

An Investigation of the Role of Professionalization in Helping New Firms
Obtain Venture Capital and Angel Investment

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ABSTRACT

Small new firms often rely heavily on equity financing, such as venture capital or angel investment. However, it is challenging for them to attract financial support during their start-up period. Signals carried by professionalization may contain positive information about the organization of small new businesses. This information may increase the probability of obtaining venture capital or angel investment for a small new firm. This study intends to help fill gaps in our understanding of the effect of professionalization on equity financing, and in particular, whether professionalization helps to attract venture capitalists or angel investors. Our empirical results show that the signals carried by professionalization tend to enhance small new firms' attractiveness. The findings also indicate that different forms of professionalization may have different impacts on the probability of obtaining venture capital or angel investment.

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1. Introduction

In this paper, we set out to empirically investigate which/whether signals carried by professionalization help small new firms obtain external equity financing, in particular venture capital and angel investment. Small firms and new ventures make an important contribution to the economy (Berger and Udell 1998; Cavalluzzo and Wolken 2002). In general, small new firms need to attract investment in the initial stages of their business. They need to choose between two types of financial support, equity financing and debt financing. In our paper we investigate which firms are successful in obtaining equity financing from professional investors such as venture capitalists and angel investors during their start-up period. In other words, we ignore investments from other companies, friends or families. In credit markets venture capital and angel investment have become more and more popular and are the types of equity financing studied in this paper. We want to find out what kinds of firms are most likely to obtain investments from a professional investor in the equity market, and which types of professionalization serve as signals to those investors.

It is hard for small new firms to obtain equity investment from potential investors because they are young and lack a sufficient track record. In other words, it is difficult for investors to determine the worthiness of new firms in the equity market. There is no doubt that a firm whose performance is excellent is more likely to attract financial support in the credit market. We need to find out which factors investors believe will enhance firms' performance. In our paper we consider factors such as the firm's and its owner's characteristics and the firm's compensation plans. We consider the compensation plans to be the types of professionalization that may affect the firm's ability to obtain equity investment. Most of the studies related to professionalization based on the organizational perspective focus on firms' compensation plans.

The sample we use in our study comes from the Kauffman Firm Survey (KFS). This survey collects data on small new businesses which were founded in 2004 in the United States. The data were obtained from small new firms through web surveys or phone interviews. The baseline survey provides data for the year 2004, and there are five follow-up surveys from 2005 to 2009. In addition, the data of the KFS is well known

for its consistency and accuracy. In 2004, 4928 businesses were interviewed, and thus the sample size is big enough to support our study.

We use cross-section logit models to obtain our results, because the dependent variable we have is a dummy variable that indicates whether or not the firm has received the specified type of equity financing. Among the independent variables we include dummy variables for different types of professionalization. The estimation results can tell us which factors have a significant impact on the probability of obtaining equity financing.

Our empirical results show which types of professionalization help new ventures obtain equity financing. As Hellmann and Puri (2002) point out, stock options can be seen as a key type of professionalization which is positively related to the investments a firm can attract, such as venture capital and angel investment. In our study we find that being a C-corporation (a legal entity separated from its owners that may engage in business, make contracts, own property, pay tax, etc.) and employing more people in research and development also have a significant positive effect on equity financing. Potential investors may use these signals to evaluate a new firm looking for investments.

The next section is a literature review which introduces equity financing, venture capital and angel investment. It also suggests that the professionalization of small new firms may help to identify firms with strong performance. The third section describes the data set and the variables we choose to use. The fourth section presents the methodology and our empirical results. The last section discusses the conclusions, limitations and directions for further research.

2. Literature Review

In this section we introduce the difference between debt financing and equity financing, and explain why we consider venture capital and angel investment to be two major forms of equity financing. We also discuss how professionalization can affect equity financing, and introduce the hypotheses of the paper.

2.1 Equity Financing in the form of Venture Capital and Angel Investment

During the 20th century job growth and economic prosperity in the UK and the US have continued to become less dependent upon large firms (Storey 1994), and more small private firms are created every year. As Dicke (1996,11) points out, small firms make a large contribution to the American economy by “making up over 90% of all American business, employing nearly half of the workforce, and producing over one-third of American's gross national product.”

Usually, small firms rely on two types of investment and financing, debt financing and equity financing. In general, several financing difficulties challenge small firms' growth and innovation (Coleman 2000). Both debt financing and equity financing have their own advantages and disadvantages. The difference between them is that debt financing requires taking out a loan, while equity financing does not. Loans must be paid back over a certain period of time, usually with interest. The biggest advantage of debt financing (in addition to tax deductibility) is that the lending party does not gain any share of ownership in your business and your only obligation is to repay the debt to the lending party within a given period of time. The biggest disadvantage is that the business will not have all its cash flow available to do business and the interest rate can be high.

Equity financing is when the business owner sells part of the ownership of the firm in exchange for money from investors. Many small and growth-stage businesses use equity financing as a source of funding from professional investors and non-professional investors such as friends and family members. The most common source of equity financing is professional investors known as venture capitalists and angel investors, the types of investors in whom this paper is interested. According to the financial growth cycle perspective adopted by Berger and Udell (1988), small businesses at their start-up stage depend heavily on internal financing, trade credit, and angel investment. The advantage of equity financing is that firms don't need to repay the investments to investors and there is no interest rate effect as in the case of debt financing. We can easily perceive that new small firms are highly likely to choose equity financing in the form of venture capital and angel investment.

Unfortunately, equity financing involves significant transactions costs such as public market due diligence, distribution, and securities registration (Berger and Udell 1998). Unlike larger publicly-owned firms who are obligated to share their information with capital markets, small new businesses generally keep private their transaction with their suppliers, customers and labour force. As a result, it is harder for small firms to obtain external credit because audited financial statements are not accepted or do not convey the firms' quality (Berger and Udell 1998). Within the unpredictable debt financing market, firm owners are under a lot of pressure to repay their loans, and as the time period for repayment increases, the interest on loans increases as well.

The reality is that it is hard for small businesses to obtain both loans and equity investments.¹ However, in the equity financing market, the pressure to repay the investors is comparatively less, because both the firm owner and the investors are obligated to share the risk of new ventures. In equity financing, both venture capitalists and angel investors provide funds to early-stage, high risk, high potential, high-return and high-growth startup companies, which usually have a novel technology or business model and are in new or high technology fields, such as IT, software, biotechnology, etc. (Van Osnabrugge 2000). In what follows, we will first outline the differences between venture capitalists and angel investors; then we will consider the characteristics which they have in common.

Venture capitalists are used to providing money to young and start-up companies with high growth expectations in equity financing markets (Alexander, Heinrich and Karsten 2010). Gomper and Lerner (1998) focus on the venture capital segment of equity markets, and point out that there are a lot more attractive opportunities for entrepreneurs if the economy is growing rapidly. However, the structure of the capital market is also important. Black and Gilson (1998) examine the differences between bank-centered and stock-centered capital markets, and find that in general, bank-centered capital markets show fewer capabilities to create an efficient venture capital infrastructure. Analogously, Gomper and Lerner (1999) note that venture capital flourishes in countries with deep and liquid stock markets. Likewise, Schertler (2003)

¹ As Petersen and Rajan (1994, 4) note "a potential lender is uncertain about the competence and trustworthiness of the management, as well as the kinds of investment opportunities that could arise."

measures the liquidity of stock markets using either the capitalization of the stock market or the number of listed companies. Due to the disadvantages of bank-centered capital markets, Green (1998, 48) argues that “debt financing has lower availability than equity financing.” But since entrepreneurs need to find backers who are willing to bear risk, venture capital has become more popular than bank loans, even though the management of venture capital is costly (Chemla 2005).

A particular sector becomes attractive to investors only when the expected value of transaction costs is small enough and the volumes of payoff exceed a certain amount of management fees. Then new investors will enter this sector (Alexander, Heinrich and Karsten 2010). In addition, venture capitalists are attracted to new companies with a limited history of operation that are too small to raise capital in public markets, but have not reached the point where they are able to secure a bank loan or complete a debt offering. In exchange for the high risk that they assume, venture capitalists usually get significant control over company decisions, in addition to a significant portion of the company’s ownership.

Business angels tend to be private individuals who often had their own successful firms in the past, and are now looking to invest some of their money and experience gained in small and less mature firms (Van Osnabrugge 2000). Since angel investors invest their own money (Benjamin and Margulis 2000), an increasing number of angel investors have joined together to become an angel group or angel network that manages its pooled money and seeks to invest in new businesses that have the potential to return at least 10 or more times their original investment within 5 years. Angel investment fills the gap in start-up financing between “friends and family” who provide seed funding and venture capital. Within the past few years, public policy has sought to encourage angel investors (Joshua 1998).

Now consider the differences between angel investment and venture capital. Recently angel investors have become an even greater source of funding than venture capitalists as professional investors (Van Osnabrugge 2000). In the UK and the US the number of angel investors is, on average, between 30-40 times the number of entrepreneurial firms financed by the venture capital industry (Wetzel and Freear 1996). It is now well accepted that the business angel market is the largest single source of risk

financing for entrepreneurial firms exceeding the institutional venture capital industry (Marson and Harrison 1996). In addition, angels and venture capitalists differ in their motivations, their entrepreneurial experience, and their expected involvement (Van Osnabrugge and Robinson 2000). In general, angel investors are more involved with the companies in which they invest than venture capitalists, and are often more involved with their day-to-day operations than venture capitalists (Benjamin and Marguilis 2000).

Despite the importance of funds which come from friends and family, in the equity financing market the two most important and efficient types of financing are angel investment and venture capital. We can combine these two types of investors together because both of them reduce agency risks at all stages of the investment process. As Van Osnabrugge (2000) concludes, angel investors place more emphasis on doing so ex post investment (the incomplete contracts approach), while venture capitalists stress doing so more ex ante investment (the principal-agent approach). For example, angel investors provide early stage financing, called seed capital, for start-up ventures, while venture capitalists typically provide later stage financing, after an angel's investment (Sudek 2006-2007). If we want to investigate the probability that a new venture obtains external equity financing, we can define equity financing to include both venture capital and angel investment because both of them are start-stage funding for small businesses.

