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Venture Capital and Dividend Policy

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Abstract: In this paper, we empirically examine the impact of venture capital investment on the dividend policy of the invested companies using a sample of list companies from China's ChiNext market during the period 2014 to 2019. Our empirical results show that different types of VC investments have different impacts on the dividend policies of the invested companies. To be specific, we found independent venture capital companies (IVCs) promote the company's dividend payment and increase the level of dividend payments while corporate venture capital (CVC) inhibits the company's dividend payment. The joint participation of multiple types of venture capital investment (syndication) also increases the company's dividend distribution. Our main contributions are two-fold. First, we provide a comprehensive analysis in the field of VC and dividend policy; second, we differentiate VC from the perspective of investment objectives and examine its different impacts on the dividend policies of the invested companies.

Keywords: venture capital; independent venture capital; corporate venture capital; dividend policy

1. Introduction

Since the establishment of the American Research and Development Corporation (ADR) in 1946, the venture capital industry has rapidly developed. In 1985, the establishment of the China New Technology Venture Capital Corporation (Zhong Chuang Company) marked the beginning of the venture capital industry in China. With more than 40 years' development, China's venture capital industry has undergone significant development and formed its unique characteristics.

At the same time, as one of the important corporate decisions, dividend policy has attracted significant interest from academic researchers. However, dividends have long been a debated topic in corporate finance. Miller and Modigliani (1961) proposed the dividend irrelevance theory, which states that dividend payments have no direct impact on companies' stock evaluations. However, other researchers do not agree and have proposed many different theories to explain the variations in terms of companies' dividend payment. For example, Walter (1963) argued that dividends are desired by the investors so that they can reinvest and earn future capital gains, and Gordon (1959) claimed that they are preferred to capital gains because dividend payment reduces risks associated with investments because it is more certain (bird in the hand theory); Lintner (1956) argued that dividends are preferred by the company as they help to reduce the level of information asymmetry, and Bhattacharya (1979) proposed a signaling model where the dividend payments have a significant impact on the firm's valuation (signaling theory); Jensen (1986) argued that dividend distribution can help companies to reduce the conflict of interest between managers and shareholders and this improves a firm's valuation (agency theory).

Empirical analyses of dividend payment have also not arrived at consistent conclusions, but most studies have confirmed that dividend payment positively affects the value of a firm. For example, Asquith and Mullins (1983) found that dividend payment

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and a subsequent increase in dividend payments are all positively related to a company's stock price. Using data from the Nairobi securities exchange, Aduda and Kimathi (2011), however, showed that dividend payment did not have any significant effect on share prices. Yegon et al. (2014) investigated the relationship between dividend policy and financial performance for listed manufacturing companies in Kenya and found that the dividend policy is positively related to a fixed asset, return on capital employed, earnings per share, etc.

In China's capital market, it is puzzling to see that companies listed on the main stock exchange usually pay no or low-level dividends, while on the contrary, stocks listed on the Growth and Emerging Market (GEM) have shown a clear pattern to pay more dividends than their peers from other markets or exchanges, i.e., they usually issue normalized dividends and pay a higher-level dividend, as clearly indicated in Table 1. Since most of the stocks listed on the GEM market tend to have a venture capital background, it naturally leads to the question of whether the venture capital background has an impact on the listed companies' dividend policies.

Table 1. Sample statistics of dividends payments for GEM companies from 2014 to 2019.

Year	Number of Companies	% of Companies Issuing Dividends	Average Dividend Yield
2014	403	92.3%	0.487%
2015	488	85.6%	0.317%
2016	563	89.7%	0.409%
2017	704	87.5%	0.615%
2018	733	77.4%	0.959%
2019	785	73.1%	0.837%

Data source: "Wind" database in China.

Since most of the GEM companies are backed up with venture capital investment, we hypothesized that the venture capital background has a significant influence on the invested company's dividend policy. We argue that this might be due to the following two reasons: venture capital institutions motive the invested companies to pay dividend as this will improve their returns; and secondly, dividend payments of the invested companies will send a positive signal to the market, and thus, increase the future share price when it later goes to the IPO stage.

Therefore, in this paper, using data from China's GEM market, we empirically test whether the venture capital background has a significant impact on the listed companies' dividend policies. Specifically, we focus on three questions: first, whether the involvement of venture capital increases the likelihood of dividend payment from the invested companies; second, whether the involvement of venture capital increases the dollar amount of dividend payment from the company; and third, whether the depth of venture capital involvement and the proportion of the venture capital's shareholding affect the level of dividend payment of the invested companies.

The rest of the paper is organized as follows: In Section 2, we summarize the literature review and present the methodology and hypotheses in Section 3. In Section 4, we explain the data and variables. We then provide empirical results in Section 5 and draw conclusions in Section 6.

