

## PART III

# Internal Governance and Member Relations



## 9. Centralized versus individual: governance of farmer professional cooperatives in China

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### INTRODUCTION

During the socialism era, millions of small farms in China were replaced by large state or collective farms that were subject to central planning. Since the institutional reform in the late 1970s and the subsequent market liberalization, China's rural economy experienced profound and rapid changes. Lin (1992) finds that about half of the 42.2 percent increase in total farm output in China between 1978 and 1984 can be explained by the institutional reform of decollectivization that activated the household farming system. Individual decision-making of family farmers reduced the incidence of rural poverty, which fell from 30.7 percent in 1978 to 14.8 percent in 1984 (NSBC, 2007). Decentralized decision-making under the family farming system facilitated agricultural market liberalization, and such a market scenario helped to shield farmers from rent extraction by the downstream industries (Huang et al., 2007). To sum up, the institutional reforms in rural China explain the majority of the economic progress during the early reform period of the 1980s and 1990s (De Brauw et al., 2004; Lin, 1992).

However, small farmers, traders, large-scale commercial firms and government agencies all face substantial difficulties in accessing information and in working together in agrifood systems (Hazell et al., 2006; Poulton et al., 2010). Small family farmers may find it difficult to get appropriate and reliable inputs and farming technologies. On the output side of the farm, buyers find the transaction costs with the vast number of small farmers immense (Hu et al., 2004). Producer organizations become an institutional option for overcoming the transaction costs related to many individual smallholder farmers (Rottger, 2005). Motivated by the new market scenario since the 1980s, new farmer cooperative organizations emerged in

many provinces of China in the late 1980s, and the establishment of farmer cooperatives has been speeding up since the late 1990s. After the introduction of the new legal framework, the number of farmer cooperatives has increased from 100 000 in 2006 to 446 000 in mid-2011 (SAIC, 2007, 2011).

The Chinese government is attempting to restructure the agrifood system to a modernized one by supporting farmer cooperatives and associations (Han, 2007). It was reported that 2.9 percent of farmers and 10 percent of villages were covered by Farmer Professional Cooperatives (FPCs) by 2003 (Shen et al., 2005). On 31 October 2006, the 'Law of Farmer Professional Cooperatives' was passed in the Standing Committee of the 24th People's Congress, and the law became effective as of 1 July 2007. The law expects cooperatives to provide services like purchasing agricultural inputs, marketing, processing, transportation, storage, agricultural technology and information; providing finance and other social service are not stated, however. Deng et al. (2010) find that, after the introduction of the legal framework, 21 percent of China's village and county seats had FPCs and these FPCs provided services to about 20 percent of rural households in 2008.

Historically, agriculture in developed as well as developing countries is neither organized as large hired-labor farms nor as agricultural production cooperatives. Producer organizations subject to family governance are prevalent (Schmitt, 1993). Nevertheless, smallholdings are facing a systematic unfavorable situation in technology adoption, climate change, transformation of the agro-food market toward consolidated modern supply chains, and various uncertainties (Dorward et al., 1998; Hazell et al., 2006).

Nevertheless, the recent emergence of producer organizations that were promoted by the Chinese government is complicated due to a rapidly changing economic and political environment. Moreover, Chinese producer organizations have many stakeholders beyond farmer-members – they might be input providers of seed and pesticide, downstream retailers, brokers, or government bodies. Meanwhile, many farmers engage in off-farm labor activities, and agriculture in China is experiencing a dramatic transformation. Given this background, it is a crucial question as to how the decision-making of the smallholder family farm is governed within China's emerging producer organizations. Specifically, people would like to know the decision-making process within producer organizations and how the various decision rights of farm management are organized.

Because of the ambitious nature of the goals and the high cost of data collection, we necessarily must limit the scope of this chapter. In particular, in this study, we examine only FPCs that organize production and marketing of specific agricultural products. We do not consider farmer

associations and other collective organizations that may provide only services (for example, machinery or irrigation). Nor did we survey individual farmers within the FPCs. Ours is an institutional-level study, examining how the decision rights are arranged within China's emerging farmer cooperatives. Lastly, using cross-sectional data to analyze the determinants of governance has empirical shortcomings.

To meet the goals and objectives of the study, the chapter is structured as follows. The following section presents a conceptual framework and draws up research hypotheses. The third section introduces the sampling and data collection. In the fourth section we describe the emerging FPCs and the decision rights within them. In the fifth section we present multivariate analyses on the whole set of decision rights and several attributes that affect the related transaction costs. In the final section we draw conclusions and outline policy implications.