2.2 Professionalization

An important point of view supported by Newcomer (1955) and Golembiewski (1983) is that professionalization may provide important information to angel investors and venture capitalists about small firms and enhance the firm's attractiveness by aligning the owner and employees' interest. When a company develops from a small new firm to a large complicated organization, the key challenge of the company becomes to attract highly educated and highly skilled employees. Newcomer (1955) regards a standard code of conduct as the most important aspect of professionalization, but in this paper we broadly define professionalization as the status of human resource development, especially in new and high-technology industries. Studies on the impact of professionalization can be traced back to 1955 and most of the studies related to

professionalization are based upon the perspective of organizational theory (Hall 1968; Newcomer 1955). Chittoor and Das (2007) also show that a firm that has professionalized its management seems to do a better job of attracting investors. So far there is no study addressing the effect of professionalization on start-up businesses' ability to attract equity financing. In this paper we intend to fill this gap by investigating which kinds of professionalization carried by small new firms can improve the firms' ability to attract equity financing, including venture capital and angel investment. As Hellmann and Puri (2002, 170) note, the informal literature suggests that venture capitalists play a more important and highly involved role in the business than traditional financial intermediaries like banks do, and they also play a broader role in the professionalization of companies in which they invest.

To the best of our knowledge, the article written by Hellmann and Puri (2002) is the only and most relevant empirical study we can find on the role of professionalization in corporate financing through venture capital. Hellmann and Puri begin with Zingales' (2000) premise that human capital is central to the development of new start-up firms, and their paper empirically examines the hypothesis that venture capitalists encourage the development of human resource functions in small new businesses. Hellmann and Puri use a dataset of 173 start-up firms in Silicon Valley over the period 1994-1997. They use probit models and Cox duration models to examine the impact venture capital can have on the development of new firms, and find that venture capital is related to professionalization measures such as human resource policies, stock option plans and the hiring of a marketing Vice-president. For example, the probability of using business or professional contacts to recruit administrative and managerial personal was 43.7 percentage points higher for firms who had received venture capital financing. Similarly, firms that had received venture capital were twice as likely to adopt a stock option plan than firms that had not received venture capital.

It is interesting to note that Hellmann and Puri model the relationship between venture capital and professionalization differently than does this paper. Rather than looking at the effect of venture capital on professionalization, in our paper we want to estimate the impact professionalization can have on the probability of firms obtaining equity financing.

In order to find the right kind of professionalization of human capital that helps a new venture obtain external equity financing, we need to examine how firms view venture capital as a contribution to the human resource development process, and how venture capital affects the timing of key professionalization events in a company. In this paper we assume that the key elements of professionalization are benefit plans such as stock option plans, hiring and retirement plans, paid sickness, paid vacation, health plans, flexible time and bonus plans. Professionalization is very closely related to the use of knowledge and skilled workers in the company (Empson 1999). In order to attract talented employees to the firm, firms tend to provide incentives for the employees and hope they will help them retain employees (Saxenian 1994). Hellmann and Puri state that stock options are a sign of professionalization that formalizes the incentives between the owners of the firm and employees. In this paper we consider adding more forms of human resources professionalization (not only stock options), and testing whether they are significantly correlated with equity financing, in particular with venture capital and angel investment.

2.3 Overview and the Hypothesis

In the remainder of this paper, we attempt to investigate the impact of professionalization on the equity financing of new ventures, focusing on venture capital and angel investment. For a small start-up business, there are only two kinds of funding they can obtain. One is debt financing, and the other is equity investment. As we discussed above, there is very little research that discusses which factors attract these types of investments. According to this literature review, small businesses and new ventures rely heavily on equity financing, which we define as venture capital and angel investment. Even though the firm's owner and investors must share the ownership of the firm and may face transactions costs, in reality venture capitalists and angel investors are playing more and more important roles as investors in start-up small businesses.

Hellmann and Puri (2002) note that professionalization is measured by human resource structure, incentive plans and the standard code of conduct. Stock options are the most important type of professionalization that is correlated with investment.

Hellmann and Puri also point out that small new firms who have these forms of professionalization show better performance and attract more financing support. In this paper we consider professionalization to be an element that can affect equity financing. In other words, we hypothesize that venture capital and angel investment rely heavily on the aspects of professionalization that are recorded in the KFS. This paper will test the hypothesis that professionalization significantly helps new ventures attract venture capital and angel investment, using a logit model. The next section discusses the data source and variables that will be included in the model.

3. Data and Variables

In this section we introduce the data we use in this paper, and the variables we choose for the logit model, including dependent and independent variables. We discuss in turn three categories of independent variables: professionalization variables, the firm's characteristics and the firm owner's characteristics.

3.1 Data²

The data set used for this study is a public-use data set that can be downloaded from the website of the Kauffman Firm Survey.³ The Kauffman Firm Survey (KFS) is a panel survey of 4,928 American businesses founded in 2004.⁴ The KFS is one of the few surveys in the United States that focuses on the nature and performance of new small firms' activities. In fact, it is the largest longitudinal study over the formative years of small firms. The survey inquires about the nature of financing and also the

² The discussion in this data section relies on both Ballou, Barton, DesRoches, Potter, Zhao, Santos, and Sebastian (2007), and Ballou, Robb, DesRoches, Potter, Zhao, and Reedy (2009), as well as the KFS website.

³ <http://www.kauffman.org/kfs/>.

⁴ The KFS is sponsored by the Ewing Marion Kauffman Foundation and administered by Mathematica Policy Research Inc. (MPR). All the firms in the data set are new private businesses founded in the reference year 2004. Missing data in the follow-up survey can be attributed to bankruptcy, non response, or failure to find the new address. The project team of the KFS has conducted the survey from 2004 to 2009. It plans to conduct a follow-up survey in 2011. Surveying the same firms over time allows the tracking of operating performance, and may provide us with evidence of the development of new businesses.

organizational arrangements within these businesses. It also collects information on the characteristics of the founders and investors in these businesses. The public-use data set includes the baseline survey (2004) and five follow-up surveys (2005-2009). In total, that means we have data for the first six years of a new business. The variables we use in this paper are extracted from the questionnaires of the KFS.

The firms included in the KFS were selected from the Dun & Bradstreet (D&B) database. The D&B corporation database is the largest commercial list of American firms so far. The KFS places two restrictions placed on the D&B database. First, the businesses must have been created in the year 2004, and second, the firms must be founded by a person or team of people who is involved in the everyday operation of the business. In other words, the KFS panel data exclude the following types of businesses: wholly owned subsidiaries of existing firms, businesses inherited from someone else, and businesses owned by a not-for profit organization. Therefore, the survey asks a series of questions about the characteristics of business owners who created the businesses in 2004. In the end, 32,469 businesses were included in the baseline interviews for the survey, but only 4,928 of them completed the survey.

To be eligible for the KFS, the new business must have engaged in at least one of several business activities in calendar year 2004. These activities included whether the firm started paying unemployment taxes (UI) or payments under the Federal Insurance Contributions Act (FICA), whether the firm used an Employer Identification Number (EIN) or Schedule C to report business income on a personal tax return, and whether the firm had a legal status for its business in 2004. A web survey as well as a telephone interview was used for data collection. A \$50 incentive was paid to the owners to thank them for their cooperation in finishing the survey. The MPR project team members spent a whole year collecting the Baseline Survey data; 4,928 firms completed the interviews. This constituted a 43 percent response rate of eligible firms in 2004. In 2005, 3,998 interviews were completed in the first follow-up and 369 firms in the Baseline Survey were considered to be permanently out of business, an 89 percent weighted response rate.⁵ In the year 2006, 3,390 interviews were completed in the

⁵ The response rate is the “measures of the potential for nonresponse bias and of the quality of a survey” (Ballou et al. 2007 P53), defined by The KFS Baseline Methodology Report.

second follow-up and 406 more firms were out of business. In the year 2007, 2,915 interviews were completed in the third follow-up, an 84 percent response rate. In the year 2008, 2,606 interviews were completed in the fourth follow-up resulting in an 83 percent weighted response rate.

The sample we actually use in the empirical analysis is less than 4,928 firms and it decreases year by year, for two reasons. First, not all the firms want to obtain equity financing; some of them prefer debt financing during their start-up period. Second, not all the firms answered the questions relevant to this paper, so they were deleted because of these missing values. The sample size of our study in the year 2004 is 2,157, and the sample sizes in the following years are 1,201 (2005), 1,050 (2006), 878 (2007), 741 (2008), and 599 (2009). The sample size decreases due to the decrease in the number of firms participating in this survey because of business attrition.⁶

It is noteworthy that the KFS data have two limitations which could influence our results. The first is that some variables are assigned values such as 5+ or 25+ which are not numerical values. For example, the maximum value for the number of human resources employees is 5+, which means the number of people in charge of HR is 5 or more persons. Similarly, the value of 25+ means 25 or more employees. In order to use these observations, 5+ was changed to 5 and 25+ was changed to 25, etc. This top-coding will affect data accuracy. The other limitation is that some variables are provided in the form of a range rather than a precise number. Such variables include total expenses, owner's age, total assets, and owner's investment. These variables are continuous variables, but they are provided as categorical variables. In this paper we transform them into multiple dummy variables. Although this allows us to include these variables in our econometric analysis, it does not permit us to compute ratios, sums or products of these variables. Consequently, these two data limitations decrease data accuracy.

In addition, we have to mention an important precondition of our study, which is that the firms we choose are new, independent businesses created by a single person or a team of people. We exclude firms which are branches or subsidiaries owned by an

⁶ Business attrition means some firms participated in the baseline survey but did not participate in the follow-up surveys because of bankruptcy, refusal or failure to locate the firm's new address.

existing business, firms inherited from someone else, purchases of an existing business or a franchise, and organizations designed for social and charitable objectives and legally established as a “not-for-profit.”

3.2 Variables

In this subsection we introduce both the dependent and independent variables. The independent variables include professionalization and control variables. The professionalization variables are all dummy variables and the control variables represent characteristics associated with the firm and its owners.