2. Literature Review

Studies have reported many positive influences of venture capital investment on the invested companies from many perspectives. For example, Kortum and Lerner (2000) and other studies pointed out that companies with a venture capital background tend to have better innovation and patented technology output efficiency. Bottazzi et al. (2008) argue that venture capital involvement plays a positive role in a company and can efficiently

improve its long-term earnings. At the same time, venture capital institutions can apply their rich industrial knowledge and management experience to improve the innovation of the invested companies. Tyebjee and Bruno (1986) stated that venture capital investments not only provide financial support but also participate in corporate management, and there is a significant positive correlation between a company's long-term performance and the proportion of venture capital holdings. Large and Muegge (2008) believe that venture capital companies participate in the corporate governance of the invested companies, e.g., in internal management, strategy formulation, and many other value-added services, and thus, can improve the earnings of those companies. Puri and Zarutskie (2012) pointed out that companies with venture capital backgrounds have better growth potential than companies with no venture capital background.

Researchers have also studied whether the different types of venture capital background motivate or impact the listed companies' strategies or performance. For example, Pinkow and Iversen (2020) examined the strategic objectives of CVC and concluded that CVC is a powerful approach to help cooperations to engage in open innovation practices and increase their internal exploitation capabilities. Jeong et al. (2020) studied how venture capital (VC) investment affects startup firms' sustainable growth and performance. Using a sample of 363 firms listed from 2000 to 2017, they demonstrated that startups have better sustainability and performance if they receive the VC investments at the initial stage. Zhang et al. (2021) empirically analyzed the herd behavior in the VC market in China, including the existence, causes, and consequences of herding behaviors among venture capitalists, and found that the evidence of higher herding levels for venture capitalists can be explained by more positive industry-level fundamental information signals and a higher degree of industry information uncertainty and that it is not driven by a trading feedback signal.

Literatures have also studied companies' dividend policies for a long time; however, there is no consistent conclusion as to whether dividend payment has a positive impact on a company's valuation, either theoretically or empirically. For example, Gordon (1959) proposed the "bird-in-hand" theory and argued that risk-averse investors would prefer more certain dividend payments in the current period than uncertain future capital gains. Miller and Modigliani (1961), on the other hand, claimed that corporate value has nothing to do with a company's dividend policy in a completely rational and ideal market. He also pointed out that corporate shareholders and managers have significantly different objectives, which creates agency costs that might damage the firm's value. The above two research results lay a theoretical foundation for subsequent corresponding research. Easterbrook (1984) argued that the involvement of venture capital investment helps to supervise and discipline managers' behaviors regarding cash flow management, and thus, motivates companies to pay more dividends. Gorman and Sahlman (1989) pointed out that venture capital firms will protect their own interests from encroachment and strengthen investment returns through post-investment management. As a result, they will actively participate in the invested companies' corporate governance and decision making, including companies' dividend decisions. Lerner (1994) found out, through an empirical study, that venture capital firms have a significant impact on the dividend distribution of the invested companies, and thus, affect the companies' overall corporate governance. (Puri and Zarutskie 2012) also argued that venture capital companies are more likely to issue dividends to reduce the amount of cash flow that managers can manipulate, and thus, reduce agency problems and improve corporate governance. Similarly, Fodil and Walid (2010) also pointed out that the intervention of venture capital will significantly improve the corporate governance and prompt the company to pay dividends.

There are also a few domestic related studies in China regarding venture capital investment and the invested companies' dividend policies. For example, Wei and Liu (2004) argued that venture capital intervention can help reduce the financing constraints of the invested companies, while financing constraints are known to have a negative correlation

with a company's dividend payment level. Wang et al. (2014) found, through empirical research, that the participation of private equity investment significantly increases the probability and intensity of a company's dividend distribution. Xu et al. (2016) conducted an empirical analysis on a sample of A-share-listed companies in China from the past ten years and found that venture capital investment can regulate the improper consumption behavior of managers, and thus, increase the companies' motivation to pay dividends and improve the overall operating efficiency of the companies. Wu and Zhang (2017) conducted an empirical analysis of listed companies in China and found out that the companies with venture capital backgrounds paid significantly higher dividends amount than companies with no venture capital background.

In this paper, we extend the previous research by providing a more comprehensive and system analysis of venture capital's impacts on the dividend policies of the invested companies. To be specific, we classify the VC investment into IVC, CVC, and syndication and examine their impact on the invested companies respectively. Our paper contributes to literature in many perspectives. First, our paper enriches the literature by providing a systematic analysis of the impact of a venture capital background on companies' dividend policies. Second, we further distinguish the different venture capital backgrounds of IVC and CVS and explore their different impacts on the companies' dividend policies. Third, our research provides insights for investors to further understand the dividend policies of the invested companies. Dividend payment is an important component of shareholders' returns and understanding companies' dividend policies will help investors to better evaluate companies' future development prospects and investment opportunities.

3. Research Methodology and Hypotheses

Based on the investment objectives and organizational structure, the venture capital industry can be roughly classified into two different types: independent venture capital institutions (hereinafter referred to as IVCs) and corporate venture capital (hereinafter referred to as CVCs). Although the two have many commonalities in investment fields and investment models, they have significant differences, mainly in the following three areas:

(1) Organizational structure.

IVCs usually choose a limited partnership structure, which usually consists of a general partner (GP) and a limited partner or partners (LP). General partners usually make a small capital contribution, and mainly focus on the normal operation and management of IVCs, including searching for investment projects, managing invested companies, etc. General partners also bear liability for the enterprise. Limited liability partners are generally considered as the true investors, who do not participate in the actual project investment and operation of the enterprise and assume corresponding limited liability within the scope of the subscribed capital. The limited partner or partners and general partners sign a partnership agreement and make a corresponding contractual agreement on key information such as business scale, holding period, project investment location, and profit sharing.

