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Means, Variability, and Extremes: Reinterpreting the Role of Resources in New Ventures

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Abstract

Organizational theory often focuses on the average effects of constructs on outcomes. However, despite the many benefits of such an approach, the complexity of our world implies the occurrence of extreme outcomes that can violate what was predicted regarding average outcomes. Although our theories acknowledge variability, little research has thoroughly examined the effect of factors on outcome variability. In this paper, we discuss the study of variability and illustrate this discussion with an empirical example in entrepreneurship, exploring the role of resource abundance in human and financial capital on performance variability and the incidence of extreme outcomes. We explore these questions using a panel data set of 4,928 new firms followed over their first four years to verify that canonical human and financial resources have little relationship with mean performance but rather with performance variability across firms, and with the likelihood of extreme performance outcomes such as fundraising or failure.

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ABSTRACT

Organizational theory often focuses on the average effects of constructs on outcomes. However, despite the many benefits of such an approach, the complexity of our world implies the occurrence of extreme outcomes that can violate what was predicted regarding average outcomes. Although our theories acknowledge variability, little research has thoroughly examined the effect of factors on outcome variability. In this paper, we discuss the study of variability and illustrate this discussion with an empirical example in entrepreneurship, exploring the role of resource abundance in human and financial capital on performance variability and the incidence of extreme outcomes. We explore these questions using a panel data set of 4,928 new firms followed over their first four years to verify that canonical human and financial resources have little relationship with mean performance but rather with performance variability across firms, and with the likelihood of extreme performance outcomes such as fundraising or failure.

Keywords: resources, entrepreneurship, extreme performance, risk

INTRODUCTION

Organizational theory and research often focus on the average effects of constructs on outcomes (Mohr 1982). Despite the many advances such an approach has produced, the unusual complexity of our world means that sometimes our collective attention to average effects can be misleading. Extreme outcomes, such as Google's initial public offering (IPO), Apple's iTransformation, or Enron's implosion, characterize the foundations of many of our most frequently discussed stories, and extreme positive outcomes are the unabashed goal of many actors, particularly entrepreneurs. In addition, sometimes constructs have contradictory effects. For example, consider the relationship between resource abundance and new venture success. On the one hand, greater resource abundance may enable young ventures to overcome the liabilities of newness and smallness (Stinchcombe 1965), helping them weather early development, respond to unforeseen shocks, invest in production capabilities, or grow more quickly than competitors (Brown and Eisenhardt 1997, Eisenhardt 1989). On the other hand, resource abundance can also be negative, with research suggesting that resources can cushion organizations from the realities of the environment, facilitating tangential pursuits or apathy that leads to their eventual downfall (Barnett and McKendrick 2004, Cyert and March 1963 [1992]), or it can even constrain the ability of the organization to respond to novel developments affecting their industry (Christensen and Bower 1996, Henderson and Clark 1990, Leonard-Barton 1992). It would then seem that increased resources may imply an increased divergence in outcomes, some firms performing far better and some performing far worse. This example suggests that despite the fundamental focus on averages in our field, the effects could be conceptualized to occur on the variability—which would then play an acknowledged but underexamined role in organization studies.

Even though various approaches are possible to address situations where the mean outcome does not capture the richness of the phenomena, most attempts employ a contingency approach whereby the effect of a construct is moderated by an additional factor. In the example of resources, the effects of this factor on performance might be moderated by industry complexity (George 2005). Certainly, such an approach has benefits and enriches our theories. However, accounting for the many sources of variability in a complex world can sometimes require a growing list of possible contingency factors, and it soon becomes an equally

complex theory. Furthermore, when taken to its furthest logical conclusion, implicitly, this dominant approach implies that unless someone controls those intervening factors, prediction will not be available.

Fortunately, an alternate approach provides a way around this problem: it amounts to framing the problem as contingent on the outcome. Instead of trying to untangle expectations of improving outcome on average (better versus worse outcome), one can aim to untangle expectation of average outcomes versus extreme outcomes—basically, to predict outcome variability. Since in most contexts we are focused on only one type of (extreme) outcome (for instance, bankruptcy or a major fund-raising event), building inferences about extreme outcomes can provide fruitful theory. For instance, Arora and Nandkumar (2011) suggest that greater opportunity cost for the entrepreneur (a proxy for quality, a human capital resource) might increase the chances of both quicker success and quicker failure. Although such effects are contradictory on the surface, a variability theory subsumes the effect of the factor that would tilt toward one or the other extreme, but with the benefit of providing a robust inference about the extremes (robust because it does not need to control for an ever-growing list of contingency factors). This amounts to making inferences linking factors with *variability* of outcomes,[1] beyond the traditional inferences on average outcomes.

Considering effects on variability matters to organizational scholarship because increased variability implies the potential for more extreme outcomes (March 1991). And extreme outcomes (threshold, reference points) are often the actual targets of organizational actors (Hu et al. 2011). However, because most theoretical and empirical work has an intrinsic grounding in a means-based, expected-value conceptualization of probability theory, nuanced effects between the mean and the extremes are likely to have been missed (Denrell 2003, Kalnins 2007). Beyond the necessary study of moderating factors, it may be possible to

[1] Variability here is conceptualized as the spread of outcome, conceptualized at firm level, i.e., the construct captures the likelihood of a focal firm to differ (either in good or bad) from the average of the population. Its most common operationalization will be the second moment of the distribution of outcome, as much a firm-level measure as is the expected outcome—traditionally captured by first moment of the distribution. We discuss mean and variability in cross-sectional terms, i.e., the spread of outcomes observed across a population of firms, consistent with the theoretical and empirical operationalization of many studies, such as March's exploitation-exploitation study (1991). To be clear, this paper does not address issues of firm-level constructs such as intra-firm variability along time (i.e., volatility).

develop theory that is more generalizable and robust by conceptualizing the effects of factors on the variability of outcomes.

VARIABILITY AND EXTREME OUTCOMES

A tricky issue often challenges management scholars. On the one hand, for the most part our research offers insights into the average effects of constructs on a theorized relationship. On the other hand, outliers invariably emerge to challenge our assumptions, often in the form of students or practitioners raising the question of how to emulate the success of the latest IPO or questioning how we account for abnormally low performance of a collapsing firm. Such extremes represent more than fascinating examples or troubling nuisances in the research process—they underscore a fundamental tension in the very nature of our theories. At the core, management theories are largely focused on explaining the average effect of a construct on outcomes, with limited attention to the effect of a construct on variability. While it may be tempting to label extremes as irrelevant or to try some methodological approach to correct for their existence (e.g., labeling them outliers, fat-tail events, etc.), their very existence suggests the need to examine the effects of constructs on variability with as much attention as has been paid to the effect of constructs on averages.

