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Start-up Financing Choice and Post-entry Performance

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Start-up Financing Choice and Post-entry Performance

Abstract

Using an original data set of start-up firms in Japan, this paper investigates whether post-entry performance differs between start-up firms, according to the source of finance. In particular, the difference among firms that used entrepreneur's own savings (insider finance), bank borrowing, and risk capital from business angels or venture capital firms is focused upon. It is found that start-up firms financed by business angels are more likely to increase sales even after controlling entrepreneur, firm, and industry characteristics. On the other hand, the use of entrepreneurs' own savings and financing from founding members and family (quasi-insider finance) negatively influence post-entry performance. In addition, it is not found that those financed by banks tend to grow.

Introduction

Start-up firms are expected to play an important role in promoting economic growth. The emergence of high-growth firms boosts the stagnated economy by enhancing job creation and stimulating innovation (e.g. Birch, 1979; Acs & Audretsch, 1990). When starting businesses, however, entrepreneurs face significant difficulty in receiving finance from financial and capital markets, because of the limited operating history of the business. Berger & Udell (1998) argued that start-up firms are the most informationally opaque and, therefore, experience great difficulty in obtaining intermediated external finance. Even though start-up firms have high growth potential, external sources of finance often do not provide sufficient funds, because of the information asymmetries between the entrepreneurs and finance providers. This results in severe financial constraints being placed on the start-up. Under the presence of information asymmetries, how firms are financed at start-up is the key to ensuring sustainable firm growth.

Needless to say, banks play a major role as the source of finance for conventional (existing) small

firms. However, as is often argued, they may be reluctant to provide funds to start-up firms due to risk aversion behavior. In their place, it is expected that venture capitalists provide risk capital. However, venture capital (VC) firms, which are funded by large scale investments from institutional investors (e.g. pension funds), are essentially negative toward small scale investment such as seed and start-up financing (Bygrave & Timmons, 1992). In addition, the VC industry in some developed countries, including Japan, is not yet fully developed for seed and start-up financing. Jeng & Wells (2000), for example, argued that VC firms in Japan and Germany are not as actively involved in managing their investments as those in the United States. They also provided evidence that VC investment normalized by average gross domestic product (GDP) in Japan is much less than in the United States and Western Europe.

For these reasons, in addition to entrepreneurs' personal savings (insider finance), entrepreneurs often depend on financing from founding members and family (quasi-insider finance), and informal investors such as business angels, at the very earliest stage for developing business plans or products (Harrison & Mason, 1997; Benjamin & Margulis, 2000; Van Osnabrugge & Robinson, 2000). Under the presence of information asymmetries, informal investors play a more important role as external capital providers of initial funds, as opposed to banks (Peterson & Shulman, 1987; Berger & Udell, 1998). However, many small business owner-managers are opposed to sharing ownership, either with financial institutions or with other individuals, and so depend on founders' own capital or debt financing

(Hamilton & Fox, 1998). This may constitute a constraint upon the growth of the business. Previous literature indicates that fast-growth small businesses are willing to share equity (Storey, 1994b).

This paper explores the impact of start-up financing on post-entry performance. In particular, the paper highlights the difference between start-up firms, according to the source of finance. Using data obtained from an original questionnaire survey, we examine whether start-up financing choice significantly affects firm growth. The results suggest that start-up firms financed by business angels are more likely to increase sales, while those financed by banks are not found to achieve firm growth. Also, the use of entrepreneurs' own savings (insider finance) and financing from founding members and family (quasi-insider finance) negatively influence post-entry performance. We begin with a literature review on start-up financing and post-entry performance, and present hypotheses we test.

Literature Review and Hypotheses

Berger & Udell's (1998) financial growth cycle model, the most widely accepted view of small business capital structure, contended that changes in optimal capital structure are a function of firm size, age, and information availability. Although the differences among firms in these three factors are relatively negligible at the start-up stage, start-up capital structures and post-entry performance are very different among firms.

Regarding "existing" small firms, a large amount of research empirically examines how the financial behavior of small firms is influenced by size, age, firm type, business sector, etc., and how

financial behavior influences small firm performance (e.g. Van der Wijst & Thurik, 1991; Hutchinson, 1993; Chaganti et al., 1995; Chittenden et al., 1996; Michaelas et al., 1999; Lopez-Gracia & Aybar-Arias, 2000; Romano et al., 2000; Reid, 2003). On the other hand, there have been relatively few investigations of the relationship between start-up financing choice and post-entry performance. Although Brophy & Shulman (1992) pointed out that the determination of appropriate capital structure for entrepreneurial firms is one of the potentially useful areas related between finance theory and entrepreneurship, empirical research regarding "start-up capital structure" has not been advanced. In addition, most research regarding start-up financing has concentrated on the investigation of the determinants of capital structure and types of financing used at start-up (e.g. recent work, Cassar, 2004). The main purpose of this paper is to advance start-up financing research by examining how the start-up financing choice influences post-entry performance.

