6-9-2012

THE IMPACT OF BOOTSTRAPPING ON NEW VENTURE PERFORMANCE AND SURVIVAL: A LONGITUDINAL ANALYSIS

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Recommended Citation
Available at: http://digitalknowledge.babson.edu/fer/vol32/iss12/4
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ABSTRACT

Entrepreneurs rarely possess all of the financing necessary to achieve desirable outcomes. As a result, they must often be creative in financing and operating their new ventures. These creative actions, collectively, are termed bootstrapping. The literature, though, is unclear as to whether this ultimately has a negative or positive impact on performance and survival. This worked examines the relation between bootstrapping activity and performance/survival on a large longitudinal sample of new firms. Findings indicate the relation depends upon whether the entrepreneur is pursuing profitability, growth, or simply survival. With regard to the latter two, bootstrapping is generally negatively associated with desirable outcomes. However, with regard to profitability, bootstrapping activities are actually positively associated.

INTRODUCTION

Noted to be an “essential entrepreneurial phenomenon,” (Grichnik & Singh, 2010, p. 1) bootstrapping—particularly financial bootstrapping—is a term that has been increasingly examined in the academic entrepreneurship literature. Defined early on as a method to secure resources without reliance on long-term external financing (Freear, Sohl, & Wetzel, 1995), financial bootstrapping is said to occur when there is a lack of internal and external funding for the entrepreneur (Winborg, 2009). The notion has been in the academic literature for at least 20 years (e.g. Van Auken & Carter, 1989), but has only recently received rigorous examination by scholars.

In spite of this recent work, a number of gaps have been noted in this literature. Possibly the most important missing element is empirical evaluation of the bootstrapping/performance relation. Grichnik and Singh (2010) and Vanacker, Manigart, Meuleman, and Sels (2011), for example, note the relative absence of research examining the impact of bootstrapping, not only on venture growth, but also survival. Similarly, Ebben (2009) observes a lack of examination on the relationship between bootstrapping and time. While these issues are beginning to gain attention, empirical studies remain limited, and the empirical work to date tends to be underpowered and/or lack external validity.

One purpose of the current work is to empirically assess the relation with rich, longitudinal data on a large sample of new firms. Additionally, we argue that the topic of bootstrapping has not been couched appropriately in theory (Ebben & Johnson, 2006). In some ways bootstrapping is a construct in search of a theory. In a movement towards proper epistemology, we seek to provide a theoretical grounding. These two related deficiencies in the literature—one theoretical and
one empirical—are not small issues for scholars, entrepreneurs, and policy makers. For example, two of the more popular recent theories to arise in the new venture literature—effectuation (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005)—espouse tactics like bootstrapping not only as realistic options of necessity, but also as normative tactics; indicating that operating in relatively resource-poor environments is the preferred mode of operation. Indeed, some recent research supports this (e.g. Vanacker et al, 2011; Read, Song, & Smit, 2009). However, we would argue that, because of the lack of theoretical grounding, conclusions from the few empirical works on the bootstrapping topic remain suspect. Therefore, advising practicing entrepreneurs from this research may be premature.

In working to address these broad gaps, we draw from and seek to inform two related bases of theory: signaling theory and resource-based theory. However, we begin with an overview of the rather disjointed extant literature on bootstrapping, paying particular attention to the literature that addresses the relation between bootstrapping and performance. This coverage leads to theoretically derived hypotheses that will be tested with a large, longitudinal sample of new firms.

**Bootstrapping Literature Review**

Small ventures will typically encounter financial resource constraints, and will respond to those constraints by bootstrapping (Van Auken & Neeley, 1996). A review of the literature reveals multiple definitions of bootstrapping (e.g. Winborg & Landstrom, 2001; Van Auken & Neeley, 1996; Brush, 2008). Most incorporate the idea that bootstrapping is a process whereby entrepreneurs assemble resources and at least persevere—if not grow—without utilizing long-term debt or equity financing from outside banks and/or investors. This process is generally termed ‘financial bootstrapping’ (Winborg & Landstrom, 2001; Freear, Sohl, & Wetzel, 1995). To be complete, though, a definition should also address the fact that entrepreneurs must be imaginative to discover ways to compete and survive without access to this financing. As such, bootstrapping is not only the absence of outside debt or equity, it is also the ongoing process of acquiring other resources (e.g. supplies, employees, equipment) at minimal cost (e.g. Vanacker et al., 2011). Accordingly, we adopt a definition put forth by Freear, Sohl, and Wetzel (1995) as “highly creative ways of acquiring the use of resources without borrowing money or raising equity financing from traditional sources” (p. 102). Table 1 (see appendix) provides a summary of the literature on the topic.

