Allocation of Decision Rights in Fruit and Vegetable Contracts

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Abstract

Primary farmers and downstream agri-business are vertically coordinated via various governance structures, such as spot markets, vertical integration, or other hybrid forms. In this paper, we focus on one particular vertical coordination from, i.e., contract farming. The use of contracts as a way of organizing transactions between primary farmers and downstream agri-business is spreading in many agricultural sectors. One observation is that many restrictive arrangements are adopted in agricultural contracts. The restrictive contractual arrangements specify issues/decisions ex ante, and/or move decision rights across fixed firm boundaries. What determines the extent and form of decision rights allocation in agricultural contracts? According to the literature on writing costs, GHM models and franchising, quality, reputation and uncertainty determine the completeness of a contract, while quality, reputation, specific investment and monopsony-oligopsony power determine the extent of decision rights allocation between farmer growers and downstream processors. We present the data on 12 vegetable and fruit contracting networks in China to test the explanatory power of the above-mentioned explanatory variables. We find that the extent of completeness of a contract and allocation pattern of decision rights varies substantially across different supply chains in China. Most firms have rights to guide or direct the activities of contracted farmers regarding inputs and/or in-process activities. This observation is in consistent with many other studies. We also find that a contract will become more complex when the firm designing the contract sells high quality products. In addition, market uncertainty may determine the completeness of a contract too, while reputation won't determine the completeness of a contract. The other important finding is that many decision rights are shifted from farmers to firms under contract farming. Quality, reputation and specific investments by firms positively influence the number of decision rights allocated to agri-business firms under contract farming, while monopsony-oligopsony power and specific investments by farmers do not play a role in allocating decision rights.

Keywords

Contract farming, China, allocation of decision rights, completeness of contract.

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1 Introduction

The use of contracts as a way of vertically organizing transactions is spreading in many agricultural sectors. Although cash markets are still important in coordinating supply and demands, however, different kinds of contractual arrangements gradually demonstrate their significance in providing links to all stakeholders. According to USDA/ERS (2006), contracts covered 39 percent of the value of U.S. agricultural production in 2003, up from 36 percent in 2001 and 28 percent in 1991. Commodities such as tomatoes and broilers have been produced almost exclusively under contracts between processors and independent growers for decades in the United States (Vukina and Leegomonchai, 2004). Developing countries in African have adopted contract farming as one effective way of developing the local agricultural economy for decades (Litte and Watt, 1994). Developing countries are experiencing a rapid increase in contract farming recently, driven by globalization, trade liberalization and agricultural industrialization (Cook and Chadda, 2000).

Growing and/or marketing agricultural products under contracts, or contract farming, is different from spot markets, because contract farming specifies a delivery requirement of a product or a service ex ante and a set of rules or provisions may be adopted for guarantying the final delivery. Contract farming is a vertical relationship in the sense of combining upstream primary producers and downstream marketing or processing firms ex ante. Contract farming is said to have advantages like reducing uncertainty and providing access, while disadvantages like excluding smallholders out of the contract farming system and agribusiness firms appropriating contracted farmers' surplus are specified (MacDonald, 2004; Glover, 1984; Goldsmith, 1985; Wiliams and Karen, 1985; Warning, 2002; Glover and Kusterere, 1990; Little and Watts, 1994). In contrast to fully vertically integrated systems, such as investor-owned agricultural corporations, contract farming offers primary producers more independence in making decisions and primary producers remains independent entities.

Within the broad category of contract farming, contractual arrangements vary a lot across different supply chains/relations between downstream firms and primary grower. First, some contracts assign the ownership of the commodity to the processor, while other contracts do not. For example, a DuPont high-oil corn contract specifies that farmers do not obtain any ownership rights to the crop because DuPont owns the crop; rather, farmers are caring for DuPont's property (Hamilton, 1999; Goodhue, 1999). Vukina and Leegomonchai (2004) observe similar contractual arrangements in the poultry industry, i.e., the processor hold the tile of ownership of chickens while the growers are compensated with fixed payments for raising chicken to market-weight.

Second, some contracts specify the restrictive provisions regarding input choice, and/or production method. Several prior studies notice the input control aspect in contracts (Goodhue, 1999; Hueth et. al, 1999). A contractual relations survey regarding growers and first handlers in California fruit and vegetable markets shows that 46 of 88 firms specified or provided seeds to control seed variety, and, some firms even specified the planting, pruning and harvest (Hueth et.al, 1999). In broiler industry contracts, processors may control almost every aspect of production from the distribution of inputs (chicken and feed) to decisions about when to harvest the mature bird and repopulate the houses with new flocks (Vukina and Leegomonchai, 2004). Menard (1996, p.170) identifies three types of contracts in the French poultry industry: fixed-price contracts; buy-and-sell contracts; and contracts of the putting-out type. Fixed-price contracts are agreements in which growers remain fully independent, and growers commit to deliver a certain quantity of chickens with specified characteristics at a certain date. Contracts of this type specify a fixed amount of money to be paid to growers. Buy-and-sell contracts are arrangements in which growers buy chicks and sell chicken, dealing with the same firm at both

ends. Growers usually remain in charge of intermediate products, though there may be restrictive clauses. Contracts of the putting-out type are agreements in which growers are provided with chicks, food, equipment or they must get them from specific firms.

Third, contracts are different in the pricing provisions to farmers. Some contracts purchase farmers' products at fixed prices specified ex ante, some contracts use tournament pricing when compensating farmers and some contracts do not adopt market-based pricing.

These observations illustrate that contract farming is characterized by various rules and incentives to govern the parties involved. It raises the question: how are these rules and incentives designed and/or aligned to deal with a specific transaction/product? One tentative treatment to the above observations is pursued by ERS/USDA (2003;2006) in distinguishing production contracts and marketing contracts. Agricultural contracts fall into two broad groups, where the ownership of the contracted commodity is treated as one distinguishing feature. ERS/USDA (2006, p.6) claims

> *Under a production contract, the farmer provides a set of services to the contractor, who usually owns the commodity while it is being produced. The contract specifies the services to be provided by the farmer, the manner in which the farmer is to be compensated for the services, and specific contractor's responsibilities for provision of inputs.…   Marketing contracts focus on the commodity as it is delivered to the contractor, rather than on the services provided by the farmer. They specify a commodity's price or a mechanism for determining the price, a delivery outlet, and a quantity to be delivered.'*

According to this classification, production contracts assign the ownership of transacted product to agricultural firms (i.e., contractor) while market contracts do not. In addition, production contracts are more complete than market contracts in sense that more contingencies and activities are identified ex ante. As the result of ex ante assignment of ownership and ex ante specifications of various rules and rights, the spectrum of decision rights for one and/or two parties is reduced. This classification highlights that the allocation of decision rights between two parties varies among different contracts, however, it remains unclear under what circumstances a set of decision rights should be allocated to a party, and why[2]. This is important because the allocation of decision rights, as a way of coordinating activities across various production processes and motivating behaviour of various stake-holders, determines how effective contract farming is.

We address this gap by focusing on the details of decision rights in contractual arrangements commonly found under a contract farming governance structure. Decision rights in the form of authority and responsibility address the question 'Who has authority or control (regarding the use of assets)?'. Decision rights concern all rights and rules regarding the deployment and use of assets (Hansmann, 1996). They specify who directs the firm's activities. The allocation of decision rights between two parties varies. On the one hand, contract farming could be extensive by the processor allocating quota, controlling quality, controlling most production aspects, and even owing the residual claims of the commodity; on the other hand, contract farming could be limited by the processor to just a few dimensions of the transaction.

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[2] In addition, this classification is not so accurate in terms of ownership allocation in some cases. For example, growers may leave the ownership of the contracted commodity to the contractors under production contracts, whereas seed, chemical inputs, and/or specifying planting/growing methods may be clearly specified and/or provided under marketing contracts.

Section 2 presents the research objective and the research question. Section 3 formulates the hypotheses regarding contract farming, while section 4 specifies the research design. The data is analyzed in section 5. Section 6 draws conclusions.

2 Positioning

This section starts with distinguishing three types of contracts (2.1). Subsequentially, contract farming is conceptualized and elaborated as one form of vertical coordination (2.2). The research question is developed consequentially (2.3).

2.1 Classifying contracts

Three types of contracts have been identified conceptually in the literature (Bolton and Dewatripont, 2005). Complete contingent contracting refers to a contract specifying exactly what is expected of each party under all possible future contingencies. Complete contracting refers to a contract specifying exactly what is expected of each party under all observable possible future contingencies. Incomplete contracting refers to a contract which fails to fully specify actions under each future contingency.

