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WORKING PAPER

Bootstrapping as a Resource Dependence Management Strategy and its Association with Startup Growth [1]

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ABSTRACT

BOOTSTRAPPING AS A RESOURCE DEPENDENCE MANAGEMENT STRATEGY AND ITS ASSOCIATION WITH STARTUP GROWTH

This paper studies the association between bootstrapping and startup growth. Bootstrapping reduces a startup's dependence on financial investors, but may create new dependencies. Drawing upon resource dependence theory, we hypothesize that when bootstrapping does not create new strong dependencies it will benefit startup growth, especially when dependence from financial investors is high. However, when bootstrapping creates new strong dependencies it will constrain growth, especially when dependence from financial investors is low. We use a longitudinal database of 205 Belgian startups comprising data from both questionnaires and yearly financial accounts. Findings broadly confirm our hypotheses. Theoretical and managerial implications are discussed.

1. Introduction

Many startups face severe resource constraints (Daily et al., 2002; Parhankangas and Arenius, 2003; Baker and Nelson, 2005), which drive founders to engage in a variety of resource acquisition strategies. Traditionally, scholars have depicted financial market transactions as the prime mechanism through which resources are acquired. In this view, firms acquire cash from financial investors to buy resources in factor markets (Winborg and Landström, 2001). Nevertheless, information asymmetries and other market imperfections make that outside sources of finance are often unavailable or difficult to obtain for young and small firms (Berger and Udell, 1998; Van Auken, 2001; Cassar, 2004). This observation has spurred an emerging body of literature that focuses on how entrepreneurial ingenuity may lead to the use of alternative resource acquisition strategies, which may allow founders to overcome resource constraints (Winborg and Landström, 2001; Baker and Nelson, 2005).

Bootstrapping is one such alternative resource acquisition strategy, which is widely used in young and small firms (Bhide, 1992; Freear et al., 1995; Van Auken and Neeley, 1996; Winborg and Landström, 2001; Harrison et al., 2004). Bootstrapping is defined as the use of resourceful and innovative methods, which (i) minimize the amount of finance firms need to raise through financial market transactions with traditional outside financiers and (ii) allow firms to secure resources owned by others at little or no cost (Freear et al., 1995; Winborg and Landström, 2001; Ebben and Johnson, 2006; Brush et al., 2006). Despite the central role of bootstrapping in the resource acquisition process of young and small firms, few scholars have studied its consequences for firm development (Harrison et al., 2004). The empirical findings that recently emerged appear inconclusive and even contradictory (Ebben, 2009; Jones and Jayawarna, 2010; Vanacker et al., 2011).

At least two shortcomings characterize prior research on the consequences of bootstrapping. First, this research has not examined the existence of contingencies which may explain the mixed evidence so far. Second, there is a lack of theoretical understanding as to how different bootstrapping techniques affect firm growth. In order to address these shortcomings, we employ resource

dependence theory (RDT) to refine our understanding of the relationship between bootstrapping and growth. Specifically, we argue that the relationship between bootstrapping and startup growth depends upon (i) the strength of startup's dependence on financial partners that may be alleviated through bootstrapping and (ii) the strength of new interorganizational dependencies created through bootstrapping. The RDT framework we employ is particularly suitable to study the relationship between bootstrapping and startup growth, because the growth of firms is expected to depend on their ability to acquire and maintain resources and to manage dependencies with key resource providers (Pfeffer and Salancik, 1978; Daily et al., 2002; Hillman et al., 2009).

We hypothesize that the effect of bootstrapping on firm growth is contingent on the extent to which firms are dependent on external resources provided by financial investors. Some firms are highly dependent on financial investors and have low negotiation power with these investors. This is especially the case when firms lack internal cash flows (Berger and Udell, 1998; Winborg and Landström, 2001; Vanacker and Manigart, 2010) or when they have high growth ambitions (Brush et al., 2001; Daily et al., 2002; Florin et al., 2003; Sapienza et al., 2003; Brush et al., 2006). In a RDT framework, bootstrapping may be viewed as a strategy aimed at reducing this dependence on financial investors by cultivating alternative sources of funding (Casciaro and Piskorski, 2005; Ebben and Johnson, 2006). Bootstrapping is hence expected to be especially beneficial in firms that are strongly dependent on financial investors, as this may allow them to reduce their dependence on the latter. Nevertheless, while a firm decreases its dependence on financial investors when bootstrapping, certain bootstrapping techniques may create new dependencies with other organizations thereby potentially adding more constraints (Pfeffer, 1987; Davis and Cobb, 2010). As a result, firms that replace their low dependence on financial investors with bootstrapping techniques which create new strong dependencies with other resource providers may hamper their future growth.

We test our claims empirically by using a longitudinal dataset that combines questionnaire and financial accounts data on 205 Belgian startups. Our empirical analyses show that bootstrapping

is largely positively associated with firm growth in startups that are strongly dependent on financial investors, i.e. in cash flow constrained startups and in startups with growth ambitions. In contrast, when startups have low dependencies with financial investors, bootstrapping has a negative relationship with firm growth, especially when bootstrapping creates new strong dependencies with other resource providers.

This study contributes to the entrepreneurship and management literature in at least four ways. First, we theorize about bootstrapping methods which, until now, have largely been presented as an eclectic collection of entrepreneurial actions. We argue that bootstrapping methods differ with respect to their dependencies created with resource providers, and that these differences matter in how they are related with firm growth. Hence, we show that not all bootstrapping methods are equal. While some are highly beneficial, others may hamper firm growth.

Second, we contribute to the recent stream of research on resource acquisition strategies in entrepreneurial firms (Clarysse et al., 2011). We show that acquiring resources through either financial market transactions or through bootstrapping methods are complementary. Their long lasting effects on startup growth are contingent on the extent to which firms can manage the dependencies created by the use of these different methods.

Third, our study contributes to RDT theory. A basic premise in RDT theory is that firms take actions to manage external interdependencies, but that these actions are inevitably never completely successful and hence produce new patterns of dependence and interdependence (Pfeffer, 1987; Hillman et al., 2009). We extend RDT by proposing that the use of bootstrapping techniques is another way to manage resource dependencies which, although especially relevant for young and small firms, has received little attention in RDT.

Finally, our research design has major advantages compared to prior research on bootstrapping. It measures the use of bootstrapping close to startup, hence reducing recall and survivorship biases. It is longitudinal in nature, and by separating the measurement of our dependent

and independent variables through time, we are better able to draw causal inferences compared to cross-sectional research. Moreover, it introduces novel ways to measure the use of bootstrapping methods, combining traditionally used qualitative survey data with quantitative data from financial accounts. This may be particularly promising given the findings of recent research on the relevance of financial accounts data for new firms (Wiklund et al., 2010).

The rest of this paper is organized as follows. In section 2 we develop hypotheses on the association between bootstrapping and startup growth. Section 3 describes the research method, including the sample, measures and econometric approach. Section 4 presents the main research findings and discusses additional robustness tests. Finally, section 5 discusses the findings, reviews the limitations of the study and provides recommendations for future research.

2. Literature review and development of hypotheses

2.1. The management of dependencies in accessing resources

One of the major challenges of startups is to gather the resources needed for their emergence and growth (Clarysse et al., 2011). Scholars have often focused on the ability of startups to raise cash from external investors, such as banks and private equity investors, through financial market transactions (Berger and Udell, 1998). Startups can use this cash raised from external investors to buy resources in factor markets. In return for the cash provided in financial market transactions, investors ask for a monetary return that compensates them for their risk. Startups have little leverage over investors' actions, however, as the latter are typically more powerful. The power of external investors originates from the critical nature of financial resources for startups on the one hand and the low dependence of financial investors on a specific startup on the other hand (Ebben and Johnson, 2006). As a result, financial investors may dictate the terms of the relationship or ultimately threaten to withdraw (Casciaro and Piskorski, 2005). Investors may, for example, increase the cost of funding or deny further funding altogether which might hamper the future growth of the firm. Strongly relying

on financial investors hence creates dependencies and increases the riskiness of the firm, as financiers' future actions are uncertain (Pfeffer, 1987).

