How Horizontal Integration affects Transaction Costs of Rural Collective Construction Land Market? An Empirical Analysis in Nanhai District, Guangdong Province, China

Abstract: High transaction costs caused by dispersed and fragmented tracts, insecure tenure and incomplete information in rural land market has become a common issue in the transition economies. Horizontal integration may economize on transaction costs but aggrandize governance inputs. Therefore trade-off between integration and governance is one of the biggest challenges in land commercialization and rural restructuring worldwide. Resorting to a field survey in Nanhai District, Guangdong Province, this work estimates how the transaction costs of rural collective construction land are influenced by the horizontal integration degree and the level of self-organization governance of collectives. Four Tobit models are constructed based on the scale of collectives and the results show that: (1) There is an almost U-shaped relationship between the horizontal integration degree of the collectives and the transaction costs. The horizontal integration among shareholders can not only centralize the fragmented land assets from individual farmers and reduce the transaction costs of rural construction land, but also result in organization costs. The transaction costs are not decreasing as the horizontal integration increases until the transaction costs saved are equal to resultant organization costs. (2) The more collective leaders, the higher organization costs and the more opportunism behaviors, which will give rise to the transaction costs. This suggests that the Chinese authorities should strengthen the ongoing efforts to reduce the transaction costs of market and improve the efficiency through a more transparent and accessible market and optimal scale of horizontal integration of the collective. Our work sheds some light on the mechanisms at play in the reform and innovation of rural grass-root governance and it contributes to a better understanding of land-based shareholding cooperation system and nature of ongoing rural construction land market in China and transitional economies.

Keywords: horizontal integration; organization governance; transaction costs; asset specificity; transaction uncertainty; transaction frequency; rural collective construction land (RCCL)

1. Introduction

The inability to convert property into usable assets is the main barrier to economic prosperity in the developing countries (De Suto, 2000). Rural land market could help the economy to realize considerable gains in productivity (Benjamin and Brandt, 2002). In order to activate land asset, many transition countries, including the former Soviet Union (Lerman and Shagaida, 2005; Shagaida, 2005; Borodina, 2007), Central and Eastern Europe (Deininger *et al.*, 2012; Jazoj *et al.*, 1997; Ciaian, 2001), Southeast Asia (Vietnam, Laos and Cambodia) (Deininger and Jin, 2005, 2010; Do and Iyer, 2008; Nguyen, 2012), have tried to

construct market mechanism through land reform targeting de-collectivization and transformed the economies from centrally-planned to market-oriented since 1990s. The restitution and distribution of land property to individuals in the transitional economies have largely minimized the self-organization and supervision costs and released household production potentials in comparison with that in large state and collective farms in the centrally planned period. For example, Vietnam has become the fastest economic growth and rice export country from the poor and rice importer (Deininger and Jin, 2005).

However the restitution and distribution of land property greatly increased fragmentation of tracts at the same time (Lerman, 2005; Bordina, 2007; Savasanao and Scanidizzo, 2009; Melnychuk *et al.*, 2005).Without complete land registration and certification system, clear delineation of property rights, symmetry information, the land market may not work efficiently because of extremely high transaction costs associated with the overly fragmented land ownership (Deininger *et al.*, 2012; Shagaida, 2005). Thus, the optimal scale of farm that coordinates transaction and governance costs through horizontal and vertical integration among individual households (Angelovska *et al*., 2012) is one of the most important issues facing the governments and rural governance in deepening reform and land market construction in the transitional economies.

As one of the fastest growing countries, China has undergone the similar process of successful land reform and brought about rural prosperity as above mentioned transitional economies worldwide since 1978. The rapid rural development fuels industrialization and urbanization with agricultural surplus (Chen, 2004). While the rapid development of industrialization and urbanization in China has drawn migrants from inland rural areas to coastal urban areas (Long *et al.*, 2007, 2009, 2012; Tang *et al.*, 2012), stimulating the increasing demand for construction land (Tang *et al*., 2012). The construction land for urban developers in urban areas became more and more expensive year by year.

Compared with urban construction land, rural collective construction land (RCCL) is abundant and relatively cheaper. In the early 1980s, taking the advantage of the geographical location and the reform and opening up policy, the local governments in China's southeastern coastal areas, such as Guangdong Province, encouraged the development of township and village enterprises (TVEs). A great number of Hong Kong, Taiwanese and foreign investors have been building their factories on the rural land there (Po, 2008), which stimulated rural villagers to convert the arable land into non-agricultural uses. However, some TVEs have experienced a boom period and then gone bankruptcy because of inappropriate management and weak competitiveness, leading to a large number of stocks of scattered RCCL. For the sake of minimizing production costs, some small and medium scale urban developers preferred RCCL to urban construction land, on one hand; rural villagers have spontaneously developed a variety of strategies to sell or lease their construction lands to urban developers for non-agricultural uses, on the other (Po, 2008). So the urban developers have the incentives to conspire with village cadres to trade the RCCL privately, even take the adventure of legal punishment. And implicit RCCL market was pervasive at that time, whereas numerous rural land assets were embezzled by a few collective leaders. China tried to use market mechanism

to activate the sleeping rural land assets which are two times more than urban construction land.

However, a well-functioning RCCL market relies on low transaction and organization costs. Unlike the contiguous and large scale urban construction land, the RCCL is fragmented by farmland and scattering distributed. And high costs of information searching and contract negotiation hinder the functioning of RCCL market (Zhang *et al.*, 2017a).

