Clustering as a Way to Lower Capital Barriers: The Case of the Cashmere Sweater Cluster in Zhejiang

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Abstract

Understanding how small enterprises overcome capital barriers is the key to understanding China's rapid development. The literature traditionally emphasizes the development of financial market to raise small amount of loan. By studying the division of labor in the cashmere sweater cluster in Puyuan and the cash flow in the course of daily operation, this paper, argues instead that industry clusters lower capital entry access through the division of labor; various entities in the cluster obtain the capital required for daily operation by taking advantage of individual social capital and endogenous capital in the cluster.

I. Introduction

A large body of literatures examines the relationship between finance and development. For instance, Schumpeter argues that the services provided by financial intermediaries—mobilizing saving, and facilitating transactions—are essential for technological innovation and economic development. A number of empirical studies seem to confirm the importance of finance for economic development. (Goldsmith, 1969; Mckinnon, 1973). For instance, at the country level, King and Levine (1993,) using data from 80 countries over the 1960-1989 period, present cross-country

evidence consistent with Schumpeter`s view that the financial system can promote economic growth. Using firm level data, Demirguc-Kunt and Maksimovic (1998) provide evidence on the importance of the financial system and of legal enforcement in relaxing the external financing constraints of firms and in facilitating their growth. Rajan and Zingales (1998) show that industries which are dependent on external sources of finance grow faster in countries with better developed financial systems. Rioja-Felix and Valev-Neven(2004) use panel data from 74 countries to test the effects of financial development on the sources of growth in different groups of countries. The results are consistent with the hypothesis that finance has a strong positive influence on productivity growth especially in more developed economies. In less developed economies, the effect of finance on output growth occurs primarily through capital accumulation. Ayyagari *et al.* (2006) use firm level survey data to present evidence on the relative importance of different features of the business environment. They find that only obstacles related to finance, crime and political instability directly affect the growth rate of firms. They further show that the result for finance result is the most robust of the three. These studies show that financial capital is closely related to economic development.

Since opening up and the beginning of reform in 1978, China has had rapid economic growth. Between 1978 and 2005, the average annual growth rate of China is 9.6%. Small and medium private companies have played an important role in China's economic development. However, these companies suffer from common financing difficulties. (Lin and Li, 2001; Yu, 2002; Wang and Zhang, 2003; Lin and

Sun, 2005) This raises the question as to how small and medium companies have overcome the capital barrier and realized rapid development? Traditional studies emphasize the role of informal finance in SME (small and medium enterprises) financing in China (Zhang and Li, 1990; Shi et al. 1998; Guo, Liu, 2002; Lin and Sun, 2005).

By studying the Puyuan cashmere sweater industrial cluster, one of the most dynamic private industrial cluster in the Yangtze Delta Area, this paper attempts to answer the above question from a different perspective. The remainder of the paper is organized as follows: Section 2 presents a theoretical model based on theories from related literatures in which industrial clusters lower the capital barrier; Section 3 introduces the development history of Puyuan's cashmere sweater cluster; Section 4 analyzes how the cluster increases access to capital through the division of labor; Section 5 explores how the cluster utilizes social capital to lower the required levels of daily working capital; Section 6 contains a statistics review; while the final section concludes.

II. Theoretical Model in which Industrial Clustering Reduces the Barrier to Capital

In the model, access to capital which is needed for industrial production is limited to access to entry capital and to working capital. The theoretical model on lowering the cost of capital access through the division of labor is based upon the social characteristics of China. The model consists of two parts:

A. Lowering the cost of accessing capital through the division of labor

The division of labor is an important part of Classic Economics. For instance, in the first chapter of *The Wealth Of Nations* (1776), Adam Smith elaborates on the importance of division of labor. Likewise, Young (1928) argues that increasing returns depend upon the progressive division of labor. Marshall (1920) points out that the division of labor is pronounced in industrial cluster. More recently, many case studies have confirmed the existence of division of labor in industrial cluster(Schmitz, 1995; Hayami et al, 1998; Sato, 2000; Yamamura, 2003; Sonobe and Otsuka, 2006); These studies show that the division of labor is closely related to industrial clusters and to economic development. Some researchers also noted that industrial clustering lowers the cost entry access into industrialization. Sonobe *et al.* (2002), in a study of a garment cluster in China, notes that "the establishment of markets significantly reduced the entry barriers to this industry." (page 121) Schmitz and Nadvi (1999) once stated that in industrial clusters "[p]roducers do not have to acquire equipment for the entire production process; they can concentrate on particular stages leaving other stages to other entrepreneurs." Therefore, "[i]t follows that investment capital is needed in small, rather than big, lumps. Moreover, working capital requirement are affected by clustering"(page 1505. However, these studies are not substantiated by solid evidence.

Based upon these previous studies and our observations, we introduce a model in which divisions of labor lower capital access barriers.

Within a cluster, it is very capital intensive to build an integrated procurement

process, to increase production and ultimately to increase sales. It is therefore a great challenge to many of those intending to enter into the industry. Industrial clusters divide the entire process into many divisions. Each of these is relatively independent of each other thereby greatly reducing investment costs for each division relative to those of an integrated conglomerate; the greater the number of divisions, the lower the investments for each division. Different divisions require different levels of initial investment. We order and then enumerate all of the investments for all the divisions from high to low; we also enumerate all the initial capital amounts possessed by all market entities in the cluster in the same order. The two arrays are then denoted in a same axis thereby creating a simple model of the division of labor which lowers capital barriers.

