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ABSTRACT

This paper examines the division of founder shares in entrepreneurial ventures, focusing on the decision of whether or not to divide the shares equally among all founders. To motivate the empirical analysis we develop a simple theory of costly bargaining, where founders trade off the simplicity of accepting an equal split, with the costs of negotiating a differentiated allocation of founder equity. We test the predictions of the theory on a proprietary dataset comprised of 1,476 founders in 511 entrepreneurial ventures. The empirical analysis consists of three main steps. First we consider determinants of equal splitting. We identify three founder characteristics –idea generation, prior entrepreneurial experience and founder capital contributions – regarding which greater team heterogeneity reduces the likelihood of equal splitting. Second, we show that these same founder characteristics also significantly affect the share premium in teams that split the equity unequally. Third, we show that equal splitting is associated with lower pre-money valuations in first financing rounds. Further econometric tests suggest that, as predicted by the theory, this effect is driven by unobservable heterogeneity, and it is more pronounced in teams that make quick decisions about founder share allocations. In addition we perform some counterfactual calculations that estimate the amount of money 'left on the table' by stronger founders who agree to an equal split. We estimate that the value at stake is approximately 10% of the firm equity, 25% of the average founder stake, or $450K in net present value.

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Section 1: Introduction

Sooner or later every entrepreneurial team has to face a tough decision of how to divide founder shares. This can be difficult because it requires founders to assess the relative value of each other's contributions. A simple solution is to value all members equally; this avoids making value judgments and requires minimal negotiation. However, an equal split of founder equity may not always be appropriate, for some founders may feel like there are contributing relatively more and thus expect to receive more shares. This paper examines the division of founder shares in entrepreneurial ventures, focusing on the decision of whether or not to divide the shares equally among all founders.

Founding teams adopt a variety of approaches to splitting the ownership among themselves. For instance, at Pandora Radio (originally known as Savage Beast), an online music company that was founded by three people who had few *a priori* differences between them regarding their expected contributions to the venture, the team split the equity quickly and equally (Wasserman *et al.*, 2008b). At Ockham Technologies, where there were significant differences in the backgrounds of the three founders, the team engaged in a detailed negotiation over equity stakes and ended up deciding on an unequal split (Wasserman, 2003b). In this paper we provide a theory and some empirical evidence to explain under what circumstances founders choose to split their shares equally, the process of how they reach that decision, and how this decision may be related to subsequent outcomes.

Given the paucity of prior research on this topic, we develop a simple theoretical model of the central issues involved in founder equity splits. The model includes negotiation frictions, based on the cost (or discomfort) of valuing relative differences. It generates three sets of empirical predictions: (i) larger teams and teams with more heterogeneous founders are less likely to agree on an equal split; (ii) the same founder characteristics whose team-level heterogeneity predicts fewer equal splits, also affect individual share allocations in case of unequal splitting; and (iii) equal splitting is associated with lower valuations, for reasons discussed below.

We test these predictions on a unique, proprietary dataset comprised of 1,476 founders in 511 private ventures. A major barrier to studying the allocation of founder equity has been lack of data; standard datasets lack information about founders' initial ownership of their ventures, at least in part because of the sensitivity of such data, and fail to include such factors as the duration of the negotiation over equity

splits. To get past these barriers, we use data from the annual CompStudy survey of Technology and Life Sciences ventures in North America. The CompStudy survey was first conducted in 2000, and over the last decade, has become a standard annual reference for private-venture boards and CEOs regarding executive-compensation benchmarks. In 2008 and 2009, the CompStudy survey added detailed questions about founding teams and their equity splits. These data serve as the core of the empirical section of this paper, and enable us to begin opening the black box of founders' equity allocations.

As a starting point we compare the actual percentage of founder shares received against the benchmark of an equal split. We define *share premium = equity share – (1/N)*, where *N* is the number of founders in the venture. Figure 1 shows the distribution of share premia in our data. The most striking fact about this distribution is the spike at zero. Indeed, approximately one third of all founding teams simply decide to split the equity equally. Our objective is thus to understand the underlying reasons for this curious base finding.

Our empirical analysis is comprised of three main steps, closely following the theory's empirical implications. The first step is to explain the determinants of equal splitting. The theory suggests that larger teams are less likely to split the equity equally, and the data clearly supports this hypothesis. The theory suggests that equal splitting is less likely when there is more heterogeneity within the founding team. Our data allow us to consider four founder characteristics: years of work experience, prior founding experience (a.k.a. serial entrepreneurs), whether they contributed to the founding idea, and capital invested in the venture. We find that greater team heterogeneity in entrepreneurial experience, idea generation and capital contributions predict a lower probability of equal splitting. The theory also predicts more equal splitting when negotiation costs are high. We think of these not only in terms of direct cost (time and resources spent on negotiating) but mostly in terms of indirect costs, especially in terms of social barriers to evaluating differences. This social-cost interpretation is supported by a finding that teams where founders are related through family are more likely to do an equal split. Teams with more experienced founders are also less likely to split the equity equally.

The second step of the analysis focuses on the subset of teams that split the equity unequally, to analyze the determinants of founders' share premia. Our theory predicts that the same founder characteristics whose heterogeneity measures affect unequal splitting should also affect the size of the share premium among unequal splitters. Indeed, we find that prior entrepreneurial experience, contributing to the founding idea and investing capital are all associated with higher share premia.

The third step of the empirical analysis examines how equal splitting is related to valuation. We find a negative relationship between equal splitting and the pre-money valuation at the time of a first round of outside financing. Our theoretical model predicts such a negative relationship, not because of a direct causal effect but because of a "stakes effect" (founders are less hesitant to initiate negotiation when the stakes are high) and what we call a "negotiator effect" (better entrepreneurs are keen negotiators, both with outsider stakeholders and with each other). In this case a team's refusal to negotiate an unequal split may reveal an underlying weakness, a lack of entrepreneurial negotiation skills. Negotiating skills are obviously not directly observable, but we consider an indirect test, where we decompose the decision to split the equity into an expected and an unexpected component, arguing that the negotiator effect should work through the unexpected component. We indeed find that the relationship between equal splitting and valuation is driven by the unexpected component, and that the expected component has no explanatory power. This is consistent with unobserved heterogeneity, such as a negotiator effect.

We also examine the speed with which a team negotiates its division of equity. In our sample, 47% of all teams report that they agreed on an equity split within a day or less. Our theoretical model suggests that quick negotiations are associated with equal splitting, something we indeed find in the data. Furthermore, the theory suggests that the negative relationship between equal splitting and valuation should be concentrated among quick negotiators, which is supported by the empirical evidence. This last finding is particular striking, because it shows that processes deep inside the entrepreneurial venture might still be related to financial outcomes such as firm valuation.

We also consider the possibility that some teams have a distinct preference for equal splitting. This could be because of a desire to balance control rights, especially avoiding one founder's obtaining a majority of shares. Or it could be that founders have 'other-regarding' preferences (sometimes also called altruism or a preference for equality; see Fehr and Schmidt (2006)) that value equality by itself. We first show that such benefits of equal splitting are easily incorporated into our theoretical framework. We then provide some preliminary evidence that suggests that equal splitting is positively correlated with a preference to balance founder representation on the board of directors, consistent with the control argument. It is also positive correlated with equality of founder salaries and bonus targets, which is consistent with theories of other-regarding preferences.

In the final section of the paper we perform some counterfactual calculations to gauge how much money is at stake when a team decides to forgo negotiations and accept an equal split. Any such calculations

require bold assumptions, so we provide a variety of alternative approaches. Overall we find that the decision to allocate founder shares equally does not appear to be economically trivial.

Although we are not aware of any other paper that looks inside the black box of founder equity splits, our analysis still builds on a variety of prior literatures. The recent finance literature has emphasized that in order to understand a firm's financial structure, it is important to go back to the very beginnings of the firm (Kaplan *et al.*, 2004; Lemmon *et al.*, 2010). The work of Robb and Robinson (2009) also recognizes the importance of insiders (i.e., founders) in the capital structure of entrepreneurial firms. Hauswald and Hege (2006) examine ownership and control rights for joint ventures between established firms, and find a high incidence of equal share divisions.[4] The problem of dividing shares is closely related to the "division of a pie" problem that has been studied extensively in game-theoretic literature (e.g., Binmore *et al.*, 1986; Rubinstein, 1982). Interestingly, some of the recent game-theoretic literature examines why identical parties may still not always agree on an equal division (Ashlagiy *et al.*, 2008), whereas we are concerned with the question of why non-identical founders agree on an equal division. A small economics literature also discusses equal compensation for unequal agents (Bose *et al.*, 2010; Encinosa *et al.*, 2007). Finally, there is an organizational literature that examines the social factors that affect the formation of founding teams (e.g., Ruef *et al.*, 2003).

The remainder of this paper is structured as follows. In section 2 we develop a simple theoretical model and discuss its empirical implications. In section 3 we describe the CompStudy survey from which the data are taken, and explain the variables used in the empirical analyses. Section 4 examines the determinants of equal splitting. Section 5 analyzes determinants of individual share premia. Section 6 studies the relationship between equal splitting and valuations. Section 7 considers potential non-pecuniary benefits of equal splitting. Section 8 estimates the value at stake using counterfactual calculations. Section 9 briefly concludes.

Section 2: Theoretical Motivation

In this section we discuss the theoretical foundation and develop a simple formal model. Rather than seeking to develop a complex theory, we try to develop the simplest possible model to guide and

[4] For related work on joint ventures, see also Robinson & Stuart (2007); Dyer, Singh, & Kale (2008); and Gulati & Wang (2003).

interpret the empirical evidence. Suppose there are N founders, indexed by i=1,…,N. Founders need to decide how to split their venture's equity. They have imperfect information about the exact value each founder contributes to the venture, and face the following simple choice. Either they negotiate equity stakes, which requires that each founder incurs private costs k, or they all forgo those costs and simply split the equity equally. We assume that without negotiation costs, an equal split is the only focal point, i.e., it is not possible to negotiate an unequal split without incurring negotiation costs. We justify this by saying that any agreement on an unequal split requires founders to agree about how to value their respective differences, which is likely to involve some costly negotiation. The private costs k should be interpreted broadly, to include not only the time and resources devoted to evaluating differences among founders, but also the psychological costs and social impediments of discussing who contributes more value.[5]

There are three dates in the model. At date 0, the two founders have to decide whether or not to evaluate their differences. If they evaluate them, they incur the costs k, learn about the respective differences, and negotiate an equity split at date 1. If they don't evaluate their differences at date 0, they simple agree to an equal split at date 1. At date 2 the value of the venture, denoted by π, is revealed.

Consider the negotiation at time 1. For simplicity we assume that the founders bargain according to the Nash-Shapley bargaining value, although nothing depends on this. After incurring costs k, founders have common knowledge about their relative value-added to the venture, and split the equity according to $S_i = 1/N + \Delta_i$, where S_i denotes the percentage share received by the individual-founders and Δ_i is the share premium, resulting from the Nash-Shapley value. We will discuss the determinants of Δ_i in the empirical part of the paper.

If founders incur k, Δ_i becomes observable to all at date 1. At date 0, however, the founders only observe an imperfect signal, given by $\delta_i = \Delta_i + \varepsilon_i$. δ_i represents each founder's initial belief about his/her own value contribution, prior to going through an extensive process of communicating and evaluating this belief with his/her partner(s). We assume that ε_i are drawn independently from a common distribution. To obtain simple analytical expressions we use the uniform distribution over the interval [-u,u], where $u \geq Max|\Delta_i|$. Note that this distribution satisfied the condition $E(\varepsilon_i)=0$, so that each partner has

[5] Another possible cost of negotiating is that founders antagonize each other to the point of breaking up. In that case the cost of negotiation includes a term $\lambda\pi/N$, where λ is the probability of team break-up and π the expected value of the venture.

an unbiased belief about his/her relative value-added. A recent literature argues that entrepreneurs are optimists (Puri *et al.*, 2007). It is straightforward to extend the model to allow for optimistic founders who have biased beliefs about their value contribution. This would require a distribution with $E(\varepsilon_i)>0$, and imply that optimistic entrepreneurs are more likely to demand negotiation, and therefore less likely to split the equity equally.