Figure 1 helps to clarify the conceptual difference of contracts from the perspective of specifying actions for situations/events/contingencies. Let s ($s \in [s_1,...,s_N]$) denote states/situations of a project, while a ($a \in [a_1,...,a_M]$) denotes a course of actions. A contract help parties to expect what other parties will do in the future contingencies/situations. However, it is not easy to specify in each situation a specific course of actions because of bounded rationality and/or high costs of formulating and enforcing the alignments (i.e., contracting costs). Thus, according to the extent of how a situation is described/linked with an action (or a course of actions), a contract can be classified into three categories: first, a complete contingent contract specifies a specific course of actions for every possible situation; second, a complete contract specifies a specific course of actions for at least two specific situations (it is reflected by s<r in figure 1); third, an incomplete contract specifies no specific actions, indicated by the symbol Φ in figure 1, in some situations.

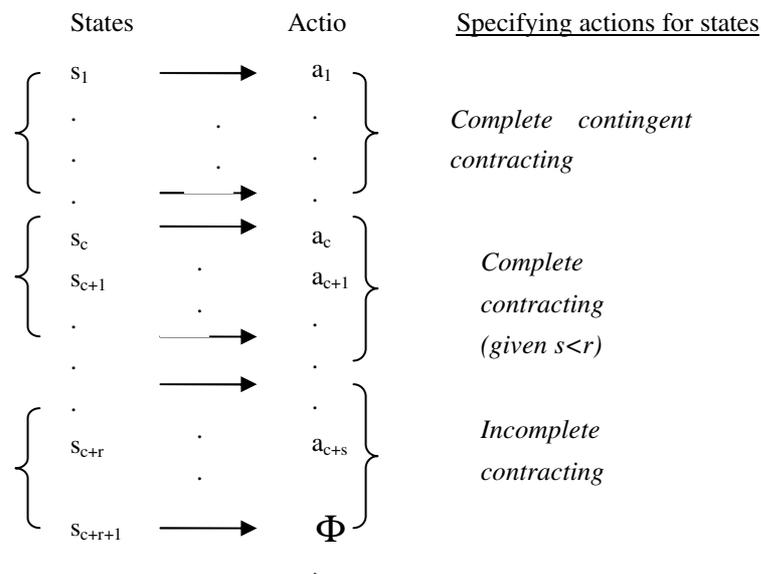| States	Actio	Specifying actions for states
s_1 → a_1		
. . .		*Complete contingent contracting*
. . .		
s_c → a_c		
s_{c+1} . a_{c+1}		*Complete contracting (given s<r)*
s_{c+r} . a_{c+s}		*Incomplete contracting*
s_{c+r+1} → Φ		

Figure 1: Contracts and mapping states into actions

Allocation of decision rights plays no roles in case of complete and complete contingent contracts, because all relevant aspects of transactions are covered by the contract (Hendrikse, 2003). It starts to matter when some circumstances can not be covered by a contract. Contractual clauses have to be formulated regarding who has the rights to decide in such circumstances. Figure 2 classifies the three types of contracts. Introducing agricultural contracts has far-reaching implications for both ex ante investment choices and the ex post bargaining process between the involved parties. This research adopts the incomplete contracting perspective to analyze contracts in agricultural markets.

		Behavioral hypothesis		
		Opportunistic	Self-interested	Idealistic
Degree of rationality	Complete rationality	Complete contracts	Complete contingent contracts	
	Limited rationality	Incomplete contracts		
	Procedural rationality			

Figure 2: Classifying contracts

2.2 Conceptualizing contract farming

An important insight of incomplete contracting theory is the need to allocate the right to make decisions about issues that can not be contractually specified (Lerner and Mergers, 1998). Decision rights in the form of authority and responsibility address the question 'Who has authority or control (regarding the use of assets)?'. Decision rights concern all rights and rules regarding the deployment and use of assets (Hansmann, 1996). They specify who directs the firm's activities, i.e. the allocation of authority.

Contract farming can be treated as a hybrid governance structure lying between the two polar forms of Spot Markets and Integration, which deal with successive production stages. Figure 3 distinguishes four governance structures from the perspective of allocating authority/ decision rights. The setting of a supply transaction involves an upstream party (farmer suppliers/growers), a downstream party (agribusiness/buyers) and two assets (e.g., production and processing equipments). The rectangles represent productive assets, the crosses inside rectangles represent decision rights of the assets, and the ovals represent the degree of vertical integration between the two parities. Three degrees of integration are distinguished. The degree of vertical integration is 0, i.e., no oval, when the governance structure Spot Market prevails. The degree of vertical integration is 1, i.e., solid oval, when either the governance structure Backward Integration or Forward Integration / Agricultural Cooperative is actual. Finally, the degree of vertical integration is between 0 and 1, i.e., dotted oval, in the governance structure Contract Farming.

Spot   Backward   Forward   Contract
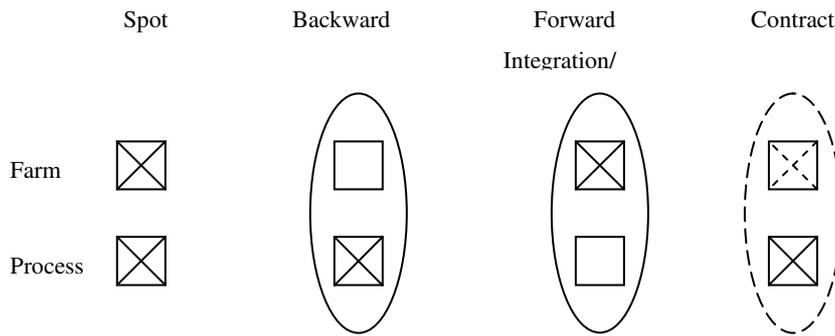   Integration/

Farm

Process

Figure 3:   Four governance structures

Under the governance structure Spot Market, the two parties are independent, and prices coordinate the activities of the involved parties. Under the governance structure Backward Integrated, upstream assets are owned by the downstream party. Ownership of the assets implies that the access to the productive assets (and consequentially the returns of the assets) is controlled by the downstream owner. Decision rights reside with downstream players, and authority acts as the major coordination mechanism. Upstream farmers work as employees. Investor-owned agribusinesses are the representative of such a governance structure. Under the governance structure Forward Integration, individual farmers own upstream production assets as well as downstream processing assets. Most agricultural cooperatives are representative of such a governance structure. Under the governance structure Contract Farming, upstream farmers remain independent in the sense that they work with their own productive assets such as land, growing facilities, etc. It means that farmers are autonomous to decide on how to use their assets and how to deal with the resulting products. However, this autonomy is limited by the contract with the downstream party via ex ante specified and/or ex post restriction on the scope of authority. Ownership may not change, but decision rights across fixed firm boundaries may be moved using contracts (Baker, Gibbons and Murphy, 2005). This character is captured by the dotted oval.

2.3 Research question

Contract farming is characterized by some decision rights being moved across fixed firm boundaries (which is captured by the dotted cross in figure 3). Both features are related with the extent and form of decision rights across involved parties. Contract farming captures various arrangements because of the extent of decision rights specified ex ante and the allocation pattern of decision rights varies.

To understand the reason for the various arrangements under contract farming, we have to address the following question: what determines the form and extent of decision rights allocation in contract farming? This question can be divided into two sub-questions. Firstly, many decisions/issues are specified in contracts ex ante. The more issues are specified in a contract, less space is left for parties to decide later on and behavior uncertainty is decreased. Completeness of a contract is increased by including more specifications and reducing discretion for parties. Thus, by focusing on the specifications ex ante in a contract, we will address first question: What determines the completeness of a contract? By answering this sub-question, we will understand why some contracts are simple while other contracts are relatively complicated when dealing with similar agricultural products.

Secondly, when contracts are not complete, decision rights should be allocated. There are two major parties involved in agricultural contracts: upstream farmer growers and downstream processors. The allocation of decision rights will be addressed by the question: When are decision rights allocated to downstream agricultural firms? By answering this sub-question, we will understand why some contracts deliberately limit the contracted farmers' decisions/choices while other contracts grant farmers with extensive discretion.

To summarize, our main research question is what determines the form and extent of decision rights allocation between farmer growers and downstream processors in contract farming? By examining empirically the determinants of the completeness of a contract and the allocation of decision rights in the vegetable and fruit sector, our theoretical objective is to contribute to the literature which tackles the endogeneity of the degree of 'completeness'. Our practical objective is to better understand the practice of contract farming and thus help managers to effectively manage the relations between producers and processors.

3 Contract Farming Hypotheses

This section start with formulating the hypotheses regarding completeness/incompleteness of contracts (3.1). Then the hypotheses predicting the allocation of decision rights to agricultural firms instead of farmers are elaborated (3.2).