3.2.1 Dependent Variables

As mentioned in the literature review, we know that equity investment is money received in return for some portion of ownership, and it is one of the ways to fund business expenses. In this paper our objective is to determine how professionalization will effect equity financing in the form of venture capital and angel investment. In the data set, the two most relevant variables are whether the firm obtained equity investment from venture capitalists or not, and whether the firm received equity investment from business angels or not. Although we know that the total number of observations in the KFS is 4,928, only 36 of the firms obtained venture capital financing and only 157 of the firms obtained angel investment in the year 2004. Table 1 provides more perspective on the importance to new firms of different sources of equity financing.⁷

Unfortunately missing values are a huge problem for the angel investment and venture capital variables. There are 1,659 missing values for the venture capital variable, and 1,660 missing values for the angel investment variable. We don't know the exact reason why there are so many missing values, but a few possibilities exist. Firms can choose to skip this question during the telephone interview or web survey; maybe the firms don't have either of these kind of investments so they choose not to answer

⁷ The sources of equity financing include: Spouses or life partner of owners of business which does not include spouses or life partners already named as owners; Parents, in-laws or children of firm owners; angel investors of individuals who are not relatives of owners, excluding venture capitalists; Other companies; Government agencies; Venture capitalists and Other sources.

the questions; or maybe the interviewer forgot to ask these questions. However, we would still like to use these data in the paper, if possible. In order to decrease the number of missing observations and because both investments are equity financing, we combine these two variables together by creating a new dummy variable that is equal to one if the firm obtained either venture capital or angel investment, and equal to zero if the firm reports that it didn't obtain equity investment from either venture capitalists or angel investors. This dummy variable is used as the dependent variable. Finally, if the firm did not answer either question, the variable is assigned a missing value code. In the same manner we generate dependent variables for all calendar years from 2004 to 2009. Because the number of missing values increases across the years, the frequency of usable observations decreases.

3.2.2 Professionalization Variables

The first group of independent variables considered are the professionalization variables, all of which are dummy variables. Our study obtains these variables from the fifth section of the KFS questionnaire, "Business Financing," which provides information on the compensation plans offered by firms to their full-time and part-time employees. We can consider these benefits plans to be proxies for professionalization.

In this paper we use seven professionalization variables over six years: bonus plan, flexible time, health plan, paid vacation, paid sickness, retirement plan and stock options. The data set provides information separately on compensation of both full-time and part-time employees; we combine all the employees together for each dummy variable so as to reduce the effect of missing values. The weight of missing values is comparatively large in all the compensation plans. For example, in the year 2004, 4,028 firms completed the questions about compensation plans. The bonus plan variable has 2,207 missing values, which constitute 44.78% of the observations. In the case of the flexible time plan, the missing values constitute 67.29% of the sample, more than half of the observations. The variables for other types of benefit plans have the same problem. The percentage of observations with missing values for health plan, paid sickness, paid vacation, retirement plan, and stock options are respectively 71.71%, 70.82%, 60.70%, 77.86%, and 77.03%. A possible reason for the large number of missing values is that

firms skipped this question, but another possibility is that they simply did not have this type of benefit plan for employees.

Again, in our study, we cannot ignore the possibility that the missing values will affect the results, because they may contain some valuable information. Therefore we assume that all the missing values reflect the absence of the associated benefit plans, and generate new dummy variables as follows. If the firm offered a compensation plan to either full-time or part-time employees, then the dummy variable equals one. If the firm did not implement this plan for either full-time employees or part-time employees, or the firm did not answer this question during the interview, the dummy variable for this plan is set equal to zero. All the professionalization dummy variables from the baseline survey to the fifth follow-up (2004-2009) are created in the same manner.

There is another reason why we convert the missing values to zeros: to make our final sample size larger. We know that in the KFS, 4,928 firms have completed the interviews. If we did not recode the value of missing values, Stata would automatically delete the missing values. In this case, number of observations in 2004 would be only 1,078. However, after we equate the missing equal to zero, the number of observations in the year 2004 becomes 2,157, which is one thousand more than before. In our study we prefer the larger sample size and it is not unreasonable to assume that firms who didn't answer the questions don't have these benefit plans. The missing values may also affect our results.

Intuitively, we expect a positive relationship between compensation plans and equity financing. In other words, we expect firms that have benefit plans to be able to raise funds in the equity market. Excellent performance is a good signal to help companies gain investment from venture capitalists or business angels. Small new businesses prefer to perform better in order to obtain a competitive advantage in the equity market. This is especially true when they lack financial resources during the formative period. As noted in the literature review, Hellmann and Puri (2002) argue that stock options are a consistent form of professionalization related to good performance and are widely used in both private and public companies. Small new firms are more likely to use stock options in order to retain better skilled workers and improve the value of their firms to attract more investment (Core and Guay 2001; Oyer and Schaefer

2005). We can easily predict that better benefit plans for employees are an efficient and effective way to motivate employees. This stems from their role in helping the firm attract better educated employees and wealthy investors.

3.2.3 Control Variables

We want to introduce two sets of control variables. The first set includes the characteristics of the firm and the second set includes the characteristics of the firm's owners. The firm's characteristics are useful and important factors to help investors make decisions on their investments. Generally speaking, venture capital and angel investment are high risk and high return investments. As an investor, before providing funds to a new business, one must have a comprehensive understanding of the employees' expertise and functionalities. Besides, the investor also needs to consider the organizational structure of this new business.

The KFS includes five variables that measure the number of employees or owners who were primarily responsible for human resources (HR), sales, research and development (R&D), financing or general administration. In the survey, these workers include full-time and part-time employees, but not contract workers who work for the business but are not in the business' official payroll. Due to data limitations, the KFS automatically assigns all the firms who have more than 25 employees in their start up period or more than five employees in charge of HR, Sales, R&D, Finance and General Administration values of 25+ or 5+.

The first firm characteristic variable is the number of employees responsible for human resources. These responsibilities include employee benefits, recruitment and hiring. The range of the variable is zero to five. The second one is the number of employees involved in sales or marketing; the third is the number of employees in research and development; and the fourth is the number of employees engaged in financial administration activities such as accounting procedures, budgeting, financial analysis or investment activities. The fifth one is the number of employees doing general administration work such as office management, responding to maintenance requests, purchasing supplies or training employees in office procedures.

We also include two categorical dummy variables for other firm characteristics. These are the firm's total assets and its legal status. Total assets is the most important element that investors need to consider in order to measure firm size and economic strength. The more assets the new firm has, the larger the size of the firm and the higher the probability it can obtain investments from both venture capitalists and business angels. We use four dummy variables to represent firms' total assets. The first variable includes firms with total assets between \$0 and \$1,000; the second one identifies firms with total assets between \$1,001 and \$10,000; the third variable identifies firms with total assets between \$10,001 and \$100,000; finally, the fourth dummy variable identifies firms with total assets of \$100,000 or more. In this paper we consider the firm's total assets to be a key control variable to measure the characteristics of a new business.

Legal status is a control variable that describes the ownership structure of the firm. We use five dummy variables to represent legal status. The first identifies firms that are sole proprietorships owned and managed by one individual. The second identifies limited liability companies, which implies the firm's ownership lies somewhere between a corporation and a partnership and offers some of the benefits of companies, but they are not subjected to as much government regulation as an S-Corporation. The third type of legal status is an S-corporation. A subchapter S-corporation passes profits and losses through to shareholders. C-corporations constitute the fourth type of legal status. C-corporations are legal entities separated from owners, that may engage in business, make contracts, own property, pay tax, and sue and be sued by others. Finally, the fifth type of legal status is a partnership. There are two types of partnerships. One is general partnership, which is an association of two or more people who co-own a business for the purpose of making a profit without forming an S-corporation or C-corporation. The other type is a limited partnership, in which the limited partner can invest in the business but foregoes any right to manage the company.

These are the fourteen control variables in the study and we use these variables to try to measure the firms' characteristics. We expect they will have an impact on the ability to obtain funds in the equity financial market. As for HR employment we expect employment in sales, R&D, financing and administration to be positively related to the

firm's ability to obtain equity investments. With respect to total assets, potential investors prefer to invest in firms with more assets. With respect to legal status, we expect a positive relationship with C-corporation status and a negative relationship with S-corporation status, because in an S-corporation investors will share the firm's losses.

The owner's characteristics also play an important role in attracting funds, especially in equity financing. As we discussed in the literature review, investors share the ownership with the firm's founder and they share the risk with all other shareholders. It is expected that a firm owner will be more competitive and conservative in the financing market when they are older, have higher education, have more work experience, or invest more money in their own company. In addition, an owner's gender may be relevant too. We also add a dummy variable to measure whether or not the firm's owner has invested in his or her own company. In total, five variables from the KFS are used to construct owner characteristics control variables. In summary, these are the firm owner's work experience, education, gender, age, and amount of investment. Only work experience is a continuous variable; the other variables are categorical or dummy variables.

First, consider the firm owner's work experience. Only a small number of cases record a value of over 40 years for owner's work experience, because people by that time are mostly retired. In the end, we predict that work experience will be positively related to equity financing. In other words, we expect that the more work experience the firm owner has the more funds the firm can gain in equity finance.

Next, the education level of the firm's owner can be represented by a categorical variable. There are four levels which can be explained as follows: a high school diploma or less, college or university study without a degree, college or university study with a degree, and a master's or higher degree. We expect that the higher the level of education of the firm's owner, the higher the probability that the firm will attract equity investments.

As for the owner's age, in the KFS the owner's age ranges from 18 to over 75. Because the owner's age is a categorical variable rather than a continuous variable, in our study we recode the owner's age to reduce the number of categories from ten to

four. Dummy variables are created for each of the following age ranges: 18 to 34, 35 to 44, 45 to 54, and 55 or higher.

The variable measuring the total investment by the firm's owner is also recoded to construct four dummy variables. The first dummy variable is one if the owner did not invest in his own firm at all, which is the case for 21.8% of the sample. The second dummy variable is one if the firm owner has invested \$1 to \$5,000 in their own firm. The third dummy variable equals one if the firm owner has invested \$5,001 to \$25,000 in the firm. The fourth dummy variable is one if the firm owner invested \$25,000 or more in their own business. We expect that the more the firm owner has invested in their own business, the larger the probability of the firm obtaining equity financing.

Lastly, the owner's gender is controlled for in our study. Previous studies have suggested that gender discrimination exists in the credit market (Blanchflower, Leivine and Zimmermann 2003; Cavalluzzo 2002). We use a gender dummy variable valued at zero for males and one for females. We expect that male owners may be more effective in obtaining venture capital or angel investment.

To sum up, in this paper we include 35 independent variables in our logit model, including 7 professionalization variables, 14 firm characteristics, and 14 firm owners' characteristics. Table A1 of the appendix lists all the variables retrieved from the KFS, while Table A2 of the appendix contains definitions of all the variables used in the logit model.