Although theorizing about averages has its merits, such an approach does not fit all contexts because some of the most and the least desirable organizational outcomes are *extreme*, not average outcomes. Enron's bankruptcy or the Google's IPO are examples of extreme organizational outcomes. Because these types of outcomes have disproportionate impacts on stakeholders, knowing what triggers them may be just as important as knowing what improves outcomes on average. Indeed, extreme outcomes have captured the attention of practitioners and the general public, feeding a growing practitioner literature dealing with topics such as outliers (Gladwell 2008) or black swans (Taleb 2007). Collectively these works express the intuition that extreme success—or failure—cannot be treated and predicted like average phenomena.

Nonetheless, extreme outcomes present difficulties for scholars, mostly because they have been undertheorized (Baum and McKelvey 2006, Daft and Lewin 1990, Starbuck 1993). A few organizational theory perspectives focus—in substance—on extreme rather than average outcomes. For instance, the literature on *high-reliability organizations* (Weick and Sutcliffe 2001) and *normal accidents* (Perrow 1984) focuses on organizational catastrophes, and it takes extremely low outcomes as the focus of research. At the other

extreme of the performance range, entrepreneurship literature often studies how new firms reach the IPO stage, building theories around these rare, positive events (e.g. Beckman and Burton 2008, Stuart et al. 1999). Because it informs the occurrence of extremes, predicting variability of outcomes in our theories and research represents an important need.

In entrepreneurial contexts, identifying sources of variability has particular relevance since variability is the driving factor of selective processes in an evolutionary perspective (Campbell 1969 [1998]). Entrepreneurship is subject to various evolutionary mechanisms (Aldrich 1999) and has been modeled as the locus of various types of selective processes (Eckhardt and Ciuchta 2008). However, rarely has the literature identified sources of variability that could have consequences on evolutionary outcomes. We will, therefore, provide an empirical illustration of the means-based versus variability-based approaches by exploring how, in an entrepreneurial context, canonical resources commonly assumed to have a positive effect on mean outcomes may actually increase variability.

There are several approaches to modeling variability. The dominant approach so far has been to introduce contingency factors into a theory, which has significant drawbacks. First, since the pool of possible contingencies may be bounded only by the various ways in which one could make effective use of resources, the theoretical body of possible contingencies could become equally complex; in layman's terms, the map may become as big as the world it attempts to represent. Although such a concern may seem outlandish, it may lie at the heart of many debates, for example, the debate about the potential tautology of the resource-based view (Barney 2001, Priem and Butler 2001). Critics of the resource-based view suggest that the theory's overdependency on contingency borders on tautology, since theory about resources often ultimately depends on good utilization of those resources (Bromiley and Fleming 2001). Therefore, simply introducing more moderating factors, many of which may fall under the umbrella of "good management," might lead to theory resembling *ex post* rationalization rather than *ex ante* prediction (Priem and Butler 2001).

In addition to a contingency approach, the mean-variance trade-off approach, popularized in management literature by March (1991),[2] offers a productive method to more robustly account for the effects of constructs on variability. Specifically, March (1991) suggests that the effect of a construct on the average and on variability may not move in the same direction. For instance, March introduced the idea that survival can diminish at the same time that mean performance improves (1991: chapter 3). An alternate approach to identifying a long list of contingency factors would be therefore to theorize about variability itself. Such theory encapsulates the effects of moderating factors that could account for the likelihood of one or the other extreme occurring, to the benefit of having a robust inference about the spread—robust because it does not depend on contingency factors, hence it does not assume *control*, nor *measure,* of the contingency factors. This approach suggests a theory construction that *subsumes* the contingencies to the benefits of building inferences linking factors to outcomes variability without intervening moderating constructs.

APPLICATION: THEORIZING EFFECTS OF RESOURCES ON PERFORMANCE VARIABILITY IN NEW VENTURES

One area where the contrast between means-based and variability-based approaches may be strongest is in the setting of new organization emergence (Schumpeter 1934). In contrast to mature businesses, new ventures often face an increased likelihood of severe negative outcomes, including death, as they struggle for legitimacy and survival (Meyer and Rowan 1977, Stinchcombe 1965). At the same time, new ventures also often have a chance of extremely positive outcomes, such as performing an IPO or getting funding from professional investors that expect such IPO (Beckman and Burton 2008). Given the tension between those extremes, examining the effect of resources only in terms of average expectation may overlook the effect of resources on the spread of outcomes, suggesting the need to explore variability effects, especially since even small initial heterogeneity in resources tends to amplify over time (Wernerfelt 2011). Substantively, we will focus on two canonical resources—human and financial capital—that are often assumed to have a positive effect on organizational outcomes, and we will explore their influence on the average, variability, and

[2] Mean-variance trade-off has roots in operational research and appeared early in business literature in finance theory (Black and Scholes 1973), for instance.

incidence of extreme outcomes.[3] Our goal is not to provide uncontested empirical proof of the effect of resource abundance on performance, but to provide an empirical illustration of the potential variability effects embedded in constructs, that we normally discuss in terms of "average" outcomes.

Financial capital. Financial capital is a fundamental resource for new organizations, and probably one of the most robust indicators of organizational slack (Bourgeois 1981). In particular, capital at founding can help firms overcome the liabilities of newness and smallness (Bruderl et al. 1992, Levinthal 1991) and may be necessary for or at least facilitate bootstrapping activities. Such capital can be put to many uses, including expenditures, such as rent or salaries as well as investments such as equipment or buildings (Timmons and Spinelli 2008). Despite these many benefits, various arguments suggest the possibility that an abundance of financial resources may also decrease organization performance. For one, the organizational slack from excess founding capital may act as a security cushion against the need to change course or focus on activities that create more value (Bourgeois 1981, Cyert and March 1963 [1992], Kraatz and Zajac 2001). This problem has been well illustrated in settings of radical innovation where firms, cushioned by revenue from their existing activities, do not respond to innovations until too late (Christensen and Bower 1996, Henderson and Clark 1990), as well as in new venture settings where financial resources can lead ventures to focus more internally (Patzelt et al. 2008).

Furthermore, excess financial resources may allow a venture to fall into search traps (behavioral with cognitive bias), such as engaging in tangential projects that distract the firm from the core task of creating value. To illustrate this danger, in their simulation of search after discontinuous change, Lant and Mezias (1990) suggested that firms can fall into a trap of wasting resources on costly, tangential search and mistakes. By contrast, having constraints may force the firm to be more creative and proactive. To illustrate, Zott and Quy (2007) found that entrepreneurs with fewer financial resources were more motivated to engage in

[3] Various other classical resources could be considered, yet the context suggests focusing on the most canonical ones (money and people). For instance, if one were curious about the intellectual capital, the KFS data set contains a cross-sectional sample of U.S. firms, for which little patenting activities occurs, so this factor has little variance. If curious about organizational resources such as culture, it does not apply since we consider firms from their starting point; so many organization-level "antecedents" do not apply. With such a diversified sample of fresh new firms, the most obvious resources (money and people) were the common denominator around which we could conduct the exploration.

symbolic actions—actions and value that might not have been deployed under conditions of greater resource abundance—that created significant positive benefits for their firms,.

