

Contract Farming in China: Supply Chain or Ball and Chain?

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Abstract: Contract farming in China has grown rapidly over the past 10 years. This paper examines the evolution of contract farming, and explores the incentives to engage in contract farming, preferred contract forms and contract performance from the perspective of both Chinese farmers and contracting firms. Firm and household perspectives on contracting are assessed using data obtained from village and firm level surveys. Preliminary results from the village survey suggest that most farmers have a favorable view toward contract production. However, contract farming tends to bypass smaller producers. Farmers identify price stability and market access as the key advantages to contracts while firms consider improved product quality ensured through contracts as the critical incentive to exercise contracts. Contracting firms favor direct contracts with larger farms. Contracts with farmer-owned cooperatives and middlemen were also used. The result also indicates that, in general, contract performance is less than desired and is dependent on contract design and specifications. Econometric models are used to examine those factors that encourage farmers and firms to engage in contract farming. Characteristics of agents, product or enterprise type and government support significantly influence farmers' and firms' choice of contracts.

Classification codes:

Key Words: contract farming, Chinese agriculture; vertical coordination

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Presented at Minnesota International Economic Development Conference, University of Minnesota, April 29-30, 2005

Funding for this project was provided by the National Science Foundation of China (70373027).

Contract Farming in China: Perspectives of Smallholders And Agribusiness Firms

1. Introduction

Over the past 25 years, the Chinese agricultural sector has been fundamentally restructured. Agricultural production and farm household income has grown rapidly, due, to a large extent to agrarian reforms undertaken by the government. Beginning in 1978, a series of institutional reforms significantly transformed a collectivized planned agricultural sector into something resembling a capitalist structure. The crucial milestones have been the abolition of the communal property base, the introduction of the household contract responsibility system, price and market liberalization, the revision to the Land Administration Law in 1998, and, most recently, China's admission to the World Trade Organization (WTO) (Kedliker, 1992; Oi, 1999; Unger, 2002; Whiting, 2001; Zweig, 1997). The farm household correspondingly has become an active agent in the marketplace in contrast to a passive production unit in the planned economy. Farm households at the village level have certain rights to decide of what they would produce and how to market their products subject to some minimum production requirements from local government. However, Chinese farmers face a number of challenges – low agricultural prices due to large stocks of products, lagging incomes and excess labor in the agricultural sector among others. Externally, Chinese agriculture faces increasing competition from foreign products due to its recent entry into the WTO and the continuing globalization

of agriculture. Domestically, Chinese agriculture has moved into a new development stage characterized by significant increases in the level of production along with shifts in food demand as a consequence of urbanization and rising incomes. Under these circumstances millions of small-scale farm households in China are unable to compete – to respond to changes in domestic demand and to withstand pressure from international markets. For many small holders, market access has become increasingly difficult and their incomes continue to lag behind the rest of the economy.

Agricultural officials in China are faced with a dilemma – how to overcome the limits imposed by a fragmented production system, improve the quality and competitiveness of agricultural products and raise the income of rural households. In 2004 a system of subsidies, along with infrastructure investments and reform in rural credit institutions was introduced to improve the welfare of farm households. (Gale, Lohmar, Tuan, 2005). However institutional innovation – creating new ways of doing business also plays an important role in China’s attempts to modernize its agricultural system and improve rural incomes. One of these innovations is contract farming. Contract farming is a fairly new venture for the Chinese agricultural sector—one that emerged as a result of the government’s agricultural industrialization programs.

Contract farming has a checkered history throughout the world. At its best, contract farming provides a means to manage complex production processes with greater precision than is possible through arm’s length market transactions. This can result in higher quality, safer food with lower production and marketing costs. In

some cases, particularly in developing or transition economies, contracting can overcome imperfections in input and output markets or institutional deficiencies – providing credit, seeds, machinery services, human capital and market access to farmers. However, without adequate competition among contracting firms, informed farmers and rule of law, contract farming can lead to economic serfdom for peasant farmers and a food system that meets the economic objectives of power elites (See for example, Allen and Lueck, Eaton and Shephard, Little and Watts, MacDonald, Ruston).

The agricultural industrialization program, of which contract farming is a part, has been supported and motivated by the Chinese government with the purpose of making agricultural production more profitable and competitive. Contract farming offers a means to efficiently connect small-scale farmers and large-scale food processing firms. Local government also recognized the potential of contract farming in transforming agricultural structure and raising farmer income. In turn, local governments have implemented a number of programs and incentives such as credit support and tax reduction for agribusinesses involved in contract farming.

Contract farming in China has made considerable progress since its emergence 20 years ago. Four characteristics can be safely generalized from its growth so far. First of all, the number of agricultural commodities produced under contract has increased steadily. Agricultural products produced or marketed under contract have grown from small-quantity locally specialized products, such as food oil and vegetables to bulk commodities such as corn, beans, rice and wheat. For example, in Jiling Province, the number of contracted commodities has grown from

30 in 1999 to 70 in 2000. Second, the geographic distribution of contract farming has also expanded significantly. Initially, contract farming developed in the economically advanced coastal provinces. Now contract farming is spreading rapidly into the underdeveloped areas of central and western China. Most firms sign contracts not only with local farmers but also with farmers in other provinces. Third, the scale of products produced under contract – the planted areas, volume of cash receipts and number of farmers has also increased. According to the China Department of Agriculture, planted area involved in all types of contracts reached 18.6 million hectares in 2001 approximately 40% higher than that in 2000. Finally, the number and complexity of contracts has also increased. Beyond rather standard production and marketing contracts, new contracts cover now food purchases between main production regions and high demand regions and seed production between farmers and research institutions.

According to the most recent survey from the China Department of Agriculture, the number of organizations involved in agricultural industrialization across 31 provinces has increased 4.6 times between 1996 and 2000. The number of farmers who signed contracts with firms increased twofold over the same period. The proportion of farmers involved in contract farming went up correspondingly from 10 percent to 25 percent.

Table 1.1 shows the level and composition of firms or organizations involved in agricultural industrialization between 1996 and 2000 – the most recent data available. The dominant firm type is the so-called “dragon-head-driven” company. The dragon head companies are agribusiness firms designated by either central,

provincial or local because of their economic strength, operation scale, level of technology and management and their potential to improve farm incomes. These firms agree to develop production or marketing systems for local farmers – systems that include market access, technology, technical assistance, credit and other inputs. For most of the dragon-head firms, their systems involve the use of contracts. In exchange for their role in rural development the dragon-head firms receive support from all levels of government and, since 2002, financing from the Agricultural Development Bank of China. In some cases the dragon-head firms that are engaged in contracting are also encouraged to develop “bargaining associations” for farmers in an attempt to create some degree of countervailing power.

The types of organizational or economic relationships between farmers and agribusinesses over the 1996 – 2000 period are reported in Table 1.2. Most relationships involve the use of the contracts. Note however that the proportion of contract relationships dropped from 70.8% in 1996 to 55.6% in 1998 and 49% in 2000. This would suggest that although the volume of production under contract appears to be increasing in China, the proportion of firms involved in contracting is declining – presumably because other forms of business organization-cooperatives or farmer-owned business are becoming more prominent or are proving to be more effective. Problems associated with contracts may include inadequate description of terms on production contracts, contract governance and enforcement. Data from the China Department of Agriculture indicates that the contract enforcement rate including every type of “Firm + Farmer” relationship was less than 20% in 2000 across the nation. Recently local governments have imposed certain mandatory

contracting orders that force farmers to comply with contract provisions. In some cases this has resulted in outcomes that make farmers worse off. The most common reason cited for conflict is that farmers and firms do not understand the contract provisions or the process of contract farming. In this paper we attempt to address the following questions: (1) How is contract farming organized in China? Why has its development been encouraged? (2) What are the factors that influence the establishment of contracts between farmers and firms? (3) How should the contract be designed? (4) What are major factors that affect contract enforcement? We must answer the preceding questions carefully in order to make farmers and firms aware of the obstacles they need to overcome in contact farming so as to make each party better off.