## HYPOTHESES

A governance structure consists of both decision rights and income rights (Hansmann, 1996). Decision rights concern all rights and rules regarding the deployment and use of assets. They specify who directs the firm's activities. Income rights delineate incentives. They specify who appropriates the net earnings of the firm. We distinguish decision rights and income rights of an FPC (and focus on decision rights in this study). Unlike market coordination in which decision-making is decentralized to individual farmers and unlike hierarchies in which all the decision-making is centralized, farmers make most decisions individually and make some decisions collectively in cooperatives. The allocation of decision rights can be quite differentiated. At one extreme, farmers relinquish most decisions regarding cropping, marketing and/or processing. At the other extreme, all these decisions reside with individual farmers.

Asset specificity, uncertainty and frequency are three dimensions of transactions that affect transaction costs (Williamson, 1985). Different agricultural products may involve different transaction costs caused by their biological attributes. Most agricultural products are subject to seasonal factors and are perishable. Staple crops such as wheat and cotton are less perishable and easier to store, compared to fresh vegetables and fruit. For dairy transactions, the raw milk is subject to quality loss almost overnight. In general, the higher the perishability, the higher the transaction costs.

Within farmer cooperatives, market governance that features individual decision-making is advocated when the degree of asset specificity is low.

When asset specificity increases due to the increasing prominence of the hold-up problem, centralized decision-making emerges as hierarchies. Feng and Hendrikse (2009) conclude that for projects with different level of asset specificity, the cost of governance structure in farmer cooperatives varies and there are multiple trajectories of governance. For perishable products, farmers' on-farm specific investments are subject to the hold-up problem in negotiating prices with large processing firms and thus they are motivated to form cooperative governance (Hendrikse and Veerman, 2001).

*Hypothesis 1a:* When products are more perishable, the decisions rights regarding marketing in China's FPCs are more collectivized.

Certain biological characteristics of agricultural products demand a high frequency of transaction. For frequent transaction, partners may expect market coordination to avoid the costs of hierarchy. Alternatively, they are likely to set up a special governance structure, as the cost of this can be spread over many transactions. (Williamson, 1985). For example, dairy and egg farmers harvest almost every day, while hogs are only slaughtered once in the entire production stage. For dairy and egg farmers it might be beneficial to make marketing decisions jointly.

*Hypothesis 1b:* Where sales and procurement occur more frequently, the decisions rights regarding marketing in China's FPCs are more collectivized.

Quality labeling is adopted in many agricultural chains signaling a high quality attribute, and both private brands and public certification are well-observed devices for assuring quality (Raynaud et al., 2005). Brand names are actually the commitment to *ex ante* specified high quality standards by a firm. The commitment created by brand names is credible because the reputational capital of FPCs is at stake under a private brand. Public certification is another option for assuring quality. However, under public certification, the credibility of a quality label relies on government enforcement. Henson and Reardon (2005) review studies about private standards in the agrifood market and conclude that public food safety regulations established in developing countries often do not have either monitoring or enforcement capacities. For the products with brand names or certification, specific investments have been made at the processing and/or marketing stage of production. For this situation, transaction cost economics suggests that 'hierarchy' is the appropriate governance structure.

FPCs taking the quality labeling strategy, either by registering private

brand names or by acquiring public certification, tend to centralize the decision rights of individual farmers in order to deal with the incidence of moral hazard. The empirical research regarding automobile franchise contracts shows that the variation in the allocation pattern of decision rights is driven by potential *ex post* opportunism by both dealers and manufacturers, and manufacturers of higher quality cars centralize more control and monitoring rights over dealers' actions since dealer behavior poses a higher risk to the contract in this situation (Arrunada et al., 2005). *Ex post* opportunism is also pervasive for both farmers and processing firms in agricultural networks, and many decision rights by farmers are shifted across the network to the downstream firm dealing with high quality products (Hu and Hendrikse, 2009). Hypothesis 2 formulates a similar causal link existing in the governance of FPCs.

*Hypothesis 2:* When an FPC increases branding or certification of its products, the decision rights regarding marketing and production within FPCs in China tend to be more centralized.

Spatial coverage of membership matters in determining the governance of FPCs from the perspective of membership heterogeneity. Cooperatives help farmer members grasp the benefit of economies of scale, access to markets, technology and capital, and lower risks. However, various aspects of the governance of cooperatives, such as collective decision-making, are tailored towards a homogeneous membership (Hansmann, 1996). As heterogeneity of members increases, the efficiency of cooperatives is jeopardized (LeVay, 1983; Cook, 1995; Choi and Feinerman, 1993; Karantininis and Zago, 2001; Hendrikse and Bijman, 2002). Membership confined to a local level and producing similar products suffers less from the heterogeneity problem.

*Hypothesis 3:* When membership within an FPC expands outside the local township and becomes more heterogeneous, collective decision-making is harder to maintain within the FPC.

## SAMPLING AND DATA COLLECTION

The data used in this study are from a survey in five provinces in China.<sup>1</sup> The first survey was conducted in late 2003, collecting primarily 2003 data in six provinces. Within each province, all counties were sorted in descending order of gross value of industrial output per capita, and two from each tercile of listed counties were selected from each stratum. Finally,

six counties were selected in each province. The same strategy applies to the selection of townships in each county: six towns were selected and, in each town, we asked all village representatives (typically the village leader and accountant) to participate in a questionnaire-based survey at the village level. In total, 2459 villages were surveyed.