As noted earlier, one approach to dealing with such contradictory influences could be the introduction of multiple contingency factors; however, such a contingency approach might not be perfect since it reduces parsimony and might ultimately amount to making *good use* of resources, a tautological tendency of resource-based theory critiqued by earlier authors (Bromiley and Fleming 2001, Priem and Butler 2001). However, these contingencies have much in common with a variability approach: the more equity that firms receive, the greater the gap between the firms whose performance improves and the firms whose performance declines due to resource abundance. For instance, feeling of cushioned is less likely with less equity (not much cushion anyway) than with more equity: hence the gap between the worst firms (that would be primed to complacency because of a large cash cushion) and the best firms (that will not make this mistake) will be greater with greater equity. Similarly, with little equity, the possibility to engage in tangential projects is limited (not much slack anyway); but with more equity, the gap between the worst firms (that could go out of bounds with easy money) and the best firms (that would not make this mistake) will be great. We could continue to reason in a similar manner for related contingencies, reaching the conclusion that for most of imaginable ways to (mis)use equity, more equity implies a greater gap between the worst firms (for which increased means implies increased spoilage) and the best firms, hence an increase in the dispersion of performance among firms, i.e., the cross-sectional variability. Therefore, we predict that:

> *Hypothesis 1: Greater financial capital in the form of founding equity will be associated with greater variability of performance across firms.*

Human capital. A second canonical resource to consider is human capital (Becker 1964), which lies at the foundation of resources-based theory (Coff and Kryscynski 2011, Foss 2011). Even more than financial capital, human capital may be a central factor in the success of a new venture since it provides firms with knowledge, expertise, relationship, experience, and so forth (Amit and Schoemaker 1993). Of the several types of human capital, founders play an important role, contributing labor, knowledge, and other resources which significantly affect the future of a new venture (Eisenhardt and Schoonhoven 1990). For these reasons, founders are distinguished from other groups, such as simple shareholders, who usually contribute primarily

financial capital, or employees, whose contribution is usually limited in scope and driven largely by salary. We will focus on simple and parsimonious measures of human capital: for the founding team, its size, and for the main individual (the "founder") and whether he/she had a previous start-up experience (Garbuio et al. 2011)—clear and simple measures of human capital that have already been associated with outcome variability (i.e., extremely low and high outcomes in Singh and Fleming 2010).

Despite the many positive benefits, a mix of behavioral and organizational arguments suggests potential downsides to greater founder resources. To start, some studies have failed to find an effect for the number of founders on firm performance (Beckman 2006, Hogan and Hutson 2005, Lange et al. 2007), signaling that if more founders bring benefits, this must also bring handicaps to balance those benefits. For example, more founders increases the potential for conflict, which slows decision-making processes and decreases performance. Furthermore, more founders means there are more individuals who perceive they have authority because of their status as founder and, therefore, there may be more conflicts or it may be more difficult to resolve conflicts (Brehmer 1976, Cosier and Rose 1977). In support of this view, Ensley et al. (2002) examined the effects of affective conflict in new venture teams and found that such conflict had a large, negative effect on sales growth.

The challenges of ownership transition are another reason greater founder resources may be detrimental: when conflicts arise, it may be difficult to make changes to the new venture team composition, since removing founders implies more administrative or personnel difficulties than removing simple employees. Existing empirical research suggests that removing founders, although common, can be a costly and complicated process (Boeker and Karichalil 2002, Wasserman 2003).

Shirking and communication issues are the third reason that more founders may be detrimental (Shapiro and Stiglitz 1984). Specifically, more founders means both more opportunities to assume work will be done by someone else (and, therefore, engage in tangential projects) and more incentives to shirk since a smaller share of the total reward will go to each founder. Finally, adding more individuals to the decision-making team may simply increase the complexity of communication and slow decision making, thereby decreasing performance (Bourgeois and Eisenhardt 1988).

Employing a similar argument as we did for the effects of equity abundance, the number of founders is a resource with many potential explanations and contingencies. We, therefore, chose not to theorize directly on each of these contingencies to avoid complexity (expansion in the number of contingencies to check) and ensure availability of prediction even if we cannot control for the moderator. Therefore, we hypothesize an increase of dispersion of performance across firms, similar to Taylor and Greve's (2006) work linking multimember teams (compared to individuals) to greater variation in innovation. We posit that:

> *Hypothesis 2: Greater human capital in the form of more founders will be associated with greater variability of performance across firms.*

Notably, this hypothesis corresponds to Singh and Fleming's (2010) findings, with two notable differences. First, the context here is new ventures instead of inventor teams. More importantly, we hypothesize in this first step an increase in spread of outcomes (variability), whereby Singh and Fleming (2010) directly hypothesize effects on the extremes, a step we accomplish separately in the next section. Conceptually, we suggest distinguishing the fact that increase in variability in outcomes can be embodied by greater *spread* from the fact that it imply that particular types of *extreme outcomes* are more likely to occur.

Finally, besides examining human capital resources in terms of number of founders, we also examine human capital in terms of the primary founder's entrepreneurial experience (Bruderl et al. 1992). A human capital- or resource-based perspective suggests that experience in starting a previous firm—which we will label serial entrepreneur—should be a valuable resource when founding a new venture (Argote 2004, Forbes 2005). Even in the cases where an entrepreneur's previous experience was a failure (and for some observers, especially in the case where it was a failure), past venture experience should trigger learning (Dencker et al. 2009) or learning about one's quality, hence self-selection naturally eliminating those without proper quality (Stam et al. 2008). Hence, experience in prior ventures should imply an increase in performance for ventures run by serial entrepreneurs (Shane and Khurana 2003).

At the same time, there exists the possibility that serial entrepreneurs may actually decrease venture performance. For one, entrepreneurial success may be more an issue of skill than learning (Gompers et al. 2010), which would neutralize potential learning effects for repeat entrepreneurs. Worse, there may be an analogous "market for lemons" in the labor pool of serial entrepreneurs (Akerlof 1970). Specifically,

successful entrepreneurs may behave differently than unsuccessful entrepreneurs, leading to the underrepresentation of successful entrepreneurs in the total pool of serial entrepreneurs. For example, assuming successful entrepreneurs have already established a value-creating organization, they are more likely to stay engaged with their existing venture rather than reenter the entrepreneur pool. Alternatively, if they exit their successful ventures, they may have generated sufficient wealth that they no longer need to work as entrepreneurs, hence exiting the entrepreneur pool by becoming investors or pursuing other activities. By contrast, unsuccessful entrepreneurs are often forced back into the labor pool much more quickly, leading to an adverse selection effect for prior founding experience. Hence, serial entrepreneurs may exhibit a negative selection bias that would imply lower venture performance.

In addition, some serial entrepreneurs may have an increased likelihood of engaging in negative transfer of prior learning (Plous 1993). Specifically, an entrepreneur with prior experience is likely to transfer learning from his/her prior organizational experience to his/her next venture even if it may no longer be appropriate, thereby decreasing performance (Finkelstein and Haleblian 2002, Schilling et al. 2003). Indeed, either the adverse selection effect or the negative transfer effect may explain why prior research has struggled to find an effect for the prior experience of the primary founder (Song et al. 2008).