Table 1.1 Diversity of Organization Forms in agricultural industrialization

Organizational Forms	1996	1998	2000
1. Dragon-head-firms	5381	15088	27000
Proportion in the total (%)	45.51	49.93	41.0
2. Middlemen	3384	8024	22000
Proportion in the total (%)	28.62	26.44	33.0
3. Government Authorities	1450	4848	7600
Proportion in the total (%)	12.26	15.98	12.0
4. Other types	1600	2384	9600 ^①
Proportion in the total (%)	13.61	7.85	14.0

Table 1.2 Economic Relationships between Firms and Farmers

Relationship Structure in different Years	Firm Numbers	Proportion (%)
1996	11824	100.0
1. Contract Relation	8377	70.84
2. Cooperative	1255	13.26
3. Farmer-owned-business	2222	18.8
1998	30344	100.0
1. Contract Relation	16948	55.68
2. Cooperative	2791	9.2
3. Farmer-owned-business	3396	11.19
4. Others	7209	23.76
2000	66000	100.0
1. Contract Relation	32340	49.0
2. Cooperative	9240	14.0
3. Farmer-owned-business	8580	13.0
4. Others	15840	24.0

2. Survey Data Description

2.1 Farm-level data:

Farm-level data were obtained through a survey conducted by more than 60 undergraduate rural-area students from Zhejiang University when they returned to their home villages during the winter break in February 2004. The survey contained questions on the farm household, farm production status and involvement in contract farming. Student survey enumerators were carefully trained before they returned home. Each student randomly selected 30 households in their home village to survey. The students returned 1820 surveys of which 1036 were complete and usable. Because many of the student volunteers came from Zhejiang, Jiangxi and Shangdong provinces, more data were collected in

these three provinces. In total, the farmers included in the survey represent over 13 provinces and 47 counties as shown in Table 2.1 and Figure 2.1.

2.2 Firm-level data:

Firm level surveys were conducted by mail and through direct interviews. The survey was restricted to designated dragon-head firms. A preliminary survey, conducted in June, 2004, was sent to a small sample of dragon-head firms across China. Return rates were so low that a national survey was abandoned. Instead, to assure a high rate of return through mail surveys, limited survey population was restricted to dragon-head firms within Zhejiang province. Our research center has a close relation with many of firms and this, we believed, would improve the return rate. The survey was mailed to 111 agribusiness firms in Zhejiang province under the name of contract farming project. A total of 80 usable copies of the survey were returned. During the same period, between July and August 2004, we interviewed an additional 36 firms. The distribution of organizational types of dragon-head firms and geographical location of these firms are illustrated in the Table 2.2 and Figure 2.2.

Table 2.1 Regional Distribution of Farmers Investigated in Survey

Regions	Households (units)	Proportion (%)
East Area	586	56.6
Fujian	60	5.8
Guangdong	50	4.8
Jiling	61	5.9
Jiangsu	23	2.2
Shandong	128	12.4
Zhejiang	264	25.5
Central Area	304	29.3
Hubei	11	1.1
Hunan	57	5.5
Jiangxi	236	22.7
West Area	146	14.1
Sichuan	58	5.6
Yunnan	29	2.8
Chongqing	30	2.9
Guangxi	29	2.8
Total	1036	100

Table 2.2 Distributions of Firms with Different Properties

Properties of Firms	Quantity Numbers	Proportion(%)
1. Private Firms	78	67.2%
2. Collective-Owned-Firms	5	4.3%
3. State-Owned -Firms	8	6.9%
4. Joint-Venture-Firms	11	12.1%
5. Others	14	12.4%

Figure 2.1 Farm Provinces Covered Across China



Figure 2.2 Firms Location in Zhejiang Province



3. Contract Farming: Empirical Analysis on Farmers and Firms

3.1 Empirical Analysis on Farmer Side

3.1.1 Overall Situation

Out of 1036 farmer households included in the survey only 220 households or 21.2% of the total ever participated in contract farming. However when farmers without contracts are asked whether they would be willing to engage in contract farming, 76 percent farmers answered positively. Only the remaining 2.1 percent indicated they would not consider a contract if offered. The results suggest that most farmers have a favorable view toward contract production and would like to be involved in contract farming if they were offered the opportunities. From table 3.1 we can see that the primary reason farmers are not participating in contract farming is the absence of such opportunities. An absence of perceived benefits presumably due to small-scale production and contractors showing no interest account for other reasons. This implies that the existence of many small-scale operations influences the growth of contract farming in China.

Graph 3.1: Having Contracts Farmers and Willing-to-Accept Farmers

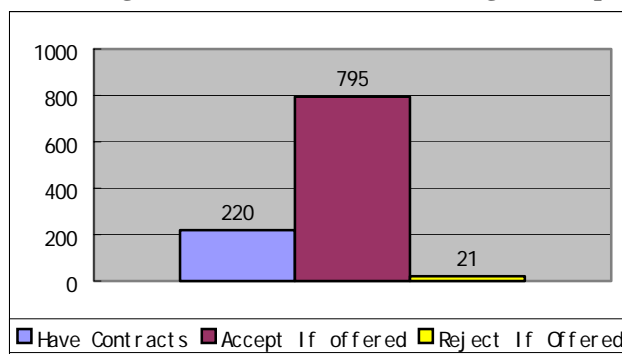


Table 3.1: Reasons why Farmers do not have contracts

A variety of reasons	No Opportunities	No Obvious Benefits	Too Complicated Process	Buyers Showing no Interest	Total
Magnitude	426	169	21	200	816
Proportion	52.2%	20.7%	2.6%	24.5%	100%

3.1.2 Incentives to engage in contract farming

Table 3.2 illustrates several potential incentives identified by current contract producers that make them willing to engage in contract farming. Farmers strongly identify price stability and market access as the key advantages to contracts. However, credit and technology support provided by contracting firms were also identified by some households.

Table 3.2: Incentives to join contract farming

Incentives	Market Access	Price Protection	Credit Support	Technology Support	Total
Magnitude	124	73	17	6	220
Proportion	56.4%	33.2%	7.7%	2.7%	100%

3.1.3 Organizational types contracting with farmers

In table 3.3 we present information on farmers' existing and pretended business relationships. Agribusinesses, cooperatives and middlemen use contracts with farmers. Although nearly 70 of all existing contracts are with middlemen and firms, firms and cooperatives are the types of organizations farmers are most willing to contract. In many cases middlemen are often the only alternative for farmers who would like to engage in contracts in many cases. Since cooperatives are not well developed in China, farmers have

fewer opportunities to contract with them. The apparent preference of Chinese farmers for cooperatives deserves further investigation.

Table 3.3: Organizational Types Dealing with Farmers

Organizational Types	MiddleMen	Firms	Village Government	Depart. Of Tech	Cooperative	Others	Total
Actual Proportions	34.1	34.1	12.7	5.9	0.5	12.7	100
Pretended Proportions	18.0	32.7	8.8	14.4	18.7	7.5	100

3.1.4 Types of Contracts

Production and marketing contracts are the dominant types. We can easily understand this point from farmer's concerns presented in Table 3.2 (A sample contract is given in Appendix A).