In Figure 1, the horizontal axis represents the types of divisions and the sequential order of groups of individuals, while vertical represents capital amounts. Within a given industry, integrated production requires large initial investments and hence only limited groups of individuals can access the entry. After divisions, the investment for each type of division is reduced and people can choose corresponding types according to their access to capital; those with capital amounts are over K1, choose type 1, while individuals between K1 and K2, choose type 2. Those with low amounts of capital may choose type N which requires the least capital. Over 100,000 participating entities in the Puyuan cluster manage to overcome capital barriers through this type of division of labor. This argument is supposed by the data obtained through investigation.

B. Utilizing Social Capital to Lower Transaction Cost Incurred by Division of Labor as well as Demand for Working Capital

Whether to adopt an integrated company or to divide labor is a question raised by, amoung others, Coase . He argues that corporate production incurs "the costs of organizing within the firm", whereas market division lead to "the costs of organizing in another firm or to the costs involved in leaving the transaction to be "organized" by the price mechanism."(Coase, 1937). According to these theories, the more divisions in a cluster, the higher the transaction costs. In other words, clusters takes advantage of the division of labor to lower capital access but they it also incur higher transaction cost which in turn will raise capital threshold. However, China is a society where personal relations are very important and where social capital plays a key role in the daily life and commercial activities of Chinese people. (Zhang and Li, 2003) In China, market participants in industrial clusters take full advantage of social capital to lower transaction cost and to further reduce demand for working capital. The forms of social capital include low cost financing between individuals, oral agreements in place of formal agreements, credit purchases and sales along an industrial chain.

To summarize, industrial clusters lower capital access through the division of labor; market entities in the cluster reduce transaction costs resultant from the division through the full use of social capital and thereby further lower demand for working capital.

Brief Introduction to Puyuan Cashmere Sweater Industrial Cluster

Puyuan Township is located in northern Zhejiang Province, between Hangzhou and Shanghai. Historically, Puyuan has an important center for production of silk. In 1976, a collectively owned enterprise (Puyuan production cooperative) introduced 3 hand-shaken weaving machines and began to produce cashmere sweaters. This new product yielded great returns. In 1977, the output value of production rapidly rose to 300,000 yuan from 28,000 in 1976. As a result, since the end of 1977, this collective enterprise began to specialize in the production of cashmere sweaters. (Chen Xingming, 1996). This was the beginning of Puyuan's cashmere sweater industry. Since the 1980's, a large number of privately-owned businesses and some of the collective enterprises which has been engaged in other industries with unsatisfactory benefits began to produce cashmere sweaters. At the end of 1988, the local government created cashmere sweater markets near the national highway. In 1990, the output of the whole town was over 28 million and an estimated 90% families of Puyuan Town and peripheral villages were engaged in the production of cashmere sweaters. In 1994, Puyuan's sweater production capacity reached 10 million with market sales exceeded 2 billion yuan making it the largest distributing centre of cashmere sweaters in China. In 2004, there were over 3,900 enterprises and family workshops in the Puyuan Township engaged in the production of a variety of cashmere sweaters. There are more than 6,000 sweater dealers in the market, over 50,000 people were involved in the cashmere sweater production and the market transaction turnover topped 10 billion yuan with business volume amounts to nearly

500 million pieces[1].

III. The Puyuan Cashmere Sweater Industrial Cluster Lowers Capital Access through Division of Labor

In the Puyuan cashmere sweater industrial cluster, there are more than 10,000 market entities (such as manufacturing enterprises, family workshops, dealers, etc.) which form the production chain in the entire cluster through division of labor.

The Status of Division of Labor in the Industrial Cluster

Starting from the production process and organizations, we examine the divisions in Puyuan cashmere sweater industrial cluster. Figure 2 describes its main production process

On the basis of the labor division of the production process, there are primarily two types of production organizations. The first is an integrated production organization with big manufacturing factories as the core. "Big factories" here is only a comparative concept as in Puyuan it refers to the manufacturing enterprises in the industrial park. The Puyuan industrial park was established in 2000, and currently contains 121 factories which engaged in the productionm of cashmere sweater. After these big factories purchase the raw materials from the yarn dealers, the weaving process is completed inside the factory; semi-finished goods are outsourced to specialized dyeing factories and finishing factories. After this process, the products are then ironed, sorted and packaged inside the factory before being ultimately sold in the market. This organization consists of four kinds of labor division: large

manufacturing factories, yarn dealers, dyeing factories and finishing factories.

The second is a virtual enterprise model in which the market clothing dealers play a key role. When the dealers receive the orders or believe that a certain style sells well, they go to the raw material market to purchase the materials. The materials are then are delivered to the family workshops specialized in weaving. When the weaving is finished, sweater dealers send the semi-finished goods to the dyeing factories after which the goods are sent to the finishing factories. Printing and ironing workshops receive these goods when the finishing is over. After all of these processes, the products are carried back to the dealers' workshops, packaged and sold. In this organizational model, the raw materials are frequently transported from one processing point to another resulting in a number of three-wheeler drivers specialized in transportation. The involved division of labor in the industrial cluster includes: clothing dealers, yarn dealers, family weaving workshops, dyeing factories, finishing factories, printing workshops, ironing workshops and three-wheeler drivers engaged in transportation.

Explanatory note: The dashed-line chart in the figure represents the production processes of the sweater dealer, the solid arrows denote the actual flow route of the raw materials and semi-finished goods, and the dashed arrows show information exchange among the entities

After transactions are closed on the market, the products need to be transported. Since transportation is mostly long-distance, it is not economical for the buyers to transport goods themselves consequently leading to the establishment of logistics companies in the Puyuan cashmere sweater cluster.