Under this circumstance, land-based shareholding reform initiated in Guangdong Province in the early 1990s, and later spread to other regions in China (Fu and Davis, 1998; Po, 2008; Ito *et al.*, 2016). Individual farmers converted their land assets into shares and voluntarily joined together to establish the Rural Shareholding Cooperatives (RSCs) (Yi, *et al.*, 2017; Yep, 2015). The RSCs could re-collectivize the fragmented land from individual farmers and trade them in the market, transforming the multiple transactions between enterprises and individual farmers into one (Deng *et al.*, 2016). The bottom-up institutional innovation greatly reduces the costs of information searching, contract negotiation and transaction, and provides the necessary condition for RCCL market to operate.

Some local regulations and central institutional arrangements make RSCs transaction legalization. In 2005, Guangdong Provincial government locally issued *Regulation and Administration for the Management of Collective Construction Land Use Rights Transfer in Guangdong Province*, which is the first local regulation about the circulation of rural construction land. Eight year later, "*Establishing a unified market of urban and rural construction land" and "Rural collective construction land can enter the market, and has the coequal rights and prices with state-owned land*" was passed in the Third Plenary Session of the eighteen of the Communist Party of China (CPC) in 2013. Then 33 pilots of RCCL commercialization around China have also been legalized since 2015. The once implicit RCCL market can run explicitly.

However, due to the fact that the RSCs are formed by the horizontal integration of many individual farmers, the transaction costs can be economized, meanwhile resultant organizational costs are incurred. So the trade-off between integration and governance is a key to efficient RCCL market. What is the relationship between the size of the organization and the transaction costs in the transaction process?

Therefore, this paper tries to study the relationship between the horizontal integration of RSCs and transaction costs in RCCL market. In theory, the findings may enrich the literature on transaction cost economics which may provide the theoretical basis for the further study of organization efficiency and transaction efficiency in RCCL market. In practice, it sheds light on the reform of rural collective organizations, the innovation of internal governance structure and the improvement of the efficiency of rural asset disposal in transitional economies.

The paper is structured as follows: Section 2 proposes the research hypotheses. Section 3 introduces the study area, methodology and data. The results of the Tobit model will be presented and discussed in Section 4. Section 5 closes the work.

2. Theoretical framework and hypotheses

2.1. Theoretical framework

As shown in Fig.1, RCCL market in China has several characteristics. First of all, the suppliers (farmer households, rural enterprises and rural collectives) co-own the RCCL which is dispersed and fragmented spatially (Tan *et al.*, 2006; Zhang *et al.*, 2016). Without spatial replacement and consolidation of the RCCL, it is difficult for the owners to supply large and spatially connected plots in the market. Secondly, different suppliers play different roles in the market. Farmer households are always disadvantageous groups who have low negotiation ability to directly trade the collectively owned RCCL with urban developers because of weak organization degree and asymmetry information available (Cai and Qi, 2007). Contrary to farmer households, the collective cadres are *de facto* owners of the RCCL, who often take advantage of their powers and collude with enterprises to sell and rent the RCCL privately on behalf of the collectives. Thirdly, the demanders- urban enterprises prefer large scale and contiguous land to small and scattered one so as to meet the requirements of industrial agglomeration. Fourthly, mismatch of supply and demand of the RCCL incurs high costs and risks of transaction.

From Coasian transaction cost theory, each transaction in the market will generate transaction costs, including the costs of information searching, contract negotiation, and subsequent rental monitoring and enforcement (Coase, 1937). In general, the transaction costs depend on asset specificity, transaction uncertainty and transaction frequency (Williamson, 1971, 1979). The stronger the asset specificity, the higher the degree of uncertainty in the transaction and the higher the transaction frequency, the higher the transaction costs are. The RCCL is getting more and more expensive, and farmers are more dependent on it, which means that the asset specificity is high and easily leads to the "hold-up" behavior of the other parties, resulting in higher transaction costs. Transaction uncertainty includes uncertainty of behavior and environment. According to above analysis, rent-seeking and opportunism behaviors of village leaders driven by interests, lead to higher transaction costs. The uncertainty of transaction environment caused by the imperfect market mechanism and information asymmetry increases the costs of information searching and negotiating between the enterprises and farmers. In the case of high asset specificity and uncertainty, multiple bargaining between enterprises and farmers which means higher transaction frequency will be happened in the RCCL market, so the transaction costs will increase significantly (Deng *et al.*, 2016).

In such a context, the RSCs have emerged and demonstrated its necessity and advantages in the early 1990s in several regions like Guangzhou, Nanhai and Shunde in Guangdong Province. As one of the pioneers, Nanhai's shareholding reform operated on the basis of the village as an administrative unit, which is responsible for converting its collective lands and assets into shares so as to establish a land-based shareholding co-operative organization named RSCs (Po, 2008). This paper will study how the RSCs help to lower transaction costs based on empirical analysis in Nanhai District.

Firstly, through horizontal integration of individual farmers or households, the RSCs could concentrate the property rights of rural lands from individual farmers, then trade in the market, which avoids the frequent negotiation between the enterprises and individual farmers.

Secondly, before being traded in the market, the scattered land plots are often centrally consolidated into sufficiently large scale contiguous ones by RSCs (Jiang and Liu, 2004). These consolidated lands can not only meet the requirements of enterprises, but also reduce the costs of information searching in the process of RCCL transaction.

Thirdly, as the supplier of RCCL market, rural collective organization, whose governance structure has been innovating continuously since the reform of shareholding system. Rural collective economic organizations (RSCs) have taken their economic powers away from political organizations (Po, 2011; Chen, 2016), and the leaders of each organization have clear division of powers and responsibilities from 2012. This could not only promote the degree of self-organization governance, but also prevent the opportunism behavior of village leaders to some extent. Subsequently, the Corporations of Rural Collective Assets Management were established by rural collective economic organization since 2015, so that collective assets could be managed and supervised by all the shareholders, reducing the moral hazards of collective leaders.