Table 3.4: Types of Contracts

Types of Contracts	Marketing	Production	Others	Total
Households	149	61	10	220
Proportions	67.7%	27.7%	4.6%	100%

3.1.5 Forms of Contracts

Approximately 51 percent of all contracts are written and the remainings are oral contracts between agents. But the choice of contract form is highly correlated with contractor type. Oral contracts are used primarily by middlemen and written contracts are used by firms. The underlying reason comes from the reputation and familiarity associated with middlemen who are from the same village as the contracting farmers. Social norms make oral contracts perform very well. But outside firms would prefer to written contracts that clearly specify rights and responsibilities for both parties.

Table 3.5: Forms of Contracts (Proportions)

Organizations	Forms of Contracts		Total
	Oral	Written	
Middlemen	64.0	36.0	100
Agribusiness Firms	14.7	85.3	100
Village Government	75.0	25.0	100
Local Authorities	61.5	38.5	100

3.1.6 Contract Specifications

Farmers with contracts were asked to provide information on contract specification. Long-term contracts, more than one year, account only for 17.7 percent, the remaining 82.3 percent of contracts were short-term contract less than one year.

Approximately 44 percent of actual contracts reported in Table 3.6 specified a flexible delivery price that fluctuated with the local market. The second most common provision, 27.3 percent is specified as floor price. When farmers without contracts were asked about preferred pricing mechanisms, 68.6% selected a price floor and only 20.9% of farmers would shift to flexible delivery price. Since price specification is usually regulated by the buyers, we can see that its use does not fully reflect farmers' preference.

Table 3.6 Price Specification and Farmer's Willingness-to-Accept (Proportions)

Price Specification	Flexible Price	Price Floor	Fixed Price	Others	Total
Real Situation	44.1	27.3	22.7	5.9	100
Willingness-to-Have	20.9	68.6	9.1	1.4	100

The delivery payment method, Table 3.7 is another critical contract specification that directly affects farmer's intent in contract farming. Cash payment at delivery is used in half of all real transactions. Payment after

delivery accounts for another 22.3 percent. Most of farmers would prefer to immediate cash payments.

Table 3.7 Payment Method and Contracts

Payment Method Selected	Cash Payment	Prepaid Deposit	Pay-after-Delivery	Total
Actual	50.0	27.7	22.3	100
Pretended	66.4	27.3	6.4	100

3.1.7 Enforcement and Violation of Contracts

Information presented in Table 3.8 indicates 60% of farmers with contracts did not have a conflict with the other party. About 35.9% of farmers reported infrequent conflict and 4.1% of farmers often had a problem with their contractor. The overall enforcement of contracts is above the average level. As shown in Table 3.9 most 86.4% were about price and quality terms, such as 86.4% of farmers who think the main reason for the conflicts is price. In addition farmers reported that Most of the conflicts were resolved by negotiation between farmers and buyers and only 2.3% of conflicts were resolved by the court.

Table 3.8 Contract Performances

Do Conflicts Happen A lot?	Never	Seldom	Often	Total
Magnitude	132	79	9	220
Proportion (%)	60.0	35.9	4.1	100

Table 3.9 Reasons for Contract Conflicts Units: %

Issues	Price Term	Quality Term	Quantity Term	Delivery Time
Have experienced	86.4	72.7	6.8	18.2

3.1.8 Benefits for Farmers

Farmers with contracts were asked to rank, using a liken scale, a number of potential benefits. The primary benefits were improving quality of products, stabilizing the sale price and lowering marketing costs. However, farmers did not perceive benefits in reducing production costs and increasing selling price.

Table 3.10 Benefits For Farmers From Contracting Farming

Benefits	No	A little	Normal	Greater	A lot	Total
Reducing Production Cost	31.8	30.0	24.1	13.6	0.5	100
Improving Quality	7.3	15.5	43.2	31.4	2.6	100
Increasing Selling Price	22.3	36.8	28.6	11.8	0.5	100
Stabilizing Sale Price	10.5	15.0	30.9	38.6	5.0	100
Reducing Marketing Cost	21.3	25	19.1	27.3	7.3	100

3.1.9 Logistic Analysis on Factors that Encourage Farmers to Engage in Contract Farming.

According to the studies from Lajili et al. (1997), Rehber (2000), Sartwelle et al. (2000) and Key (2003), farmer's discrete choice to join contract farming is influenced by the household's characteristics, operation features, product categories, market attributes and underlying environmental condition. A discrete choice model is constructed in this paper to test the hypothesis that a farmer's decision to engage in contract farming is affected significantly by the above behavioral factors.

Model Specification

In the discrete choice model, farmer households choose to participate in contract farming depending on the following five explanatory variables: (1) farmer household's characteristics (P) that are reflected by the education level and risk attitude; (2) the extent of specialization and commercialization in the farmer's production (R); (3) agricultural products categories (C); (4) market attributes (T) represented by degree of price fluctuation and the distance of target market; (5) underlying environmental condition (E) measured by the presence of government support policy and traffic condition to primary market. The general model takes the form:

$$A_i = F(P_i, R_i, C_i, T_i, E_i; \beta) + \varepsilon_i \quad (1)$$

The above specification fits the range of binary Logistic model and A_i is binary choice in which 1 denotes participation in contract farming. ML method is adopted to obtain the estimation results:

We use x_i to stand for all of explanatory variables and rewrite the model as follows:

$$\Pr(Y_i = 1) = f(p_i) = \frac{\exp(\beta'x_i)}{1 + \exp(\beta'x_i)} \quad (2)$$

and individual likelihood for observation i becomes:

$$p(y_i) = f(p_i)^{y_i} [1 - f(p_i)]^{(1-y_i)} \quad (3)$$

Further assuming independence across individuals we are able to obtain the likelihood function for all observations:

$$L = \prod_{i=1}^n P(y_i) = \prod_{i=1}^n f(P_i)^{y_i} [1 - f(P_i)]^{(1-y_i)} \quad (4)$$

its log counterpart takes the form:

$$\ln L = \sum_{i=1}^n \{y_i \ln f(P_i) + (1 - y_i) \ln [1 - f(P_i)]\} \quad (5)$$

The variables included in the estimating equation are listed in Table 3.11 along with their mean value. Risk aversion was assessed using the farmer's response to a standard lottery with economically significant gains and losses and an expected value of zero. Price fluctuation was determined from a subjective estimate by the respondent.

Results and Discussions

We used SPSS 11.5 software to run the logistic regression on the 1036 observations in farmer data set. Two models were estimated. Model 1 included all of variables. Model 2 was estimated using backward selection to eliminate the variables with smallest t value until significance of most of variables is achieved.

The regression results indicate that farmer's education level and risk attitude have no significant impact on the choice probabilities. We would have expected positive relation between farmer's education level and participation in contract farming. The reason might lie with the fact that there is only a slight difference in farmer's education level and most of them are within very low level. The same logic accounts for risk attitudes as most of farmers rejected the lottery. Specialization and commercialization in production are

positively and significantly related to a farmer's acceptance of a contract. Note that this may reflect the impact of the contract on the farm's output mix. Distance of the target market has a significant positive impact on contract choice. If farmers were far away from the target market, they would consider participating in contract farming. Most of exporters purchase products by signing contracts with local farmers in order to ensure high quality, lock in adequate supplies and ensure timelines for processed goods to foreign consumers. Price fluctuation in target market is not significant in part due to sampling errors.

Government support accounts for another important factor that drives farmers to engage in contracts. Its coefficient is significant in 1% confidence level in both models. Finally there is a significant relationship between enterprise type and the existence of a contractual relationship.