Therefore, similar to our arguments regarding equity and number of founders, serial entrepreneurs represent a resource where outcomes depend on many contingencies. So we chose not to directly theorize on the average effects of each contingency in order to avoid complexity (many contingencies to check) and implicit agnosticism (contingency theory does not predict anything if the moderator cannot be controlled). Rather, we hypothesize an increase in dispersion of performance across firms, consistent with other attempts to hypothesize variability, such as Adams et al.'s (2005) prediction of effect of CEO on performance variability. [5] We, therefore, posit:

[5] We insist that all these hypotheses about variability are not similar to those of Bowman's paradox (1980) literature that focuses on the relationship between performance—the mean of Y—and risk—the longitudinal variability $\Delta_t Y$ (e.g., Andersen et al. 2007, Bromiley et al. 2001). By contrast, the current study considers the effects of resource factors (X) on cross-sectional performance variability ($\Delta_f Y$) to predict whether the factor increases occurrences of extremely high (H) and low (L) outcomes. Where Bowman's (1980) literature studies $Y = f_0(\Delta_t Y)$, the focus here is to establish $\Delta_f Y = f_1(X)$.

Hypothesis 3: The main founder being a serial entrepreneur will be associated with greater variability of performance across firms.

Expressing Inferences as Effects of Resources on Extreme Performance Outcomes

We suggested that canonical resources may have contradictory effects on performance in new ventures and, as a result, the more interesting effect on resources may be the effect on variability in performance outcomes. Consequently, the first set of hypotheses were expressed in terms of variability in performance rather than average effects, assuming performance can be measured in a continuous manner. Given such an effect on performance variability, a second important question is what those effects signify for other types of firm outcomes. The mean-variance trade-off suggests that if performance variability increases, both positive and negative extreme outcomes will occur more frequently (March 1991). Below, we identify some extreme outcomes—typically discrete extreme events—and express theory accordingly to the following logic: a factor that increases variability of performance in a continuous dimension should also increase occurrences of both discrete extreme negative and discrete extreme positive organizational outcomes. This will lead to a second set of hypotheses, this time formulated in terms of extreme outcomes instead of outcome variability.

Regarding extreme negative outcomes, the most salient to consider is failure. Because of the liability of newness, limited market power, and a firm's short history, death is a salient extreme outcome for ventures: it represents the end of firm operations and often a significant loss to equity and debt holders (March et al. 1958 [1993], Stinchcombe 1965). Furthermore, this is also an extreme threshold since it distinguishes the large majority of firms that survive from the minority that die every year (e.g., in our sample, roughly 18% of firms were identifiable as failures after three years). Thereafter, we will consider failure as a *negative extreme performance outcome*.

Regarding extreme positive outcomes, ideally we would like to examine a classical measure of extreme entrepreneurial performance: for example, whether the firm reaches IPO or the amount of capital raised during an IPO (Beckman and Burton 2008, Hannan et al. 1996, Stuart et al. 1999). However, our study relies on a representative sample of new ventures in the U.S., a general population out of which the chances of

reaching IPO are mostly negligible (in many industries, making an IPO is simply exceptional). Therefore, as a proxy of extreme positive outcomes, we explore a related rare and positive event that is yet significantly attainable—whether the firm completes subsequent fund-raising activities. Such events can also be considered positive performance outcomes, especially when the funds comes from professionals or independent investors (Beckman et al. 2007, Burton et al. 2002), which we label *premium investors*. Such funding events are rare since only a small fraction of new ventures successfully obtain such funding—most firms must rely on funding from other sources, such as friends and family (e.g., in our sample, less than 6% of firms can raise money from premium investors in the first three years after their establishment). Such professional funding events also constitute a positive signal—hence, a performance measure. Thereafter, we will consider fund-raising from premium investors as a *positive extreme performance outcome*.

Assuming equity increases outcome variability (see theory subsection above), equity should have a detrimental effect by increasing extremely negative outcome (failure), while having a beneficial effect by increasing extremely positive outcome (raising funds from premium investors):

Hypothesis 4a: Greater financial capital in the form of founding equity will be associated with a greater likelihood to reach extremely low performance, such as failing.

Hypothesis 4b: Greater financial capital in the form of founding equity will be associated with a greater likelihood reach extremely high performance, such as raising funds from premium investors.

For the same reasons, the variability effect of the number of founders also suggests an increase in the likelihood of both high and low extreme performance outcomes.

Hypothesis 5a: Greater human capital in the form of more founders will be associated with a greater likelihood to reach extremely low performance, such as failing.

Hypothesis 5b: Greater human capital in the form of more founders will be associated with a greater likelihood to reach extremely high performance, such as raising funds from premium investors.

Finally, the variability effect of serial entrepreneurs also suggests an increase in the likelihood of both high and low extreme performance outcomes.

Hypothesis 6a: The main founder being a serial entrepreneur will be associated with a greater likelihood to reach extremely low performance, such as failing.

Hypothesis 6b: The main founder being a serial entrepreneur will be associated with a greater likelihood to reach extremely high performance, such as raising funds from premium investors.

If considering the overall set of hypotheses, it is noteworthy that the variants of each hypothesis set (a versus b) in H4-H6 go normatively in opposite directions, e.g., more equity is beneficial by increasing extremely high outcomes but is simultaneously detrimental by also increasing extremely low outcomes. These effects are assumed to occur concurrently across the population of firms. A second remark is to notice that one could consider H4-H6 to derive formally from H1-H3. However, this would be the case only if the dependent variable was the same across all hypotheses and the theory made strong assumptions about the distribution about that variable. By contrast, we theorize about different performance outcomes that cannot be perfectly correlated in the field. Hence, even relying on the same mechanism, the analytical separation of effects on variability (H1-H3) and on extremes (H4-H5) is warranted, both empirically as well as theoretically, and the two expressions should be considered on an equal footing until further empirical verification.

METHOD

Data

To examine the proposed hypotheses, we leveraged the Kauffman Firm Survey (KFS), a unique data set that allowed us to explore the empirical consequences of variability effects across a broad sample of 4,928 ventures from birth through their first few years of existence. The KFS is a survey of new businesses in the United States, initially based on a Dun & Bradstreet (D&B) database of firms founded in 2004. This survey of 4,928 firms is the first large national sample of new ventures tracked over time since founding. Extensive details about the indicators used and other methodological issues concerning the KFS are publicly available (Desroches et al. 2007), even though access to the full data is restricted to vetted researchers.[6]

The firms considered (from the initial 250,000 in the D&B database of firms founded in 2004) were narrowed using specific definitions of what a business start entailed. Firms were screened by initial calls that recorded information on specific business activities. The KFS includes only businesses in which the founder could be contacted and answer questions regarding founding time and financial information. Overall, out of 17,258 firms screened, 6,030 were eligible for the study and 4,928 respondents completed the initial round of

[6] Data included herein are derived from the Kauffman Firm Survey restricted-access data file. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Ewing Marion Kauffman Foundation.

the study. Besides the 2004 baseline year data, three years of follow-up data (2005, 2006, and 2007) were used in this study. This design allows exploring relationship between the initial conditions (Y0) and subsequent events occurring in a reasonable time afterward (three years). Each follow-up survey confirmed much of the information from the first round and asked questions on the aspects of the business that had changed. The follow-up waves had response rates of 88%, 82%, and 82%, respectively. More than 2,900 businesses were still responding to the survey at the third follow-up.