3.3 Descriptive statistics

First we need to examine the descriptive statistics of the sample for each year from 2004 to 2009. These statistics can be found in Tables A3 to Table A8, which show that the number of firms in the sample decreases across from year to year: 2,157 (2004), 1,201 (2005), 1,050 (2006), 878 (2007), 741 (2008), and finally 599 (2009). This phenomenon is reasonable because compared with big public companies, small new firms lack management experience and competitive market power. They are also a disadvantaged group in terms of both supply and demand. As a result many firms went bankrupt during the first few years. Second, we know that venture capitalists and angel investors are always looking for a new firm or start-up to invest in. After four or five

years, the small new firms may have grown fast and they can attract other consistent financial support or, at the extreme, they may not need any further investment. Then venture capital or angel investment may not be sought anymore. According to Table A3, during the year 2004 about 6.7% of companies obtained equity financing, but in 2009 only about 4.0% of companies obtained venture capital or angel investment, a dramatical decrease over the six years. All the independent variables in tables A3-A8 in the appendix are used in our analysis; the tables provide their sample mean, standard deviation, minimum and maximum value in the samples used for logit estimations. The tables show that the mean values of *HR*, *financing* and *R&D* decrease slightly over time, while the mean values of sales, administration and work experience increase across the six years. In addition, within our sample, the limited liability company is the most common type of legal status. The most common level of total assets is the total assets over \$1000,000. Most of the firm owners are aged between 35 and 45. Most firm owners did not invest in their own company at all.

4. Empirical results

In this section we first introduce our empirical model, the logit model, and we also explain how to compute marginal effects for the logit model. Then we discuss the results of the logit estimation.

4.1 The Logit Model

We adopt a logit model to test the effect of professionalization on equity financing since the dependent variable is a binary variable. It is well known that linear regression models suffer from numerous problems when the dependent variable is a dummy variable. A tobit model might have been appropriate if we were studying how much money the firm gets from the equity market. However, the topic of this paper is whether the firm attracts venture capital or angel investment. We prefer to use the logit model rather than the probit model, although these two models often lead to similar results.

As we mentioned before, the KFS is a cross sectional dataset and we have six years of data that range from 2004 to 2009. Instead of estimating a panel logit model, we estimate the logit model separately for each year and then we compare the results.

In the logit model, the probability that the firm will obtain venture capital or angel investment, P_i is given by

$$P_i = \frac{e^{x_i'\beta}}{1 + e^{x_i'\beta}},$$

where x_i is the vector of explanatory variables for firm i , and β is a vector of coefficients to be estimated.

In addition to the coefficient estimates, we also need to look at the marginal effect of each variable to understand the results. For continuous variables the marginal effect is the derivative of the probability P_i with respect to the continuous independent variable. The marginal effect of continuous variable x_{ik} can be written as

$$\frac{\partial P_i}{\partial x_{ik}} = P_i(1 - P_i)\beta_k,$$

where β_k is the coefficient of x_{ik} . As for the dummy variables, since their values are all either 0 or 1, we need to compute the difference between the conditional probability when the independent variable is equal to 1 and when the independent variable is equal to 0. The marginal effect of dummy variables can be written as

$$\Delta = P(y_i = 1 | x_{ik} = 1) - P(y_i = 1 | x_{ik} = 0).$$

where Δ is the marginal effect and y_i is the dependent variable. We need to compare the marginal effect of each independent variable with the base case probability of receiving financing to determine the importance of each marginal effect.

4.2 Results

After organizing the data, we need to compute the logit estimates and marginal effects for each year. The parameter estimates can be found in Table 2. First, we need to consider the change in the number of observations. It is undeniable that our final sample size will decrease due to the decreasing number of firms participating in the KFS from year to year. In table 2, the number of observations starts at 2,157 in the first year (2004), and then it decreases year by year. The numbers are 1,201 in 2005, 1,015 in 2006, 878 in 2007, 741 in 2008, and finally 599 in 2009. This is reasonable because the number of observations for both the dependent variable and independent variables are decreasing.

Second, we need to check the goodness of fit of the logit model. In the year 2004 the Likelihood ratio (LR) value is 152.53 with 29 degrees of freedom (DF). In the following years the LR values are 133.82 in 2005 with 30 DF, 103.71 in 2006 with 29 DF, 94.53 in 2007 with 29 DF, 80.74 in 2008 with 28 DF, and 87.52 in 2009 with 27 DF.⁸ These LR values are big enough to reject the null hypothesis that all the slope coefficients are zero, which implies that some variables significantly affect small new firms' ability to obtain equity financing. Furthermore, the p-value of the LR statistics is 0.000 for all six years, which means our model does have overall explanatory power and we do have some significant independent variables that can affect the dependent variable. We can easily accept the hypotheses of our study. However, the pseudo R^2 is not very big in our model, but it increases across the years from 0.14 in 2004 to 0.43 in 2009.

In order to find which independent variables significantly affect the probability that small new firms obtain equity financing such as venture capital or angel investment, we need to examine the p-value of each estimated coefficient. Table 2 presents the coefficient estimates for each year with their t-statistics in parentheses below. In Table 2 we use asterisks to indicate the level of significance. * means the p-value is less than

⁸ The DF change from year to year because sometimes Stata drops some variables automatically. In 2005 (30 DF), all the the coefficients are estimable. In other years Stata drops limited sole proprietorship (legal status-1). Stata also drops the variable for assets below \$1,000 (total assets-1) in 2008 (DF 28), and drops the firm with total assets between \$1,000-\$10,000 (total assets-2) and the firm owner's education level below high school (education-1) in 2009 (DF 27).

0.1, ** means the p-value is less than 0.05, and *** means the p-value is less than 0.01. All the coefficients with asterisks significantly affect the dependent variable. Then we need to check the coefficients of these variables to figure out the relationship between the independent variables and the dependent variable. If the coefficient has a positive sign, it indicates this factor may help small new firms obtain venture capital or angel investment. If the coefficient has a negative sign, it means this variable may impede firms from obtaining equity financing.

Note that the reference firm differs slightly from year to year because Stata dropped different variables in different years. In 2004, the reference firm is a firm with no professionalization plans, with *total asset-3* (firm has a total assets of \$10,001-\$100,000), *legal status-2* (limited liability company), a male owner, *education-3* (has finished college or university with a degree), *age-2* (owner's age between 35-44), *investment amount-3* (firm owners have invested an amount of \$5,001-\$25,000 in their own business), and with sample mean values of all the continuous variables. In Table 2 we can see the coefficients of *bonus* and *flexible time* are negative and statistically significant, This means if a firm has these two compensation plans, it is less likely to obtain equity financing than the reference firm. The coefficients of *paid sickness* and *stock option* are positive and statistically significant. This means if a firm offered these two benefit plans, it would more likely to obtain equity financing than reference firms do. Also in Table 2, firms who have more employees in charge of *R&D* and more *total asset-4* (assets above \$100,000) are more likely to get equity financing than reference firms do. In general, if a variable has a positive and statistically significant coefficient, firms with this characteristic are more likely to obtain equity financing than the reference firms does, and vice versa.

In table 2 we can see that taking all the years together, the variables with positive and significant coefficients include *bonus*, *health plan*, *paid sickness*, *stock options*, *sales*, *R&D*, *total asset-4* (above \$100,000), *legal status-4* (C-corporation), *legal status-5* (partnership), *gender*, *work experience*, *education-3* and *education-4* (education level above undergraduate study), and *investment amount-3* and *investment amount-4* (owner's investment above \$5000). On the other hand, the variables with negative and significant coefficients include *bonus*, *flexible time*, *paid sickness*, *paid*

vacation, *HR*, *total asset-2* (between \$1000-\$10,000), *legal status-3* (S-corporation), *gender*, *work experience*, *education-1* and *education-2* (below high school or have college study but without degrees), and *age-1* (below 34) or *age-4* (above 55). We can see that the effect of the variables *bonus*, *paid sickness*, *work experience* and *gender* on equity financing is different in different years.

As discussed above, we use categorical dummy variables to represent factors such as the firm's total assets, legal status, the owner's education level, age, and the amount that the firm's owner invested in their own business. Stata automatically omits the highest frequency category during estimation. *Total asset-4* (total assets above 100,000), *legal status-2* (limited liability company), *owner age-2* (35-44 years old), and *owner's investment-1* (\$0-\$1,000) were omitted from the logit model; *owner's education-4* (owner has a degree of master or more) was omitted in 2006 and 2007, but in the other years *owner's education-3* (owner finished university or college with degrees) was omitted. (Recall that the definitions of all our variables are in Table A2 in the Appendix.)

We also need to consider the marginal effects for each variable. Therefore we list the marginal effect of each variable in Table 3 and compare their p-values in order to figure out which variables' marginal changes have a significant effect on the results. The continuous variables with significant marginal effects include *HR*, *sales*, *R&D*, *financing*, and *administration*. Dummy variables with significant marginal effects include *bonus*, *flexible time*, *health plan*, *paid sickness*, *paid vacation*, *retirement plan*, *stock option*, *work experience*, *gender*, and some categories of the firm's total assets, legal status, owner's education, age and amount of investment from the firm's owner.

However, we can see that there are very few statistically significant marginal changes in Table 3, and many of changes in the probabilities appear to be small. To get a better idea of the importance of each variable, we must compare the marginal effect to the predicted probability of receiving angel or venture capital financing for the reference firms in the same year. The predicted probabilities are 0.0668 in 2004, 0.0649 in 2005, 0.0463 in 2006, 0.0444 in 2007, 0.0310 in 2008, and 0.0401 in 2009.

In the remainder of this section, we discuss the results by category of variable. First, we consider the effect of the firm's characteristics. The results in Table 2 show that

there are five kinds of firm characteristics that have a statistically significant impact on the probability of obtaining venture capital or angel investment. To start with, the variables that represent the number of employees who are in charge of *sales*, *HR* and *R&D*, all have statistically significant coefficients in at least one year. *Sales* is positively related to the probability of firms obtaining equity financing only in the year 2008, and *HR* is negatively related to the probability of getting equity investment in three years, 2005, 2007 and 2008. The marginal effects of *HR* and *sales* are not significant during all six years, but for *HR*, the marginal effect in 2007 is -0.0190, as compared to the predicted probability of 0.0444. Thus the addition of one more person in charge of human resources seems to reduce the probability of attracting angel investment or venture capital by 42.8%.