We assume that at date 0, each partner has a choice of either accepting an equal split, which has the advantage of forgoing the evaluation costs k, or demanding a negotiation about equity splits. Even if only one partner demands negotiation, all have to incur k. The decision to demand negotiation is therefore given by a trade-off between the expected gains from negotiation versus the cost of bargaining. Formally, a partner asks for negotiation whenever $\delta_i\pi > k$, where π represents the founders' (rational) expectations of the future value of their company.[6] Using $\delta_i\pi < k \Leftrightarrow \varepsilon_i<(k/\pi)-\Delta_i$ and using the properties of the uniform distribution, the probability that founder i does not ask for negotiation is given by $[u+(k/\pi)-\Delta_i]/2u$. The probability of equal splitting at date 0 is given by the probability that none of the founders ask for negotiation, given by $\theta = \text{Prob}[\varepsilon_i<(k/\pi)-\Delta_i \text{ for all } i] = \Pi_{i=1,\ldots,N}[u+(k/\pi)-\Delta_i]/(2u)^N$.

The equilibrium of this model is as follows. At date 0, each partner observes his/her signal δ_i. They split the equity equally with probability θ. However, with probability $1-\theta$, at least one of the partners demands negotiation. In that case, all partners incur evaluation costs k. They discover their true differences Δ_i and split the equity according to $S_i = 1/N + \Delta_i$.

We now use this simple model to derive some empirical implications. Our discussion explicitly acknowledges that as econometricians we only observe a subset of the information available to the agents in the model. Moreover, to empirically explain equal splitting we could trivially assume that there exists a large portion of teams with $\Delta_i=0$. However, this amounts to assuming rather than explaining equal splitting. Instead, we assume that there is a non-degenerate distribution of Δ_i's, so that the case of $\Delta_i=0$ is a measure zero event. This means that our model only predicts equal splitting for teams that do not incur evaluation costs. We will return to this assumption later.

Consider first the role of team size. In our model, when one founder demands negotiation, the entire team ends up having to engage in the negotiation. Intuitively this suggests that larger teams are less

[6] Note that each founder observes his signal δ_i but not his partner's signal δ_j. At the time of initiating any negotiation or communication, s/he can therefore only consider his/her own signal.

likely to end up with an equal split. Consider the effect of adding a $N+1^{th}$ founder to a team of N. For simplicity, suppose that the additional founder does not perturb the relative value-added of the other founders, i.e., $\Delta_{N+1}=0$. In that case, using obvious notation, we have $\theta_{N+1} = \Pi_{i=1,\ldots,N+1}[u+(k/\pi)-\Delta_i]/(2u)^{(N+1)}$ so that $\theta_{N+1}/\theta_N=[u+(k/\pi)]/2u<1$. Moreover, because of the strict inequality, this result continues to hold in a neighborhood of $\Delta_{N+1}=0$. For teams with comparable levels of heterogeneity we state the first Empirical Implication.

Empirical Implication 1 (Team size): *Larger teams have a lower probability of equal splitting.*

Next we turn our attention to the negotiation costs k. We immediately note that the higher k, the greater the probability of equal splitting.[7] Again, as econometricians we cannot directly observe the value of k, but we may be able to identify some covariates that we denote by K_T – the subscript T refers to the fact that this variable varies at the team level.

Empirical Implication 2 (Evaluation costs): *If there are team-specific covariates K_T that are positively related to the evaluation costs k, then higher values of K_T are associated with a higher probability of equal splitting.*

Let us now examine the role of founder heterogeneity. For this consider any distribution of Δ_i's and consider a change where one founder's Δ_i increases while that of another founder, who has a smaller Δ_i, decreases.[8] Without loss of generality we focus on founders 1 and 2 with $\Delta_1 > \Delta_2$ and we denote the increase in heterogeneity by some small $\sigma > 0$. Using obvious notation, we have $\Delta'_1 = \Delta_1 + \sigma > \Delta_1 > \Delta_2 > \Delta_2 - \sigma = \Delta'_2$. Straightforward calculations reveal that $d\theta/d\sigma < 0$.[9] This says that greater heterogeneity among founders (as measured by an increase in σ) decreases the probability of equal splitting. The Δ_i's are again not observable to the econometrician. Let X_i be an observable covariate that varies at the individual-founder level and let $H_T(X_i)$ be a measure of the heterogeneity of this covariate within the team. Suppose that the covariate X_i is relevant to the share premium Δ_i then we obtain the following prediction.

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[7] Formally we note that $\text{sign}[d\theta/dk] = \text{sign}[d\log(\theta)/dk] = \text{sign}[\sum(1/\pi)]> 0$.

[8] Increases in heterogeneity involving more than two founders follow a similar logic.

[9] Evaluating $d\theta/d\sigma$ near $\sigma=0$ we note that $\text{sign}[d\theta/d\sigma] = \text{sign}[d\log(\theta)/d\sigma] = \text{sign}[(u+(k/\pi)-\Delta_2+\sigma)^{-1}-(u+(k/\pi)-\Delta_1-\sigma)^{-1}] = \text{sign}[\Delta_2-\Delta_1] < 0$.

Empirical Implication 3 (Team heterogeneity): *The greater the heterogeneity $H_T(X_i)$, the lower the probability of equal splitting θ.*

In addition to making predictions for the probability of equal splits, our model also makes predictions about the share premium Δ_i.[10]

Empirical Implication 4 (Share premium): *If for a covariates X_i the heterogeneity $H_T(X_i)$ lowers the probability of equal splitting θ, then X_i also affects the individual share premium Δ_i, and vice versa.*

Empirical Implication 4 says that the covariates that affect the share premium at the individual level are the same as the covariates whose heterogeneity affects the probability of equal splitting at the team level.

Finally we explore the relationship between the equity split decision and the value π of the company. Empirically we will measure π through a company's financial valuation. Our model suggests two reasons why equal splitting may be associated with lower valuations. First, it is easy to see that there is a direct negative effect of π on θ.[11] This is because teams that expect to have more profitable ventures are less likely to agree on an equal split. We call this the "stakes effect," and it says that founding teams with greater expectations have stronger incentives to negotiate their initial allocation of equity.

In addition to the "stakes" effect, we consider a second effect that we call the "negotiator" effect. The simple intuition is that keen negotiators make better entrepreneurs and also bargain harder among themselves. Put differently, entrepreneurs who obtain better deals by negotiating hard with their customers, suppliers, employees or investors may also be more inclined to negotiate among themselves. This suggests that negotiation costs are negative related to team quality. More formally, we assume that there is an unobservable quality parameter (μ, interpreted as the willingness to negotiate hard) that generates higher profits (i.e., π is increasing in μ) and at the same time is associated with lower negotiation costs (i.e., k is decreasing in μ).

[10] Note that by definition we have $\sum_{i=1,\ldots,N} \Delta_i=0$ so that Δ_i measures *relative* value-added. As a consequence, all founder-specific covariates X_i should be expressed in relative terms.

[11] Formally, $\text{sign}[d\theta/d\pi] = \text{sign}[d\log(\theta)/d\pi] = \text{sign}[\sum -(k/\pi^2)] < 0$.

Note that neither the stakes nor the negotiator effects imply a causal relationship between equal splits and lower valuations. In fact, the stakes effect reflects what econometricians refer to as reverse causality, whereas the negotiator effect is a case of unobserved heterogeneity.

Empirical Implication 5 (Valuation). *Equal splitting is associated with lower valuations because of a "stakes effect" where teams that expect a higher valuation have stronger reasons to negotiate an unequal split; and because of a "negotiator" effect where k is a decreasing function of team quality μ, so that an equal split becomes a sign of lower team quality.*

Our final set of empirical implications concerns the importance of negotiation itself. Our basic model set-up suggests that quick (slow) negotiation is associated with equal (unequal) splitting. Finding empirically a positive correlation between equal splitting and quick negotiation would thus confirm the fundamental premise of the model.[12] Moreover, combining this insight with Empirical Prediction 5 suggest that equal splitting with or without lengthy negotiations represent two distinct economic outcomes. In particular, the negative association between equal splitting and valuation that emerges from Empirical Implication 5 should only pertain to quick equal splitting, but not to equal splitting after lengthy negotiations.

Empirical Implication 6 (Negotiation speed and valuation): *If an equal split emerges from a quick negotiation it is associated with a lower valuation than if it emerges from a lengthy negotiation process.*

Section 3: Data and variables

3.1: Data sources

The data for this paper come from the annual CompStudy survey of private American ventures, for which one author is the lead investigator (see Wasserman, 2003a, 2006; 2011 for more details). The first CompStudy survey was conducted in 2000 with 211 private information technology ventures (broadly defined, including telecommunications). Two years later a parallel survey of life sciences ventures was

[12] Narrowly speaking the model actually predicts a perfect correlation, something we would not expect empirically. An imperfect correlation brings up an interesting theoretical question of how to interpret the off-diagonal elements. For teams that negotiate quickly but agree on an unequal split the natural interpretation is that founders already had a detailed understanding of their relative strengths prior to initiating the negotiation process. For teams that undergo a lengthy negotiation process, at the end of which they agree to an equal split, it appears that there is a distinct benefit to doing so. In Section 7 we further formalize this.

added, and since then, annual surveys of both industries have been conducted.[13] The list of target companies is generated by combining the list of private companies included in the VentureXpert database with the membership lists of local technology associations (e.g., the Massachusetts Technology Council). Invitations are sent to the CEOs and CFOs of those companies, and participants are encouraged to provide additional names of companies that meet the survey selection criteria.[14] To encourage participation in the survey, participants are offered a free copy of a detailed "CompStudy Compensation Report" that is based on the survey results and made available only to participants. The report includes detailed position-by-position breakdowns of salaries, bonuses, and equity holdings for the eleven most common C-level and VP-level positions in private ventures. The breakdowns provide compensation benchmarks by industry segment, geographic location, company size and age, financing rounds, founder versus non-founder status, and other metrics collected in the survey. Over the last decade, CompStudy's annual compensation reports have become a standard reference within the top management teams of private American ventures and for the board members and investors who are involved with those ventures.

The dataset used in this paper combines the Technology and Life Sciences surveys from 2008-2009, while controlling for the industry of each participant. A major benefit of conducting annual surveys, and of collecting one's own data, is that each year the researcher can add new questions to tackle emerging research questions that aren't addressed by existing datasets (e.g., about the equity-split negotiation process) or are highly confidential (e.g., about the percentage of equity received by each founder). For the 2008 CompStudy survey, we added detailed questions about each founding team, its prior work experience and relationships, and the equity split within the team. These questions were repeated in the 2009 survey. The dataset for this paper combines the survey responses from both 2008 and 2009, in both the technology and life sciences industries. Across those two surveys, we received responses from a total of 576 multi-founder teams. Dropping 65 repeat respondents in 2009, we arrive at our full dataset of 511 ventures and 1,476 founders (an average of 2.9 founders per venture).

[13] These two industries are the predominant ones for high-potential ventures. For instance, during the years covered by the CompStudy surveys (2000-2009), information technology ventures accounted for almost 30% of all IPOs, life sciences and healthcare for another 18%, the financial industry for almost 12%, and no other industry was above 8.3%. Similarly, these two industries receive far more venture capital than any other industries.

[14] The CEOs and CFOs of the ventures were targeted due to the sensitivity of the questions and the breadth of corporate knowledge required to completing the survey.

Each year, survey response rates vary between 10%-20%, higher than the typical response rates for surveys of similar firms and targeting similar levels of executives (e.g., Graham *et al.*, 2001). The surveys are conducted online so that fields can be validated as they are being entered. When possible, data are cross-checked with publicly-available information sources to validate the accuracy of the submissions. Each year, the survey data are checked for representativeness against the VentureXpert population. Regarding geographic distributions and industry segments, the dataset is a representative sample of private high-potential ventures in the technology and life sciences industries within the United States. Regarding age of venture, the dataset contains slightly younger companies given that VentureXpert only includes ventures that have raised institutional capital while our dataset also includes pre-funding ventures (9% of our sample).

Compared to a sample of public companies, this dataset should be far less susceptible to survivor biases. Our survey design allows us to capture companies at a very early stage, but it is still not possible to sample companies at birth, or before. Indeed, our analysis starts at a point in time where teams have been formed, so that we cannot analyze the process of how teams are formed. Clearly team formation is not random, but our research question does not require random assignment of founders to teams. On the contrary, we are interested in examining how those founders who are actually starting a company split the equity.