3.1 Extent of completeness/incompleteness of contracting hypotheses

Battigalli and Maggi (2002) model contractual incompleteness as arising endogenously from the costs of writing contracts, i.e., the costs of describing the environment and the parties' behaviour. A contract is viewed as specifying obligations for the agent. Different from the prior studies emphasizing mainly missing clauses, they argue that the optimal contract is characterized both by rigidity and by discretion: discretion, meaning that the contract does not specify the parties' behaviour with sufficient detail; and rigidity, meaning that the parties' obligations are not sufficiently contingent on the external state. In their term, the clauses of a contract can be ranked in three groups: contingent clauses, describing both future contingencies and parties' actions, incur the highest writing cost, and are used to regulate the most important tasks; rigid clauses, only describing parties' actions (like instructions given by a superior to other agents), incur relatively lower writing cost, and are used to regulate less important tasks; discretion clauses (i.e. missing contingencies), leaving the discretion to parties, incur no writing cost, and are used to regulate the least important tasks. The optimum degree of discretion and rigidity is determined by the trade-off between the writing costs and the potential surplus.

Battigalli and Maggi (2002) examine how changes in the importance of writing costs relative to the potential gross surplus (gross of the writing costs) affect the optimal degree of rigidity and discretion of a contract. Denote the importance of writing costs (c) relative to the potential gross surplus (A) as $y=c/A$. The the degree of discretion (captured by missing clauses in the model) is increasing in c/A and the amount of contingent clauses is decreasing in c/A. The intuition is simple. A smaller c/A implies that writing costs are decreasing or potential gross surplus is increasing, incorporating more clauses, and therefore less discretion becomes more attractive because it entails tailoring actions more to specific situations. Notice that an extremely small c/A, e.g, $c/A=0$, calls on contingent complete contract, that is, all states and the corresponding course of actions in each state will be specified in a

contract. On the contrary, an extremely large c/A prefers to leave all discretion to agents. The degree of rigidity (captured by the number of rigid clauses in the multi-task principle-agent model) is increasing in c/A for low values of c/A and decreasing in c/A for high values of c/A. Figure 4 depicts these relationships.
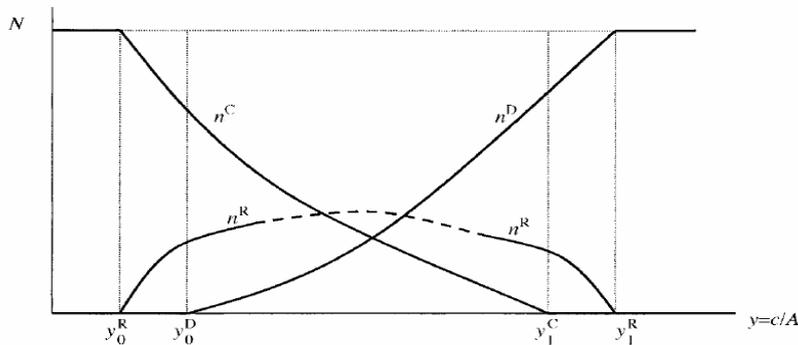

Figure 4: Impact of change in y on the optimum contract (Battigalli and Maggi, 2002, p.808)

A number of testable hypotheses regarding contractual incompleteness can be formulated. Let's focus on A (i.e., the potential gross surplus (gross of the writing costs)). If the potential gross contracting surplus is very small, no contract can be agreed upon since the contracting costs may be too high to be worth formulating a contract. If A increases, the optimum degree of discretion is expected to decrease, while the optimum degree of rigidity and the possibility of observing contingent clauses are both expected to increase. If the potential gross contracting surplus is very large, the optimum contract specifies for each contingency an action because the writing cost can be neglected, i.e., complete (contingent) contracts emerge. There will be no scope for discretion. In addition to these two extreme situations, there are other situations where it is more interesting to predict and compare the completeness of contracts. When the potential gross contracting surplus is small, an optimum contract is expected to specify some (rigid) clauses while leave substantial scope to agents' discretion. Thus, the more potential gross surplus a contract may generate, the less discretion is left to agents, and more issues are specified in a contract. Consequentially, the completeness of a contract is positively influenced by the potential gross surplus of a contract.

The potential gross surplus of a contract can be represented by the value of contracting. Two cases can be distinguished regarding a change in the value of contracting. Firstly, if firms deal with high quality products, procuring material by contracting may have advantages over procurement from spot markets. In spot markets, both quantity and quality of products may not be stable enough for firms' marketing or processing. To buying the required materials, firms have to spend lots of resources to search, screen, and bargain with suppliers. Contracting may save transaction costs for firms by locating suppliers ex ante and by guaranteeing quality of supplying ex ante and/or ex post.

The second case concerns firms having a well recognized reputation. Reputation is intangible capital which facilitates firms' business in many ways. It usually takes considerable investment to build up a reputation. However, it is fragile. Contracting can reduce the chances of destroying reputation by procuring unsatisfactory materials.

Thus, we have the following two hypotheses:

Hypothesis 1: Completeness of a contract increases when the firm deals with higher quality products.

Hypothesis 2: Completeness of a contract increases when the firm has a more well-recognized reputation.

Uncertainty is identified in Battigalli and Maggi (2002) as another factor determining the extent of incompleteness of a contract. They claim that rigidity is decreasing as uncertainty increases, while contingent and discretion are increasing as uncertainty increase. The argument is as follows (Battigalli and Maggi, 2002, p.809): 'when uncertainty is higher the efficiency cost of ignoring low-probability events and writing rigid clauses is higher, hence the number of rigid clauses is lower. Moreover, when uncertainty is higher, both contingent clauses and missing clauses increase in number'. It is depicted by the following figure (Battigalli and Maggi, 2002, p.809). The two dots indicate the critical levels of the incremental benefit from matching events with actions. They separate D (i.e. discretion) from Rn (i.e., Rigid clauses in contracts), and Rn from Cn (i.e., Contingent clauses). As uncertainty increase, an optimum contract will leave more scope for parties' discretion, and reduce rigid/specified tasks/activities which are not dependent on contingencies (see figure 5).
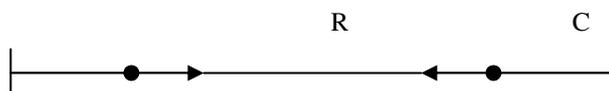

Figure 5:   Effect of increase in uncertainty on the optimum contract
(Battigalli and Maggi, 2002, p.809)

Applying this prediction to agricultural contracts, we have the following hypothesis:

Hypothesis 3: In more uncertain environment, the completeness of a contract is decreased.

3.2 Decision rights allocation hypotheses

The property rights model, i.e. GHM (Grossman and Hart (1986), Hart and Moore (1990)), addresses governance structure choice in the setting of incomplete contracting. They define the ownership of assets as the holder of residual decision rights: the rights to make any decision regarding the use of an asset that is not explicitly attenuated by law or assigned to other parties by contract. Integration involves benefits as well as costs, and the assignment of decision rights, hence ownership, should be allocated to the party who can create most value to a specific relation, because it affects ex ante investment incentives via the allocation of bargaining power ex post.

Aghion and Tirole (1994) apply and develop the property rights model to the relationships between small research firms and larger financial firms. According to them, two factors determine how decision rights are allocated: firstly, and consistent with the GHM model, the extent to which underinvestment by either or both of the parties jeopardized the success of the project; secondly, the relative bargaining power of the two parties. Bargaining power is constrained by the limited ability of many small high-technology firms to obtain outside financing. When research firms are short of financing, even the marginal impact of its research effort on the value of final output is greater than the marginal impact of the financing partners' financial investment, the property rights may not be allocated to research firms.

Underinvestment problem is a relevant issue for contract farming. Both farmers and processors have to make specific investments to make a transaction successful. Farmers need to deliver products with specified quality, and processors need to process and sell out the products at satisfactory prices. For farmers, they may need purchasing special productive assets, such as greenhouse or irrigation facility; and, they may need to speed time and effort on learning new production technology. For processors, they may need to buy storing facility and/or special transportation; they may also need to train their employees to efficiently collect marketing information, and/or establish or maintain marketing channels, developing niche markets. For each party, breaching contracts is costly due to the sunk costs which can not be recovered by finding alternative buying/selling alternatives. Decision rights should be allocated carefully to induce two parties' investment incentives. Thus, we expect decision rights in agricultural contracts to be allocated and balanced in such a way that both parties' specific investments can be protected as much as possible.   The two hypotheses are therefore:

Hypothesis 4: More decision rights will be allocated to the firm, as the level of firms' specific investment increases.
Hypothesis 5: Less decision rights will be allocated to the firm, as the level of farmers' specific investment increases.

In agri-food transactions, bargaining power is also an important issue. Processors' bargaining power generated from financial means are larger compared with individual small farmers. However, this bargaining power may be strengthened or weakened by processors' competition status. If the processor has monopsony-oligopsony power, that is, there is no or few competitor buyers (including markets) within a certain geographical area, then farmers have less choice to sell their products. To gain access to marketing channels, farmers may give up their autonomy in making decisions for market access via contracts. Monopsony-oligopsony power thus can be transformed into bargaining power of processor, and further induce more authority allocated to processors. Thus, we have

Hypothesis 6: More decision rights are allocated to firms, if firms have more monopsony-oligopsony power.

