



Research article

The impact of venture capital funds with foreign limited partners investment on enterprise internationalization: evidence from China

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ABSTRACT

This paper examines the relationship between local venture capital (VC) funds and portfolio enterprise internationalization from the perspective of limited partners (LPs). Based on a sample consist of 581 listed enterprises invested by local VC funds in China during 2009–2021, it's found that, compared to the VC funds invested by local LPs completely (LLP_VC), the VC funds with foreign LP investment (FLP_VC) are more likely to help portfolio enterprises list overseas. If FLP_VC syndicates or act as a major investor, it will have a greater role in promoting the internationalization of enterprises.

1. Introduction

As an important financial support for enterprises, venture capital (VC) is able to provide value-added services to its portfolio enterprises with its expertise and relationship network. With more and more enterprises seeking to expand overseas markets, the important role of VC in enterprise internationalization has been recognized by many researchers (Sergi and Popkova, 2022; Dutta and Folta, 2016; Cumming et al., 2016; Humphery and Suchard, 2013). Existing research suggests that enterprise resource plays a crucial role in the internationalization process (Park, 2020; Khurshed et al., 2020), and the investors have different resource bases (Maula et al., 2005). However, studies discussing the impact of VCs on enterprise internationalization mainly focused on the type of VC institutions, ignoring the impact caused by fund investors on VC resource endowment. According to Pahnke et al. (2015), as the starting link of VC fund operation cycle, capital raising object will have an impact on the resource endowment of VC fund, which determines the subsequent behavioral decision of VC fund.

In traditional theory, the Limited Partner (LP) of VC fund is pure financial investor who will not be involved in the actual affairs of the institution (Gompers and Lerner, 1996) and has no influence on the portfolio enterprises. Meanwhile, the General Partner (GP) is responsible for managing the VC fund and making investment decisions. In European and American venture capital practice, LPs are passive investors. After the fund is established, the investment operation of the VC fund is entirely the independent responsibility of the GP, and LPs are not allowed to participate. Otherwise, LPs are likely to violate the Control Rules and

lose the protection of limited liability. However, in China, an emerging market, the system of VC fund operation has yet to be improved. In the practice of Chinese VC, LPs can not only influence the investment operation of VC funds through the restriction and compensation clauses in the limited partnership agreement, but also appoint representatives to the investment committee to directly participate in the investment operation of VC funds (Ozmel et al., 2018, 2020). The process of interaction inevitably results in the resources sharing. Normally, foreign LPs have accumulated rich investment experience and social connections in international investments, and after frequent formal or informal interactions with Chinese VC institutions, they will inevitably change the international resource level of VC funds. However, what impact foreign LP-invested VC funds have on the internationalization of their portfolio enterprises is rare to find in current theoretical research.

To address this dilemma, this paper explores the relationship between the capital type of LP of Chinese VC funds and the enterprise internationalization. In detail, Chinese VC funds are divided into two types: VC funds with foreign LP investment (FLP_VC) and VC funds invested entirely by local LPs (LLP_VC), and the differences in their impact on the portfolio enterprise internationalization. It's considered in this paper that, according to resource-based theory (Battisti, 2022; Castellani et al., 2022), for local VC institutions, receiving investment from foreign LPs with rich international investment experience and powerful relationship network can greatly improve their internationalization resource endowment, thus enhancing their capability to provide value-added services such as international strategy consulting and

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business guidance to portfolio enterprises. As for foreign LPs, although they do not link to the portfolio enterprises directly, they can establish connections through VC institution (Ozmel, 2020) to transfer internationalization resources to the enterprises. In addition, based on signaling theory, VC institutions play an important role in certifying the quality of enterprises, and highly reputable VC institutions can deliver beneficial signals to the industry about the portfolio enterprises (Chemmanur, 2021; Park, 2020). Most foreign LPs in Chinese market are well-funded, experienced and mature investors, and their investments reflect recognition of the reputation and quality of the VC institutions. As a result, VC enterprises invested by foreign LP can provide a stronger authentication value of the quality, legitimacy and reliability of their portfolio enterprises in the international market based on their "brand effect".

