

# The Matching and Dynamic Behavior Between SMEs and Venture Capital Institutions

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**Abstract.** Due to the lack of collateral, the strategic funding for access to venture capital institutions is one of the main financing strategies for SMEs in the start-up period. When selecting a venture capital institution, SMEs should proceed from their own strategies and characteristics and choose according to the matching with different venture capital institutions. In general, SMEs and venture capital institutions are optimally when they form a positive assortative matching, that is, high-quality SMEs form strategic investment relationships with the stronger and larger venture capital institutions. After adding information asymmetry factors, such as the signal from participants, we found SMEs prefer to match local venture capital institutions. The analysis in this paper is based on the dynamic analysis of the match.

## 1. Introduction

SMEs are the mainstay of innovation, and their financing issues have been the focus in social. In addition to equity financing, there are many financing methods, such as open market equity financing, bond issuance, bank loans and other private equity financing. In the open market equity financing, in the current domestic market, due to high listing requirements and cumbersome procedures, the development of the stock market is not high. In terms of quantity, this can only be the choice of a few enterprises. The requirements for the issuance of bonds in the open market are not low, and it is also difficult for most companies.

Relatively speaking, bank loans are the most alternative financing tool for venture capital financing. The biggest advantage of loans as a means of financing debt is its leverage effect. However, due to the risk aversion requirement, banks require certain repayment guarantees, such as guarantees or guarantees, when issuing loans. However, for many enterprises in the start-up period or the main body of M&A activities, they usually need to have certain Capital can get a loan. The rationality of the capital structure is an important aspect that enterprises need to consider when making credit or equity financing. Of course, the factors considered include the availability of various financing methods and financing costs.

SMEs are financing through venture capital investment, which is to participate in non-central and bilateral matching transactions in the venture capital market. For each small and medium-sized enterprise, what kind of venture capital institution has reached a financing transaction to form a matching relationship, not only determines the amount of financing, but also the return requirement, because different venture capital institutions have different resources and behaviours, and will also affect the ultimate growth and development of SMEs. Therefore, this paper starts from this perspective and tries to provide a reasonable explanation for some phenomena in the equity financing of SMEs.

Many studies have also found that venture capital investment is of great significance for promoting innovation and economic growth, and promoting employment. For example, Link and Ruhm et al. gave a positive answer to private equity promoting SME innovation.<sup>[1]</sup> Popov and Roosenboom report the analysis of European markets shows that private equity 8% of equity investment in enterprises is invested in research and development, and its contribution accounts for 12% of industrial innovation.<sup>[2]</sup>

In terms of matching process and competitive search, Moen<sup>[3]</sup> and Rocheteau et al.<sup>[4]</sup> give a more systematic definition separately. Competitive search equilibrium is simply a combination of price posting and direct search mechanism, that is, one party competes. The way to attract the other trader to come to trade. Galenianos and Kircher discusses the basics of game theory for competitive search equilibrium,<sup>[5]</sup> and the concept and extension of competitive search equilibrium is more comprehensive analysis.<sup>[6]</sup> Next, we will analyse the efficiency of participation in decision-making and other related issues by using the competitive search equilibrium concept system.

The following is a summary of the matching model between SMEs and venture capital institutions in the venture capital market, and then analyses the model equilibrium and positive assortative matching. Then introduce reputation into the model and examine the impact of reputation.

## 2. VC market Matching Model Setting

The venture capital market consisting of small and medium-sized enterprises and VC institutions has typical decentralized characteristics. This paper analyses the venture capital market by competitive search matching model developed by many scholars.