The standard concern with not sampling at birth is the possibility that the sample suffers from some survivorship bias. Given the unique nature of our data, no out-of-sample comparison is feasible. However, we can perform a within-sample test for survivor bias. Specifically, we analyze whether in our sample older ventures differ from younger ventures with regards to our two core dependent variables, the team-level equal-split dummy and (the absolute value of) the individual-level share premium received by each founder. We use t-tests of median split sub-samples of the dataset, splitting the ventures into 252 "older ventures" and 259 "younger ventures." If there is strong survivor bias in the sample, we would expect to see differences in these variables between the younger ventures and the older ventures, but we find no such bias. For the younger ventures, 32.0% had split the equity equally (standard deviation of 0.468); for the older ventures, 34.9% had split the equity equally (standard deviation of .478), with the t-test for difference being insignificant. Likewise, a t-test of the absolute value of the founder-level share premium (for the younger ventures, a mean of 9.2 and standard

deviation of 11.3; for the older ventures, a mean of 10.2 and standard deviation of 13.0) found no significant difference between older ventures and younger ventures.

Another sample selection issue concerns the question of exactly who gets counted as a founder. For our main analysis we use the self-reported data, but as a robustness check we also examined whether our main results could be affected by some unusual team definitions. There are two types of gray areas in the data. First, some founders join a while after founding, making them look more like non-founding executives. Second, some founders receive very low equity stakes, making them look more like employees. As a robustness check we removed from the sample all teams that had (i) any "founders" who joined more than two years after the first founder, and/or (ii) any founders with an equity stake that was more than 70% below the equal stake.[15] We found that this did not change the main insights of the analysis.

3.2: Empirical variables

Appendix 1 summarizes our core variables, their definitions, and the specific survey question used for each variable. Table 1 shows the descriptive statistics. Panel A shows the statistics for the team-level variables, and also separates the sample into teams that split the equity equally versus unequally. Panel B shows the descriptive statistics for the individual-founder variables, also separated into teams that split equally versus unequally. Table 2 reports the pair-wise correlation between the main variables of interest, Panel A at the team level and Panel B at the individual-founder level.

Our core dependent variables capture the allocation of equity within the founding teams. Our raw data include for each co-founder the specific percentage of equity received. Our initial analyses focus on the determinants of whether teams split the equity equally versus unequally. We use a binary variable of whether the team split the equity equally (i.e., all founders received the same percentage) or unequally. This binary variable is the basis for estimating the probability of an equal split, as captured by θ in the theory model. At the individual-founder level, to analyze the determinants of the percentage received by each founder we use the share premium, defined as the actual equity stake minus the equal stake (which is 1/N where N is the number of founders in the venture). This measures the deviation from the focal

[15] The 70% threshold applies to any founder that receives less than 15% in a team of two, less than 10% in a team of three, or less than 7.5% in a team of four. We also varied this threshold and obtained very similar results.

outcome of an equal split, and corresponds to the Δ_i's in the theory. Figure 1 shows the distribution of the share premium across the entire sample.[16]

Another important dependent variable is the pre-money valuation received by the venture during its first round of outside financing. While the post-money valuation is a measure of the total company value after completion of the round, the pre-money valuation is a more appropriate measure of the value actually captured by the founders.

Most economic theories would argue that the allocation of equity is a forward-looking decision, so that the optimal allocation depends largely on parameters that affect the fundamental problem of moral hazard in teams (Holmstrom, 1982). Unfortunately these parameters, such as the relative effort elasticity and the relative productivity of the different founders, are empirically hard to observe. Instead we have to contend with more objective measures of founder differences that are observable at the time of founding. While these variables may appear to be backward looking (e.g., founder X has prior entrepreneurial experience) they typically contain relevant forward looking information (e.g., founder X is more productive because of prior experience).

The independent variables include individual-founder and team-level variables. At the individual-founder level, we have four main variables: work experience, entrepreneurial experience, ideas and capital. Those correspond to the X_i's in the theory model.

Evans and Leighton (1989) suggest that education has greater returns in self-employment than in wage work, suggesting an important role for human capital in entrepreneurial firms. In addition, prior entrepreneurial experience may be particularly important (Gompers *et al.*, 2010). Thus, our individual-founder variables include two measures of human capital: the founder's years of work experience prior to founding the current venture, and whether the founder had prior founding experience ("serial entrepreneur").

[16] Because we are interested in the initial decision to split equity we do not examine any subsequent changes in founder shares. At the time of initial contracting founders can also specify so-called vesting clauses where some of the founder shares are earned over time on the basis of predefined milestones, but where the initial equity stake reflects the full potential share that can be earned by each founder. Our survey identifies which teams adopt founder vesting (though without details on the schedules and conditions). The adoption of founder vesting schemes is not significantly correlated with equal splitting.

Our third individual-founder variable captures whether the founder had been responsible for the idea on which the venture was founded ("idea person"). There is some debate about the value of bringing an idea into a team. The famous Arrow paradox (1962) argues that it is difficult to capture the value of an idea, because prior to disclosing an idea, no one is willing to pay for an unknown idea, and after disclosure the information has been transmitted so there is no further need to pay for it. The null hypothesis is thus that ideas do not affect the division of equity among founders. However, this reasoning only acknowledges the backward looking component of idea generation. One resolution of the Arrow paradox, suggested by Arora (1996), is that the idea generator also has complementary skills and non-codifiable knowledge that makes him/her uniquely valuable to the implementation of the idea. Under this hypothesis we would expect the idea generator to command a higher share premium because of forward-looking components, such as the creativity and implementation skills that idea generators bring into the founding team.

Our final individual-founder variable captures the financial contributions made by the founders to the venture. For each founder, the survey asks whether the amount of capital contributed falls into one of five categories: \$0k, \$1k-\$25k, \$26k-\$100k, \$101k-\$500k, and More than \$500k.[17]

An executive's economic gains may be influenced by the executive's position in the organization (e.g., Lazear *et al.*, 1981). Thus, we also consider data about the positions held by each of the founders within the venture, such as CEO, Chairman, CTO, or other.[18]

The main team variables include the size of the founding team, as well as the team-level versions of the individual-founder variables. This includes the team means of the individual-founder variables listed above, which we think of as negotiation cost covariates K_T. For example, firms with more experienced entrepreneurs may have a lower cost of negotiation, because their experience has hardened them to the

[17] There is no perfect way of converting this ordinal measure into a numerical measure of capital. To be pragmatic, we use the midpoints when available, otherwise the lowest point, resulting in the following categories (in \$ million): 0, 0.012, 0.063, 0.3 and 0.5. We tried several variations, such as varying the amount for the top-coded category, using natural logarithms or using categorical variables 1-5, and found that the results were very similar across all these permutations.

[18] This variable captures the main position by a founder, but it does not provide complete information on board representation for two reasons. First, these dummies are mutually exclusive, so that a founder would only report being the chair of the board if s/he did not hold any executive position such as CEO. Second, it does not measure board participation other than chair of the board. As a consequence we will use a different part of the survey to obtain information on board participation, as described below.

fact that negotiation is part of entrepreneurial life. As a measure of team heterogeneity (i.e., the $H_T(X_i)$) we focus on the coefficient of variation of the individual-founder variables.

We also consider some social impediments to negotiation. Organizational sociologists, such as Uzzi (1997) and Granovetter (1985; 2005), have shown how economic transactions are embedded in the prior social relationships of the participants in the transaction, with different relationships resulting in different transaction outcomes. Subsequent work has shown that, in particular for founding teams, prior relationships can have powerful impacts on the team's early evolution (e.g., Ruef *et al.*, 2003; Wasserman *et al.*, 2008a). In our study, the founding team's prior relationships are categorized into prior work experience together, prior founding experience together, prior friends but not coworkers, and related to each other at time of founding. In our theoretical framework, we think of these relationship variables impacting negotiation costs, i.e., we can think of them as part of the covariates K_T.

Our empirical analysis also includes standard controls for industry, geography and date. Industry dummies capture whether the venture is a technology venture versus a life-sciences venture.[19] The venture's location was captured by dummies for the two "entrepreneurship hubs," in California and Massachusetts, and one for non-US participants, namely a small subset of participants from Canada. Year dummies were used in the equity-split models to capture the year in which the equity was split, and in the financing models for the year in which the first outside round was raised.

The survey captures the elapsed time over which the founders negotiated the equity split, categorized by: 1 day or less, 2 days to 2 weeks, 2 weeks to 2 months, 2 months to 6 months, and More than 6 months. 47% of all teams agreed on an equal split after 1 day or less. This naturally captures our notion of forgoing negotiation, so that our analysis uses a dummy variable called "quick negotiation" that takes the value 1 if a team agreed on an equal split after 1 day or less, 0 otherwise.

We also use some additional variables for extensions and robustness checks. We examine four additional measures of team equality, concerning salaries, bonuses, board of directors and CEOs. The CEO measures come from the usual founder section of the survey, but the three remaining measures come from different parts of the survey. This data has three important limitations. First, all the compensation and board data is measured at the time of the survey, not at the time that the team

[19] More granular industry-level dummies were also analyzed, but did not change the results in any models.

allocates founder equity. Second, the compensation and board data identifies whether an executive is a founder or not, but due to anonymity concerns it cannot be linked to the individual founder data. As a consequence we can only link the compensation data to the founder data at the level of the firm. Third, the compensation data is only available for 279 out of 511 companies (54.6%), and the board data for 445 companies (87.1%).

We use the salary (bonus) data to create a simple dummy variable that takes the value 1 whenever all founders receive the same salary (bonus), 0 otherwise. The CEO (board) variable is based on whether control is given to a single founder or not. Specifically, the Balanced-CEOs dummy takes the value 1 either if none of the founders assume the position of CEO, or else if two founders share the CEO title; 0 otherwise. Only 6 out of 511 teams (1.2%) have Co-CEOs, 83 teams (16.2%) have no CEOs. 80 teams (15.7%) have no founders on the board, 126 teams (24.6%) have two or more founders on the board.

Section 4: Determinants of equal splitting

Table 3 reports the results from a series of Probit regressions where the dependent variable measures whether teams split the equity equally. The first model features industry, geography and year controls, as well as the team size variable. We note that the larger the founding team, the more likely it is to split the equity unequally ($p<0.01$). This result remains robust across all specifications, and is consistent with Empirical Implication 1. In terms of the control variables, the industry dummies, as well as the year dummies which are not reported for brevity's sake, are never significant. For the geographic controls, we find that Canadian teams are more likely to split the equity equally ($p<0.1$).

The second model of Table 3 adds team-level variables that are based on the individual-founder characteristics – entrepreneurial and work experience, idea generation and founder capital. A higher mean level for the former variables reflects greater team experience, which might lower the cost of negotiation. For example, if one of the founders is a serial entrepreneur, it is likely that his/her prior experience with splitting equity will make the negotiation process easier. Empirical Prediction 2 suggests that higher mean values reduce the probability of equal splitting. Table 3 shows that this argument holds for one of the four variables: teams with higher average work experience are less likely to split the equity equally.

Table 3 also considers the coefficient of variation as a heterogeneity measure for these variables. Empirical Prediction 3 suggests that heterogeneity should reduce the incidence of equal splitting. Table 3 shows this to be true for three out of four variables: the mix of serial entrepreneurs ($p<0.1$), idea people ($p<0.05$), and founder capital invested ($p<0.01$).

The third model of Table 3 adds some social determinants, focusing on the prior relationships among founders. These variables are measured at the team level. The main result is that teams where founders are related through family are more likely to split the equity equally ($p<0.1$). This suggests that close social ties may create a barrier to valuing relative differences among founding team members.

We performed a variety of robustness checks. Using a Logit instead of a Probit model does not affect the patterns of results. It may be argued that instead of looking at the mean of the experience variables one should consider the maximum. For example, it may be less important that all founders are serial entrepreneurs, all that matters is that at least one of them is. We therefore reran Table 3 using maxima instead of means, but found again that the only significant variable concerned work experience. Finally, for the three categorical variables (serial entrepreneurs, ideas and capital), instead of using the coefficient of variation, we considered using entropy as an alternative measure of heterogeneity. The results were very similar, except that the p value for the entropy measure of idea heterogeneity fell into the range of 0.12 to 0.14.

