**The Role of Founding Conditions in New Firm Growth:**

**An Empirical Study of U.S. Startups**

**Abstract**

Drawing upon the resource-based view of the firm, I predicted the impact of founding size, intellectual properties, and entrepreneurial human capital on new firm growth in the early and later years of a startup. They were empirically tested with a sample of 4923 firms in the longitudinal panel database from the Kauffman Firm Survey conducted over the period of 2005 – 2010, and the theoretical and practical implications of the results were discussed.

**Introduction**

 Growth is an indicator of new firm success (Feeser and Willard 1990; Fischer and Reuber 2003; Barringer et al. 2005). This study was conducted to investigate the role of founding conditions in new firm growth. Different theoretical perspectives emphasize the impact of different elements of founding conditions on the performance of new firms. The competence-based research stream argues that founders’ human capital endowments, such as their knowledge and skills, are critical elements for new firm growth (A. C. Cooper et al. 1994; Feeser and Willard 1990; Colombo and Grilli 2005). Founders with better education and more work and startup experience are more likely to have superior entrepreneurial judgment and consequently to be better at identifying new business opportunities and integrating others’ knowledge to expand their business. The economic perspective argues that firm size and intellectual properties at founding drive new firm growth (Bogner et al. 1996; Audretsch and Mahmood 1994; Zingales 1998; Lucas 1978). To help us better understand the complex relationship between founding conditions and new firm growth, I developed hypotheses that relate the growth of new firms to the conditions prevailing at the time of founding and that estimate how long these effects last. Specifically, I predicted the impact of founding size, intellectual properties, and entrepreneurial human capital on new firm growth in the early and later years of a startup. These hypotheses were developed primarily on the basis of the resource-based view of the firm, but they also incorporate insights from the economic view. They were empirically tested with a sample of 4923 firms in the longitudinal panel database from the Kauffman Firm Survey conducted over the period of 2005 – 2010, and the theoretical and practical implications of the results were discussed.

**Literature Review**

In the resource-based view literature, studies emphasize the impact of valuable resources and capabilities on firm performance. Firms’ sustainable competitive advantages originate from their unique and difficult-to-imitate resources and capabilities (Barney 1991; Grant 1996). Founders’ human capital endowment, such as their knowledge and skills, is a critical aspect of the capability of new firms (A. C. Cooper et al. 1994; Feeser and Willard 1990; Colombo and Grilli 2005). In the upper echelons research stream, the characteristics of a top management team are reported to have significant impacts on strategic actions and organizational performance (Hambrick 2007). In the context of new firms, studies have found that specific types of human capital expedite venture creation and development (Davidsson and Honig 2003), and general types of human capital facilitate successful initial public offerings (D. P. Dimov and Shepherd 2005).

However, the results of empirical studies examining the role of entrepreneurial human capital on new firm growth are inconclusive. For example, mixed results have been reported on the impact of experience on firm performance. Experience is of two main kinds: industry experience and startup experience. Entrepreneurs gain insight from both work and startup experience that can improve firm performance. Because entrepreneurship is a process that involves discovering facts in which entrepreneurs create and operate new businesses (Kirzner 1997), those individuals with industry-specific experience tend to possess relevant information about cost structure, pricing and the value chain of differentiated markets in the same industry (Bruderl et al. 1992; Landier and Thesmar 2009; D. Dimov 2010). Industry experience helps entrepreneurs comprehend current trends in production processes or service delivery (Delmar and Shane 2006), enhances their understanding of the impact of economic environment on industry growth (Mikhail et al. 1997), and enables them to evaluate business opportunities within the industry (Delmar and Shane 2006; Ronstadt 1988). In addition, industry experience improves entrepreneurs’ ability to forecast business performance (Cassar 2014). Entrepreneurs also gain valuable skills from previous or serial venturing experiences. Because experience helps individuals improve in areas of task performance such as forecasting ability (Clement 1999; Mikhail et al. 1997), entrepreneurs gain entrepreneurial judgment by learning form work and startup experiences (Baron and Ensley 2006; Corbett 2005; MacMillan and McGrath 2006; Parker 2006; Ronstadt 1988; Shane 2000; Wiklund and Shepherd 2003).