### 2.1. Participant

In order to simplify the analysis of the problem without losing the generality, we assume that there are two types of risk-neutral participants in the venture capital investment and financing market, namely the representation of capital - VC capital and the carrier of innovation and entrepreneurship - production enterprises. The natural property of the capital held by each VC capital is the same. The difference between VC capital is reflected in the manager's investment choice ability, business risk ability, post-investment management ability and so on. The difference in these capabilities leads to the different effects of VC capital on the project value growth, which constitutes the basis of the difference in investment income obtained by VC capital. These capabilities are collectively referred to as value-added service capabilities for the convenience of the following description. According to the different value-added service capabilities of VC Capital, VC capital is divided into  $M$  different types  $m=1, \dots, M$ . Let the number of VC capital of type  $m$  be  $\mu_m > 0$  and is an exogenous variable. Each VC capital is distinguished by the number  $i, i \in [0, \mu_m]$ . In order to reflect the category in which VC capital is located,  $(m, i)$  refers to the specific VC capital whose number  $i$  belongs to category  $m$ . For the sake of simplicity of analysis, assume that each VC capital has one unit of capital for venture capital investment, and the sum of all VC capital supply in the market is  $\sum_{m=1}^M \mu_m$ . This is also equal to the total amount of VC capital in the market.

Similarly, as a carrier of entrepreneurial innovation and innovation, entrepreneurship and human capital, we divide him into  $N$  different categories according to their characteristics.  $n=1, \dots, N$ , assume  $v_n > 0$  representative  $n$ , the number of companies. Similar, use  $(n, j)$  represents number is  $j \in [0, v_n]$  a company belonging to the  $n$ th category. Each enterprise only needs VC investment in the unit, and each VC capital has 1 unit of capital for venture capital investment. The total number of companies in the market is  $\sum_{n=1}^N v_n$ . At the same time, it is also equal to the demand for VC capital in this market.

### 2.2. Matching Process

Assuming all market participants are rational, in order to simplify the analysis of the problem, the different processes of venture capital exit are not specifically considered here. Under the assumption of perfect expectations, it is assumed that VC capital and enterprises have perfect

expectations for future returns, that is, the actual future earnings of the company are consistent with their current expectations.

Under the search for matching market structure model, the interactive behavior process between VC capital and enterprises before the equity investment agreement is reached can be represented by a three-stage game. First, any company (n, j) demonstrates its promised future earnings to all VC capital. Second, each VC capital collection compares all committed revenues and then selects a company to bid. Finally, the company selects a VC capital from the bid application received for financing, to produce, and to pay its promised investment income p. Those VC capitals that have not been selected by the company and those that do not have the appropriate VC capital are selected for the search waiting period.

According to the usual point of view, labour and capital are the two most basic elements of enterprise production, without loss of generality. Here we assume that the production and value creation activities of enterprises cannot be separated from the human capital and innovation achievements and capital investment of entrepreneurs. The key factor is that entrepreneurs have entrepreneurial human capital and innovation before financing, while capital is owned by venture capital management institutions. In a decentralized market, the premise that a company can organize production is a combination of the enterprise that includes the human capital and innovation of the entrepreneur and the VC capital that owns the capital. Since it is assumed that the same category of VC capital and firms are identical in terms of characteristics affecting output,  $f_{m,n}$ , for a unit of m-class VC capital and one-unit n. The output of the enterprise after matching each other, if it is regarded as exceeding the excess output of the individual entrepreneur's human capital and capital, its meaning is similar to the production function. In order to make the analysis of the following text simple, and also assume that a VC capital can only match at most one enterprise, a company can only match at most one VC capital. Similar to the general production function settings, it is assumed here  $f_{m,n}$  is non-negative and increases with m and n, while assuming  $f_{m,n}$  with supermodel:  $m < m'$ ,  $n < n'$ , when there is  $f_{m,n} + f_{m',n'} > f_{m,n'} + f_{m',n}$ . When there is only entrepreneurial human capital and innovation, or only VC capital, no material products can be produced, i.e.  $f_{0,n} = f_{m,0} = 0$ . In other words,  $f_{m,n}$  It can be seen as an output gain in the case where VC capital of type m and type of enterprise of n are separately present.