Star-up Financing Choice and Performance

Previous literature has discussed the relationship between the proportion of the value of a firm retained by insiders (e.g. managers) and the insiders' perception of the likelihood of success. Leland & Pyle (1977) assumed that entrepreneurs know the likelihood of success of their firms and that potential investors do not. In their theoretical model, entrepreneurs retain a significant ownership interest only if the future cash flows of their firms are expected to be high relative to current firm value. Based on their model, the following hypothesis is introduced, where the greater the proportion of the value of a firm

retained by entrepreneurs, the greater the entrepreneurs' perception of the likelihood of it success. Carter & Van Auken (1990) empirically examined this hypothesis by analyzing the relationship between entrepreneur's personal equity and their small business first year's financial difficulties. Their results show a significant negative relationship between first year financial difficulties and the percentage of start-up capital represented by the entrepreneur's personal funds.

Hypothesis 1a: The use of entrepreneur's own saving (insider financing) at start-up is positively related to post-entry performance.

Hypothesis 1b: The use of external financing from founding members and family (quasi-insider finance) is positively related to post-entry performance.

Regarding the effects of bank financing on post-entry performance, Åstebro & Bernhardt (2003) pointed out that there are three reasons to be expected as a positive predictor of performance. First, securing a bank loan relaxes financial constraints on investment. Second, securing a bank loan may increase a company's credibility with suppliers and customers. Third, the existence of a bank loan may indicate the qualities of the owners and the company. They examined the survival of new small businesses and bank loans, and found that there is a "negative" correlation between having a bank loan and business survival. However, having a bank loan is, *ceteris paribus*, a significant "positive" predictor of the survival of start-up firms. On the other hand, Storey (1994a) pointed out that the current

employment size of new firms is not related to whether or not the firm uses bank finance at start-up. Although these empirical results are somewhat mixed, we introduce the following hypothesis based on reasons and empirical results indicated by Åstebro and Bernhardt (2003).

Hypothesis 2: The use of bank loan at start-up is positively related to post-entry performance.

According to Modigliani & Miller (1958), in a frictionless capital market, the source of finance (debt-equity capital structure) has no influence on the performance of start-up firms. However, heavy usage of debt by start-up firms may deter them from growth, because their cash flows are unstable and the cost of debt financing is high. Davidson & Dutia (1991) indicated that the heavy usage of debt is an important factor explaining the lower profitability of small firms. In addition, Fu et al. (2002) examine the relationship between profitability and financial capital for small firms in Taiwan. When financial capital is further divided into debt and equity, the results show a significantly positive relationship between profitability and equity financing, but a significantly negative relationship between profitability and debt financing. Based on these empirical results (although these are focused not on start-up firms but on existing small firms), the following hypothesis is introduced.

Hypothesis 3: The ratio of debt financing to total money raised at start-up is negatively related to post-entry performance.

As discussed, because of the presence of information asymmetries, informal investors play a more

important role as external capital providers of initial funds, and finance structure may affect the post-entry performance of start-up firms. Fenn & Liang (1998) pointed out that private equity for rapidly growing small businesses is raised primarily from the organized VC market and the informal market, which is comprised of high net worth individuals or business angels. Furthermore, Davila et al. (2003) examine the association between the presence of VC and the employment growth of start-ups. They indicated that the number of employees increases in the months prior to the VC funding round and further increases during the months afterwards.

Hypothesis 4: The use of angel and VC financing at start-up is positively related to post-entry performance.

Data and Methodology

Data Collection

We attempted to construct an original data set through a questionnaire survey named *Survey on the Management of Start-ups in Japan* (*Wagakuni Start-up Kigyo no Keiei Jittai ni Kansuru Chosa*). Using this survey, we constructed a sample to estimate the post-entry performance of start-up firms. The name and address list for the survey was obtained from Tokyo Shoko Research, Ltd., a major credit investigation company in Japan, in December 2001. The list consists of 5684 firms founded in the manufacturing and information service industries during 1995-1997. However, 223 questionnaires were returned to us because the address was unknown (thus questionnaires were sent to 5461 start-up firms). The data set of this survey comprised of 1045 firms, which are joint-stock corporations or private limited companies in

the Japanese manufacturing and information service industries (response rate was 19.1%). Since some firms had been founded before or after the observation period, 1995-1997, or could not be regarded as founded during the period, they were excluded from the sample. In addition, firms from industries other than the manufacturing and information service industries were excluded. As a result, the number of observations is 848. Furthermore, since all the firms did not necessarily answer all the questions, the number of observations depends on the question.[1]

To conduct the empirical examination of the four aforementioned hypotheses, we employ a multiple regression model on the determinants of post-entry performance based on start-up financing.