However, entrepreneurs accrue incomplete benefits from experience, because it does not necessarily generate knowledge that can be applied to other new businesses (Reuber and Fischer 1994). Only a portion of knowledge gained from previous experience can be applied to the novel and nonrecurring task (Clement et al. 2007). Because each business opportunity is unique, entrepreneurs can transfer only part of knowledge gained from experience, because entrepreneurial opportunities can vary significantly (Bonner and Lewis 1990; Jacob et al. 1999). In addition, entrepreneurs’ emotional responses and cognitive biases may inhibit learning from experience; individuals must evaluate prior events and alter their knowledge if they are to learn from experience (Haleblian et al. 2006; Madsen and Desai 2010), but entrepreneurs may be unwilling to substantively evaluate past startup experience because of emotional responses and cognitive biases (Shepherd 2003). For example, performance feedback recalled by entrepreneurs may be systemically biased (Cassar and Craig 2009). Mixed results have also been reported on the role of education in firm growth (Stuart and Abetti 1990; Westhead and Cowling 1995; Almus and Nerlinger 1999; Colombo and Grilli 2005).

 From the economic perspective, firm size and proprietary intellectual properties at the time of founding influence startup growth. Larger firms may operate more efficiently than smaller firms because their operation is closer to the minimum efficient scale (Audretsch and Mahmood 1994), and those smaller in size operate at a smaller scale because of greater cash constraints (Zingales 1998). Even when a firm adjusts to its desirable size later, it must do so gradually because of lack of sufficient resources (Penrose 1959) or the uncertainty involved (L. Cabral 1995). Meanwhile, startups with intellectual property rights have certain early-mover advantages (Pereira et al. 2015). In the U.S. software startups backed by venture capitals, patents positively influence firm performance (Mann and Sager 2007). Firms that own intangible resources tend to exhibit proactive and risk-taking behaviors in order to pursue growth opportunities (Wiklund et al. 2010; Anderson and Eshima 2013). For example, patents play an important role in high-growth firms (Parker et al. 2010).

Therefore, this study aims to investigate the effects of founding size, intellectual properties at founding, and founders’ educational, industry and startup experiences on new firm growth, and to estimate how long such effects last.

**Hypotheses Development**

 Drawing upon the resource-based view supplemented by arguments from the economic view, I present, in each hypothesis, the rationale for predicting that new firm growth will be related to founding conditions.

 In the resource-based view, firms that possess valuable resources should perform better in the market selection process (Wernerfelt 1984; Barney 1991). For example, the initial stocks of financial and human capital exert an enduring effect on firm performance (A. C. Cooper et al. 1994; Eisenhardt and Schoonhoven 1990). In particular, human capital has a stronger influence on firm performance than physical capital, because knowledge assets are more difficult to trade or imitate (Youndt et al. 1996; Barney 1991; Teece 1998). The knowledge human capital embodies is mostly tacit. High-quality human capital possesses more complex and tacit knowledge, which is particularly difficult to transfer (Simonin 2004; McEvily and Chakravarthy 2002). Human capital has been found to be a good predictor of firm survival (Mata and Portugal 2002; A. C. Cooper et al. 1994; Gimeno et al. 1997). In the context of new firms, the ability to develop and exploit firm-specific assets is critical to new firm performance (Burgelman 1994; Bogner et al. 1996; Chang 1996). Founders with high-quality human capital are more likely to have better entrepreneurial judgment, and consequently are better in identifying new business opportunities and integrating others’ knowledge to expand their business. They are also more likely to recruit and retain highly skilled employees.