### 2.3. Centralized Clearing Planner

In order to compare the efficiency of the decentralized venture capital market, based on a number of implications for search-matched research methods, the efficiency of the market-arranged market is discussed here. The so-called social planner refers to the market organizer. In the case of known VC capital and enterprise risk utility benefit function, the goal of social planner is to maximize the output value of the economy. In order to achieve this goal, the social planners will issue instructions to whom VC capital is bidding, and who accepts the company as an equity investor. Each VC capital only bids for one enterprise, and each enterprise only accepts one unit of bidding VC capital.

The enterprise chooses and informs the VC capital that it contacts with the expected investment income. The expected investment income is mainly reflected by the valuation of the existing enterprise assets, the investment quota and the share of the equity, and the equity repurchase clause. Under the assumption of rational people, it has complete expectations for investment returns. VC Capital predicts the expected return of the company and selects the company that wants to invest to conduct investment negotiations. On the other side of the market, the company selects a VC capital from all VC capitals involved in the negotiation and negotiates an equity investment contract to integrate equity capital for production. In order to focus only on the main issues, we assume that all companies and VC capital in the market differ only in the level of final investment returns. There are M types of VC capital in this market, and the number of types of enterprises is N. When the m-type enterprise and the n-type VC capital reach an investment and financing agreement, the return

on investment is  $x_{m,n}$ .

The constraint of applying symmetric equalization to the search matching model can easily introduce coordinated friction. The details of such methods can be found in Burdett, Shi and Wright.<sup>[7]</sup> In a VC investment market, assuming that there is  $x$  VC capital, the probability that each VC capital should select a certain investment enterprise is independent of each other. If the enterprise is expected to obtain a total of  $q$  investment intentions for each VC capital. The probability of obtaining an investment opportunity is  $q/x$ . The probability that an enterprise obtains

$z$ -investment intention is a binary distribution, and its expression is  $\frac{x!}{(x-z)!z!} \left(\frac{q}{x}\right)^z \left(1-\frac{q}{x}\right)^{x-z}$ , where

$z \in \{0, 1, 2, \dots, x\}$ . When the quantity  $x$  of VC capital is large enough, its distribution will approach Poisson distribution. At this time, the quantity of investment intention obtained by the enterprise to

be invested will be close to  $\frac{q^z e^{-q}}{z!}$ .

Further, this result does not need to assume that the probability of all investment intentions is the same for the company. This means that there are two ways to ensure that an investment company receives investment intentions: one way is to assume that an unlimited number of VC capitals must seek a firm investment with a positive probability, and the investment intentions expected by the company are Infinitely more; another method, some type  $h_n$ . The VC capital represented by the probability 1 is to invite the investment invitation of the selected company. However, the symmetry limit means that if a certain type  $h_n$ . The VC capital has the probability 1 to go to the investment invitation of the selected company, then other types of VC capital will inevitably behave this way. Either way, the amount of investment intentions expected to be infinite is infinite, which is not the optimal state. After all, only one candidate can get this investment opportunity.

Assume that there are two types of risk-neutral participants in the VC investment market, VC capital and companies. The total number of VC capital is 1, and the investment management and value-added ability according to VC capital  $h_n$ . Divide VC capital into  $N$  different categories:  $0 \leq h_1 \leq \dots \leq h_N \leq \bar{h}$ . Let  $\psi_n$  represents the number of the type  $h_n$  of the VC capital. At the same time, the market still exists in quantity  $\theta$  of the company, each company wants to introduce a VC capital equity investment. Corporate entrepreneurs have human capital  $k$  Compliance interval  $[0, \bar{k}]$ , its probability distribution on a subset of  $\Phi$ . Assume  $j \in [0, \theta]$  Uniform distribution, the only identification of a single enterprise, the human capital of this enterprise is  $k_j$ . In the following text, if it does not cause confusion, it is also used.  $h$  with  $k$  refers to the investment management capabilities of VC capital and the growth of enterprises, or their types.