Dependent Variables

As a measure for the performance of firms, the growth rates of employment and sales are used. In the survey, we inquired about the numbers of employees and board members both at that time and at start-up, respectively. Some small firms do not have any employees, and instead board members often play a role as employees. In this case, board members may be able to be counted as employees. In the case of firms with no employees (only with board members acting as employees), the growth rate cannot be defined. In this paper, therefore, employment size is measured by the number of employees

[1] Although we could not conduct a strict response bias check, we checked whether there are biases in the distribution of industrial sectors (two-digit Standard Industrial Classification Codes) or locations (prefectures), based on the comparison between our sample, and the *Census of Manufactures* and *Survey on Specified Service Industries: Information Services* data. As a result, there seemed to be bias in the distribution of several sectors (e.g. printing and chemical) and locations (e.g. Hiroshima prefecture).

plus board members. The growth rate of employment is defined as the difference of the logarithms of employment sizes between the periods, divided by firm age. On the other hand, we inquired about sales for the preceding three years. The growth rate of sales is defined as the difference of the logarithms between the two years (i.e. sales 3 years prior and 1 year prior to the survey year), divided by two. Table 1 shows the growth rates of employment sizes and sales, respectively. On average, the employment growth rate is 7.3% (median is 4.1%).[2]

[Table 1 here]

Independent Variables

Table 2 shows which source was used for initial funds in the sample. In Table 2, about 80% of the start-up firms have utilized personal savings of the entrepreneur. Approximately 37% and 15% of the start-up firms have utilized financing from founding members and the family of the entrepreneur, respectively. On the other hand, 12.5% have used commercial banks in start-up financing, and the rate of funds financed by commercial banks is approximately 7% of initial funds. In addition, about 6% have used public financial institutions in start-up financing, and the rate of funds financed by public financial institutions is approximately 3% of initial funds. Furthermore, about 11% of the start-up firms have utilized financing from private companies, and the rate of funds financed by them is at the relatively

[2] Even when deflation has occurred during the period, the average sales growth rate is maintained at 9.9% (median is 6.4%). There remains, however, the upward bias in the following estimation, since exits have been excluded from the sample. Although it was important to control the bias, the survey could not cover exits.

high level of 6.8% of initial funds.

Among the start-up firms, 6% have utilized business angels, and only 0.8% have used VC firms. As mentioned before, many small business owner-managers are negative toward sharing ownership. Furthermore, business angels and venture capitalists have a strict screening process. Thus, angel and VC financing represent relatively small portions of small business finance. This is consistent with Berger & Udell (1998), which showed that the percentages of angel and VC finance of total finance are 3.59% and 1.85%, respectively.

[Table 2 here]

Regarding start-up financing choice, eight dummy variables are included in the regression model. *Entsaving*, *Fmember*, and *Family* are dummy variables for firms which are financed by personal savings of the entrepreneur, founding members, and family of the entrepreneur, respectively. *Bank*, *Pubfinance*, and *Company* are dummy variables for firms which are financed by commercial banks, public financial institutions, and private companies, respectively. Furthermore, *Angel* and *VC* are dummy variables for firms which are financed by business angels and VC firms, respectively.

Regarding the debt financing ratio at start-up, we cannot obtain accurate data from our survey. However, main debt financing for Japanese start-up firms consists of financing from private commercial banks and public financial institutions (these private and public banks seldom share equity with start-up firms). Thus, in our analysis, the ratio of borrowing from private commercial banks plus public financial

institutions to total money raised at start-up (*Ratio_Bank&Pub*) is used to measure the debt financing ratio at start-up.

Control Variables

Previous studies have examined the effects of entrepreneur, firm, and industry characteristics on start-up financing and post-entry performance. Thus, we examine the relationship between start-up financing choice and post-entry performance by controlling these characteristics.

Entrepreneur Characteristics

Scherr et al. (1993) found that the percentage of the owner's income expected to be derived from the business is positively associated with external financing (debt use), and the owner's age is negatively associated with debt use. Furthermore, using a large sample of UK start-ups, Cressy (1996a) indicates that business income targets in practice constitute significant motivation for start-up growth, and that human capital represented by age plays no additional role. Cressy (1996b) demonstrates that human capital is the 'true' determinant of survival and that the correlation between financial capital and survival is spurious. Although we cannot obtain data on business income targets from our survey, it is possible for us to use data regarding the entrepreneur's IPO intention as motivation for firm growth. The entrepreneur's IPO intention might be also regarded as a business income target.