Finally, in order to establish a formal and open RCCL transaction market, the rural collective assets trading platforms at the level of district, township and village have been set up since 2010. These platforms provide the information about traded land for both parties and reduce the transaction costs caused by information asymmetry. In addition, the mechanism of bidding adopted in land transaction is of great importance for the formulation of transparent and formal transaction rules and environment, which helps to supervise each other and avoid opportunism behavior.

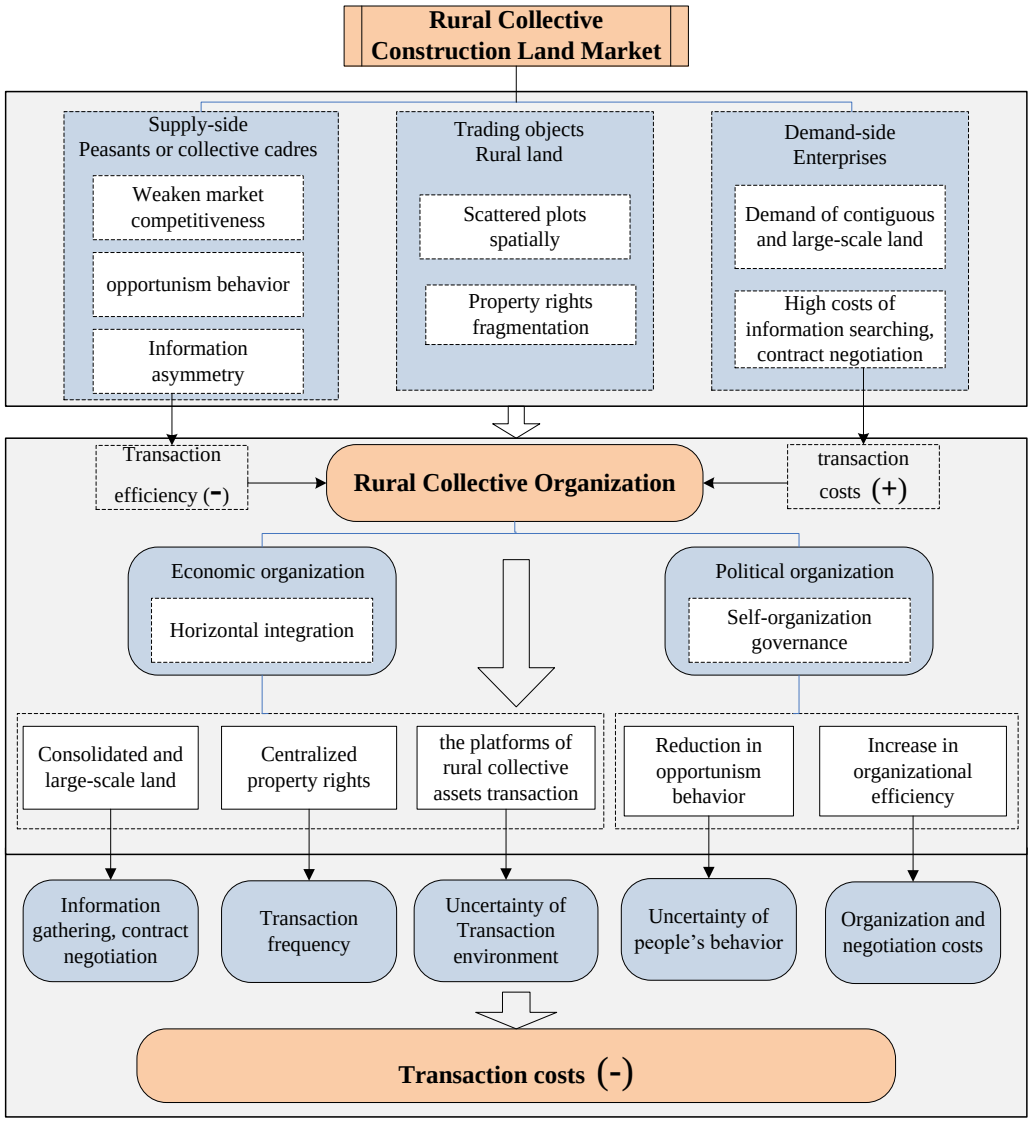

Fig. 1. The theoretical framework

2.2. Hypothesis

As Coase (1937) noted that, the horizontal integration can be defined as "When a transaction that was originally organized by two or more entrepreneurs was organized by an entrepreneur, a coalition appeared that called horizontal integration". Many enterprises often adopt the integration strategy (horizontal integration and vertical integration) to save transaction costs and improve the efficiency.

In Nanhai District, the model of "separation of economic organization and political organization" was adopted to separate the economic functions from self-governing functions. The economic organizations are responsible for the disposal and management of rural assets, and political organizations mainly hold responsibilities of the overall coordination, public service and supervising the behavior of economic organizations. So we analyze the

relationship between horizontal integration and transaction costs from the perspective of rural economic organization and political organization.

In the economic organization, individual shareholders or households can be seen as a special form of firm, assuming two shareholders i and j, the horizontal integration would happen when the following condition is satisfied (Sexton, 1986):

$$\beta(i \cup j) < \beta_i + \beta_j, \quad (\beta(i \cup j) > 0) \qquad (1)$$

Here, β_i and β_j, represent the transaction costs of the two shareholders *i* and *j*, respectively, ($\beta_i > 0$ and $\beta_j > 0$).