In each village survey, the two village cadres were asked whether any farmer in their villages participated in any FPC, including those that were not based in their village. If the answer was 'yes', a set of questions (for example, the legal status, initiation, major functions) was presented.

The second round survey was conducted in 2009 to investigate the development status of FPCs in 2008. Considering the increased survey costs related to the FPC survey, in the second round survey we drew a sub-sample from the first one. We surveyed five provinces and, in each province, the six sampled counties (from the 2003 survey) were grouped into three terciles and we select one in each tercile. In each county, the six sample townships (from the 2003 survey) were sorted into two groups (namely, poor and non-poor); we then drew one in each group. Finally, the second round of the survey in 2009 covered five provinces, 15 counties, 30 townships and 380 villages. The empirical evidence in this study is drawn from the second round survey.

In the second round survey, we asked the village cadres 'Is there any farmer in your village currently participating (and historically participated) in any registered or non-registered farmer professional cooperative or association that may not necessarily be in the residential villages'. If the answer was 'Yes', rather than surveying the village cadres about the FPCs at the village level (as we did in the first round survey), we traced the FPCs and surveyed the FPC leaders after identifying them in the village survey. A separate questionnaire was used to investigate the initiation, the handled products, internal governance structure, the provision of inputs and other technical services, the provision of marketing and other services, and the personal data of FPC leaders. In total, we surveyed 189 FPCs and then focused on 157 of those that produced specific agricultural products.

In the survey for FPC presidents, we asked them how input purchase, output marketing and farming activities were organized and governed. We use the term 'centralized marketing' when FPCs balance the billing of transactions collectively and members pay (or receive) the money with FPCs individually. 'Service marketing' or 'broker coordination' are the terms used when FPCs provide the information and service to members who will bill input sellers or output buyers directly; FPCs may or may not charge fees during the process. When FPCs provide no service of input and output marketing, we use the term 'individual marketing'.

'Centralized production' refers to the governance under which FPCs



standardize the farming activities and members are required to conform to the production rules. Determining this category is challenging because the production complexity for different products is distinct and it is difficult to compare them. For example, the production stages for greenhouse vegetables and dairy farming are totally distinct. We therefore asked the FPC presidents how the farming was organized for the major farming activities at different production stages. For example, for livestock FPCs, we mainly asked about the feeding and animal care. For vegetables, we asked about the nursery, watering, pruning and planting. If one of them was marked as 'centralized', we defined the FPCs as having centralized production.

Only one third of the FPCs surveyed have member equity and 85 percent of these (46 out of 54) have specified rights of residual claim based on equity. The other FPCs either have no FPC residual or limit members' right to claim the residual. In this study we adopt the term 'residual claim rights' when FPCs have member equity and members can get a dividend from the residuals.

## EMERGING FARMER COOPERATIVES IN CHINA

### Legal Framework

The introduction of the new legal framework in 2007 marked the emergence of farmer cooperatives and associations in China. The development of farmer cooperatives and associations in rural China has gone through four stages since the late 1980s. There were quite a few farmer cooperatives before 1998 (Stage 1), and there was an accelerated increase during 1999 and 2003 (Stage 2). Shen et al. (2005) found 40 percent of the surveyed farmer associations were established during this period. During 2004–07 (Stage 3), the lack of a clear legal status was one of the main constraints to the development of FPCs in China although there was a systematic promotion of farmer associations in 2004 (World Bank, 2006). Various government departments (such as the Ministry of Agriculture, Ministry of Civil Administration, State Administration for Industry and Commerce, Science and Technology Association) had all been involved in administering producer organizations. The 2007 law clearly names the Industrial and Commercial Bureau as the authorized institution for registration. The Agricultural Bureaus at the county level (or higher) are responsible for supervising FPCs' operation (Stage 4).

In Table 9.1 we present the age profile for all the 157 FPCs surveyed in this study. Only 9 percent of the FPCs were established before 2003 and most of them were initiated during 1999 and 2003. Nearly 68 percent of

*Table 9.1 Agencies at which the Farmer Professional Cooperatives (FPCs) registered*

	Initiation year (%)				Total sample
	Before 1998	1998–2003	2004–2007	After 2007	
Civil Affairs Bureau	0	7	53	40	15
Industrial and Commercial Bureau	1	3	14	82	94
Rural or Agricultural Affairs Office	0	0	0	100	8
Science Association	14	29	43	14	7
Others	0	33	0	67	3
Non-registration	7	10	43	40	30
Total sample	4	10	37	106	157

*Note:* The figures in rows are percentages

the surveyed FPCs were established after the introduction of the formal legal framework (thus in Stage 4). The Industrial and Commercial Bureau is the main registering administration as 60 percent of the surveyed cooperatives and associations – 94 out of 157 – registered with it; 82 percent of them were initiated after 2007.<sup>2</sup> The new legal framework has greatly facilitated the development of FPCs in rural China (Deng et al., 2010).