Regarding entrepreneur-specific characteristics, *Ln_Fage* is the logarithm of the entrepreneur's age at start-up. *IPO-oriented* is a dummy variable for entrepreneurs who wish to go public. In addition to

these two variables, two variables are included in the regression model to control differences of entrepreneurs' characteristics. *University* is a dummy variable for entrepreneurs who have graduated from university or post-graduate school. Strictly speaking, entrepreneurs who dropped out during their university or post-graduate degree are included, and are regarded as having graduated from where they last enrolled. *Founder* is a dummy variable for the entrepreneur who is an original founder of the firm. In our sample, both an original founder of the firm and a successor of the firm are included.[3]

Firm Characteristics

Regarding firm-specific characteristics, Colombo & Grilli (2005) examined the role of external financing in influencing start-up size, and found that bank debt-financed firms are not larger than firms created only through founders' personal savings. Regarding the relationship between start-up size and post-entry performance, Audretsch (1995) and Audretsch et al. (1999) indicated growth rates are negatively related to start-up size. In order to investigate this relationship, *Ln_Startsize_emp* is defined as the logarithm of the number of employees plus board members at start-up in the regression analysis of employment growth. On the other hand, we inquired about sales only for the last accounting year and its preceding two years, and *Ln_Startsize_sales* is defined as the logarithm of sales two years prior in the regression analysis of sales growth.

[3] Some previous researches examine the differences of performance between male and female entrepreneurs (e.g. Watson, 2002), and between novice and serial entrepreneurs (e.g. Westhead & Wright, 1998). However, female and serial entrepreneurs represent only small percentages of our sample. Thus, we do not examine these effects on performance in the following analysis.

In addition, independent firms and non-independent firms such as spin-offs and family businesses are included. *Independent* is a dummy variable for independent firms. Similarly, our sample firms are legally classified into joint-stock corporations or private limited companies. *Corporation* is a dummy variable for joint-stock corporations.

Industry Characteristics

Regarding the relationship between industry characteristics and performance, Robinson (1998) found that the stage of the life cycle of the venture's entered industry was the most important determinant of new venture performance among the four industry structural elements examined. The other three elements, i.e. industrial concentration, entry barriers, and product differentiation did not have a statistically significant relationship with performance.

Thus, in addition to entrepreneur-specific and firm-specific characteristics, the variable *Industry growth*, measured by both employment growth and sales growth, is included in the regression model. While the *Census of Manufactures* covers establishments with 4 or more persons employed, it is conducted on all sized establishments only in 1998, 2000, and 2003 after their foundation years, 1995-1997. Since the effects of small-sized establishments on industry growth cannot be ignored when the post-entry performance of start-up firms are examined, industry growth is measured with data from 1998-2000. *Industry growth_emp* measured by employment growth is used in the regression analysis of employment growth, while *Industry growth_sales* measured by sales growth is used in the regression analysis of sales

growth. Each variable is defined as the difference between the logarithms of employment figures and sales during 1998-2000, using the *Census of Manufactures* and *Survey on Specified Service Industries: Information Services*. For industry growth control, 25 industry groupings based mainly on two-digit SIC Codes, including medical preparations, computer software products, and information services were created, and the growth rates of employment and sales in each industry were computed. Finally, two year dummy variables *Cohort 1995* and *Cohort 1996* are included to control macro-economic conditions.

[Table 3 here]

The descriptive statistics and the correlation matrix of the independent and control variables on employment growth are indicated in Table 3 (not shown on sales growth). As expected, the correlation between *Bank* and *Ratio_Bank&Pub* and *Pubfinance* and *Ratio_Bank&Pub* are at the high level of 0.797 and 0.519, respectively. Thus, we estimate different models to control the possibility of multicollinearity between these variables in the following regressions.

Empirical Results on Performance

Univariate Analysis

We show the difference in firm growth, according to the source of finance. Tables 4 and 5 present the employment and sales growth, respectively, and provide *t*-statistics to show the difference of the source of finance. In Table 4, the employment growth of start-up firms financed by business angels significantly differs from that of the others, indicating that those financed by business angels are more

likely to grow. This tendency is also found in the sales growth at the 1% significance level in Table 5. On the other hand, the average and median growth rates of start-up firms financed by VC firms are larger than the others, but the difference is not significant, partly because the number of start-up firms financed by VC firms is not notably large. When VC financing is included in angel financing, it is found that firms financed by business angels or VC firms are more likely to increase employment and sales compared to firms that do not receive such financing, and the difference is fairly significant.

Moreover, financing through entrepreneurs' own savings does not affect firm growth, even when financing from the board members and employees or family of entrepreneurs is included. Furthermore, it is not found that bank financing or public support financing significantly affects firm growth.