 First, I hypothesize that founders’ industry experience drives startup growth because they have gained knowledge and skills by learning about the industry and have become better in identifying business opportunities and integrating specialists’ domain-specific knowledge. Individuals can gain relevant knowledge and skills by learning by doing (Cassar 2014). Individuals can improve their judgment when tasks are clearly defined and repetitive, and feedback is provided in a timely and regular manner (Hayward et al. 2006; Wright 2001). Founders with greater industry-specific work experiences are more likely to have better entrepreneurial judgment, and idiosyncratic entrepreneurial judgment determines how an individual identifies new business opportunities (Foss 1993; Hodgson 1998; Alvarez 2002). Further, founders need to integrate and coordinate the complementary domain-specific knowledge possessed by specialists to create and expand their businesses (Colombo and Grilli 2010). Some studies have found evidence that founders’ industry-specific work experience is a driver of firm growth (A.C. Cooper and Bruno 1977; Feeser and Willard 1990; Colombo and Grilli 2005). Therefore, I hypothesize that founders’ industry experiences exert an enduring positive effect on startup growth.

H1a. The founders’ industry experience at founding is positively related to new firm growth in the early years.

H1b. The founders’ industry experience at founding is positively related to new firm growth in the later years.

 Next, entrepreneurs’ previous venturing experience is beneficial in multiple ways to new firm growth. First, entrepreneurs gain knowledge about business creation and development by learning through experimentation (Ardichvili et al. 2003; Baron and Ensley 2006; Delmar and Shane 2006; Shane and Khurana 2003; Jovanovic 1982). In the process of learning by doing, individuals repeatedly perform the task at hand, thus increasing their expertise in this task (Choo and Trotman 1991; Dew et al. 2009). Second, startup experience improves entrepreneurs’ evaluation and judgment of business opportunities (Colombo and Grilli 2005; Corbett 2005), because they develop strong cognitive structures through their reflection on previous entrepreneurial activities (Baron and Ensley 2006; Gruber et al. 2008). They learn from their own misperceptions of various market segments and products and revise their beliefs regarding their ability to precisely evaluate business opportunities (Parker 2006; Shane 2000). Studies have found that cognitive capability was positively associated with sales growth and profit growth (Simons et al. 1999), as well as task performance (Hunter and Hunter 1984). Third, startup experience helps entrepreneurs become aware of the cognitive biases in their judgment, so that past misperceptions and errors in judgment can reduce biases in the entrepreneur’s beliefs (Forbes 2005) and allow them to better understand the entrepreneurial risks and the base rates of new business success and failure (Hayward et al. 2006). Entrepreneurial experiences also reduce the tendency for over-optimism in business forecasting (Hmieleski and Baron 2009). Entrepreneurs constantly solve problems on the basis of experience and feedback from the market, and take joint actions over time to realize creative ideas. Hence, I propose the next two hypotheses.

H2a. The founders’ startup experience at founding is positively related to new firm growth in the early years.

H2b. The founders’ startup experience at founding is positively related to new firm growth in the later years.

I also hypothesize the impact of founders’ education on startup growth. Mixed results have been found on the role of education in firm growth (Stuart and Abetti 1990; Westhead and Cowling 1995; Almus and Nerlinger 1999; Colombo and Grilli 2005). Some studies have identified the entrepreneur’s education as being positively associated with firm growth (McPherson 1996; Mead and Liedholm 1998), whereas other studies have reported that formal education, as one type of human capital, does not directly relate to venture tasks, although other types of human capital, such as industry and start-up experiences, directly relate to the current task of the venture (A. C. Cooper et al. 1994; Marvel et al. 2014). Despite these mixed findings, I argue that education equips entrepreneurs with greater knowledge and skills and consequently helps them improve their judgment in opportunity identification and business expansion, which ultimately benefit startup growth in both early and later years.

H3a. The founders’ level of education is positively related to new firm growth in the early years.

H3b. The founders’ level of education is positively related to new firm growth in the later years.