## DECISION-MAKING OF FPCs IN CHINA

FPC farmers in China collectively make decisions to form their own organizations in order to meet the challenges associated with the industrialized and commercialized markets in agriculture. However, decision rights are complicated and refer to various choices, such as in procuring inputs, selling output, and the production process itself. In what follows, we describe the decision-making within FPCs in China by viewing three activities: procuring inputs, marketing output, and production. To be specific, a production decision is defined as being centralized when the FPC sets uniform standards and requires all the members to conform. When looking at the rights of procuring inputs and marketing output, we observe three modes: centralized, service (or broker coordination), and individual. Under the centralized mode, FPCs procure inputs or sell output collectively. Under the service mode, FPCs provide market information to members who purchase the inputs and sell products themselves. FPCs will charge a fee from either members or sellers/buyers. In this case, the FPC

Table 9.2 Decision rights of Farmer Professional Cooperatives (FPCs) in China

	Total	Input purchase			Output marketing		
		Centralized (1)	Broker (2)	Individual (3)	Centralized (4)	Broker (5)	Individual (6)
Sample	157	24 (15)	77 (49)	56 (36)	36 (23)	80 (51)	41 (26)
FPCs required equity capital from members	54	12 (22)	33 (61)	9 (17)	27 (50)	21 (39)	6 (11)
FPCs specified rights of residual claim based on ownership	46	12 (26)	29 (63)	5 (11)	26 (57)	17 (37)	3 (7)
Centralized production	25	9 (36)	14 (56)	2 (8)	13 (52)	11 (44)	1 (4)

Note: Figures in parentheses in rows are percentages.

functions as a broker. Loosely organized, FPCs with individual marketing do not provide any service for purchasing inputs or marketing output. Farmers trade individually on the markets for inputs and output.

In Table 9.2, we present the decision-making and income rights of the FPCs surveyed. Nearly half of the FPCs function as brokers in procuring farming inputs and in marketing output (Row 1, Column 2 and Column 5). The FPCs transmit the market information about inputs and outputs to farmers who purchase the inputs and sell the products themselves. Individual purchase of inputs and selling of output accounts for 36 percent and 26 percent of FPCs, respectively.

Although minor, we do observe centralized decision-making of input purchase, output marketing and production for the surveyed FPCs in China. As shown in Table 9.2, about 15 percent of the FPCs have centralized inputs purchasing via FPCs and 23 percent have centralized output marketing, respectively (full sample, Column 1 and Column 4). Almost 16 percent of the surveyed FPCs (that is, 25 out of 157) have standardized the on-farm production process, and they present very low individualism of marketing at the same time. For the 25 FPCs that have centralized production, only 8 percent of them adopted individual input procurement and 4 percent individualized output marketing (Row 4, Column 3 and Column 6; Table 9.2). Centralized production goes together with

centralized marketing as it offers customers uniform products of a guaranteed quality.

Income rights within FPCs were delineated by equity investment and residual claim rights. We found only 34 percent of the surveyed FPCs (that is, 54 out of 157 FPCs) required members to buy shares, and 29 percent of the FPCs (that is, 46 out of 157 FPCs) assigned the rights of residual income to farmers. As in other parts of the world, farmers are mostly interested in receiving high prices for their products (or paying low prices for their inputs). Thus, they receive residual income mainly through their transaction relationship, not through their ownership relationship. In China, most FPCs use a combination of the two streams of residual income (Bijman and Hu, 2011). One stream is related to the volume/value of the transaction between member and cooperative, and the other is related to the volume/value of investment of the member in the cooperative.

Income rights have an apparent correlation with the decision-making of production and marketing within FPCs. First, rarely do farmers of FPCs in China sell their products individually when they have invested in the equity capital of the cooperative. For the 54 FPCs having member equity, only 17 percent and 11 percent purchased inputs and sold output individually (Row 2, Column 3 and Column 6; Table 9.2). For the 24 FPCs with centralized inputs purchasing, half of them required equity capital (Row 2, Column 1; Table 9.2). FPCs with centralized input procurement and output marketing are organized more like a hierarchy with commitment of equity investment, as those cooperatives of the new generation in the USA (Coltrain et al., 2000).

Secondly, newly initiated FPCs are more inclined to require farmers to make an equity investment and to give them residual claim rights. For example, for 46 FPCs whose farmer members hold residual claim rights, 34 of them – nearly 74 percent – were initiated after 2007 (Row 4, Column 8; Table 9.3). We also find that the earlier an FPC was established, the more likely it was to centralize input purchase (Column 1; Table 9.3). However, the relationship is the opposite for output marketing. Newly established FPCs tend to centralize output marketing (Column 4; Table 9.3), and this is in line with the main objective of the new legal framework that emphasizes output marketing and vertical coordination along the agrifood chain.