Table 3.11 Interpretation and Summary on Explanatory Variables

Variable Names	Definition	Mean
Household Characteristics (P)		
Education Level	1=below elementary School; 2=elementary school; 3=middle school ; 4=above middle school	2.46
Risk Attitudes	1=Risk Averse; 2=Neutrality; 3=Risk Favor	1.06
Operation Features (R)		
Specialization	Income from main agricultural product/total income (%)	0.45
Commercialization	Quantity of marketed products/total production (%)	0.65
Product Categories (C)		
Food	Dummy variable 1: yes 0: no	0.43
Vegetable	Dummy variable 1: yes 0: no	0.13
Fruit	Dummy variable 1: yes 0: no	0.06
Tea	Dummy variable 1: yes 0: no	0.01
Edible Mushroom	Dummy variable 1: yes 0: no	0.04
Nursery	Dummy variable 1: yes 0: no	0.02
Poultry	Dummy variable 1: yes 0: no	0.05
Meat	Dummy variable 1: yes 0: no	0.08
Market Attributes (T)		
Price Fluctuation	1=0~10%; 2=10%~20% 3=20%-50%; 4= beyond 50%	2.20
Target Market	1=local market; 2=non-local market; 3=foreign market	1.20
Environmental Condition (E)		
Traffic	0=bad; 1=good	0.91
Government Support	0=no support; 1=support available	0.50

Table 3.12 Farm-level Logistic Regression Results

Explanatory Variables	Model 1		Model 2			
	Coefficient (B)	Wald	Coefficient (B)	Wald	Exp(B)	Normalized Coefficient
Intercept	-3.533**	41.857	-3.420**	102.495	0.033	-0.637
Farm's Characteristics (P)						
Education	-0.062	0.517				
Risk Aversion	0.278	1.282				
Operation Features (R)						
Specialization	0.498	2.440	0.613**	3.947	1.846	0.104
Commercialization	0.585*	3.426	0.527*	2.884	1.694	0.090
Categories of Product (C)						
Food	0.415*	2.857	0.365*	3.513	1.441	0.039
Vegetable	0.123	0.143				
Fruit	0.779**	5.172	0.692**	6.417	1.998	0.118
Tea	1.596***	7.813	1.487***	7.150	4.425	0.450
Mushroom	0.112	0.056				
Nursery	1.173**	4.370	1.013**	3.666	2.754	0.295
Poultry	1.050***	7.819	0.993***	8.453	2.701	0.187
Meat	1.192***	13.688	1.089***	14.573	2.972	0.171
Market Attribution (T)						
Price Fluctuation	-0.110	1.780				
Target Market	0.535***	9.978	0.532***	10.303	1.703	0.049
Environment (E)						
Traffic	0.157	0.297				
Government Support	0.674***	13.661	0.651***	13.556	1.918	0.064
Prediction Accuracy		78.0%			77.9%	
-2loglikelihood		969.319			973.196	
Chi-Square Value		93.920***			90.042***	
Nagelkerke' R ²		0.135			0.130	

注：“*”、“**”、“***” represent respectively significance at 10%, 5% and 1% levels.

3.2 *Empirical Analysis on Firm Side*

3.2.1 Overall situation

Out of 116 dragon-head firms include in survey 100 firms were involved in contract farming. Experience with contract farming varies across firms. Out of total, 65 firms have engaged in contracting for more than 3 years, 31 firms are between 1 and 3 years and only 4 firms have less than 1 year experience.

3.2.2 Main incentives from the perspective of firms

The survey shows, Table 3.13, that the primary incentives for firms to utilize contracts are to stabilize the supply of raw material and to improve the quality of products. Reducing transaction costs and obtaining government support were identified by 16 and 20 percent of the firms, respectively.

Table 3.13 Main Incentives to Sign Contracts

	Stable Supply of Raw Material	High Quality of Delivery Goods	Reducing Transaction Cost	Stabilizing the Delivery Price	Obtain Government support	Total
Numbers of firms	78	77	16	44	20	100
Proportion (%)	78.0	77.0	16.0	44.0	20.0	100

3.2.3 Types of Contract Organizational Chains

Agribusiness firms utilize a number of organizational or supply chains to contract with farms. The most common chain is the “Firm + Big Farm” type with half of the investigated firms using it. The type “Firm + Cooperative + Farm” in which the cooperative links farms and firms like a bridge takes the second position favored by other 21 percent of firms. Some firms utilize local authorities, village collective organizations and middlemen to establish contractual relationships with farms.

Table 3.14 Organizational Chains Connecting Farms and Firms

	Firm+Farm	Firm+Village +Farm	Firm+Cooperative +Farm	Firm+Middlemen +Farm	Firm+Local Authority+Farm	Others	Total
Proportion	50.0%	8.0%	21.0%	14.0%	4.0%	3.0%	100%

We also can find that the organizational chains selected by firms are related to the farm size. The table 3.15 reports that more firms would choose “Firm + Farm” type of chain if the size of farms that are delivering goods to firms is bigger. Firms tend to use an intermediary in the supply chain to deal with small farms.

Table 3.15 Farm Size and Organizational Chain

Farm Size	Proportion of Types of Chains				
	Firm+Farm	Firm+Village +Farm	Firm+Cooperative +Farm	Firm+Middlemen +Farm	Firm+Local Authority+Farm
Small	8.0	62.5	28.6	21.4	25.0
Relatively Small	10.0	35.0	71.4	78.6	50.0
Big	66.0	2.5	0.0	0.0	25.0
Very Big	16.0	0.0	0.0	0.0	0.0
Total	100	100	100	100	100

3.2.4 Types of Contracts

Among the 100 agribusiness firms included in the survey, 63 firms signed marketing contracts with farms. But the type of contract depends largely on the categories of delivered goods. Table 3.16 suggests that a marketing contract is commonly used in the fruit, vegetable and tea processing industries whereas production contracts turn out to be more common in meat and dairy processing industries.

Table 3.16 Categories of Goods and Contract Type

Categories of Goods		Contract Type		Total
		Marketing Contract	Production Contract	
Vegetable Processing	Firm Quantities	21	8	29
	Proportion (%)	65.5	34.5	100.0
Meat Processing	Firm Quantities	4	6	10
	Proportion (%)	40.0	60.0	100.0
Food Oil Processing	Firm Quantities	10	4	14
	Proportion (%)	71.4	28.6	100.0
Fruit Processing	Firm Quantities	3	0	3
	Proportion (%)	100.0	0.0	100.0
Aquaculture	Firm Quantities	6	8	14
	Proportion (%)	48.3	51.7	100.0
Dairy	Firm Quantities	0	3	3
	Proportion (%)	0.0	100.0	100.0
Tea	Firm Quantities	8	1	9
	Proportion (%)	100.0	0.0	100.0
Silk	Firm Quantities	0	2	2
	Proportion (%)	0.0	100.0	100
Edible Mushroom	Firm Quantities	2	2	4
	Proportion (%)	50.0	50.0	100.0
Bee Honey	Firm Quantities	1	1	2
	Proportion (%)	100	0.0	100.0
Other goods	Firm Quantities	6	4	10
	Proportion (%)	40.0	60.0	100.0
Total		37	63	100

3.2.5 Forms of Contracts

Most agribusiness firms use written contracts (Table 3.17). The ranks or hierarchies of dragon-head-driven firms also influence the selection of forms of contracts. Lower rank firms, particularly county level firms, choose oral contracts more often in part because they maintain close relationships with local farms and have confidence on each other.

Table 3.17 Contract Forms and Rank of Firms

Rank of Dragon-head-firms	Contract Form		Total
	Proportion of Oral Contract	Proportion of Written Contracts	
National	11.1	88.9	100
Provincial	14.2	84.8	100
Municipal	12.5	87.5	100
County	66.7	33.3	100

3.2.6 Specifications on Contracts

The survey results indicate that about 88 percent of contracts involve negotiations between both parties. Only 2 percent are drafted completely by firm contractors. This suggests that most of firms are consulting with farms to write specific contract provisions in the sense that both sides' benefits are satisfied.