Types of Labor Divisions in the Cluster

According to the above analysis, we identify ten primarily types of division of labor that directly relate to the product manufacture in the Puyuan cluster: yarn dealers, large manufacturing factories, family weaving workshops, dyeing factories, finishing factories, printing workshops, ironing workshops, sweater dealers, three-wheeler drivers and logistics companies. Table 1 presents the number and main characteristics of each of the ten types. The table shows that the ten kinds of labor division types differ significantly in terms of numbers. This difference is attributable to differences in their unique characteristics. Logistics companies require enormous investment and large scale, as a result, there is only one in Puyuan; There are very few dyeing and finishing factories since they are capital intensive and subject to pollution control by the government. Large factories need to build factory buildings and purchase large-scale assembly-lines, involving large investment thereby they are also not numerous. Likewise, printing and ironing workshops need a certain amount of equipment investment. While the processing procedure is very simple and they can deal with a large number of products in unit time, however, they are subject to unified management by the government resulting in their not being numerous.

The remaining yarn dealers, family weaving workshops, sweater dealers and

three-wheelers are numerous because the required investment is relatively small and there is less governmental regulatory control.

Lowering capital access barriers through the division of labor

In August and December of 2005, we conducted two sample investigations in Puyuan during which we visited more than 140 entities and gathered 126 effective questionnaires. The overall results of this investigation are described in table 2.

Since divisions differ greatly in terms of the modes of investment, the survey differed according to their features. We studied the capital investment that the respondent needed in order to maintain normal operation at the present point in time. For production, we investigated the present discounted value of the fixed assets, the annual rent for factory buildings and the fund required for inventory, etc; For the sales department, this includes the annual rent for the department, tax (the sale department includes tax), the fund required for inventory, etc; for three-wheeler, it refers to the present discounted value of the transportation vehicles. The mean, maximum and minimum investment required for each division and the standard deviation of the panel data are shown in Table 3.

The table shows that a three-wheeler requires the lowest average investment so individuals who buy a 3-wheeler can easily enter the production chain of the cluster. There are two types of 3-wheelers: the electric may cost several thousands yuan while the man-powered one costs less than 1,000 yuan. Three-wheeler drivers mainly come

from Henan, An'hui and other provinces.

The ironing workshop requires an average investment of over 40,000 yuan and, due to the government plan, they are concentrated in a designated zone in the industrial park where gas is supplied in a unified manner. In terms of investment, differences among the workshops are rather small. The average investment for family weaving workshops exceeds 70,000 yuan, and production scale of this type is rather flexible with significant differences in the sample. People with low amounts of capital may buy a second-hand machine for around 1,000 yuan to start production, while richer ones may buy larger quantities and higher high-grade machines.

Printing workshops need more expensive machines than the weaving ones with average investment exceeding 100,000. So whereas there is little difference among the machines, there may be a significant difference in terms of the number of purchased machines. The yarn dealer's investment goes towards rent and inventory. If goods are sold on a commission basis, then they take up less fund and dealers do not have bear the risk of maintaining an inventory; but if dealers purchase goods based upon their personal assessment of the market, purchase from the producer and sell it themselves, there may exist inventory risk which results in higher investments.

In terms of paying rent and the need to maintain inventory, sales departments are similar to yarn dealers. Most sales departments are also similar to the headquarter of a virtual enterprise through which each link along the production chain is mobilized. Dyeing and finishing factories require large equipments and are suitable for mass production and therefore typically require large investment and scale. Furthermore,

they are subject to pollution control by the government. Large manufacturing factories consist of various processes and they generally have their own brands or OEM production authorized by a non-local large manufacturer. Since they need to set up large factory buildings and purchase assembly line equipments, their investment is relatively larger. The logistics company requires large parking and offloading areas as well as a transport team. This necessitates very large amount of investment.

A completely integrated company which including all of the production process with the exception of the logistics company requires an average investment of over 10 million RMB yuan, an amount which clearly exceeds the capital of most individuals. Large manufacturing factories in the cluster bear resemblance to the integrated company in terms of division type. It consists of many processes and requires an average investment of over 7 million yuan and therefore only a few can afford to enter.

Figure 5 plots the cost of the investment for each type of division and for the integrated company thereby creating a tendency chart of investments for different types of division. The figure clearly shows that investments differ among different divisions with a shape resembling a staircase. The investment required for an integrated company is higher than those for most types of division. In combination with the number of each type of division in Table 1, one can see that sales departments, yarn dealers, family weaving workshops, printing workshops, ironing workshops and three-wheeler drivers account for over 96% of total entities in the cluster. In other words, the division of labor in the Puyuan cashmere sweater

industrial cluster facilitates the entry into industrial production by numerous people with low capital.

The division of labor in the Puyuan cluster reduces the capital access for every specific classification so that different individuals are able to choose the type of division corresponding to their own capital (including self-owned capital and those raised from social relations) and enter into the production chain of the cluster This supports the model presenting earlier in the section.

Industrial clusters lower the need for working capital through social capital

While the division of labor lowers the capital cost to access the industrial cluster, after entry firms still encounter capital barriers in the course of daily operation. In order to control risks, state-owned commercial banks in China rarely lend money to small enterprises (Wang Xiao and Zhang Jie, 2003; Lin Yifu and Sun Xifang, 2005). Family workshops in the form of self-employed worker and sales departments have even more difficultly to obtain financial support from banks. Table 4 shows the proportion of bank loan lent to the different types of labor division within the cluster in question. The table shows that logistics companies, dyeing factories, finishing factories and large manufacturing factories have a greater likelihood of having a loan while the numerous low capital classifications generally do not have loans. Nevertheless, for production purposes, many self-employed workers still need certain amounts of capital for their daily operation (due to production cycles and inventory maintenance, etc.). This constitutes a formidable challenge for those self-employed people with insufficient capital. .

