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Procedia Computer Science 91 (2016) 114 – 121

**Procedia**  
Computer Science

Information Technology and Quantitative Management (ITQM 2016)

# Venture capital, financial leverage and enterprise performance

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## Abstract

This paper aims to study the relationship among venture capital (VC), financial leverage and enterprise performance by empirical study, utilizing the data from China's GEM (Growth Enterprises Market) listed companies of 2010-2014. The empirical results show that: VC is positively related to enterprise performance, and financial leverage is negatively correlated with corporate performance; Moreover, further research indicates that this negative relationship becomes larger and more significant in the VC-backed firms by introducing the cross term of VC and financial leverage.

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Peer-review under responsibility of the Organizing Committee of ITQM 2016

*Keywords:* Financial leverage, Venture capital, Enterprise performance, GEM;

## 1. Introduction

Enterprise's financing and its influence on the enterprise performance, which determine the survival and development of the enterprise, have always been a hot topic of research. Venture capital (hereafter VC) and debt financing are important external financing modes for innovative enterprises, and they are of great significance for enterprises to obtain the funds needed for the production and operation. VC is a new type of financing. It plays a more and more important role in small and medium-sized enterprises, especially in technological innovative ones. VC can provide financial and management support for the enterprise, so as to promote the growth of its performance [1]. However, as a part of the VC institutions are keen on the Pre-IPO projects, the impact of VC on the enterprise performance is uncertain [2]. The financing way can affect the enterprise performance by influencing the proportion of financial leverage. There are more and more literature to research the relationship between financial leverage and firm performance, but the conclusions are quite different [3], which needs further study.

With the establishment of China's GEM in 2009, a large number of small and medium-sized enterprises with high growth potential come into the plate. Many of these companies want to use VC and debt financing to achieve their rapid growth. But the relationship among VC, financial leverage and firm performance has not yet reached a unified conclusion. In this paper we combine VC and financial leverage to study their impact on firm

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performance by selecting the GEM listed companies as the research sample, so as to help the enterprises to make the financing decision and ultimately improve their performance.

## 2. Literature Review And Hypotheses

### 2.1. The influence of VC on firm performance

What are the effects of VC on firm performance? At present, scholars hold two different views: one is that VC plays a positive role in promoting the performance of enterprises and most of the relevant literature supports this view. VC could not only provide the necessary funds for the development of the invested companies, but also enhance the value of the enterprises by participating in decision-making, improving the governance of corporations, optimizing the allocation of resources [4]. Jain and Kini [5] found that, although after the IPO the companies all had experienced decline in performance, but the operating performance of VC-backed companies was significantly better than non-VC-backed ones. Brav and Gompers [6] showed that if all the returns were equally treated, the return of VC-backed companies was better than the ones that did not have the background of VC in the five years after the IPO. Tan and Yang [7] pointed out that VC had a positive impact on the long-term performance of the independent innovative SMEs of China. Based on the data obtained from China's GEM during the period from 2009 to 2013, Xiu and Xia [8] reported that the exit of VC would have a negative impact on enterprise performance, enterprise performance would significantly decrease after the venture capital exited, which proved the positive effect of venture capital on improving enterprise performance from the side. Xu et al. [9] found that the entry and participation of VC can significantly improve the IPO performance of enterprises.

Another view is that, compared to non-VC-backed enterprises, there is no increase in the performance of VC-backed ones or the performance of these companies will be even worse. Using the data from Australian listed companies, Rosa et al. [10] reported that VC backed listed companies and non VC backed ones got the same profits within 2 years of post-IPO, the result showed that there was no obvious difference between the two types. Wang et al. [11] found that in the Singapore market, the operating performance of VC-backed firms was worse than that of non-VC-backed ones during the time of IPO and post-IPO. Besides, there was no significant difference between the two types of companies. Using the method of empirical analysis, Tan et al. [12] found that VC had no significant positive impact on IPO underpricing, listing costs, R&D investment of enterprises. In terms of long-term operating performance, excess returns, VC-backed firms were significantly worse than non-VC-backed ones. Hou [13] empirically tested the impact of VC and its characteristics on entrepreneurial performance from three perspectives of investment return, profitability and growth. The regression results showed that venture capital and its participation duration had negative effect on performance and profitability of the companies, and had no significant effect on the companies' growth.