As for the delivery price specification on contracts, the price floor is a more common approach accepted by firms (Table 3.18). Flexible price and fixed delivery price mechanisms are also used in some cases. When the rank of the dragon-head-driven firms is considered, the price floor strategy is preferred by higher rank firms whereas flexible price works better for lower rank firms. Due to its strong financial status and favorable public policy coming from government, high rank firms tend to make better use of the riskier floor price method.

Table 3.18 Rank of Firms and Price Specification

Ranks of Dragon-Head-Firms	Price Specification				Totals
	Flexible Price	Price Floor	Fixed Price	Others	
National	22.2	66.7	11.1	0.0	100
Provincial	28.8	57.6	4.5	9.1	100
Municipal	37.5	50.0	6.3	6.3	100
County	33.3	55.6	11.1	7.0	100

The width of price fluctuation in the local market is highly correlated with the selection of price mechanism. When the price is fairly stable, firms tend to accept fixed price and flexible price methods. Likewise, most firms select flexible price as price fluctuation increases.

Table 3.19 Width of Price Fluctuation and Price Specification

Width of Price Fluctuation	Price Specification Methods				Total
	Flexible Price	Price Floor	Fixed Price	Others	
Very Narrow	25.0	0.0	50.0	0.0	100
Narrower	32.8	57.8	6.3	3.1	100
Wider	30.8	61.5	0.0	7.7	100
Very Wide	56.7	10.0	0.0	33.3	100

The payment method is another critical issue affecting sharing of benefits between farmers and firms. The cash payment method is used by 57% of investigated firms. The prepaid deposit method accounts for another 23 percent.

About 38 percent of contracts, Table 3.20, signed by firms have a life of between 1 and 2 years. About 34% percent covers within 1 year or less and only 18% have a life of over 3 years. In table 3.21 we report the contract lifetimes by categories of goods processed in firms.

Table 3.20 Categories of Goods Processed and Contract Period

Categories of Goods	Firm's Proportion sorted by Contract Period				Total
	Less than 1 year	1~2 years	2~3 years	Over 3 years	
Vegetable	44.8	27.6	6.9	20.7	100
Meat	30.0	60.0	0.0	10.0	100
Food Oil	50.0	35.7	7.1	7.1	100
Fruit	33.3	33.3	0.0	33.3	100
Aquaculture	21.4	50.0	14.3	14.3	100
Diary	33.3	33.3	14.3	33.3	100
Tea	22.2	11.1	22.2	44.4	100
Silk	0.0	50.0	0.0	50.0	100
Edible Mushroom	25.0	50.0	25.0	0.0	100
Bee Honey	0.0	100.0	0.0	0.0	100
Others	30.0	40.0	20.0	10.0	100

The contracting period is also affected by the price fluctuation of the processed goods. The wider the price fluctuation, the shorter the contract period as would be expected because of the uncertainty of future price.

Table 3.21 Width of Price Fluctuation and Contract Period

Width of Price Fluctuation	Contracting Period (percentage of firms)				Total
	Less than 1 year	1~2 years	2~3 years	Over 3 years	
Very Narrow	50.0	25.0	15.0	10.0	100.0
Narrower	29.7	42.2	17.5	10.6	100.0
Wider	52.4	34.6	9.2	3.8	100.0
Very Wide	53.3	38.7	8.0	0.0	100.0

3.2.7 Description on Potential Factors that Influence Firms

A. Firm Types

The rank of the firm plays an important role in its use of contracts to purchase raw materials. The dragon-head-firms are generally evaluated according to their scale and reputation and fall into four levels, namely national type, provincial type, municipal type and county type with a decreasing rank. The proportion of national and provincial firms involved in contracting farming is much higher than that of municipal and county firms.

表3.22 Firm Types and Contract Farming

Firm Types		Contract Farming		Total
		Without CF	With CF	
National Type	Quantity	1	9	10
	Proportion (%)	10.0	90.0	100
Provincial Type	Quantity	4	66	70
	Proportion (%)	5.7	94.3	100
Municipal Type	Quantity	7	16	23
	Proportion (%)	69.6	30.4	100
County Type	Quantity	4	9	13
	Proportion (%)	30.8	69.2	100

B. Categories of Processed Goods

The type of processed goods is strongly associated with the firms' use of contracts. All firms in the dairy, the aquaculture and honey industries make use of contracts although the number of the firms

included in survey is small. The detailed information is illustrated in

Table 3.23:

Table 3.23 Processed Products and Contract Farming

Categories of Processed Goods		Contract Farming		Total
		Without CF	With CF	
Vegetables	Quantity of Firms	2	29	31
	Proportion (%)	6.5	93.5	100
Meat	Quantity of Firms	2	12	14
	Proportion (%)	16.7	83.3	100
Food Oil	Quantity of Firms	5	14	19
	Proportion (%)	26.3	73.7	100
Fruit	Quantity of Firms	2	3	5
	Proportion (%)	40.0	60.0	100
Aquaculture	Quantity of Firms	0	14	14
	Proportion (%)	0.0	100.0	100
Dairy	Quantity of Firms	0	3	3
	Proportion (%)	0.0	100.0	100
Tea	Quantity of Firms	1	9	10
	Proportion (%)	10.0	90.0	100
Silk	Quantity of Firms	0	2	2
	Proportion (%)	0.0	100.0	100
Edible Mushrooms	Quantity of Firms	0	4	
	Proportion (%)	0.0	100.0	100
Bee Honey	Quantity of Firms	0	2	2
	Proportion (%)	0.0	100.0	100
Others	Quantity of Firms	4	11	15
	Proportion (%)	26.7	63.3	100

C. Requirement on Quality of Raw Material

The higher the requirement on raw material quality the higher the proportion of firms engaged in contract farming. Respondents were asked to rank the importance of input quality using a 4 point scale.

Table 3.24 Input Quality Requirement and Contract Farming

Quality Requirement		Contract Farming		Total
		Without CF	With CF	
Low	Quantity of Firms	1	2	3
	Proportion (%)	33.3	66.7	100
Relatively High	Quantity of Firms	4	32	36
	Proportion (%)	11.1	89.9	100
High	Quantity of Firms	10	36	46
	Proportion (%)	21.7	78.3	100
Very High	Quantity of Firms	1	30	31
	Proportion (%)	3.2	96.8	100

D. Target Market

If the target market was located in foreign countries, firms would tend to use contracts more often.

Table 3.25 Target Market and Contract Farming

Target Market		Contract Farming		Total
		Without CF	With CF	
Domestic Market	Quantity of Firms	13	67	80
	Proportion (%)	16.3	83.7	100
Foreign Market	Quantity of Firms	3	33	36
	Proportion (%)	8.3	91.7	100

E. Price Fluctuation

If the price fluctuation in the local market is relatively high, firms are less likely to use contracts.

Table 3.26 Price Fluctuation and Contract Farming

Price Fluctuation		Contract Farming		Total
		Without CF	Without CF	
Very Narrow	Quantity of Firms	1	6	7
	Proportion (%)	14.3	85.7	100.0
Narrower	Quantity of Firms	9	71	80
	Proportion (%)	11.2	88.8	100.0
Wider	Quantity of Firms	4	22	26
	Proportion (%)	15.4	84.6	100.0
Very Wide	Quantity of Firms	2	1	3
	Proportion (%)	66.7	33.3	100.0

3.2.8 Logistic Analysis on Factors that Influence Firm's Choice

To further examine which factors significantly influence firms' use of contracts we estimate the model again based on 116 firms in the sample.