Bhide (2000), for example, seems to espouse this definition, and in so doing offers a number of prescriptions for operating in a bootstrapped context. His view is that bootstrapping a startup is virtually unavoidable, but may not place the entrepreneur at a disadvantage. This must often be the case as “entrepreneurs cannot start a business without financial assistance, they do not have access to financial institutions and cannot secure financial assistance if they lack prior business experience” (Gnyawali & Fogel, 1994, p. 51). In essence, entrepreneurs who make the decision to bootstrap (or who have no choice but to bootstrap) are left to their own creative devices with little or no assistance from external funding sources. Stemming from this, bootstrapping becomes a necessity in order for the entrepreneur to overcome resource constraints and to optimize the resources that are accessible. The entrepreneur is compelled to generate alternative solutions “that are superior to those developed in situation where resource slack is readily available” (Grichnik & Singh, 2011, p.1). They must contend with various liabilities (e.g. financing, legitimacy, inexperience), and determine the most parsimonious ways in which to overcome them. For
example, financial resources are in short supply for the new venture (e.g. Cassar, 2004; Chaganti, DeCarolis, & Deeds, 1995), often creating the need to formulate creative and non-traditional approaches. This is closely tied to Thorne’s (1989) claim that “entrepreneurial character” (p. 7) is directly linked with the entrepreneur’s ability to produce alternative sources of financing. It would be the case, then, that bootstrapping is part and parcel to the entrepreneurial experience.

This leads to an interesting perspective – contrary to the view where entrepreneurs are forced to bootstrap based on a lack of resources, recent research suggests that bootstrapping may actually be a proactive and conscious strategy by the entrepreneur to lower costs and risk (e.g. Carter & Van Auken, 2005; Grichnik & Singh, 2010; Winborg, 2009) and to maintain control over decision-making (Patel, Fiet, & Sohl, 2007; Bhide, 1992), regardless of available capital. For instance, Winborg (2009) categorizes founders based on their motivations for using bootstrapping (i.e. to reduce costs, constrained by lack of capital, and to reduce risk), and the studies’ findings indicate that various bootstrapping techniques are implemented based on the particular motivations of the founder. This feeds the debate as to whether or not bootstrapping might be more than a desperate option and, instead, may be deliberately chosen in order to provide the entrepreneur with certain advantages. Ebben and Johnson (2006) further highlight that these choices will also vary based on where the organization is in its life cycle.

The Bootstrapping-Performance Relation

Based on finance theory, bootstrapping should be a relatively benign issue. Assuming perfectly efficient markets, value-adding startups should receive all the financing they need—whether that be debt or equity (e.g. Modigliani & Miller, 1958). Therefore, only entrepreneurs with value-adding ventures who choose to eschew external funding would bootstrap, and lack of financing for startups would be far less of a topic for discussion. However, that assumption is routinely violated in the context of startups primarily because of information asymmetry. Briefly, information asymmetry captures the notion that it is difficult for external parties (i.e. financiers and customers) to gauge the quality of a given venture because complete information on the viability of that venture is simply not available. So, entrepreneurs may be routinely forced to bootstrap.

By most indications, bootstrapping should constrain performance and increase the likelihood of failure—at least in the near term. A host of studies, for example, hold that a primary cause of new firm failure is the inability to receive adequate external debt or equity financing (e.g. Berger & Udell, 2002). Since, fundamentally, bootstrapping is the absence of this financing, bootstrapped firms should struggle. Interestingly, though, a review of the extant literature (see Table 1) reveals that bootstrapping is also sometimes portrayed positively because it demonstrates an ability for a new firm to be self-sustaining (Carter & Van Auken, 2005). In this context, implementation of bootstrapping would indicate that the firm is viable. Moreover, while bootstrapping will likely constrain revenues, it is usually associated with a lower cost of capital, as banks and private equity players generally charge a premium to start-up’s use of funds; whereas internal capital is relatively cheap (Ang, Cole, & Lin, 2000; Scherr & Hulbert, 2001). Hence, bootstrapping may serve to enhance performance, particularly in the long run.