RDT maintains that organizations seek access to resources from alternative partners when dealing with existing powerful resource providers. Consistent with the RDT framework, founders take actions to reduce financial uncertainty and dependence of their startup (Pfeffer and Salancik, 1978) by actively deploying bootstrapping techniques (Ebben & Johnson, 2006; Winborg, 2009). Bootstrapping techniques refer to a collection of methods used to access resources without raising funds from outside investors through financial market transactions (Freear et al., 1995; Van Auken and Neeley, 1996; Winborg and Landström, 2001; Harrison et al., 2004; Ebben and Johnson, 2006). Bootstrapping includes minimizing capital invested, using owner-related finance, using government subsidies, minimizing accounts receivable, delaying payments and sharing and borrowing of resources (Winborg and Landström, 2001).

It remains unclear whether bootstrapping is beneficial or not for firm development and growth. On the one hand, Ebben (2009) demonstrates the existence of a negative association between the use of joint-utilization, customer-related and delaying payments bootstrapping methods and the financial condition of small firms. On the other hand, Jones and Jayawarna (2010) find that the use of payment-related and joint-utilization bootstrapping methods is positively associated with performance. Vanacker et al. (2011) find either positive or insignificant effects of bootstrapping on the growth of startups. These opposing findings suggest that contingencies may influence the relationship between bootstrapping and the subsequent development and growth of firms. Furthermore, we lack insight as to why some bootstrapping techniques benefit some startups, while others have no or even a negative effect.

Drawing upon RDT, we argue that whether the use of bootstrapping techniques is beneficial for a startup's growth depends upon the strength of the startup's dependence on financial partners that may be alleviated through the use of bootstrapping. Some bootstrapping methods may create new

dependencies with other business partners, however, thereby creating new sources of risk (Starr and MacMillan, 1990). Hence, we further argue that the relationship between the use of bootstrapping techniques and a startup's growth also depends upon the strength of new interorganizational dependencies created through bootstrapping. We first elaborate on how different bootstrapping techniques may create new interorganizational dependencies. Thereafter, we develop hypotheses on how the use of bootstrapping techniques is expected to be related with startup growth, contingent upon the startup's dependence on financial investors.

2.2. The creation of interorganizational dependencies through bootstrapping

Bootstrapping expands the resource base of a firm, but may also expose the firm to an additional source of interorganizational risk. While some bootstrapping techniques may create almost no new interorganizational interdependencies, others may create strong new interorganizational interdependencies and uncertainties which RDT argues may hamper the future development and growth of firms (Pfeffer and Salancik, 1978). Below, we expand on how bootstrapping techniques may create dependencies with other organizations.

Some bootstrapping techniques, especially internal optimization and owner-related techniques, do not create new interorganizational dependencies. Internal optimization techniques aim at minimizing investments, for example through internal optimization of working capital requirements. These techniques decrease investments in daily operations, thereby increasing the availability of cash. Owner-related bootstrapping involves the use of a founder's own funds and of his or her family. While these techniques may affect the personal ties of founders, they do not create dependencies at the firm level and hence constitute inside funds. As inside funds do not create interorganizational ties, they are easier to deploy for alternative uses and experimentation compared to outside funds (Bhide, 1992; George, 2005).

Further, many government programs provide access to (financial) resources which, for example, allow startups to test the viability of new opportunities or to overcome liabilities of newness. While the use of government subsidies creates an interorganizational relationship with the government, governments typically do not directly intervene in business activities and generally provide resources at favourable terms. This dependence hence carries a low organizational risk.

Other bootstrapping techniques may create stronger interorganizational dependencies, however. Customer-related bootstrapping and delaying payments have in common that they access resources through external organizations that are key to a firm's future development. Through customer-related bootstrapping, firms tap resources from customers, for example by negotiating cash sales rather than credit sales. Alternatively, through delaying payments, resources from suppliers are held longer in the startup where they can be put to other uses. Both strategies create interorganizational interdependencies with customers and suppliers, which in turn lead to uncertainties about what the actions of these partner firms will be and hence make future success uncertain (Pfeffer, 1987). The risks of strongly relying on customers and suppliers may be high, especially given the lack of formal commitments and possibilities of opportunistic behavior by the transaction partners (Starr and MacMillan, 1990). For instance, suppliers may decide that they are no longer willing to provide raw materials at the same conditions or may refrain from providing them altogether (Vanacker et al., 2011; Winborg and Landström, 2001), or customers may insist on payment terms that are more favorable for them, or stop buying from the firm altogether.

We argue that the interorganizational risk emanating from the use of customer-related bootstrapping is lower compared to that emanating from the use of payment-related bootstrapping methods. Customers themselves commit to providing resources through customer-related bootstrapping methods. As a customer, buying from a startup is risky as chances are high that the firm will not survive. If a customer voluntarily pays early, it shows a strong commitment to the survival and growth of the firm, hence signalling a strong mutual dependence. Early payment may therefore

be a purposeful strategy used by customers to manage their own interorganizational risk with the startup and reduce uncertainty with it (Hillman et al., 2009). There may hence be a strong reciprocal dependence from customers with the startup, leading to lower interorganizational uncertainties with customers (Casciaro and Piskorski, 2005).

In contrast, startups themselves decide on late payment of suppliers. This bootstrapping technique is hence more likely forced upon suppliers by startups, rather than being a voluntary behavior from suppliers. This entails a higher risk that suppliers will behave opportunistically in the future (Winborg and Landström, 2001). Delaying payments may also signal to outside stakeholders, including potential employees, customers and suppliers, that the startup is in financial trouble making these stakeholders less willing to transact with the startup in the future. These effects may explain the finding of Ebben and Johnson (2006) that the use of delaying payment bootstrapping techniques decreases as startups age.

A final bootstrapping technique is to obtain access to resources through joint-utilization techniques, for example by using joint premises or equipment, or engaging in joint purchase techniques. These bootstrapping techniques establish new relations with the owners of these resources, hence increasing a firm's interorganizational risk, as the goals of the firm and the resource providers may not always be aligned. For example, when using joint equipment, the owner may wish to increase its own use in the future thereby decreasing the use that the firm can make of it. Alternatively, when using another partner's premises, the owner may decide not to invest in the premises to the extent that the firm would estimate optimal. Partners are expected to pursue their own interests and behave opportunistically in the future, which is not always in the best interest of the focal firm (Starr and MacMillan, 1990). Joint-utilization bootstrapping is hence expected to lead to increased dependence on another organization.

A startup's resource acquisition strategies and the increasing dependence of particular bootstrapping techniques on partner organizations are depicted in Figure 1.

--- Insert Figure 1 about here ---

2.3. Bootstrapping and startup growth

Not all startups are similar, and different startups face different levels of constraints and dependencies (Specht, 1993). Hence, RDT may offer an explanation for how the use of bootstrapping may influence startup growth (Boyd, 1990; Hillman and Dalziel, 2003; Parhankangas and Arenius, 2003), contingent upon their dependence on financial investors. The dependence of a startup on external financial investors is stronger with a greater need for funding (Casciaro and Piskorski, 2005). We hence argue that startups with greater resource needs are more dependent on traditional financial investors and therefore benefit more from the use of bootstrapping methods.

A startup's dependence on traditional financial investors is especially strong in startups with a weak cash flow position as they have no internal funding alternatives (Myers and Majluf, 1984; Berger and Udell, 1998; Clarysse et al., 2011), and startups with growth ambitions as they have high resource needs (Brush et al., 2001; Florin et al., 2003; Sapienza et al., 2003).[2] Hence, financial investors are expected to be particularly important in these startups, leading to a strong power imbalance between these startups and financial investors (Ebben and Johnson, 2006). In such situations, the use of bootstrapping techniques may be especially relevant to alleviate financial partner risk (Van Auken, 2005; Ebben and Johnson, 2006). To obtain more favorable resource exchange conditions and to reduce uncertainty in the procurement of needed resources, the more dependent actor in a power-imbalanced dyad–the startup–will attempt to restructure its dependence (Casciaro and Piskorski, 2005). One way to decrease a startup's dependence is to use bootstrapping techniques,

[2] While the literature often suggests that especially growth oriented firms have cash flow problems and hence that both dimensions have a strong and positively association, cash flow problems and growth orientation are orthogonal in our empirical setting as demonstrated below. We hence treat cash flow problems and growth orientation as two distinct firm characteristics in the remainder.

as these techniques bring in new resources without relying on financial partners (Ebben & Johnson, 2006). Foregoing suggests that bootstrapping will be especially beneficial when startups are strongly dependent on financial investors and when bootstrapping techniques do not create new, strong dependencies with business partners. We elaborate on this expected relationship hereafter.