As shown in Fig. 2, through horizontal integration, RSCs could help to internalize the external transaction costs between the individual shareholders or households and enterprises, reducing total transaction costs. However, this horizontal integration among shareholders will also result in organization costs at the same time. So the optimal scale of RSCs is determined by the transaction costs saved by the horizontal integration between shareholders and resultant organization costs ((Luo, 2000; Lin and Ma, 2006).

If the RSCs scale is much greater than optimal scale, the "lazy" (opportunistic) and "free-rider" behavior will increase, just like the period of collectivized agricultural production during 1957-1978 (Long *et al.*, 2009), which will result in higher organization and negotiation costs and inefficient internal governance. Whereas, if the scale of RSCs is smaller than optimal scale, the fragmentation of land plots and property rights under the period of household responsibility system (HRS) will lead to higher transaction costs and lower work efficiency. So, this paper proposes the following hypothesis.

Hypothesis 1: The horizontal integration degree of rural collective organization will not reduce the transaction costs of RCCL until the resulting organization costs are equal to the transaction costs saved ceteris paribus.

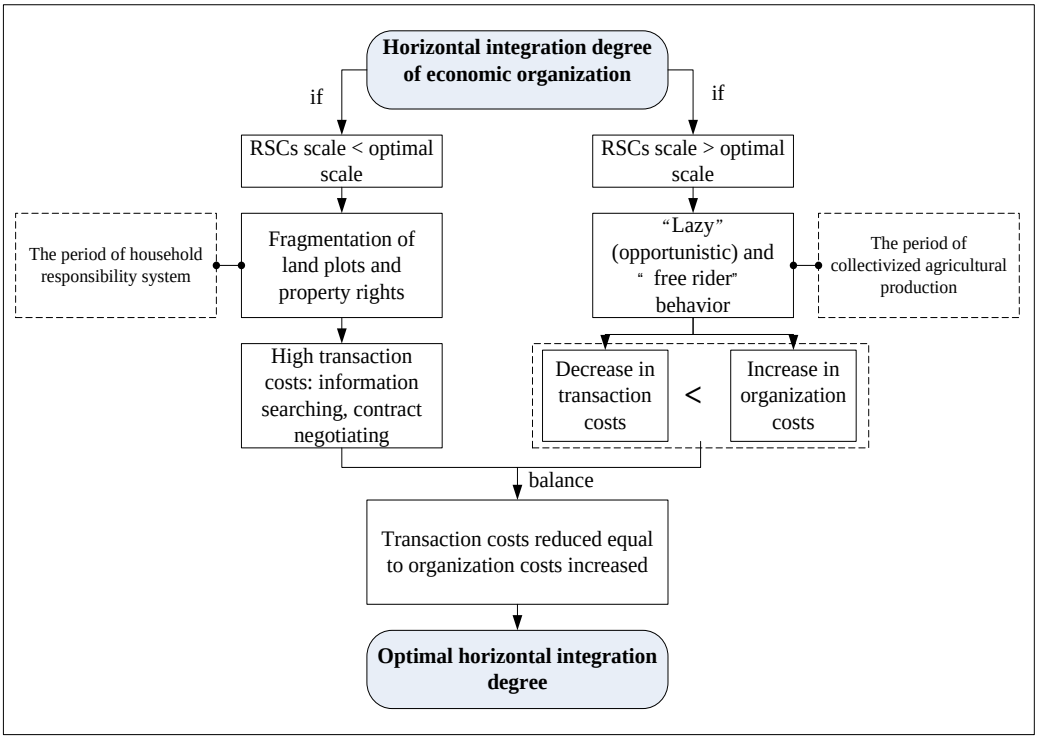

Fig.2. The relationship between horizontal integration of economic organization and transaction costs

As the important decision-makers and supervisors, rural political organization may play an important role in the process of RCCL transaction. As shown in Fig. 3, the higher level of self-organization governance will reduce the opportunism and "rent-seeking" behavior and enhance the efficiency of internal organization and coordination. Accordingly, the other hypothesis can be presented.

Hypothesis 2: The transaction costs in the RCCL will decrease with the higher level of self-organization governance.

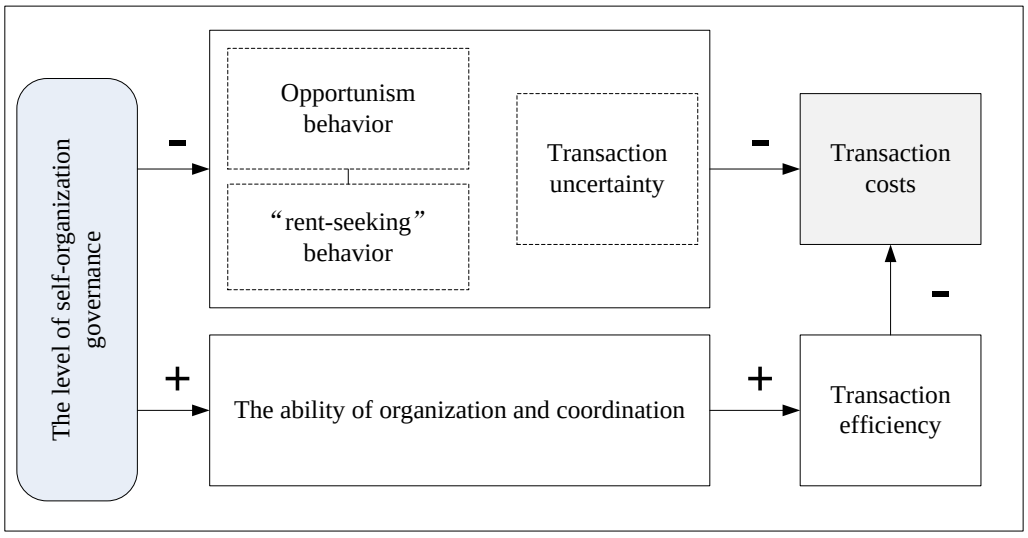

Fig.3. The relationship between the level of self-organization governance and transaction costs