Model Specification

As described in the preceding subsection we categorize the factors into following three classes: type of firms (E) represented by their rank, characteristics of processed goods (P) denoted by requirement on the quality of raw materials and corresponding industries and market attributes (T). The study only takes several typical goods, such as vegetable, meat and food oil into consideration. Explanatory variables are listed in detail in Table 3.27.

The general model takes the form:

$$T_i = F(E_i, P_i, M_i) + \varepsilon_i \quad (6)$$

The dependent variable T_i is binary where 1 denotes participation in contract farming. Maximum likelihood estimation method is used to obtain the estimation results. Table 3.27 presents descriptive statistics along with hypothesized signs for variables included in the estimating equations. The regression results are presented in Table 3.28.

Results and Discussions

We are able to draw the following results from the sample data:

1. The rank of firms has a significant and positive effect on the use of contracts. This may reflect the fact that scale and reputation are viewed as favorable signals by farmers and makes them more willing to cooperate with high rank firms.
2. Characteristics of processed goods have a certain positive effect on the dependent variable consistent with expectations. The firms in the fresh vegetable processing industry are more likely to use contracts since firms need a stable and timely supply of raw goods that are quite perishable.
3. Price fluctuation in the target market has a significantly negative effect on the use of contracts. Firms tend to use contracts in a market with a less price variation.

Table 3.27 Included Variables

Variable Names	Definition	Mean	Expected Impact
Dependent Variable			
Discrete Decision	0=without CF; 1=with CF	0.86	
Explanatory Variable			
Types of Firm (E)			
National	Dummy variable, 1 means yes and 0 means no.	0.09	+
Provincial	Dummy variable, 1 means yes and 0 means no.	0.60	+
Product Characteristics (P)			
Categories			
Vegetable	Dummy variable, 1 means yes and 0 means no.	0.27	+
Meat	Dummy variable, 1 means yes and 0 means no.	0.09	+
Food Oil	Dummy variable, 1 means yes and 0 means no.	0.14	+
Tea	Dummy variable, 1 means yes and 0 means no.	0.08	+
Quality Requirement	1=low; 2=relative high; 3=high; 4=very high	2.91	+
Market Attributes (T)			
Foreign Market	Dummy variable, 1 means yes and 0 means no	0.31	+
Price Fluctuation	1=never; 2=narrower; 3=wider; 4=very big	2.22	-

Table 3.28 Regression Results on Factors that Influence Firm's Engaging in Contract Farming

	Coefficient	Normalized Coefficient	Wald Stat	Exp(B)
Explanatory Variables				
Types of Firm (E)				
National	2.57*	1.84	3.81	13.10
Provincial	3.18***	1.50	13.40	23.92
Product Characteristics (P)				
Categories				
Vegetable	2.97**	1.71	7.85	19.40
Meat	0.13	0.08	0.01	1.14
Food Oil	1.45	0.84	1.83	4.26
Tea	1.39	1.05	1.00	4.00
Quality Requirement	0.23	0.05	0.30	1.26
Market Attributes (T)				
Foreign Market	0.03	0.01	0.01	1.03
Price Fluctuation	-1.14**	-0.35	4.14	0.32
Intercept	1.18	1.11	0.47	3.26
Overall Tests				
Prediction Accuracy		91.4%		
-2loglikelihood		67.05		
Chi-Square Value		26.03**		
Nagelkerke' R ²		0.364		

Note: “*”、 “**”、 “***” represent respectively significance at 10%, 5% and 1% levels based on t values.

3.3 Empirical Analysis on Contract Performance

3.3.1 Overall Contract Performance

The firm level survey allows us able to analyze the potential factors that influence a contract's performance and the likelihood of violation. The key issue we are interested in is the performance ratio of underlying contracts-the ratio between well-exercised contracts and the total number of contracts. We use 75 percent acceptable performance as a benchmark. Our data indicates that 72 firms out of 100 with contracts have the performance ratio higher than 75 percent benchmark. About 10 firms have less than 50 percent acceptable performance. Reasons for contract failure include unacceptable delivery quality and contractees' selling products to other parties for a higher bid price. Resolution of contract disputes is difficult. As many as 53 percent of firms report that there is no way to resolve conflicts. Legal action occurs in 7 percent firms. Another 7 percent of firms rely on local government to resolve the disputes. Loosely speaking, the legal mechanism used to guarantee high contract performance is less important than other types of informal mechanisms.

Contract violation is strongly associated with the farm size. We find that 79 percent of firms report contract violation among small size farms, 14 percent among middle size farms and only 7 percent among large size farms. Since the production of small size farms is usually not specialized and incentives for growers are weak, product quality is not ensured.

3.3.2 Descriptive Analysis on Factors that Affect Contract Performance

A. Organizational Chain and Contract Performance

The firm level survey also reveals that contract performance is influenced by the type of contract organizational chain (Table 3.29). The contract performance under “Firm + Cooperative + Farm” chain is highest, “Firm + Middlemen+ Farm” next and “Firm + Local or Village Government + Farm” is the lowest.

Table 3.29 Organizational Chain and Contract Performance

Organizational Chain	Percentage Distribution of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
Firm+Farm	4.0	16.0	24.0	56.0	100
Firm+Village Government+Farm	0.0	25.0	25.0	50.0	100
Firm+Cooperative+Farm	0.0	9.5	14.3	76.2	100
Firm+Middlemen+Farm	0.0	14.3	21.4	64.3	100
Firm+Local Government+Farm	0.0	25.0	25.0	50.0	100

B. Contract Types and Contract Performance

Contract type is another potential factor that might affect contract performance. The proportion of firms that adopt marketing contracts with above 75 percent contract performance ratio is a little higher than that of production contracting firms.

Table 3.30 Contract Types and and Contract Performance

Contract Type	Percentage Distribution of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
Marketing Contract	3.2	15.9	25.4	55.6	100
Production Contract	0.0	13.5	18.9	67.6	100

C. Contract Form and Contract Performance

Contract form, written or oral, plays a role in determining contract performance ratio. The overall comparison is almost the same but oral contracts appear to perform somewhat better than written contracts using the 75 percent benchmark. The result seems contrary to the common sense, but it indicates the importance of reputation and social networks in the Chinese rural economy.

Table 3.31 Contract Forms and and Contract Performance

Contract Form	Percentage Distribution of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
Oral Form	0.0	16.4	10.0	73.8	100
Paper Form	1.2	9.5	21.4	67.9	100

D. Contract Term Specification and Contract Performance

Contract specifications regarding delivery price, payment method, period, and performance standards influence the performance ratio in many ways.

As for delivery price specification, the performance ratio is highest under a price floor and lowest for a flexible price mechanism (Table 3.32). For payment method, the pre-paid deposit method has a better performance ratio than cash payment at delivery time or after delivery time. (Table 3.33)

Comparing contract term and performance rate suggests that contracts written for less than one year or longer than 3 years perform better using the 75 percent benchmark. (Table 3.34)

Performance standards specified in contracts significantly influence the performance rate. For an instance, the contractor might have a minimum

requirement on a certain input. The proportion of firms with more than 75 percent performance rate under these measures reaches 90.6 percent in contrast to 25.5 percent without these measures (Table 3.35). We also find use of direct incentives, such as bonus to farms for successful implementation of contracts will also encourage a higher performance rate (Table 3.36). Finally, the existence of an indemnification clause- that requires compensation if the contract terms are violated also improve performance (Table 3.37).