However, as of yet, the empirical research fails to provide justification for this positive viewpoint. While commonly accepted as an approach often used by new firms, the topic has received only minor focus in entrepreneurship literature (Winborg & Landstrom, 2001). Within the existing literature on bootstrapping, it appears the majority of studies focus primarily on three
elements: various types of bootstrapping techniques (e.g. Winborg & Landstrom, 2001), which
techniques are used (e.g. Carter & Van Auken, 2005), and under what circumstances those choices
are made. For example, Van Auken (2005) assesses the choices of venture owners to use particular
bootstrapping techniques over others, Winborg and Landstrom (2001) examine the use of various
financial bootstrapping methods and the behaviors that accompany them, while Winborg (2009)
investigates what motivates founders to use bootstrapping. Building on this, others attempt to
determine if bootstrapping is a proactive, deliberate choice, rather than an induced reaction to
environmental resource constraints (e.g. Grichnik & Singh, 2010). The types of bootstrapping
may also vary over time, as found by Ebben and Johnson (2006), indicating that ventures may
respond with particular bootstrapping behaviors at different points in their life cycle.

Even more limited are studies focusing on the actual impact of bootstrapping on venture
performance. Touching upon this relationship, Perry, Yao, and Wolff (2008) observe that nascent
firms that utilize techniques focusing on generating support external to the venture (versus
internal techniques) are more likely to result in that venture becoming operational. Similarly, while
Fitzsimmons’ (2007) study does not examine long-term impact, it does find that bootstrapping
behavior (in the form of leveraging assets to fund short-term growth) is exhibited by resource-
constrained high-growth firms. Ebben (2009) examines the relationship between bootstrapping
and how the financial condition of the firm impacts its decision to use various bootstrapping
methods. Building off of this, the study also shows that while certain techniques may impact
profitability, others may negatively impact other areas of performance (such as leverage and
liquidity; Ebben, 2009). Correspondingly, while many bootstrapping methods do not appear to
impact growth, there are those—such as hiring temporary employees, persuading customers to
pay with less delay, and sharing physical premises—that do positively impact growth (Vanacker et
al., 2011; Vanacker & Sels, 2009).

As can be seen, the overall bootstrapping-performance relationship remains unclear. Since
findings of the collective field are somewhat ambivalent regarding the relationship, in the following
sections we consider two related theories that inform the relationship. We submit that this is an
important contribution to the literature because, while bootstrapping has long been discussed
among researchers, it has remained somewhat atheoretical. Because entrepreneurship research
tends to be phenomenological, this condition occurs periodically. However, it is crucial that
scholars work to embed these constructs in bona fide theory so that we can properly build a base of
knowledge and draw appropriate conclusions. It is for this reason that we proceed to conceptualize
bootstrapping within two established bases of theory: resource based theory and signaling theory.

Resource Based Theory

Resource based theory (RBT) holds that resources (tangible and intangible) held by firms are
heterogeneous and these varying resource configurations can be used to differentiate firms from
competitors (Penrose, 1959). The entrepreneur is aware of unique opportunities, finds access to
resources that allows them to exploit these opportunities, and is able to recombine those resources
into heterogeneous outputs (Alvarez & Busenitz, 2001). However, for this differentiation to
result in enhanced performance, the configuration of resources in a given firm must be valuable,
rare, inimitable, and non-substitutable (Barney, 1991). These qualities can result in sustainable
advantage and performance (Barney, 1991). Porter (1996) further states that, for a configuration
to qualify as a competitive advantage, it must increase revenue, decrease costs, or both. It is then
up to the entrepreneur to determine that a resource is valuable, and implement and exploit the
resource in the most effective manner. From this perspective, the entrepreneur may implement bootstrapping to acquire resources, and combine them to create unique outputs. The ability to utilize bootstrapping as a technique to overcome various constraints when founding their venture, may in and of itself be a valuable intangible resource of the entrepreneur.

In examining the four criteria listed above (value, rarity, inimitability, and non-substitutability), it can be suggested that bootstrapping may indeed add value through a lower cost structure. Bhide (1992) is a proponent of this notion and compares bootstrapping to a just-in-time inventory system. When a start-up is cash starved, he maintains, entrepreneurs are far more diligent in examining expenditures, and are less likely to waste money. Moreover, any problems are quickly seen and dealt with, as opposed to simply throwing money at them. By contrast, when start-ups are awash in cash from banks or equity players, entrepreneurs may purchase things that are unnecessary. They may even feel pressure to spend money to show “progress.”

However, when evaluating bootstrapping against the remaining criteria, its competitive advantage potential is less certain. Since most start-ups are bootstrapped (Shane, 2008), the practice is not rare, by definition. This same fact indicates that bootstrapping is not inimitable, and it appears that competitors can trump the practice by obtaining outside capital. Therefore, in order to overcome various constraints when founding their venture, while bootstrapping may provide short-term benefits for the new venture when it is initially founded, we argue that it does not result in competitive advantage or long-term sustainability for the firm.