3. Study area, data and methodology

3.1. Study area

Nanhai District (22°48'03"-23°18'00" N, 112°51'55″-113°15'47″E) is located in Foshan City, Guangdong Province (Fig. 4), adjacent to Hong Kong. The study area is in the hinterland of the Pearl River Delta Region and is one of the fastest growing industrial and urban regions in China, comprising seven townships and 274 villages. It covers 1073.82 km^2 of which 536.93 km^2 are construction land. Of the total construction land, RCCL accounts for approximately 46.69% and state-owned construction land is about 53.31%. We choose Nanhai District as our study area as it is the earliest land shareholding system and also the typical market-oriented RCCL transaction.

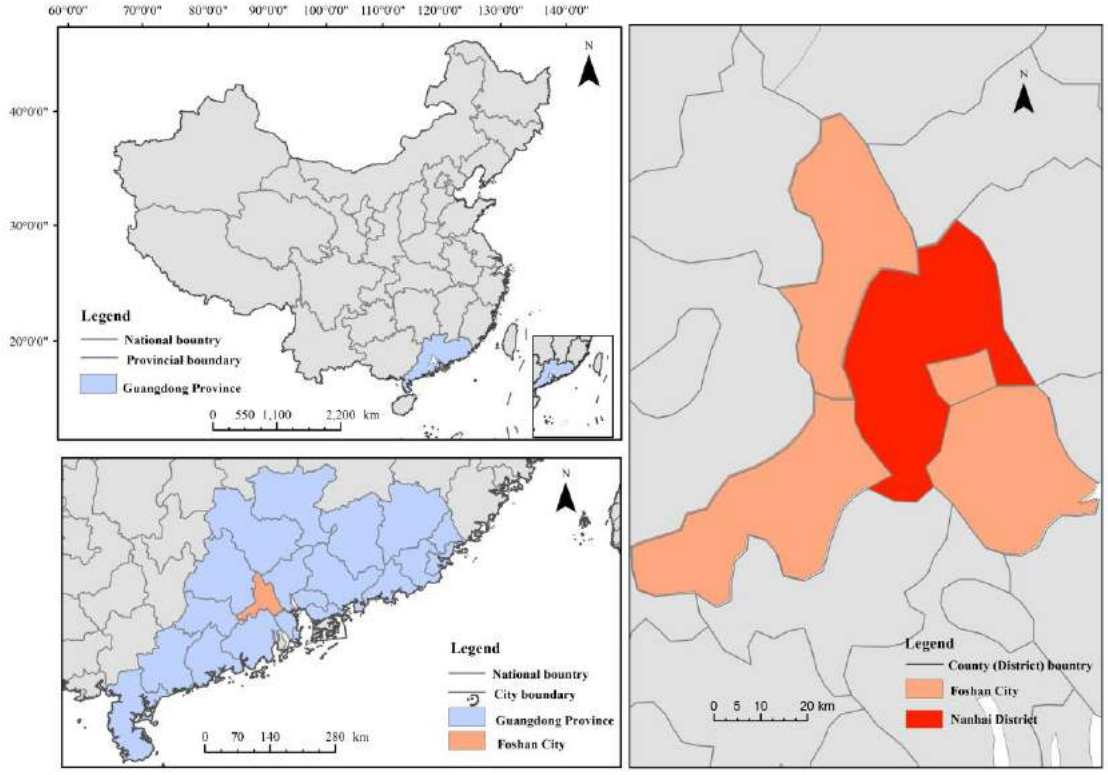

Fig.4. Location of the study area

3.2. Data collection

We conduct an empirical study basing on the data collected from village collectives in Nanhai District, Guangdong Province in 2016. The respondents in the survey were village leaders who were responsible for the RCCL transaction. In order to test the hypotheses above, we designed the questionnaire with the following three sections. The first section is about the information of RCCL transaction including the land information, the surroundings and the costs in different phases of RCCL transaction. The second part includes the uncertainty of behaviour and environment in the process of trading. The third is the transaction frequency. The socioeconomic data of the village are from the yearbooks and the government website. We obtained 380 questionnaires, of which 324 were valid.

3.3 Variables

Based on the hypotheses, transaction costs is the dependent variable, the horizontal integration degree and the level of self-organization governance are independent variables. A

RSC is a horizontal association of farmers who hold the land shares. So in order to identify the horizontal integration degree, the "RSC scale (the number of shareholders)" can be introduced. In Nanhai District, the RSC is a two-hierarchy organization- Economic Cooperative (EC) (*Jingjishe*)[1] (the lowest RSC) and Economic Joint Community (EJC) (*Jinglianshe*)(the upper RSC) which is composed of several ECs. So we will study which organization form is more efficient. According to our investigation, there are generally 171-1479 shareholders in EC, 1493-11000 shareholders in EJC. In order to further illuminate the relationship between the horizontal integration degree and transaction costs in different scales, this paper will divide the scale of EJC into three parts: 1493-3310, 3310-5460, >5460 basing on cluster analysis.

The level of self-organization governance relates to the number of collective cadres and the proportion of CPC in principle.

In addition, other variables including asset specificity[2], transaction uncertainty and transaction frequency are control variables. The following indicators are designed based on the transaction cost theory of Williamson (1979; 1985; 1989) (Table1):

Physical asset includes the area of trading land parcels. The villagers in Nanhai District are increasingly dependent on the construction land as the land becomes more and more expensive, if the construction land is developed for other purposes, the value will be reduced, thus result in high transaction costs. The larger size of land parcel traded which means higher asset specificity may give rise to higher coordination and barging costs among shareholders.