CVCs, on the contrary, are usually a subsidiary investment branch or investment department of a non-financial company. Such branches or investment departments rely on the resources of the parent company to invest in startup companies, and thus, serve the parent company's investment purposes. At the same time, CVCs most of the time only obtain investment capital from the parent company instead of from third-party investors, therefore CVCs are not subject to the restrictions that IVCs usually face.

(2) Remuneration and incentive programs.

According to Dushnitsky and Shapira (2010), CVCs and IVCs also choose different compensation plans. According to a survey conducted by Frederic W. Cook & Co. in 2000,

68% of the CVCs surveyed stated that they had not yet adopted an incentive plan for project investment performance, but instead they usually gave managers a fixed salary and bonus as an employee of the parent company.

On the contrary, IVC companies widely adopt an incentive compensation system based on the project investment performance. In addition, IVCs usually require managers to participate in the project investment of startup companies. CVCs, on the other hand, do not have relevant requirements, and even prohibit internal employees from investing in the invested companies due to agency issues.

(3) Investment objectives.

IVCs and CVCs are also significantly different in terms of their investment objectives. IVCs' investment objectives are relatively definite: financial returns are usually the most important, and a lot of times the only investment objective. The primary goal of CVCs, on the other hand, is to bring new technology or growth to the parent company, and to contribute to the competitiveness of the parent company from a strategic perspective (MacMillan and Roberts 2008). From an operation perspective, there is also a clear difference between CVCs and IVCs in making investment decisions. IVCs are independent in making investment decisions, while CVCs usually have to incorporate the strategic goals of the parent company with their own financial goals and try to find the best win–win strategy for both the parent company and themselves. For example, General Motors Corporation of the United States (the CVC department of General Motors, CGM) specifically claims that its primary task is: "investing in growth-stage companies to enhance GM's innovation capabilities".

As we can see from previous analyses, even though both IVCs and CVCs are venture capital firms, they have significant differences in terms of organizational structure, internal incentives, and investment objectives. As a result, it is reasonable to believe that they might have different impacts on the invested companies, including their dividend policy.

In addition, venture capital syndications, which are the joint investments of both IVCs and CVCs, are usually considered to be more beneficial to companies, as IVCs and CVCs can complement each other with their management experiences. Accordingly, we hypothesize that companies with a joint investment background of IVCs and CVCs are subject to stronger supervision and constraints, and thus, are more likely to pay dividends or a higher level of dividend.

To summarize, we classify venture capital companies into three groups: IVCs, CVCs, and VC syndications. We then investigate their specific influences on the dividend policies of the invested companies. Specifically, we empirically test the following three hypotheses within each venture capital group.

H1. *The involvement of venture capital significantly increases the likelihood that the invested companies will distribute dividends.*

H2: *The involvement of venture capital significantly increases the dividend payout level of the invested companies.*

H3: *The depth of venture capital involvement significantly increases the dividend payout level of the invested companies.*

4. Data and Variables

4.1. Explanatory Variables

From the "Wind" database in China, we obtained dividend distribution information for the listed companies on China's GEM board from 2014 to 2019. And our data regarding venture capital came from many sources including the "Wind" database, CSMAR database, Shenzhen Stock Exchange, company annual reports, CVSource database, etc.

We then created three main dependable variables, DivDummy, DivPS, and DivRatio, as defined below.

DivDummy is a dummy variable which equals 1 if the company paid a dividend in year t and 0 otherwise:

$$DivDummy_{i,t} = \begin{cases} 0, \text{there is dividend payment for company i in year t} \\ 1, \text{there is no dividend payment for company i in year t} \end{cases}$$

Following Wu and Zhang (2017), we use dividends per share DivPS and the dividend payout ratio, DivRatio, respectively, to measure the absolute dividend payment level and dividend payment relative to net income.

$$DivPS_{i,t} = \frac{\text{Total Dividend Payment of Company i in Year t}}{\text{Total Number of Shares Outstanding of Company i in Year t}}$$

$$DivRatio_{i,t} = \frac{\text{Total Dividend Payment of Company i in Year t}}{\text{Net Income of Company i in Year t}}$$

We then created two different groups of explanatory variables to measure VC involvement. The first group focuses on the background of venture capital firms and the second group uses venture capital and the shareholding ratio to measure the impacts on the invested companies.