The GHM model predicts that the allocation of ex post decision rights is determined by the desire to improve the ex ante specific investment. However, the allocation of decision rights in the contracts may be determined by a different mechanism. Arrunda, Garicano and Vazquez (2001) examine the allocation of rights and monetary incentives in 23 automobile franchise contracts. The empirical findings show that all contracts substantially limit the decision rights of franchisees, and grant extensive implementation and enforcement powers to manufactures. The degree of the contractual asymmetry is explained by the incidence of moral hazards. They point out both vertical externalities (Klein and Murphy, 1988) and horizontal externalities (Telser, 1960) exist in the dealer manufacturer relationship. Manufacturers also have potential moral hazards problem, which is constrained by brand names. It is suggested that a trade-off between the risk of ex post opportunism on the two sides (i.e., both franchisor automobile manufacturers and franchisee dealers) drives the allocation pattern of decision rights. When the cost of dealer moral hazard is higher and the risk of manufacturer opportunism is lower, the manufacturers hold more rights to determine the performance required from their dealers and to use mechanisms such as monitoring, termination, and monetary incentives to ensure

that such performance is provided. As Baker, Gibbons and Murphy remark (2005, p.13), '*They test the informal theory that it is the need to achieve efficient ex post adaptation that drives variation in the contractual allocation of decision rights across different dealership networks. They find that when dealer's ex post actions can damage the network more, manufacturers are allocated more control and monitoring rights over dealer's actions: 'Manufacturers of higher-quality cars and those with larger networks are allocated...more discretion over the operation of their networks.' Thus, AGV's findings suggest that the ex post decision rights are not allocated to improve ex ante incentives to invest in the relationship, but rather to improve the ex post decision-making itself.*'

The above informal theory may also explain the allocation of decision rights in agricultural contracts. Similar to franchising, agricultural contracts also entail externalities at the producers' side. As agricultural products become more and more specialized, many contractors require high quality products by providing specific quality and safety attribute standards. However, quality attributes of agricultural commodities has inherently a high degree of heterogeneity (Ligon, 2002; Carriquirey 2003). This variability stems mainly from the randomness of the production environment and/or the heterogeneity of the practices employed by farmers.

A farmer grower may, without being detected within the supply chains, provide a low-quality product to the processor/retailer who processes or sells the brand product. By shirking, a farmer saves his efforts in providing a specified quality attribute. Shirking may have two negative effects. Firstly, the low-quality product attribute may be detected by final consumers, which eventually reduces their value perceptions on the brand. Thus, the costs of shirking are carried by the brand-owner, i.e. processor or retailer. Secondly, when bad behavior can not be detected, high quality producers will have to share the loss from decreased value of the commodity or the brand with the processor/retailer. Anticipating this, producers will under-invest in quality-enhancing techniques. This has been identified in the contract literature (for example, Hennessy (1996)). Thus, because of two negative effects of shirking behaviour, the more important quality attributes and the combined brand are to the processor or the retailer, the higher the costs of the vertical externality.

As in franchising, ex post opportunism from processors in farmer-processor relationships is possible too. The centralized contract, that is the processor is in charge of most decisions, can result in opportunistic behavior by the processor (Bogetoft and Olesen, 2002). Centralized contracts usually shift the authority to make most of the decisions away from producers to the processor. For example, many broiler contracts require a big initial investment on chick housing, and/or specifies guidance format to grow chickens. Assume producers have made specific investment to deliver specified products. The processor may reject the delivery by downgrading quality attributes or ask for a discount on agreed-upon prices, when the market situation is not good for selling. Since it is hard to verify if the ex post renegotiation claims is based on a real situation or on simply opportunism, producers may have to give up all or the greater part of his share of quasi-rents since his investment is sunk into this specific relation. To anticipate this, producers may hesitate to make efficient relationship specific investments, even though his investment is valuable to create greater values for the whole chain. Thus, in agricultural contracts, hold-up problems faced by producers will influence producers' decisions on accepting centralized contracts or decentralized contracts.

In line with Arrunda, Garicano and Vazquez (2001), we expect that decision rights allocation would be determined by the extent of the opportunism risks of the two sides in a specific supply chain. When high quality of contracted products is important for the processor, the costs of opportunism risks from growers are greater. In this case, more decision rights will be allocated to processors. When processors

have a good reputation, the risks of hold-ups will be reduced, the willingness of accepting authority from processors will be increased. Thus, we expect the following two hypotheses to hold:

Hypothesis 7: More decision rights are assigned to the firm, when the firm deals with higher quality products.

Hypothesis 8: More decision rights are assigned to the firm, when the reputation of the processor is better recognized.

4 Research design

This section starts with motivating multiple case studies as the research strategy (4.1). Then, how to select cases is explained (4.2), and data collection methods are presented (4.3). Next, the measurement issue is illustrated (4.4). Finally, we discuss reliability and validity and formulate the tactics to address these two criteria (4.5).

4.1 Research strategy

Verschuren and Doorewaard (1999, p.3) classify seven types of research, i.e., theory-developing research, theory-testing research, problem-finding research, diagnostic research, design-oriented research, intervening-oriented research and evaluation research. Since we develop several hypotheses from various theories regarding contractual completeness and decision rights allocation and are to test them for their validity, our research is characterized by theory-testing research. Different research strategies, such as experiment, survey, case study, can be selected for such tests. Which strategy is the preferred one depends on types of research questions and research focus (Yin, 2003), and/or the specification of hypotheses (Dul and Hak, 2007).

According to Yin (2003), case study research is appropriate to research how-type and why-type research questions on contemporary events without control of behavioral events. Our main research question is "*what determines the form and extent of decision rights allocation in contract farming*?". At the first glance, it is a what-type question which calls on either explorative survey/experiment/case study (if it is exploratory by nature) or survey and archival strategies (if it is actually a form of a 'how many/much' line of inquiry). However, it is actually more 'explanatory', since whey are trying to explain, based on several theories, what factors lead to the complex contract and what factors shape the allocation of a set of decision rights between parties. In other words, it is actually a 'why'-type question. In addition, our object of research is the contracting relationship between primary farmers (upstream growers) and agri-businesses (downstream processors, including all kinds of marketing and/or processing firms), which is a contemporary phenomena and difficult to be manipulate. In sum, case study research is suggested to be the most appropriate strategy to test our hypotheses.

Dul and Hak (2007) shows that, despite common belief, the case study is a useful strategy for theory-testing, and it is the preferred strategy for testing certain types of propositions. The specification of the proposition of a theory (i.e., a hypothesis) falls into two broad groups: deterministic propositions (e.g, if more A then more B) and probabilistic propositions (e.g., if more A then it is likely there is more B). There are three types of deterministic propositions, i.e., deterministic sufficient, deterministic necessary, and deterministic proportional, and two types of probabilistic propositions, i.e., probabilistic proportional co-variational relationships and probabilistic proportional causal relationship. The

expression of deterministic proportional proposition is like 'If A is higher, then B is higher'. All the eight hypotheses in our research follow this formulation pattern and thus can be classified as deterministic proportional relationships. Take one hypothesis as an example. Hypothesis 1 claims that 'completeness of a contract increases when the firm deals with higher quality products'. It can be re-formulated as 'if the product transacted by a firm has a higher quality, then the extent of completeness of a contact is higher'. For a deterministic proportional relationship, Dul and Hak suggest that experiment is the preferred strategy, case study is second-best, while survey is not possible. It is not feasible to choose an experiment in our research project, because it entails manipulated changes of the 6 independent variables, however, it is not possible to manipulate the independent variables such as reputation and specific investments. The case study is thus chosen as the second-best strategy.

The case study can be further classified as single case study and multiple case study. We adopt multiple case study as our research strategy. Yin (2003) suggests choosing the multiple-case design instead of one single-case design when you have the choice (and resources). Eisenhardt (1989) indicates that with fewer than four cases it will be difficult to generate theory with much complexity. Herriott and Firestone (1983) argue that the evidence from multiple cases is often considered more compelling, and thus the conclusions are considered to be more robust. In addition, we would like to achieve both depth and breath in analyzing data, however, one single case does not provide enough breadth. All these arguments imply that the multiple case study strategy is the most appropriate one to be adopted in our research, that is, multiple instances (i.e. cases) will be chosen, and they are compared in order to test the hypotheses.

4.2 Selection of cases

A case study is characterized by small number of research units (i.e., cases), thus the selection of the cases to be studied is of vital importance in the technical design phase (Verschuren and Doorewaard, 1999). A survey usually requires random (or probabilistic) sampling, however, the sampling principle in the case study strategy follows the replication logic (Yin, 2003). Each case must be carefully selected so that it either predicts similar results or predicts contrasting results but for predictable reasons.