Section 5: Determinants of individual share premia

Empirical Prediction 4 concerns the division of equity among non-equal splitters. We focus on four key determinants of the share premium, namely whether a founder has prior start-up experience (i.e., serial entrepreneur), years of prior work experience, whether the founder contributed to the founding idea, and the amount of founding capital provided. Because our theory shows that only relative differences within teams matter, we de-mean all of the founder characteristics.

Model 1 of Table 4 reports the results from an OLS regression, where the standard errors are clustered by team. One econometric challenge is that all the share premia within a team necessarily add up to zero. This conflicts with the standard assumption of independently distributed errors. A similar problem occurs with the estimation of market shares (which always sum to one). The standard solution is to drop

one observation per market (or team in our context), which solves the linear dependency (Gaver *et al.*, 1988).[20] Given the small size of teams, estimation results can be sensitive as to which founder is dropped. We therefore re-estimate the model multiple times, dropping one founder per team at random. Model 2 reports the results of a bootstrapped OLS regression with one million iterations of randomly dropping one founder per team.

The results in models 1 and 2 are highly consistent. We find that the share premium is higher for serial entrepreneurs ($p<0.01$), for the idea person ($p<0.01$), and for founders who invest more founding capital ($p<0.01$). However, prior years of work experience do not have a significant impact on the share premium. This is consistent with Empirical Implication 4, because the three founder characteristics that affect the share premium are exactly the same three characteristics whose heterogeneity at the team level predicts unequal splitting.

In addition to the four founder characteristics, other aspects may affect the division of shares. Of particular interest are the managerial positions assumed by the different founders. In Model 3 and 4 of Table 4 we add controls for whether each founder is CEO, Chair or CTO. We find a significant share premium for the CEO ($p<0.01$) and for being the chair of the board of directors ($p<0.01$). Being a CTO has a positive but smaller effect on the share premium ($p<0.01$). The inclusion of founder roles may also influence the strength of the coefficients for founder characteristics. We note that the coefficients for founder ideas and founder capital remain highly significant. The coefficient for serial entrepreneurs is smaller and becomes marginally insignificant in Model 3. Moreover, in that model the negative relationship between experience and share premia becomes marginally statistically significant ($p<0.1$).

We perform several robustness checks for this model. First, it is possible to add team-level controls such as team size. In unreported regressions we added a full set of dummy variables to account for every possible team size. We found that all the dummies were insignificant and all the main coefficients retained very similar point estimates and significance levels. Upon reflection, this should not be a surprise, since the additional controls estimate differences in the average premium when we know that the average premium is zero by construction. The same can be said for any other team-level controls. Indeed, we also reran the model using team fixed effects and found again that the estimates were very

[20] Several other econometric methods have been developed to handle the adding-up constraint in market share data. However, these methods cannot be applied to our data, since they require a fixed number of firms per market, whereas in our data there are variable numbers of founders per team.

similar. Second, we augmented the sample to also include all equal splitters and found that while the coefficients were naturally smaller, they still retained their statistical significance. Third, we reran all regressions using the relative share premium, defined as (Share – Equal Share) / Equal Share, and obtained similar results.

There are many ways in which the analysis of share premia could be extended, and we plan to further explore these in future work. However, what matters for this paper is Empirical Prediction 4, which states that those founder variables whose heterogeneity measure affect the probability of equal splitting should also have a first-order effect on the share premium. The results from Table 4 support this prediction.

Section 6: The relationship between equal splitting and valuation

6.1 Base specification

To examine Empirical Implication 5, we explore the connection between equity splits and financing outcomes. As our financing outcome, we focus on (the natural logarithm of) the venture's pre-money valuation. This captures the value of the venture at the time of the investment round, but before the capital has been added to the value of the venture. The pre-money valuation is computed by multiplying the total founder shares with the price paid by the first round investors, thus measuring the value of the founders' stakes. We limit the analyses to first rounds that occur within three years of the equity split, in order to minimize the chances that intervening events might obfuscate the linkages between the founders' equity-split and financing events.[21]

The main independent variable of interest is whether or not a team splits the equity equally. The analysis of Table 5 also includes base controls for team size, industry and geography. In terms of time controls, we use financing year fixed effects to control for market conditions at the time of financing. In addition, we control for the time between when the equity was split and when the venture raised its first outside round. It is also possible that the team and social factors analyzed in Table 3 have a direct impact on the valuation. In the second model of Table 5 we include them as additional controls.

[21] In unreported robustness checks, we varied this window of time in each direction, with no changes in the results.

The main result from Table 5 is that equal splits have a negative and significant effect on valuation ($p<0.05$). This is consistent with Empirical Implication 5. In terms of magnitudes, the average pre-money valuation of equal splitters is close to $5M, compared to $5.5M for unequal splitters. We obtain very similar magnitudes when evaluating the regression coefficients at the mean. Broadly speaking, equal splitters are associated with a valuation discount of approximately 10%.

The number of observations in Table 5 drops by 42% for three reasons: the valuation is known but occurs beyond the 3 year horizon (9% of firms), the valuation is unknown (25% of firms), or the firm never raised any outside financing (8%). We first verified that the results continue to hold when we add the valuations that occur beyond the three years horizon. We then consider some additional tests for whether the remaining missing observations affect the main result. We consider the correlation between equal splitting and observing a valuation but find no significant relationship. We then estimate a Heckman framework where the outcome regression uses the pre-money valuation as dependent variables, just as in Model 1 of Table 5. In the selection equation the dependent variable equals 1 if the valuation is observed, 0 otherwise. The selection equation can be specified with or without the companies that never obtain outside financing. The independent variables are the usual controls from Model 3 of Table 3 (using Model 1 or 2 does not affect the results). We admit that we do not have a clever instrument for the selection equation, but note that statistical identification comes from the fact that the selection equation uses founding year controls, whereas the outcome regression uses financing year controls. We find that the effect of equal splits on valuations remains very similar, always retaining statistical significance. Moreover, the estimate of ρ, which measures the correlation of error terms across the selection and outcome equation, is statically insignificant, suggesting no significant selection effects. Thus we cannot detect any systematic biases between those companies that do or do not report their valuations.

6.2. Unobserved heterogeneity

Table 5 establishes a relationship between equal splits and pre-money valuation, but we do not claim that such a relationship is causal. Our data does not contain a natural experiment. More important, our theory emphasizes a non-causal relationship in the first place. In particular, the "negotiator" effect identified in our theory concerns unobserved heterogeneity.

We propose an additional test to further investigate this. If there is unobserved heterogeneity, we would expect it to show up in the error term of the Probit model in Table 3. For example, willingness to negotiate would increase the error term which leads to a higher probability of an equal split. While the true error is unobservable, we can proxy it with the difference between the realization ($p = 0 \text{ or } 1$) and the predicted probability ($\hat{p}$). We call $u=p-\hat{p}$ the unexpected component of the equal split, and note that higher values of u imply greater reluctance to negotiate.[22] We then decompose the coefficient of equal splits into its expected ($\hat{p}$) and unexpected (u) components and rerun the model of Table 5. Table 6 reports the results, showing that the unexpected component is negative and statistically significant, while the expected component is highly insignificant. This is consistent with unobserved heterogeneity. Obviously we cannot say what exactly the unobserved heterogeneity is, but our theoretical model identifies one possible source: If some teams have better quality because of some unobservable keenness to negotiate, then they are likely to both obtain better valuations and negotiate equity shares among themselves.

6.3. The role of negotiation speed

Empirical Implication 6 considers the role of the negotiation process. The theory suggests that quick negotiation should be associated with equal splitting. Moreover, while quick equal splitters should have a lower valuation than non-equal splitters, this need not be true for slow equal splitters. Put differently, in the case of quick negotiations, our model makes a clear prediction, whereas in the case of long negotiations, it is ambiguous whether equal splits should be associated with higher or lower valuations.

To empirically examine the role of negotiation speed, we first examine the relationship between quick negotiation and equal splits. From Table 1, Panel B we note that the two variables are positively correlated ($p<0.01$). In an unreported regression we confirm that this correlation continues to hold in a multivariate setting where we also control for all the independent variables for variables used in Table

[22] To get the intuition, consider a team with highly heterogeneous observable characteristics. From Table 3 we would expect this team to choose an unequal split, i.e., $\hat{p}$ is low. Suppose now that this team surprises us and does an equal split ($p=1$), suggesting strong aversion to negotiate. In that case we find that u is large (close to 1). Conversely, consider a very homogenous team, so that we might expect an equal split, i.e., $\hat{p}$ is high. If the team surprises us and does an unequal split ($p=0$), we suspect high willingness to negotiate, and we find that u is small (close to -1).

3.[23] This validates the fundamental premise of our theory that equal splitting is associated with quick negotiations.

To test Empirical Implication 6 we then examine whether the relationship between equal splits and valuation is affected by the speed of negotiation. In Table 7 we find that the negative relationship between equal splits and valuation appears to be driven by the quick negotiators: equal splitters who negotiate quickly have a negative and statistically significant coefficient ($p<0.05$), whereas equal splitters who reach an agreement after lengthy negotiations have a negative but insignificant coefficient. Note that the difference between the two coefficients is not statistically significant, so that we should remain somewhat cautious about the strength of the differential effect. Still, this provides at least some suggestive evidence of the differences between fast and slow equal splitters. This is consistent with Empirical Implication 6.

Section 7: Non-pecuniary benefits of equal splitting

7.1. Theoretical considerations

So far in our analysis the main benefit of equal splitting is the avoidance of negotiation costs. There may also exist non-pecuniary benefits to equal splitting. Our empirical analysis already revealed that some teams agree to an equal split after lengthy negotiation. The results from Tables 5 and 7 do not indicate any valuation benefits of equal splitting, but there may be other 'unobservable' or 'non-monetary' benefits that we will now consider.

To extend our theory, suppose there is a non-pecuniary benefit to equal splitting, denoted by b, which for simplicity is the same for all founders. After negotiation costs are sunk, all founders agree that an equal split is preferable to an unequal split whenever $Max(\Delta_i) \leq b$, otherwise they settle on the Nash-Shapley solution. Prior to incurring negotiation costs a founder demands negotiation whenever $\delta_i \pi > k+b$. Thus the probability of equal splitting becomes $\theta = \Pi_{i=1,\ldots,N}[u+((k+b)/\pi)-\Delta_i]/(2u)^N$. It is immediate that the higher the benefit of equal splitting, the higher the probability of equal splitting, both at the ex-post stage (slow negotiations) and the ex-ante stage (quick negotiations). This simple model extension

[23] The only other independent variable that is significant for explaining negotiation speed is team size, with larger teams requiring more time for negotiation ($p>0.01$).

shows that non-pecuniary benefits of equal splitting should not be viewed as an alternative theory, but as an extension of our basic model. [24]

7.2: Equal splitting and control

Let us consider the benefit of balancing control rights. In addition to allocating cash flow rights, shares also allocate voting rights.[25] The interesting difference is that there may be a threshold effect, where the value of owning shares jumps discreetly when a founder (or a subgroup of founders) crosses the majority threshold. Some teams may thus choose an equal split in order to avoid giving too much control to any one founder. Hauswald and Hege (2006) emphasize this argument in their analysis of joint ventures.

The benefit of balancing voting rights is not directly observable, so we consider a number of indirect tests. We ask whether teams that split the equity equally also manifest a desire to balance control in other dimensions. Entrepreneurial teams allocate voting control through founder shares, but they also allocate control when they make decisions about executive positions and participation on the board of directors. We ask whether equal splitters are more likely to have executive teams where no single founder is chosen to be the CEO or to sit on the board of directors. The CEO-Balance (Board-Balance) variable equals 1 whenever either none or more than one founder is CEO (sits on the board).[26]

Table 2 shows that CEO-Balance is positively correlated with equal splitting, although the correlation is statistically insignificant ($p<0.2$). However, Board-Balance is strongly correlated and statistically significant ($p<0.01$). The t-tests in Table 1 reveal the same relationships.

To further validate this relationship, we consider Probit regressions using the independent variables from Model 3 of Table 3 (using Models 1 or 2 yields similar results) plus the equal split dummy. Again we do not impose a causal interpretation on the estimated coefficients, but merely want to verify that the pair-wise correlation survives in a multivariate environment. The results are reported in Table 8. We find that

[24] Note also that this simple model extension provides a justification why in equilibrium an equal split may still occur with slow negotiations, something that is a measure zero event in the base model.