Dependent Variables

Profit. In the first step, the performance outcome is operationalized as profit in year 3, perhaps the most common continuous performance measure (we take the absolute value, neutralize value between 0 and 1, log, and put back the sign).

Premium Fund-raising. *Premium Fund-raising* is a binary variable coded '1' if a firm received funds from venture capitalists, corporate investors, or angel investors for any of the years *after* its founding year (Y1-Y3). The year zero is not included because it would create an automatic correlation with the independent variable of founding equity (Y0).

Premium Fund-raising (ranked quantiles). In order to examine more extreme positive outcomes, i.e., more stringent tests of positive outcomes, firms were placed into ranked quantiles according to the amount of equity raised (above measure). For instance, *Premium Fund-raising Ranked (top 5%)* is a dummy variable coded '1' for the top 5% of the firm population based on the amount of equity raised and '0' otherwise. The quantile values 6%, 5%, and 3% were explored.

Survival. *Survival* is a binary variable coded '1' if a firm is still operating at the end of the period (Y3) and coded '0' if the firm ceased operations permanently for causes other than acquisition or merger. The acquired or merged firms are removed (missing) from the sample because of lack of information to attribute a valence to such outcome, i.e., it is difficult to know, without collecting transaction information, whether the sales/merger was a positive or negative outcome for the stakeholders. Firms with missing information are coded as 'missing information' rather than inputing values. In constructing the dependent variables, we chose to construct all variables to reflect "positive outcomes" so that the direction of effects can be compared easily. Therefore, we measure the outcome as survival, which is simply the inverse of failure.

Survival (ranked quantiles). In order to find more extreme negative outcomes, i.e., a more stringent test of failure, each of the firms that failed is attributed the amount of loss accumulated at the time of failure, then are ranked according to this amount. The amount considered is the cumulated financial loss, plus a valuation of the time spent by the founders in the venture.

Independent variables

Log Equity. Equity is the founding capital from equity sources declared by respondents at founding (Y0) which, to correct for Pareto distribution, we add one and take the log of, to produce the variable *Log Equity*.

Number of Owners/Operators. The KFS gathers information about the owners and whether they were operationally involved, which correspond to the usual definition of founders and to our theorizing above. Therefore, we operationalize the concept of founders as the *Number of Owners-Operators* at founding (Y0).

Serial Entrepreneur. Prior start-up experience of the main owner was collected by the question, "How many other new businesses have you started besides the current business?", coded '1' if the main owner at founding (Y0) had any such prior experience of starting a previous business, and '0' otherwise.

Controls

In order to address possible endogeneity, we also control for several factors that could potentially influence the independent variables, in particular industry, female founder and the firm having employees.

Analyses of Effects on Variability (Step 1 to Test Hypotheses 1, 2, and 3)

Our goal is to look beyond the effects of the hypothesized constructs on average outcomes and instead to look at the effects on variability in outcomes. We employ a general approach introduced by Sørensen (2002), whereby the effects on the mean and variability are directly specified and jointly estimated using a multiplicative heteroscedasticity regression model. To estimate the mean and variability jointly, we cannot treat the second moment, the variance, as following a normal distribution since this would violate the fact that it can only be positive; instead, its logarithm is assumed to follow a normal law (e.g. Sørensen 2002). A maximum likelihood estimation (MLE) in Stata, implemented by a procedure provided in Stata documentation (mynormal13 in Gould et al. 2003:204), allows the joint estimation of the effects of the

independent factors on performance taken as a normally distributed random variable of mean μ and variance σ, modeled as:

$$\text{Equation 1: } \mu = \beta X + \varepsilon$$

$$\text{Equation 2: } \sigma = \exp(\gamma X)$$

Analysis of Effects on Extreme Outcomes (Step 2 to Test Hypotheses 3, 4, and 5)

In addition to exploring the effects of the hypothesized variables on performance variability (profit), we also hypothesized effects on extreme performance outcomes (fund-raising and failure). In contrast to the first analysis exploring the effect of the hypothesized effects on profit variability, verifying the effect of the hypothesized variables on these extreme outcomes remains contingent on the relative strength of the moment effects (mean versus variability) and on the extremeness of the outcome considered.

Therefore, we conducted an exploratory analysis to examine the potential effects on extreme outcomes. To do this, we first identified theoretically valid extreme outcomes and then validate that these are indeed extreme outcomes by calculating the rarity of the event. We expected both failure and fund-raising to be much lower than 50%; however, since such rarity may not have been stringent enough to detect the extreme effect, some additional more stringent thresholds (quantile dummies) were computed to identify even more extreme outcomes. The quantile dummies identified fractions of the population according to their relative success (ranked by the amount raised from premium investors) or failure (ranked by the cumulated loss) and represented attainment of those more stringent extreme outcomes. Testing theory on this set of metrics could be viewed as testing the slope at different quantile levels to observe whether the effect will be detectable as the rarity of events increases.

Results

Table 1 presents descriptive statistics and correlations for the variability analysis (step 1). Table 2 presents descriptive statistics and correlations for the analysis of extreme outcome (step 2). Since the independent variables are identical with those in the previous step, this second table reports only the new dependent variables and, for comparison, the dependent variable from step 1.

---- Insert Table 1 and Table 2 about here----

Regarding measures of extreme high performance, the ratio of firms raising premium funds is 6%, further subdivided into the top 5% and 3% quantiles of firms. Regarding measures of extreme low performance, the ratio of firms surviving is 82%, implying roughly an 18% failure rate; further subdivided into the bottom 13%, 10%, 7%, 4%, and 1% quantile. In both cases, quantiles were chosen as reasonable intervals, although alternate quantile divisions produced similar results.

Effect of financial and human capital on variability. Table 3 shows the joint mean (equation 1) and variability (equation 2) effects. Hypothesis 1 argued that the effect of equity on performance would be an increase in the variability of performance. The analysis suggests that equity does not have a significant effect on average performance, yet it increases the variability of performance outcomes (0.00742, $p < 0.01$), supporting H1.[7] Similarly, Hypothesis 2 argued that an increase in the number of founders leads to an increase in the variability of performance, which is supported in the analysis (0.0399, $p < 0.01$). Finally, Hypothesis 3 argued that a serial entrepreneur increases the variability of performance outcomes, which is supported in the analysis (0.0289, $p < 0.05$). Our results demonstrate that although the hypothesized constructs had no significant effect on average outcomes, they significantly increased the variability in outcomes.