In sum, the three different modes regarding allocation of decision rights reflect distinct governance structures of FPCs. For the individual mode, there is no statutory obligation to purchase all inputs and sell all output through the cooperative. The cooperatives do not experience strategic behavior of members when the contracted prices are lower than those in the auction market. For the service mode (or broker coordination), the governance is relatively more loose than that of the centralized mode,

Table 9.3 Decision rights and the age of Farmer Professional Cooperatives (FPCs) in China

	Total Sample	%	Input purchase			Output marketing			Centralized production	Claim residuals
			Centralized (1)	Broker (2)	Individual (3)	Centralized (4)	Broker (5)	Individual (6)		
Total sample	157		24	77	56	36	80	41	26	46
Initiating year										
1994–2003	14	9	5 (36)	4 (28)	5 (36)	1 (7)	10 (71)	3 (22)	5 (36)	5 (36)
2004–2006	37	24	3 (8)	21 (57)	13 (36)	6 (16)	17 (46)	14 (38)	2 (5)	7 (19)
2007–now	106	68	16 (15)	52 (49)	38 (36)	29 (27)	53 (50)	24 (23)	19 (18)	34 (32)

Note: Figures are incidence of the sample. Figures in parentheses in rows are percentages

and the members still hold some rights. Centralized marketing means that farmers delegate the decision rights regarding marketing to the farmer collective.

### **Membership and Decision-making**

The membership of the surveyed FPCs in the sample is by and large within the township boundary. As shown in Table 9.4, 47 and 27 percent of the FPCs included members within local villages and members across villages (but within local township), respectively. The spatial coverage of membership seems to be related to the decision-making within FPCs. For example, for the 24 FPCs that centralized input purchase, 19 of them had membership within local townships (Column 1, Row 2 and Row 3; Table 9.4). Centralized decision-making of production seems to be easily achieved in FPCs that do not allow for members outside the local township (Column 7, Row 2; Table 9.4). When the membership stretches outside local townships, centralized input purchase and production seems to be difficult to maintain.

However, output marketing tends to be centralized within FPCs when the membership develops beyond township boundaries. As shown in Table 9.4, for the 36 FPCs that centralized marketing, 15 of them – almost 42 percent – were outside the local township; the ratio is much higher than that for broker coordination and individual marketing (Columns 4, 5 and 6). One possible explanation would be that it is more efficient to collectivize output marketing when reaching a certain scale of members and productions.

FPCs in transitional China are not exclusive. Nearly half of the surveyed FPCs provided services to ‘client members’ who in some cases differentiate themselves from ‘formal members’ only in the registration status and related voting rights. As shown in Table 9.4 (Row 4 and Row 5), the median size of client members is larger than that of the formal ones (or registered members).<sup>3</sup> While the size of membership presents variation (due to initiating sources and products) and may not be comparable, we created the variable of the percentage of formal member to all members serviced. We find that FPCs with centralized production seem to provide exclusive services only to formal members (Column 7, Row 6).

### **Product Attributes**

Although having a wide range of products, FPCs in China are primarily found in high-value-added sectors, namely vegetables and livestock products. For example, approximately 42 percent of the surveyed FPCs

Table 9.4 Membership and governance of Farmer Professional Cooperatives (FPCs) in China

	Total		Input purchase			Output marketing			Centralized production
	obs.	% or mean or median	Centralized (1)	Broker (2)	Individual (3)	Centralized (4)	Broker (5)	Individual (6)	
<i>Spatial coverage</i>									
Within village	74	47%	13	31	30	10	40	24	18
Other villages within township	43	27%	6	19	18	11	19	13	1
Outside township	40	25%	5	27	8	15	21	4	6
<i>Size of membership</i>									
Formal members at initiating year (median)	157	23	26	18	30	14	29	15	18
Client members at initiating year (median)	80	35	30	35	43	80	33	35	108
Median percentage of formal member to total	157	88%	76	83	100	88	92	83	100

Note: Figures in the table body are the incidence of the sample

were engaged in the livestock sector (that is, dairy, egg poultry, and meat animals) and 41 percent of the sample were engaged in the horticultural sector, including greenhouse vegetables and orchard fruits (Table 9.5). Interestingly, centralized input purchase and output marketing occur mostly in the livestock and vegetable sectors. Within livestock, dairy and egg products are highly perishable, and the frequency of production and marketing is higher than meat livestock and grains. As shown in Table 9.5, indeed, for FPCs that centralized input purchase and output marketing, the incidences of FPCs in dairy and eggs are higher than in grains (Columns 1 and 4). However, centralized production emerges in both grain and high-value sectors (Column 7).