 In the economic perspective, firm size and intellectual properties are critical elements for firm growth. First, I hypothesize that larger size at founding drives startup growth because larger firms are more cost effective, have better access to resources, and possess better capabilities. Larger firms may operate more efficiently than smaller firms because their operation is closer to the minimum efficient scale (Audretsch and Mahmood 1994). Those smaller in size operate at a smaller scale because of greater cash constraints (Zingales 1998). In their early years, firms endure the strongest impact of cash constraints because of lack of reputation and information asymmetries (Diamond 1989). Larger startups can endure poor performance and suffer losses for a longer time because of larger assets and better access to funds. Larger size may also be an indicator of better managerial capabilities. Firms may choose to operate at a larger scale because of the cost effectiveness derived from better capabilities (Lucas 1978). Further, firms may choose to enter at a larger scale because they are more optimistic about their business success (Frank 1988).

 Founding size is also relevant to the later growth of a startup because a firm’s past growth indicates its good performance and growth aspirations. A firm’s strategic choices involve the allocation of resources that could be sunk; therefore, the firm may find it difficult to adjust the decision even after it becomes apparent that the past decision was unwise (Dixit and Pindyck 1994). Even if the firm adjusts to the desired size, it must do so gradually because of lack of sufficient resources (Bogner et al. 1996) or the uncertainty involved (L. Cabral 1995). Therefore, I hypothesize that the initial firm size at founding is positively related to startup growth in both the early and later years.

H4a. The initial firm size at founding is positively related to new firm growth in the early years.

H4b. The initial firm size at founding is positively related to new firm growth in the later years.

 Next, I hypothesize that the intellectual properties owned by the new firm at founding drive startup growth. One source for firm growth is the accumulated stock of intellectual properties in the form of patents, copyrights, and trademarks. Startups with IP rights have certain early-mover advantages (Pereira et al. 2015). For example, patents play an important role in high growth firms (Parker et al. 2010), and in the U.S. software startups backed by venture capitals, patents positively influence firm performance (Mann and Sager 2007). In addition, firms that own intangible resources tend to exhibit proactive and risk-taking behaviors in order to pursue growth opportunities (Wiklund et al. 2010; Anderson and Eshima 2013). Firm innovativeness also positively influences sales (Freel 2000). Therefore, I hypothesize the positive impact of intellectual properties at founding on new firm growth in both the early and later years.

H5a. The intellectual properties owned by the firm at founding are positively related to new firm growth in the early years.

H5b. The intellectual properties owned by the firm at founding are positively related to new firm growth in the later years.

**Methods**

**Data and Sample**

 In this study, I test the hypotheses with a sample of firms in the longitudinal panel database from the Kauffman Firm Survey (KFS) conducted over the period of 2005 – 2010. KFS is a longitudinal data set of new ventures randomly chosen from Dun and Bradstreet’s database of all new businesses started in 2004 in the United States, excluding nonprofit firms, wholly owned subsidiaries of existing businesses, and firms inherited from someone else. In this longitudinal survey, sampling weights were used on the basis of all the new businesses in the United States. Among the eligible businesses, 4,928 completed the baseline survey, resulting in a 43% response rate with sampling weights. Of these firms, 3,998 completed the first follow-up survey, resulting in an 89% response rate after adjusting for the sample weights. In the second follow-up survey, 3,390 firms completed the interviews, resulting in an 85% weighted response rate. In the third follow-up survey, 2,915 firms completed the interviews, resulting in an 83% weighted response rate. In the fourth follow-up survey, 2606 firms completed the interviews, resulting in an 83% weighted response rate. In the fifth follow-up survey, 2408 firms completed the interviews, resulting in an 85% weighted response rate. (Farhat and Robb 2014) As indicated in Table 2, the final sample consists of 4923 new ventures. Five firms were excluded because of duplications or being founded before 2004. In the KFS, many new businesses had closed by the time each follow-up survey was conducted, resulting in self-selection of businesses represented in those follow-up surveys.

**Measures**

 All the variables were from the confidential KFS dataset provided by the National Opinion Research Center (NORC), which includes more details on entrepreneur characteristics, new firm performance and the external business environment than the publicly available dataset.