How do the numerous small capital market entities in the Puyuan cluster overcome working capital shortages? Figure 5 has a breakdown of by labor division of the sources of funds for daily operations. Yarn dealers, family weaving workshops, printing and ironing workshops as well as the three-wheeler drivers - all of which are small capital entities - mostly borrow from relatives and friends and seek help from upstream and downstream enterprises. 'Relatives and friends' are the main components of one's individual social relations. We define individual social capital as social resources which can be utilized through individual social relations. While the relation between upstream and downstream enterprises arises from within the industrial cluster, it can also be defined as a type of endogenous capital in the cluster. The study of the Puyuan industrial cluster has shown that various small capital market entities have overcome barriers to working capital by utilizing individual social capital and endogenous capital in the cluster.

Utilizing individual social capital to provide working capital

China is a society where personal relations are very important. In China, social groups are often formed on the basis of relatives to engage in various undertakings (Fei Xiaotong, 1985). Individual social capital provides private financing. Figure 5 shows that, in Puyuan's cashmere sweater industrial cluster, three-wheeler drivers tend to seek help from relatives and friends when they have working capital shortage; Likewise, about half of the numerous low investment market entities such as family workshops, raw materials and finished products sales departments tend to borrow from their relatives and friends; over 1/3 of large manufacturing factories, dyeing and

finishing factories get private financings from relatives and friends to overcome the capital shortage even though they are capable of acquiring bank loans. This underscores the important role of individual social capital in providing required working capital.

Individual social capital also provides a platform to share information and decision making, reduce operating risk and to help to fill the working capital gap. In the Puyuan cluster, there is an clear concentration of social relations in terms of space. Among our samples, most owners of large manufacturing factories come from 4 cites in the province: Tongxiang, Wenzhou, Taizhou and Shaoxing. Likewise, family weaving workshops are mainly run by people from the Hunan and Anhui provinces. In the sample, people coming from Hunan accounting for one third while people from Anhui represent nearly 20 percent. Additionally, own investigation shows that individuals tend to do similar jobs in the same places. The social capital derived from geographical relations facilitates market information exchange, production decision making and hence reduces operating risks.

Utilizing endogenous capital in the cluster to lower requirements for operating capital

Previously, we defined seeking help from upstream and downstream enterprises with the cluster as a type of endogenous capital in the cluster. There are close connections between upstream and downstream enterprises in many aspects. Here we examine the connections between them in operating capital.

Transfering financial pressure to large enterprise and state-owned commercial bank through capital credit between upstream and downstream enterprises

In the Puyuan industrial cluster, capital credit starts from the stage of yarn purchasing. When individuals purchase yarn from yarn manufacturers in other location, the initial trade generally does not involve credit. However, after this occurs several times, yarn dealers can often take the goods before payment due to the mutual trust which has been established.

Likewise, when a sales department is going to organize production, first they will raw materials on the yarn market, usually from familiar yarn dealers and therefore they can also buy the material but pay at a later point in time. The same thing happens sales departments send raw materials or semi-finished goods to family weaving workshops, dyeing factories, finishing factories, printing workshops and ironing workshops for processing as payment is also made after processing; Only after sale of the products can the sales department pay the processing fee to the workshops and factories, followed by the payment made by the yarn dealer to the non-local yarn manufacturers for the raw materials provided. Table 6 shows that most market entities suffer from credit constraints. According to our survey, credit is very important. Broadly speaking, only unfamiliar clients are asked for an immediate payment, and after several transactions, payment will be made after delivery (or processing) of goods.

This common practice of accounts credit transfers the capital pressure in each link of the cluster to large enterprises and state-owned commercial banks outside the

cluster, and result in much lower requirement for daily working capital. The finished clothing dealer can organize production with a low working capital through credit purchases from processing workshops and yarn dealers; yarn dealers purchase raw materials on credit and transfer the capital pressure to the non-local yarn manufacturers; yarn manufacturers are usually large enterprises with abundant capital, which helps company to obtain bank loan easily. Through the bank loan, part of the capital pressure has been passed onto the state-owned commercial banks. From this pressure transferring chain, we can see that the cluster makes full use of the relations between upstream and downstream enterprises, i.e., endogenous capital in the cluster, and transfer most capital pressure to large enterprises and banks. This is the equivalent to obtaining financial support from the bank and thereby reduces the daily capital demand significantly. But this behavior also carries potential risk. If a large financial crisis occurs, credit collapse will be transmitted to midstream and downstream along the industrial chain and, in turn, will impact the numerous small and medium sized enterprises which have little access to state-owned bank loans.

Guaranteeing the normal operation of production chain on credit trade through flexible account settlement

Credit trading among upstream and downstream enterprises lowers the demand for daily operating capital. However, there exists a potential risk as trade credit builds up, one link of the production chain may collapse due to the heavy load. For instance, even though yarn dealers could transfer credit pressure from others to the yarn manufacturer by means of credit, they still need a certain amount of capital to

maintain normal operationms (e.g. rent, salary, etc), and the credit to the yarn manufacturer is not infinite. Alternately, clothing dealers often owe family workshops trade receivables, and workshops in turn have to postpone capital pressure by means of salary payables; However, there is always a deadline for payment. Therefore, trade credit is crucial to maintaining normal operation of the production chain.