------ Insert Table 3 about here -------

Effects of financial and human capital on extreme outcomes. Table 4 reports the logistic regression for extremely low outcomes (as evaluated by failure). The analyses were conducted by making the criteria increasingly stringent. We first tested the effects of covariates on survival, so on avoiding falling into the bottom 18% of the population (Model 1), then avoiding bottom 13% (Model 2), bottom 10% (Model 3), bottom 7% (Model 4) and finally bottom 4% (Model 5). Hypothesis 4a predicted that having greater capital (equity) at founding time could be detrimental and increase more extreme incidences of failure. At the level of basic survival (bottom 18%) the effect was in the right direction, negative, but non-significant (-0.15). When

[7] To check for the choice of financial resource (here equity), separate analyses were conducted where the independent variable was equity plus debt. These tests confirmed the reported results but with limited significance, consistent with the *a priori* idea that equity is most likely associated with greater spread of outcomes whereas debt is strongly linked to specific projects or assets, hence less likely to generate spread.

examining more extreme incidences of failure, the effect was confirmed as in the predicted direction (negative) and increasingly significant (-0.14, $p < 0.01$ for the most extreme outcomes), providing support for H4a.

Regarding human capital, Hypothesis 5a predicted that a greater number of founders could be detrimental and increase more extreme incidences of failure. The analyses (Table 4) found no significant effect at the level of basic survival (bottom 18%). When making the level more stringent (bottom 13%, then 10%, etc.), the effect of greater founders follows the predicted direction (negative) and is significant (-0.27, $p < 0.01$ for most extreme negative outcome), providing support for H5a. Finally, Hypothesis 6a predicted that a serial entrepreneur could increase more extreme incidences of failure. The analyses (Table 4) found no significant effect at any level of survival; therefore, the H6a could not be supported.

----- Insert Table 4 about here -----

Table 5 reports the logistic regression for extremely high outcomes (the fund-raising success). The analyses are conducted by making the criteria increasingly stringent, allowing comparison of the effects of hypothesized variables on increasingly extreme outcomes. We first test the effects of covariates on premium fund-raising, which occurs in the top 6% of cases (Model 1), then on being in the top 5% (Model 2), and in the top 3% (Model 3). Hypotheses predicted that larger equity (H4b), number of founders at founding time (H5b), and serial entrepreneur (H6b) could increase more extreme positive outcomes (the chance to raise funds at a later stage). The results support the H4b, H5b, and H6b regarding the ability to raise money and to reach the top 5% or even 3% of the population when ranked on amount of funds raised (0.080 for log equity, 0.43 for number of founders, and 0.47 for serial entrepreneur, $p < 0.01$).

------ Insert Table 5 about here ------

Because these statistical results mix four types of effects (mean, variability, extreme positives, and extreme negatives) in a rather unconventional manner, we graphically summarize them in Figure 1, allowing a comparison without being encumbered by the numerical details. If equity and number of founders have no observed relationship to the mean, increased variability of outcome does relate to increasing occurrences at both extremes. By contrast, serial entrepreneur displays a different pattern of variability: a negative effect on the mean occurs simultaneously with a beneficial effect on extreme positive outcomes. This is an apparent

contradiction between the effect on the mean and the effect on an extreme. This result is especially interesting since serial entrepreneur is associated with significantly lower performance, so one would not have expected it to be associated—by traditional approaches—with increased success. The traditional approach would, therefore, overlook the interesting association of serial entrepreneur with extreme positive outcomes, a apparent contradiction explainable only when considering effects on outcome variability.

----- Insert Figure 1 about here -------

DISCUSSION

This study argues for greater theoretical attention to variability beyond the usual focus on means-based theorizing, as a complement to contingency theorizing. It also suggests that predictors might have negligible effects on average performance outcomes and, therefore, could easily be dismissed as irrelevant, yet could actually have significant effects on performance variability, hence on extreme outcomes. Despite its relative merits and flaws, the empirical analysis attempts to illustrate the greater theoretical need—the development of theory that addresses the effects of constructs on both the average and variability of outcomes while remaining robust to various, often unpredictable, contingencies. To illustrate, we discuss specific applications of these results in terms of resources, organizational risk, and theory development.

Making Theory Robust Rather than Contingent

This research illustrates an opportunity to make resource theory *robust* rather than, and sometimes in addition to, being *contingent*, which has both theoretical and practical appeal. For one, a moderation approach to some theories, such as the resource-based view, may trigger an endless addition of contingencies explaining how the *beneficial* effects of resources depends on their *good* use, which runs the risk of becoming tautological (Priem and Butler 2001). By contrast, hypothesizing about variability allows formulating a positive theory that subsumes such contingencies in their commonality: *resource abundance increases the gap between the best and the worst performers*. Interestingly, critics of resource theory have suggested shifting resource theory toward a more evolutionary perspective (Bromiley and Fleming 2001)—a theoretical framework into which variability predictions naturally fit.

Variability theorizing also avoids the implicit agnosticism in contingency theories, which are always at the risk of making prediction inapplicable if the moderating variable cannot be predicted *ex ante* or controlled.

By contrast, even without such controllability, the variability approach allows expressing a prediction about increased variability/stochasticity/risk, which is often sufficient to inform many field decisions.[9] For researchers, this parsimony has the noticeable benefits of allowing development of theory that is robust (to the large range of contingencies) and positive (i.e., with verifiable consequences), which would be impossible otherwise.

To be clear, the variability approach is complementary to traditional contingency theorizing. A variability approach is more theoretically and empirically parsimonious and easier to exploit in practice, hence more robust. By contrast, a traditional approach explicitly modeling moderations allows us to fully exploit mechanisms. However, by requiring measurement and control of the contingency factors, it makes the theory complex and fragile: if one cannot control or measure the moderator, the theory cannot apply. The message here is not that moderation lacks merit since the current study relies on the numerous previous studies that painstakingly identified a wealth of ways to make good or bad use of resources. Rather, the variability approach, in effect, complements the substantial body of contingency theories by allowing the expression of a more parsimonious version of the same phenomena.

Opportunities to Improve Theory

The resources we examined seemed to have little effect on the mean but a significant effect on variability and extreme outcomes, which underscores the importance of theorizing about variability to better predict extreme outcomes (e.g., Denrell 2003, Kalnins 2007). Ignoring such variability effects would imply that a theory based on expected outcomes (e.g., average) might wrongly be assumed to apply to extreme outcomes and vice versa. To illustrate, our analysis highlighted two ways in which theory addressing variability may differ from means-based theory. First, we demonstrated how resources (financial and human capital) might have countervailing effects and, therefore, might be nonsignificant on the mean while having

[9] On that aspect, some readers might wonder whether the current study could nevertheless control for such factors. However, note that variability addresses two issues with resource theory: controls are difficult to capture and there is an endless list of factors related to "making good use" of resources. Hence, trying to control here (i.e., showing that the divergence of outcomes is actually linked to this factor) would be a defeating strategy: if the outcomes move accordingly, we are not much advanced; if they do not, the theoretical reasoning tells us that a wealth of other ways exist to make good use of resources, so nonverification of the moderation would not be a refutation.

significant, and apparently contradictory, effects on various classes of extreme outcomes. Second, we observed how a construct (serial entrepreneur) could have a different effect on an extreme outcome (beneficial) than on the mean outcome (detrimental) because of variability effects.