***Dependent variables***

*Firm growth.* New firm growth is measured by the Birch index (Birch 1987; Schreyer 2000) to reduce the bias caused by firm size.

$$g=(E\_{it}- E\_{it-1})(\frac{E\_{it}}{E\_{it-1}})$$

Where $E\_{it}$ is the employment of firm i at time t.

 Employment is used as a growth indicator because measuring firm size in terms of employment neither reflects input prices of a company nor requires deflation, as use of sales data does (Coad 2009). Using employment measure also avoids the bias caused by the manipulation of reported sales and profits common in many small businesses (Cressy 2006).

***Independent variables***

*Industry experience*. This variable describes the number of years of working experience respondents had in the industry in which their startup operates, measured as the natural log transformation of industry experience plus one.

*Startup experience*. This variable represents the number of other new businesses respondents started in addition to their current business, measured as the natural log transformation of the number of other new businesses started plus one.

*Education*. This variable is the average level of education of the founding team members, measured using the following indicators (Cassar 2014): 0) less than high school; 1) high school; 2) some college, technical or associate’s degree; 3) bachelor’s degree; and 4) post-bachelor’s degree.

*Founding size.* The firm size at founding is measured by the total assets owned by the firm in the founding year. Respondents were asked to estimate the value of each owned asset, consisting of cash, accounts receivable, product inventory, equipment, land, buildings, vehicles and any other assets. The value of total assets is the composite sum of all the assets, represented in the following ranges: (1) $500 or less; (2) $501 to $1,000; (3) $1,001 to $3,000; (4) $3,001 to $5,000; (5) $5,001 to $10,000; (6) $10,001 to $25,000; (7) $25,001 to $100,000; (8) $100,001 to $1,000,000; and (9) $1,000,001 or more.

*Intellectual properties.* This variable refers to the number of patents, copyrights, and trademarks the new firm possessed in the founding year.

***Control variables.***

*Age.* This variable describes the average age of the founding team members, measured as the natural log transformation of the average age plus one.

*Provide service.* The dummy variable indicates whether the new firm provides a service (yes = 1, no = 0).

*Ownership.* This variable describes the total percentage of the business owned by all the owners/operators at founding.

*Market competition.* Without controlling for the subsequent market competition, misleading conclusions might be drawn about the role of founding conditions in new firm growth. I use industry concentration as a proxy for market competition because I work with multiple industries with different structures (Geroski et al. 2010). Current firm concentration in a certain area matters because competition from other firms may limit the business expansion of new firms, because (1) new firms can’t secure the funds required, as they lack legitimacy in financial markets (Diamond 1989) and consequently are more likely to suffer from cash constraints (L. M. B. Cabral and Mata 2003) and (2) strong local competition can lead founders to change their growth expectations for their new businesses, although the impact of local competition may be slight because firm heterogeneity limits the threat posed by industry competitors (Bertin et al. 1996). In the KFS, each firm was matched to the County Business Patterns data based on the county in which it is located and the three-digit North American Industry Classification System (NAICS) code. Industry concentration is measured by two indicators: (1) total mid-March employees of all the establishments/firms in the industry in the county the startup is located in; and (2) total number of establishments/firms in the industry in that county.

**RESULTS**

 Table 1 presents the descriptive statistics and correlation matrix of all the variables. Table 2 presents the determinants of new firm growth. In the first year, positive associations are found between intellectual properties and firm growth and between founding size and firm growth. There is a marginally significant positive association between startup experience and firm growth. It is noteworthy that the association between the percentage owned by owner operators and firm growth is significantly negative. The negative association between the second indicator of market competition (total number of establishments in the industry in the county the startup resides in) and startup growth is marginally significant. In the second year, a positive association is found between startup experience and firm growth. The association between the percentage owned by owner operators and firm growth is significantly negative again. In the third, fourth and fifth years, a positive association is found between startup experience and firm growth; however, no other significant associations are found among other variables except for a marginally significant positive relationship between education and new firm growth in the fourth year. The results of the regression analyses support Hypotheses 2a, 2b, 3b, 4a and 5a. The founders’ startup experience at founding is positively related to new firm growth in the early years. The founders’ startup experience and level of education have an enduring positive impact on startup growth, while the initial firm size and number of intellectual properties owned by the firm at founding have a short-term positive impact on new firm growth.