There are four principal manner of settlement in the Puyuan cluster. The first one is to make settle after a given but irregular period of time generally once per month, 3 months, half a year even one year. The second one is to settle once the accrued amount reaches a set amount, for instance, settling accounts when the sum reaches 100,000 yuan; The third is to settle according to the financial status of the debtor and creditor enterprises, i.e. debtor enterprises will settle their debt once they have sufficient capital, but when the creditor enterprises are in urgent need of capital (e.g. paying salaries to workers), debtor enterprises will settle part of the capital to help out creditor enterprises; The fourth one is to settle according to production batches.

We examine the third manner in greater detail. In the Puyuan cluster, different production batches mix together, therefore various ways of settlement coexist. Furthermore, each entity may settle in different manner depending on the partner or the period of time. In order to better understand the situation, we asked each interviewee about the main ways of settlement in 2004. Given the similarity in the quantity of samples and characteristic of the division types, we combine large manufacturing factories and dyeing and finishing factories into one category, and then put the family weaving workshops, printing and ironing workshops together into one

group. The three-wheeler drivers and logistics companies seldom use credit, so they are not counted. Table 7 shows the data on the 4 main ways of settlement adopted by the market entities in 2004. We can infer that large factories usually choose to settle the debt according to time and batches, and that the time is relatively fixed: mainly every month or every three months. Due to their more complete financial and management system, their ways of settlement are relatively standardized. On the other hand, yarn dealers, clothing dealers, and workshops are rather flexible, and open to adjustment according to the financial status of both parties.

This flexible settlement method fits well in a complex society by mutually financing and trading on credit to the maximum extent and by ensuring the normal operation of the production chain in the context of trade credit by avoiding collapse of any single link.

To lower the transaction cost in the cluster and save the operating capital by using oral agreements to replace formal contract

In the Puyuan cluster, the division of labor is rather detailed, and trade credit among different divisions is very common. If formal contract would be adopted in transactions in the cluster, very large transaction costs would be incurred. These costs would then be distributed among the market entities in the cluster and consequently lead to considerable increase in the levels of working capital required. However, in the Puyuan cluster, the replacement of formal contract by oral agreements helps to prevent this problem.

We can obtain rough image of disputes are settled among market entities from our on-site interviews. Table 8 depicts the main solutions that different types of division in the cluster may choose when the disputes between upstream and downstream enterprises take place. We see that large enterprises opt for the legal ways while the numerous small investment market entities prefer out-of-court settlements. When asked about why they did not use legal channels to solve the problems, their answers were similar to 'We do not have a formal contract so there isn't any reliable evidence when it comes to lawsuit, and we can not afford to it either.'

In the Puyuan cluster, while many large enterprises sign business contracts, numerous small capital market entities rarely sign formal contracts instead preferring oral agreements. The following example illustrate how oral agreements operate:: when a sales department sends a batch of yarn to the family weaving workshop for processing, all he need is an oral agreement about the desired weaving, the time of delivery, and the time and manner of settlement with the workshop. No formal contract is required. In this case, ensures the execution of the agreement? Actually there large numbers of family weaving workshops and sales departments in the Puyuan cluster and market approximates perfect competition. If the family weaving workshop cannot insure the delivery schedule and the quality of the goods, it may lose their cooperative partner. Even if they have cooperated with each other for a long period, this is possible given the abundance of potential substitutes. Conversely, why does the sales department not violate the oral agreement of payment due to the abundance of substitutes? In practice, this seldom happens, because an unfamiliar

workshop offers no guarantee regarding quality. Furthermore, it takes time and cost to establish a new cooperation so the sales department will not break up the oral agreement easily. The balance that is formed on the basis of mutual long-term interests has maintained the common practice where oral agreement is replaced by formal contract in the cluster.

Statistic tests

In the first several sections of this paper, we discussed how the Puyuan cluster lowers barriers to the access of capital through the division of labor and lower the requirements of operational capital through the use of social capital. This section utilizes the survey data to test the qualitative evidence by statistics method.

What should be tested? The Puyuan cashmere sweater industry is a low technology industry where the intrinsic difference of the operating type between market entities is the combinative degree of the capital and the workforce. That is, individuals enter the industrial cluster according to their own financial, human and social capital. Consequently, we examine whether the difference of the three capitals is significant different among the different combinative types of capital and labor.

First, we examine the level of combination of capital and workforce in the sample data. The quantities of capital and labor are used as indicators for comparison. The specification index is defined based upon the capital and labor ratio. The distribution chart of the Figure 6 is obtained by utilizing the Kernel Density Estimate and taking logarithm of the proportion of the capital and labor quantity. Figure 6 shows that, in the sample data, the combination of capital and labor is concentrates on

two areas thereby leading us to divide the sample into two types of enterprises, capital intensive and labor intensive.

We also classify investment capital, bank loan as financial capital; degree of education, age, and years of engagement represent human capital; whether using social capital to overcome credit constraints. Table 9 shows the result of the statistic test after comparing the differences among the 3 kinds of capitals in the two types of enterprises.

The table shows that inital capital investment is the key factor affecting the choice of division when individuals enter the industrial cluster. The two kinds of enterprises differ significantly in terms of bank loans with capital intensive enterprises having more access to bank loans and labor intensive ones having difficultly obtaining bank loans. These two results show that financial capital has an important impact on the choice of setting up labor intensive or capital intensive enterprises. Individuals with high financial capital and access to bank loans tend to choose capital intensive enterprises. This represents an inclination in choosing production enterprises with higher investment in a specific type of division.