For the first group, we created four dummy measures, VCDummy, IVCDummy, CVCDummy, and SynDummy to indicate whether the invested company had a background with venture capital, IVCs, CVCs, or VC syndication, respectively. They are defined as below:

$$VCDummy_{i,t} = \begin{cases} 0, Invested\ company\ i\ does\ not\ has\ venture\ captial\ background\ in\ year\ \text{t} \\ 1, invested\ company\ i\ \ has\ venture\ captial\ background\ in\ year\ \text{t} \end{cases}$$

$$IVCDummy_{i,t} = \begin{cases} 0, Invested\ company\ i\ does\ not\ has\ IVC\ background\ in\ year\ \text{t} \\ 1, invested\ company\ i\ \ has\ IVC\ background\ in\ year\ \text{t} \end{cases}$$

$$CVCDummy_{i,t} = \begin{cases} 0, Invested\ company\ i\ does\ not\ has\ CVC\ background\ in\ year\ \text{t} \\ 1, invested\ company\ i\ has\ CVC\ background\ in\ year\ \text{t} \end{cases}$$

$$SynDummy_{i,t} = \begin{cases} 0, Invested\ company\ i\ does\ not\ have\ both\ IVC\ and\ CVC\ background\ at\ the\ same\ time\ t\ in\ year\ \text{t} \\ 1, Invested\ company\ i\ has\ both\ IVC\ and\ CVC\ background\ \ in\ year\ \text{t} \end{cases}$$

To determine whether the invested companies had a venture capital background, we followed the measurement standard from Xie and Mei (2014): We first check the names of the top ten shareholders of the invested companies and see whether they contain any key words such as "venture investment", "venture capital entrepreneurship" or "venture capital investment", etc. If so, it was considered that the company had a venture capital background. Second, if we see a name in the top ten shareholders contained key words such as "investment consulting", "investment management", "high-tech investment", "technology investment", or "innovation investment", etc, we will make further classification based on the following two ways: 1) we cross-checked the names with the list of Chinese venture capital institutions included in the "China Venture Capital Development Report", which was compiled by the Venture Capital Research Institute of the China Science and Technology Promotion Research Center and determined that the company had a venture capital background if the shareholders' names appeared on the list. Secondly, we explored the main business lines of the shareholders through multiple channels on the internet and determined the company to have a venture capital

background if the main business lines of the top ten shareholders included "venture investment".

We then followed the method of Zhan et al. (2016) to further determine whether the invested company had an IVC, CVC, or VC syndication background. We started from the listing prospectus of the top 10 shareholders and cross-checked with the CVSource, Wind, and Guotai's CSMAR databases to determine whether the invested companies had an ICV, CVC, or VC syndication background. If there was only a corporate venture capital background, then CVCDummy = 1, otherwise CVCDummy equaled 0; if there was only an independent venture capital institution background, then IVCDummy = 1, otherwise 0; if both IVC and CVC appeared at the same time, then SynDummy = 1 and 0 otherwise.

For the second group of explanatory variables, we used the following ratios to quantify the involvement of venture capital. Following Chen et al. (2011), we used the ratio of holding shares to measure the degree of involvement as follows:

$$VCRatio_{i,t} = \frac{\text{Sum of VC holding shares among top 10 shareholders of the invested company i at time t}}{\text{Total number of shares of the invested company i at year t}}$$

If the same VC company has investment in multiple rounds of the company, then the shares were added together at year t.

$IVCRatio_{i,t}$, $CVCRatio_{i,t}$, and $SynRatio_{i.t}$ were created following the same logic by only measuring the ratios of the IVC holding shares, CVC holdings, or syndication holding shares.

4.2. Control Variables

Following the academic literature, we identified the following control variables:

(1) Variables to measure ownership structure

Studies argue that an increase in equity ownership will lead to a higher likelihood of the company issuing dividends or increased dividends. For example, an early study by Lv and Wang (1999) pointed out that companies can significantly reduce the agency problem through their dividend policy. Gugler and Yurtoglu (2003) performed an empirical study of German listed companies and found out that a company's dividend policy is primarily affected by the controlling shareholder. Zhu (2005), on the other hand, argued that the main objective of shareholders' investment is to obtain capital gains, and thus, a companies' ownership structure has no impact on the company's dividend policy. In this paper, we use the largest shareholder's ownership ratio variable, NOR, to measure the company's equity concentration.

$$NOR_{i,t} = \frac{\text{Number of shares owned by the largest shareholder for company i in year t}}{\text{Total number of shares for company i in year t}}$$

(2) Profitability

It is widely acknowledged in the literature that a company's dividend payment is closely related to its profitability or earnings. Lintner (1956) conducted a field study on 28 listed companies through a questionnaire survey to the management and found out that under normal circumstances most companies' management will tend to match the dividend policy with their expected profitability of the company. Higgins (1972) argued that companies' different dividend policy decisions are caused by the difference between each company's current profit and future investment needs. Yuan (2001) analyzed China's special market by using the revised Jones model, and the results showed that when a company's current earnings exceed expectation, major shareholders usually choose to transfer and recover earnings in the form of dividends. In this paper, we use two measures of profitability: return on equity (ROA) and earnings per share (EPS), as defined below:

$$ROE_{i,t} = \frac{\text{Net Income of Company i in year t}}{\text{Total Shareholder's Equity of Company i in year t}}$$

$$EPS_{i,t} = \frac{\text{Net Income of Company i in year t}}{\text{Total Number of Shares Outstanding for Company i in year t}}$$

(3) Financial Leverage

Financial leverage is another factor that is identified in the literature as influencing a company's dividend policy. For example, Easterbrook (1984) found that an increase in debt burden will squeeze a company's free cash flow, and thus, have a significant negative impact on the company's willingness to pay dividends. Zhang (2010) also empirically demonstrated that an increase in the liability-to-asset ratio will have a significant negative impact on corporate dividends. Ma and Ye (2016) found that in China's GEM market, the listed companies have significantly lower debt-to-asset ratios than companies listed on the main board markets. And at the same time, the ability and willingness of GEM companies to pay dividends is relatively stronger and there is a positive relationship between the two.