As the GEM listed corporations are mostly companies with high growth potential, these companies are more likely to get the favor of venture capital institutions, so as to obtain the necessary capital and other value-added services provided by VC. What's more, the majority of the literature supports the view that VC contributes to the growth of the company and improve the performance of it, therefore we put forward the hypothesis 1:

H1: There is a significant positive correlation between VC and enterprise performance. That is, compared with the non-VC-backed enterprises, VC-backed ones have better performance.

### 2.2. The impact of financial leverage on firm performance

Although many scholars have studied the relationship between financial leverage and corporate performance, but they have failed to get a consensus, and the research conclusions are quite different. Some scholars believe that financial leverage is positively related to corporate performance. Debt financing could reduce the free cash

flow of enterprises, thus increasing the value of the company [14]. The increase of corporate debt ratio could reduce the agency costs associated with external equity [15].

Another part of the scholars believe that the financial leverage and corporate performance are negatively correlated. When companies had more growth opportunities, the companies would take a more conservative financial leverage policy, growth opportunities and debt ratios showed a reverse relationship [16]. Fan and Qiu [17] took 21 listed corporations in Shanxi Province of China as the research objects and used regression analysis to study the relationship between financial leverage and corporate growth. The empirical results showed that the financial leverage of listed corporation in Shanxi province had an inhibitory effect on the growth of the companies. Based on the panel data of 381 small and medium-sized listed corporations in A-share market of China from 2003 to 2009, Zhang et al. [18] analyzed the influence of capital structure and corporate governance on firm performance. They found that in general debt constraints and the performance of small and medium-sized listed corporations were significantly negatively correlated.

In addition, the rest of the scholars point out that the relationship between financial leverage and corporate performance is affected by other factors. The relationship between the two is different in different conditions. Lv et al. [19] took the 2798 mixed samples from 1998 to 2001 of Shenzhen and Shanghai stock exchanges of China as the research object, to study the influence of financial leverage on the growth of listed corporations under different operating conditions. The results showed that the impact of corporate financial leverage on the growth was different under different operating performance, which was different from the results of the previous research. Wang [20] believed that the financial leverage ratio of the state-owned listed companies was negatively related to the value of the companies, but the financial leverage ratio of the private controlled listed companies was positively related to the corporate value. Yang [3] selected the data of China's A-share listed companies from 2009 to 2013 as a sample to explore the relationship among capital structure, social responsibility and corporate performance by constructing regression model of panel data, and using the generalized least squares method to estimate the panel model. The research showed that the relationship between capital structure and firm performance was regulated by the level of social responsibility: when the level of corporate social responsibility was high, the capital structure and corporate performance were negatively related, but when the level of corporate social responsibility was low, the capital structure and corporate performance were positively correlated, the effect of capital structure on enterprise performance changed with the level of social responsibility.

Through the above analysis, we can see that scholars have different opinions on the relationship between financial leverage and firm performance. But for the companies in debt, they tend to accept the investment plans of net present value of cash flows that exceeds the sum of the liability interest and investment value [21]. In addition, the companies have to not only pay a fixed interest for the debt capital, but also repay the principal in accordance with the terms of the agreement. The debt capital lacks financial flexibility and it is a fixed financial burden for the enterprises. Accordingly,

H2: There is a significant negative correlation between financial leverage and enterprise performance.

### *2.3. The joint effect of VC and financial leverage on firm performance*

At present, no scholar combines VC and financial leverage to study how the corporate performance will change under the combination of the two. But as the two important sources of capital, VC and debt capital can meet the enterprises' needs for development funds, and ensure sustainable development of enterprises, so as to enhance the enterprise performance. In view of VC can provide financial support and management support for the invested enterprises, and it is conducive to the growth of enterprises, we predict that: the impact of financial leverage on the performance of VC-backed companies is more significant than that of non-VC-backed companies. Thus, we offer the following hypothesis:

H3: Compared to non-VC-backed companies, in VC-backed ones, the negative impact of financial leverage on corporate performance is greater and more significant.