[25] Throughout this section we assume that all founder shares carry the same voting rights. While our survey does not ask about voting rights, one author's extensive field research suggests that unequal voting rights among founders are extremely uncommon.

[26] Section 3.2 discusses the limitations of our empirical measure.

the equal split coefficient is positive and significant ($p<0.05$) for Board-Balance, and positive but marginally insignificant ($p<0.13$) for CEO-Balance.[27] Overall there is credible evidence that equal splitters are more likely to also balance board control, but only weak evidence that they balance CEO control.

We called the benefit of balancing control a "private" benefit, implying that it has no direct impact on valuation. In unreported regressions we examine whether our measures of balanced control affect valuation by including them in the valuation model of Table 5. Indeed we find that they always remain insignificant.[28]

7.3: Equal splitting and compensation equality

Non-pecuniary benefits may involve things other than control, so we now extend the argument for a more general preference for equality. A recent literature explores the economic importance of "other-regarding preferences," a.k.a. inequity aversion or altruism (see Bartling *et al.*, 2007; Fehr *et al.*, 1999, 2006). Moreover, organizational scholars have long argued that equality within teams may promote better team cohesion and greater cooperation, especially within teams that operate under "social logics" (e.g., Adams, 1965; Leventhal, 1976). All these arguments suggest that some teams perceive other benefits of choosing equal allocations.

[27] As discussed in sections 3 and 5, we also observe whether a person is chairman of the board at the time of founding. We can thus construct a similar measure of balanced power where we consider both CEOs of board chairs as power positions, and ask about the balance of power. We find that this augmented balance measure is also uncorrelated with equal splitting.

[28] To look for further evidence of control balancing, we ask whether the benefit of balancing voting rights depends on team size. In teams of two, any deviation from equal splitting implies that the dominant founder obtains a voting majority. In teams of three, a small deviation from equal splitting implies that the dominant founder can collude with one other founder to obtain a supermajority. In teams of four, a small deviation from equal splitting implies that the dominant founder can collude with one other founder to obtain a simple majority. Etc. The main insight from this is that the benefit of balanced voting control is particularly high in teams of two, where any deviation from equal splitting automatically gives a single founder voting majority. We use this insight to empirically examine whether equal splitting is more prevalent among teams of two. We rerun the regressions of Table 3 (not reported here) adding a dummy for teams with exactly two founders. This dummy is positive and statistically highly significant ($p<0.01$), indicating that teams of two are indeed more likely to split the equity equally. This evidence is supportive of the notion that the decision to split the equity equally is partially driven by a desire to balance voting control. Moreover, this desire to balance control does not affect the other determinants of equal splitting, indicating that balance of control is a complementary and not an alternative explanation. (Not surprisingly, the one coefficient that is affected by the inclusion of the 'team of two' dummy is the team size coefficient itself. It remains negative but becomes insignificant, implying that the team size effect is driven by the higher incidence of equal sharing among teams with two founders.)

The empirical challenge is that preferences for equality are not directly measurable. However, one implication from these theories is that preferences for equality should not only affect the division of equity, but other team decisions, too. We already saw that equal splitters are more likely to balance certain control functions, most notably board participation. We now ask whether equal splitters are also more likely to adopt equal compensation packages. We focus on two central aspects of compensation, namely founder salary and target bonus.[29]

Table 2 shows that there is a positive and statistically highly significant ($p<0.01$) correlation between equal splitting and equal salaries, similar for the t-test in Table 1. Again we also consider a Probit regression for equal salaries, using the independent variables of Model 3 of Table 3 (using Models 1 or 2 yields similar results), plus the equal split dummy. Table 8 shows that that the equal split coefficient is positive and highly significant ($p<0.01$), confirming that the correlation between equal splits and equal salaries continues to hold in a multivariate environment. We also obtain very similar results for our measure of equal bonus targets. These tests indicate that equal splitting is positively correlated with other dimensions of compensation equality, supporting the notion that teams that allocate founder shares equally also exhibit a more general preference for team equality. Note also that these findings refute a potential alternative hypothesis that founder systematically trade-off equal equity allocations against unequal compensation packages.

Section 8: Estimating the value at stake

When founders agree to an equal split, how much money is at stake? In some sense, this question cannot be answered, because all we know is that teams that split the equity equally chose to do so. Any counter-factual estimates require bold assumptions and need to be interpreted with caution. We nonetheless find it worthwhile to provide a quantitative approximation of how costly the decision to split the equity equally might be.

Appendix B provides a detailed explanation of our methods to generate counterfactuals. In essence, we use the regression for the share premia among unequal splitters (Model 3 of Table 4) to generate out-of-sample predictions for the expected premium in the sample of equal splitters. We argue that this value can be thought of as an implied transfer of shares, because the decision to split the equity equally means

[29] Again, Section 3.2 discusses the limitations of our empirical measure.

that founders gave up the opportunity to receive their predicted share premia. To estimate average and median values of the implied transfer for each team, we focus on the absolute value of the predicted share premium. We then multiply this with a suitably chosen pre-money valuation to obtain the absolute premium value. This provides a dollar amount for the money at stake in the decision of whether to agree to an equal split. We also compare this premium value against the typical value of a founder stake.

Our counterfactuals estimate what equal splitters might have done if they had chosen to split the equity unequally, in the way that typical unequal splitters would have done. In terms of our theory, we can think of this as an artificial lowering of the negotiation costs k, sufficient to induce at least one founder to ask for negotiation. Our counterfactuals hold the fundamental profitability (π) of the company constant. Practically, we do not change the valuation of equal splitters, i.e., we assume that their valuation discount, found in Table 5, remains intact.

Table 9 presents results from the counterfactual exercise. It reports the mean and medians for three distinct calculations. The first pair of columns shows the estimates for the share premia. In the second pair of columns we multiply the share premia with the undiscounted pre-money valuation to obtain a simple estimate of the premium value. The third pair of columns uses a pre-money valuation discounted at 12.75%; the appendix provides an explanation for this choice of discount rate.

The first row shows the predictions for equal splitters, the second row for unequal splitters. We note that the mean values are well above the median values. This is typical for value distributions of entrepreneurial companies, where the majority of companies have moderate valuations, but a few companies have large positive values that raise the average well above the median.

The third row shows the actual premium values for unequal splitters. Comparing the second and third rows, we note a considerable difference between the actual and predicted share premium. The reason for this discrepancy is that the linear prediction model, while providing unbiased estimates of the average premium, severely underestimates the absolute premium. In the appendix we explain a method-of-moments rationale of using a stretch factor. While this factor preserves the mean of the predicted value, it also matches the mean (or median) absolute deviation of the predicted value to the mean (or median) absolute deviation of the actual value, within the sample of unequal splitters. The fourth row reports the mean and median stretch factor. In the fifth row we apply the stretch factor to the absolute predicted

share premia among equal splitters. We find that the stretch factor has a large impact on the estimated premium values, raising the discounted premium value above $500K.

Overall we note that the range of estimates for the value at stake with equal splitting varies from a low of $175,945 (median of the discounted value prediction) to a high of $788,637 (mean of the stretched value prediction). While we do not need to take a stance on which of these predictions is the most reasonable, we believe that the main insight from Table 9 is that the values at stake are substantial.[30]

Another way of assessing the value at stake is to compare the predicted premium values to the total value held by a typical founder. The sixth and seventh rows of Table 9 report the total value of shares held by the average or median founder. Rows eight to ten then show the relationship between the predicted premium value and this total share value. For equal splitters we find that the forgone premium value is worth between 17% - 40% of the total value of shares.

The results of Section 6 already showed that equal splitting is associated with a valuation discount, amounting to approximately 10% of the valuation. The results in this section do not even consider this discount, but identify additional costs of equal splitting. At the risk of oversimplifying we average the basic and stretched estimates, and find that the economic value at stake seems to amount to approximately 10% (± 2%) of the firm equity, 25% (± 5%) of the average founder stake, or $450K (± $120K) in net present value.

Section 9: Conclusion

This paper is concerned with the first financial arrangement within a new firm, namely the division of founder shares. It opens the black box of financial relationships within founding teams, something that has received little attention in the prior literature. Arguably the division of equity is one of the key decisions taken by founder teams, yet we find a surprisingly high incidence of equal splitting. We develop a simple theory where founders have a choice between accepting an equal split without having to negotiate, or undertaking costly negotiations to come up with a differentiated allocation of equity shares. The theory generates several empirical predictions that are borne out in the data. Moreover, simple calculations suggest that the amount of money at stake is far from trivial.

[30] Appendix 2 discusses some additional robustness checks.

Future research might look into other aspects of the financial contracts among founders. One important area of research is examining to what extent founder financing is used as a substitute for external financing (see also Robb and Robinson (2009)). Another interesting set of issues revolves around the evolution of founder equity shares, and the use of founder vesting schedules that make the allocation of equity shares contingent on milestones. More generally, we believe that there is a benefit to exploring the financing arrangements among the founders themselves.

Figure 1. Histogram of Share Premia

This figure shows the distribution of the share premia among the 1476 individual founders. The share premium is defined as the percentage equity share of a founder minus the equal share, given by 1/N where N is the number of founders in a team.

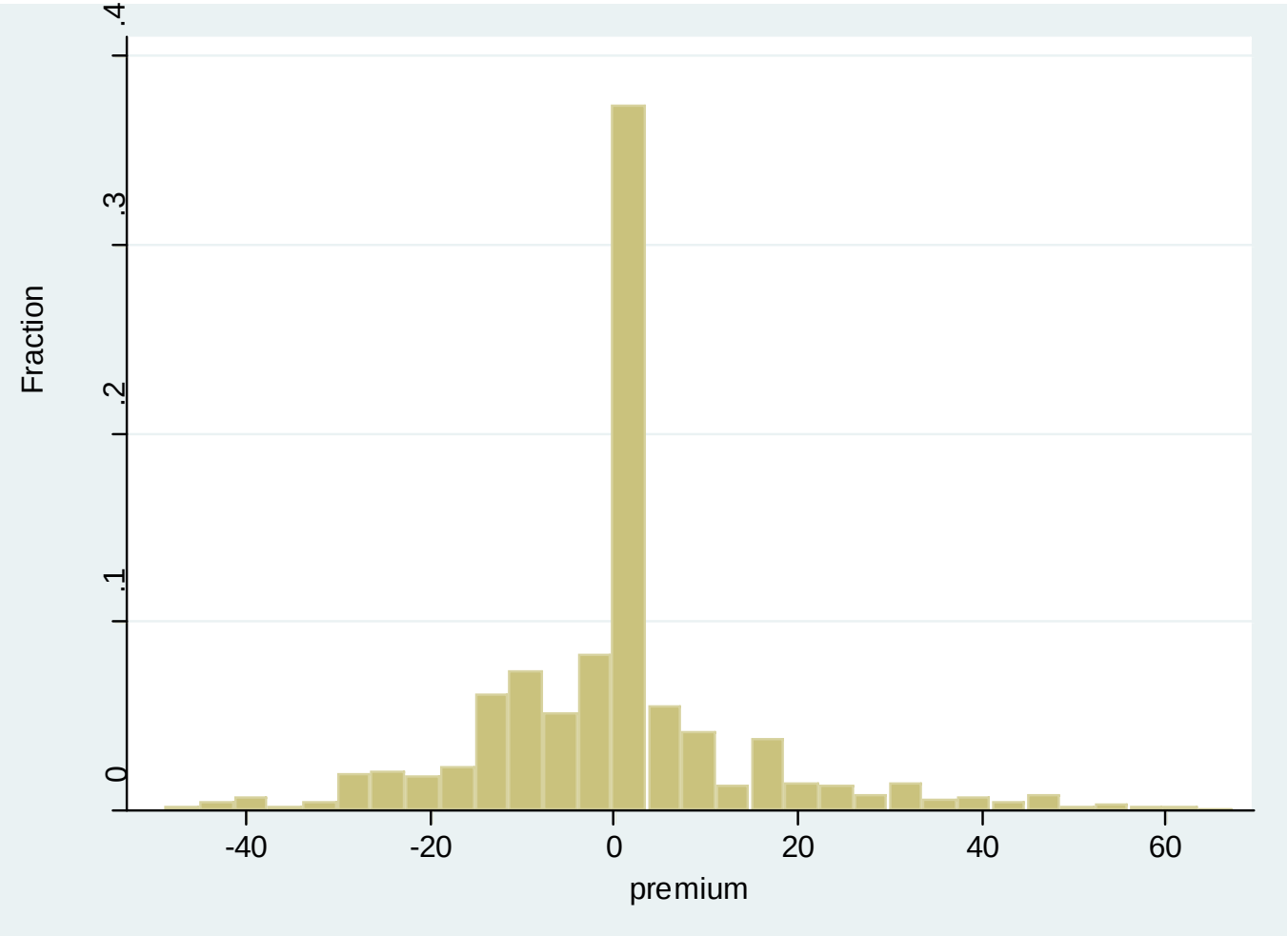

Table 1. Descriptive Statistics

This table provides descriptive statistics for all the variables used in the analysis. Variables are defined in Appendix 1. The table reports the number of observations, mean value and standard deviations in the full sample, in the subsample of teams that split the equity equally, and in the subsample of teams that split the equality unequally. Panel A features all variables that vary at the level of individual-founders, Panel B those that vary at the level of the team. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The last column reports the results of t-tests for the difference between the equal and unequal sample, where ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Panel A: Individual-founder Level