To explain the case selection for our research, we list the research question here again: *what determines the form and extent of decision rights allocation in contract farming*. It is nice to explore the above questions in different agricultural sectors, like the pork, poultry, vegetable industry, etc. However, it is out of our ability to consider all these sectors in one paper. To address the question carefully, we decide to focus on only the fruit and vegetable sector. There are two main reasons for choosing this particular agricultural sector.

Firstly, the extent of contract farming varies a lot in the fruit and vegetable sector (USDA, 2006). There are simple contracts as well as complicated contracts, and there are highly restrictive contracts as well as quite autonomous contracts. Our preliminary observations on the fruit and vegetable sector in China confirm this. We visited four fruit and vegetable cooperatives in Eastern China two times in 2004 and in 2005. Various arrangements of vertical coordination and decision rights were observed. Thus, the fruit and vegetable sector provides the appropriate scenario for capturing the driving forces of our model. In contrast, concentration of decision rights by agricultural firms dominates in pork industry and poultry industry.

Secondly, compared with livestock sectors such as poultry, pork and beef, fruits and vegetables have received less attention in the prior literature regarding decision rights. For example, Goodhue (2000) explains why processors control growers' inputs in the broiler industry, using an agency theory framework. In the setting of farmer heterogeneity, processors control inputs to reduce the information rents paid to agents. Reimer (2006) develops a property rights model that shows how in certain circumstances production contracts do not transfer sufficient control over the use of production assets to intermediaries. In sum, our focus on vegetables and fruits is motivated both by practical observations and theoretical considerations.

Once the fruit and vegetable sector is chosen, what we have to decide next is the number of cases. A 'case' in our research is the contracting relationship between primary farmers (upstream growers) and agri-business (downstream processors, including all kinds of marketing and/or processing firms). The unit of analysis is the contractual arrangement between two parties. We have selected 12 fruit and vegetable contracting relations between farmers and agricultural firms from the Shandong province in China. Shandong province is located in eastern coastal China, and is chosen because it is well known for vegetable and fruit production. Three districts or counties in the Shandong province are chosen: Shouguang city, Laiyang city and Dezhou district to increase local variety. Shouguang and Laiyang are both famous for vegetable and fruit production, while Dezhou is particularly famous for one type of fruit, i.e., Chinese date. Shouguang and Laiyang are more developed than Dezhou. In addition, Shouguang is more domestic-oriented while Laiyang is more export-oriented. Each case is chosen by considering both variability regarding contracting practices and the researchers' access capability to the case companies.

4.3 Data collection methods

Data used in our research are mainly primary data, generated by various labor-intensive methods. The major data collection method is face-to-face semi-structured interviews. It is useful to acquire written contracts, but written contracts can not be our major data source due to two reasons. Firstly, we expect it is difficult to gather commercial contracts because of the confidentiality issue. Secondly, we also consider oral contracts. Thus, interviews are the right data extraction method for our purpose, and whenever possible, written contracts will be collected and analyzed too to increase data reliability.

Interviews are based on a carefully designed questionnaire. The questionnaire is developed from prior empirical studies and our major concepts. A major part of the questionnaire is designed to collect data on decision rights specification and allocation in contracts. Interviewees are the persons from agri-business who know the details and operations of contracts. Because agricultural contracts are mainly take-it-or-leave-it by nature and hence agri-business plays a major role in designing contracts, we focus our interview object on agri-business. It is interesting to interview and get information from farmers too, but it is not feasible to extract data from farmers because of limited time and access.

The procedure of interviewing agricultural firms for contracting details is as follows. Firstly, we approach relevant local authorities in the three districts. These authorities either directly supervise/regulate the fruit and vegetable industry in their district, or are higher-level authorities co-ordinating supervising/regulating government agencies. The purpose for approaching these authorities is two-fold. On the one hand, these authorities have superior information regarding the relevant industry and the firms and farmers operating in the industry. On the other hand, in China, it is usually not feasible to approach a firm directly as a researcher to collect primary data. Many firms may

reject your access simply because they are afraid that the local government may not like them to say something. The firms are more willing to cooperate with the researcher when the local officials introduce researchers to them and encourage them to cooperate. Secondly, we choose specific firms to interview by considering both the research framework and the access possibility provided by the local officials. Normally, we can choose from a list of firms suggested by the officials. Thirdly, we go to the chosen firms for face-to-face interviews. For each interview, it takes about two hours. It is not possible to always interview general managers. In some cases, we interview business managers. The information is normally written down in the questionnaire. We asked for recording interviews for each interviewed firm, however, this was rejected in most cases. Only 4 interviews are recorded on tape.

The individual interviews are supplemented by other methods to generate data, such as group interviews, on-site observations, factory and field visits, and a content analysis of textual materials. The triangulation of methods helps us to improve the validity of our data.

4.4 Major concepts and measurements

There are two independent variables in this research, i.e., contract completeness and decision rights allocated to firms. The measurement issue of these two independent variables and the six explanatory variables are addressed in this section.

Contract completeness

As we have argued, the more issues are specified and written into a contract, the more complete a contract is. Thus, completeness of contracts is measured by the number of clauses in a contract. A clause is one distinct legal stipulation/provision in a contract. In a written contract, each clause starts with a distinct number such as I1, or 1. We calculate the sum of clauses by adding up all clauses.   In case of no written contract, we explain the definition of a clause and require the respondent/interviewee to state exactly the number of clauses in their oral/informal contracts.

Decision rights allocated to firms

Decision rights are a set of rights to direct activities or decide how to use assets. Across vegetable and fruit supply chains, many activities are involved in order to deliver products to final consumers. Figure 4.7 captures the important activities involved in the production and marketing process.[3] We distinguish input decision rights, in-process decision rights, after-process decision rights, monitoring decision rights and termination decision rights and some other decision rights. We add up the number of rights allocated to one party (i.e., firms in our analysis) as the index of authority allocated to one party. This method has been adopted in several empirical studies (Arrunada, Garicano, and Vazquez, 2002; Lerner and Merges, 1998). Elfenbein and Lerner (2003) adopt another method: they distinguish two sets of decision rights in the contractual relationship between a portal and its partner. For one set of decision

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[3] Inputs include seeds, fertilizer, pesticides, and productive equipments such as green houses, watering equipments etc, and other physical materials. Before growing crops, farmers have to make plans: what to grow and how many to grow. Once decide on the type and quantity of crops, farmers will prepare site, plant, harvest and deliver the products. In downstream marketing and processing stage, agricultural firms pack (including sorting, sizing, and packing), label, process, finally sell the products. Contracts combine two parties together by governing these activities.

rights that could be assigned to either party, a provision is coded as +1 if it favours portal, -1 if it favours the partner, and 0 if neutral. For the second set of decision rights that mainly limited the activities for the partner, they code +1 if such limitation rights are present and 0 if absent. Since our research is mainly focused on decision rights allocated to a firm, we decide to use the first method. Of course, simply adding up the number of decision rights has problems, because it treats each decision right with the same weight. To partly deal with this problem, we will further look into each sub-group.
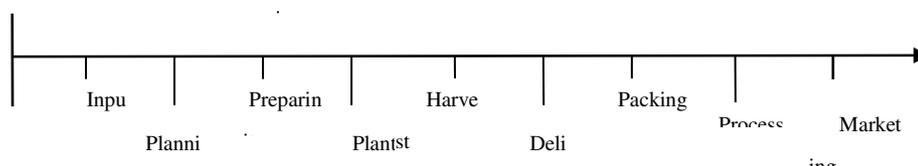

Figure 7: Activities/decisions involved in the production and marketing process (adapted from Allen and Lueck, 2003, p.184)

Quality

Quality is measured by the quality standards adopted by firms when procuring and marketing products. In China, there are three levels of national quality certification: NPF (Non-Pollution Food), GF (Green Food), OF (Organic Food). Vegetables with these national certifications are thought to have higher quality than non-certified vegetables. In addition, some vegetables are sold under international quality certifications. Some international quality certifications may be stricter than some national quality certification. Thus, to measure the quality standards required by a firm, we let the interviewee first list the quality standards/certification they have. In case of international certification, they are required to compare this quality standard with GF standards. If a firm requires no national or international quality certification, the quality standard of vegetables of this firm is ranked as low; if a firm requires NPF and GF, its quality standards is ranked as medium; if a firm requires GF or international quality certification higher than GF, its quality standard is ranked as high. In sum, , three values regarding quality are identified: 'High' if a firm specifies/requires Organic Food Standards or any international quality standards which equals or is stricter than Organic Food, 'Medium' if a firm specifies/requires Green Food Standard or No Pollution Food Standards, and 'low' if the above two cases does not apply.