### **Quality Labeling Strategy and Governance of FPCs in China**

The agrifood system in China is modernizing and industrializing. Although brand and certification are important reputation enhancing assets for FPCs to realize value-adding and strengthen the farmers' ownership along the agrifood chain (Hendrikse and Bijman, 2002), only 17 percent and 18 percent of FPCs had their own brand and quality certification (Table 9.5). For this group of FPCs, very few of them centralized input purchase and production. But they tend to centralize the marketing of outputs (Column 4). The emergence of the transformed agrifood system and the new agribusiness mode via FPCs do not enter the production stage, and the content of output marketing and production seems still to be disconnected (Jia et al., 2012).

### **Agribusiness of FPCs in China**

The decision rights within FPCs seem to have a minor correlation with the transformed agrifood system and the new agribusiness mode in China. Since 2003, the Chinese government at every level has strongly supported the development of a new agribusiness mode called 'Firm-Farmers' to reach economies of scale and to strengthen the coordination of the agrifood supply chain (Waldron, 2009). The dominant type of firm is the so-called 'Dragon-Head-Driven' company. It intends to channel technology to farmers and to stabilize farmers' access to high-value-added markets. In the agribusiness of 'Firm-Farmers' and 'Dragon-Head-Driven' companies, the firms were selected and asked to contract with farmers to produce specific attributes. For example, they may provide seeds, fertilizers, other inputs and technical advice. In exchange for their role in enhancing the vertical coordination of the agrifood system, these firms receive support and subsidies from the government. Although it was found in some studies



Table 9.5 Product attributes, quality labeling, new business mode and decision rights of Farmer Professional Cooperatives (FPCs) in China

Product	Total		Input purchase			Output marketing			Centralized Production (%) (7)
	obs.	pct.	Centralized (1)	Broker (2)	Individual (3)	Centralized (4)	Broker (5)	Individual (6)	
Dairy and egg	20	12	6	8	6	9	8	3	1
Meat product	48	30	5	23	20	6	28	14	4
Aquatic	12	8	1	5	6	3	4	5	4
Grain	12	8	0	7	5	3	5	4	4
Vegetables	46	29	10	24	12	12	21	13	5
Orchard fruits	19	12	2	10	7	3	14	2	7
Brand	27	17	5	17	5	14	8	5	4
Certification	28	18	6	17	5	10	11	7	6
Production base	37	24	11	18	8	7	28	2	5
Dragon-head companies	42	27	11	22	9	12	28	2	8

Note: Figures are incidence of the sample

that contracting introduced vertical coordination along the agrifood chain (Guo et al., 2007), the roles of these new agribusiness modes on the decision rights within FPCs are not conclusive.

## ECONOMETRIC ANALYSIS

### The Model

Based on the second round survey, we created a cross-section database consisting of 157 FPCs. As so many different factors might be simultaneously affecting the observed association between the decision rights within China's FPCs and various transactional attributes (product, branding, quality labeling, membership and others), multivariate analysis is needed. The basic model is as follows:

$$Y_{ik} = a_0 + a_1 * Product_i + a_2 * Brand_i + a_3 * Certification_i + a_4 * Membership_i + \delta * Z_i + e_i$$

where the dependent variable  $Y_i$  is the decision rights for inputs purchase ( $k = 1$  under centralization;  $k = 2$  through a broker coordination), output marketing ( $k = 3$  under centralization;  $k = 4$  through a broker coordination), and centralized production ( $k = 5$ ). It is a binary discrete variable containing 1 when the answer to each of the above variables is 'Yes'.

We include a set of independent variables. 'Product' consists of six dummy variables for dairy and eggs, meat, aquaculture, grains, vegetables and orchard fruits. The product dummies explain transactional attributes like transaction frequency and perishability. 'Brand' and 'Certification' record whether an FPC brands its products or certifies them to certain standards of quality or safety. 'Membership' contains two variables: the spatial coverage of membership and the percentage of formal members to the total serviced members. For the former, we use three dummy variables for FPCs having membership within the local village, across villages but within the local township, or outside the local township.

We also include several control variables to reflect the development of agribusiness in China. Since the mid-2000s, the Chinese government made various initiatives to promote agro-industrialization. For example, the government encouraged and directed concentrated production complexes (called Production Bases, *shen chan jidi* or *Jidi* in Chinese) that aggregated agricultural production of a number of smallholders into a large one. The policy initiative of farmer professional cooperatives was part of the

agro-industrialization. In this study, we include variables such as the age of FPC, FPCs being the contracted Production Base for agribusiness firms, and FPCs being within the government-initiated agribusiness mode of 'Dragon-Head'. To estimate the relationship between the decision rights within FPCs and other factors, we use the Logit model (since the dependent variable is either 1 or 0). The results are presented in Table 9.6.