### 3. Competitive Search Equilibrium

Please follow the instructions closely in order to make the volume look as uniform as possible. Under the assumption of a competitive search equilibrium model, this section yields how to achieve socially optimal outcomes in the case of non-central transactions. The competitive search game process can be divided into three stages. In the first stage, each enterprise  $(n, j)$  releases the expected commitment revenue related to VC capital's value-added service capability to VC Capital.  $p_{m(n,j)}$  is the specific manifestation of this income includes the cash flow of the company's future earnings reflected in the business plan sent by the company, the current valuation of the company, the capital quota to be included in the plan, and the proportion of the shares. Through this information, VC capital can be predicted. The size of future investment income. In the second phase, each VC capital observes the promised returns of all possible companies, and adopts a hybrid strategy to negotiate and negotiate the financing needs of a certain enterprise. In the third stage, at

least one VC bidding company receives a VC financing agreement, and after production and operation, due to the assumption that production and operation risks and perfect expectations are not considered, the VC will realize its commitment when exiting. The proceeds. VC institutions and enterprises that do not have an investment agreement will only be able to obtain any revenue from the venture capital market in this round if they wait for the next time period to continue.

### 3.1. Choice Behaviour of VC Capital

Assume that each company (n, j) gives a different commitment to different types of VC capital, and that VC capital belonging to the same type cannot be treated differently. For any enterprise  $(n, j)$ , VC capital of type m must be based on the promised return given by the firm.  $p_{m,(n,j)}$  To choose your own bidding strategy. Suppose a VC capital can only bid to a company. For VC capital (m, i), a feasible strategy is probability  $Pr_{m,i}$  to each company.

All VC capitals of the type m adopt the same bidding strategy in the venture capital market, and there are a large number of VC capitals in each market, and there is a queue of VC capital composed of multiple bidding competitions for each enterprise (n, j). Each m-type VC capital bids to the n-type enterprise with the same probability, so any enterprise of type n (n, j) averages the number of VC capitals belonging to type m, i.e. the queue length is  $q_{m,(n,j)} = \frac{\mu_m Pr_{m,(n,j)}}{v_n}$ .

Assuming that the random bidding behavior of each VC capital is independent, the number of bidding VCs is subject to the parameter  $q_{m,(n,j)}$  Poisson distribution, any company of type n receives  $z \in \{0, 1, 2, \dots\}$  The probability of a VC capital bid only from type m is  $\frac{q_{m,(n,j)}^z}{z!} e^{-q_{m,(n,j)}}$ . To simplify the presentation below, the length of the bid queue that is defined by firms with productivity above a certain value m is:  $Q_{m+1,(n,j)} = \sum_{l=m+1}^M q_{l,(n,j)}$  and  $Q_{M+1,(n,j)} = 0$ . Meanwhile, if the productivity is higher than the number of VC capital bids of type m,  $z=0$ , then the probability is  $e^{-Q_{m+1,(n,j)}}$ .

Under the competitive equilibrium strategy, VC Capital adjusts its bidding strategy so that there is no difference between the bidding current enterprise and other best companies. The equalization queue length must be such that all VC capital of type m is bid free to bid to any two companies. In order for each type of VC capital to satisfy this equilibrium condition, all firms with positive bid probabilities must have the same expected return. In contrast, companies that do not have VC capital bids are expected to have lower returns. Assume  $V_m$  represents the highest committed return of other companies to VC capital of type m. Since the proportion of a single company (n, j) in all enterprises is close to infinity, the promised income he gives will not affect  $V_m$ . The description here can be referred to Burdett, Shi and Wright. [7] The approximate correctness of this conclusion is when the number of parties to the market is large enough. Also, if the queue length  $q_{m,(n,j)}$ . If it is positive, that is, if at least one VC capital is bid for the enterprise, then the VC capital of type m must have the promised return from the enterprise (n, j) equal to the optimal promised income given by other enterprises  $V_m$ , that is:

$$V_m = \frac{e^{-Q_{m+1,(n,j)}} (1 - e^{-q_{m,(n,j)}})}{q_{m,(n,j)}} p_{m,(n,j)} \quad (1)$$