The owners of the two types differ not much in terms of years of engagement. However, there is a remarkable difference in the degree of education. Owners of capital intensive enterprises have higher levels of education than other owners. The several test results show that human capital also influences the choices of enterprise type.

There is also a great difference in terms of choice of enterprise type based upon

being a native of the province or being from another province. Native individuals can mobilize more social capital and are therefore capable of setting up capital intensive enterprises. There are also marked differences in the key methods to meet working capital need. Capital intensive enterprises have access to more bank loans, and to more channels. These two results underscore the role of social capital in the choice of enterprises.

To summarize, within an industrial cluster, individuals match their type of division in the production chain with their own financial, human and social capital. The three capitals integrate with and substitute for each other and form an individual's comprehensive capital The industrial cluster provides an entry and development channel for individuals with different comprehensive capitals.

Conclusions

The economic development of China over the past twenty years has been widely recognized. The numerous small and medium scale private enterprises which gradually emerged in the small towns and countryside areas have played an important role in the creation of this success. Traditional theory stresses the importance of the capital in this process of industrialization. We observe that if a peasant or worker has become self-employed (i.e. setting up a small factory or do business himself), the primary problem faced is how to raise the startup capital. However, the state-owned commercial banks rarely offer loans to the small pioneers in order to control risk. As a

result, in order to understand the miracle of China's economic growth, one has to understand how these numerous small enterprises overcome the capital barrier and enter the industrial production.

This paper answers the above 2 questions from two perspectives by studying the most dynamic private industrial cluster in the Changjiang Delta area.

1. The industrial cluster lowers the access capital barriers of each classification through the division of labor thereby enabling individuals to choose the appropriate type of division according to their capital and to enter the production chain in the cluster. The more detailed the division of labor, the easier it is for people with different talents and endowments to find their own position. In our case study, there are 10 kinds of types of division which are directly related to production with entry capital levels ranging from thousands yuan to over 10 million yuan. This division of labor has enabled over 10,000 market entities (including big or small enterprises, family workshops, sales departments, three-wheeler drivers, etc.) to enter into the industrial production.

2. In the course of daily operations, most entities inside the cluster have solved the shortage of daily working capital by utilizing individual social capital and endogenous capital in the cluster. Each market entity acquires private financing to overcome the temporary capital shortage by means of individual social relations. Through credit among the upstream and downstream enterprises of the cluster, the capital pressure is transferred to large enterprises outside of the cluster which can obtain loans from the state-owned banks. As a result, the small investors in the cluster

effectively obtain bank loans. The flexible ways of account settlement enable normal operations as a result of trade credit. In daily operations, oral agreement substitute for formal contracts and therefore lower transaction costs and save working capital.

Generally speaking, in the literature and in practice, there is great emphasis placed on the importance of developing small credit in order to directly solve shortage sof capital in a formal or informal manenr. Our research indicates that through industrial clustering and social capital, the entrepreneurs have found an effective method to lower barriers to access to capital and to overcome shortages of operating capital. This finding contributes to traditional development economics by suggesting that in addition to removing the primary main limiting factors, constraints can be transformed into the driving forces for innovation.

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Table 1 The number of firms by type

Types	Number	Main Characteristic
Yarn dealer	250	Yarn market dealer required
Large manufacturing factory	121	Factory building, assembly line, mass production required
Family weaving workshop	3518	Leasing family workshop, small equipment, small-lot production required
Dyeing factory	23	Factory building, large size equipment, governmental pollution control required
Finishing factory	42	Factory building, big equipment, governmental pollution control required
Printing workshop	100	Family workshop, certain amount of equipment, mass production required
Ironing workshop	100	Family workshop, certain amount of equipment, mass production required
Sweater dealer	5750	Sales department required
Three-wheeler drivers	2000	Electric or manpower tricycles required
Logistics company	1	Big parking ground, loading ground, a transport team, large investment and capability of coordination required

Data source: Puyuan Township Statistics Center, Administrative Committee of Puyuan Industrial Park and Market Management Committee.

Table 2: Overall status of the investigation samples

Type of labor division	Number	Total	Percentage of sample out of Total (%)
Yarn dealer	11	250	4.4
Large manufacturing factory	14	121	11.5
Family weaving workshop	32	3518	0.9
Dyeing factory	5	23	21.7
Finishing factory	6	42	14.3
Printing workshop	5	100	5.0
Ironing workshop	3	100	3.0
Sweater dealer	39	5750	0.7
Three-wheeler drivers	10	2000	0.5
Logistics company	1	1	100.0
Total number of samples	126		

Note: Variations in the number of each type are mainly due to variations in the total number and internal differences within the same type.

Table 3: Required investment by type of division

Types of division	Avg. investment	Max. investment (10,000 yuan)	Min. investment (10,000 yuan)	Standard deviation
Yarn dealer	12.45	30.00	3.00	7.76
Large manufacturing factory	731.74	1628.60	105.60	428.86
Family weaving wo rkshop	7.31	43.00	0.22	8.49
Dyeing factory	383.96	963.36	200.00	326.12
Finishing factory	649.50	889.20	269.80	257.93
Printing workshop	10.60	20.00	6.00	5.73
Ironing workshop	3.83	4.50	3.00	0.76
Sweater dealer	12.74	50.00	2.00	9.16
Three-wheeler drive rs	0.55	1.20	0.05	0.38
Logistics company	4000.00	4000.00	4000.00	0

Data source: Based upon survey data collected by author

Table 4: Comparison of loans acquired between different types of divisions of labor