### Multivariate Results and Discussions

Hypotheses 1a and 1b are confirmed. Being highly perishable, dairy and eggs tend to be marketed through FPCs in a centralized way (Column 3; Table 9.6). Frequently procuring inputs of agro-chemicals and feed, FPCs in the livestock and vegetable sectors tend to centralize input purchase (Column 1). Being frequently marketed (nearly every day), dairy and eggs have a high tendency of centralizing output marketing through FPCs in China (Column 3). In line with transaction cost economics, perishability and frequency affect the decision rights of marketing within FPCs in China.

Hypothesis 2 is not confirmed. The estimated results show that branding FPCs' products introduces centralized output marketing. However, it does not lead to any cooperation and collective decision-making in production and input purchase. Surprisingly, certification of public food safety and quality standards by FPCs in China has no impact on any of the decision rights within the FPCs. This evidence is supported by Hu et al. (2007) who found that the public certification of food safety and quality standards in China's agrifood system, be it at the national or local level, is primarily used by Chinese cooperatives and firms as a means to advertise and promote sales without affecting the production stage. Recent studies reveal that public certifications play a minor role in signaling quality and food safety standards, as China's consumers do not consider them as a primary concern when purchasing food (Bai and Zhang, 2010; Zhang et al., 2009).

As predicted in Hypothesis 3, when the spatial coverage of an FPC expands outside the township boundary, the transaction costs within FPCs rise due to increasing heterogeneity of the membership. It will be difficult to centralize the decision-making for input purchase and production (Column 1, Column 5; Table 9.6). Interestingly, large FPCs tend to centralize output marketing (Column 3). This is easily explained. To market products collectively through FPCs, scale matters as it is easier (for farmers) to capture scale economies in organizing large amounts of outputs. However, this does not mean that scale economies do not exist in input purchase and production. It implies that the transaction costs of a

Table 9.6 Results of multivariate analysis estimating the decision rights of Farmer Professional Cooperatives (FPCs) in China

	Input purchase		Output marketing		Centralized production
	Centralized	Broker / Service marketing	Centralized	Broker / Service marketing	
	(1)	(2)	(3)	(4)	(5)
Dairy and eggs (D)	0.31*** (3.15)	-0.18 (0.99)	0.25* (1.70)	-0.14 (0.83)	-0.26* (1.83)
Meat product (D)	0.11** (2.42)	-0.08 (0.52)	-0.04 (0.37)	0.05 (0.32)	-0.24* (1.79)
Aquaculture (D)	0.11 (1.13)	-0.09 (0.46)	0.09 (0.54)	-0.09 (0.45)	0.07 (0.40)
Vegetables (D)	0.21*** (3.45)	-0.13 (0.85)	-0.03 (0.26)	-0.04 (0.27)	-0.22 (1.60)
Orchard fruits (D)	0.09 (1.49)	-0.02 (0.14)	-0.04 (0.30)	0.23 (1.37)	0.03 (0.21)
Brand (Yes = 1; No = 0)	0.02 (0.27)	0.11 (0.87)	0.29*** (3.77)	-0.28** (2.23)	-0.12 (1.25)
Certification (Yes = 1; No = 0)	0.12 (1.55)	0.03 (0.24)	-0.09 (0.94)	0.08 (0.62)	0.11 (1.24)
Spatial coverage: within township (D)	-0.09 (1.26)	0.07 (0.74)	0.11 (1.47)	-0.03 (0.32)	-0.18*** (3.33)
Spatial coverage: outside township (D)	-0.15*** (2.60)	0.27*** (2.78)	0.23*** (2.82)	-0.01 (0.12)	-0.04 (0.60)
Percentage of formal members to total	-0.00 (1.01)	-0.00 (0.64)	-0.00 (0.26)	0.00 (0.46)	0.00 (0.31)
FPC age	0.02* (1.66)	-0.03* (1.78)	-0.05** (2.28)	0.01 (0.33)	-0.02 (1.40)
FPC contract with industry as 'production base' (jidi) (Yes = 1; No = 0)	0.12* (1.94)	-0.01 (0.11)	-0.08 (1.05)	0.30*** (3.30)	-0.02 (0.22)
The downstream buyer of FPC is 'dragon-head' company (Yes = 1; No = 0)	0.07 (1.26)	0.07 (0.72)	0.13** (2.02)	0.10 (1.09)	0.07 (1.11)
N	157	157	157	157	157

*Notes:*

As binary variables, the dependent variables are coded to 1 when the answer to each of the questions 1–5 is 'Yes'; they are coded to 0 when the answer is 'No'.

D = Dummy variables.

Absolute *t* statistics in parentheses.

\*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

For product classification, the category of 'grains' is set as the base value; for scope of FPC membership, the category of 'within local village' is set as the base reference.

heterogeneous membership in a large area will overshadow the benefits of scale economies so that centralized decision-making is not adopted.