**DISCUSSION**

 Analysis of the results suggest a dynamic link between founding conditions and new firm growth, founding size and intellectual properties driving growth in the early years of a startup but being replaced by entrepreneurial human capital in the later years. Previous studies investigated the effect of entrepreneurial human capital on firm performance, but few known studies have estimated how long such effects last for new firm growth. This empirical study also incorporated the arguments from the economic perspectives and revealed existence of a short-term impact of founding size and intellectual properties on new firm growth.

 As for theoretical and practical implications, firm performance research could benefit from integrating the resource-based view, human capital theory in particular, and economic perspectives. Human capital theory argues that people’s varying knowledge and skills have economic value (Becker 1964; Schultz 1961). Human capital has been found to be vital to entrepreneurial success (Unger et al. 2011) because it helps new firms accumulate new knowledge and create advantages (Bradley et al. 2012; Corbett 2007). Various types of human capital have different effects on firm performance (A. C. Cooper et al. 1994; Marvel et al. 2014), and this study reveals the enduring impact of startup experience on new firm growth. It is also important for practitioners and policy makers to understand which effects matter for new firm growth and the degree to which such effects persist. Entrepreneurs need to prepare carefully for the founding of a firm, because their strategic choices made at inception have long-lasting effects. Policy makers should tailor the support to the founding conditions of new firms.

 This study has several limitations. First, many new businesses in the Kauffman Firm Survey (KFS) had closed by the time each follow-up survey was conducted, resulting in self-selection of businesses in the follow-up surveys. This self-selection bias might significantly influence the statistical effects of various variables on new firm growth. Second, there could be finer-grained approaches to the operationalization of aspects of human capital. For example, the education measures could consider the discipline, such as business, engineering, liberal arts, or other degrees. The work experience construct could consider various types, such as experience in R&D, operations, marketing, etc.

 Future research could integrate theories of motivation with human capital theory because motivation provides the entrepreneur with the impetus and energy to acquire necessary human capital and to implement actions. Aggregate measures could be designed to represent the firm-level human capital. Other elements of human capital could also be examined, including judgment, decision making and insight. Because the percentage owned by the owners is negatively correlated with new firm growth, future studies could explore how access to venture capital drives new firm growth; venture capital investors may provide additional resources and capabilities as “coaches” (Colombo and Grilli 2010).