Table 3.32 Delivery Price and Contract Performance

Delivery Price	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
Flexible Price	2.9	11.8	35.3	50.0	100
Price Floor	0.0	9.6	1.9	88.5	100
Fixed Price	0.0	0.0%	28.6%	71.4	100

Table 3.33 Payment Method and Contract Performance

Payment Method	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
Cash Payment	1.8	10.5	17.5	70.2	100
Pre-paid Deposit	0.0	16.7	8.3	75.0	100
Payment-after-delivery	0.0	4.3	26.1	69.6	100

Table 3.34 Contract Length and Contract Performance

Valid Period	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
less 1 year	2.9	11.8	8.8	76.5	100
1-2 years	0.0	7.9	23.7	68.4	100
2-3 years	0.0	20.0	20.0	60.0	100
above 3 years	0.0	0.0	22.2	77.8	100

Table 3.35 Minimum Requirement and Contract Performance

Minimum Requirement	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
With	0.0	0.0	9.4	90.6	100
Without	4.3	31.9	38.3	25.5	100

Table 3.36 Incentive Measurement and Contract Performance

Incentive Measurement	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
With	0.0	5.7	20	74.3	100
Without	3.3	23.3	26.7	46.7	100

Table 3.37 Indemnification Clause and Contract Performance

Indemnification Specification	Prop. Of Firms Associated with Contract Performance				Total
	less 25%	25% -50%	50%-75%	above 75%	
With	1.4	6.8	18.9	73.0	100
Without	3.8	28.5	24.6	43.1	100

3.3.3 Logit Model to Analyze the Contract Performance

To further examine how these factors might affect the contract performance, we estimate a model of contract performance.

Model Specification

As the foregoing sections, we have following explanatory variables: (1) Contract Organizational Chain (O); (2) types of contracts (T); (3) Forms of contracts (F) and (4) Specifications of contracts (I). A summary of the explanatory variables is presented in Table 3.38. The simple behavioral model can be expressed as:

$$P_i = G(O_i, T_i, F_i, I_i) + \varepsilon_i \quad (7)$$

We differentiate the dependent variable contract performance into two alternatives: high performance with an implementation rate of 75 percent or greater and low performance with less 75 percent implementation rate. In this form, a binary logit model can be employed to examine the impact of different factors on performance classification. The same maximum likelihood estimation approach is used to obtain regression results.

Table 3.38 Summary of Explanatory Variables for Contract Performance

Variable Names	Definition	Mean
Dependent Variable		
Overall Contract Performance	1 if performance rate higher than 75%; 0 otherwise	0.72
Explanatory Variables		
Contract Organizational Chains (O)		
Firm+Farm	Dummy Variable: 1 for true 0 for false	0.50
Firm+Village Government+Farm	Dummy Variable: 1 for true 0 for false	0.08
Firm+Cooperative+Farm	Dummy Variable: 1 for true 0 for false	0.21
Firm+Middlemen+Farm	Dummy Variable: 1 for true 0 for false	0.14
Firm+Local Government+Farm	Dummy Variable: 1 for true 0 for false	0.04
Contract Types (T)		
Marketing Contract	Dummy Variable: 1 for true 0 for false	0.63
Contract Forms(F)		
Oral Form	Dummy Variable: 1 for true 0 for false	0.15
Contract Specifications(I)		
Delivery Price		
Flexible Price	Dummy Variable: 1 for true 0 for false	0.33
Price Floor	Dummy Variable: 1 for true 0 for false	0.53
Fixed Floor	Dummy Variable: 1 for true 0 for false	0.07
Valid Period	1=less 1 year; 2=1-2 years; 3=2-3 years; 4=above 3 years	2.12
Payment Method		
Pre-paid Deposit	Dummy Variable: 1 for true 0 for false	0.11
Safeguard Measures		
Minimum Input Requirement	Dummy Variable: 1 for true 0 for false	0.74
Incentive Policy	Dummy Variable: 1 for true 0 for false	0.50
Indemnification Clause	Dummy Variable: 1 for true 0 for false	0.74

Results and Discussions

Based on the econometric analysis, several observations can be stated:

1. The different types of contract chains do not appear to significantly affect the contract performance. But the positive signs of “Firm+Cooperative+Farm” and “Firm+Middlemen+Farm” indicate that they tend to be associated with high performance rate. The other three types of chains lead to lower contract performance by showing negative sign in their corresponding coefficients.
2. We cannot find evidence to support the hypothesis that contract types significantly influence contract performance. The negative sign suggests that marketing contract might result in lower performance relative to contract types.
3. The oral form contract appears statistically significant in explaining the contract performance. The result is not consistent with our theoretical expectation that written contracts should have more power to ensure high performance. However, since oral contracts are used by local firms and middlemen, self discipline and reputation in the Chinese agriculture sector probably influences this outcome. An increasing number of transactions depend on agents’ reputation instead of being monitored by the law. Most oral contracts occur between those firms and farms who know each other quite well. This helps achieve a better implementation rate. In contrast, written contracts between agents who do not know each other tend to perform worse, in part, because the contracting firm is viewed as external to the existing social network.

4. The use of price floor has a significant and positive effect on contract performance. Since the price floor can transfer market risk from farmers to firms and protect farm benefits, it is highly favored by farmers and may result in a higher performance rate. Contract length and payment method are not significant however both show positive signs. Among performance measures, a minimum input requirement and an incentive policy have a significant impact on contract performance classification. Contract specifications that include a performance measure might encourage both agents to adhere the contract provisions.

Table 3.39 Logistic Regression Results on Contract Performance

	Coefficient	Normalized Coefficient	Wald Values	Exp(B)
Explanatory				
Contract Organizational Chains (O)				
Firm+Farm	-1.0	-1.04	0.29	0.37
Firm+Village Government+Farm	-3.19	-4.22	1.78	0.04
Firm+Cooperative+Farm	1.51	1.87	0.45	4.51
Firm+Middlemen+Farm	0.57	0.61	0.09	1.77
Firm+Local Government+Farm	-2.54	-3.25	1.20	0.08
Contract Types (T)				
Marketing Contract	-0.33	-0.18	0.11	0.72
Contract Forms(F)				
Oral Form	3.71*	4.02	3.58	41.02
Contract Specifications(I)				
Delivery Price				
Flexible Price	-0.19	-0.15	0.02	0.83
Price Floor	3.62**	3.16	5.20	37.22
Fixed Floor	1.05	1.06	0.33	2.86
Contract Length	0.45	0.10	1.36	1.57
Payment Method				
Pre-paid Deposit	0.47	0.45	0.07	1.60
Safeguard Measures				
Minimum Input Requirement	3.20***	1.83	9.44	24.44
Incentive Policy	2.61**	1.61	5.42	13.60
Indemnification Clause	0.28	0.16	0.08	1.32
Intercept	-4.06**	-4.97	3.33	0.02
Model Overall Examination				
Prediction Accuracy		93%		
-2loglikelihood		49.40		
Chi-Square Value		69.19***		
Nagelkerke' R ²		0.72		

Note: “*” 、 “**” 、 “***” represent respectively significance at 10%, 5% and 1% levels based on t values.

4. Conclusion and Policy Implications

This study examined the extent and performance of contract farming from the perspective of Chinese farm households and contracting agricultural firms. The farm-level survey indicates that the actual proportion of farms engaged in contract farming is relatively low and significantly less than the proportion of farm households willing to produce under contract. A lack of contract opportunities is the most frequently cited reason, particularly for small size farms. Farmers identify price stability and market access as the key advantages to contracts while firms consider improved product quality as the critical incentive for contracts use. The organizational chain “Firm+Cooperative+Farm” appears to be the most desirable way to maintain contracts even though middlemen and direct “Firm+Farm” contracting are the most common types at present. Marketing contracts are more common than production contracts for both firms and growers. Oral contracts are most commonly used by middlemen and county-level dragon-head-firms because of strong social capital and networks in rural areas. The price floor provision is favored by most farms due to its lower risk. Cash payment at delivery time is the preferred payment method. The short-term contract is the main type used with growers, but both the type of commodities and the commodity’s price fluctuation affect contract length to a certain degree.