Startups experiencing cash flow problems generally have three options when they are confronted with new opportunities (Baker and Nelson, 2005). First, they may decide not to pursue value creating opportunities. It is well documented that some entrepreneurs prefer to limit firm growth and even scale down their business rather than raising outside sources of financing (Manigart and Struyf, 1999), driven by a fear of losing control over their firms (Sapienza et al., 2003). Such a strategy will obviously have a negative impact on firm growth. Second, entrepreneurs can search for finance from external financiers, such as banks and external equity investors, but thereby they increase their dependence on financiers. Moreover, in many cases external investors may be unwilling to provide financing to startups which experience cash flow problems (Vanacker and Manigart, 2010). Third, startups may engage in resourceful and innovative strategies such as bootstrapping to mitigate resource constraints, rather than simply accepting these constraints (Baker and Nelson, 2005; Ebben and Johnson, 2006).

In a RTD framework, cash flow constrained startups may especially benefit from the use of bootstrapping, since it provides them access to well-needed financial and other resources and reduces the dependence of these startups on relationships with outside investors where they have little leverage. Rather than remaining passive and do nothing when startups experience cash flow problems, bootstrapping may allow them to reduce their constraints and even pursue new value creating opportunities through the control over additional resources (Winborg and Landström, 2001; Brush et al., 2006; Ebben and Johnson, 2006). In startups with cash flow problems, bootstrapping is hence expected to complement the limited amount of internal cash flows and outside sources of finance (Winborg and Landström, 2001; Ebben and Johnson, 2006) and helps the startup acquire

control over additional resources. Therefore, bootstrapping is expected to benefit growth in cash flow constrained startups, because cash flow constrained startups that do not bootstrap may have to forego value-creating investment opportunities. This is especially the case when bootstrapping techniques do not create strong dependencies with business partners. In this case, cash flow constrained startups reduce their dependence on financial investors and at the same time avoid the creation of new strong dependencies with other business partners which may hamper startup growth as well.

Further, startups with growth ambitions are expected to require more resources compared to startups without growth ambitions to pursue their growth ambitions (Brush et al., 2001; Florin et al., 2003; Sapienza et al., 2003), hence making external financiers such as banks, venture capital or angel investors more important for them. This creates vital interorganizational relations between growth-oriented ventures and outside investors, with the latter typically being more powerful (Dailey et al., 2002; Ebben and Johnson, 2006). Moreover, growth ambitions are likely to increase the potential for conflict between outside investors and entrepreneurs (Cassar, 2004). From a RDT perspective, startups with growth ambitions may attempt to reduce investors' power over them, especially since future actions of investors are uncertain and the potential for conflict is high (Pfeffer, 1987). Growth-oriented startups that bootstrap obtain access to alternative resources and as such decrease the power of traditional investors where they typically have little leverage (Ebben and Johnson, 2006). This is expected to be especially beneficial when bootstrapping techniques do not create new strong dependencies with business partners which may hamper firm growth as well. This leads to the following hypotheses:

H1A: For startups with high dependence on financial investors, as indicated by cash flow problems, bootstrapping techniques which create weak new dependencies will be positive for growth.

H1B: For startups with high dependence on financial investors, as indicated by growth ambitions, bootstrapping techniques which create weak new dependencies will be positive for growth.

Alternatively, startups with a low dependence on traditional financial investors which nevertheless use bootstrapping methods may be hampered in their growth, especially if they use bootstrapping methods that create new interorganizational dependencies. Startups with limited growth ambitions or without cash flow problems have a low need for financial resources and may even have alternative investors willing to provide funding (Vanacker and Manigart, 2010). Financial investors therefore have lower power over these firms. Using bootstrapping techniques in these firms may create new interorganizational dependencies and these new dependencies may ultimately create higher levels of risk (Pfeffer, 1987; Davis and Cobb, 2010). Especially when using bootstrapping techniques that create new strong dependencies, these firms substitute a financial partner with relatively little power for a more powerful business partner. Thereby these firms increase their interorganizational risk, which may hamper their growth. This leads to following hypotheses:

H2A: For startups with low dependence on financial investors, as indicated by no cash flow problems, bootstrapping techniques which create strong new dependencies will be negative for growth.

H2B: For startups with low dependence on financial investors, as indicated by no growth ambitions, bootstrapping techniques which create strong new dependencies will be negative for growth.

3. Method

3.1. Sample and data sources

We obtained access to a governmental database, which comprises the population of firms that were formally incorporated in Flanders, Belgium. We focused on firms incorporated between September 2001 and August 2002. This short timeframe ensures that firms are founded under similar environmental conditions, and that they all pass through the same environmental changes at the same

age, which is expected to reduce unobserved heterogeneity (Bradley et al., 2010). We selected firms that employed less than 50 persons at startup (on a full-time equivalent basis) in order to focus on small firms (Wiklund and Shepherd, 2005). This resulted in a population of 2,679 firms. These firms may be newly created firms, as well as firms that have been established through mergers and acquisitions or through restructuring activities. We combined questionnaires and financial accounts to obtain detailed, longitudinal data on these firms.

All firms in the population were mailed a questionnaire in September 2003. Informants were questioned close to the time of incorporation to minimize survivorship bias (Cassar, 2004) and recollection biases (Ebben, 2009). After an initial mailing, firms received a written reminder to complete the questionnaire and telephone calls were conducted to further increase the response rate. We received 637 questionnaires, which corresponds with a response rate of 29.40% (based on the number of firms we were able to reach through postal mail or telephone contact).[3] While 231 questionnaires related to newly created firms, 406 related to previously existing firms that continued under a new form (including firms that have been established through mergers and acquisitions or restructuring activities). In the latter cases, the incorporation date was not representative of the founding date. Because we wanted to make valid comparisons between real startups, we omitted the previously existing firms that continued under a new form from our sample (e.g., Chandler and Hanks, 1998).

The questionnaire was extensive and started with questions related to the founding of the startup itself. It also included questions with respect to founding team composition, the use of different government support programs, policies with respect to purchases, human resource policies and the innovation and technology strategy among other key issues. The questionnaire further probed

[3] Possible non-response bias was tested by comparing the means of several key financial variables (measured in 2003) among respondents and non-respondents. Both groups did not differ significantly from each other in terms of value added, total assets and liquidity among other variables. There is hence no indication that non-response bias is unduly influencing our results.

for the financial policies in startups. This gave us insights in the use of different sources of finance and their respective importance.

In addition to questionnaire data, we collected yearly financial accounts data. An important advantage of the Belgian research setting is that all firms with limited liabilities of shareholders are required by law to file detailed financial accounts. For each year more than 50 variables from the financial accounts of each startup (balance sheet, profit and loss account) are recorded. We were unable to find any financial account data for only 12 startups, which suggests that they did not survive their first year of incorporation and hence never filed a financial account. Nine startups were excluded from the sample because informants returned incomplete questionnaires. We further excluded five startups from the sample because they were outliers. Some of these startups, for instance, operated in regulated industries. This reduced the final sample to 205 startups.

3.2. Variable definitions

3.2.1. Dependent variable

We measure the growth of startups by looking at their ability to create value added over time. Value added is measured as the difference between sales and the cost of inputs. The value added created by startups can be used to pay wages, interest and taxes. If anything remains after these payments, it can further provide funding to self-finance new investment projects or to pay dividends. Profits hence form only a part of a firm's value added. We track the value added generated by the startups in our sample from 2003 until 2007. This five-wave longitudinal research design allows to examine the association between the initial use of bootstrapping on both the initial amount of value added created and the subsequent growth in value added. Longitudinal box plots (not presented) show that the distribution of value added is skewed. We therefore use the natural logarithm of value added in all subsequent analyses, which has the advantage that it functions as a normalizing transformation and decreases the probability that extreme observations will drive our findings (Hand, 2005).

Alternative growth measures such as sales are difficult to use in our research setting. Small Belgian firms are only required to report their value added and not the individual components which determine value added, including sales. Hence, the use of sales data would lead to a biased sample focusing on larger startups. Moreover, the use of employment as an alternative growth measure may also be problematic. Indeed, startups may grow and develop without hiring new employees exactly because they engage in bootstrapping techniques such as hiring temporary employees. Growth in employment is furthermore industry-dependent, which is less the case for growth in value added (Delmar et al., 2003). This explains our focus on growth in value added.

3.2.2. Independent variables

The key independent variables are bootstrapping use, cash flow problems and growth ambitions. These variables are measured as close as possible to startup to avoid problems of reverse causality. We expand on the measurement of all independent variables hereafter.