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TABLE 1: DESCRIPTIVE STATISTICS AND CORRELATION MATRIX a

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  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 | 22 |
| 1. Firm growth year1 | 13.69 | 212.39 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2. Firm growth year2 | 25.87 | 408.40 | .705\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3. Firm growth year3 | 23.15 | 381.51 | .497\*\*\* | .686\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4. Firm growth year4 | 36.36 | 566.68 | .517\*\*\* | .742\*\*\* | .930\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5. Firm growth year5 | 34.95 | 507.67 | .462\*\*\* | .607\*\*\* | .956\*\*\* | .938\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6. Intellectual properties | 1.40 | 8.82 | .104\*\*\* | -.007 | .052\*\* | -.006 | .002 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7. Ownership | 92.98 | 21.71 | -.072\*\*\* | -.041\* | -.026 | -.003 | -.002 | -.046\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8. Founding size | 5.24 | 2.69 | .042\*\* | .037\* | .025 | .041\* | .023 | .003 | -.025† |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9. Industry experience | 2.21 | 0.99 | 0.026 | .030† | .020 | .029 | .027 | .017 | -.012 | .055\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10. Startup experience | 0.44 | 0.57 | .048\*\* | .032† | .041\* | .055\*\* | .056\*\* | .028† | -.134\*\*\* | .082\*\*\* | .055\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 11. Education | 2.65 | 1.03 | .032\* | .019 | .035† | .039\* | .034† | .061\*\*\* | -.084\*\*\* | .025† | .031\* | .102\*\*\* |   |   |   |   |   |   |   |   |   |   |   |   |
| 12. Age | 3.78 | 0.34 | .013 | -.018 | -.019 | -.023 | -.044\* | -.011 | .059\*\*\* | .074\*\*\* | .193\*\*\* | .144\*\*\* | .091\*\*\* |   |   |   |   |   |   |   |   |   |   |   |
| 13. Provide service | 0.85 | 0.35 | .011 | .010 | .005 | -.004 | -.025 | -.032\* | .079\*\*\* | -.001 | .128\*\*\* | -.081\*\*\* | -.040\*\* | -.046\*\* |   |   |   |   |   |   |   |   |   |   |
| 14. Market competition1 year 1 | 164025.76 | 252721.59 | -.006 | -.010 | -.003 | -.008 | -.011 | .014 | .024† | -.041\*\* | .057\*\*\* | .004 | .113\*\*\* | -.015 | .113\*\*\* |   |   |   |   |   |   |   |   |   |
| 15. Market competition2 year 1 | 13991.24 | 20918.51 | -.016 | -.016 | -.006 | -.013 | -.016 | .018 | .043\*\* | -.037\* | .090\*\*\* | -.005 | .127\*\*\* | -.013 | .147\*\*\* | .911\*\*\* |   |   |   |   |   |   |   |   |
| 16. Market competition1 year 2 | 166383.56 | 254783.12 | -.004 | -.007 | .000 | .006 | .008 | .001 | .013 | -.041\*\* | .062\*\*\* | .007 | .130\*\*\* | -.008 | .100\*\*\* | .843\*\*\* | .775\*\*\* |   |   |   |   |   |   |   |
| 17. Market competition2 year 2 | 14168.05 | 21708.49 | -.014 | -.016 | -.002 | .005 | .009 | .003 | .025 | -.045\*\* | .085\*\*\* | -.005 | .135\*\*\* | -.019 | .128\*\*\* | .777\*\*\* | .855\*\*\* | .892\*\*\* |   |   |   |   |   |   |
| 18. Market competition1 year 3 | 174142.29 | 261904.70 | .006 | .001 | -.001 | -.009 | -.007 | -.001 | .026 | -.036\* | .072\*\*\* | .001 | .111\*\*\* | -.023 | .119\*\*\* | .914\*\*\* | .820\*\*\* | .862\*\*\* | .776\*\*\* |   |   |   |   |   |
| 19. Market competition2 year 3 | 14965.79 | 22428.48 | -.008 | -.016 | -.006 | -.015 | -.012 | .000 | .040\* | -.032\* | .097\*\*\* | -.005 | .127\*\*\* | -.027† | .151\*\*\* | .838\*\*\* | .915\*\*\* | .792\*\*\* | .867\*\*\* | .894\*\*\* |   |   |   |   |
| 20. Market competition1 year 4 | 177689.02 | 265525.41 | .013 | .014 | .000 | -.004 | -.003 | -.006 | .010 | -.051\*\* | .073\*\*\* | -.005 | .107\*\*\* | -.020 | .120\*\*\* | .887\*\*\* | .808\*\*\* | .821\*\*\* | .752\*\*\* | .954\*\*\* | .866\*\*\* |   |   |   |
| 21. Market competition2 year 4 | 15574.58 | 23392.02 | -.004 | -.009 | -.006 | -.010 | -.008 | -.007 | .024 | -.046\*\* | .090\*\*\* | -.011 | .125\*\*\* | -.030† | .144\*\*\* | .822\*\*\* | .890\*\*\* | .766\*\*\* | .830\*\*\* | .859\*\*\* | .955\*\*\* | .902\*\*\* |   |   |
| 22. Market competition1 year 5 | 174101.44 | 261816.14 | .006 | .001 | -.001 | -.010 | -.010 | .001 | -.001 | -.048\*\* | .067\*\*\* | .009 | .110\*\*\* | -.038\* | .125\*\*\* | .885\*\*\* | .803\*\*\* | .843\*\*\* | .772\*\*\* | .959\*\*\* | .863\*\*\* | .952\*\*\* | .857\*\*\* |   |
| 23. Market competition2 year 5 | 15133.16 | 22835.47 | -.008 | -.016 | -.006 | -.015 | -.013 | .000 | .010 | -.045\* | .088\*\*\* | .004 | .123\*\*\* | -.045\* | .144\*\*\* | .821\*\*\* | .885\*\*\* | .783\*\*\* | .850\*\*\* | .864\*\*\* | .956\*\*\* | .864\*\*\* | .946\*\*\* | .899\*\*\* |