Logistic regression suggests that farmers’ acceptance of contracts is influenced by enterprise type, the farm’s production characteristics, marketplace attributes and public policy. Econometric analysis also shows that quality

requirements for delivered raw material, price volatility and public support policy encourage firms to utilize contracts.

The study shows that the overall implementation rate of contracts is still low. Several factors lead to contract violations. Key reasons for contract violation include the failure of delivered goods to meet the contract quality requirements and the sale of contract goods to other parties if prices are higher. Contract violation is common with small size farms. Production contracts, price floor mechanism and pre-paid deposit payments tend to be associated with better contract performance. Further, the use of performance standards, such as input minimum requirement and incentive bonus, are positive factors that encourage higher contract performance.

Our results also showed that the degree of commercialization is associated with a higher likelihood of contract farming. Public policies that encourage the adjustment of agricultural structure so as to improve farmers' specialization and commercialization should be made right now. Developing farmer cooperatives is another critical public policy consideration. Firms have to incur increased contracting monitoring costs when confronted with a fragmented farm structure. Bargaining associations or other types of cooperatives might reduce transaction costs and generate better performance. Further, a well-behaved external environment should be created. The study indicates that public policy can encourage contract farming from the perspective of firms and farms. The government has the responsibility to monitor performance of contacts by protecting both sides' benefits. In addition, credit support, tax benefits and access

to improved technology can encourage more dragon-head-firms and farms to consider contract production.

Appendix A:**Agreement on planting water radish****Contractor: Zhongsu Limited Company, City of Lanxi****Contractee: The government of Yongchang Town**

In order to bring along and encourage farmers to develop contract farming and optimize agricultural structure, thus to ensure that farmers receive the substantial economic benefits, both contractor and contractee, through friendly consultation, have reached the following agreement on the water-radish planting acreage of the farmers and the purchase of the yields:

1. Contractor will entrust contractee with the responsibility for planting techniques and acreage in some villages. Contractee will provide the planting families and the planting acreage which should be over 3,000 mu.
2. Contractee should be in charge of examining and supervising the farmers and to market to the contractor the entire planted radish crop.
3. The quality standard of the water radish sold by the farmers should meet the demands determined by contractor.
4. Contractor offers a favorable price for the delivered goods: higher by 3 percent than the local market price at delivery time.
5. On the expiration of the contract, contractor takes priority of renewing it if desired.
6. This agreement will be valid for 2 years.
7. This agreement is duplicate and each side has one copy. It becomes effective on the date of signing.

Reference:

- [1] Allen, Douglas W., and Dean Lueck, *The Nature of the Farm: Contracts, Risk, and Organization in Agriculture*, Cambridge, MA: The MIT Press, 2003
- [2] Bogetoft, Peter and Olsen, Henrik, Ten Rules of Thumb in Contract Design: Lessons from Danish Agriculture, *European Review of Agricultural Economics*, Vol, 29(2), 2002: 185-204
- [3] Boger, silke, Quality and Contractual choice: A Transaction Cost Approach to the Polish Hog Market, *European Review of Agricultural Economics*, Vol, 28 (3), 2001: 241-261
- [4] Dorward, Andrew, The Effects of Transaction Costs, Power and Risk On Contractual Arrangements: A Conceptual Framework For Quantitative Analysis, *Journal Of Agricultural Economics*, Vol. 52, 2000 (2): 59-73
- [5] Eaton, Chales and Andrew W. Shepherd, *Contract Farming, Partnerships for Growth*, FAO Agricultural Services Bulletin 145, 2001
- [6] Frank, S.D., etc., Transaction Costs as Determinants of Vertical Coordination in the U.S. Food Industries, *American Journal of Agricultural Economics*, Vol.74, 1992: 941–950
- [7] Gale, F, Lohmar, B and Tuan, F, *China’s New Farm Subsidies*, Outlook Report from the Economic Research Service of USDA
- [8] Goodhue, Rachael. E., Impact Control in Agricultural Production Contracts, *American Journal of Agricultural Economics*, Vol. 81, 1999: 616–620
- [9] Goodhue, Rachael. E., Broiler Production Contracts as a Multi-agent Problem: Common Risk, Incentives and Heterogeneity, *American Journal of Agricultural Economics*, Vol. 82, 2000 (4): 606–622
- [10] Hennessy, David, A. and Lawrence, John D., Contractual Relations, Control, and Quality in the Hog Sector, *Review of Agricultural Economics*, Volume 21, 1999(1): 52-67
- [11] Hennessy, David, A., Information Asymmetry As a Reason For Food Industry Vertical Integration, *American Journal of Agricultural Economics*, Vol.78, 1996 (11): 1034-1043

- [12]Hobbs, Till E., Increasing Vertical Linkages in Agrifood Supply Chain: A Conceptual Model and some Preliminary Evidence, Research Discussion Paper No.35, University of Saskatchewan, August 1999.
- [13]Hueth, Brent, and David A. Hennessy, Contracts and Risk in Agriculture: Conceptual and Empirical Foundations. In Richard E. Just and Rulon D.Pope, eds.,A comprehensive Assessment of Risk in U.S Agriculture, Boston, MA: Kluwer Academic Publishers, 2002
- [14]Kedliker, D. Peasant power in China: The era of rural reforms, 1978 – 89. New Haven, CT: Yale University Press, 1992
- [15]Key, Nigel and McBride, William, Production Contracts and Productivity in the U.S. Hog Section, American Journal of Agricultural Economics, Vol. 81, 2003 (1): 121-133.
- [16]Lajili, Kaouthar, etal., Farmer’s Preferences for Crop Contract, Journal of Agricultural and Resource Economics , Vol. 83,1997(2):264-280
- [17]Little, D. Peter and Watts, J. Michael., Living Under Contract: Contract Farming and Agrarian Transformation in the Sub-Saharan African, the University of Wisconsin Press, 1994
- [18]MacDonald, James, Janet Perry, et.al, Contracts, Markets and Prices, Agricultural Economic Report Number 837, Economic Research Service of USDA
- [19]Martinez, Steve W., Vertical Coordination of Marketing Systems: Lessons from the Poultry, Egg and Pork Industries, USDA, Agricultural Economic Report No.807, April 2002
- [20]Oi, J. C., Rural China takes off. Berkeley, CA: University of California Press, 1999
- [21]Rehber, Erkan, Vertical Coordination in the Agro-food Industry and Contract Farming: A Comparative Study of Turkey and the USA, Food Marketing Policy Center Research, University of Connecticut., 2000, Report No.52
- [22]Roe, Brain etal., Hog Production Preferences for Marketing Contract Attributes, American Journal of Agricultural Economics, Vol. 86, 2004 (2): 115-123

- [23] Rusten, David, Contract farming in developing Countries: Theoretical Aspects and Analysis of some Mexican Cases, Espanol, 1996
- [24] Sartwelle, James., et al., The Effect of Personal and Farm Characteristics upon Grain Marketing Practices, Journal of Agricultural and Applied Economics , 2000(4): 95-111
- [25] Sykuta, Michael E., and Cook, Michael L., A New Institutional Economics Approach to Contracts and Cooperatives, American Journal of Agricultural Economics, Vol. 83,2001 (5): 1273-1279
- [26] Unger, J. ,The transformation of rural China. New York: Armonk, 2002
- [27] Whiting, S. H.,Power and wealth in rural China: The political economy of institutional change. Cambridge: Cambridge University Press, 2001
- [28] Zhu, L. Rural reform and per capita income in China: The impact of China's post-Mao rural reforms in selected regions. Basingstoke: Macmillan, 1991
- [29] Zweig, D. Freeing China's farmers: Rural restructuring in the reform era. New York: Armonk. 1997