In this paper, we define the variable Leverage as below:

$$Leverage_{i,t} = \frac{\text{Total Liablities of Company in year t}}{\text{Total Assets of Company i in year t}}$$

(4) Cash Flow

It is widely believed that a company's cash flow sufficiency forms the basis for the company to pay dividends. In this paper we created a variable "Cash" to measure a company's cash sufficiency:

$$Cash_{i,t} = \frac{\text{Operaing Cash flow of Company i in year t}}{\text{Total Revenue of Company i in year t}}$$

(5) Company Scale

The existing literature generally argues that a company's size positively influences its dividend payment. For example, Crutchley and Hansen (1989) showed that there is a significant positive correlation between company size and dividend payment. Von Eije and Megginson (2008) studied European listed companies and found that an increase in a company's size significantly increases the likelihood of a company paying dividends. Moh'd et al. (1995) started with a theoretical analysis from the perspective of agency costs and argued that larger companies have a stronger demand for reducing agency costs, which strengthens their dividend payment behavior. Yu and Chen (2009) conducted empirical research on the listed companies in China and found that there is a certain correlation between a company's dividend payment and the size of the company: i.e., there is a stronger likelihood that large-scale companies will pay dividends. Following the previous literature, we also use the log value to measure a company's size:

$$Size_{i,t} = \ln(\text{total assets of company i at the end of year t})$$

(6) Growth Potential

Studies also argue that companies with more future growth potential and development prospects have relatively higher demand for investment, thus leading to a lower dividend payment. Copeland and Weston (1988) showed a significant negative correlation between a company's growth rate and its cash dividend payment. Liao (2012) pointed out that Chinese companies' cash dividends are mainly affected by their asset liquidity, predictable investment returns, profitability, and company development strategies. Using China's A-share data, Mou and Song (2016) found that the potential growth of a listed company has a significantly negative impact on the company's likelihood to pay dividends. In this paper, we created two measures to measure a company's potential growth.

$$Growth_{i,t} = \frac{\text{Revenue of Company i in year t} - \text{Revenue of Company i in year t} - 1}{\text{Revenue of Company i in year t} - 1}$$

$$Invest_{i,t} = \frac{\text{Capital Expenditure of Company i in year t}}{\text{Total Assets of Company i in year t}}$$

Detailed descriptions of variables are provided in Table 2.

Table 2. Definitions of variables. This table provides the definitions of the variables in our empirical study.

Variables	Name	Definition
Dependent Variables	DivRatio	Dummy variable, which equals 1 if company pay dividend and 0 otherwise.
	DivRatio	Dividend payout ratio: percentage of dividend over net income.
	DivPS	Dividend payment per share.
Explanatory Variables	VCDummy	Dummy variable which equals 1 if top 10 shareholders have VC background and 0 otherwise.
	IVCDummy	Dummy variable which equals 1 if top 10 shareholders have IVC background and 0 otherwise.
	CVCDummy	Dummy variable which equals 1 if top 10 shareholders have CVC background and 0 otherwise.
	SynDummy	Dummy variable which equals 1 if top 10 shareholders have both CVC and IVC background and 0 otherwise.
	VCRatio	Percentage of VC shares out of total number of shares.
	CVCRatio	Percentage of CVC shares out of total number of shares.
Control Variables	Invest	Percentage of CAPEX out of total assets.
	Size	Company size: log of total assets.
	Leverage	Percentage of total liabilities out of total assets.
	ROE	Return on equity.
	EPS	Earnings per share.
	Growth	Growth of revenue.
	Cash	Ratio of operating cash flow to total revenue.
	NOR	Number of shares of the number 1 share holder/sum of shares from top 10 shareholders.

5. Empirical Results and Discussion

In this section, we present our empirical analysis.
Table 3 shows the descriptive statistics of the variables.

Table 3. Descriptive statistics of the variables. This table shows the descriptive statistics of our empirical variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
DivDummy	2352	0.798	0.402	0	1
DivRatio	2352	28.761	45.93	−160.077	734.055
DivPS	2352	0.252	0.44	0	3.09
VCDummy	2352	0.469	0.499	0	1
IVCDummy	1788	0.23	0.421	0	1
CVCDummy	1620	0.158	0.365	0	1
SynDummy	1440	0.082	0.274	0	1
NOR	2352	0.531	0.499	0	1
VCRatio	2352	16.686	24.1	0	121.21
IVCRatio	1788	12.061	21.561	0	100
CVCRatio	1620	4.625	10.861	0	73.9

Invest	2352	4.281	3.991	0.008	30.17
EPS	2352	0.201	0.572	−7.09	4.578
Size	2352	8.656	0.741	6.838	11.716
Leverage	2352	33.312	18.009	1.399	139.764
ROE	2352	4.149	19.191	−332.85	77.64
Growth	2352	29.036	180.683	−91.064	8269.92
Cash	2352	9.006	34.821	−553.78	793.02
NOR	2352	28.681	12.049	3	69.36

Table 4 shows the Pearson correlation results among the variables.