 a N =4923. † p < .1 (two-tailed) \* p < .05 (two-tailed) \*\* p < .01 (two-tailed) \*\*\* p < .001 (two-tailed)

TABLE 2: REGRESSION ANALYSIS: DETERMINANTS OF NEW FIRM GROWTH a

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | New firm growth Year 1 | New firm growth Year 2 | New firm growth Year 3 | New firm growth Year 4 | New firm growth Year 5 |
|  | Coeff. (S.E.) | Coeff. (S.E.) | Coeff. (S.E.) | Coeff. (S.E.) | Coeff. (S.E.) |
| **Founding conditions:** |  |  |  |  |  |
| Intellectual properties | 2.361\*\*\* | -0.343 | 0.072 | -0.347 | -0.446 |
|   | (0.368) | (0.589) | (0.691) | (0.999) | (1.037) |
| Founding size | 2.936\* | 3.673 | 2.416 | 4.877 | 6.365 |
|   | (1.299) | (2.255) | (2.802) | (3.916) | (4.079) |
| Industry experience | 2.739 | 8.249 | 9.962 | 15.087 | 16.316 |
|   | (3.592) | (6.229) | (7.766) | (10.726) | (11.354) |
| Startup experience | 11.614† | 25.677\* | 25.964\* | 42.239\* | 46.686\* |
|   | (6.191) | (10.529) | (13.203) | (18.504) | (19.104) |
| Education | 3.735 | 5.420 | 10.877 | 18.064† | 13.223 |
|   | (3.405) | (5.873) | (7.336) | (10.250) | (10.817) |
| **Control variables:** |  |  |  |  |  |
| Provide service | 15.128 | 12.640 | 4.507 | -12.899 | -16.431 |
|   | (9.880) | (17.196) | (21.725) | (30.365) | (31.459) |
| Ownership | -0.630\*\*\*(0.166) | -0.796\*\*(0.292) | 0.128(0.376) | 0.124(0.537) | 0.171(0.555) |
| Age | 3.064 | -23.192 | -30.155 | -32.845 | -34.003 |
|   | (11.835) | (19.550) | (25.098) | (36.825) | (37.980) |
| Market competition: |  |  |  |  |  |
| 1.Total current employees in the local industry | 4.864E-5(0.000) | 5.654E-5(0.000) | 3.726E-5(0.000) | 6.927E-5(0.000) | 2.521E-5(0.000) |
| 2.Total current establishments in the local industry | -0.001†(0.000) | -0.001(0.001) | -0.001(0.001) | -0.001(0.001) | -0.001(0.001) |
|   |  |  |  |  |  |
| R2 | 0.021 | 0.009 | 0.004 | 0.007 | 0.007 |
| Observations | 3914 | 3271 | 2752 | 2421 | 2225 |

a The table gives parameter estimates; the standard error (below each parameter estimate) is in parentheses. The analysis takes into account sampling weights.

† *p* < .1 (two-tailed) \* *p* < .05 (two-tailed) \*\* *p* < .01 (two-tailed) \*\*\* p < .001 (two-tailed)