Such nuances might not have been observable with a one-dimensional expected outcome approach—i.e., if theorizing only the mean or only an extreme outcome. Although theorizing on the mean will remain a mainstay of the field, our findings highlight how theorizing about the effects of constructs on variability can enrich and synthesize organizational theories. For example, the field is often characterized by significant debate about whether a construct or activity (e.g., acquisitions, resources, etc.) has a positive or negative effect on performance outcomes. This study suggests that such questions may benefit from a theoretical approach accounting for variability that may help explain apparently contradictory effects of a construct on organizational outcomes. Instead of making the resource theory contingent on difficult-to-capture factors, the theory, in fact, becomes contingent on outcomes: if one seeks great success, more resources can be beneficial; if one shuns significant failure, more resources may be detrimental. In some ways, developing theory that explicitly addresses the effect of variability on performance outcomes is one step toward unpacking the apparent "paradoxes" of performance (Meyer and Gupta 1994).

Future Research and Limitations

Future research could be conducted by focusing on specific resources and by choosing an empirical setting designed to prove causality with solid robustness. Rather, we aimed here to reconsider the predominant approach to theorizing and testing about average effects. We hope this study exemplifies how to frame a theory—illustrated here about resources—that is intrinsically robust to different contingencies linked to managing well and nuanced on different types of outcomes (fund-raising, bankruptcy, profit, IPO, etc.).

If our findings contribute substantively to theory and practice in entrepreneurial contexts, they also suggest new directions for organizational theory at large. Namely that various performance paradoxes might be illuminated by compacting various contingencies into a variability (i.e., risk) theory and that making theory contingent on the outcome—distinguishing average, extreme positive, and extreme negative—would match it better to the various shades of organizational outcomes.

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TABLES AND FIGURES

Table 1. Descriptive Statistics for Variability Analysis (Step 1)

	Variable	N	Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)
(1)	Profit (Y3)	2880	1.020	4.043	~-7	~8	1.00					
(2)	Log Equity (Y0)	4908	7.513	4.111	0.000	~14	-0.05	1.00				
							(0.01)					
(3)	Number of Owners/Operators (Y0)	4920	1.404	0.765	0.000	~10	-0.04	0.13	1.00			
							(0.02)	(0.00)				
(4)	Has Employees (Y0)	4928	0.424	0.494	0.000	1.000	0.00	0.11	0.08	1.00		
							(0.86)	(0.00)	(0.00)			
(5)	Female Entrepreneur (Y0)	4919	0.260	0.439	~0	~1	-0.06	-0.04	-0.02	-0.06	1.00	
							(0.00)	(0.01)	(0.13)	(0.00)		
(6)	Serial Entrepreneur (Y0)	4912	0.425	0.494	0.000	1.000	-0.05	0.07	0.09	0.05	-0.07	1.00
							(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

~: indicate values approximated in table for non disclosure purposes (per KFS rules)
The significance is indicated below the coefficient (in parenthesis)

Table 2. Additional Descriptive Statistics for Extreme Outcomes (Step 2)

Descriptive Statistics - additional descriptive statistics for extreme outcomes (step 2)

	Variable	N	Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	Profit (Y3)	2880	1.020	4.043	~-7	~8	1.00							
(2)	Deviation of Profit (Y3)	2880	3.797	1.290	~0	~8	-0.54	1.00						
							(0.00)							
(3)	Raised Premium Funds (Y1-3)	4928	0.060	0.238	0.000	1.000	-0.16	0.22	1.00					
							(0.00)	(0.00)						
(4)	Ranked by Premium Funds, top 5%	4928	0.050	0.217	0.000	1.000	-0.16	0.22	0.90	1.00				
							(0.00)	(0.00)	(0.00)					
(5)	Ranked by Premium Funds, top 3%	4928	0.030	0.170	~0	~1	-0.17	0.21	0.69	0.76	1.00			
							(0.00)	(0.00)	(0.00)	(0.00)				
(6)	Ranked by Premium Funds, top 1%	4928	0.010	0.098	0.000	1.000	-0.15	0.19	0.39	0.43	0.57	1.00		
							(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
(7)	Survived up to Y3	3538	0.824	0.381	0.000	1.000	.	.	0.07	0.08	0.09	0.05	1.00	
							(1.00)	(1.00)	(0.00)	(0.00)	(0.00)	(0.00)		
(8)	Ranked by Loss, bottom 13%	3538	0.871	0.336	0.000	1.000	.	.	0.05	0.07	0.08	0.04	0.83	1.00
							(1.00)	(1.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	
(9)	Ranked by Loss, bottom 10%	3538	0.901	0.299	0.000	1.000	.	.	0.04	0.05	0.07	0.04	0.72	0.86
							(1.00)	(1.00)	(0.03)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)
(10)	Ranked by Loss, bottom 7%	3538	0.930	0.254	0.000	1.000	.	.	0.02	0.03	0.06	0.03	0.59	0.71
							(1.00)	(1.00)	(0.30)	(0.07)	(0.00)	(0.06)	(0.00)	(0.00)
(11)	Ranked by Loss, bottom 4%	3538	0.960	0.195	0.000	1.000	.	.	-0.01	0.01	0.04	0.02	0.44	0.53
							(1.00)	(1.00)	(0.73)	(0.42)	(0.01)	(0.16)	(0.00)	(0.00)
(12)	Ranked by Loss, bottom 1%	3538	0.990	0.098	0.000	1.000	.	.	-0.07	-0.04	0.02	0.01	0.21	0.26
							(1.00)	(1.00)	(0.00)	(0.03)	(0.23)	(0.50)	(0.00)	(0.00)

~: indicate values approximated in table for nondisclosure purposes (per KFS rules).
The significance is indicated below the coefficient (in parenthesis).

Descriptive Statistics

	Variable	N	Mean	S.D.	Min	Max	(9)	(10)	(11)	(12)
(11)	Ranked by Loss, bottom 4%	3538	0.960	0.195	0.000	1.000	0.61	0.74	1.00	
							(0.00)	(0.00)		
(12)	Ranked by Loss, bottom 1%	3538	0.990	0.098	0.000	1.000	0.30	0.36	0.49	1.00
							(0.00)	(0.00)	(0.00)	

~: indicate values approximated in table for nondisclosure purposes (per KFS rules).
The significance is indicated below the coefficient (in parenthesis).