R&D is one of the few firm characteristic variables that has a statistically significant coefficient in every year, although the marginal effect of *R&D* is not statistically significant in every year. Respectively, it is significant and positively related to the probability of obtaining equity financing in the years 2004 and 2005, and its marginal effect ranges from 0.0134 in 2004 to 0.0079 in 2009. These marginal effects imply that if the firm employed one more person in *R&D*, the probability of attracting angel investment or venture capital would rise by 1.34 percentage points in 2004, holding all else constant. This amounts to a 20% increase compared to the predicted probability of the reference firm in 2004 (6.68%). These results make sense because we know that both venture capital and angel investment are suitable for high risk, high technology, high return new companies which are more common in the fields of IT or biochemistry. In these areas, research and development is the most important strategy to win a competitive advantage in the market.

We can also see that a firm with higher total assets can more easily obtain venture capital or angel investment, but having lower total assets than the reference firm can have negative effects too. Potential investors like to invest in a big and wealthy new firm because it enjoy more market power and is less risky. A firm's total assets are a good measure of the size of a company. The more assets a company has the higher the probability of obtaining venture capital or angel investment. The marginal effects of most categories of total assets are not statistically significant, except for *total assets-4*

(firm's total assets are \$100,000 or more) in 2004. This marginal effect is 0.0508, which means if the firm's total assets increase from less than \$100,000 to over \$100,000, the probability of attracting equity financing will rise by 5.58 percentage points, holding all else constant. This amounts to an 83.5% increase.

The last important firm characteristic is its legal status. In Table 2 we can see that *legal status-4* (C-corporation) also has a statistically significant coefficient in every year. This form of legal status is thus highly positively related to the probability of obtaining equity financing for small new firms. Although the marginal effects of C-corporation status are statistically significant only in the first three years, their values of 0.0784 in 2004, 0.0358 in 2005, and 0.0955 in 2006 imply that a change in legal status from type 2 (limited liability company) to type 4 (C-corporation) would increase the probability of attracting angel investment or venture capital by 7.84, 3.58, and 9.95 percentage points in 2004, 2005, and 2006, holding all else constant. This amounts to increases of 117%, 55%, and 215%. These results make sense because C-corporation is the type of legal status that is best suited to equity finance. In equity financing, both investors and firm founders are shareholders; investors offer funds to small new firms in exchange for partial ownership of the company. After obtaining venture capital or angel investment, the firm's organization style becomes C-corporation because all the shareholders have a responsibility to engage in business, make contracts, own property, pay taxes, etc. In contrast, *legal status-3* (S-corporation) has a statistically significant coefficient and marginal effect only in year 2004, but it is negatively related to the probability of obtaining equity financing for small new firms. The marginal effect of being an S-corporation is -0.0478 in 2004. Holding all else constant, this amounts to a 71.5% decrease in the predicted probability of obtaining equity financing for the reference firm. This result also makes sense because an S-corporation is the type of corporation in which all profits and losses are passed through to shareholders. In equity financing, all investors are shareholders, but the investors prefer to get more profits and take fewer losses than the firm's founders do. However, an S-corporation forces all the shareholders to share equally in the profits and losses, which is why this form of legal status has a negative effect on the probability of obtaining angel investment and venture capital.

Next, we need to discuss the firm owner's characteristics. The results in Table 2 show that there are five kinds of firm owner's characteristics that have a statistically significant coefficient in at least one year. The owner's education level and investment amount have similar effects on the results. If the firm owner has a higher education level or invests a larger amount in their own business, the firm will have a higher probability of obtaining venture capital and angel investment. This is likely because firm owners who have finished college or university with a degree (or a higher education level) will be more capable of operating a high technology business than owners who have less than a high school education. Although the marginal effects of a higher education level (above college or university) are not statistically significant, we can find that the marginal effect of *education-1* (high school or below) is significantly negative at -0.0467. Holding all else constant, this amounts to a 70% decrease in comparison to the predicted probability in 2004. Similarly, the larger the amount the firm owners invested in their own business, the higher the probability the firm will obtain equity financing. Potential investors tend to have greater trust in firm owners who invest a lot of money in their own business, and they thus prefer to invest in these firms. However, the only statistically significant marginal effect is for *investment-4* (invest \$25,000 or more), which is 0.21 in 2007. Holding all else constant, this marginal effect constitutes a five-fold increase in the probability of obtaining angel investment or venture capital.

The owner's gender and work experience both have statistically significant coefficients in some years, but their effects are not obvious because they have both positive and negative relationships with the probability of obtaining equity financing in different years. The marginal effect of the owner's *work experience* is small and not statistically significant, but the owner's *gender* has a significant marginal effect in 2004. The marginal effect of owner's *gender* is -0.0255 in 2004, which implies that if the firm's owner were female rather than male, the probability of attracting angel investment and venture capital would decrease by 2.25 percentage points, holding all else constant. This amounts to a 33.7% decrease. The sign of the coefficients and marginal effects of *gender* and *work experience* in different years are different. Their effects on the ability to attract equity financing are ambiguous too.

As for the professionalization variables, in Table 2 we can see that four kinds of professionalization have a statistically significant impact on the probability of obtaining venture capital or angel investment. As Hellmann and Puri (2002) argue, stock options are the most effective and efficient way for small new firms to enhance firm's performance and keep valuable employees. When a firm performs better, it will gain a competitive advantage in credit markets and become more attractive to venture capitalists and angel investors. *Stock options* is the most important professionalization variable in that it has a statistically significant coefficient from 2004 to 2007, although its marginal effect is only statistically significant in the year 2004. The magnitude of the marginal effect ranges from 0.1969 in 2004 to 0.0006 in 2008. The marginal effect in 2004 implies that for firms with stock options as a benefit plan, the probability of attracting equity financing is 19.6 percentage points higher, holding all else constant. This amounts to a threefold increase. In fact, many small new firms give part of their stock to their employees in the early stage of development, which helps them to retain a lot of valuable employees in their companies.

Other benefit plans such as *bonus*, *health plan* and *paid sickness* also have statistically significant coefficients that are positively or negatively correlated with the ability to obtain equity financing in some years. In Table 3, we can see that the marginal effects of *bonus plan* and *flexible time* are negative and statistically significant in 2004. The marginal effect is -0.0414 for *bonus plan* and -0.0314 for *flexible time*. Holding all else constant, these two marginal effects amount to 62% and 47% decreases respectively. However, since the sign of the marginal effects changes from year to year, the overall effects are ambiguous.

If a firm has a paid vacation plan, it may have more difficulty in obtaining equity financing. *Paid vacation* has a negative and statistically significant coefficient in 2005, 2007, and 2008, but its marginal effect is not statistically significant in any of these years. It makes sense in that paid vacation seems like a waste of money during the start-up period of a small firm. It is very welcome for employees but not that popular among potential investors. *Paid sickness* also has statistically significant coefficients in 2004, 2005, 2007, 2008, and 2009, but its marginal effects are not significant in any of these years. The impacts of *bonus* and *paid sickness* are not so obvious because in

2004 *bonus* is negatively related to equity financing, while in 2007 it has a positive impact. *Paid sickness* is positively related to equity financing in the years 2004, 2008 and 2009, but is negatively related in 2007. In addition, *health plan* has positive effects on the probability of obtaining equity financing only in 2005, and *flexible time* only has a negative effect in 2004. In other years these variables have no important effects. In general, some professionalization may help a small new firm's performance, and thus may help the firm to attract more venture capital or angel investment.

Thus, we can draw some conclusions regarding which kind of professionalization can help new ventures obtain equity financing. Stock options are the form of professionalization most closely associated with success in obtaining equity financing. But other factors also help new firms obtain venture capital or angel investment. C-corporation status, an emphasis on R&D and higher total assets are the most important elements that affect small firms' probability of obtaining venture capital or angel investment across many years. But other variables may have a positive or negative impact on obtaining equity financing just in some particular years.

5. Conclusion

Equity financing is an important source of investment for start-up small firms and new ventures. There are many different sources of equity finance. These include funds that come from spouses or life partners, parents or families, government agencies, venture capitalists, angel investors, etc. In our study we just consider two forms of equity finance, venture capital and angel investment, and exclude other types of equity investment. However, it is also a challenge for a new company to obtain equity financing because the transactions costs could be very high. But if the amount invested is large enough, equity financing is still worth striving for because it places less pressure on the firm for repayment than debt financing and the investors will not only share ownership with the firm owners but also share the high risk with them.

Meanwhile, a professionalized firm tends to have good performance (Golemniewski 1983). Good performance could help a firm obtain equity financing. Our study investigates whether signals carried by professionalization help new ventures get

external equity financing in the form of venture capital and angel investment. We use the firms' compensation plans as the professionalization variables; a professionalization variable valued at one means the firm offers this benefit plan to their employees, and zero means it does not. In addition we also include some characteristics of firms and their owners as control variables because they may have an effect on the firm's performance too.

Our logit estimates for the years 2004 to 2009 indicate that in general, our hypothesis that professionalization is correlated with the probability of a small new firm obtaining equity financing has been verified. Just as Hellmann and Puri (2002) say, stock options are highly positively related to new venture equity financing. In our study several other forms of professionalization, including paid sickness, paid vacation, health plans, and bonuses can also affect equity financing. Owners who have a higher education level, more work experience and invest more money in their own company also have a positive effect on the firm's performance. In addition, elements of the firm's organizational structure such as total assets, human resources personnel and sales personnel also play an important role in attracting investment.

To sum up, our findings provide some important implications for new ventures, potential investors and researchers. On the demand side of equity investment, the results suggest that small new firms are likely to successfully obtain venture capital or angel investment if they focus on the positive impact of professionalization factors. On the supply side, potential investors may use these professionalization signals to help them make financial decisions, because some forms of professionalization carry positive signals regarding the firm's performance. Lastly, for academics, more knowledge of the impact of a firm's professionalization on obtaining equity investment can guide researchers interested in further study in this field.