[Table 4 and Table 5 here]

In Tables 4 and 5, we also provide the results with the Mann-Whitney z-statistics to take into account a non-parametric test. Even when the non-parametric test is employed, it is found that start-up firms financed by business angels are more likely to increase employment and sales. The results also support the positive relationship between firm growth and angel financing. However, the firms financed only by VC firms are not found to grow significantly. As discussed, the ratio of the VC-backed firms is low, and, hence, there is the possibility that the results are brought about due to an insufficient sample size. As a result of our findings, business angels providing initial funds to start-up firms play a significant role in achieving high firm growth. The findings imply that business angels pay more attention to

monitoring the growth potential of start-up firms compared to other individuals.

Multivariate Analysis: OLS Regressions

As shown in Tables 4 and 5, the positive relationship between firm growth and angel financing is seen. Business angels and VC firms appear to invest in growing industries, such as information technology. On the other hand, post-entry performance is affected not only by firm-specific characteristics but also by entrepreneur-specific characteristics, since start-up firms tend to be small. In addition, industry-specific characteristics may have an impact on post-entry performance. Therefore, we estimate the relationship between firm growth and angel financing, by controlling the effects of industry growth, and entrepreneur-specific and firm-specific characteristics.

[Table 6 here]

Table 6 shows the relationship between firm growth and financing choice at start-up, by using OLS regression models. Although we only show results by using financing choice dummies, empirical results are stable even if financing percentages (i.e. the ratio of funds financed by each source to all funds) are used. In order to take into account the heterogeneity of variances, White's (1980) heteroschedasticity-consistent estimator is employed. As shown in Table 6, angel financing has a positive impact on sales growth, which indicates that start-up firms financed by business angels are more likely to increase sales. However, the relationship is not found in employment growth. In addition, there is a tendency that entrepreneurs' own savings (insider finance) and financing from founding members

and family (quasi-insider finance) negatively affect post-entry performance. In particular, financing from founding members and family negatively affect post-entry employment growth. The use of bank borrowing and debt financing does not affect performance. Interestingly, financing by private companies positively affect post-entry performance for both employment and sales growth.

Regarding entrepreneur-specific characteristics, the coefficient of *IPO-oriented* is positively significant, which indicates that entrepreneurs who wish to go public increase employment and sales. In line with suggestions by Cressy (1996a), the intention to go public (IPO intention) may constitute significant motivation for start-up growth. Other variables such as *Ln_Fage*, *University*, and *Founder* are not statistically significant, although there is a tendency that young entrepreneurs, entrepreneurs who have graduated from university or post-graduate school, and successors of start-up firms (not original founders) increase employment and sales.

Regarding firm-specific characteristics, start-up size negatively affects post-entry employment and sales growth. Furthermore, independent firms and spin-off firms tend to increase employment. The results also show that joint-stock corporations achieve higher employment growth than private limited companies. The legal form of a private limited company in Japan presumably is introduced under the premise that a private limited company is not publicly traded but privately held. As expected, the behavior and strategies of start-up firms are different between the two legal forms, and joint-stock corporations have more intention to achieve growth than those of privately limited companies. This

result is consistent with Storey (1994a). Finally, regarding industry-specific characteristics, it is found that industry growth has a positive impact on performance, in particular employment growth.

Conclusion, Discussion, and Limitations

This paper investigated whether post-entry performance differs between start-up firms, according to the source of finance. Using an original data set of start-up firms in Japan, we examined the impact of start-up financing choice on firm growth. As a result, it was found that angel financing has a positive impact on sales growth, when we estimate the relationship between firm growth and start-up financing choice by controlling the effects of industry growth, and entrepreneur-specific and firm-specific characteristics (H4 is accepted). On the other hand, the use of entrepreneurs' own savings and financing from founding members and family "negatively" influences post-entry performance, opposed to our expectation (H1 is not accepted). Our empirical results may suggest that Leland & Pyle's theoretical model, which assumes that entrepreneurs know the likelihood of success of their firms and that potential investors do not, is not applicable to start-up financing. Furthermore, it was not found that start-up firms financed by banks tend to grow (H2 is not accepted). The ratio of debt financing from private banks and public financial institutions is not related to the performance (H3 is not accepted).

With respect to the different impact of bank financing and angel financing on firm performance, there are two possibilities. One possibility is that the difference in impact of each financing method is

due to the difference of "priority" in their screening and monitoring process. As it is necessary for business angels to harvest their own investment, business angels tend to pay more attention to the growth potential of start-up firms. On the other hand, as it is not necessary for banks to harvest their own investment when making loans, banks seem to be more concerned with the stability of start-up firms, rather than growth potential.