Besides transactional attributes conceptualized in the hypotheses, we also include several control variables. For example, the age of the FPC significantly affects the decision rights of input purchasing and output marketing, but in different ways. As shown in Table 9.6, the earlier an FPC is established, the more likely input purchase is centralized. However, new FPCs tend to be more output marketing-oriented with centralized decision-making.

The emerging new agribusiness mode of 'Production Base' and 'Dragon-Head-Driven' company in China affects only the decision rights of input purchase and output marketing within FPCs (Column 1 and Column 3). For years, China's government attempted to restructure the traditional low-value-added agrifood chains in China to modern ones by enhancing the vertical coordination between the farmers and the downstream segments along the agrifood chain. Through a 'Production Base' (*jidi* in Chinese) and a 'Dragon-Head-Driven' company' (*longtou qiye* in Chinese) scheme, FPC farmers are expected to be integrated into the agrifood system by contracting with certain agricultural enterprises. This governance system was termed as agro-industrialization (*no-ye chan-ye-hua* in Chinese) (Niu and Xia, 2000). We establish that an FPC functions more like an advanced broker to coordinate input purchase and output marketing between individual farmers and the enterprises. It does not promote joint production and corresponding services to individual farmers.

## CONCLUSION

This study aimed to investigate the internal governance of FPCs in transitional China. The empirical analysis is based on a national survey on 157 farmer professional cooperatives in China. We first described the decision rights and income rights of FPCs in China, and then related the type of decision-making of input purchase, output marketing, and production to several attributes that affect the transaction costs related to FPCs in the agrifood system in China.

The main research findings are summarized as follows. First, the governance of FPCs in China is based on an owner-operator system in which decision rights are still retained by family farmers. However, it seems that FPC farmers tend to delegate the decision rights of purchasing of inputs and marketing of output to the FPC. Second, perishable and frequently marketed products tend to introduce centralized marketing within FPCs in China. Third, branding of FPCs correlates with joint output

marketing. As another reputation asset, public certification does not affect any decision-making within the FPCs in China. Last but not least, the emergence of the new agribusiness mode introduces vertical coordination at the farm gate via FPCs, but it only affects the farmers' decision-making of input purchase and output marketing. The decision rights of production are retained by individual farmers.

Williamson (1985) shows that the difficulties of coordination of economic activities under conditions of uncertainty and risk lead to hierarchical or centralized decision-making procedures. Member commitment is most easily achieved in small cooperatives. To achieve economic efficiency, however, many cooperatives become larger and centralize decision-making, causing a dilemma regarding decision rights within FPCs. As an important input and potential solution, information dissemination and communication can reduce uncertainty and the associated probability of errors in decision-making, and thus affect the optimal organizational structure of agrifood chains (Fulton and King, 1993).

The emergence of farmer cooperatives in China is an institutional adaptation for smallholder farmers being integrated in the transformed agrifood system. The concentrated downstream segment of the agrifood chain also views farmer organizations as a viable institutional option to procure products and secure quality. Farmers may find that the full bundle of decision-making rights is undermined, and they have to delegate some rights, particularly relating to the marketing of their products. However, decision rights over production activities will not be transferred as the family farm has been found to be an efficient and inclusive institutional arrangement in the agrarian economy (Schmitt, 1991; Binswanger et al., 1995). This has great policy implications because some policy directives for transforming smallholder family farms to consolidated large ones tend to exclude the poor ones and thus pose challenges to rural equity (Jia et al., 2013). Producer organizations that are governed on the basis of family farms are inclusive and potentially increase rural income (Yang and Liu, 2012).

This study has several limitations though. The product dummies (for livestock products, aquatic products, grains, vegetables, and orchard fruits) are unable to reflect all the attributes that affect transaction costs affecting the decision-making within FPCs. The categorization of industries is crude as products in the same category might be distinct in terms of transaction complexity and uncertainty. Meanwhile, the characteristics of FPCs' downstream partners were not surveyed. To fully uncover the determinants of the decision rights within FPCs, an approach that includes both farmers at the upstream segment and buyers at the downstream segment of the value chain is needed in future research.

## NOTES

1. More details about the first round survey are available in Jia et al. (2012) and Shen et al. (2005).
2. It is not rare for registration of FPCs to an agency (or more than one agency) to be due to qualifying for support from various sources. The national campaign for 'Farmers' Cooperative Organizations' and increased financial support from various government agencies amplify and distort the incentive for initiating cooperatives and associations. In the survey, we found a few 'empty-shell' cooperatives that provide no service to members. They are established to receive preferential support from the government.
3. The size of formal membership may be underestimated. When FPCs update their formal membership at the Industrial and Commercial Bureau, they need to collect the fingerprints of all the formal members. This is time consuming and troublesome in rural China. As such, FPCs may not update their membership at the ICB and the surveyed numbers may be understated, although we asked the enumerators to explain this to the FPC presidents.

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