Geographical location can be characterized as the distance from the land parcel traded to the town center. The closer to the town center, the higher value of construction land is, more factors should be considered by the collectives in the trading process, resulting in higher organization costs.

Uncertainty of transaction environment is composed of: (1) the way to determine price, (2) land certificate, (3) trading platform. Compared with negotiating, transaction through bidding may be more open and fair, which can reduce the uncertainty of transaction environment and the transaction costs. The land certificate can guarantee the safety of property rights and thus reduce transaction costs. The trading platforms at the level of village, township and district have been established in Nanhai District respectively. The transaction environment on the platforms at the district level may be more open and fair, thus may improve the transaction efficiency and reduce the transaction costs.

Uncertainty of people's behavior includes: (1) the market form, (2) contract notarization, (3) government intervention. Compared with the rental market,

[1] In Nanhai District, Economic Cooperative (EC) is the lowest RSC and Economic Joint Community (EJC) is the upper RSC which is composed of several ECs. Village is a political and administrative unit which is consistent to EJC in geographical scope only on condition of villagers are landholders. It is usually that villagers are greater than landholders because married women, newborn children and migrants are often excluded in holding cooperatives unless they buy the land shares from EJCs or ECs.

[2] Asset specificity: refers to the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value (Williamson, 1989). The stronger the asset specificity, the higher the degree of uncertainty in the transaction and the higher the transaction frequency, the higher the transaction costs are.

transaction in the sale market is more likely to be "locked-in" by the opportunism behavior of the other parties because of the larger parcels traded and longer term of contract with more uncertainty, thus gives rise to higher transaction costs. The contract notarization guarantees the rights of two parties and reduces the risk of default. The government intervention may lead to the rent-seeking, uncertainty and high transaction costs.

Transaction frequency can be presented as 50 (the longest years of industrial land use rights) divided by the actual contract term in the RCCL market. The negotiation and organization costs will increase with transaction frequency.

Table 1

The definition of variables and description of statistics

Variables			Definition	Mean	Std. Dev.
Asset specificity	Human capital	horizontal integration degree x_1	the number of shareholders of collectives (person)	3542.18	2046.90
		the level of self-organization governance 1 x_2	the number of collective leaders (person)	6.22	1.95
		the level of self-organization governance 2 x_3	the number of CPC (person)	129.11	71.21
	Physical asset	area of the land parcel traded x_4	the actual value (m^2)	32032.73	105793.99
	Geographical location	geographical location x_5	distance from the land traded to the town center (km)	8.16	5.19
Transaction uncertainty	Uncertainty of transaction environment	the way to determine price x_6	bidding=1, negotiating=0	0.64	0.48
		land certificate x_7	yes=1, no=0	0.76	0.43
		trading platform x_8	Economic Cooperative (*Jingjishe*) =1; Economic Joint Community (*Jinglianshe*) =2 , Town=3, District=4	2.40	0.89
	Uncertainty of people's behavior	the market form x_9	sale market=1, rental market=0	0.30	0.46
		contract notarization x_{10}	yes=1,no=0	0.47	0.50
		government intervention x_{11}	yes=1,no=0	0.31	0.46
Transaction frequency	Transaction frequency	transaction frequency x_{12}	50/years of the contract	5.49	7.79

3.4. Methods

3.4.1. Estimation of transaction costs

In the RCCL market, the transaction process includes the following steps: preliminary transaction contract application; democratic voting in the village; public notice on the trading platform; bidding; contract signing; contract notarization.

The total transaction costs can be calculated as follows (Zhang *et al.*, 2017a, 2017b):

$$C_{total} = \sum_{i=1}^{n} (Labor_i \times Time_i \times 68.64 + Cash_i) \quad (2)$$

Where, C_{total} is the total transaction costs (unit: Yuan); $Labor_i$ is the number of people involved in the stage i; $Time_i$ is the days spend on the trading stage i; 68.64 is daily salary (unit: Yuan/Day); $Cash_i$ is the direct expense in the step i (unit: Yuan).

3.4.2. Tobit model

Considering that the transaction costs are all above zero, the limited dependent variable model (Tobit) should be adopted when the independent variable is truncated or censored. This model can not only analyze consequent numeric variables, but also virtual variables by using maximum likelihood estimation method. Tobit model is constructed as (Tobin, 1958):

$$Y = \begin{cases} \beta^T X_j + \varepsilon_j, \beta^T X_j + \varepsilon_j > 0 \\ 0, otherwise \end{cases} \quad (3)$$

Where, Y is the independent variable; X_j is the independent variables; β is the parameter to be estimated; ε_j is the stochastic disturbance term, and $\varepsilon_j \sim N(0, \sigma^2)$.

4. Results

4.1. Transaction costs

According to equation (2), the total transaction costs can be measured by the sum of costs in each stage of transaction process, which include the labor costs, time costs and cash. According to Price Bureau in Foshan City (the upper administrative unit of Nanhai), Guangdong Province, the lowest standard of monthly salary is 1510 Yuan/Month (223.18 USD), that is, the daily salary is 68.64 Yuan/Day, which can be used to calculate the labor costs and time costs, the value of transaction costs is obtained as Table 2. In the RCCL market in Nanhai District, the average transaction cost organized by ECs (*Jingjishe*) is about 6405 Yuan, the lowest cost is 1579 Yuan, and the maximum is 15375 Yuan. The average transaction cost in the scale of "1493-3310", "3310-5460", ">5460" is 16202 Yuan, 33907 Yuan, 52577 Yuan, respectively.