Bootstrapping use. Recent publications on bootstrapping (see for instance, Jones and Jayawarna, 2010; Ebben 2009; Ebben and Johnson, 2006; Carter and Van Auken, 2005; Van Auken, 2005; Harrison et al., 2004) almost exclusively draw upon the bootstrapping methods originally identified by Freear et al. (1995) and further developed by Winborg and Landström (2001). The typical approach in these studies is to ask entrepreneurs through a survey to recall the use of multiple bootstrapping methods at particular points in time. Entrepreneurs subsequently have to rate the use of these methods in their firms on a five-point Likert scale.

In this study, the measurement of bootstrapping is distinctive from most previous research in a number of ways. First, we measure bootstrapping close to startup and as such avoid recall biases, which is a potential problem that has plagued many studies on bootstrapping. Second, we not only rely on surveys, but combine both data from surveys and financial accounts to measure bootstrapping. This further reduces recall biases, since we do not only rely on the perceptions of entrepreneurs, but

also focus on the actual use of particular bootstrapping methods as indicated in the financial accounts (Deloof et al., 2006; Huyghebaert et al., 2007; Vanacker et al., 2011). Finally, we do not restrict our measures to five-point Likert scales, because using such scales can imply analytical limitations in that informants overestimate the use of different bootstrapping methods (Winborg and Landström, 2001). Rather, we prefer the use of continuous industry-adjusted variables whenever available. For instance, entrepreneurs are not asked to rate their use of leasing on a five-point scale, but the industry-adjusted ratio of leasing on total assets is calculated from the financial accounts.[4]

Following Winborg and Landström (2001) we focus on six categories of bootstrapping methods. A first category of bootstrapping methods covers the extent to which startups engaged in minimizing resources tied up in their daily operations. More specifically, consistent with previous studies, we focused on minimizing investments, which allows to free-up cash resources (Winborg and Landström, 2001). We measure this by calculating the industry-adjusted ratio of inventory on total assets from the financial accounts. This measure is multiplied by -1, so that higher values indicate more bootstrapping. We also checked the extent to which firms used flexible human resource policies in their first year of operation (Carter and Van Auken, 2005). Using more interim workers rather than hiring employees on the startup's payroll reduces its fixed costs and decreases the negative cash flows in periods that employees are not fully needed. We adjust the raw number of interims for the respective industry averages.

A second category of bootstrapping methods relates to whether owners used their own financial means. The reliance on personal savings and personal sources of capital is an important aspect of bootstrapping (e.g., Harrison et al., 2004; Yilmazer and Schrank, 2006). The survey data

[4] Although our approach has clear advantages, there are also disadvantages. First, since we measure bootstrapping differently from previous studies, it hampers comparability with these previous studies. Second, by focusing on the actual use of bootstrapping methods, we sometimes have less fine-grained data available. For instance, we do not ask what specific techniques entrepreneurs use to reduce days of sales outstanding (e.g., use routines to speed up invoicing, cease business relationships with late payers or use interest on overdue payments). Rather, we directly calculate the industry-adjusted ratio of days of sales outstanding.

and financial accounts data allow to calculate the natural logarithm of the amount of own funds and the natural logarithm of the amount of funds from family and friends raised at startup. Ebben and Johnson (2006) indicate that personal loans taken by owners are an integral part of owner-related bootstrapping. We created a dummy personal bank loan equal to one when the founders took personal loans and zero otherwise. Given that the boundaries between the founders and their ventures are often blurred we preferred the use of a dummy variable, as it is difficult to obtain the exact amount of debt finance raised through founders and their firms separately. Owners may further reduce the need for finance by running the startup from home. We created a dummy, labeled run startup from home, which equals one if the startup was run from the home and zero otherwise.

A third category of bootstrapping methods relates to the use of government subsidies. We enumerate all 15 subsidy programs relevant for startups and asked for which subsidies startups applied in their first year of operations. The variable subsidies counts the number of subsidy programs for which startups applied. The variable was subsequently adjusted for the average use of subsidies in a particular industry, as particular subsidy programs are more important for startups in specific industries.

A fourth category of bootstrapping methods relates to the minimization of accounts receivables. We asked for the average number of days sales outstanding (DSO) in the questionnaire. We adjust the raw number of DSO for the industry average. When startups are able to reduce the industry-adjusted DSO, they collect cash sooner compared to their peers (Winborg and Landström, 2001). We multiply industry-adjusted DSO with -1, so that larger values indicate more use of this bootstrapping method.

A fifth category of bootstrapping methods relates to delaying payments. First, the extent to which startups used leasing is calculated as the ratio of leasing to total assets obtained from the financial accounts. Leasing allows startups to delay the payment of a major part of their investment (Winborg and Landström, 2001). Given that the use of leasing may be industry-dependent, the

industry mean ratio of leasing on total assets is subtracted from the raw leasing on total assets ratio. Second, the questionnaire probed for the number of days payables outstanding (DPO). DPO are industry-adjusted by subtracting the industry average from the raw number of DPO. Finally, startups may delay payments to tax authorities. We calculate the industry-adjusted ratio of delayed payment of taxes on total assets based on financial accounts data.

A sixth and final category of bootstrapping methods relates to the joint usage of resources. We created a dummy variable, share premises with others when startups did not own the buildings in which they operated and zero otherwise (Winborg and Landström, 2001; Carter and Van Auken, 2005; Van Auken, 2005). Furthermore, we created a dummy variable cooperation for purchase, which equals one when startups engage in joint purchases and zero otherwise. Coordinating purchases with other businesses may for instance allow ventures to take advantage of economies of scale (Ebben and Johnson, 2006).

We interact the above bootstrapping variables with time. Time is clocked by using the number of years (e.g., 0, 1, 2, 3 and 4) since startup. The time variable captures any linear growth trend in value added over time. The main effects of the bootstrapping variables capture the impact of bootstrapping on the level of value added in the startup year. The interactions between bootstrapping and time indicate how startups that use more or less of particular bootstrapping methods exhibit higher (or alternatively lower) growth in value added over time. The interactions between the bootstrapping methods and time are the main variables of interest in this study. They allow us to understand how bootstrapping is associated with the growth in value added over time, while controlling for differences in the initial level of value added in startups that use more or less bootstrapping.

Two measures were used to capture the dependence of startups on financial investors: whether they experienced cash flow problems and whether they had growth ambitions at startup.

Cash flow problems. The survey probed whether startups experienced cash flow problems that distort normal business operations in their first year of operation by including the following question: "*Which significant cash flow problems that distorted normal business operations did your venture experience during the past year: (1) being unable to timely pay suppliers (2) private customers that did not pay (3) private customers that did not pay timely (4) business-to-business customers that did not pay, (5) business-to-business customers that did not pay timely, (6) governmental agencies or businesses that did not pay, (7) governmental agencies or businesses that did not pay timely, (8) excessive leverage, (9) other cash flow problems and (10) the venture did not experience cash flow problems that distorted normal business operations".* Note that the questionnaire focused on cash flow problems that distort normal business operations. This does not include cases where, for instance, one customer did not pay timely without affecting the operations of the startup. The study dichotomously classifies startups as experiencing cash flow problems when informants answered "yes" to at least one of the first nine options. About half of the startups (51%) indicated they experienced some form of cash flow problem that distorted business operations.

Growth ambitions. The study dichotomously classifies startups as having growth ambitions if they answered "yes" to the following survey question: "*Does your firm intend to expand within the next year?"* Almost half of the informants (48%) indicated their startup would do so.[5] Table 1 provides a two-by-two matrix that splits the sample according to the cash flow positions and growth ambitions of startups. It demonstrates that startups are almost equally spread across the four possible quadrants and hence that having cash flow problems or growth ambitions are orthogonal. Startups

[5] One may wonder to what extent our measures of cash flow problems and growth ambitions measured through the eyes of our informants correspond with actual cash flow problems and growth ambitions. We find that startups which indicated they experienced cash flow problems achieve lower value added over time. This is consistent with the literature on finance constraints, which indicates that finance constraints hamper startup development. Moreover, although previous studies argued that growth ambitions do not necessarily lead to higher growth (Wiklund and Shepherd, 2003), we find that on average startups which indicated they have growth ambitions achieved higher value added over time. These findings confirm the validity of our measures. In the robustness section described below we provide alternative operationalizations for cash flow problems and growth ambitions which further support our findings.

with growth ambitions are hence not necessarily more or less likely to report cash flow problems, while startups without growth ambitions have an equal probability of experiencing cash flow problems or not.