Reputation

Arrunada, Garicano, and Vazquez (2001) measure reputation by the length of the relationship between two contract parties. For our purpose, this measurement for reputation is not satisfactory, because contract farming is a new phenomenon in China and thus contracting experience may not vary enough among different firm-farmer supply chains. We use two kinds of measurements. The first measurement is *brand name capital*. If a firm has invested substantially in its brand and accumulated brand name capital, the firm is more likely to develop and sustain reputation. Questions are therefore formulated regarding the firm's branding strategy and expenses. Based on the overall answers, brand name capital is ranked as one of three levels with decreasing order: national-recognized, local-recognized, and no-brand. These three levels of brand name capital represent high/medium/low reputation correspondingly.

A second measurement is *official honor/award*. In China, governments still play an important role in coordinating and/or supervising enterprises, although they do not intervene in the operations of

enterprises any more in most cases. In recent years, rural development and agricultural industrialization are a policy focus for both central and local governments. The governments have both the incentives and the ability to screen good or bad agricultural firms. The well-performing firms are honored or awarded by the government to encourage their further development. Such honor/awards normally consider the size of a firm, the farmers a firm is dealing with, share of the market, community contributions, employment, etc. Thus, the honors awarded to one specific firm can be treated as a mirror to reflect how well the firm establishes its reputation in the local society. For example, among many possible official honors or awards, however, honor of 'dragon-head agribusiness firm'[4] is of particular important and informative in agricultural sectors in indicating a firm's performance. We distinguish four values regarding the measurement: 'national honors/awards' if a firm get some honors/awards from central governments, 'provincial honors/awards' if a firm gets some honors/awards from provincial governments, 'local' honors/awards if a firm gets some honors/awards from local governments, and 'no official honors/awards' if a firm gets no honors/awards from any governments. These four levels of official honors/awards represent the level of reputation in decreasing order.

Uncertainty

Uncertainty is a complex concept. Behavioral uncertainty is an important focus in transaction cost economics and supply chain management (see for example, Kwon and Suh, 2004). For our purpose, we mainly focus on uncertainty of the environment. In an uncertain environment, firms have difficulties to predict supply and demand and the price may fluctuate a lot. We use the difficulty level of market (price and supply, demand) prediction to measure uncertainty. The following question is asked to measure uncertainty, "for the vegetable you mainly deal with, is it difficult to predict demand, supply, price? " The interviewee is required to choose among 5 levels: 1 not difficult at all; 2 not very difficult; 3 difficult; 4 very difficult; 5 extremely difficult. Uncertainty is scaled from 1 to 5 in ascending order, i.e., 1 is the lowest level of uncertainty while 7 is the highest level of uncertainty. These five scales can be transformed into three levels of uncertainty: 1 and 2 for 'low' uncertainty; 3 for 'medium' uncertainty, and 4 and 5 for 'high' uncertainty.

Firm's specific investment

Firm's specific investment is measured by both specific physical investment and human capital investments. We ask 5 questions to measure overall level of specific investment: the first two questions require the interviewee to evaluate the physical investment in procuring, processing and marketing products and potential loss in case of changing or closing current business. The third and fourth questions ask the interviewee to evaluate the training practice to employees on procuring, processing and marketing and potential loss in case of changing or closing current business. The fifth question asks the interviewee to evaluate the investment on quality control. All answers are scaled by five levels from 1 to 5 in ascending order: 1 refers to no specific investment and 5 the highest level of specific investment. By summarizing the five answers, we obtain a measure of the specific level of firm's specific investment.

*Farmers' specific investmen*t

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[4] It is called 'Long-tou-qi-ye' in Chinese.

Farmers' specific investment is measured from two aspects too: physical specific investment and human capital investment. Since we interview the firms instead of farmer growers in our research, it is difficult and not feasible to find contracted growers to answer the two questions. Alternatively, we ask the interviewees to evaluate farmer's specific investment. Better measurements can be acquired when the interviewees are both familiar with farmers' operations and judge the level of investment fairly. During the interviews, we are assured that the interviewees are familiar with farmers' activities. However, the validity of the measurement may be influenced by the interviewee' arbitrary judgment. It implies that we have to be especially cautious when drawing any conclusion by using this measurement.

Monopsony-oligopsony power

The interviewee is required to evaluate the number of potential competitor firms which may contract with growers. If within the same period, many competitor firms may contract with growers, any individual firm is less powerful when bargaining with farmers. Thus, the monopsony-oligopsony power can be measured by potential competitor contractors available for growers. The more potential rival firms exist, the less monopsony-oligopsony power the firm has. We distinguish three possibilities regarding the degree of a firm's monopsony-oligopsony power. If in a given area, farmers can only sign contracts with one firm, then the firm is perceived to have 'high' monopsony-oligopsony power; if farmers can sign contracts with less than five potential firms but less than 10 firms, then the firm is perceived to have 'medium' monopsony-oligopsony power; if farmers can sign contracts with more than 5 potential firms, then firms are perceived to have 'low' monopsony-oligopsony power.

4.5 Validity and reliability

The quality of case study research can be evaluated by the tests of reliability and validity, and several tactics can be used to establish or increase reliability and validity. Yin (2003) summarizes the four design tests as construct validity, internal validity, external validity and reliability.

Construct validity concerns the measurement issue of major concepts, that is, do the measurements really approach what it intends to measure (i.e., concepts)? To increase the construct validity, we use several tactics. Firstly, we review the high-quality empirical studies on a similar topic to see how they measure similar concepts. If their way of measuring can be applied to our research, we replicate their approaches. For example, measuring decision rights allocated to firms, specific investment by firms/farmers, monopsony-oligopsony power, are approached in this way. Secondly, for some measures such as the measurement for reputation and quality, we ask both peer researchers and professionals/experts to check the accurateness since we develop them by ourselves. Thirdly, we pilot-test the semi-structured questionnaire by asking several people: a Chinese researcher specialized in agricultural institutions and organizations; a Chinese researcher specialized in finance but quite familiar with rural societies; a senior local officer who was once responsible for both industry and agriculture development in local district; two local officers who are currently working in agricultural supervision and regulation agencies; a manager in a agricultural firm. The final English version of the questionnaire is included in the appendix 1, the final Chinese version in the appendix 2. The fourth tactic to guarantee this validity is to use multiple sources of evidence. We use individual interviews, group interviews, on-site observations, casual talks with farmers and textual materials to generate

evidence. In addition to these data collection tactics, we also telephoned one key interviewee to generally illustrate our findings in the stage of composing reports.

Internal validity concerns whether a causal relationship is really established from cases. Carefully treating data when analyzing them help to increase internal validity. Explanation-building and addressing rival explanations are adopted in our research as the tactics.

External validity concerns to what extent the study findings can be generalized. Case study is often criticized by its low external validity. However, following replication logic in multiple-case studies helps to increase external validity. In addition, this concern requires to treat the findings carefully: when a specific hypothesis is rejected, a new direction of testing hypothesis or potential of formulating a new hypothesis has to be incorporated; when a specific hypothesis is supported, it is worth pointing out the domain of generalization clearly.

Reliability demonstrates that the operation of a study can be repeated with the same results. We develop a case study database to establish reliability. All the interviewee's talks and answers are written down by us as much as possible during the interview. When allowed, we record the whole interview. Both the textual documents and tapes are kept for reference.

5 Empirical findings

This section starts with introducing the general information about the interviewed firms in the cases (5.1). Next, contractual arrangements regarding price terms, quantity terms and decision rights are analyzed (5.2). Finally, the hypotheses are tested and empirical finds are summarized (5.3).

5.1 General information on case firms

We interview eighteen firms for generating information on fruit and vegetable contracting. Seven firms deals with Chinese date farmers in Dezhou district, Shandong province. Only two firms provide useful information and therefore are accepted as our object of analysis, because the remaining five do not use contracting with farmers when procuring Chinese date. [5] Five firms deals with vegetable farmers in Shouguang city. Four firms are involved in vegetable contract farming and accepted for further analysis, while one is abandoned for further study because the interviewee did not cooperate on several important issues (such as details of a contract) when interviewing. We interview 4 firms involved in vegetable farming in Dezhou district and 2 firms with vegetable contact farming in Laiyang city. These six firms are included into the sample. In sum, we have 12 real cases, 10 of which are for vegetable contract farming and 2 for fruit contract farming. Table 4.4.1 summarizes the establishment, location,

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[5] When checking the information regarding firms' characteristics, we find that the size of the firm is not necessarily the reason for choosing spot market procurement. For the two firms using contract farming, one firm's fixed capital is 1 million Yuan while the other's fixed capital is 0.22 billiion Yuan. For the five firms using spot market procurement, the largest one's fixed capital is 18 million Yuan, the smallest firm's fixed capital 0.56 million Yuan, and the average 7.58 million Yuan. Since this paper is not focusing on the choice between contract faming and spot markets, we will not analyze the material further for it.

size and profitability of the firms, [6] and table 2 summarizes the involved vegetable or fruit business of each firm.