Types of division	Have loan	Total Number	Percent with bank loan
Yarn dealer	1	11	9.09
Large manufacturing factory	10	14	71.43
Family weaving workshop	2	32	6.25
Dyeing factory	5	5	100.00
Finishing factory	5	6	83.33
Printing workshop	1	5	20.00
Ironing workshop	0	3	0.00
Sweater dealer	6	39	15.38
Three-wheeler drivers	0	10	0.00
Logistics company	1	1	100.00

Data source: Based on survey data obtain by the author

Table 5 Main Solutions to Addressing Daily Working Capital Shortage Adopted by Different Types of Division

Types of Division	Borrowing from Relatives and Friends (%)	Borrowing from State-owned Banks (%)	Seek help from Upstream and downstream enterprise (%)	Other channels (public fund Raising and private financing) (%)
Yarn Dealers	63.6	0.0	27.3	9.1
Large Production Factory	50.0	42.9	0.0	7.1
Family Weaving Workshops	53.0	0.0	47.0	0.0
Dyeing & Finishing Factory	36.4	54.5	9.1	0.0
Printing & ironing workshops	62.5	0.0	37.5	0.0
Sales department	56.4	7.7	33.3	2.6
Three-wheeler drivers	100.0	0.0	0.0	0.0
Logistics company	0.0	100.0	0.0	0.0

Note: Since dyeing and finishing factories share similar features and since the respective samples are insufficient, we group the two together in order to better represent the actual situation; Likewise, printing and ironing workshops are also grouped together.

Data source: Based upon survey data obtained by the author.

Table 6: Credit Status of Different Divisions in Daily Operation

Types of division	Proportion of credit to upstream enterprises (%)	Proportion of credit by downstream enterprises (%)
Yarn dealer	100.00	90.91
Large manufacturing factory	92.86	85.71
Family weaving workshop	——	100.00
Dyeing factory	——	80.00
Finishing factory	——	100.00
Printing workshop	——	100.00
Ironing workshop	——	100.00
Sweater dealer	94.88	76.92
Three-wheeler drivers	——	10.00
Logistics company	——	0.00

Note: The concept of upstream or downstream enterprises does not apply for those market entities which only engage in one process. Those which give products to such entities can be regarded as either the upstream enterprise or the downstream enterprise. We hereby define them as downstream enterprises those trading with them

Data source: Based on survey work by the author

Table 7: The main ways of settlement in operation among different types of division in 2004

Types of division	By time (%)	By accrued amount (%)	By mutual financial status (%)	By production batch (%)
Yarn dealer	36.4	9.0	45.6	9.0
Large manufacturing factory & Dyeing and finishing factory	80.0	0.0	0.0	20.0
Family weaving workshop & printing and ironing workshop	60.0	7.5	27.5	5.0
Sales department	30.8	5.1	61.5	2.6

Data source: survey work by the author

Table 8: Main solution to disputes between upstream and downstream enterprises in different types of division

Types of division	Lawsuit (%)	Out of court (%)	Mediation (%)
Yarn dealer	0.0	90.9	9.1
Large manufacturing factory & Dyeing and finishing factory	56.0	40.0	4.0
Family weaving workshop & printing and ironing workshop	0.0	97.5	2.5
Sales department	10.3	89.7	0.0
Three-wheeler drivers	0.0	100.0	0.0

Data source: Survey work by the author

Table 9: Statistics Test

			Labor intensive	Capital intensive	P-VALUE
Financial capital	Logarithm of the invested capital (mean value)		0.7967	3.5223	0.0000
	Bank loan (percentage)		6.28%	33.33%	0.0010
Human capital	Years of engagement (mean value)		5.8409	6.9136	0.1673
	Years of education (mean value)		8.7273	10.1481	0.0008
	Age (mean value)		34.6591	38.4691	0.0076
Social capital	Local people(percentage)		13.64%	72.84%	0.0000
	Key daily financing channels	Relatives and friends(percentage)	61.36%	55.56%	
		State-owned bank (percentage)	0.00%	18.52%	
		Upstream and downstream enterprises (percentage)	38.64%	22.22%	0.0050
		Others (percentage)	0.00%	3.70%	