Furthermore, this paper explores the impact of VC investment strategies on portfolio enterprise internationalization. International market is a complex of multiple cultures and system, and the richer the access to international market knowledge, the more likely that systematic international knowledge will be acquired (San et al., 2016). As syndication by multiple VC institutions has advantages such as joint accreditation, complementary resources, risk sharing and opportunity creation (Dai and Nahata, 2016), this paper argues that FLP_VC syndication can better accelerate enterprise internationalization process compared to investing individually. In addition, when VC institutions are the main investors, they have stronger grab on the post-investment management for the portfolio enterprises and a closer relationship with the enterprises, which facilitates the transfer of resources. Therefore, this paper argues that when FLP_VC acts as the main investor, it has a greater role in promoting the internationalization of enterprises.

This paper examines the impact of LP capital type of Chinese local VC funds on the internationalization of their portfolio enterprises, using a sample consists of 581 listed enterprises invested by local VC funds from 2009-2021. It is found that FLP_VC significantly facilitates the internationalization of the enterprises compared to LLP_VC, and the facilitation effect is more pronounced when FLP_VC adopts syndication strategy or acts as major investor.

The contributions of this paper are mainly reflected in the following two aspects: (1) The impact of differences in VC resource endowment on portfolio enterprise internationalization is discussed in a new perspective. Previous studies have focused on the perspective of the type of VC institution, this paper explores the relationship between the LP capital type of local VC funds and enterprise internationalization, which provides a new approach to the topic; (2) This paper breaks the traditional concept that LPs are purely financial investors. Previous major theoretical studies assume that LPs only play the role of providing capital in VC funds. This paper proposes a new hypothesis in the context of investment practice and finds that the composition of LP capital in local VC funds can lead to differences in the portfolio enterprise internationalization, indicates that LPs also have non-capital functions and enriches the research on LPs.

2. Data and methodology

Firstly, information on the listed enterprise invested by local VC funds in China, VC fund investment events, VC fund management institutions and fund LPs from 2009-2021 is obtained from the PEdata, a professional database in the field of equity investment in China. Secondly, the data on listed enterprise is supplemented through the CSMAR database and Wind database. Enterprises that have been invested by foreign VC funds are excluded. Meanwhile, any sample with incomplete data is discarded. Finally, 581 listed enterprises invested by local Chinese VC funds are obtained.

Eq. (1) is a baseline regression model to examine whether FLP_VC has an impact on the internationalization of portfolio enterprises.

$$Probit(Overseas_i = 1) = \beta_0 + \beta_1 X_i + \beta_2 Controls_i + Industry_i + Region_i + Year_i + \varepsilon_{ic} \quad (1)$$

Where *Overseas_i* is defined as the internationalization of enterprise *i*. Referring to Humphery and Suchard (2013), we measure *Overseas_i* using a dummy variable that is equal to 1 if the enterprise is listed outside of China mainland and 0 otherwise.

X_i represents the following three indices: (1) FLP_VC investment. Two dummy variables are set to measure FLP_VC investment, *FGN_LP*, which takes 1 when an enterprise is invested by at least one FLP_VC and 0 otherwise; *OFGN_LP*, which takes 1 when an enterprise only invested by FLP_VC and 0 otherwise; (2) Syndication. Define the dummy variable *Syn_LP*, which takes 1 if the enterprise is invested by two or more FLP_VCs, and 0 otherwise; (3) Main investor. The way to determine the main investor mainly include participating in the first round of investment and the largest cumulative investment amount. Although the amount of investment later in the round may be higher as the project progresses, it may not be accurate to determine the main investment only by relying on the cumulative amount of investment. However, there is no doubt that the VC institutions with higher investment amount have a greater say in relative terms. So, we set the dummy variable *Main_LP*, which is based on the calculation result of the average investment amount of VCs before the listing of the enterprise. If the investment amount of a FLP_VC is higher than the average, then the fund is defined as the main investor of the enterprise and *Main_LP* takes the value of 1, otherwise it takes the value of 0.