--- Insert Table 1 about here ---

3.2.3. Control variables

We control for factors that may influence startup growth: founder characteristics, startup characteristics and industry effects. For founder characteristics, we include the number of founders as a measure of the generic human capital of the founding team (Colombo and Grilli, 2005). Next, we include the (average) number of years of management experience of the founder (or founding team). This is a measure of the specific human capital of the founder or founding team (Colombo and Grilli, 2005). We also control for the level of education of the founder (or founding team). Higher values indicate higher levels of education, with the lowest level of education coded as 1 (elementary school) and the highest level of education coded 5 (university).

The following startup characteristics are included as controls. We included the natural logarithm of total assets in the first year of operations to account for the initial size of the startup. This variable also controls for the total amount of finance (debt and equity) raised. We measured whether startups pursued specific innovation strategies, differentiating between product and process innovation. Startups are expected to engage in innovation activities in order to create more value added over time.

Finally, we control for industry effects by including industry dummy variables. Almost 28% of startups provide business services, with another 24% active in the wholesale or retail sector, 15% in the restaurant and hotel industry and 10% in construction. The other industries represent less than 10% of the sample. Table 2 presents the descriptive statistics and correlations.

--- Insert Table 2 about here ---

Table 2 shows that the average startup in our sample is established by 2.35 founders with 8.2 years of management experience. It has €206,000 assets in the first year of operations and €240,000 of value added. Almost half of the startups (48%) engage in process innovation while 58% engage in product innovations. At startup, €16,000 is invested by founders and €1,233 by their family or friends. Only 7% of founders took a personal bank loan to fund their venture. One in four of the startups initially operated from the founder's home, while 68% shared premises with others. One in five of startups engaged in cooperation for purchases. Table 2 also reports the industry-adjusted bootstrap variables used in subsequent regressions. For ease of interpretation we discuss the untransformed variables. Startups have on average some 8% of assets in inventories, 1.5% of their assets are leased and 0.4% of their assets related to delayed payments of taxes. Startups employ on average 0.6 interims. Average days of sales outstanding equals 31 and average days of payables outstanding equals 28 days. Startups apply on average for 1.1 types of subsidies. Table 2 further shows that correlations between variables are generally low.

3.3. Econometric approach

Standard OLS regressions assume that observations are independent from one another. In our sample, startups have repeated observations and assuming independence is hence questionable. We therefore use the "cluster" option in Stata to adjust our results for this concern (e.g., Janney and Folta, 2006), and report adjusted standard errors for each regression coefficient.[6] Multicollinearity is a

[6] We also estimated Generalized Estimating Equations (GEE) which also account for the clustered nature of our data. Ballinger (2004) provides an excellent description of these models and their application in recent management research. This alternative longitudinal estimation method provided qualitatively similar results compared to those reported below.

potential problem, as we include multiple interactions between the different bootstrapping methods and time to test for the effects of these bootstrapping methods on the growth in value added over time. One method for dealing with multicollinearity is to orthogonalize the collinear variables by "partialing out" the common variance (e.g., Ployhart et al., 2002; Pollock and Rindova, 2003; Bradley et al., 2010). The resulting transformed measures are uncorrelated with each other, but are still correlated with the dependent variable. We employed the "orthog" command in Stata to generate such measures for the bootstrapping methods and their interactions with time.

4. Results

Table 3 presents the results of the multivariate regression analyses. Panel A presents two regression models linking bootstrap methods to startup growth in the groups of startups that are highly dependent on financial investors. The first model, testing hypothesis 1A, includes startups that experienced cash flow problems, while the second model, testing hypothesis 1B, includes startups with growth ambitions in their first year of operation. Both groups of startups are generally considered to be highly dependent on traditional financial investors. Panel B presents two regression models, which include startups that did not experience cash flow problems and startups without growth ambitions in their first year of operation. These startups are characterized by low dependence on traditional financial investors. These models test hypotheses 2A and 2B. All models include control variables, bootstrap variables and bootstrap variables interacted with time. The bootstrap variables indicate whether startups that use more or less of a particular bootstrapping method differ in value added generation in the first year of operation. The bootstrap variables interacted with time indicate whether startups that use more or less of a particular bootstrapping method differ in value added generation over time (i.e., whether value added is increasing or decreasing over time). These interactions between the bootstrap variables and time are the main variables of interest in this study.

--- Insert Table 3 about here ---

The control variables in Table 3 show broadly similar behavior in all groups of startups. Startups established by a larger group of founders create more value added, although this effect is not always significant. Startups with growth ambitions founded by a more experienced team create more value added, but experience has no impact on value added creation in the other groups of startups. Unsurprisingly, larger startups create more value added. The controls further indicate that startups involved in process innovation, but not in product innovation, create more value added. The time variables indicate that startups create more value added as they age, except in startups without growth ambitions. Growth ambitions is added as a control variable in models 1 and 3 and is positively associated with value added creation. Cash flow constraints is added as a control variable in models 2 and 4, showing that cash flow constraints are especially detrimental for value added creation in startups with growth ambitions. The impact of bootstrapping on the initial amount of value added created is generally limited, especially in the startups with cash flow problems and startups without growth ambitions. We now turn to the impact of bootstrapping on the subsequent growth in value added in order to test our hypotheses.

4.1 Bootstrapping and growth in startups with high dependence on financial investors

Model 1 shows that for startups with cash flow problems and hence with high dependence on financial investors, the use of more bootstrapping is generally positively related with growth in value added. The use of more interim personnel is positively associated with the subsequent increase in value added in cash flow constrained startups (β = .031; p < .01). With respect to owner-related bootstrapping methods, startups that use more own funds (β = .054; p < .01), use more funds from family and friends (β = .043; p < .01) and resort to personal bank loans (β = .020; p < .10) also exhibit higher growth in value added. The use of subsidies is positively associated with growth in cash flow

constrained startups (β = .057; p < .01). Customer-related bootstrapping is marginally significantly associated with growth in value added (β = .029; p < .10). We find a negative association, however, between the joint use of premises with other businesses growth in value added (β = -.027; p < .05).

The above results provide broad support for Hypothesis 1A. For startups with high dependence on financial investors, as indicated by cash flow problems, bootstrapping techniques which create weak new dependencies are positively associated with growth. Indeed, most bootstrapping techniques are either positively related with growth in value added or not related. It is only when strong new dependencies are created (e.g., sharing premises with others) that the effects of bootstrapping on growth are negative.

Model 2 presents the findings relating to the association between bootstrapping and growth in value added for startups with growth ambitions. There are multiple positive associations between owner-related bootstrapping methods and the subsequent creation of value added. Startups with growth ambitions that use more owner funds (β = .072; p < .001), use more funds from family and friends (β = .035; p < .05) and rely on personal bank loans (β = .043; p < .10) exhibit a higher growth in value added over time. When startups with growth potential apply for more subsidy finance this is positively associated with the subsequent creation of value added (β = .042; p < .10). Startups that speed up payments by customers exhibit higher growth in value added over time (β = .078; p < .05). When startups have growth potential the use of leasing (β = -.042; p < .05) and delaying payments of taxes (β = -.093; p < .001) is negatively associated with growth in value adding. Finally, when startups with growth ambitions use joint-utilization techniques this is negatively associated with growth in value added. Startups that share premises with other businesses (β = -.040; p < .10) and startups that cooperate purchases with other businesses (β = -.038; p < .10) create less value added over time when they have growth ambitions.

The above results provide strong support for Hypothesis 1B. For startups with high dependence on financial investors, as indicated by growth ambitions, bootstrapping techniques which

create weak new dependencies are positively associated with growth. Bootstrapping techniques are negative when they create strong new dependencies, for instance when startups delay payments and engage in joint-utilization techniques with other businesses.

4.2 Bootstrapping and growth in startups with low dependence on financial investors

Model 3 presents the findings relating to the association between bootstrapping and growth in value added in startups without cash flow problems. As startups without cash flow problems develop, we find that the use of own funds is positively associated with a subsequent increase in value added creation over time (β = .064; p < .01). This effect is similar to the one observed in cash flow constrained startups. In contrast to the findings in cash flow constrained startups, the association between the use of funds from family and friends and subsequent value added creation over time is negative in non-cash flow constrained startups (β = -.044; p < .01). Model 2 shows that the use of customer-related bootstrapping is positively associated with more value added in subsequent years (β = .075; p < .05). This effect was also observed in cash constrained startups. The use of delaying payment bootstrapping methods is negatively associated growth in value added. Specifically, both startups that delay payments to suppliers (β = -.060; p < .05) and delay payments to tax authorities (β = -.084; p < .001) create less value added over time, but the use of leasing is not associated with future value creation. Finally, cooperation for purchase is negatively associated with growth in value added (β = -.051; p < .01).