	All Founders			Equal Split			Unequal Split			t-test
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	
Share premium	1476	0.000	15.592	428	0.000	0.000	1048	0.000	18.507	
Serial entrepreneur (D)	1476	0.318	0.466	428	0.311	0.463	1048	0.322	0.467	
Prior years of work experience	1476	17.018	9.450	428	15.752	9.885	1048	17.534	9.222	***
Idea person (D)	1476	0.232	0.422	428	0.217	0.413	1048	0.238	0.426	
Founder capital invested	1476	0.055	0.113	428	0.059	0.111	1048	0.054	0.113	
CEO position	1476	0.294	0.456	428	0.332	0.471	1048	0.279	0.449	**
Chairman position	1476	0.045	0.208	428	0.044	0.206	1048	0.046	0.209	
CTO position	1476	0.146	0.353	428	0.187	0.390	1048	0.129	0.335	***

Table 1. Descriptive Statistics – continued

Panel B: Team Level

	All Teams			Equal-split teams			Unequal-split teams			t-test
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	
Equal split	511	0.335	0.472	171	1.000	0.000	340	0.000	0.000	NA
Team size	511	2.888	1.259	171	2.503	0.877	340	3.082	1.374	***
Team's CV of serial entrepreneurs	511	0.659	0.799	171	0.443	0.688	340	0.768	0.830	***
Team's CV of work experience	511	0.336	0.366	171	0.298	0.378	340	0.356	0.358	*
Team's CV of idea people	511	0.408	0.694	171	0.258	0.551	340	0.484	0.746	***
Team's CV of founder capital invested	511	0.447	0.650	171	0.213	0.479	340	0.564	0.692	***
Team's mean # of serial entrepreneurs	511	0.337	0.353	171	0.334	0.388	340	0.339	0.335	
Team's mean work experience	511	16.795	7.958	171	15.779	8.785	340	17.306	7.469	**
Team's mean # of idea people	511	0.239	0.346	171	0.213	0.351	340	0.252	0.343	
Team's mean founder capital invested	511	0.058	0.095	171	0.060	0.101	340	0.057	0.092	
Prior work experience together (D)	504	0.714	0.452	168	0.673	0.471	336	0.735	0.442	
Prior founding experience together (D)	498	0.189	0.392	167	0.174	0.380	331	0.196	0.398	
Friends-not-coworkers before founding (D)	496	0.375	0.485	167	0.347	0.478	329	0.389	0.488	
Related to each other (D)	494	0.107	0.310	167	0.138	0.346	327	0.092	0.289	
Quick negotiation (D)	446	0.469	0.500	153	0.608	0.490	293	0.396	0.490	***
Time to outside finance	400	1.375	2.581	130	1.097	1.447	270	1.951	3.969	**
Pre-money valuation (L)	298	1.219	1.053	92	1.013	1.270	206	1.312	0.928	*
Geography: Canada (D)	511	0.047	0.212	171	0.064	0.246	340	0.038	0.192	
Geography: California (D)	511	0.321	0.467	171	0.304	0.461	340	0.329	0.471	
Geography: Massachusetts	511	0.170	0.376	171	0.164	0.371	340	0.174	0.379	
Industry: IT (D)	511	0.564	0.496	171	0.596	0.492	340	0.547	0.499	
Industry: Life Sciences (D)	511	0.313	0.464	171	0.304	0.461	340	0.318	0.466	
CEO-Balance (D)	511	0.174	0.380	171	0.205	0.405	340	0.159	0.366	
Board-Balance (D)	445	0.463	0.499	147	0.565	0.498	298	0.413	0.493	**
Equal salary (D)	279	0.301	0.460	94	0.457	0.501	185	0.222	0.416	***
Equal Bonus Target (D)	279	0.573	0.495	94	0.670	0.473	185	0.524	0.501	**

Table 2. Correlations

This table reports the piecewise correlation coefficients for all the variables used in the analysis. Variables are defined in Appendix 1. Panel A features all variables that vary at the level of individual-founders, Panel B those that vary at the level of the team. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Panel A: Individual-founder Level (n=1,476)

	(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)
1. Equal split (D)								
2. Share premium	0.00							
3. Serial entrepreneur (D)	-0.01	0.17***						
4. Prior years of work experience	-0.09***	0.05*	0.25***					
5. Idea person (D)	-0.02	0.14***	0.14***	0.11***				
6. Founder capital invested	0.02	0.18***	0.20***	0.23***	0.06**			
7. CEO position (D)	0.05*	0.35***	0.18***	0.02	0.12***	0.07**		
8. Chairman position (D)	0.00	0.12***	0.17***	0.22***	0.09***	0.20***	-0.14***	
9. CTO position (D)	0.07**	-0.06*	-0.02	-0.07**	-0.02**	-0.06**	-0.27***	-0.09***

Table 2. Correlations – continued : Panel B: Team Level (n=511)

	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26
1. Equal split (D)	X																									
2. Team size	-0.22***	X																								
3. Team's CV of serial entrep's.	-0.19***	0.33***	X																							
4. Team's CV of work experience	-0.08*	0.13**	0.11**	X																						
5. Team's CV of idea people	-0.15***	0.10**	0.09**	-0.02	X																					
6. Team's CV of founder capital invested	-0.26***	0.08*	0.19***	0.09**	0.12**	X																				
7. Team's mean # of serial entrepreneurs	-0.01	-0.12**	0.15***	-0.12**	-0.02	.12**	X																			
8. Team's mean work experience	-0.09**	0.06	0.09**	-0.29***	0.05	0.04	0.26***	X																		
9. Team's mean # of idea people	-0.05	-0.05	-0.01	-0.04	0.29***	0.00	0.11**	0.16***	X																	
10. Team's mean founder capital invested	0.02	-0.06	-0.02	-0.11**	-0.06	0.19***	0.17***	0.24***	0.05	X																
11. Prior work exp'c together (D)	-0.07	0.24***	0.09**	-0.10**	0.05	0.03	0.02	0.12**	0.10**	0.02	X															
12. Prior joint founding exp'c (D)	-0.03	0.06	-0.04	-0.04	-0.02	0.08*	0.46***	0.16***	0.12**	0.16***	0.18***	X														
13. Friends-not-coworkers before founding (D)	-0.04	0.12**	0.02	0.02	0.03	0.05	0.02	-0.05	0.00	0.07	-0.16***	0.06	X													
14. Related to each other (D)	0.07	-0.07	-0.01	.12**	-0.04	0.12**	0.02	-0.02	-0.03	0.13**	0.00	0.12**	-0.04	X												
15. Quick negotiation (D)	0.20***	-0.21***	-0.12**	-0.05	-0.07	-0.05	0.00	0.00	0.04	0.07	0.01	0.03	-0.08*	0.11**	X											
16. Time to outside finance	0.16**	-0.09	-0.11**	-0.02	-0.02	0.00	-0.09	-0.06	-0.03	0.16***	-0.01	-0.02	0.08	0.03	0.18***	X										
17. Pre-money valuation (L)	-0.13**	0.08	0.00	-0.06	-0.09	0.06	0.04	0.13**	0.08	0.09	0.08	0.05	-0.11*	0.02	-0.05	0.08	X									
18. Geography: Canada (D)	0.06	0.07	0.01	0.03	0.04	-0.02	0.00	0.07	-0.02	0.09**	0.06	-0.08*	-0.03	-0.02	-0.01	0.03	-0.17**	X								
19. Geography: California (D)	-0.03	0.03	-0.02	-0.03	-0.01	-0.04	0.01	-0.05	-0.02	0.00	0.01	0.02	-0.05	0.05	-0.05	-0.05	0.05	-0.15***	X							
20. Geography: Mass. (D)	-0.01	0.02	0.02	0.00	0.02	-0.02	-0.05	0.04	-0.02	-0.01	-0.04	0.03	-0.04	-0.04	0.02	0.06	0.14**	-0.10**	-0.31***	X						
21. Industry: IT (D)	0.05	-0.08**	-0.01	-0.04	0.09**	-0.01	-0.03	-0.22***	-0.20***	-0.07	-0.01	0.01	-0.08*	.11**	0.03	-0.05	-0.05	-0.01	0.04	-0.01	X					
22. Industry: Life Sciences (D)	-0.01	0.06	0.01	0.07	-0.10**	0.02	0.03	0.23***	0.28***	-0.01	0.03	0.03	0.02	-0.09**	0.02	0.02	0.01	-0.01	-0.06	0.00	-0.77***	X				
23. CEO-Balance (D)	0.06	0.04	0.08*	-0.02	-0.07	0.01	-0.01	0.06	0.01	0.08*	-0.04	-0.02	0.00	0.03	-0.01	0.11**	-0.02	-0.03	-0.04	0.04	-0.13**	0.16***	X			
24. Board-Balance (D)	0.14**	0.07	-0.04	0.04	0.01	-0.11**	0.02	-0.08	-0.01	-0.01	0.05	0.04	0.03	-0.04	-0.09*	0.03	-0.01	0.05	0.08	-0.14***	0.03	-0.04	0.01	X		
25. Equal salary (D)	0.24***	-0.19***	-0.11*	0.04	-0.02	-0.11*	-0.04	-0.10	-0.08	0.05	-0.10*	-0.08	-0.02	-0.07	0.10	-0.06	-0.07	-0.01	0.01	-0.07	0.13**	-0.12**	0.08	0.26***	X	
26. Equal Bonus Target (D)	0.14**	-0.08	-0.01	0.01	0.13**	-0.10*	0.03	-0.03	-0.07	0.04	-0.04	-0.05	-0.01	-0.06	0.03	0.03	-0.07	-0.09	0.08	0.00	0.10	-0.14**	0.11*	0.19***	0.53***	X