### 3. Research method

#### 3.1. Sample and Data Collection

VC participation is a major feature of the GEM listed companies. In this paper, we selected the GEM listed companies from 2010 to 2014 in China as the research samples to study the relationship among VC, financial leverage and enterprise performance. The samples of ST or data with missing key values were removed and 1212 completed annual samples were finally collected. All the financial data of the enterprises came from the CSMAR database and all estimations were calculated using SPSS 19.

For the definition of VC, we learned from Wu [22], Fu [23] and Wang [24], and followed the following ideas to manually collect and determine VC: If the name of the shareholder of the company contained the words "venture capital", then the shareholder of the company was VC; Referring to the 2012 edition of the "China venture capital and private equity investment institutions" compiled by the Zero2IPO database and the directory of VC included in "Chinese venture investment development report 2013", if the shareholder of the company entered any one of these two lists, then it was determined that the shareholder was VC; If the names of the shareholders of the company were not in the above lists, then we referred to introductions to the company's shareholders, and if the shareholder's main business contained venture capital business, then the shareholder was VC; If the shareholder's main business did not contain the venture capital business but contained equity investment, then it was identified as PE.

#### 3.2. Regression model

In order to test the hypothesis proposed in this paper, we construct the following regression model:

$$ROE = \alpha_0 + \alpha_1 VC + \alpha_2 LEV + \alpha_3 VC \times LEV + \alpha_4 SIZE + \alpha_5 Board\ Size + \alpha_6 Top1 + \alpha_7 Growth + \alpha_8 \sum INDUST + \varepsilon \quad (1)$$

Where  $\alpha_i$  denotes the regression parameters of the model,  $\varepsilon$  denotes the error term of the model, VC×LEV denotes the cross term of VC and financial leverage.

##### 3.2.1. Dependent variables

Scholars often use Tobin Q value or return on equity to measure the performance of the company. Using the method of Lu and Lv [25], this paper chooses the return on equity (ROE) (net profit / average balance of stockholders' equity) to measure the performance of enterprises, the reason is that the return on equity can reflect the final results of the company's operating activities and the profitability of shareholders' investment funds. Compared to Tobin Q value, it is more likely to truly reflect the value of the enterprise.

##### 3.2.2. Independent variable

We construct a dummy variable VC to measure the participation of venture capital, If venture capital participate in a company, then the value of VC is 1, otherwise the value is 0; Besides, we use the asset liability ratio (LEV: total liabilities / total assets) to measure the financial leverage of the enterprise.

Table1. Variable definitions and descriptions

Nature	Symbol	Method
Dependent	ROE	Net profit divided by shareholders 'equity
Independent	VC	The dummy variable of venture capital
	LEV	Asset-liability ratio
Cross	VC*LEV	The cross-term of VC and LEV
Control	Board Size	The total number of board seats
	Top1	Equity Concentration Ratio
	Growth	Revenue growth rate
	SIZE	Natural logarithm of total assets
	INDUST	Industry dummy variable

### 3.2.3. Control variables

Due to the board size (Board Size), equity concentration ratio (Top1), enterprise growth (Growth), firm size (SIZE) and industry (INDUST) are likely to affect the performance of the enterprise, so they are used as the control variables in this paper.

The definitions and measurement methods of the above variables are shown in Table 1.