Meanwhile, drawing on the existing literature (Johanson and Vahlne, 1977; Humphery and Suchard et al., 2013), in the regressions, we control for *Age* (enterprise age), *Num_rounds* (number of VC funding rounds), *Num_investors* (number of institutional investors), *Max_AVG* (maximum average investment size), *Max_regions* (maximum number of investment regions), *Max_IND* (maximum number of investment industries). See Appendix 1 for detailed definitions. The industry, year and region fixed effects are also controlled. Because the explanatory variables in this paper are dummy variables, the Probit model is used for the baseline regression estimation.

3. Results

Table 1 shows the results of the descriptive statistics for the main variables. It can be seen from Panel A that approximately 10.8% of enterprises in the whole sample chose to list outside of China mainland. According to the results of Panel A and Panel B, the mean values of the variables *FGN_LP* and *OFGN_LP* in the sample of enterprises listed in mainland China are lower than the mean values of the whole sample, while the mean values of the above two variables in the sample of enterprises listed overseas are higher than the mean value of whole sample and the sample of enterprises listed in mainland China, indicating that enterprises are more likely to achieve internationalization with the support of FLP_VC.

Table 2 shows the regression results of Eq. (1). As per Model 1, the regression coefficient of *FGN_LP* is significant and positive at the 1% level, indicating that *FLP_VC* investment, is significantly and positively related to the enterprise internationalization. The regression results of Model 2 show that the regression coefficient of *OFGN_LP* is significant and positive at the 1% level and is greater than that of *FGN_LP*, indicating that the likelihood of offshore listing is greater when the enterprise only invested by *FLP_VC*. The above regression results illustrate that *FLP_VC* can significantly promote overseas listing and internationalization of enterprises compared to *LLP_VC*, proving the inference of the hypothesis which mentioned above.

Model 3 and Model 4 in Table 2 demonstrate the impact of VC investment strategy on the internationalization of portfolio enterprises. The results of Model 3 show that the correlation coefficient between *Syn_LP* and overseas listing of enterprises is 2.885 and is significant at the 1% level. This indicates that FLP_VCs syndication is more likely to increase the likelihood of overseas listing compared to investing separately. In Model 4, the coefficient of *Main_LP* is positive and significant at the 1%

Table 1. Descriptive statistics.

Panel A: whole sample						Panel B: Mean value by listing location	
	Obs	Mean	Std.dev.	Min	Max	Overseas (N = 63)	Mainland China (N = 518)
<i>Overseas</i>	581	0.108	0.311	0	1	–	–
<i>FGN_LP</i>	581	0.176	0.381	0	1	0.476	0.139
<i>OFGN_LP</i>	581	0.077	0.268	0	1	0.302	0.050
<i>Syn_LP</i>	581	0.086	0.281	0	1	0.381	0.050
<i>Main_LP</i>	581	0.127	0.334	0	1	0.444	0.089
<i>Age</i>	581	13.079	5.787	0	61	8.889	13.589
<i>Num_rounds</i>	581	2.542	2.750	1	26	2.841	2.506
<i>Num_investors</i>	581	2.162	2.695	1	27	2.381	2.135
<i>Max_AVG</i>	581	1.666	0.770	0.086	5.913	2.133	1.609
<i>Max_regions</i>	581	5.862	5.393	1	36	6.143	5.828
<i>Max_IND</i>	581	7.150	4.832	1	27	7.190	7.145

Table 2. Results of baseline regression.

	Model 1	Model 2	Model 3	Model 4
<i>FGN_LP</i>	0.927*** (5.505)			
<i>OFGN_LP</i>		1.413*** (6.204)		
<i>Syn_LP</i>			1.608*** (7.471)	
<i>Main_LP</i>				1.182*** (6.533)
<i>Age</i>	-0.073*** (-3.420)	-0.077*** (-3.540)	-0.073*** (-3.276)	-0.076*** (-3.440)
<i>Num_rounds</i>	-0.071 (-1.372)	-0.006 (-0.113)	-0.031 (-0.562)	-0.067 (-1.331)
<i>Num_investors</i>	0.002 (0.025)	-0.031 (-0.392)	-0.026 (-0.312)	0.000 (0.006)
<i>Max_AVG</i>	0.328*** (2.952)	0.325*** (3.047)	0.341*** (3.084)	0.311*** (2.778)
<i>Max_regions</i>	0.024 (1.042)	0.013 (0.558)	0.023 (1.000)	0.024 (1.017)
<i>Max_IND</i>	-0.040** (-2.101)	-0.011 (-0.581)	-0.022 (-1.149)	-0.033* (-1.762)
<i>Constant</i>	-0.908** (-2.283)	-1.429*** (-3.376)	-1.578*** (-3.521)	-1.094*** (-2.618)
year/Industry/Region	YES	YES	YES	YES
Observations	581	581	581	581
PseudoR ²	0.293	0.306	0.339	0.314
Loglikelihood	-141.068	-138.400	-131.871	-136.857