Firm 1 was formerly established in Laiyan city, Shandong province as a brick and tile manufacturing factory in 1975. In 1986, it was re-established and shifted its business first to fresh vegetable and fruit, and later on processed vegetable and fruit. In 1989, it was re-organized by introducing the share-holding institution. In 1993, it developed into a large enterprise group which has diversified in agricultural sectors. Currently, it has 21,000 permanent employees. In 2005, its sales turnover reached 26,020 million Yuan. Vegetable business accounts for 20% of its export. It deals with both fresh vegetables and processed vegetables such as seasoned vegetables and frozen vegetables. Main vegetables are spinach, broccoli, capsicum, burdock, green soy bean, snow pea, etc. 60% of vegetables are exported to abroad and 40% are sold in domestic markets. Among all the export designations, Japan is the most important one which consumes 90% of its export, and the EU and USA and Singapore consume the rest 10% of its export.

Firm 2 was established in 1994 in Laiyan city, Shandong province as a private joint venture enterprise. It develops very fast. Currently it has 1,800 permanent employees. In 2005, its sales turnover reached 1,200 million Yuan. Its main business involves fresh and processed vegetables, which sums up to almost 60 different products. All products are sold abroad. Similar to firm 1, Japan is its most important client which consumes 90% of its export while the EU and the USA consume the rest 10% of its export.

Firm 3 was established in 1992 in Shouguang city, Shandong province as a shareholding company. Currently it has 200 permanent employees. In 2005, its sales turnover reached 28 million Yuan. Vegetable business accounts for 99% of its businesses. Main vegetables are garlic, carrot, capsicum, ginger. All products are sold abroad, and Japan is also its most important export destination.

Firm 4 was established in Shouguang city, Shandong province in 2002 as a private company. It is the smallest firm in the four cases. Currently, it has 180 permanent employees. In 2005, its sales turnover was 18 million Yuan. Its main business involves only fresh vegetables, and all products are sold in domestic markets. Main vegetables are seasonal vegetables such as tomato, cucumber, eggplant, etc. Up to 2005, it has obtained Green Food certificates for 13 kinds of vegetables.

Firm 5 was established in Shouguang city, Shandong province in 2001 as a limited liability company. Currently it has 1800 permanent employees, and its fixed capital is 83.1 million Yuan.   In 2005, its sales turnover reached 42 million Yuan. Vegetables account for 40% of its business. All vegetables are sold abroad. Main vegetables are cauliflowers, sword beans, okras.

Firm 6 was established in Shouguang city, Shandong province in 1994 as a share-holding company. Currently it has 50 permanent employees, and its fixed capital is 4 million. Vegetable accounts for 50% of its all business. All vegetables are sold in domestic markets. The main vegetable is French shepherd's purse.

Firm 7 was established in Dezhou district, Shandong province in 1994 as a limited liability company. Currently it has 40 permanent employees, and its fixed capital is 3.2 million. In 2005, its sales turnover reached 14 million Yuan. Vegetable accounts for 30% of its business. All vegetables are sold in domestic markets. Main vegetable is capsicums.

Firm 8 was established in Dezhou district, Shandong province in 2003 as a company. Currently it has 248 permanent employees, and its fixed capital is 6 million. In 2005, its sales turnover reached 1500

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[6] The real names and contact details of the interviewed firms and the title of the interviewees are listed in appendix 3.

million Yuan. Vegetable accounts for 70% of its business. Most vegetables are sold abroad. The main vegetables are cabbages, capsicums, carrots, and garlic.

Firm 9 was established in Dezhou district, Shandong province in 2000 as a private company. Currently it has 120 permanent employees, and its fixed capital is 20 million. In 2005, its sales turnover reached 27 million Yuan. Vegetable accounts for 50% of its business. All vegetables are sold abroad. Main vegetable is capsicums.

Firm 10 was established in Dezhou district, Shandong province in 2000 as a shareholding company. Currently it has 42 permanent employees, and its fixed capital is 22 million. In 2005, its sales turnover reached 60 million Yuan. Vegetables account for 100% of its all business. All vegetables are sold abroad. Main vegetables are leeks, green Chinese onions, capsicums.

Firm 11 was established in Dezhou district, Shandong province in 1998 as a private company. Currently it has 35 permanent employees, and its fixed capital is 1 million. In 2005, its sales turnover reached 1.85 million Yuan. Chinese date accounts for 90% of its business, and is all sold in domestic markets.

Firm 12 was established in Dezhou district, Shandong province in 1999 as a shareholding company. Currently it has 1300 permanent employees, and its fixed capital is 2200 million. In 2005, its sales turnover reached 3400 million Yuan. Chinese date accounts for 40% of its all business, and is mainly sold all in domestic markets.

Characteristics Firms in cases	Establish-ment	Location	ownership	No. of fixed employee	Fixed capital (million Yuan)	2005 Sales (million Yuan)	Gross profita-bility
Firm 1	1986*	Laiyang	Shareholding	21,000		26,020	--
Firm 2	1994	Laiyang	Private joint venture	1,800		1,200	--
Firm 3	1992	Shouguang	Shareholding	200		28	--
Firm 4	2002	Shouguang	Private	180		18	--
Firm 5	2001	Shouguang	Limited liability	1800	83.1	42.2	20%
Firm 6	1994	Shouguang	Shareholding	50	4		20%
Firm 7	1994	Dezhou	Limited liability	40	3.2	14	22.9%
Firm 8	2003	Dezhou	private	248	6	1,500	20%
Firm 9	2000	Dezhou	private	120	20	27	18.3%
Firm 10	2000	Dezhou	shareholding	42	22	60	9.4%
Firm 11	1998	Dezhou	private	35	1	1.85	20.5%
Firm 12	1999	Dezhou	shareholding	1300	2,200	3,400	--

Table 1 General Information on Case Firms (I)

Characteristic Firms	Percentage of vegetable business	Percentage of fruit business	Percentage of export in vegetable/fruit	Major vegetable/fruit

in cases			business	
Firm 1	20% in all exports	--	60%	spinach, broccoli, capsicum, burdock, green soy bean, snow pea
Firm 2	Main business	--	100%	spinach, broccoli, capsicum, green soy bean, snow pea
Firm 3	99%	--	100%	garlic, carrot, capsicum, ginger
Firm 4	100%	--	0%	seasonal vegetables such as tomato, cucumber, eggplant
Firm 5	40%	--	100%	
Firm 6	50%	--	0%	French shepherd's-purse
Firm 7	30%	--	0%	capsicum
Firm 8	70%	--	2%	Cabbage, capsicum, carrot, garlic
Firm 9	50%	--	100%	capsicum
Firm 10	100%	--	100%	Leek, green Chinese onion, capsicum
Firm 11	--	90%	0%	Chinese date
Firm 12	--	40%	10%	Chinese date

Table 2: General Information on Case Firms (II)

In short, firm 1 to 10 are involved in vegetable contracting, while firm 11 and firm 12 fruit contracting. None of the firms are state-owned firms. Firm 1 is the oldest firm and established in 1986. Firm 8 is the youngest firm and established in 2003. The size of the firms varies a lot, measured from permanent employees, fixed capital or sales turnovers. Regarding diversification/specialization, firm 2, 3, 4, 5, 8, 9, 10 mainly deal with vegetables and firm 11 mainly deals with Chinese date, while the remaining firm 1, 6, 7, 11 also deal with other products. Regarding marketing channels, firm 2, 3, 5, 9 and 10 export all vegetables to foreign markets, and firm 1 targets both foreign and domestic markets, while the remaining firms mainly or wholly target domestic markets.

5.2 Contractual arrangements

This section illustrates contract arrangements in terms of price specifications, quantity specifications and decision rights allocation.

5.2.1 Price term

Price terms vary across different contracting relations. In case 1 and 2, the price is determined by the firm by calculating the costs of planting vegetables in contracted land and transporting vegetables to the delivery sites. In case 3 and 4, both contracts specify the pricing as the spot market price at delivery. In practice, case 3 usually adds a premium (e.g. 0.05 Yuan in 2005) to current unit cash price for the contracted vegetable. Case 4 usually adopts the higher price among various spot market prices at delivery date. In case 7, the contract specifies a fixed price without bonus. In the remaining cases (i.e., case 5, 6, 8, 9, 10, 11 and12), the price clauses in the contracts are contingent: it first specifies a minimum price; then it stipulates that the firm will pay the minimum price when the spot market price at delivery is lower and will pay the spot market price otherwise.