Our study contains several limitations. The first are data limitations. As we mentioned earlier, the data set includes a small portion of non-numerical values, such as a value of 5+ for the number of people in charge of HR. Any firm with more than 5 HR employees is considered to have just five. The data would be more accurate in the absence of this top-coding. Second, some variables were reported in ranges, not actual values. While this did not have a major impact on our study, often researchers prefer to

use continuous variables instead of categorical variables. The third limitation is that we can not tell which side of the market the equity financing in our study belongs to, the supply side or the demand side. Different sides may care about different measures of a firm's performance. As a result we have to take both sides into account to analyze the impact. The fourth limitation is that the direction of causality is not very obvious. In this paper we examine the impact of professionalization (compensation plans) on the probability that the firm obtains equity financing. However, in the KFS dataset, it is not clear when the firms adopted these plans -- was it before or after they obtained equity financing? The fifth limitation arose when we created the professionalization variables and treated missing values as 0 values. This may not be a good approach because we do not know the reason why the firm did not answer this question during the interview. The sixth data limitation is that in the KFS we can not find any direct information about the transaction costs associated with equity financing. We should take into account the impact of this cost on obtaining equity financing because it is probably important and negatively related to the probability of obtaining equity financing.

Finally, there are several directions in which the research of this paper could be extended. First, the data set needs several improvements. The huge number of missing values is an important problem. It would be desirable if the KFS could provide us with the reasons why so many missing values occur, and try to avoid sample selection bias. Second, due to time limitations, we chose to use cross section data instead of exploiting the panel aspect of the data to estimate the logit model. Maybe we could estimate a panel logit model with fixed effects and period effects and compare the results to our cross section results. Since we investigate the same firms over several years, there may be a correlation between years.

It would also be desirable to clarify the difference between the supply effect and the demand effect of professionalization, and take into account the costs of obtaining equity financing. The costs could effect both the supply side and the demand side. Lastly, researchers need to know the regulations and laws that apply to the equity financing market. Different bankruptcy laws and regulations in different states may have important effects.

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Table 1. Percentage of Firms who Obtain Equity Financing, by Source

Source of Equity financing	2004	2005	2006	2007	2008
Spouses or life partner	2.9%	1.7%	1.6%	0.7%	0.9%
Parents	5.6%	3.5%	2.7%	2.5%	1.8%
Angel investors	4.7%	3.6%	3.0%	2.4%	1.6%
Other companies	1.9%	2.2%	2.2%	1.4%	1.1%
Government agency	0.8%	0.7%	0.5%	0.5%	0.2%
Venture Capitalists	1.0%	1.0%	0.8%	0.5%	0.4%
other sources	0.5%	0.2%	0.3%	0.1%	0.3%

Source: KFS

Table 2. The Logit Model Coefficient Estimates, 2004-2009

Variables	2004	2005	2006	2007	2008	2009
Professionalization Variables						
Bonus	-0.901** (-1.97)	-0.255 (-0.70)	0.416 (0.83)	1.365** (2.62)	-0.599 (-0.82)	1.103 (1.54)
Flexible Time	-0.607* (-1.67)	0.308 (0.94)	0.395 (0.89)	0.410 (0.89)	1.294 (1.57)	0.219 (0.29)
Health Plan	0.312 (0.76)	0.739* (1.90)	-0.120 (-0.23)	0.037 (0.06)	0.119 (0.13)	0.042 (0.05)
Paid Sickness	1.155** (2.11)	0.925* (1.74)	0.875 (1.19)	-1.630** (-2.23)	2.005** (2.04)	2.935** (2.37)
Paid Vacation	-0.193 (-0.35)	-0.926* (-1.73)	-1.211 (-1.57)	0.098 (0.15)	-2.612** (-2.65)	-4.182*** (-3.27)
Retirement Plan	-0.747 (-1.21)	-0.050 (-0.11)	-0.944 (-1.57)	-0.542 (-0.82)	-0.498 (-0.67)	-1.073 (-1.15)
Stock Option	1.557*** (0.000)	1.033** (2.86)	1.443** (3.00)	2.009*** (3.31)	0.331 (0.40)	0.980 (1.08)
Firm Characteristics						
HR	0.124 (0.97)	-0.618** (-2.59)	-0.093 (-0.41)	-0.635* (-1.87)	-1.536** (-2.76)	-0.184 (-0.47)
Sales	-0.138 (-1.25)	0.099 (0.86)	0.085 (0.51)	0.132 (0.74)	0.459* (1.89)	0.227 (0.99)
R&D	0.200** (2.08)	0.448*** (4.17)	0.515*** (4.01)	0.341** (2.21)	0.549** (2.89)	0.720*** (3.62)
Administration	-0.020 (-0.14)	-0.062 (-0.37)	-0.259 (-1.11)	-0.132 (-0.49)	-0.168 (-0.46)	0.160 (0.05)
Financing	-0.159 (-0.96)	-0.221 (-1.05)	0.038 (0.12)	-0.142 (-0.44)	0.209 (0.51)	-0.207 (-0.53)
Total asset-1	-0.249 (-0.72)	-0.982 (-1.23)	-0.564 (-0.68)	0.119 (0.16)	N/A	0.916 (0.91)
Total asset-2	-0.319 (-0.95)	-1.287** (-1.88)	-0.790 (-0.98)	-0.676 (-0.83)	-0.496 (-0.40)	N/A
Total asset-3	---	-0.366 (-1.25)	-1.296** (-2.72)	-1.138** (-2.53)	-0.726 (-1.04)	-1.265 (-1.63)
Total asset-4	0.591** (2.74)	---	---	---	---	---
Legal Status-1	---	1.399 (0.99)	N/A	---	---	---
Legal Status-2	---	---	---	---	---	0.193 (0.22)
Legal Status-3	-1.144*** (-4.02)	-0.103 (-0.28)	0.211 (0.46)	0.168 (0.34)	-0.129 (-0.17)	---
Legal Status-4	0.826*** (3.78)	1.470*** (4.50)	1.647*** (3.78)	1.181** (2.39)	1.781** (2.48)	2.495** (3.12)
Legal Status-5	0.087 (0.26)	1.032** (1.85)	-0.184 (-0.17)	0.010 (0.01)	0.607 (0.48)	2.134 (1.59)
Owner Characteristics						
Gender	-0.465* (-1.79)	0.299 (0.86)	0.225 (0.44)	0.465 (0.99)	0.392 (0.57)	1.198* (1.77)
Work Experience	-0.004 (-0.44)	-0.001 (-0.11)	0.044** (2.15)	-0.043* (-1.90)	-0.011 (-0.35)	-0.012 (-0.38)

Variables	2004	2005	2006	2007	2008	2009
Education-1	-1.098** (-2.34)	0.089 (0.14)	-1.297 (-1.18)	-1.666 (-1.48)	1.859 (1.34)	N/A
Education-2	0.106 (0.43)	0.666* (1.68)	-0.285 (-0.58)	-0.895* (-1.71)	0.377 (0.36)	-1.206 (-1.32)
Education-3	---	---	0.099 (0.24)	-1.203** (-2.44)	---	---
Education-4	0.123 (0.55)	0.532 (1.56)	---	---	1.783** (2.33)	-0.154 (-0.23)
Age-1	-0.877** (-2.47)	-0.267 (-0.57)	-0.563 (-0.82)	-0.743 (-1.22)	-0.463 (-0.48)	-0.483 (-0.56)
Age-2	---	---	---	---	0.612 (0.90)	---
Age-3	-0.042 (-0.18)	-0.038 (-0.11)	-0.182 (-0.40)	-0.228 (-0.50)	---	-0.506 (-0.66)
Age-4	-0.122 (-0.47)	0.252 (0.65)	-0.078 (-0.15)	-1.847** (-2.59)	-1.266 (-1.46)	-0.144 (-0.19)
Investment Amount-1	0.229 (0.87)	---	---	---	---	---
Investment Amount-2	-0.363 (-1.17)	0.403 (0.68)	0.120 (0.15)	1.484** (2.32)	1.387 (1.42)	-0.010 (-0.01)
Investment Amount-3	---	1.020** (2.96)	-0.209 (0.42)	0.589 (0.96)	0.072 (0.08)	-1.360 (-0.98)
Investment Amount-4	0.030 (0.12)	1.101*** (3.35)	0.096 (0.842)	2.299*** (4.71)	0.315 (0.33)	0.641 (0.64)
Constant	-2.442	-4.267	-4.551	-2.538	-6.388	-5.233
Sample size	2157	1201	1015	878	741	599
LR chi2 (DF)	152.53	133.82	103.71	94.53	80.74	87.52
Prob.> chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.1442	0.2318	0.2725	0.2962	0.3938	0.4345

* means P-value < 0.1, **means P-value < 0.05, ***means p-value < 0.01.