where  $\frac{e^{-Q_{m+1,(n,j)}} (1 - e^{-q_{m,(n,j)}})}{q_{m,(n,j)}}$  is reach the probability of an investment agreement,  $p_{m,(n,j)}$  is the

expected return for VC capital. Due to the probability of Poisson distribution  $\frac{q_{m,(n,j)}^z}{z!} e^{-q_{m,(n,j)}}$ , where  $z$  is an integer, refers to the number of VC capital bidding enterprises  $(n, j)$  of the existing type  $m$ , and there is no VC capital that is more valuable than the VC capital of type  $m$  to bid. Thus, for this VC capital of type  $m$ , the probability of reaching an investment and financing agreement with the enterprise is  $1/(z+1)$ . For a VC capital of a bid, the probability of reaching an investment agreement is the sum of the probabilities for all possible  $z$  values:

$$\begin{aligned} \sum_{z=0}^{\infty} \frac{1}{(z+1)!} q_{m,(n,j)}^z e^{-q_{m,(n,j)}} &= \frac{e^{-q_{m,(n,j)}}}{q_{m,(n,j)}} \sum_{z=1}^{\infty} \frac{1}{z!} q_{m,(n,j)}^z e^{-q_{m,(n,j)}} \\ &= \frac{e^{-q_{m+1,(n,j)}} (1 - e^{-q_{m,(n,j)}})}{q_{m,(n,j)}} \end{aligned}$$

Back to (1), in case  $V_m > e^{-q_{m+1,(n,j)}} p_{m,(n,j)}$ . Because the proceeds from bidding to other companies are higher, type  $m$  Venture capital institutions will not bid for enterprises. At this time  $q_{m,(n,j)} = 0$ . For any given  $\{V_m\}$ , formula (1). Uniquely determines the queue length  $q_{m,(n,j)}$  and income  $p_{m,(n,j)}$ .

Thus, the length of the bid queue  $q_{m,(n,j)} > 0$ . Any company whose expected return is

$$y_{m,(n,j)} = e^{-q_{m+1,(n,j)}} \frac{1 - e^{-q_{m,(n,j)}}}{q_{m,(n,j)}} p_{m,(n,j)} \quad (2)$$

Where  $Q_{m+1,(n,j)} = \sum_{l=m+1}^M q_{l,(n,j)}$ . The number of VC capitals whose value-added service capability type is greater than or equal to  $m+1$ , that is, the expected number of VC capitals that are superior to VC capital of type  $m$ . The above formula can be understood as follows: the income from the enterprise  $(n, j)$  is equal to the probability of reaching the investment agreement multiplied by the project income of the VC capital, wherein the probability of reaching the investment agreement is equal to the probability that there is no better bidder multiplied by the same type Probability of selected bidders (the queue length is  $q_{m,(n,j)}$ ). The probability that there is no better bidder is equal to  $e^{-Q_{m+1,(n,j)}} (1 - e^{-q_{m,(n,j)}})$ . The queue length satisfies the above formula (2). In the case of VC capital, there is no incentive to choose other companies.

### 3.2. Choice Behavior of SME

By giving different valuations and investment ratios to VC organizations with different post-investment management capabilities and experience, companies maximize the expected profit of a given pool of VC institutions willing to invest. The Shimer coordinated friction model (Shimer, R, 2005) shows that the optimal strategy is to choose the VC organization with the best post-investment management capabilities and experience. Entrepreneur  $(n, j)$  maximize the expected return in the case of meeting the optimal strategy of the enterprise:

$$\sum_{m=1}^M e^{-Q_{m+1,(n,j)}} [1 - e^{-q_{m,(n,j)}}] [f_{m,n} - p_{m,(n,j)}] \quad (3)$$

In other words, the optimal return maximizes the difference between the value-added ability and the rate of return of each type of VC, multiplied by the probability of VC institutions willing to invest.