Table 4. Pearson correlation of variables. This table shows the Pearson correlation result of variables in our empirical analysis.

Variables	DivDummy	DivRatio	DivPS	VCDummy	VCRatio	Invest	EPS	Size	Leverage	ROE	Growth	Cash	NOR
DivDummy	1												
DivRatio	0.299 ***	1											
DivPS	0.288 ***	0.094 ***	1										
VCDummy	0.022	0.011	0.012	1									
VCRatio	0.046 **	0.023	0.037 *	0.614 ***	1								
Invest	0.075 ***	−0.007	0.086 ***	0.024	0.036 *	1							
EPS	0.429 ***	0.074 ***	0.331 ***	0.005	0.042 **	0.118 ***	1						
Size	0.190 ***	−0.069 ***	0.154 ***	0.009	0.041 **	0.119 ***	0.312 ***	1					
Leverage	−0.238 ***	−0.177 ***	−0.132 ***	0.017	0.034 *	0.015	−0.242 ***	−0.012	1				
ROE	0.424 ***	0.089 ***	0.196 ***	0.002	0.032	0.123 ***	0.832 ***	0.299 ***	−0.279 ***	1			
Growth	0.004	−0.023	0.026	0.024	0.01	−0.014	0.062 ***	0.052 **	0.060 ***	0.063 ***	1		
Cash	0.061 ***	0.048 **	0.026	−0.02	−0.03	0.039 *	0.062 ***	0.052 **	−0.148 ***	0.028	−0.027	1	
NOR	0.083 ***	0.060 ***	0.100 ***	0.061 ***	0.081 ***	0.092 ***	0.077 ***	−0.014	−0.040 *	0.070 ***	−0.003	0.012	1

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

To test the multicollinearity problem of the variables, we also conducted the VIF test, as shown in Table 5. As Table 5 shows, all the variables except ROE and DPS have a VIF value less than 3, which indicates that there are no obvious multicollinearity concerns.

Table 5. VIF test of variables. In this table, we show the VIF results for our empirical variables.

	VIF
ROE	3.376
EPS	3.328
IVCDummy	2.942
VCRatio	2.501
VCDummy	2.370
Size	1.135
Leverage	1.127
IVCRatio	1.054
CVCDummy	1.052
Invest	1.039
Cash	1.033
NOR	1.018
Growth	1.013
Mean VIF	1.750

For empirical analysis, we first test whether having different VC backgrounds has an impact on the likelihood of a company issuing dividends. The results are shown in Table 6. In these regressions from model 1 to model 4, DivDummy is the dependent variable and different explanatory variables are included in different models. These models are used to test whether having any of the VC/IVC/CVC/Syn VC backgrounds has a significant impact on the likelihood of the invested companies to pay dividends.

Table 6. Regression results for DivDummy. This table shows the regression results with DivDummy as the dependent variable. Our explanatory variables include VCDummy, IVCDummy, CVCDummy, and SynDummy, and other control variables include Invest, ROE, Size, Leverage, Cash, Growth, and NOR.

Explanatory Variables	DivDummy			
	Model 1	**Model 2**	**Model 3**	**Model 4**
VCDummy	0.159			
	(1.31)			
IVCDummy		0.308 *		
		(2.03)		
CVCDummy			−0.300 *	
			(−1.96)	
SynDummy				0.499 *
				(2.00)
Invest	0.0121	0.0113	0.0123	0.0124
	(0.75)	(0.69)	(0.75)	(0.76)
ROE	0.0891 ***	0.0888 ***	0.0886 ***	0.0899 ***
	(12.46)	(12.42)	(12.43)	(12.5)
Size	0.275 **	0.275 **	0.269 **	0.264 **
	(2.93)	(2.93)	(2.85)	(2.8)
Leverage	−0.0214 ***	−0.0213 ***	−0.0212 ***	−0.0215 ***
	(−6.14)	(−6.09)	(−6.05)	(−6.17)
Cash	0.00168	0.00181	0.00183	0.00161
	(0.95)	(1.03)	(1.03)	(0.91)
Growth	−0.00019	−0.00021	−0.00018	−0.00018
	(−0.68)	(−0.75)	(−0.67)	(−0.64)
NOR	0.0112 *	0.0115 *	0.0121 *	0.0111 *
	(2.2)	(2.27)	(2.38)	(2.19)
_cons	−0.961	−0.963	−0.813	−0.829
	(−1.17)	(−1.17)	(−0.99)	(−1.01)
N	2352	1788	1620	1440

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

As we can see from model 1, VCDummy has a positive coefficient of 0.159, but the result is not significant at the 5% confidence level, indicating that GEM-listed companies in China with a venture capital background are more likely to pay dividends, but the impact is not significant. Model 2 shows that IVCDummy has a positive and significant (at 5% level) coefficient (0.308), indicating that GEM-listed companies with only an IVC background are more inclined to pay dividends and the impacts are significant. On the other hand, CVCDummy's coefficient is negative (−0.3) and significant at the 5% level. This implies that companies with only a CVC background are less likely to pay dividends than their peers. In model 4, we see that the coefficient for variable SynDummy is 0.499, which is the highest coefficient value and is significant at the 5% confidence level. This indicates that companies with both IVC and CVC backgrounds are more inclined to distribute dividends than other companies.