Table 3. Marginal Effect of All the Variables, 2004-2009

Variables	2004	2005	2006	2007	2008	2009
Professionalization Variables						
Bonus	-0.0414** (-2.33)	-0.0025 (-0.72)	0.0128 (0.64)	0.0799 (1.18)	-0.0007 (-0.60)	0.0217 (0.72)
Flexible Time	-0.0314* (-1.91)	0.0040 (0.94)	0.0121 (0.93)	0.0149 (0.89)	0.0039 (0.93)	0.0027 (0.30)
Health Plan	0.0238 (0.66)	0.0119 (1.20)	-0.0029 (-0.24)	0.0011 (0.06)	0.0002 (0.12)	0.0005 (0.05)
Paid Sickness	0.1255 (1.40)	0.0166 (1.00)	0.0341 (0.72)	-0.0246 (-1.54)	0.0094 (0.59)	0.1636 (0.70)
Paid Vacation	-0.0119 (-0.38)	-0.0067 (-1.51)	-0.0181 (-1.30)	0.0031 (0.14)	-0.0014 (-0.74)	-0.0109 (-0.85)
Retirement Plan	-0.0365 (-1.58)	-0.0005 (-0.11)	-0.0157 (-1.34)	-0.0127 (-0.87)	-0.0006 (-0.54)	-0.0073 (-0.81)
Stock Option	0.1969** (2.23)	0.0196 (1.34)	0.0753 (1.26)	0.1608 (1.34)	0.0006 (0.30)	-0.0180 (0.51)
Firm Characteristics						
HR	0.0082 (0.96)	-0.0068 (-1.61)	-0.0024 (-0.40)	-0.0190 (-1.34)	-0.0023 (-0.77)	-0.0020 (-0.40)
Sales	-0.0092 (-1.20)	0.0011 (0.79)	0.0022 (0.50)	0.0039 (0.66)	0.0007 (0.75)	0.0025 (0.63)
R&D	0.0134* (1.82)	0.0050* (1.72)	0.0130 (1.56)	0.0102 (1.40)	0.0008 (0.74)	0.0079 (0.86)
Administration	-0.0014 (-0.14)	-0.0007 (-0.36)	-0.0065 (-0.94)	-0.0040 (-0.48)	-0.0002 (-0.43)	0.0018 (0.41)
Financing	-0.1058 (-0.94)	-0.0024 (-0.92)	0.0010 (0.12)	-0.0042 (-0.43)	0.0003 (0.46)	-0.0023 (-0.43)
Total asset-1	-0.0149 (-0.77)	-0.0070 (-1.31)	-0.0110 (-0.72)	0.0038 (0.15)	N/A	0.0162 (0.62)
Total asset-2	-0.0186 (-1.00)	-0.0081 (-1.59)	-0.0140 (-0.99)	-0.0149 (-0.88)	-0.0006 (-0.39)	N/A
Total asset-3	---	-0.0034 (-1.03)	-0.0187 (-1.43)	-0.0229 (-1.47)	-0.0008 (-0.61)	-0.0080 (-0.77)
Total asset-4	0.0508** (2.30)	---	---	---	---	---
Legal Status-1	---	0.0323 (0.53)	N/A	---	---	---
Legal Status-2	---	---	---	---	---	0.0023 (0.22)
Legal Status-3	-0.0478** (-3.02)	-0.0011 (-0.28)	0.0059 (0.44)	0.0054 (0.32)	-0.0002 (-0.16)	---
Legal Status-4	0.0784** (2.64)	0.0358* (1.87)	0.0955* (1.67)	0.0630 (1.31)	0.0073 (0.76)	0.1088 (1.09)
Legal Status-5	0.0060 (0.25)	0.0196 (1.10)	-0.0043 (-0.18)	0.0003 (0.01)	0.0012 (0.35)	0.0756 (0.67)
Owner Characteristics						
Gender	-0.0255* (-1.79)	0.0038 (0.74)	0.0063 (0.41)	0.0174 (0.81)	0.0007 (0.44)	0.0248 (0.76)
Work Experience	-0.0002 (-0.44)	-0.0000 (-0.11)	0.0011 (1.25)	-0.0013 (-1.32)	-0.0000 (-0.32)	-0.0001 (-0.35)

Variables	2004	2005	2006	2007	2008	2009
Education-1	-0.0467** (-2.53)	0.0010 (0.14)	-0.0187 (-1.21)	-0.0248 (-1.42)	0.0080 (0.63)	N/A
Education-2	-0.0074 (0.43)	0.0103 (1.24)	-0.0063 (-0.54)	-0.0180 (-1.28)	0.0007 (0.34)	-0.0078 (-0.76)
Education-3	---	---	0.0026 (0.24)	-0.0214 (-1.40)	---	---
Education-4	0.0087 (0.54)	0.0077 (1.24)	---	---	0.0073 (0.82)	-0.0016 (-0.23)
Age-1	-0.0407** (-2.39)	-0.0026 (-0.58)	-0.0110 (-0.82)	-0.0159 (-1.12)	-0.0005 (-0.46)	-0.0042 (-0.53)
Age-2	---	---	---	---	0.0012 (0.60)	---
Age-3	-0.0027 (-0.18)	-0.0004 (-0.11)	-0.0042 (-0.39)	-0.0061 (-0.49)	---	-0.0044 (-0.56)
Age-4	-0.0078 (-0.47)	0.0032 (0.60)	-0.0019 (-0.19)	-0.0258 (-1.50)	-0.0011 (0.28)	-0.0015 (-0.23)
Investment Amount-1	0.0168 (0.84)	---	---	---	---	---
Investment Amount-2	-0.0207 (-1.17)	0.0055 (0.56)	0.0032 (0.14)	0.0922 (1.14)	0.0044 (0.62)	-0.0001 (-0.01)
Investment Amount-3	---	0.0193 (1.59)	0.0058 (0.38)	0.0234 (0.75)	0.0001 (0.08)	-0.0082 (-0.76)
Investment Amount-4	0.0020 (0.12)	0.0218 (1.61)	0.0025 (0.19)	0.2100* (1.82)	0.0005 (0.28)	0.0098 (0.42)
Predicted probability	0.0668 (13.11)	0.0649 (10.11)	0.0463 (7.91)	0.0444 (7.19)	0.0310 (5.73)	0.0401 (6.12)

* means P-value < 0.1, **means P-value < 0.05, ***means p-value < 0.01.

Appendix

Data quality is an important element that the KFS needs to ensure. The MPR project team offered an interview training course, a performance monitoring and an edit checking software to ensure that a certain level of quality in the data is present. In general a knowledgeable and experienced interviewer can eliminate subjectivity bias in a phone interview. That's why interviewers in the KFS need to take a 12 hour mandatory training course, and they also need to pass a test before the official interview. The material taught in the course includes interviewing skills, business eligibility criteria, strategies for dealing with avoidance respondents, and the attitude of confidence. In general, the interviewers gain experiences, but they also feel more confident after repeated practice. Performance monitoring is also very important in data accuracy. The team members needed to sort the information based on the report from interviewers every week. They reviewed their feedbacks and solved the new problems during the weekly meeting. Generally speaking after these processes, good suggestions will come out to enhance the interviewers' performance and increase the response rate in the future. Last but not least, using the edit checking software can also help to avoid uncertainty interviews. It is undeniable that there must be some inconsistencies or unexpected situations that happened during the phone interviews and web surveys. In these circumstances the software will allow the team members to correct the inconsistency.

In addition, data accuracy requires the data to be clean and reasonable. Not all the respondents have the necessary knowledge to provide answers to all the questions. The KFS questionnaires allow open ended questions in cases where the firms cannot find the appropriate or most similar answer in the available choices. It is reasonable that some special cases arise, and the survey needs to take that in to consideration. The special feedbacks in the web surveys also allow for this. Allowing the open ended question is another way to enhance the quality of data.

The KFS contains a detailed and systematic annotated questionnaire from the Baseline Survey (2004) to the Fifth Follow-up (2009). Each survey was separated into seven sections. The sections include the introduction, business characteristics, strategy

and innovation, business organization and HR benefits, business finances, work behaviors and demographics of owners, and computed group variables. An exception to this is the baseline survey which has another section called the eligibility screening. This section elaborates the eligibility restrictions that we discussed above such as how a business gets started, the forms of legal status a business can have, whether or not the company paid UI or FICA, etc. Perspective, The introduction gives us basic information concerning the respondents. These include information about the owner, founder or operators, business name, mailing address, and then main reason why the firms is out of business. The second section, business characteristics, includes questions about the principle activity of business, the type of businesses, the owner and their operators, and the number of part time and full time employees, etc. The third section strategy and innovation illustrates which products or services the business can provide. It also gives the businesses competitive advantage. These include their patents, copyrights and trademarks. Besides this section also includes the percentage of sales by the business itself, government or individuals. Section four collects information on business organization and HR benefit. This includes information on the number of employees or owners were primarily responsible for HR, sale, executive administration, R&D, production, and financing administration. It also indicates whether the company offers compensation plans such as retirement plan, health plan or stock options. The fifth section, business financing, collects information concerning revenue, expenses, profits or losses, and type of investment including debt financing and equity financing. Debt financing can contain money from credit card, banks families, friends or some special sources. Equity financing collects the investment from spouses, parents, families, business angels, other companies, venture capitalists or other sources. Note that this section is the focus of this paper. The sixth section work behaviors and demographics of owners explains the owner's characteristics, this includes their average weekly hours spent on the business, work experience, education level, age, origin, race, nationality, citizenship and gender. The last section, computed group variables, includes totals for pooled variables that were listed in this section. In other word the variables are subtotals grouped.

Table A1 lists all the KFS variables used in this study. The remaining tables in this appendix define the variables included in the logit models estimated and present descriptive statistics for the samples used.

Table A1. Comparisons of Variable Names with the KFS Public Dataset

Variable Name	Name in the KFS
Dependent Variable	f3f_eq_invest_vent_cap_0-5 f3c_eq_invest_angel_0-5
Bonus	e2a_ft_emp_bonus_plan_0-5 e2b_pt_emp_bonus_plan_0-5
Flexible Time	e2a_ft_emp_flex_time_0-5 e2b_pt_emp_flex_time_0-5
Health Plan	e2a_ft_emp_hlth_plan_0-5 e2b_pt_emp_hlth_plan_0-5
Paid Sickness	e2a_ft_emp_paid_sick_0-5 e2b_pt_emp_paid_sick_0-5
Paid Vacation	e2a_ft_emp_paid_vaca_0-5 e2b_pt_emp_paid_vaca_0-5
Retirement Plan	e2a_ft_emp_retire_plan_0-5 e2b_pt_emp_retire_plan_0-5
Stock Option	e2a_ft_emp_stock_own_0-5 e2b_pt_emp_stock_own_0-5
HR	e1_a_num_human_res_0-5
Sales	e1_b_num_sales_0-5
R&D	e1_d_num_resdev_0-5
Financing	e1_g_num_fin_admin_0-5
Administration	e1_f_num_gen_admin_0-5
Total asset	tot_assets_r_0-5
Legal Status	b2a_legal_status_0 c1z2_legal_status_1-5
Gender	g10_gender_01_0-5
Work Experience	g2_work_exp_01_0-5
Education	g9_education_owner_01_0-5
Age	g4_age_owner_01_0-5
Investment Amount	tot_equity_owner_0-5

Table A2. Variable Definitions

Variable Name	Definition
Dependent Variable	Equal to 1 if firm obtain venture capital or angel investment, 0 otherwise.
conditional variable	Equal to 3 if the firm is a new, independent business created by a single person or a team of people.
<i>Professionalization Variables</i>	
Bonus	Equal to 1 if firm offer bonus plan to employees, 0 otherwise.
Flexible Time	Equal to 1 if firm offer flexible time to employees, 0 otherwise.
Health Plan	Equal to 1 if firm offer health plan to employees, 0 otherwise.
Paid Sickness	Equal to 1 if firm offer paid sickness to employees, 0 otherwise.
Paid Vacation	Equal to 1 if firm offer paid vacation to employees, 0 otherwise.
Retirement Plan	Equal to 1 if firm offer retirement plan to employees, 0 otherwise.
Stock Option	Equal to 1 if firm offer stock option to employees, 0 otherwise.
<i>Firm's Characteristics</i>	
HR	The number of employees in charge of human resources in a firm, with a range of 0-5.
Sales	The number of employees in charge of sales or marketing in a firm, with a range of 0-5.
R&D	The number of employees in charge of research and development in a firm, with a range of 0-5.
Financing	The number of employees in charge of financing administration in a firm, with a range of 0-5.
Administration	The number of employees in charge of general administration in a firm, with a range of 0-5.
Total asset-1	Equal to 1 if firm with a total assets between \$0-\$1,000.
Total asset-2	Equal to 2 if firm with a total assets between \$1,001-\$10,000.
Total asset-3	Equal to 3 if firm with a total assets between \$10,001-\$100,000.
Total asset-4	Equal to 4 if firm with a total assets of \$100,001 or more.
Legal Status-1	Equal to 1 if firm's legal status is sole proprietorship.
Legal Status-2	Equal to 2 if firm's legal status is limited liability company.