Table 2

The transaction costs (yuan)

RSCs	Scale	Number of samples	Minimum	Maximum	Mean
Economic Cooperative (*Jingjishe*)	171-1479	51	1579	15375	6405
Economic Joint Community (*Jinglianshe*)	1493-3310	116	1064	38507	16202
	3310-5460	96	1922	75229	33907
	>5460	61	2540	112020	52577

4.2. Tobit model results

The results of Tobit regression models are listed in Table3.

Table 3

The results of Tobit model

Coef.	Economic Cooperative (*Jingjishe*)	Economic Joint Community (*Jinglianshe*)		
	Model 1	Model 2-1	Model 2-2	Model 2-3
	171-1479	1493-3310	3310-5460	>5460
horizontal integration degree x_1	-0.2534	-1.2702***	0.4288	1.8847*
the level of self-organization governance 1 x_2	0.3648	0.3548*	1.4516***	0.6199
the level of self-organization governance 2 x_3	0.2203	0.2739	-0.3667	0.1751
area of the land parcel traded x_4	0.3868***	0.5639***	0.5391***	0.4486***
geographical location x_5	-0.0870	0.0884	0.0481	-0.1167
the way to determine price x_6	-0.1766	0.0434	-0.4309**	-0.5656**
land certificate x_7	0.1316	0.0435	-0.0214	-0.1618
trading platform x_8	--	-0.2235*	-0.3278**	-0.2003
the market form x_9	0.3699**	0.2488*	-0.3154	-0.3010
contract notarization x_{10}	--	-0.1349	0.1034	0.3373
government intervention x_{11}	0.3492*	0.2491**	0.0356	0.1939
transaction frequency x_{12}	0.1134	-0.0721	-0.1668	-0.3102
constant	7.8816***	16.2303***	5.1752	-8.1995

Notes: Significant at: 1%***, 5%**, and 10%*; Sample size: 324; In the Model 1, the indicators of "trading platform" of each sample are all "the platform of ECs", the indicators of "contract notarization" of each example are all "no".

With the increase of RSCs scale, the impact of the degree of horizontal integration of collectives on transaction costs has shown a trend from negative to positive. In Model 1, through the horizontal integration among shareholders, the transaction costs in RCCL market could be saved, but the impact is insignificant. We can see from the results of Model 2-1, the transaction costs is decreasing as the horizontal integration increases. While the horizontal integration degree has positive impact on transaction costs insignificantly in Model 2-2 and significantly in Model 2-3.The reason may be that the horizontal integration can reduce transaction costs, but also result in high organization costs, and the resultant organization costs are much higher than transaction costs saved, especially when the scale of EJC (*Jinglianshe*) is more than 5460. The results confirms the Hypothesis 1, namely the horizontal integration degree of rural collective organization will not reduce the transaction costs of RCCL until the resulting organization costs are equal to the transaction costs saved *ceteris paribus*. And the optimal scale of the RSCs is 1493-3310 shareholders.

In terms of the level of self-organization governance of the collectives, the number of the leaders of the collective is positively correlated with the transaction costs. A larger number of collective leaders increase the coordination and administrative costs, indicating a lower self-organized level. This finding confirms the hypothesis that the transaction costs can be reduced with the improvement of the organization governance.

The scale of the trading parcel (physical asset) positively impact on transaction costs. The larger trading parcel with higher asset specificity increases the uncertainty. The RSCs may

conduct multiple democratic voting, in order to obtain the maximum benefits from the land, resulting in higher transaction costs.

In regard to the uncertainty of transaction environment, the index "the way to determine price" shows a negative impact on transaction costs. Compared with "negotiating", the transaction costs will be lower when the price is determined by "bidding". The trading information is highly transparent in the process of "bidding", while the parties in the process of "negotiating" tend to inform the information that is beneficial for them, in order to obtain higher land value income, resulting in higher uncertainty of the trading environment, which will bring higher transaction costs.

A significantly negative impact of "trading platform" on transaction costs in Model 2-1 and Model 2-2 reveals that the upper platform reduces the transaction costs of the market. Compared with the platforms at the level of village, more open and fair environment on the district ones could reduce the information asymmetry between trading parties, the costs of information searching and negotiating will be reduced accordingly. In addition, according to our survey, the perfect trading rules and procedures have been established on the district platforms, which reduce the transaction uncertainty and risk, saving a lot of labors and time in the process of RCCL transaction.

The coefficient of "the market form" is significantly positive in Model 1 and Model 2-1, which shows that the transaction costs in the sale market are higher than in the rental market. The reason may be that compared with the rental market, the larger scale land parcels and longer transaction terms in the sale market may increase the uncertainty of people's behavior and risk, and thus give rise to higher transaction costs.

The index of "government intervention" in Model 1 and Model 2-1 has a significantly positive effect on transaction costs. Without the intervention of the government, the RCCL market will be more market-oriented, while the participation of government maybe increase the "rent-seeking" and opportunism behavior, thus the transaction costs will be higher.

Contrary to conventional wisdom, transaction frequency shows an insignificant effect on the transaction costs. Transaction frequency is defined based on the contract term of a parcel traded in this study, and it cannot reflect the actual transaction times (one-time, occasional or recurrent). Hence, the transaction frequency shows the insignificant impact on the transaction costs.