We then study whether a VC background affects the relative level of dividend payments of the invested companies. For this, we run regressions using DivRatio as the dependent variable. The results are shown in Table 7.

Table 7. Regression results for DivRatio. This table shows the regression results with DivRatio as the dependent variable. Our explanatory variables include VCDummy, IVCDummy, CVCDummy, and SynDummy, and other control variables include Invest, ROE, Size, Leverage, Cash, Growth, and NOR.

	DivRatio			
	Model 5	**Model 6**	**Model 7**	**Model 8**
VCDummy	0.102			
	(0.85)			
IVCDummy		0.253		
		(1.69)		
CVCDummy			−0.333 *	
			(−2.20)	
SynDummy				0.501 *
				(2.01)
Invest	0.0171	0.0163	0.0169	0.0171
	(1.04)	(0.99)	(1.03)	(1.04)
ROE	0.0964 ***	0.0962 ***	0.0961 ***	0.0974 ***
	(12.66)	(12.64)	(12.64)	(12.72)
Size	0.301 **	0.301 **	0.294 **	0.290 **
	(3.19)	(3.18)	(3.1)	(3.06)
Leverage	−0.0185 ***	−0.0184 ***	−0.0183 ***	−0.0187 ***
	(−5.32)	(−5.29)	(−5.24)	(−5.37)
Cash	0.00196	0.00207	0.00213	0.00187
	(1.1)	(1.16)	(1.18)	(1.04)
Growth	−0.000218	−0.000235	−0.000218	−0.000213
	(−0.73)	(−0.79)	(−0.74)	(−0.70)
NOR	0.0110 *	0.0112 *	0.0118 *	0.0108 *
	(2.18)	(2.22)	(2.33)	(2.13)
_cons	−1.349	−1.357	−1.205	−1.233
	(−1.64)	(−1.65)	(−1.46)	(−1.50)
N	2352	1788	1620	1440

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In model 5, we see that VCDummy has a coefficient of 0.102, but is not significant at the 5% confidence level, indicating that the dividend payout level of GEM-listed companies with a venture capital background is less than that of companies without a venture capital background. In model 6, the dummy variable IVCDummy has a positive coefficient of 0.253, but it is not significant. On the other hand, the coefficient of CVCDummy has a negative and significant coefficient, indicating that companies with CVC backgrounds have relatively lower dividend payouts compared to their peers. In model 8, the dummy variable SynDummy has a coefficient of 0.501 and is significant at the 5% confidence level, indicating that companies with both IVC and CVC backgrounds tend to pay a higher ratio of dividend.

We then reran the regression of DivRatio on the various VC ratios and the results are shown in Table 8.

Table 8. Regression results of DivRatio with VC ratios. This table shows the regression results of DivRatio on VC ratios. Our explanatory variables include VCRatio, IVCRatio, CVCRatio, and other control variables include Invest, ROE, Size, Leverage, Cash, Growth, and NOR.

	DivRatio		
	Model 9	**Model 10**	**Model 11**
VCRatio	0.232 ***		
	(6.07)		
IVCRatio		0.244 ***	
		(5.72)	
CVCRatio			−0.180 *
			(−2.11)
Invest	−0.15	−0.158	−0.0965
	(−0.64)	(−0.67)	(−0.41)
ROE	0.169 **	0.170 **	0.171 **
	(3.18)	(3.22)	(3.21)
Size	−5.814 ***	−5.767 ***	−5.687 ***
	(−4.44)	(−4.40)	(−4.31)
Leverage	−0.396 ***	−0.389 ***	−0.391 ***
	(−7.32)	(−7.18)	(−7.16)
Cash	0.0397	0.0414	0.0356
	(1.48)	(1.55)	(1.32)
Growth	−0.00351	−0.00372	−0.00323
	(−0.69)	(−0.73)	(−0.63)
NOR	0.153 *	0.166 *	0.172 *
	(1.99)	(2.16)	(2.22)
_cons	83.72 ***	83.65 ***	84.71 ***
	(7.24)	(7.23)	(7.28)
N	2352	1788	1620

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

As mentioned earlier, the VC ratios measure the ownership percentage of VC companies among all the shares of the invested companies, and thus, can help us quantify the impacts of a VC background on the companies' dividend payouts. As we see from Table 8, both VCRatio and IVCRatio have positive coefficients while CVCRatio, on the other hand, has a significantly negative coefficient. This implies that both VCRatio and IVCRatio positively impact the dividend payout of the invested companies, while CVCRatio has a negative impact, consistent with our previous results.

Last, we reran the regression analysis using DivPS as the dependent variable and the results are shown in Table 9. Consistent with our previous results, the coefficients for VCRatio and IVCRatio are positive while the coefficient for CVCRatio is negative. However, the coefficients are not significant.