The z-test is in parentheses below the coefficients. ***, **, * denote significance at the 1%, 5% and 10% thresholds, respectively.

level, indicating that when FLP_VC is the main investor, it is more effective in promoting the overseas listing of an enterprise. The empirical results are consistent with the previous hypothesis.

As the COVID-19 spread across the world, investors faced changes in market conditions and investment opportunities (Zhang et al., 2022). The uncertainty generated by the pandemic, and the global economic slowdown, affected many sectors of the economy. The sample period includes the post-COVID-19 period (2020 and 2021). In order to exclude the possible influence of COVID-19 on the results, the data of these two years were eliminated in this paper, and the regression was performed on the remaining samples. The results are shown in Table 3. As can be seen, the benchmark regression results are still supported.

4. Endogeneity problems test

Endogeneity is an important issue that needs to be addressed in the study of the relationship between VCs and enterprise internationalization. In terms of the baseline regression results in this paper, the endogeneity problem may be reflected in both omitted variables and reverse causality. First, omitted variables. Although this paper controls for possible influencing factors from many aspects, such as the age of the firm, the number of rounds the firm was invested in, and the characteristics of the institutional investors, it is still impossible to list all the relevant factors in theory; Second, reverse causality. For the purpose of this paper, it is necessary to consider whether it is really the FLP_VC that have an impact on the internationalization of enterprises, instead of this kind of funds being more discerning and choosing the investment objects that are more likely to be listed internationally, or whether it is really the foreign LP has an impact on local VC funds, rather than whether such VC institutions are more willing to help enterprises to be listed overseas This paper uses the following methods to deal with endogeneity.

- (1) The selectivity problem of foreign LPs towards GPs.

This paper argues that if foreign LPs choose VC institutions which prefer to promote their portfolio companies to be listed abroad, they will definitely consider the international exit experience of VC institutions, and the institutions with more international exit experience are more likely to become their investment targets. Therefore, in this paper, VC

Table 3. Results of robustness test.

	Model 1	Model 2	Model 3	Model 4
<i>FGN_LP</i>	0.984*** (0.185)			
<i>OFGN_LP</i>		1.368*** (0.242)		
<i>Syn_LP</i>			2.885*** (0.678)	
<i>Main_LP</i>				1.336*** (0.203)
<i>Constant</i>	-0.071 (0.675)	-0.250 (0.234)	-4.588*** (1.080)	-0.268 (0.712)
Controls	YES	YES	YES	YES
year/Industry/Region	YES	YES	YES	YES
Observations	514	514	514	514
PseudoR ²	0.332	0.341	0.508	0.364
Loglikelihood	-118.318	-116.715	-26.677	-112.590

Table 4. Subsample regression results.

	Model 1	Model 2	Model 3	Model 4
<i>FGN_LP</i>	1.006*** (5.322)		0.880*** (4.324)	
<i>OFGN_LP</i>		1.611*** (5.944)		1.278*** (4.302)
<i>Constant</i>	-1.165** (-2.259)	-1.843*** (-3.245)	-1.492** (-2.302)	-1.998*** (-2.838)
<i>Controls</i>	YES	YES	YES	YES
<i>year/Industry/Region</i>	YES	YES	YES	YES
<i>Observations</i>	535	535	513	513
<i>Pseudo R²</i>	0.311	0.330	0.386	0.390
<i>Loglikelihood</i>	-115.959	-112.837	95.111	-94.376

The z-test is in parentheses below the coefficients. ***, **, * denote significance at the 1%, 5% and 10% thresholds, respectively.