5. Conclusions and discussions

5.1. Conclusions

This study estimates the transaction costs of RCCL market in Nanhai District, Guangdong Province, and further explores the impact of the horizontal integration degree and the self-organization governance of collectives on the transaction costs based on the transaction cost theory of Williamson. We have drawn several conclusions as follows:

Firstly, there is an almost U-shaped relationship between the horizontal integration degree of the collectives and the transaction costs. Through horizontal integration, the RSCs in Nanhai District can not only consolidate the spatially scattered plots into contiguous and large-scale land, but also can re-collectivize the fragmented property rights from individual farmers,

reducing the costs of information searching and contract negotiating between the farmers or households and enterprises. However, the organization costs will increase with the expansion of RSCs scale. The degree of horizontal integration will reach a point where the transaction costs saved are equal to the increasing organization costs. After reaching the point of the optimal scale, transaction costs will increase when the horizontal integration degree increases. In Nanhai District, the RCCL market is more efficient in Economic Joint Community (*Jinglianshe*) compared with Economic Cooperative (*Jingjishe*). Nevertheless, if the scale is expanded without limit, it will result in high organizational costs and low market efficiency.

Secondly, the higher level of self-organization governance can reduce transaction costs and improve the efficiency. More leaders in the village in Nanhai District lead to more organization costs and the opportunism behavior (Zhang *et al.*, 2017a). This means that the current number of collective leaders in Nanhai District has exceeded the optimal, leading to low level of governance. However, leaders are too few to supervise opportunism behavior. So, proper control of the number of village leaders can improve the level of self-organization and transaction efficiency of market.

5.2. Policy implication

This study contributes to the reform and innovation of rural grassroots organization governance and land-based shareholding system (LBSS) (Yep, 2015). The rural management pattern in Nanhai District which separates the economic and political functions of the administrative villages should be encouraged to implement nationwide. We should encourage the bottom-up collectivization of some individual villagers to merge into the big economic organization which can reduce transaction costs of land and property fragmentation, but the government should control the size of the rural economic organizations and release the power to the rural grassroots organizations. At the same time, the political organization should control the number of leaders, clarify the labor division, optimize the organizational governance structure and improve the self-organization level, which can improve governance efficiency.

Both household responsibility system (HRS) and LBSS in China are bottom-up induced institutional change, but have different institutional performance. The former targets low production potential and high supervision cost of collectivization. The later mainly focuses on high transaction costs and scale diseconomy of de-collectivization. Since 1949 China has experienced an arduous institutional path of privatization- nationalization- collectivization- de-collectivization, which is similar to what happened in the transition countries such as the former Soviet Union and Vietnam. Reorganization of rural households and restructuring countryside like Nanhai along the line of LBSS can be followed by other China Eastern coastal areas and the transitional economies above mentioned on the condition of the trade-offs between transaction and governance costs. Radical extremely forward privatization or backward collectivization up-down enforced institutional change will incur huge institutional costs disregarding of the acceptance willingness of the rural households and surly jeopardize the ongoing reform.

5.3. Discussions

The land fragmentation, transaction costs and market efficiency in land market have become the common issues, especially in transition countries (Lerman and Shagaida, 2005; Deininger *et al.*, 2012). As a global leading developing country, China has taken a series of measures to address these issues. Nanhai District, Guangdong Province has established a typical RCCL market and RSCs. The horizontal integration among shareholders of RSCs could help to reduce the transaction costs in RCCL market. However, as Coase (1937) argued, if the certain transaction costs can be eliminated by organizing one, why all of the shareholders and land asset are organized by a big cooperative? The reason is that when the horizontal integration degree gets higher, the organization costs of the cooperative may arise. Therefore, exploring the relationship between horizontal integration degree and transaction costs in RCCL market and the optimal scale of RSCs is significant to balance the organization efficiency and market (transaction) efficiency.

This paper calculates the transaction costs (Y) in RCCL market, that is, the sum of labor costs and cash costs at different stages of transaction process. And we also measures horizontal integration degree (X_1). This work will fill the gap in literature regarding quantifying the relationship between transaction costs and three attributes- interdependence, uncertainty and timing (Williamson,1988; Zhang, *et al.*, 2017a; 2017b; Tan, *et al.*, 2009), which may contribute to the reform and innovation of rural basic-level cooperation organization, but can be improved in several ways in the future.

(1) The optimal scale of RSCs in this study disregards rural rental market of farmland transaction. The land assets of RSCs are composed of farmland, RCCL and other rural assets in rural areas. If we fully consider the rental market of farmland, the optimal scale maybe decreases.

(2) Land-based economic activities and political governance in plains in eastern coastal China occur onsite[3], while the same behaviours in mountainous areas in inland and western China happen offsite[4]. The optimal scale in densely populated areas, like Nanhai District within realm of administrative units, is reasonable. Nevertheless the determination of the efficient scale in sparsely populated areas like inland mountainous regions may be problematic.

(3) The measurement of the horizontal integration degree (X_1) can be alternative. Horizontal integration often occurs when rivals in the same production line cooperate due to their financial interests (Dietzenbacher *et al.*, 2012), but much less on cooperatives. The nature of the cooperative form can be seen at two levels: the one is with respect to its farmer members; and the other is the inter-organizational network – the participation in federated structures and other inter-organizational networks along with other cooperatives and investor-owned firms (Karantininis, 2007). The cooperative form in this work is the former and the number of shareholders in the village is adopted to measure the horizontal integration degree subject to the

[3] onsite: In most eastern coastal plain areas, both transaction of RCCL and social governance take place in the same land shareholding cooperative within the realm of administrative region.

[4] offsite: Contrary to plain areas, transaction of RCCL occurs in the land shareholding cooperative within the realm of administrative region, but social governance happens outside because farmers in most remote mountainous area migrate to urban areas.

data availability. We can try to measure the horizontal integration alternatively in the future studies.

(4) Both static and dynamic optimal scales should be considered in the future. We estimate transaction costs and its influencing factors only based on the cross-sectional data, rather than spatial-temporal data. It is necessary to make a dynamic analysis in Nanhai District later on.

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