These findings are broadly consistent with Hypothesis 2A. For startups with weak dependence on financial investors, as indicated by no cash flow problems, bootstrapping techniques which create strong new dependencies are negatively associated with growth. Indeed, the use of delaying payments and cooperation for purchase, bootstrapping techniques which may create strong new dependencies are negatively related with growth.

Model 4 presents the findings relating to the association between bootstrapping and growth in value added in startups that lack growth ambitions. The use of interim personnel in startups without growth potential is negatively associated with growth in value added (β = -.164; p < .05). There is only a marginally significant and negative association between the use of personal bank loans and growth in value added over time (β = -.025; p < .10). Startups without growth potential that rely more leasing (β = .051; p < .01), create more value added over time. Finally, the association between the use of joint-utilization techniques, including both sharing premises with other buildings (β = -.053; p < .01) and cooperation for purchase (β = -.032; p < .05), and subsequent value added creation is negative and significant.

These findings are broadly consistent with Hypothesis 2B. For startups with weak dependence on financial investors, as indicated by no growth ambitions, bootstrapping techniques which create strong new dependencies are negatively associated with growth. When startups without growth ambitions resort to joint-utilization techniques, growth is negatively affected.

4.3. Robustness checks

We fitted several additional models to test the robustness of our findings[7]. First, we used alternative measures for classifying startups with and without cash flow problems or growth ambitions. While startups were previously classified as experiencing cash flow problems when they reported one cash flow problem that distorted business operations, a new measure was constructed which required startups to report at least two cash flow problems before they were classified as experiencing cash flow problems. While the number of startups that was classified as experiencing cash flow problems decreased, the alternative classification provided very similar results compared to the results reported in the main analyses. In order to identify startups with growth ambitions, we also used an alternative

[7] These models are not presented in detail due to space considerations, but are available from the authors upon request.

measure. Startups were asked to what extent they agreed with the following claim *"We constantly seek new market opportunities related to our existing activities"*. Answers ranged from one (totally disagree) to five (totally agree). Startups which agreed or totally agreed were labeled as more growth oriented, while the others were labeled as less growth oriented. The quest for growth is indeed related to the willingness to pursue opportunities (Stevenson and Jarillo, 1990). When using this alternative measure, results remained broadly similar compared to those reported before.

Second, one may wonder to what extent our results are driven by potential selection issues. For instance, higher quality founding teams may pick more value creating bootstrapping techniques (Grichnik et al., 2010). In order to assess the strength of this alternative explanation we followed a procedure similar to Baum and Silverman (2004). Specifically, we first estimated the impact of human capital variables (number of founders, experience and education), cash flow problems, growth ambitions, innovation activities (process and product innovation) and initial startup size (natural logarithm of total assets) on the use of each bootstrapping method. From these regressions we extracted the standardized coefficients. Next, we estimated the impact of the same variables on the growth in value added and extracted the standardized coefficients. If selection issues are driving our results we would expect high positive correlations between the standardized coefficients of the variables that drive the use of bootstrapping and the growth of startups. We find limited evidence in favor of this alternative explanation.

Finally, we ran additional regression models to investigate the relationship between bootstrapping and startup development for different combinations of cash flow problems *and* growth ambitions as depicted in table 1. The number of startups in each regression obviously becomes more limited compared to the models we presented in table 3. The additional regression models broadly support our previous findings. In startups with cash flow problems and growth ambitions, bootstrapping is largely positive. The same is true for startups with cash flow problems and without growth ambitions, although effects are less outspoken. In startups without cash flow problems and

with growth ambitions the effects of bootstrapping are mixed: Bootstrapping has a positive effect on startup growth, but especially the use of joint-utilization and delaying payment bootstrapping has a negative effect. Finally, in startups without cash flow problems and without growth ambitions, we mainly find significant negative effects of joint-utilization and delaying payments bootstrapping.

5. Discussion and conclusion

While scholars and practitioners alike agree that bootstrapping methods are frequently used in entrepreneurial firms, the literature to date is inconclusive on the impact of bootstrapping on firm development. Scholars have raised arguments to expect both a positive impact and a negative impact of bootstrapping on firm growth. This indicates that contingencies influence the relationship between bootstrapping and firm growth. The goal of this paper was to gain a deeper understanding of how cash flow problems and growth ambitions influence the relationship between bootstrapping methods and firm growth. Resource dependence theory was used as the central theoretical framework to develop hypotheses. A longitudinal research strategy was used to test the hypotheses, relating the use of bootstrapping methods at startup in 205 Belgian startups to subsequent growth in value added.

5.1. Main findings

Results broadly confirm our hypotheses. Specifically, firms with a strong dependence of financial investors largely benefit from the use of bootstrapping techniques. From a RDT perspective, this suggests that bootstrapping methods allow cash constrained firms to attract resources from other organizations next to traditional financial investors such as banks or venture capital investors, hence decreasing their excessive reliance on external financiers on which these firms have little leverage (Ebben and Johnson, 2006).

More specifically, startups with cash flow problems or with growth ambitions show mostly positive or insignificant associations between the use of bootstrapping and firm growth. Using more

owner-related bootstrapping methods, more subsidies or more interim personnel and receiving customers' payments earlier than industry average is positively associated with subsequent growth in cash constrained firms. We find only one negative association, namely between the use of joint premises and startup growth. This indicates that the benefits of using bootstrapping methods generally exceed their costs when startups experience cash flow problems. Similarly, using owner-related bootstrapping methods, applying for subsidies and collecting customer payments early positively contribute to future growth in growth oriented startups. Thanks to these additional resources, growth oriented startups are less dependent on financial investors like banks or venture capital investors over which they have little leverage (Ebben and Johnson, 2006). Bootstrapping techniques that create new dependencies with business partners, however, are negatively associated with startup growth when they are growth oriented. More specifically, delaying payment of taxes and the use of leasing (exceeding industry averages) and of joint-utilization techniques are negatively associated with firm development. The latter techniques do not only create new dependencies with business partners, but bring also "imperfect" resources (i.e., resources that are not fully adapted to the needs of a specific firm). According to the resource based view of the firm such imperfect resources may further hamper firm growth.

In contrast, firms with weak dependence on financial investors do not strongly benefit from bootstrapping methods. Only the use of own funds and customer-related bootstrapping methods are positively associated with growth in startups without cash flow problems, while the use of leasing spurs the growth of startups with limited growth ambitions. In contrast, when startups without cash flow problems use more finance from family and friends, cooperate for purchase and delay payments, their growth is constrained. Using personal bank loans, interim personnel or joint-utilization techniques are negatively associated with the growth of startups with low growth ambitions. The negative impact of the use of personal bank loans is striking. Founders with low growth ambitions who nevertheless use a personal bank loan to finance their firms might excessively constrain its

growth in order to reduce business risk, so as not to create personal financial problems should the firm eventually fail.[8]

Taken together, in line with RDT, we have shown that bootstrapping methods that do not create new dependencies with other stakeholders have in general a positive (if any) effect on a startup's growth, especially if the firm is strongly dependent on financial investors. The additional resources accessed through owner-related bootstrapping or subsidies decrease the need for and hence the power of external financiers. This effect is especially important in firms with cash flow problems or with growth ambitions. Interestingly, neither working from home nor optimizing inventory are associated with firm growth in any of the samples. Optimizing inventory probably does not yield sufficient additional resources to change the power balance with other financiers. This is not to say that it is worthless, as we only failed to find an association with firm growth. Optimizing inventory and working from home also reduce the amount of external finance needed and hence the overall cost of funding of the firm (Vanacker et al., 2011). They may hence be the preferred strategies of founders who are able to obtain more control over their firms while maintaining a similar growth rate compared to founders that raise more outside finance.