### 3.3. Analysis of Equilibrium Results

Similar to the definition of equilibrium by the Shimer model, <sup>[8]</sup> the equilibrium of the venture capital market is defined here as follows:

**Competitive search equilibrium:** In the competitive search equilibrium state, the return on investment  $w$ , the queue length  $q$ , the expected return  $y$ , should make the profit of the entrepreneur (3) maximize. At this time, the VC agency's expected return is (2) given that the number of VC institutions willing to invest from type  $m$  does not exceed the total number of VC institutions  $\mu_m$ . Resource constraint

$$\mu_m = \sum_{n=1}^N \int_0^{v_n} q_{m,(n,j)} dj \quad (4)$$

At this point, the result of the competitive search equilibrium is unique. Further, the balance queue length  $q_{m,n}$  Equal to the length of the queue selected by the social planner, or, equivalent, the probability of bidding by the VC agency. The goal of social planners is to maximize the expected total output. In this case, the result is that the optimal queue length will satisfy the first-order condition:

$$\lambda_{m,n} \geq e^{-q_{m,n}} f_{m,n} - \sum_{k=1}^{m-1} e^{-q_{m'+1,n}} (1 - e^{-q_{m',n}}) f_{m',n} \quad (5)$$

Where  $\lambda_{m,n}$  is the VC organization of type  $m$  invests in the expected number of enterprises of type  $n$ , which depends on a single VC institution  $i$ , enterprise  $j$ , and since there is no relationship here, the subscript  $i, j$  is omitted here. Knowing the length of these queues, the expected return of VC satisfies (1.1), at which point the equilibrium return of capital is equal to

$$p_{m,n} = \frac{q_{m,n} e^{-q_{m,n}}}{1 - e^{-q_{m,n}}} \left[ f_{m,n} - \sum_{k=1}^{m-1} e^{-q_{m'+1,n}} (1 - e^{-q_{m',n}}) f_{m',n} \right] \quad (6)$$

Equation (5) with (6) all the information needed to determine the return on private equity investment is given. It has been assumed that production technology is known  $f_{m,n}$ , the measurement of each type of VC institution and enterprise, the price of capital and the length of the queue. Although the length of the equalization queue cannot be observed, the expected number of VC mechanisms of type  $m$  derived from it can be used, and in extreme cases accepted by companies of type  $n$ :

$$\lambda_{m,n} = v_n e^{-q_{m+1,n}} (1 - e^{-q_{m,n}}) \quad (7)$$

In summary, the analysis of matching behavior between SMEs and venture capital institutions in this section shows that the stronger the search ability of venture capital institutions, the smaller the impact of search matching friction, and the more likely it is to obtain more matching effects. Specifically, foreign private equity capital can obtain a higher matching effect because of its more knowledge of the venture capital market. The higher the degree of specialization of private equity institutions, the lower the friction of search matching and the improved matching output.

### 4. Impact of VC Market Reputation on PAM

Reputation effect is a factor often considered in the game model. In the venture capital market, according to the analysis of the search friction mechanism in the previous article, information asymmetry has an important influence, and reputation will help to obtain greater in the bargaining process. Negotiating power, thus obtaining a better investment income and quotation in the sense of a game equilibrium solution. In addition, intuitively, reputation plays an important role in reducing search friction and increasing the likelihood of investment matching, and reputation also enhances positive assortative matching. This section begins with a simple theoretical model of reputation and

coordination, followed by an empirical analysis to test this conclusion. Atakan and Ekmekci<sup>[9]</sup>, Anderson and Smith<sup>[10]</sup> et al. has analyzed the impact of reputation in the matching model on theoretically model, especially the latter also considers the relationship between reputation and PAM. In terms of reputation research on the VC market, Meuleman, Wright and Manigart et al. argue that reputation has an impact on VC's joint investment<sup>[11]</sup>, Ivanovs and Schmidt examine the role of reputation from the perspective of the relationship between bank financing and VC<sup>[12]</sup>. In addition, Zhang Yang's research on reputation has certain reference significance for the selection of reputation indicators in empirical research.<sup>[13]</sup> A simple search matching model is described here by Atakan and Ekmekci.<sup>[9]</sup>

