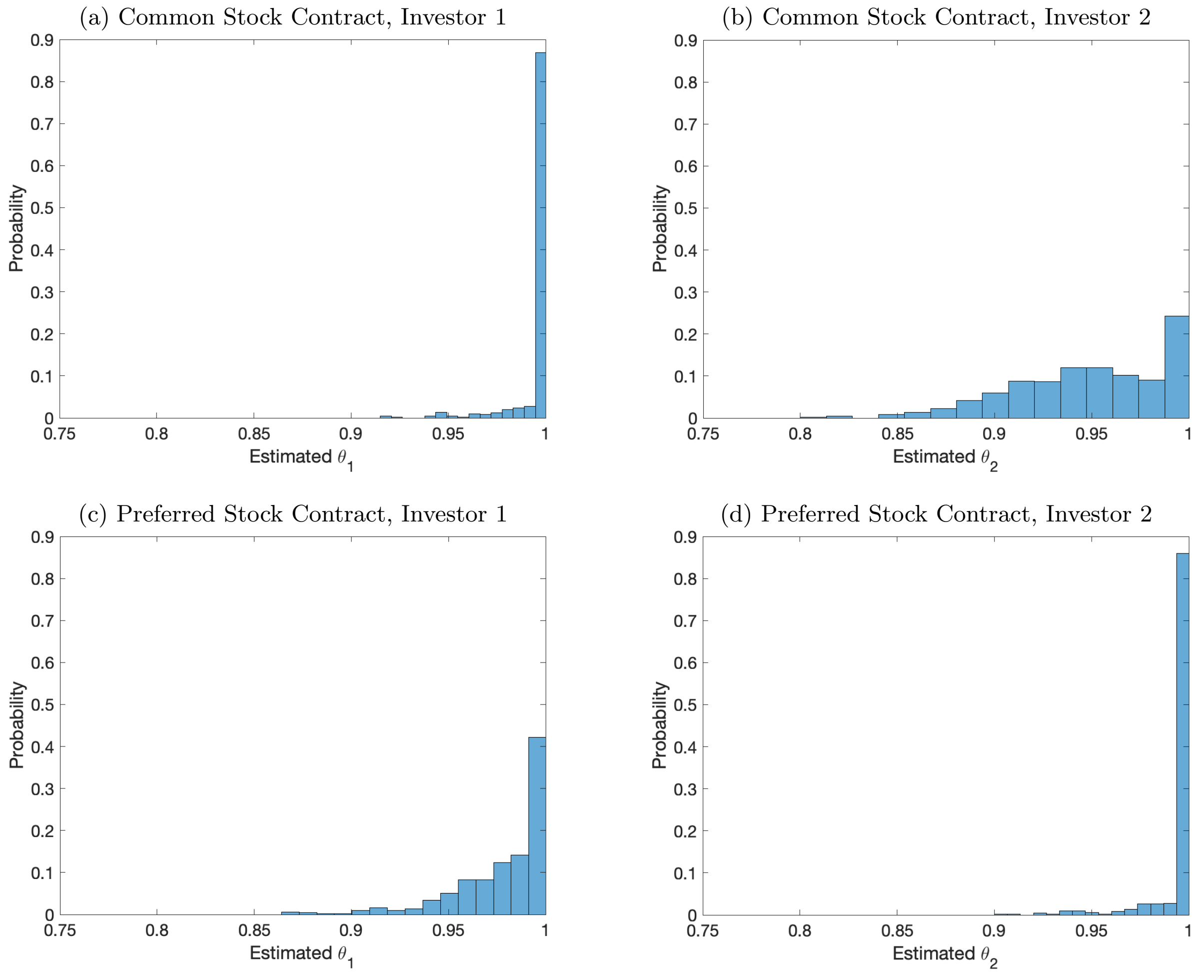


Figure C3 Bootstrapped θ Estimates for SIM Treatment



(a) Common Stock Contract, Investor 1

(b) Common Stock Contract, Investor 2

(c) Preferred Stock Contract, Investor 1

(d) Preferred Stock Contract, Investor 2