Table 3. The Determinants of Equal Splitting

This table reports the estimates from three Probit regressions where the dependent variable, called Equal split, takes the value 1 whenever a team splits the equity equally, 0 otherwise. The unit of analysis is a team. All independent variables are defined in Appendix 1. All four models control for team size (i.e., the number of founders), for geographic controls (California, Massachusetts, Rest of US and Canada) and for industry controls (information technology, life sciences and other) and for a set of dummy variables for the year when the founder split the equity. The four founder characteristics are whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. Model 3 add the average team values and the heterogeneity measures for each of the four founder characteristics. Model 3 further adds four dummy variables about the prior relationships among the founders, namely whether any of the founders had worked together before founding the venture, whether any of the founders had founding a prior venture together, whether any of the founders had been friends but not co-workers before founding the venture, and whether any of the founders were related to each other. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable:	Model 1			Model 2			Model 3		
Equal split	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Team size	-0.317	(0.07)	***	-0.223	(0.07)	***	-0.212	(0.07)	***
Team's mean # of serial entrepreneurs				0.198	(0.18)		0.217	(0.21)	
Team's mean work experience				-0.017	(0.01)	*	-0.019	(0.01)	**
Team's mean # of idea people				-0.131	(0.20)		-0.102	(0.20)	
Team's mean founder capital invested				0.735	(0.69)		0.790	(0.72)	
Team's CV of serial entrepreneurs				-0.169	(0.09)	*	-0.162	(0.09)	*
Team's CV of work experience				-0.182	(0.20)		-0.199	(0.21)	
Team's CV of idea people				-0.222	(0.11)	**	-0.209	(0.11)	**
Team's CV of founder capital invested				-0.589	(0.11)	***	-0.608	(0.12)	***
Prior work experience together (D)							0.026	(0.15)	
Prior founding experience together (D)							-0.074	(0.20)	
Friends-not-coworkers before founding (D)							-0.018	(0.14)	
Related to each other (D)							0.402	(0.21)	*
Geography: Canada (D)	0.525	(0.29)	*	0.498	(0.30)	*	0.520	(0.31)	*
Geography: California (D)	-0.007	(0.14)		-0.070	0.15		-0.097	(0.15)	
Geography: Massachusetts	0.009	(0.17)		-0.039	(0.17)		-0.006	(0.17)	
Industry: IT (D)	0.199	(0.19)		0.262	(0.20)		0.242	(0.21)	
Industry: Life Sciences (D)	0.157	(0.20)		0.263	(0.23)		0.280	(0.24)	
Split-year dummies	Yes			Yes			Yes		
Constant	0.379	(0.27)		0.779	(0.33)	**	0.752	(0.36)	**
Number of Observation (Teams)	511			511			511		
Prob > χ2	0.0000			0.0000			0.0000		
Pseudo R2	0.0591			0.1376			0.1422		

Table 4. Analysis of Share Premia

This table reports the estimates from OLS regressions where the dependent variable is the share premium, which measures the difference between the percentage of equity received by a founder and the percentage of equity received under an equal sharing rule. The unit of analysis is the individual-founder, and the sample includes only those teams that did not share the equity equally. All independent variables are defined in Appendix 1. All models use four founder characteristics, namely whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. Models 3 and 4 also include dummy variables measuring founder roles, namely whether the founder is a CEO, Chairman of the board or CTO. All independent variables are demeaned at the team level. (D) means that the variable is a dummy variable. Models 1 and 3 reports the results from OLS regressions. Models 2 and 4 reports the results from one million iterations of OLS regressions with bootstrapped standard errors, where one founder per team was randomly dropped in each iteration. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable	Model 1: OLS			Model 2: Bootstrapped			Model 3: OLS			Model 4: Bootstrapped		
Share premium	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Serial entrepreneur (D)	8.877	(2.28)	***	7.785	(2.23)	***	2.806	(2.13)		4.449	(2.18)	**
Work experience	-0.113	(0.13)		-0.132	(0.12)		-0.239	(0.13)	*	-0.179	(0.11)	
Idea person (D)	14.986	(2.71)	***	9.975	(2.83)	***	9.011	(2.50)	***	6.647	(2.64)	**
Founder capital invested	71.988	(13.34)	***	65.326	(15.48)	***	54.243	(12.58)	***	49.205	(14.42)	***
CEO position (D)	0.000	(0.00)	***	-0.408	(0.58)		19.860	(1.82)	***	13.999	(1.79)	***
Chairman position (D)							21.504	(5.01)	***	17.182	(5.26)	***
CTO position (D)							7.559	(2.14)	***	6.323	(2.03)	***
Constant							0.000	(0.00)	***	0.071	(0.00)	
Number of Observation	1048			708			1048			708		
Number of Teams	340			340			340			340		
Prob > F	0.0000			0.0000			0.0000			0.0000		
Pseudo R2	0.1896			0.1764			0.3393			0.2845		

Table 5. The Effect of Equal Splitting on Valuation

This table reports the estimates from two OLS regressions where the dependent variable is the natural logarithm of the company's pre-money valuation, measured at the time of the first external financing round, provided the round occurred within three years of the date of the equity split. The unit of analysis is a team. All independent variables are defined in Appendix 1. The key independent variable is Equal split, which is a dummy variable that takes the value 1 whenever a team splits the equity equally, 0 otherwise. All models control for team size (i.e., the number of founders), for the time elapsed (measured in years) between the date of the equity split and the date of the first external financing round; for geographic controls (California, Massachusetts, Rest of US and Canada) and for industry controls (information technology, life sciences and other) and for a set of dummy variables for the year when the financing round occurred. The four founder characteristics are whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. Model 2 includes the average team value for each of the four founder characteristics, as well as heterogeneity measures for the four founder characteristics, namely the coefficient of variation within a team. It further adds four dummy variables about the prior relationships among the founders, namely whether any of the founders had worked together before founding the venture, whether any of the founders had founding a prior venture together, whether any of the founders had been friends but not co-workers before founding the venture, and whether any of the founders were related to each other. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable:	Model 1			Model 2		
Premoney valuation (L)	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Equal split	-0.296	(0.14)	**	-0.320	(0.15)	**
Team size	0.074	(0.05)		0.131	(0.07)	**
Time until first institutional round of financing	0.135	(0.08)		0.120	(0.09)	
Team's mean # of serial entrepreneurs				0.010	(0.20)	
Team's mean work experience				0.012	(0.01)	
Team's mean # of idea people				0.331	(0.19)	*
Team's mean founder capital invested				0.951	(0.59)	
Team's CV of serial entrepreneurs				-0.075	(0.09)	
Team's CV of work experience				-0.100	(0.23)	
Team's CV of idea people				-0.203	(0.09)	**
Team's CV of founder capital invested				0.034	(0.09)	
Prior work experience together (D)				0.047	(0.14)	
Prior founding experience together (D)				-0.138	(0.16)	
Friends-not-coworkers before founding (D)				-0.225	(0.12)	*
Related to each other (D)				0.043	(0.24)	
Geography, industry and financing-year dummies	Yes			Yes		
Constant	1.146	(0.30)	***	0.718	(0.40)	*
Number of Observation (Teams)	298			286		
Prob > F	0.0001			0.0000		
R Squared	0.1646			0.2159		

Table 6. Expected and Unexpected Components of the Equal Split Effect

This table reports the estimates from two OLS regressions where the dependent variable is the natural logarithm of the company's pre-money valuation, measured at the time of the first external financing round, provided the round occurred within three years of the date of the equity split. The unit of analysis is a team. All independent variables are defined in Appendix 1. The key independent variables are the expected and unexpected components of the equal split decision. The expected component is given by the predicted probability of an equal split, derived from Model 4 of Table 3. The unexpected component is given by difference between the equal split dummy variable and the predicted probability of an equal split, derived from Model 4 of Table 3. All models control for team size (i.e., the number of founders), for the time elapsed (measured in years) between ate of the equity split and the date of the first external financing round; for geographic controls (California, Massachusetts, Rest of US and Canada) and for industry controls (information technology, life sciences and other) and for a set of dummy variables for the year when the financing round occurred. The four founder characteristics are whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. Model 2 includes the average team value for each of the four founder characteristics, as well as heterogeneity measures for the four founder characteristics, namely the coefficient of variation within a team. It further adds four dummy variables about the prior relationships among the founders, namely whether any of the founders had worked together before founding the venture, whether any of the founders had founding a prior venture together, whether any of the founders had been friends but not co-workers before founding the venture, and whether any of the founders were related to each other. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable:		Model 1			Model 2	
Premoney valuation (L)	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Expected component of equal split	-0.136	(0.43)		-0.627	(1.09)	
Unexpected component of equal split	-0.326	(0.15)	**	-0.31	(0.16)	*
Controls from Model 1 of Table 5	Yes					
Controls from Model 2 of Table 5				Yes		
Number of Observation (Teams)	286			286		
Prob > F	0.0002			0.0000		
R Squared	0.1612			0.2161		

Table 7. The Impact of Negotiation Length

This table reports the estimates from two OLS regressions where the dependent variable is the natural logarithm of the company's pre-money valuation, measured at the time of the first external financing round, provided the round occurred within three years of the date of the equity split. The unit of analysis is a team. All independent variables are defined in Appendix 1. The key independent variable are Equal and quick split, which is a dummy variable that takes the value 1 whenever a team splits the equity equally and reaches an agreement within a day or less, 0 otherwise; Equal and slow split, which is a dummy variable that takes the value 1 whenever a team splits the equity equally but does not reach an agreement within a day or less, 0 otherwise; Unequal and quick split, which is a dummy variable that takes the value 1 whenever a team splits the equity unequally and reaches an agreement within a day or less, 0 otherwise. All models control for team size (i.e., the number of founders), for the time elapsed (measured in years) between ate of the equity split and the date of the first external financing round; for geographic controls (California, Massachusetts, Rest of US and Canada) and for industry controls (information technology, life sciences and other) and for a set of dummy variables for the year when the financing round occurred. The four founder characteristics are whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. Model 2 includes the average team value for each of the four founder characteristics, as well as heterogeneity measures for the four founder characteristics, namely the coefficient of variation within a team. It further adds four dummy variables about the prior relationships among the founders, namely whether any of the founders had worked together before founding the venture, whether any of the founders had founding a prior venture together, whether any of the founders had been friends but not co-workers before founding the venture, and whether any of the founders were related to each other. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable:	Model 1			Model 2		
Premoney valuation (L)	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Equal and quick split	-0.395	(0.20)	**	-0.469	(0.21)	**
Equal and slow split	-0.228	(0.22)		-0.293	(2.23)	
Controls from Model 1 of Table 5	Yes					
Controls from Model 2 of Table 5				Yes		
Number of Observation (Teams)	275			275		
Prob > F	0.0001			0.0000		
R Squared	0.2408			0.2440		

Table 8: Equal Splits, Balance of Control and Compensation Equality

This table reports the estimates from four Probit regressions where the dependent variables are: CEO-Balance, which takes the value 1 if none of the founders assume the position of CEO, or if two or more founders share the CEO title; 0 otherwise. Board-Balance, which takes the value 1 if none of the founders sit on the board, or if two or more founders sit on the board; 0 otherwise. Equal Salary, which takes the value 1 if the remaining founders (at the time of the survey) received equal salaries; 0 otherwise. Equal bonus Target, which takes the value 1 if the remaining founders (at the time of the survey) received equal bonuses; 0 otherwise. The unit of analysis is a team. All independent variables are defined in Appendix 1. The key independent variable is Equal split, which is a dummy variable that takes the value 1 whenever a team splits the equity equally, 0 otherwise. All models control for team size (i.e., the number of founders); for geographic controls (California, Massachusetts, Rest of US and Canada) and for industry controls (information technology, life sciences and other) and for a set of dummy variables for the year when the founder split the equity for a set of dummy variables for the year when the financing round occurred. The four founder characteristics are whether a founder is a serial entrepreneur (i.e., has prior founding experience), the number of years of work experience before founding the venture, whether a founder came up with the idea on which the venture was based, and the amount of initial founding capital provided by the founder. The regression includes the average team value for each of the four founder characteristics, as well as heterogeneity measures for the four founder characteristics, namely the coefficient of variation within a team. It further adds four dummy variables about the prior relationships among the founders, namely whether any of the founders had worked together before founding the venture, whether any of the founders had founding a prior venture together, whether any of the founders had been friends but not co-workers before founding the venture, and whether any of the founders were related to each other. (D) means that the variable is a dummy variable; (L) means that the natural logarithm of the variable is reported. The table reports the coefficient estimate and its associated robust standard errors. ***, ** and * indicate statistical significance at confidence levels of 99%, 95% and 90% respectively.