Consider the quality of each participant in the search matching process may be “high” or “low”. Only natural information about the quality of participants is known. Possible non-negative output levels are assumed to be  $q_i$  among them  $i \in N, N > 1$ . For any pair of matches, the distribution of the corresponding output level is implicit. match  $\{H, H\}, \{H, L\}, \{L, L\}$  Achieve output levels  $q_i$ . The possibilities are  $h_i, m_i, l_i$ . According to the definition of probability, there is  $\sum_i h_i = \sum_i m_i = \sum_i l_i = 1$ . The expected output is  $H = \sum h_i q_i, M = \sum m_i q_i, L = \sum l_i q_i$ .

Everyone has opportunity to publicly observe its quality,  $x$  is the reputation factor. So for a reputation that is  $x$  and  $y$  match, the output level is  $q_i \geq 0$  Probability is

$$p_i(x, y) = xyh_i + [x(1-y) + y(1-x)]m_i + (1-x)(1-y)l_i \quad (8)$$

Thus, the expected output of this match is

$$Q(x, y) = xyH + [x(1-y) + y(1-x)]M + (1-x)(1-y)L \quad (9)$$

Due to  $q_i > 0, \forall i$  Established, there is  $Q(x, y) > 0$  At the same time, the match is always optimal.

In addition, the production function  $Q(x, y)$  Is bilinear, set constant  $\pi \equiv Q_{12}(x, y) = H + L - 2M$ . Therefore, supermodel requirements  $Q_{12} > 0$  Is equivalent to  $\pi > 0$  That is to say  $\{H, H\}, \{L, L\}$  with 2 times  $\{H, L\}$  Premium.

To meet the requirements of supermodel, according to the definition of Becker, this matching model is PAM.<sup>[14]</sup> Value function  $v(x) = Q(x, x)/2$ , so that there is

$$v(x) = \frac{1}{2}Q(x, x) = \frac{1}{2}\pi x^2 + (M - L)x + \frac{1}{2}L \quad (10)$$

Formula (10) indicates that the value function is strictly downward convex.

The simple model here shows that reputation has a positive effect on the value of venture capital or business, and there is also a PAM effect. In other words, reputation and investment experience have a positive relationship between venture capital institutions and companies to obtain better returns. The reputation of venture capital is positively related to the return of venture capital. The reputation of venture capital is positively related to the return of venture capital. In other reputation and investment experience have a positive effect between venture capital institutions and companies to obtain better returns.

## 5. Conclusion

We analyze the model based on dynamic matching, which shows that the transactions of SMEs and venture capital institutions with severe information asymmetry, such as geographical location, reputation, degree of specialization and cultural proximity, etc., can be contributed to information asymmetry or reduction. The factors affecting information asymmetry may promote SMEs to obtain investment from venture capital and promote the development of SMEs. However, in the process of acquiring venture capital, due to the existence of the phenomenon of proportional matching, SMEs must still choose the equivalent venture capital institutions.

This paper focuses on the positive assortative matching phenomenon to analyze the behavior of SMEs and venture capital in the financing market. The analysis of the impact of various specific



phenomena on SME financing strategies and entrepreneurial investment institutions remains to be further explored. In addition, the next work will be to conduct empirical tests through domestic venture capital market data to give more evidence.

However, because the empirical involves the choice behavior of the participants of both parties, it is difficult to test these causal relationships using the classical regression model, and the modern discrete selection model can only analyze the selection behavior of unilateral participants. Therefore, to more comprehensively verify relevant conclusions, structural model estimation techniques are needed. Because of the length of the article and the relative independence of the content, the bilateral matching structure is estimated to be expanded in detail in another article, thus providing more evidence for the conclusions of this paper.

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