**Signaling Theory**

As noted above, the key issue underlying the new venture’s inability to attain external financing is information asymmetry (Berger & Udell, 2002). Because of this reality we turn to a theory equipped to address it. Information asymmetry is core to the concept of signaling theory, which asserts that asymmetric information exists among economic agents (Spence, 1974; Certo, 2003). This is due to the issue that markets for information are not efficient, thereby resulting in information that is often incomplete or inaccurate. Because this uncertainty is inevitable, observers find it difficult to make perfectly informed decisions based upon their own limited knowledge. There are various reasons why such information asymmetry exists. For instance, the overall amount of information may be extremely difficult to effectively/efficiently communicate (Alvarez & Busenitz, 2001; Williamson, 1991). In an entrepreneurship context, information asymmetry happens despite efforts to provide adequate information, perhaps due to the entrepreneur’s motivation to provide only positive information to investors (Prasad, Bruton, & Vozikis, 2000). Some owners are concerned with protecting proprietary knowledge, and by necessity must limit information in order to protect themselves—yet, it is also critical that they somehow signal their strengths and potential for value generation to the market (Deeds, Decarolis, & Coombs, 1997).

We adopt Busenitz, Fiet, and Moesel’s (2005) definition of a signal as “new information that may change our current understanding of a future state” (p. 3). As such, effective signaling by an organization will help to offset negative effects brought about by information asymmetries, where imperfect information creates uncertainty among potential investors. In doing so, the entrepreneur can increase the perception of trustworthiness, value, and legitimacy of their organization. By utilizing effective mechanisms, future uncertainty is mitigated by mechanisms that signal current behaviors of the firm and the entrepreneur.
Additional signals, therefore, are necessary to indicate whether the investment will go to a project that will generate adequate future value, and has strong commitment by the entrepreneur (Amit, Glosten, & Muller, 1990). To do so, signals must be observable and known in advance (before an investment decision is made) as well as be costly or difficult to imitate (Certo, Daily, & Dalton, 2001), to allow all interested parties to recognize, interpret, and take action based on the signal. The information provided by the signal can change perceptions, thus potentially altering investment decisions of whether or not a venture deserves support (both long- and short-term). As described by Levy and Lazarovich-Porat (1995), the classic signaling model assumes that several organizations exist, each of which differs in quality. While an owner will have relatively complete information regarding the firm's quality, investors will not. Thus, the owner will provide signals to investors to assist them with distinguishing that organization (presumably, high-quality) from other (presumably, low-quality) organizations. If the signal is effective, the investor will have a positive response and accept the signal, motivating them to show support for the venture.

The value of signaling, then, is in its ability to reduce existing information asymmetries (Levy & Lazaraovich-Porat, 1995) and provide a way for outsiders to make conclusions and predictions about actions and outcomes (Busenitz et al., 2005). Clearly, the purpose of signaling is to frame the organization in a positive light. With negative signals, or no signals at all, potential investors can be discouraged and firm equity costs may increase (Busenitz et al., 2005). Observers will use signals to mitigate information asymmetry (Spence, 1974), using positive signals to develop positive opinions, thereby saving resources that would otherwise be spent researching the legitimacy of the organization (Busenitz et al., 2005). Signals help to provide such legitimacy, as they represent actions being taken (or will eventually be taken) by an organization or its owner.

What types of signals add value? In their research focusing on entrepreneurs and signaling, Prasad et al. (2000) focus on ‘value’ signals and ‘commitment’ signals—both of which help to create perceptions of trust, thereby improving the potential for outsider investments in the organization. For example, the higher the level of perceived commitment of the entrepreneur to organization performance and survival, the greater the perceived chance that the entrepreneur will persevere even during times of turbulence and uncertainty. Similarly, the equity invested by the entrepreneur has often been used as a signal for the expected value placed by the entrepreneur on the organization (Leland & Pyle, 1977; Prasad et al., 2000).

As noted by Prasad et al. (2000), the overall level of ownership may not be an accurate signal for an organization’s ‘value,’ as the initial personal wealth of entrepreneurs is often quite limited (Amit et al., 1990). This, in turn, limits the proportion of the organization that can be owned by the entrepreneur. This is often in spite of the entrepreneur’s personal beliefs about the firm’s potential for growth and performance. For that reason, it is suggested that the actual proportion of entrepreneur equity invested in an organization provides a better signal of the entrepreneur’s value and commitment (Prasad et al., 2000).