Dependent variable:	CEO-Balance (D)			Board-Balance (D)			Equal Salary (D)			Equal Bonus Target (D)		
	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig	Coef.	(S.E.)	Sig
Equal split	0.238	(0.16)		0.358	(0.15)	**	0.851	(0.20)	***	0.586	(0.20)	***
Team size	0.03	(0.06)		0.103	(0.07)		-0.176	(0.13)		-0.062	(0.08)	
Team's mean # of serial entrepreneurs	-0.106	(0.25)		0.336	(0.22)		-0.394	(0.32)		0.148	(0.30)	
Team's mean work experience	-0.001	0.01		-0.008	(0.01)		-0.011	(0.01)		0.001	(0.01)	
Team's mean # of idea people	0.05	(0.21)		-0.057	(0.21)		-0.230	(0.32)		-0.335	(0.27)	
Team's mean founder capital invested	0.9920	(0.72)		0.135	(0.71)		3.035	(1.06)	***	2.352	(0.98)	**
Team's CV of serial entrepreneurs	0.174	(0.09)		-0.067	(0.09)		-0.093	(0.13)		-0.007	(0.12)	
Team's CV of work experience	-0.256	(0.22)		0.208	(0.20)		0.311	(0.30)		0.434	(0.29)	
Team's CV of idea people	-0.145	(0.12)		0.052	(0.10)		0.223	(0.15)		0.540	(0.14)	***
Team's CV of founder capital invested	0.058	(0.12)		-0.220	(0.11)	**	-0.096	(0.16)		-0.287	0.14	**
Prior work experience together (D)	-0.136	(0.17)		0.130	(0.16)		-0.182	(0.23)		-0.176	(0.21)	
Prior founding experience together (D)	0.035	(0.21)		0.136	(0.19)		-0.106	(0.30)		-0.312	(0.27)	
Friends-not-coworkers before founding (D)	-0.043	(0.15)		0.047	(0.14)		-0.122	(0.20)		-0.111	(0.19)	
Related to each other (D)	0.188	0.23		-0.250	(0.22)		-0.645	(0.31)	**	-0.386	(0.29)	
Geography, industry and split-year dummies	YES			YES			YES			YES		
Constant	-1.105	(0.38)		-0.058	(0.37)		-0.958	(0.51)		-0.644	(0.49)	
Number of Observation (Teams)	490			428			273			273		
Prob > F	0.183			0.003			0.000			0.001		
R Squared	0.0782			0.0911			0.2073			0.1821		

Table 9. Estimates of Implied Transfers among Founders that Split Equally

This table provides counterfactual calculations, discussed in Section 8. Appendix 2 contains a detailed discussion.

Counterfactuals	(Row)	Shares		Value		Discounted value	
		Mean	Median	Mean	Median	Mean	Median
Absolute premium calculation							
Prediction for equal splitters	1	7.94%	7.47%	$374,860	$207,150	$333,491	$175,945
Prediction for unequal splitters	2	8.98%	8.01%	$518,588	$295,292	$479,327	$274,227
Actual for unequal splitters	3	13.66%	10.00%	$733,550	$338,333	$677,371	$317,079
Stretched calculation							
Stretch factor	4	1.52	1.25				
Prediction for equal splitters - stretched	5	12.07%	9.32%	$788,637	$368,745	$570,065	$258,678
Total value							
Equal splitters	6	39.95%	50.00%	$1,965,174	$1,100,000	$1,736,192	$1,000,000
Unequal splitters	7	32.44%	30.00%	$1,763,421	$1,040,000	$1,628,499	$963,018
Premium as a fraction of total value							
Prediction for equal splitters	8	19.87%	14.94%	19.08%	18.83%	19.21%	17.59%
Prediction for equal splitters - stretched	9	30.21%	18.64%	40.13%	33.52%	32.83%	25.87%
Actual for unequal splitters	10	42.11%	33.33%	41.60%	32.53%	41.59%	32.93%
Number of observations							
Number of founders - equal splitters		428		235		235	
Number of founders - unequal splitters		1048		643		643	
Number of teams - equal splitters		171		92		92	
Number of teams - unequal splitters		340		206		206	

Appendix 1. Variable Definitions

Variable	*Description*	*Question in Survey*
Equity split		
Founder's share premium	The percentage of equity received by each founder as a result of the equity-split negotiation, minus the amount that would have been received if the equity had been split equally	"% of company's equity received at time of initial equity split" and "Number of people who founded your company"
Equal (unequal) split	Dummy variable for whether all founders received (did not receive) the same amount of equity	(Calculated from Premium variable)
Duration of negotiation	The elapsed time over which the founders negotiated the equity split, categorized by: 1 day or less, 2 days to 2 weeks, 2 weeks to 2 months, 2 months to 6 months, More than 6 months	"How much time did the founders spend negotiating the initial equity split?"
Quick negotiation	Dummy variable for whether the founders negotiated the equity split quickly, using various cutoffs for short durations	(Calculated from Duration variable)
Slow negotiation	Dummy variable for whether the founders negotiated the equity split for a long time, using various cutoffs for long durations	(Calculated from Duration variable)
Individual-level Variables		
Serial entrepreneur	Whether the founder had prior founding experience; dummy variable	"Previously founded another company?"
Prior years of work experience	Number of years of prior work experience before founding the venture	"Years of work experience *before* founding this company"
Idea person	Whether the founder came up with the idea on which the venture was based; dummy variable	"Founder whose idea it was to begin this venture"
Founder capital invested	Amount of initial founding capital provided by the founder, categorized by: $0k, $1k - $25k, $26k - $100k, $101k - $500k, More than $500k	"Amount of founding capital contributed by this founder"
CEO position	Whether the founder received the CEO position at time of founding	"Initial position in the company [CEO choice]"
Chairman position	Whether the founder received the Chairman position at time of founding	"Initial position in the company [Chairman choice]"
CTO position	Whether the founder received the CTO position at time of founding	"Initial position in the company [CTO choice]"
Team-level Variables		
Team size	Number of people in the founding team	"Number of people who founded your company"
Prior work experience together	Whether any of the founders had worked together before founding the venture	"Before founding this company, how many of the founders had *previously worked together*?"

Variable	*Description*	*Question in Survey*
Prior founding experience together	Whether any of the founders had founding a prior venture together	"Before founding this company, how many of the founders had *founded another company together*?"
Friends-not-coworkers before founding	Whether any of the founders had been friends but not co-workers before founding the venture	"Before founding this company, how many of the founders were *friends but not co-workers*?"
Related to each other	Whether any of the founders were related to each other	"Before founding this company, how many of the founders were *related to each other*?"
Pre-money valuation	The venture's pre-money valuation in its first round of outside financing, if raised within 3 years (note: sensitivity to this cutoff tested for robustness)	"Round 1: Pre-investment valuation ($M)" [also includes questions about participants in the round]
Round 1 date	Date that first outside round of financing closed (if round raised)	"Round 1: Approximate date of completion"
Geography, Industry, and Year Dummies		
Geography dummies	Where the venture was located	"State in which your company is headquartered"
Industry dummies	The venture's industry: Technology vs. Life Sciences (also collected: primary and secondary industry segments)	"Please select one primary as well as a secondary business segment if applicable"
Split-year dummies	Dummy variables capturing the year in which the founding team split the equity	"When did the founders initially split the equity?"
Financing-year dummies	Dummy variables capturing the year in which the venture raised it first round of outside capital	"Round 1: Approximate date of completion"
Balanced Control and Compensation Assessments		
CEO-Balance	Dummy variable that equals 1 if none of the founders assume the position of CEO, or if two or more founders share the CEO title; 0 otherwise.	(Calculated based on "Initial position in the company" answers across the founding team)
Board-Balance	Dummy variable that equals 1 if (at the time of the survey) none of the founders sit on the board, or if two or more founders sit on the board; 0 otherwise.	(Calculated based on answers to "Does this executive sit on the board" across the team)
Equal-Salaries	Dummy variable that equals 1 if the remaining founders (at the time of the survey) received equal salaries; 0 otherwise.	(Calculated based on earliest "Annual base salary" answers across the team)
Equal-Bonus-Target	Dummy variable that equals 1 if the remaining founders (at the time of the survey) received equal bonuses; 0 otherwise.	(Calculated based on earliest "Cash bonus received" answers across the team)

Appendix 2. Description of Counterfactual Methodology

Our counterfactual calculations assume that, contrary to their revealed choice, teams that split equally negotiate a non-equal split, using the same 'principles' as unequal splitters. In terms of theory, our counterfactual exercise effectively looks at a scenario where we replace the true negotiation costs k with a counterfactual negotiation cost k that is sufficiently low so that at least one founder always wants to negotiate. Put differently, our counterfactual calculation examines what would happen if a team with an unobservable preference for equal splits were to change its mind and suddenly exhibit a preference for negotiating an uneven allocation of equity.

If equal splitters were to split the equity unevenly, some founders would receive more and others fewer shares. We call an implied transfer the difference between the value of shares that a founder receives under an equal split minus the value of shares that the founder would have received under the counterfactual of an unequal split. The implied transfers within a team always sums to zero, because one founder's implied gain is another founder's implied loss. To obtain an idea of the size of these transfers we focus on the absolute values of the implied transfers.[31]

To construct a counterfactual share premium we use the information from the sample of non-equal splitters to make an out-of-sample prediction for the equal splitters. Specifically, we use the linear predicted values of Model 3 in Table 4 to construct predicted values for the sample of equal splitters.

To calculate the absolute premium value, we consider both undiscounted and discounted valuations. The specific choice of discount rates is always a contentious issue. We use a pragmatic approach, noting that the valuation model of Table 5 effectively estimates a discount rate. The coefficient for the time-to-finance variable is 0.12. Since the valuation is measured as a natural logarithm, this implies a continuous time discount rate of 12%, or an annual discount rate of $\text{Exp}(0.12) \approx 12.75\%$.

[31] To provide an example, consider a team of four founders that split the equity equally, each receiving 25% of founder stock. Suppose our counterfactual calculations suggested that under an unequal split, the founders received 35%, 30%, 22% and 13%. The average absolute premium would be (10%+5%+3%+12%)/4 = 7.5%, suggesting that relative to the unequal split, the equal split implicitly redistributes 7.5% of the equity per founder. If the company had a pre-money valuation of $10M, the absolute premium value would be $750K.

Table 8 shows that the average (median) absolute share premium amounts to 7.94% (7.47%) of the company. We compare this counterfactual value for equal splitters with the results for the non-equal splitters, where the average (median) is 8.98% (8.01%). For the sample of non-equal splitters, we can also calculate the actual average (median) absolute premium, given by 13.66% (10%) as shown in Table 8. We note that the actual premium is considerably higher than the predicted premium. The predicted value of the OLS model correctly estimates the mean of the distribution, which is always zero in this model. However, due to its "averaging logic," the predicted values from the OLS model are likely to underestimate the variance of the underlying distribution. As a consequence it might be argued that they underestimate the implied transfers.

A "method-of-moments logic" would suggest using a prediction model that fits not only the mean of the distribution, but also its dispersion. One can construct several such estimators, but for brevity's sake we focus on one such approach. We note that the ratio of the actual and predicted average (median) absolute share premium is 1.52 (1.25), as shown in the fifth row. We therefore propose a "stretched" linear prediction model where the predicted values are multiplied by the stretch factor of 1.52 (or 1.25 for median). Since the expected values in our model are always zero, the same remains true for the "stretched" linear prediction model, thus guaranteeing that the predicted share premium remains unbiased. In addition, the stretched predicted share premium has the property that, in the sample of non-equal splitters, the predicted absolute share premium exactly equals the actual absolute share premium. Table 8 shows how this impacts the average (median) absolute predicted share premium for equal splitters. The predicted average (median) share premium rises to 12.07% (9.32%). As a consequence, the predicted average (median) premium value rises to $570,065 ($258,678).

Rows 6 and 7 in Table 8 report the total shares and total share value for the average (median) founder, broken down by equal versus non-equal splitters. These numbers in turn allow us to provide an idea of how big the implied transfers are. In particular we can compare the predicted absolute share premia against the total shares held by a typical founder. These calculations are shown in rows 8, 9 and 10.

We performed three additional sets of calculations not reported in Table 8. First we examined how sensitive the results were to the discount rate. We doubled the discount rate to 0.24 in log terms (or Exp(1.24) ≈ 27.13%) and found that the predicted premium values fell by another 10-

12%. Second, we consider the impact of missing valuations. We used a simple linear prediction model to generate predicted valuations for all companies that obtained some outside financing. Specifically we regressed the valuation on all control variables of Model 2 in Table 5, except that, due to missing financing dates for companies with unreported valuations, we dropped the time to finance variables and replaced the financing year dummies with founding year dummies. We then redid all the calculations but found that the predicted absolute discounted premium value was within 1% of the estimates reported in Table 8.

Our counterfactual calculations rest on several strong assumptions. By construction our predicted values take into account the observable differences between equal and unequal splitters. However, our predictions do not take into account unobservable differences between these two subgroups. Put differently, the assumption that equal splitters would split the equity using the rules of the non-equal splitters allows us to make the counterfactual comparison. However, it is a strong assumption, so we caution against too literal an interpretation of these counterfactual calculations.

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