Another possibility is that the difference in impact of each financing method is due to the difference of "ability" in their screening and monitoring process. As previous literature has pointed out, business angels have high abilities in screening and monitoring start-up firms (e.g. Harrison & Mason, 1997; Benjamin & Margulis, 2000; Van Osnabrugge & Robinson, 2000). On the other hand, banks, and in particular Japanese, banks have been negative toward start-up financing, and thus banks do not have high abilities in screening and monitoring start-up firms.

Although this paper has important implications for researchers, entrepreneurs, and policy makers, it does have a number of limitations and needs to be further researched. First, in our questionnaire survey, debt and equity for each financing method are not differentiated to avoid the complexity of the questionnaire. In addition, exits during the observation period are not included in the survey. Previous literature has pointed out that the sample selection bias occurs without exits, but we cannot take into account the issue of the sample selection bias, because the survey does not provide data on exits.[4]

[4] However, even if we obtain data on exits, we encounter another difficulty in estimating regression equations for firm growth and survival with the sample selection correction method. As Leung & Yu

Second, regarding the difference in impact on employment and sales growth, sales can be seen as a direct measurement of growth for both entrepreneurs and providers of funds, whereas a change in employment is a less direct measurement of growth. The difference in impact on employment and sales growth in addition to accurate measurements of performance as investigated by Murphy et al. (1996) needs to be further examined.

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(1996) argued, the sample selection correction method is susceptible to collinearity problems. In particular, Puhani (2000) showed that the subsample ordinary least squares (OLS) method performs better than the sample selection correction method, if collinearity problems between two regression equations are preset. In order to estimate the firm growth and survival equations, Honjo (2004) used not only the sample selection correction method with exits, but also the subsample OLS method without exits, and obtained similar results from both methods.

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Table 1 Descriptive statistics of firm growth

Growth rate (per year)	Obs.	Mean	Median	S.D.	Min.	Max.
Employment	796	0.073	0.041	0.124	-0.389	0.816
Sales	705	0.099	0.064	0.307	-1.301	1.488

In the survey, we inquired about the numbers of employees and board members both at that time and start-up, respectively. In this paper, employment size is measured by the number of employees plus board members. The growth rate of employment is defined as the difference of the logarithms of employment sizes between the periods, divided by firm age. On the other hand, we inquired about sales for the preceding three years. The growth rate of sales is defined as the difference of the logarithms between the two years (i.e. sales 3 years prior and 1 year prior to the survey year), divided by two.

Table 2 Descriptive statistics of start-up financing

	Source of finance	Usage	Ratio	
		Mean	Mean	S.D.
(a)	Personal savings of the entrepreneur	0.809	0.518	0.384
(b)	Loans and investments from founding members who are directors or employees apart from the entrepreneur	0.373	0.143	0.240
(c)	Loans and investments from the family of the entrepreneur	0.148	0.052	0.158
(d)	Loans and investments from business angels	0.059	0.022	0.113
(e)	Loans and investments from private companies	0.114	0.068	0.224
(f)	Loans and investments from venture capital firms	0.008	0.004	0.048
(g)	Loans and investments from commercial banks	0.125	0.066	0.202
(h)	Loans and investments from public financial institutions	0.059	0.026	0.120
(i)	Subsidies from the government and local governments	0.032	0.009	0.064
(j)	Leases, loans and bills for investment	0.042	0.014	0.082
(k)	Others	0.096	0.079	0.260

Note: The number of observations is 761. 'Usage' indicates the rate of the firms using the financial source to the sample firms. 'Ratio' indicates that the rate of funds financed by the source to all the funds in the sample.

Table 3 Descriptive statistics and the correlation matrix of the independent and control variables