Further, bootstrapping methods that create strong interorganizational dependencies with important business stakeholders, such as delaying payments, come at a high cost. They have at best no association with the future growth of a firm (as in startups with cash flow problems), but have a negative association with their growth in most other startups. However, the use of customer-related bootstrapping methods has, surprisingly, a strong and positive association with the growth of almost all types of ventures. RDT would suggest that relying on other organizations such as customers creates uncertainties with respect to their future actions and hence hampers future performance (Hillman et al., 2009). For example, customers might stop early payments and adhere to normal

[8] In Belgium, personal bankruptcy does not exist. Hence, founders remain indefinitely personally liable for personal loans, even after their firm went bankrupt.

payment terms in the future, or they might stop buying from the firm altogether given unfavourable payment terms. Our results suggest the opposite. This might be explained by the fact that there is a strong mutual dependence between customers and a startup, thereby decreasing partner risk (Casciaro and Piskorski, 2005). If customers pay earlier compared to industry norms, this is ultimately their own decision. As a customer, buying from a startup is risky as chances are high that the firm will not survive. If customers voluntarily pay early, they show a strong commitment to the survival and growth of the firm. Early payment may hence be a purposeful strategy used by customers to manage their mutual dependence and reduce uncertainty with the startup (Casciaro and Piskorski, 2005; Hillman et al., 2009), ultimately benefiting the growth of the startup.

5.2. Contributions and limitations

To the best of our knowledge this is the first study to examine the contingent nature of the association between bootstrapping methods and the growth of startups. We have demonstrated how firms may perform and grow by implementing bootstrapping methods that reduce the need for large amounts of external finance and this especially when firms are strongly dependent on financial investors, i.e. when they experience cash flow problems or have growth ambitions. Hence, we move beyond the dominant view in the literature that bootstrapping methods are only second best alternatives, used by firms that have no or only limited access to traditional resource providers. On the contrary, actively pursuing particular bootstrapping methods when the need is highest reduces the reliance on finance parties that might become too powerful and therefore might create excessive uncertainties in the firm.

Our research has also highlighted that not all bootstrapping methods are equally attractive, however. While delaying payments and sharing resources are often used by startups, these strategies create interorganizational dependencies, ultimately hampering its development when they serve to substitute dependencies with partners with limited power. We hence further contribute to the bootstrap literature by showing different effects of alternative bootstrapping methods, rather than

uniformly labelling bootstrapping as “positive” or “negative” for a firm. Finally, while the bootstrap literature typically collapses specific bootstrapping methods in broad clusters (e.g., Winborg and Landström, 2001; Ebben and Johnson, 2006), we have demonstrated that strategies within a cluster may have a different association with future firm development and growth.

We contribute to the recent stream of research on resource acquisition strategies in entrepreneurial firms (Clarysse et al., 2011). We show that acquiring resources through either financial market transactions or through bootstrapping methods are complementary. Their long lasting effects on startup growth are contingent on startups’ resource constraints. Hence, we contribute to a current debate in the literature on whether bootstrapping should be a purposeful resource management strategy (e.g., Bhide, 1992; Grichnik et al., 2010; Winborg, 2009), or whether bootstrapping is a second best strategy that should only be used when firms are resource constrained and unable to access all resources through market transactions (e.g., Ebben and Johnson, 2006; Ebben, 2009; Starr and MacMillan, 1990; Van Auken, 2005). We show that the reality is more nuanced than typically put forward: some bootstrapping methods are beneficial in some circumstances, but others hamper long term development in other circumstances.

This study also contributes to the RDT, by stressing its applicability beyond mature firms to startup firms (Daily et al., 2002). We have shown that founders may actively manage their venture’s dependence of financiers through bootstrapping methods. This is especially important when financiers are expected to be powerful. If, however, bootstrapping techniques create new strong interorganizational dependencies, then these techniques should be avoided as their costs may outweigh their benefits. Further, our results also hint that startups are not always the least powerful partner in interorganizational linkages. Customers may be mutually dependent on startups, which makes relationships with customers valuable for startups to mobilize additional resources.

Besides addressing important gaps in our knowledge, the current study also has a number of methodological advantages. Contrary to most previous studies that measured bootstrapping methods

by asking founders to retrospectively report on their use of bootstrapping methods during the startup phase (e.g., Ebben and Johnson, 2006), this study has measured bootstrapping methods at most one year after startup. Due to the reduced time between startup and surveying, the potential that survivorship and recall biases will confound our results is limited (Cassar, 2004). Moreover, we did not solely rely on the traditional five-point Likert scales to measure bootstrapping methods (e.g. Winborg and Landström, 2001) but rather combined data from questionnaires and financial accounts. Further, our measures of the use of some bootstrapping methods were industry-adjusted, acknowledging that bootstrap use is industry dependent. We hence believe our measures may lead to better estimates of the actual use of financial bootstrapping. Using individual bootstrap variables instead of grouping bootstrapping methods into factors may also offer more fine-grained insights into the role of specific bootstrapping methods on firm growth. Finally, the combination of the different data sources eliminated concerns with respect to common method bias.

As with all research this study also has its limitations. We study the impact of bootstrapping methods measured at startup on growth. Yet, the use of distinct bootstrapping methods changes as firms develop (Ebben and Johnson, 2006). Future research may study the relationship between changes in both bootstrapping methods and firm development. Nevertheless, the bootstrapping methods which we studied at startup are critical as firms are unlikely to use bootstrapping methods further in time if they did not use them early on (Ebben and Johnson, 2006). Finally, care must be taken in generalizing the results outside the specific research context.

5.3. Implications for practitioners and policy makers

Despite its limitations, our study provides valuable insights to founders, educators and government officials. Founders should understand that bootstrapping methods may be valuable and should be explored as important resource mobilization strategies at startup, but not all bootstrapping methods are equally valuable. Bootstrapping methods are especially beneficial when firms experience cash

flow problems or have growth ambitions, enabling founders to reduce dependency on powerful financiers while accessing more resources. Founders can hence strongly benefit from exploring bootstrapping methods to start and develop their firms, especially by focusing on owner-related and customer-related bootstrapping techniques and applying for subsidies. Nevertheless, founders should avoid the high opportunity costs of bootstrapping methods that increase reliance on business partners, especially when they do not experience cash flow problems or have high growth ambitions.

Our findings are informative and positive for policy makers as well. We have demonstrated that subsidy finance is a valuable bootstrapping technique for startups, which benefits their future growth and especially so when firms experience cash flow problems or have growth ambitions. Hence, government agencies may have to work towards increasing awareness in the entrepreneurial community of the numerous government programs available to startups.

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Figure 1

Resource acquisition strategies and partner dependencies

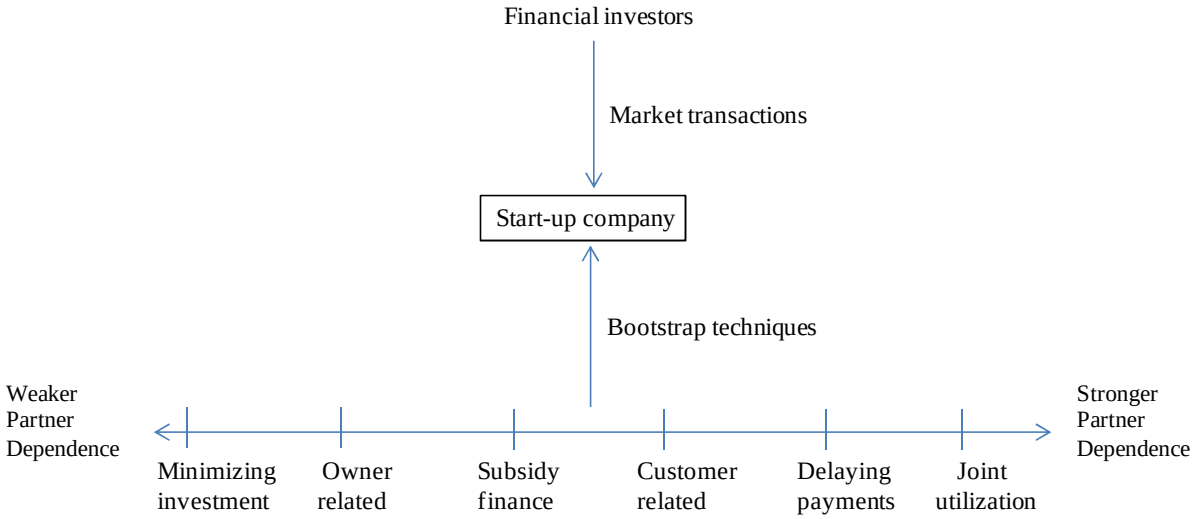

Table 1

Two-by-two matrix summarizing startups based on their cash flow position and growth ambition (n=205).