Data source: Calculation by the authors

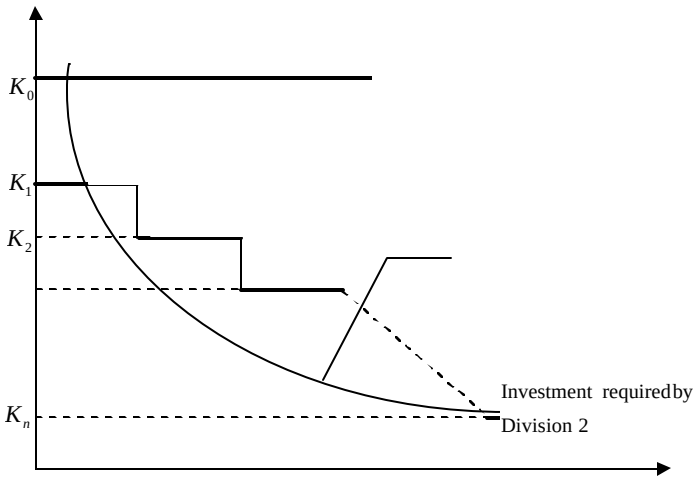

Figure 1 Individuals choosing divisions according to different amounts capital

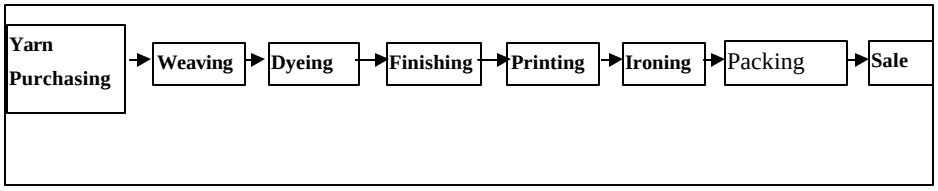

Figure 2: Main production process of Cashmere

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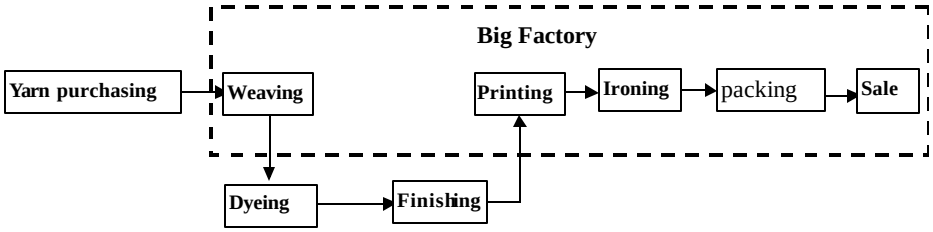

Figure 3: Integrated production organization

Note: The dashed-line chart in the figure represents the production process of the big factory, the arrows show the flow route of the raw material and semi-finished goods in the manufacturing procedure.

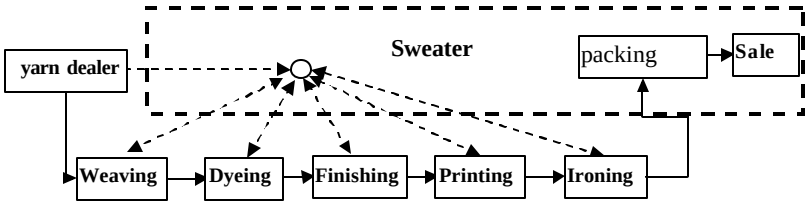

Figure 4: Virtual enterprise organization

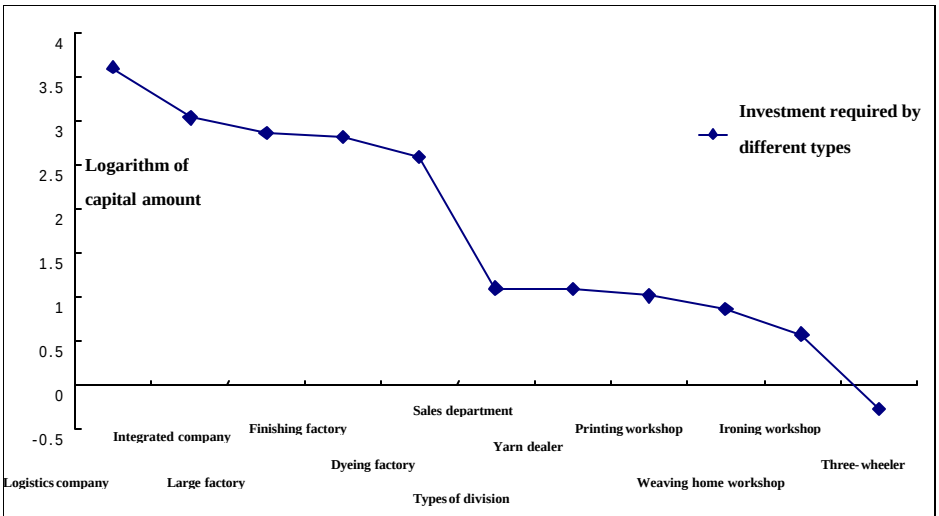

Figure 5: The tendency chart of investment

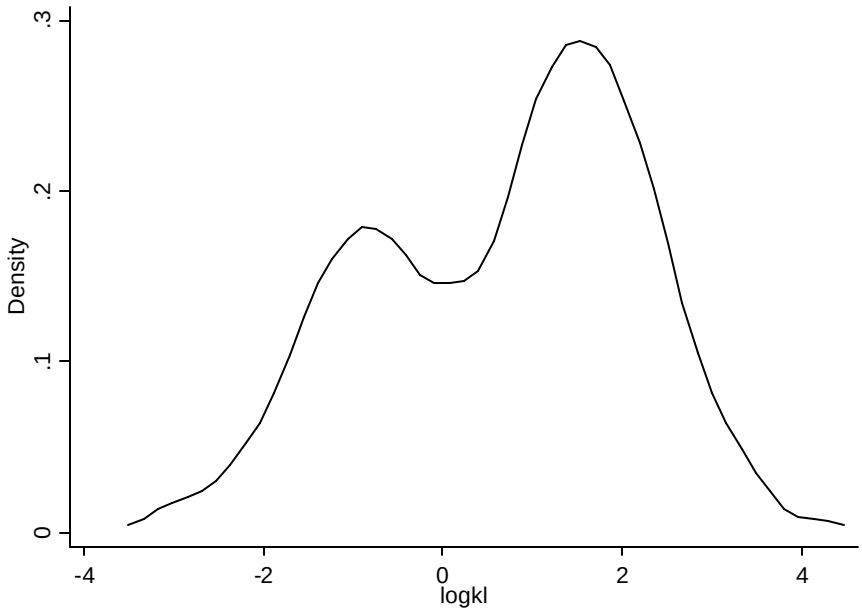

Figure 6: Sample distribution according to capital labor ratio