Variables	Obs	Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) Entsaving	647	0.810	0.393	0	1	1.000																		
(2) Fmember	647	0.389	0.488	0	1	0.258	1.000																	
(3) Family	647	0.147	0.354	0	1	0.101	0.000	1.000																
(4) Bank	647	0.114	0.319	0	1	-0.185	-0.098	-0.026	1.000															
(5) Pubfinance	647	0.059	0.235	0	1	-0.013	-0.011	-0.011	0.220	1.000														
(6) Company	647	0.121	0.326	0	1	-0.341	-0.033	-0.020	0.091	-0.052	1.000													
(7) Angel	647	0.065	0.247	0	1	0.064	0.073	0.103	-0.055	-0.039	0.037	1.000												
(8) VC	647	0.008	0.088	0	1	-0.092	-0.071	0.063	-0.032	-0.022	0.076	0.048	1.000											
(9) Ratio_Bank&Pub	647	0.088	0.233	0	1	-0.208	-0.091	-0.055	0.797	0.519	0.043	-0.071	-0.033	1.000										
(10) Ln_Fage	647	3.829	0.235	3.045	4.317	-0.155	0.033	-0.102	0.086	0.064	0.148	-0.065	-0.005	0.072	1.000									
(11) IPO-oriented	647	0.229	0.420	0	1	0.067	0.123	0.003	-0.057	-0.042	0.024	0.066	0.078	-0.088	-0.121	1.000								
(12) University	647	0.490	0.500	0	1	-0.069	-0.060	-0.031	-0.003	-0.034	0.159	0.056	0.019	-0.035	-0.017	0.173	1.000							
(13) Founder	647	0.794	0.404	0	1	0.387	0.140	0.092	-0.070	0.013	-0.188	0.103	0.045	-0.033	-0.284	0.113	-0.091	1.000						
(14) Ln_Startsize_emp	647	1.990	0.902	0	6.428	-0.325	-0.027	-0.105	0.117	-0.050	0.267	-0.038	0.016	0.066	0.351	-0.044	0.032	-0.357	1.000					
(15) Independent	647	0.555	0.497	0	1	0.335	0.154	0.090	-0.049	0.052	-0.213	0.122	-0.063	-0.012	-0.253	0.118	-0.124	0.383	-0.443	1.000				
(16) Corporation	647	0.692	0.462	0	1	-0.161	0.127	-0.140	0.040	0.010	0.216	0.067	-0.018	0.007	0.129	0.243	0.191	-0.107	0.336	-0.152	1.000			
(17) Industry growth_emp	647	-0.033	0.023	-0.114	-0.004	0.061	0.071	-0.074	0.003	0.001	0.037	-0.027	0.001	-0.009	-0.093	0.107	0.042	0.111	-0.109	0.066	0.029	1.000		
(18) Cohort 1995	647	0.314	0.464	0	1	0.005	-0.035	-0.008	0.050	0.044	-0.025	-0.070	-0.022	0.060	0.018	0.005	-0.030	-0.043	-0.026	0.049	-0.011	0.021	1.000	
(19) Cohort 1996	647	0.345	0.476	0	1	-0.022	0.021	0.021	0.087	0.040	0.021	0.047	-0.027	0.061	0.012	0.000	0.018	0.015	0.080	-0.018	0.075	-0.029	-0.490	1.000

Table 4 Comparison of the employment growth rate

Source	Usage	No.	Mean	Median	t-stat.	z-stat.
(a) Entrepreneur	no	139	0.080	0.035	0.254_{w}	-0.736
	yes	580	0.076	0.048		
(a) Entrepreneur + (b) Founding members	no	121	0.085	0.048	0.648_{w}	-0.316
	yes	598	0.075	0.048		
(a) Entrepreneur + (c) Family	no	130	0.083	0.042	0.518_{w}	-0.452
	yes	589	0.076	0.048		
(a) Entrepreneur + (b) Founding members + (c) Family	no	114	0.088	0.052	0.885_{w}	-0.006
	yes	605	0.075	0.048		
(d) Angel	no	675	0.075	0.045	-2.017^{**}	-2.720^{***}
	yes	44	0.114	0.100		
(e) Private company	no	636	0.073	0.042	-2.236^{**}	-2.644^{***}
	yes	83	0.111	0.073		
(f) VC	no	714	0.077	0.048	-1.013	-1.065
	yes	5	0.134	0.231		
(d) Angel + (f) VC	no	671	0.074	0.044	-2.343^{**}	-3.010^{***}
	yes	48	0.118	0.108		
(g) Bank	no	630	0.078	0.048	0.639	0.398
	yes	89	0.069	0.052		
(h) Public finance	no	678	0.078	0.048	0.825	0.929
	yes	41	0.061	0.020		
(g) Bank + (h) Public finance	no	607	0.079	0.048	1.040	0.798
	yes	112	0.066	0.045		
(h) Public finance + (i) Subsidy	no	657	0.078	0.048	0.559	0.741
	yes	62	0.068	0.024		

Note: No. indicates the number of observations, and the total number of observations is 719. T-stat. indicates a statistic for the two-comparison mean test. When the hypothesis that the variances are equal between the two samples is rejected at the 1% significance level, Welch's formula is used, which is indicated by w. Z-stat. indicates the Mann-Whitney two-sample statistic. *** and ** indicate the 1% and 5% significance level, respectively.