Table 9. Regression results of DivPS on VC ratios. This table shows the regression results of DivPS on VC ratios. Our explanatory variables include VCRatio, IVCRatio, CVCRatio, and other control variables include Invest, ROE, Size, Leverage, Cash, Growth, and NOR.

	DivPS		
	Model 12	**Model 13**	**Model 14**
VCRatio	0.000166		
	(0.47)		
IVCRatio		0.000278	
		(0.7)	
CVCRatio			−0.000279
			(−0.36)
Invest	0.00435 *	0.00432 *	0.00437 *
	(2.00)	(1.99)	(2.02)
EPS	0.221 ***	0.221 ***	0.221 ***
	(13.54)	(13.53)	(13.5)
Size	0.0355 **	0.0355 **	0.0357 **
	(2.91)	(2.91)	(2.93)
Leverage	−0.00151 **	−0.00151 **	−0.00149 **
	(−3.05)	(−3.04)	(−3.01)
Cash	−0.0000779	−0.0000747	−0.0000784
	(−0.31)	(−0.30)	(−0.32)
Growth	0.000023	0.0000227	0.0000229
	(0.49)	(0.48)	(0.48)
NOR	0.00265 ***	0.00265 ***	0.00269 ***
	(3.72)	(3.73)	(3.77)
_cons	−0.146	−0.147	−0.146
	(−1.36)	(−1.37)	(−1.36)
N	2352	1788	1620

t statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In terms of other variables in the regression, the coefficients tend to have the signs we expected. For example, we see that ROE has a positive and significant coefficient no matter whether we use DivDummy, DivRatio, or DivPS as the dependent variable, indicating that companies with higher profitability are more likely to pay dividends, pay a higher ratio of dividend, or have a higher amount of dividend payment. Leverage, on the other hand, has a negative and significant coefficient, which implies that companies with higher debt ratios are less likely to pay dividends, pay a lower dividend payout ratio or a lower dividend amount per share.

What is interesting is the result for company size. In most of the regression models, the coefficient for company size is positive and significant, implying that larger companies are more likely to pay dividends, pay a higher ratio of dividend or a higher amount of dividend per share. However, in model 9, we see that the variable "size" has a negative and significant coefficient when we use DivRatio as the dependent variable and VC ratios as the explanatory variables. We argue that the reason might be that for GEM-listed companies in China, larger companies usually have stronger R&D reinvestment demand, which might lead them to pay a relatively smaller percentage of earnings as dividends.

We also tested the robustness of the models in many ways, including using different explanatory variables or different data samples, etc. The results are similar and available upon request.

6. Conclusions

In this paper, we studied the impact of a venture capital background on the investment companies' dividend policy. Based on a sample of 392 companies listed on China's Growth Enterprise Market from 2014 to 2019, we investigated the impact of different types of venture capital involvement on the dividend policies of the invested companies. Our empirical results show that:

(1) Listed companies with only an IVC background or with both IVC and CVC backgrounds (VC syndication) have a stronger tendency to pay dividends, have a higher dividend payout ratio, or pay a higher amount of dividend per share. On the contrary, listed companies with only a CVC background are less likely to issue dividends, have a smaller dividend payout ratio, and pay less dividend per share.

(2) The shareholdings of VC or IVC venture capital are positively correlated with dividend payments, the relative dividend payout ratio, or the dividend amount per share issued by the invested companies. On the other hand, the proportion of CVC shareholdings significantly reduces the relative dividend payout ratios. The holdings of VC syndications (both IVC and CVC background) have similar positive impacts on the dividend payment per share but the impacts are not significant.

Our paper contributes to literature in many perspectives. First, our paper enriches the literature by providing a systematic analysis of the impact of a venture capital background on the dividend policies of the invested companies. Second, we further distinguish the different venture capital backgrounds of IVC and CVS and explore their different impacts on the dividend policies of the invested companies. Third, our research provides insights for investors to further understand the dividend policy of the invested companies. Dividend payment is an important component of shareholders' return and understanding the dividend policies of the invested companies will help investors to better evaluate the companies' future development prospects and investment opportunities.

However, there are still some limitations in our research, which are mainly reflected in three aspects:

1 The data used in this study are public data of the companies after they were listed. At the same time, since the actual exit point of venture capital institutions is difficult to identify and confirm, we assumed that companies with a venture capital background do not exist within the statistical period after listing, while the lock-up period for general companies is about three to five years.

2 In this research, we studied some characteristic variables of venture capital, including the background of venture capital, shareholding ratio, joint investment, etc., but did not include some other characteristic variables that may have potential effects, such as the reputation of venture capital, etc. In the future, it might be worthwhile to include those factors in our analysis as well.

3 In this paper, we also did not consider the macro factors that might influence the dividend policy, such as external environment, regulations, etc.

In the future, we are planning to extend our research in the following areas:

1 Confirm the exit time of venture capital investments one by one. A vertical comparison of corporate dividend behavior before and after venture capital exits may strengthen or lead to different results from the horizontal comparison in this article.

2 Include more factors that influence venture capital characteristics in our analysis and connect venture capital with other dividend-related theories to investigate the impact on the dividend policies of the invested companies.

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