Empirical findings relating these signals to performance have been equivocal. Levy and Lazarovich-Porat (1995) do find that higher levels of entrepreneur participation in the financing of a venture (i.e. proportion of shares owned by the entrepreneur) positively correlate with stock price and market valuation of the venture. Presumably, this type of entrepreneur participation is a signal for higher quality, and consequently impacts investor support of the firm. Based on the measure proposed by Prasad et al. (2000), Busenitz et al. (2005) examine the proportion of
equity owned (a proposed signal of ‘value,’ or potential rents of the venture), and also assess the percentage of individual wealth invested in the venture (a proposed signal of ‘commitment,’ or belief and dedication to the venture), to determine how value and commitment signals impact long-term outcomes for a venture. Their findings, though, show no significant correlations with long-term performance (whether an IPO takes place, or if the venture is acquired, remains private, or goes out of business).

Is Bootstrapping an Effective Signal?

Assuming that actions and behaviors that signal value and commitment are effective in influencing stakeholders, we now question whether or not bootstrapping and its manifestations will signal these virtues. To help us more effectively conceptualize this we draw on legitimacy from institutional theory. To the degree that bootstrapping can signal in a way that causes stakeholders to take them for granted, the practice can enhance performance. Taken-for-grantedness is generally used to describe a heightened level of cognitive legitimacy (Stinchcombe, 1965; Hannan & Freeman, 1989), particularly among customers, and therefore is an important concept in the current research.

In this sense, bootstrapping strategies help to convey trust to interested parties (such as investors) outside of the organization. If done effectively, signaling can “affect the value of the firm when asymmetric information prevails” (Levy & Lazarovich-Porat, 1995, p. 40). Such signals represent credibility and trustworthiness of an organization that words and promises cannot (Busenitz et al., 2005). Since outsiders possess less comprehensive information than owners, owners can provide signals regarding pertinent information through their actions and behaviors. In doing so, those who do not have perfect information regarding a venture can gain helpful insight into areas such as risks involved, commitment of the entrepreneur, and potential future value of the organization. Accordingly, effective signals help to assuage the discomfort and concern stemming from uncertainty and, instead, encourage investor support for a venture.

Signaling theory, in general, would predict constrained performance for the nascent organization. With limited access to capital, these new firms should struggle to attract customers. While most signaling theory in the new firm context has been focused upon attracting financiers, the same should hold for customers. The consumer will receive signals from the new venture that will, in turn, affect the consumers’ legitimacy assessment of the firm. Work on new firm legitimacy is strongly suggestive that consumers need to perceive permanence from the firm. The roots of permanence are age and size, and when absent, manifest themselves as the liabilities of newness and smallness.

The choices that entrepreneurs must make when bootstrapping, in general, will send signals of naiveté and a lack of professionalism, especially with regard to customers. As our interest here are from the customer’s perspective, our review of signaling theory encourages us to suspect that a resource-constrained start-up is unlikely to be legitimized after a certain threshold point. As such, we propose:

- **H1:** Bootstrapping will be negatively associated with profitability in new firms.
- **H2:** Bootstrapping will be negatively associated with growth in new firms.
- **H3:** Bootstrapping will be negatively associated with survival in new firms.
METHOD

Data

Our sample consists of data collected as part of the Kauffman Firm Survey (KFS). The KFS tracks 4,928 U.S. businesses founded (or which undertook some initial business activity) in 2004 and follows them through their early years of operation (DesRoches & Robb, 2008). Current collection efforts span seven years (2004-2010), all of which are included in our sample. Firms included in the KFS are all of the same age, as businesses already in existence and inherited businesses were eliminated from the original sample. The dataset only includes for-profit businesses that engaged in at least one of several activities in 2004, including payment of FICA taxes, presence of a legal status for the business, or payment of state unemployment taxes.

The KFS dataset includes information on each organization’s founder(s), employees, debt and equity financing, and financial performance. As founders approach bootstrapping differently or face a variety of circumstances related to funding their ventures, we proxy several bootstrapping behaviors for our study. We select activities and group them along seven broad categories: operational efficiency, management of the pay cycles, inside equity, inside debt, sweat equity, outside equity, and outside debt. The longitudinal nature of this data collection by the Kauffman Foundation makes it a suitable sample to assess the relationship of these specific bootstrapping activities to new venture performance over time, as all variables captured are time-variant.