Table 5 Comparison of the sales growth rate

Source	Usage	No.	Mean	Median	t-stat.	z-stat.
(a) Entrepreneur	no	125	0.125	0.074	0.858	1.078
	yes	532	0.099	0.064		
(a) Entrepreneur + (b) Founding members	no	107	0.113	0.064	0.343	0.742
	yes	550	0.102	0.065		
(a) Entrepreneur + (c) Family	no	117	0.119	0.064	0.592	0.740
	yes	540	0.101	0.065		
(a) Entrepreneur + (b) Founding members + (c) Family	no	101	0.105	0.056	0.022	0.360
	yes	556	0.104	0.067		
(d) Angel	no	616	0.095	0.059	-2.891***	-4.150***
	yes	41	0.238	0.207		
(e) Private company	no	577	0.091	0.060	-2.892***	-2.757***
	yes	80	0.197	0.117		
(f) VC	no	652	0.104	0.064	-0.165$_w$	-1.613
	yes	5	0.150	0.323		
(d) Angel + (f) VC	no	612	0.095	0.058	-2.772***	-4.340***
	yes	45	0.226	0.211		
(g) Bank	no	579	0.103	0.071	-0.243	0.766
	yes	78	0.112	0.044		
(h) Public finance	no	616	0.105	0.065	0.370	-0.184
	yes	41	0.087	0.064		
(g) Bank + (h) Public finance	no	554	0.103	0.067	-0.214	0.44
	yes	103	0.110	0.056		
(h) Public finance + (i) Subsidy	no	596	0.102	0.064	-0.539	-0.671
	yes	61	0.124	0.072		

Note: No. indicates the number of observations, and the total number of observations is 657. T-stat. indicates a statistic for the two-comparison mean test. When the hypothesis that the variances are equal between the two samples is rejected at the 1% significance level, Welch's formula is used, which is indicated by w. Z-stat. indicates the Mann-Whitney two-sample statistic. *** and ** indicate the 1% and 5% significance level, respectively.

Table 6 Determinants of firm growth (OLS regression)

Variables	Employment Growth		Sales Growth	
	Model 1	Model 2	Model 3	Model 4
Constant term	0.267 ***	0.265 ***	0.560 **	0.560 **
	0.075	*0.075*	*0.274*	*0.273*
Independent Variables				
Entsaving	-0.026 *	-0.025 *	-0.027	-0.028
	0.015	*0.015*	*0.041*	*0.040*
Fmember	-0.017 *	-0.017 *	-0.013	-0.014
	0.009	*0.009*	*0.026*	*0.026*
Family	-0.020 *	-0.019 *	-0.017	-0.017
	0.011	*0.011*	*0.035*	*0.035*
Bank	0.024		0.016	
	0.021		*0.048*	
Pubfinance	0.000		-0.024	
	0.020		*0.053*	
Company	0.043 **	0.044 **	0.104 **	0.106 **
	0.017	*0.017*	*0.040*	*0.041*
Angel	0.014	0.014	0.110 ***	0.110 ***
	0.013	*0.013*	*0.041*	*0.041*
VC	0.017	0.016	-0.019	-0.020
	0.080	*0.080*	*0.273*	*0.273*
Ratio_Bank&Pub	-0.043	-0.017	0.034	0.037
	0.031	*0.018*	*0.089*	*0.051*
Control Variables				
Ln_Fage	-0.023	-0.023	-0.005	-0.006
	0.018	*0.018*	*0.061*	*0.060*
IPO-oriented	0.055 ***	0.056 ***	0.072 **	0.072 **
	0.012	*0.011*	*0.032*	*0.032*
University	0.009	0.009	0.021	0.022
	0.009	*0.009*	*0.025*	*0.025*
Founder	-0.001	-0.001	-0.020	-0.020
	0.013	*0.013*	*0.034*	*0.034*
Ln_Startsize_emp	-0.055 ***	-0.054 ***		
	0.006	*0.006*		
Ln_Startsize_sales			-0.048 ***	-0.048 ***
			0.014	*0.014*
Independent	0.009	0.009	0.011	0.011
	0.010	*0.010*	*0.029*	*0.029*
Corporation	0.077 ***	0.078 ***	0.066 *	0.065 *
	0.011	*0.011*	*0.034*	*0.034*
Industry growth_emp	0.678 ***	0.684 ***		
	0.178	*0.177*		
Industry growth_sales			0.222	0.218
			0.247	*0.218*
Cohort 1995	-0.023 **	-0.023 **	-0.069 **	-0.069 **
	0.011	*0.011*	*0.031*	*0.031*
Cohort 1996	-0.024 **	-0.024 **	-0.028	-0.027
	0.011	*0.011*	*0.030*	*0.030*
Number of observations	647	647	600	600
R-squared	0.295	0.294	0.102	0.102

Note: Upper and lower (italicized) figures indicate coefficients and standard errors, respectively. ***, ** and * indicate the 1%, 5% and 10% significance level, respectively.