IPO exit events are retrieved from the Private Equity database, including information on VC institutions, exit time and exit location et al. The VC institutions that have experience in exiting through overseas IPO are marked, this paper matches the information with the VC investment institutions of the sample companies, and excludes the sample companies invested by VCs with overseas IPO exit experience. Regression is done based on the remaining sample, results are shown in Table 4, Model 1 and Model 2. The regression results for the sub-sample remained consistent with the baseline regression results.

(2) The selectivity problem of VC institutions towards enterprises.

It's believed in this paper that if it is the prospect of enterprise internationalization that attracts FLP_VC to invest, then VC institutions will invest in a relatively short period of time before the company listing, rather than investing at an early stage of enterprise development and spending a long time helping and nurturing the company. Therefore, it's unlikely to have selectivity problem in a sample that the companies have received VC investment for a long period of time prior to IPO. In conclusion, this paper follows Humphery and Suchard et al. (2013) and excludes firms in the sample that received their first local VC investment within 500 days prior to the IPO. The regression results are shown in Models 3 and 4 in Table 4 and are consistent with the findings from the benchmark regression results.

5. Conclusion and discussion

This paper discusses the difference in the impact of LLP_VC and FLP_VC on the portfolio enterprise internationalization, taking a sample of 581 listed enterprises invested by Chinese VC funds from 2009-2021, and draws the following conclusions: First, FLP_VC can significantly

Appendix 1. Variable definitions

Variables	Describe
<i>Age</i>	The number of years from establishment to listing of the enterprise.
<i>Num_rounds</i>	Total rounds of VC investment obtained before the enterprise listing.
<i>Num_investors</i>	The number of VC institutions that invest in the enterprise before it goes public.
<i>Max_AVG</i>	The logarithm value of the maximum average investment amount of a VC institution before investing in the enterprise.
<i>Max_regions</i>	The maximum number of regions (represented by provinces) that a VC institution invests in before investing in the enterprise.
<i>Max_IND</i>	The maximum number of industries (industry classification of China Securities Regulatory Commission) that VC institutions invest in before investing in the enterprise.
<i>Industry</i>	According to the "High and New Technology Enterprise Identification Management Measures" (National Science and Technology [2016] No. 32) to determine whether the enterprise industry belongs to the high and new technology industry, dummy variable.
<i>Year</i>	Dummy variable for the year the firm listed.
<i>Region</i>	Four dummy variables are constructed: Yangtze River Delta, Pearl River Delta, Beijing and other regions.

promote the internationalization of enterprises compared to LLP_VC. The promotion effect is more significant when all the VC investments of enterprises originate from FLP_VC. Second, the investment strategy of VC funds can affect the relationship between FLP_VC and enterprise internationalization. When FLP_VC is syndicated, enterprise can obtain more comprehensive internationalization services and resources, which is more helpful to the internationalization development; when FLP_VC is the main investor of the enterprise, it will have a bigger voice in the enterprise and support the enterprise to achieve internationalization.

This study expands the previous research on the relationship between differences of VC resource and enterprise internationalization from the perspective of VC institutions into a new direction, discusses the impact of VC resource differences on enterprise internationalization from a new point of view. Meanwhile, the findings of this paper break the stereotype that LPs of VC funds play only a financial role. Based on this, subsequent studies can explore the impact of LP types on the resource base of VC funds as well as corporate development from multiple perspectives.

Declarations

Author contribution statement

Ting Feng: Conceived and designed the analysis; Contributed analysis tools and data; Wrote the Paper.

Lihong Guo: Conceived and designed the analysis; Analyzed and interpreted the data.

Jianwei Dong: Conceived and designed the analysis; Analyzed and interpreted the data; Wrote the Paper.

Han Wang: Contributed analysis tools and data; Wrote the Paper.

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Data availability statement

The authors do not have permission to share data.

Declaration of interest's statement

The authors declare no competing interests.

Additional information

No additional information is available for this paper.

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