Independent Variables

Efficiency of operations. Often facing a lack of financial resources, firms must be careful not to waste resources on unnecessary expenses. New venture executives can be conscious of exuberant costs in many ways, including how much they invest in employees and property/equipment or how much product inventory they keep on hand. We measured these cost efficiencies by the number of employees, whether firms incurred expenses for property or machinery, and inventory management. We calculated the total number of employees using both full- and part-time associates, counting part-time employees as .5. As the total was not normally distributed across the sample, we used a natural log transformation as our final measure of this investment in human resources. We used a dummy coded variable to assess a firm’s primary location. Location was coded 1 if the new venture was located at a residence (for instance, in a home office or garage). A code of 2 was assigned if a firm rented or leased space, and a code of 3 was used if space was purchased. All other entries were coded 4. A variable was also used to determine if money was spent to purchase machinery or equipment (coded 1 if there were expenditures, 0 if not) for a given year. Two similar dichotomous variables were used to capture if a new venture paid expenses on property or equipment leases. As a final proxy for cost-efficient operations, we measured whether the business maintained product inventory at year end or not (coded 1 if the business held inventory, 0 if not).

Pay cycle. The management of pay cycles is another way firms can bootstrap their ventures. For instance, entrepreneurs may use delaying techniques to postpone payments of bills they owe vendors or other creditors. To capture pay cycle management, we used a dichotomous variable identifying whether they had account payable (AP) liabilities outstanding at year end (coded 1 if the business had an outstanding AP liability, 0 if not). We also captured the manipulation of accounts receivable (AR) to see if firms were allowing customers to delay payments, which could
serve as an impediment to cash flow. A dichotomous variable was coded 1 if the business held AR assets, 0 if it did not. We also include trade financing in this section. Trade financing is where a business negotiates an arrangement with a supplier to make purchases on account. Similar to the manipulation of the pay cycle, trade financing allows firms to delay payment for materials. We captured the usage of this bootstrapping activity with a binary indicator variable coded 1 if the business made any purchases through trade financing during a calendar year, 0 if it did not.

**Inside equity.** Entrepreneurs often desire to maintain ownership over their venture and do not want outsiders (i.e. angel investors, bankers, etc.) involved. External funding dilutes ownership and adds complexity to organizational decision making, and so founding entrepreneurs may seek to bootstrap their businesses via internal equity funding. In this case, the owners start the business through their own financial investment. We captured this through a binary variable coded 1 if the owners have an equity investment, 0 if they do not. We also included immediate family members as sources of inside equity, so two similar variables were created that indicate if equity funding comes from a spouse or an owner’s parents.

**Inside debt.** It may be necessary for entrepreneurs to rely on debt to get their venture started, put it on a path for growth, or keep it from closing its doors. Thus, we capture a series of binary variables that represent whether or not ventures utilized various debt-sourced funding either from owners, family members, or employees. We capture whether any owners used personal loans from family members or personal credit cards to finance the business. We also capture whether there were any loans made in the name of the business from owners, family members, or employees. All variables were coded 1 if these sources of funding were used, 0 otherwise.

**Sweat equity.** One resource entrepreneurs can use to bootstrap their venture is their own labor. Founding entrepreneurs often expend many hours performing the various functions necessary for their firm to survive and grow, and so we captured these efforts by measuring the average number of hours worked per week by owners. Because this variable was not normally distributed, we used the natural log of hours worked.

**Outside equity.** Equity funding can also come from external sources. In return for these financial resources, founding entrepreneurs give up some of their ownership stake. As many entrepreneurs face limitations regarding personal finances available to the business, we also captured indicators of whether the businesses accepted outside equity investments to fund the business. A series of binary indicator variables specify whether a venture was funded from angel investors, venture capitalists (VCs), another company, or a government entity. Each of these variables was coded 1 if the venture obtained equity funding from the source, 0 if it did not.

**Outside debt.** Similarly, new ventures may need to rely on external sources for debt funding, entering into contractual loan agreements that require no transfer of ownership. To capture whether a firm utilized outside debt funding to finance their venture, we captured whether any owners took out a personal loan from a banking institution or some other entity. We also captured whether any loans were taken out in the name of the new venture, assuming a debt agreement from a bank, a non-banking financial institution, another business, another individual not associated with the venture, or a government agency. All variables were coded 1 if the venture obtained debt funding from the source, 0 if it did not.
Control Variables

The KFS follows almost 5,000 different businesses, representing 760 different industries (as classified by a six-digit NAICS classification). As prior research has alluded to the importance of industry effects on new ventures (Short, McKelvie, Ketchen, & Chandler, 2009), we controlled for a firm’s dominant industry using a simplified two-digit NAICS code, representing 24 different industry classifications. Furthermore, we added a covariate for time as a control for macroeconomic conditions. Time was coded such that 2004 was the initial year (t=0), with subsequent years coded incrementally.