Table 3. Mean and Variability Effects on Profit

	(1) Mean Effect	(2) Variability Effect
Log Equity (Y0)	-0.0313	0.00742***
	(0.0231)	(0.00187)
Number of Owners/Operators (Y0)	-0.0240	0.0399***
	(0.129)	(0.00781)
Serial Entrepreneur (Y0)	-0.443**	0.0289**
	(0.186)	(0.0141)
Has Employees (Y0)	0.0516	0.0519***
	(0.187)	(0.0139)
Female Entrepreneur (Y0)	-0.517**	-0.0260*
	(0.201)	(0.0149)
Ind.: Agriculture Services	-3.409**	0.291
	(1.569)	(0.377)
Ind.: Construction Services	-2.813**	0.280
	(1.296)	(0.374)
Ind.: Construction Material	-3.014**	0.252
	(1.306)	(0.374)
Ind.: Wholesale Trade	-2.010	0.223
	(1.328)	(0.376)
Ind.: Retail	-3.381***	0.218
	(1.288)	(0.374)
Ind.: Transportation and Warehousing	-3.011**	0.237
	(1.373)	(0.376)
Ind.: Information	-2.939**	0.211
	(1.340)	(0.374)
Ind.: Finance and Insurance	-2.420*	0.269
	(1.339)	(0.376)
Ind.: Real Estate and Rental and Leasing	-3.465***	0.249
	(1.324)	(0.375)
Ind.: Prof. Mgt. & Educ. Serv.	-2.310*	0.200
	(1.273)	(0.374)
Ind.: Waste Mgt. and Remediation Serv.	-2.624**	0.216
	(1.295)	(0.374)
Ind.: Health Care and Social Assistance	-2.004	0.197
	(1.367)	(0.377)
Ind.: Arts, Entertainment, and Recreation	-3.536**	0.176
	(1.380)	(0.375)
Ind.: Accommodation and Food Services	-3.186**	0.279
	(1.423)	(0.375)
Ind.: Other Serv. (except Pub. Adm.)	-2.542**	0.153
	(1.294)	(0.375)
Ind.: Public Administration)	0.0285	-1.642***
	(1.309)	(0.595)
Constant	4.282***	1.013***
	(1.291)	(0.372)
Observations: 2857 F : 6.33.		
Standard errors in parentheses *** p < 0.01; ** p < 0.05; * p < 0.1.		

Table 4. Effects of Equity and Number of Founders on Extremely Low Outcomes

	(1) Survival 1=survived (82%) 0=disappeared (18%)	(2) Survival Ranked 1=top 87% 0=bottom 13%	(3) Survival Ranked 1=top 90% 0=bottom 10%	(4) Survival Ranked 1=top 93% 0=bottom 7%	(5) Survival Ranked 1=top 96% 0=bottom 4%
Log Equity (Y0)	-0.015	-0.033**	-0.044**	-0.079***	-0.14***
Nb. of Owners-Operators (Y0)	0.022	-0.026	-0.12	-0.16*	-0.27***
Serial Entrepreneur (Y0)	0.16	0.085	0.10	0.054	0.13
Has Employees (Y0)	0.092	0.074	-0.030	-0.21	-0.47**
Female Entrepreneur (Y0)	-0.16	-0.24*	-0.18	-0.15	-0.34
Ind.: Construction Services	-0.35	-0.66	1.23***	1.72***	2.25***
Ind.: Construction Material	-0.42	-1.28	0.55	0.90*	0.74
Ind.: Wholesale Trade	-0.78	-1.45	0.25	0.39	0.23
Ind.: Retail	-0.91	-1.81*	-0.14	0.017	0.44
Ind.: Transportation and Warehousing	-1.21*	-1.89*	-0.28	0.49	0.96
Ind.: Information	-0.38	-1.14	0.65	0.50	0.095
Ind.: Finance and Insurance	-0.73	-1.56	0.19	0.19	0.82
Ind.: Real Estate and Rental and Leasing	-0.46	-0.97	0.56	1.08*	1.98**
Ind.: Prof. Mgt. & Educ. Serv.	-0.41	-0.85	0.81**	1.19***	1.57***
Ind.: Waste Mgt. and Remediation Serv.	-0.61	-1.27	0.50	0.68	0.55
Ind.: Health Care and Social Assistance	-0.66	-1.45	0.10	0.41	0.21
Ind.: Arts, Entertainment, and Recreation	-0.88	-1.63			
Ind.: Accommodation and Food Services	-0.80	-1.78	-0.22	-0.018	0.20
Ind.: Other Serv. (except Pub. Adm.)	-0.70	-1.51	0.037	0.13	0.32
Constant	2.11***	3.39***	2.26***	2.86***	4.14***
Observations	3498	3498	3472	3472	3472
F	1.61	3.16	3.39	3.93	4.26
p	0.045	0.0000044	0.0000016	0.000000041	0.0000000041

Normalized beta coefficients in parentheses *** p < 0.01; ** p < 0.05; * p < 0.1.

Table 5. Effects of Equity and Number of Founders on Extremely High Outcomes

	(1) Premium Fundraising 1=top 6% 0=bottom 94%	(2) Premium Fundraising Ranked 1=top 5% 0=bottom 95%	(3) Premium Fundraising Ranked 1=top 3% 0=bottom 97%
Log Equity (Y0)	0.066***	0.062**	0.080**
Nb. of Owners-Operators (Y0)	0.38***	0.36***	0.43***
Serial Entrepreneur (Y0)	0.66***	0.57***	0.47**
Has Employees (Y0)	0.66***	0.71***	0.95***
Female Entrepreneur (Y0)	-0.59***	-0.67***	-0.78**
Ind.: Mining and utilities	1.62	1.64	1.76
Ind.: Construction Services	-0.47	-0.50	-0.34
Ind.: Construction Material	0.24	-0.070	0.037
Ind.: Wholesale Trade	0.071	-0.66	-0.40
Ind.: Retail	0.15	0.064	0.12
Ind.: Transportation and Warehousing	-0.20	-0.44	-1.21
Ind.: Information	0.66	0.42	0.84
Ind.: Finance and Insurance	-0.37	-0.49	-0.22
Ind.: Real Estate and Rental and Leasing	0.27	0.12	-0.29
Ind.: Prof. Mgt. & Educ. Serv.	-0.25	-0.52	-0.24
Ind.: Waste Mgt. and Remediation Serv.	0.018	-0.036	0.30
Ind.: Health Care and Social Assistance	-0.45	-0.45	-1.01
Ind.: Arts, Entertainment, and Recreation	0.44	0.23	-0.048
Ind.: Accommodation and Food Services	-0.25	-0.86	-0.62
Ind.: Other Serv. (except Pub. Adm.)	-0.45	-0.69	-0.30
Constant	-4.52***	-4.44***	-5.49***
Observations	4883	4883	4883
F	7.74	6.62	5.74
p	0	0	0

Normalized beta coefficients in parentheses *** p < 0.01; ** p < 0.05; * p < 0.1.

Figure 1. Graphic Summary of Findings