## 4. Empirical analysis result

### 4.1. Descriptive statistical analysis

Table2. A descriptive statistics

Variables	Min	Max	Mean	Std. dev.
ROE	-1.0355	0.354158	0.0750	0.0752
VC	0	1	0.39	0.488
SIZE	19.5440	23.1543	20.9346	0.5995
LEV	0.0110	0.8864	0.2367	0.1517
VC×LEV	0	0.886	0.0899	0.1465
Growth	-0.7909	5.8017	0.2652	0.4420

Table 2 shows the descriptive statistics of the relationship among VC, financial leverage and corporate performance. As we can see from the results of the analysis, the standard deviation of the dependent variable (ROE) is 0.0752, which indicates that there are small differences in ROE of the observation samples. Venture capital (VC) is a dummy variable. The standard deviation of VC is 0.488, which indicates that there are big differences in VC of the observation samples, and the average participation level of VC in enterprises is low. On the whole, the level of financial leverage ratio is 0.2367, while some companies have high level of debt and

financial leverage ratio has reached to 0.8864, which is far more than the average. The results show that there are significant differences in the level of debt financing between different enterprises.

#### 4.2. Regression analysis

Table 3 shows the OLS regression results. From the regression results, we can see that the regression coefficient of VC is 0.0158 at the 5% level of significance, hypothesis 1 has been verified. That is, after controlling the other factors, compared with the performance of non-VC-backed enterprises, the performance of VC-backed enterprises increases faster. The coefficient of LEV is -0.0445 at the 5% level of significance, which means that the financial leverage (LEV) has a significant negative effect on corporate performance, hypothesis 2 is established. That is to say, debt financing has a certain restriction to the growth of enterprise performance.

When it comes to the joint effect of VC and LEV on firm performance, the cross term of VC and LEV (VC×LEV) is introduced in this paper. The coefficient is -0.1046 with a significant level of 1 %, which indicates that VC×LEV has a negative impact on firm performance. That is, for the VC-backed enterprises (VC=1), the negative impact of financial leverage on corporate performance is greater and more significant. Hypothesis 3 is validated. The adjusted R<sup>2</sup> of the model is 0.1742, and it is significant to pass the F test, which shows that the model has good fitting effect. From the regression results of control variables, except the variable of SIZE, other control variables such as Board Size, Growth and Top1 are in agreement with the regression coefficients, but Top1 does not pass the significant test. The regression coefficient of SIZE is positive at the 1% level of significance, which indicates that the scale of enterprises has a significant positive effect on firm performance.

Table3. Regression results

Variables	Constant	VC	LEV	VC*LEV	Board Size
Expected symbol	+	+	-	-	+
Coefficient	0.2416***	0.0158**	-0.0445**	-0.1046***	0.0048***
T	2.6278	2.1028	-2.4392	-3.8795	3.3196
Variables	Top1	Growth	Size	adj.R <sup>2</sup>	F
Expected symbol	+	+	?	—	—
Coefficient	0.0225	0.0384***	0.0147***	17.42%	13.7761***
T	1.4083	8.3747	3.7883	—	—

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

## 5. Conclusions

As the cradle of scientific and technological enterprises, GEM is conducive to the development of small and medium-sized enterprises to obtain financing opportunities, it is an important supplement to the main board market, and it has an important position in China's capital market. This paper selects the data of China's GEM listed companies from 2010 to 2014 as a sample and builds a regression model to empirically study the influence of VC and financial leverage on enterprise performance. The empirical results show that VC has a significantly positive correlation with enterprise performance, which indicates that the participation of VC can promote the improvement of enterprise performance. On the contrary, financial leverage and corporate performance show a significantly negative correlation, which means that debt financing, to a certain extent, will

inhibit the performance of enterprises. Further study finds that the negative impact of financial leverage on corporate performance in VC-backed companies is greater and more significant, which indicates that the existence of VC will increase the negative impact of financial leverage on corporate performance.

The conclusions of this paper show that the introduction of VC should be given priority when making financing decisions, so as to promote the rapid growth of the enterprises by obtaining capital and management experience. In addition, enterprises should control the scale of debt financing, so as not to increase the risk caused by excessive debt and bring adverse effects on corporate performance. The VC-backed companies should pay more attention to the debt scale, and avoid the risk caused by financial leverage to effectively use the benefits of VC, and thereby to promote the growth of enterprise performance.

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