Dependent Variables

We selected three performance measures that are important for new ventures: profitability, growth, and survival. Profitability was measured by return on assets (ROA). To capture ROA, we divided the new venture’s net income by its total assets. This reveals how effective a firm is in generating profits using the assets owned by the firm. Our second measure of performance was sales growth, which was calculated using the difference in year-to-year revenue. Sales growth is important to new ventures because it discloses a firm’s progress in building its business over time. A log transformation was used for both ROA and sales growth to normalize these variables. Our third dependent variable was survival. We examined survival over the full seven-year period offered by the KFS. If a firm survived for the entire period, it was coded as 1; if not, it was coded as 0.

Analysis

With repeated observations and our use of dominant industry as a control, our study spans multiple levels of analysis. Random coefficients modeling (RCM) represents a statistical methodology that allows for accurate modeling of multi-level longitudinal data. It affords the ability to perform regression-like analyses of relationships at lower levels alongside analyses describing variation in lower levels due to higher-level effects and time (Holcomb, Combs, Sirmon, & Sexton, 2010). Specific to our analysis, RCM can be used to assess how specified predictors within each level of analysis influence the dependent variable (Holcomb et al., 2010). For our study, level 1 consists of the repeated observations of firms across time (within-firm variance). Level 2 data is the firm-level (between-firm variance), and level 3 is the industry level (between-industry variance). As the nature of longitudinal data suggests that closely recorded observations will be highly correlated, an important benefit of RCM is that it controls for dependence in the data (Blise & Ployhart, 2002), which many other data analytic techniques (such as OLS regression) fail to do. The SAS PROC MIXED procedure was used to conduct the hypotheses testing required for this analysis (Singer, 1998).

Results

Table 2 (see appendix) summarizes the descriptive statistics, reliability estimates, and correlations for the variables included in our study. Complying with the model-building approach advocated in prior RCM research, we began our empirical investigation by first running an unconditional null model for each of our dependent variables to partition the variance components for each of the three levels. We next added our covariate for time as a fixed effect only, unconditional growth model. Results provide evidence of a fixed negative linear trend for profitability and survival,
and were insignificant for growth. Each model was also altered to include random effects for the time coefficient at the firm and industry levels. Results for these analyses confirmed significant random effects, but did not substantially improve the fit of the models, and were rebuffed in favor of the more parsimonious fixed effect models. Table 3 (see appendix) presents output for these unconditional null and growth models.

Table 4 (see appendix) displays the results of our hypotheses testing. Our first hypothesis posits that bootstrapping is negatively associated with new venture profitability over time. Utilizing the natural log of ROA as our response variable, we found mixed results. Our measures related to efficiency in operations offer strong evidence against Hypothesis 1, as purchasing equipment ($\beta = -0.275, p < .001$) and holding product inventory ($\beta = -0.226, p < .001$) were negatively associated with profitability over time. Similarly, adding costs attributable to where the business was located ($\beta = -0.220, p < .001$) was negatively related to profitability over time. Number of employees and expenditures due to the leasing of property or equipment were not significant. Management of the pay cycle displayed no relationship between AP or AR with profitability, but did demonstrate a positive relationship between trade financing and profitability over time ($\beta = 0.144, p < .010$). Surprisingly, inside equity and inside debt strategies were largely non-significant, though most showed the purported negative relationship. The only inside debt bootstrapping strategy that was significant was for business loans received from employees ($\beta = 0.713, p < .010$). Sweat equity also showed a positive relationship ($\beta = 0.143, p < .05$), suggesting that the more hours worked by owners, the more profitable the firm will be over time. Outside equity and debt financing had a predominantly negative impact on firm profitability over time, with government equity funding ($\beta = -0.676, p < .10$), bank loans ($\beta = -0.254, p < .001$), non-bank financial institution loans ($\beta = -0.429, p < .05$), loans from other companies ($\beta = -0.907, p < .05$), and personal loans ($\beta = -0.460, p < .10$) all having significant relations. Equity from VCs was found to have a positive relationship ($\beta = 0.735, p < .10$). In all, these results fail to support Hypothesis 1, with the majority of tested bootstrapping strategies displaying a positive relationship with firm profitability over time.