		Growth ambitions?	
		Yes	**No**
Cash flow problems?	**Yes**	n = 47 (22.93%)	n = 58 (28.29%)
	No	n = 51 (24.88%)	n = 49 (23.90%)

Table 2

Sample descriptive statistics and correlations (n=205).

	Variable	Mean	*S.D.*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Value added [a]	5.48	.73	1.00																				
2	Cash flow problems	.51	.50	-.04	1.00																			
3	Growth ambitions	.48	.50	.06	-.06	1.00																		
	Minimizing investment																							
4	Inventory [b]	.00	.13	.05	-.06	-.02	1.00																	
5	Interims [b]	.01	3.03	.19	-.02	.17	.06	1.00																
	Owner-related																							
6	Own funds [a]	2.77	1.50	.03	-.10	.14	-.03	.04	1.00															
7	Funds from family and friends [a]	.21	.76	-.25	.05	-.09	-.05	-.01	-.06	1.00														
8	Personal bank loan	.07	.25	-.06	.15	.01	.03	.18	-.15	.02	1.00													
9	Run startup from home	.24	.43	.02	.03	-.09	.07	.02	-.03	-.01	.03	1.00												
	Subsidy finance																							
10	Subsidies [b]	.05	1.37	-.17	.09	.08	-.11	-.01	.03	.02	.03	-.12	1.00											
	Customer-related																							
11	Days of sales outstanding [b]	-.67	23.56	-.18	-.28	-.16	-.01	-.05	-.21	.03	-.02	-.05	-.15	1.00										
	Delaying payments																							
12	Leasing [b]	.00	.06	-.02	.03	-.01	.01	-.07	.08	-.04	.11	-.04	-.07	-.09	1.00									
13	Days of purchases outstanding [b]	.48	18.00	.10	.11	.16	.03	.05	.11	-.12	.04	.01	.20	-.50	.17	1.00								
14	Delay payment of taxes [b]	.00	.03	.02	.05	-.06	.01	.02	.01	.07	-.05	.13	-.10	.02	-.04	-.01	1.00							
	Joint-utilization																							
15	Share premises with others	.68	.50	.06	-.06	.15	-.11	.09	.07	.05	-.10	-.55	-.07	.03	.01	.00	-.11	1.00						
16	Cooperation for purchase	.21	.41	.04	.05	.11	-.03	.07	.01	-.07	.00	-.15	-.03	.02	-.01	.03	.07	.07	1.00					
17	Number of founders	2.35	1.18	.17	.11	-.03	-.03	.12	.17	.15	-.01	.02	.08	-.14	-.04	.11	.04	.04	-.02	1.00				
18	Management experience [a]	2.11	.79	.05	-.02	-.04	.01	-.08	.24	-.02	.03	-.01	-.11	-.04	.08	.18	.03	-.11	.11	.02	1.00			
19	Education	2.89	1.29	.01	-.11	.18	.01	-.01	.22	-.10	.00	-.08	.06	-.08	.05	.09	-.01	.05	.01	-.03	.14	1.00		
20	Initial size [a]	5.33	1.27	.45	.02	.14	.07	.14	.34	-.17	-.13	-.02	.13	-.25	-.01	.19	-.09	-.07	-.04	.22	.14	.18	1.00	
21	Process innovation	.48	.50	.08	.10	.17	-.04	-.05	.03	-.01	-.07	.04	.04	-.01	.01	.10	-.11	.06	.17	.01	.02	.08	.22	1.00
22	Product innovation	.58	.50	-.09	-.01	.19	-.11	.00	-.07	.03	.00	-.04	.20	-.11	.00	.18	-.15	.10	-.07	.00	-.08	.14	-.03	.08

Note. Descriptive statistics and correlations at the startup year (time = 0). Absolute values of correlations greater than or equal to .14 are significant at .05.

[a] Natural logarithm

[b] Industry-adjusted variables

Table 3

Results of regression analysis (n=205).

	PANEL A: STRONG DEPENDENCE ON FINANCIAL INVESTORS						PANEL B: WEAK DEPENDENCE ON FINANCIAL INVESTORS					
	Cash flow problems			Growth ambitions			No cash flow problems			No growth ambitions		
	Model 1			Model 2			Model 3			Model 4		
	Coef.	*S.E.*	Sign.	Coef.	*S.E.*	Sign.	Coef.	*S.E.*	Sign.	Coef.	*S.E.*	Sign.
CONTROLS												
Number of founders	.215	.059	***	.109	.070		.108	.052	*	.054	.075	
Management experience	-.001	.038		.074	.042	†	.055	.042		.028	.034	
Education	.011	.036		.049	.038		.014	.047		.016	.042	
Initial size	.286	.051	***	.442	.061	***	.365	.066	***	.218	.077	**
Process innovation	.127	.047	**	.139	.048	**	.086	.045	†	.065	.034	†
Product innovation	-.014	.048		-.028	.050		.030	.046		-.092	.032	**
Cash flow problems	N.A.			-.105	.042	*	N.A.			-.045	.034	
Growth ambitions	.109	.045	*	N.A.			.202	.051	***	N.A.		
Time	.045	.020	*	.118	.024	***	.073	.021	***	.005	.021	
BOOTSTRAPPING AND INITIAL VALUE ADDED												
Minimizing investment												
Inventory	.002	.041		-.100	.048	*	-.087	.042	*	-.057	.042	
Interims	.043	.037		.125	.030	***	.136	.041	**	.172	.395	
Owner-related												
Own funds	-.005	.048		-.035	.054		-.088	.056		-.048	.030	
Funds from family and friends	-.036	.045		-.106	.034	**	-.042	.047		.012	.032	
Personal bank loan	.068	.033	*	.060	.059		-.004	.051		.031	.093	
Run startup from home	.016	.047		-.022	.048		-.064	.043		-.033	.029	
Subsidy finance												
Subsidies	-.040	.054		-.114	.050	*	-.099	.053	†	-.040	.034	
Customer-related												
Days of sales outstanding	.001	.042		-.072	.068		-.069	.065		.078	.035	*
Delaying payments												
Leasing	-.028	.039		-.081	.056		.037	.029		.044	.045	
Days of purchases outstanding	-.031	.052		.029	.055		.032	.050		-.031	.041	
Delay payment of taxes	.030	.024		.026	.020		.042	.022	†	.043	.028	
Joint-utilization												
Share premises with others	-.048	.048		.081	.066		.096	.052	†	.078	.070	
Cooperation for purchase	-.007	.051		.035	.043		.058	.049		-.011	.062	
BOOTSTRAPPING AND GROWTH IN VALUE ADDED												
Minimizing investment												
Inventory x Time	.005	.016		.001	.017		-.033	.029		-.010	.024	
Interims x Time	.031	.013	**	.017	.015		.005	.029		-.164	.075	*
Owner-related												
Own funds x Time	.054	.019	**	.072	.022	***	.064	.026	**	.015	.016	
Funds from family and friends x Time	.043	.015	**	.035	.019	*	-.044	.014	**	.012	.009	
Personal bank loan x Time	.020	.012	†	.043	.026	†	.025	.040		-.025	.017	†
Run startup from home x Time	.006	.023		-.023	.031		-.019	.019		-.003	.012	

Note. Industry controls included but not reported. † p < .10; * p < .05; ** p < .01 *** p < .001 (two-tailed tests; one-tailed for hypothesized effects).

Table 3

Continued

Subsidy finance												
Subsidies x Time	.057	.023	**	.042	.028	†	.020	.032		-.016	.016	
Customer-related												
Days of sales outstanding x Time	.029	.021	†	.078	.034	*	.075	.037	*	.017	.017	
Delaying payments												
Leasing x Time	.002	.013		-.042	.024	*	.007	.030		.051	.018	**
Days of purchases outstanding x Time	.027	.027		-.003	.038		-.060	.025	*	-.017	.017	
Delay payment of taxes x Time	.000	.014		-.093	.009	***	-.084	.007	***	.005	.013	
Joint-utilization												
Share premises with others x Time	-.027	.014	*	-.040	.026	†	-.027	.030		-.053	.019	**
Cooperation for purchase x Time	.006	.022		-.038	.025	†	-.051	.020	**	-.032	.015	*
Constant	5.474	.108	***	5.621	.118	***	5.700	.139	***	5.438	.110	***
Number of observations	504			463			474			515		
Number of startups	105			98			100			107		
F-statistic	5.78 ***			27.14 ***			17.40 ***			15.81 ***		
R-squared	.526			.577			.509			.470		