Variable Name	Definition
Legal Status-3	Equal to 3 if firm's legal status is S-corporation.
Legal Status-4	Equal to 4 if firm's legal status is C-corporation.
Legal Status-5	Equal to 5 if firm's legal status is partnership or others.
<i>Firm Owner's Characteristics</i>	
Gender	Equal to 1 if firm owner is female, 0 male.
Work Experience	The number of years of firm owner's work experience.
Education-1	Equal to 1 if firm owner finish high school or below.
Education-2	Equal to 2 if firm owner finish college or university without degree.
Education-3	Equal to 3 if firm owner finish college or university with degree.
Education-4	Equal to 4 if firm owner finish master degree or above.
Age-1	Equal to 1 if firm owner is between 18-34 years old.
Age-2	Equal to 2 if firm owner is between 35-44 years old.
Age-3	Equal to 3 if firm owner is between 45-54 years old.
Age-4	Equal to 4 if firm owner is between 55-75+ years old.
Investment Amount-1	Equal to 1 if firm owner did not invest in his or her own business.
Investment Amount-2	Equal to 2 if firm owner invest an amount of \$1-\$5,000 in his or her own business.
Investment Amount-3	Equal to 3 if firm owner invest an amount of \$5,001- \$25,000 in his or her own business.
Investment Amount-4	Equal to 4 if firm owner invest an amount of \$25,000 or more in his or her own business.

Table A3. Statistics of All the Variables in Baseline Survey, 2004

Variables	Mean	S.D	Min	Max	N
<i>Dependent Variable</i>					
VC and AI	0.067	0.250	0	1	2157
<i>Professionalization Variables</i>					
Bonus	0.075	0.264	0	1	2157
Flexible Time	0.135	0.341	0	1	2157
Health Plan	0.083	0.276	0	1	2157
Paid Sickness	0.089	0.285	0	1	2157
Paid Vacation	0.098	0.298	0	1	2157
Retirement Plan	0.030	0.170	0	1	2157
Stock Option	0.025	0.156	0	1	2157
<i>Firm Characteristics</i>					
HR	0.845	0.858	0	5	2157
Sales	1.278	1.051	0	5	2157
R&D	1.098	0.995	0	5	2157
Financing	1.158	0.807	0	5	2157
Administration	1.260	0.904	0	5	2157
Total asset ¹	2.853	0.982	1	4	2157
Legal Status ¹	2.896	0.983	1	4	2157
<i>Owner Characteristics</i>					
Gender	0.235	0.424	0	1	2157
Work Experience	13.114	10.588	0	40	2157
Education ¹	2.828	0.978	1	4	2157
Age ¹	2.526	1.005	1	4	2157
Investment Amount ¹	2.619	1.090	1	4	2157

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.

Table A4. Statistics of All the Variables in the Fourth Follow-up, 2005

Variables	Mean	S.D	Min	Max	N
<i>Dependent Variable</i>					
VC and AI	0.0649	0.257	0	1	1201
<i>Professionalization Variables</i>					
Bonus	0.221	0.415	0	1	1201
Flexible Time	0.708	455	0	1	1201
Health Plan	0.232	0.422	0	1	1201
Paid Sickness	0.254	0.435	0	1	1201
Paid Vacation	0.311	0.463	0	1	1201
Retirement Plan	0.104	0.305	0	1	1201
Stock Option	0.073	0.261	0	1	1201
<i>Firm Characteristics</i>					
HR	0.808	0.805	0	5	1201
Sales	1.436	1.206	0	5	1201
R&D	0.083	1.087	0	5	1201
Financing	1.100	0.794	0	5	1201
Administration	1.291	0.941	0	5	1201
Total asset ¹	3.186	0.864	1	4	1201
Legal Status ¹	2.831	0.901	1	4	1201
<i>Owner Characteristics</i>					
Gender	0.216	0.411	0	1	1201
Work Experience	14.111	10.466	0	40	1201
Education ¹	2.942	0.942	1	4	1201
Age ¹	2.509	0.973	1	4	1201
Investment Amount ¹	1.946	1.172	1	4	1201

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.

Table A5. Statistics of All the Variables In the First Follow-up, 2006

Variables	Mean	S.D	Min	Max	N
<i>Dependent Variable</i>					
VC and AI	0.046	0.210	0	1	1015
<i>Professionalization Variables</i>					
Bonus	0.265	0.441	0	1	1015
Flexible Time	0.682	0.457	0	1	1015
Health Plan	0.253	0.435	0	1	1015
Paid Sickness	0.227	0.448	0	1	1015
Paid Vacation	0.349	0.477	0	1	1015
Retirement Plan	0.154	0.361	0	1	1015
Stock Option	0.066	0.248	0	1	1015
<i>Firm Characteristics</i>					
HR	0.865	0.872	0	5	1015
Sales	1.367	1.157	0	5	1015
R&D	1.066	1.076	0	5	1015
Financing	1.117	0.786	0	5	1015
Administration	1.305	0.985	0	5	1015
Total asset ¹	3.301	0.848	1	4	1015
Legal Status ¹	2.809	0.865	1	4	1015
<i>Owner Characteristics</i>					
Gender	0.197	0.397	0	1	1015
Work Experience	14.516	10.668	0	40	1015
Education ¹	2.961	0.940	1	4	1015
Age ¹	2.519	0.983	1	4	1015
Investment Amount ¹	1.718	1.091	1	4	1015

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.

Table A6. Statistics of All Variables in the Second Follow-up, 2007

Variables	Mean	S.D	Min	Max	N
<i>Dependent Variable</i>					
VC and AI	0.044	0.206	0	1	878
<i>Professionalization Variables</i>					
Bonus	0.263	0.440	0	1	878
Flexible Time	0.694	0.460	0	1	878
Health Plan	0.302	0.459	0	1	878
Paid Sickness	0.317	0.465	0	1	878
Paid Vacation	0.380	0.385	0	1	878
Retirement Plan	0.158	0.365	0	1	878
Stock Option	0.048	0.215	0	1	878
<i>Firm Characteristics</i>					
HR	0.771	0.775	0	5	878
Sales	1.415	1.203	0	5	878
R&D	1.009	1.157	0	5	878
Financing	1.076	0.807	0	5	878
Administration	1.299	0.979	0	5	878
Total asset ¹	3.335	0.841	1	4	878
Legal Status ¹	2.812	0.861	1	4	878
<i>Owner Characteristics</i>					
Gender	0.197	0.397	0	1	878
Work Experience	14.585	10.559	0	40	878
Education ¹	2.976	0.936	1	4	878
Age ¹	2.564	0.975	1	4	878
Investment Amount ¹	1.614	1.032	1	4	878

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.

Table A7. Statistics of All the Variables in the Third Follow-up, 2008

Variables	Mean	S.D	Min	Max	N
<i>Dependent Variable</i>					
VC and AI	0.031	0.174	0	1	741
<i>Professionalization Variables</i>					
Bonus	0.286	0.452	0	1	741
Flexible Time	0.687	0.464	0	1	741
Health Plan	0.334	0.472	0	1	741
Paid Sickness	0.353	0.478	0	1	741
Paid Vacation	0.430	0.495	0	1	741
Retirement Plan	0.214	0.410	0	1	741
Stock Option	0.079	0.271	0	1	741
<i>Firm Characteristics</i>					
HR	0.795	0.827	0	5	741
Sales	1.528	1.283	0	5	741
R&D	1.047	1.121	0	5	741
Financing	1.078	0.839	0	5	741
Administration	1.367	1.034	0	5	741
Total asset ¹	3.515	0.627	1	4	741
Legal Status ¹	2.777	0.835	1	4	741
<i>Owner Characteristics</i>					
Gender	0.210	0.407	0	1	741
Work Experience	14.886	10.554	0	40	741
Education ¹	2.932	0.933	1	4	741
Age ¹	2.545	0.980	1	4	741
Investment Amount ¹	1.526	0.982	1	4	741

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.

Table A8. Statistics of All the Variables in the Fifth Follow-up, 2009

Variables	Mean	S.D	Min	Max	N
Dependent Variable					
VC and AI	0.040	0.196	0	1	599
Professionalization Variables					
Bonus	0.389	0.462	0	1	599
Flexible Time	0.696	0.460	0	1	599
Health Plan	0.346	0.476	0	1	599
Paid Sickness	0.362	0.481	0	1	599
Paid Vacation	0.434	0.496	0	1	599
Retirement Plan	0.215	0.411	0	1	599
Stock Option	0.070	0.256	0	1	599
Firm Characteristics					
HR	0.758	0.778	0	5	599
Sales	1.431	1.272	0	5	599
R&D	1.036	1.186	0	5	599
Financing	1.073	0.790	0	5	599
Administration	1.327	0.988	0	5	599
Total asset ¹	3.454	0.761	1	4	599
Legal Status ¹	2.833	0.819	1	4	599
Owner Characteristics					
Gender	0.214	0.410	0	1	599
Work Experience	14.576	10.320	0	40	599
Education ¹	3.100	0.782	1	4	599
Age ¹	2.545	0.966	1	4	599
Investment Amount ¹	1.466	0.942	1	4	599

¹ The descriptive statistics reported for these variables pertain to the original categorical variable, not to the variables used in estimation.