Results for our second hypothesis, which proposed a negative relationship between bootstrapping techniques and growth over time, were even more varied. Our measures for operational efficiency were mostly positively related with growth (employees: $\beta = 0.700, p < .001$; location: $\beta = 0.264, p < .001$; property leasing: $\beta = 0.199, p < .001$, and equipment leasing: $\beta = 0.158, p < .05$), offering some support to our hypothesis. Pay cycle management tactics were contrary to our hypothesis, with AR ($\beta = 0.440, p < .001$), AP ($\beta = 0.301, p < .001$), and trade financing ($\beta = 0.165, p < .05$) all showing a positive relationship with the natural log of sales growth. Bootstrapping strategies for inside equity aligned with our second hypothesis, in that equity from the owner ($\beta = -0.248, p < .001$), owner’s spouse ($\beta = -0.340, p < .10$), and owner’s parents ($\beta = -0.526, p < .001$) were all found to be negatively related to growth. Sweat equity had a positive relationship ($\beta = 0.527, p < .001$), while all strategies of inside and outside debt were found not significant. Outside equity did show a positive relationship with growth over time for equity obtained from an outside company ($\beta = 0.354, p < .05$) or VCs ($\beta = 0.549, p < .10$). Based on these mixed results, we determine partial support for Hypothesis 2.

Our final hypothesis addressed the relationship between bootstrapping strategies and firm survival. Business location was found to have a negative significant relationship ($\beta = -0.018, p < .05$), as was holding assets in AR ($\beta = -0.037, p < .001$). Sweat equity ($\beta = -0.012, p < .10$) also had a negative relationship with survival. Equity funding from parents ($\beta = 0.041, p < .001$) had a
significant positive impact, as did inside debt strategies pertaining to the use of owners’ personal credit cards ($\beta = 0.018, p < .05$) and personal loans from family members ($\beta = 0.025, p < .10$). All other bootstrapping tactics were found to be non-significant in relation to survival. Overall, similar to the prior hypothesis, Hypothesis 3 was met with mixed results suggesting partial support.

**DISCUSSION AND CONCLUSIONS**

The goal of this work was to assess the relation between bootstrapping and performance/survival in new firms. We argue that this work contributes to the existing literature by empirically examining the relation over time on a large, representative sample of new firms. Moreover, we maintain that we provide a viable base of theory, so that findings—past and present—may be culminated in ways reflecting proper epistemology.

Our findings tell an interesting story with regard to bootstrapping. First, and not surprisingly, the strength and direction of the relation vary depending on the outcome variable examined. Those activities that lead to increased growth, for example, may not increase the likelihood of survival. As such, we should not expect all outcomes to directly covary with one another, based on the bootstrapping techniques used. Second, results also varied by type of bootstrapping tactic employed. These points suggest that researchers should use caution if prescribing bootstrapping as a proactive approach that benefits the entrepreneur by lowering costs and risk—instead, the outcome may run counter to expectation, based on the specific techniques applied as well as the particular outcome that is anticipated.

**Performance/Survival Outcome Findings**

When considering profitability, findings were unequivocal and not consistent with our stated Hypothesis 1— bootstrapping is associated with increased profitability. In this way, our result run counter to Ebben (2009) who found that increased usage of bootstrapping techniques was detrimental to future firm performance. With regards to growth, findings were mixed, but most tactics associated with bootstrapping were associated with lower performance. This provided partial support for Hypothesis 2. In this way, we run counter to Vanacker et al. (2011) and Fitzsimmons (2007) who found a mild, positive relation between bootstrapping and growth. Finally, when examining the survival outcome, we find fairly strong support for avoiding bootstrapping activities. There were fewer significant associations on this DV, but findings were consistent. These results provided partial support for Hypothesis 3.

**Limitations and Conclusion**

Though the data analyzed here are longitudinal, the years of collection marked a fairly severe recession in the U.S., and certainly these data reflect that. Also, to a certain degree, our variables proxy the use of bootstrapping in new firms. Since the data are archival, we clearly are not inside the firms observing actual behavior.

It is interesting that none of the individual activities showed consistent impacts across all outcomes. Even when considering the activities as broad categories, we do not see much consistency. Taken together, these results encourage us to advise scholars to take a deeper look into definitions of bootstrapping and the manifest variables that are derived from those definitions, in order to gain
a finer-grained understanding of which techniques are beneficial under particular circumstances. Some of the variables used to tap the construct may adequately reflect the construct, while others may be of little value—or may even prove to be detrimental—as bootstrapping techniques.

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ACKNOWLEDGEMENTS

Certain data included herein are derived from the Kauffman Firm Survey release 6.0. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Ewing Marion Kauffman Foundation.

REFERENCES


## Appendix

Note: Tables 1, 2 and 3 are not presented due to space constraints. This information is available from the authors upon request.

### Table 4: Firm-level Bootstrapping Predictors of ROA, Sales Growth, and Survival

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** ***p<0.01; ** p<0.05; * p<0.10