In none of the cases, the price paid to farmers is obviously based on the price of final products sold at the downstream stage. However, in one case, farmer growers do share the benefits of downstream marketing by gaining returns from the firm. In Case 4, clause II.5 of the contract reads, "…… every shed delivers 2,500 kilogram; when the current season's cooperation ends, the firm will allocate returns to growers according to the actual delivery minus 500 kilogram, and no returns are allocated to growers in case of less than 500 kilogram delivery. If the delivery is purchased at the unit price of above 1 Yuan per half kilogram, 0.2 Yuan will be paid to the grower for each delivered half kilogram; if the delivery is purchased at the unit price of below 1 Yuan per half kilogram, 0.1 Yuan will be paid to the grower for each delivered half kilogram. No returns are allocated for the delivery above 2,500 kilogram. " This contractual arrangement guarantees the expected delivery in two ways. First, the higher quality of the delivery is, the more returns the grower will receive.   Thus, the contracted quality is more likely to be reached. Secondly, no returns are allocated to growers when the delivery is either too low (less than 500 kilogram per shed) or too high (more than 2,500 kilogram per shed), thus the contracted quantity is more likely to be reached.

5.2.2 Quantity terms

When Sykuta and Parcell (2002) examine the quantity terms of identity-preserved soybean production contracts, they find all sample contracts are denominated in acres, although the price premiums are paid on the number of bushels of GMO-free soybeans delivered.   They call these contracts *acreage contracts.*

In our study, four cases (i.e., case 1, 2, 5, 8) are dominated in acreage, while 6 cases (i.e., case 3, 4, 9, 10, 11, 12) are dominated in kilograms. The remaining two cases, i.e., case 6 and 7, do not specify the quantity in contracts. In Case 6, the firm has the rights to require the exact quantity of one contracted farmer delivery, while in case 7, the farmers make decisions by themselves.

According to Sykuta and Parcel, acreage contracts shift some of the production volume risk to the buyer (2002, p.341). Buyers deal with this in two ways. Firstly, compared with the buyers specifying kilogram requirement, the two buyers with acreage are much bigger in size. It reflects the larger processing and marketing capability, which may increase firms' flexibility for dealing with temporal surplus or deficiency. Secondly, both firms adopting acreage contracts closely supervise/monitor growers' production volume.   In the contract from case 2, it reads (clause II6) *"when the party B finishes planting seeds, the grower must inform the party A, and party B must cooperate with party A to measure the actual seeding acreage, which will be adopted as the basis for delivery quantity"*. [7] By providing seeds before seeding and measuring seeding acreage after seeding, the firm has a clear idea on potential delivery quantity and thus abnormal surplus or shortage of delivery will not happen.

The price and quantity terms in the contracts in the twelve cases are summarized in table 3.

Basic Clauses Contract in cases	Price Term	Quantity Term

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[7] The incentive for party B (i.e., vegetable growers) informing party A (i.e., the firm) is that the final delivery quantity is calculated based on the seeding acreages. In addition, it is easy for the firm to find out the exact seeding acreage, because the firm will send employees to monitor growers' planting activities very often. According to our interviews, growers are willing to cooperate on reporting and measuring seeding acreage, since it is one of the first steps establishing trust between two parties.

Case 1	Planting-transporting-cost based	Acreage
Case 2	Planting-transporting-cost based	Acreage
Case 3	Spot market price at delivery	kilogram
Case 4	Spot market price at delivery	kilogram
Case 5	Minimum protection price	Acreage
Case 6	Minimum protection price	Not specified
Case 7	Minimum protection price	Not specified
Case 8	Minimum protection price	Acreage
Case 9	Minimum protection price	kilogram
Case 10	Minimum protection price	kilogram
Case 11	Minimum protection price	kilogram
Case 12	Minimum protection price	kilogram

Table 3: Price and quantity terms in contracts

5.2.3 Decision rights

The decision rights are listed in table 4.4. We will look into several sub-groups of decision rights. Firstly, the 12 cases show some decision rights variations regarding input. For the four potential input control activities, major firms have allocated two or three: 6 firms have the rights to control seed, fertilizer and pesticide, and 1 firm controls fertilizer and pesticide. Firm 8 and 11 allocates only one decision right, while firms 7 and 9 do not control inputs. No firm has decision rights regarding planting, irrigation and cropping facilities to be used by growers. One reason for major firms controlling fertilizer and pesticide may be related with the specific industry in this study, i.e., vegetable and fruit industry. The quality (e.g. safety attribute) of vegetables is highly dependent on what fertilizer/pesticide to use and how to use them. The manager in firm 1 tells us, "*when and how to use pesticide is very important to control quality. We send technicians to inspect the fields two times a week. It is required that our quality guarantee staffs must be on-site when growers spread pesticide. Our quality guarantee staffs will supervise what pesticides to use and the compounding of pesticides. The use of pesticides before harvesting is especially important for us. We call the ten days from pesticide spreading to harvesting 'Pesticide Security Management Period'. During these ten days, the fields will be supervised 24-hour around.*''

Case Decision rights	1	2	3	4	5	6	7	8	9	10	11	12
Price of delivery	×	×					×					
Quantity of delivery							×					
Quality specification	×	×	×	×	×	×	×	×	×	×	×	×
Input control	3	3	3	2	3	3	1	0	0	3	1	3
Specified/provided seeds	×	×	×		×	×		×		×		×
Specified/provided fertilizer	×	×	×	×	×	×				×		×
Specified/provided pesticide	×	×	×	×	×	×				×	×	×
Specified/provided planting, irrigation, cropping												

equipments												
In-process control	5	5	2	1	5	3	1	0	1	5	1	5
Planting plan	×	×										
Plowing					×	×		×	×	×		
Seeding		×			×					×		
Cultivating	×	×	×	×	×							×
Use of fertilizer	×									×		×
Use of pesticide	×	×								×	×	×
Harvesting	×	×	×		×	×						×
After-process control	5	5	6	4	6	5	4	5	3	4	4	3
Packing before delivery	×	×	×		×							
Storing before delivery			×		×	×	×					
Delivery time/place	×	×	×	×	×	×	×	×				
Quality measuring	×	×	×	×	×	×	×	×	×	×	×	×
Sorting, sizing, grading, packing for weighing and labeling	×	×	×	×	×	×	×	×	×	×	×	×
labeling	×	×	×	×	×	×	×	×	×	×	×	×
Monitoring rights	3	3	2	2	2	2	2	2	2	2	2	2
Fulfillment of delivery	×	×	×	×	×	×	×	×	×	×	×	×
Direct inspection of growers	×	×	×	×	×	×	×	×	×	×	×	×
Grower' duty to provide field records	×	×										
Termination rights	×	×		×			×		×			
Decision Rights by firms: Total	19	19	14	11	17	14	10	11	8	20	9	14

Table 4: Decision Rights Allocated to Agricultural Firms

Secondly, the 12 cases demonstrate variation regarding in-process decision rights. For the 7 potential control activities, five firms allocate 5 decision rights, and 1 firm allocates 3 ones. 5 firms have only one or two decision rights, while for 1 firm (i.e. case 7) no decision rights are allocated at all. It is worth mentioning the decision rights regarding cultivating and harvesting here. In major cases, cultivating and/or harvesting is controlled by firms somehow. Growers are required to grow according to the firms' technical guidance and the field management requirement or guidebooks. Growers are still taking care of the daily cultivating operations, however, these operations must be aligned with the firm's requirements. Most firms send their technicians to supervise and guide the growing activities.

Thirdly, the 12 cases have many similarities in allocating after-process decision rights. For the 6 potential control activities, 12 firms are allocated more than 3 decision rights. All 12 firms have rights to measure quality, to sort, size and grade, and to label. In all 12 cases except two (i.e., case 9 and 12) delivery time and/or place is decided by firms. Three points should be mentioned here. Firstly, three firms (in case 1, 2 and 4) clearly state that they make calls to growers when they need products, the products are delivered immediately after harvesting. Several firms claim that it has rights to decide delivery time and place, although the way of informing growers are not told. Secondly, firms have rights to tell farmer how to store before delivery. Take the firm in case 3 as example. The firm is

mainly processing and exporting processed garlic, which is less perishable than fresh vegetables such as spinach. It may be the reason why growers store the harvest for some time before delivery. Thirdly, no growers have rights to measure the quality of their delivery. This right is allocated completely to firms. In all 12 cases, no third-party is involved.

Fourthly, regarding monitoring rights, the fulfillment of delivery and the rights of direct field visits are allocated to firms in all 12 cases, while two firms (in case 1 and 2) additionally ask growers to record their field operations.

Fifthly, regarding termination rights, in five cases firms are allocated the rights to terminate contracts by judging if growers breach contractual terms, while in the remaining 7 cases clauses specifies when to terminate contracts legally.

Sixthly, regarding quality specification rights, firms have the right to specify the exact quality requirement.

Seventhly, regarding the decisions on price and quantity, in major cases they are ex ante specified by contracts, thus firms or farmers are not allowed to decide by themselves. However, in case 7 the firm has rights to decide the quantity, while in case 6 the farmers decide how much to deliver. In the cases 1 and 2, the firms have rights to decide the price.

5.3 Testing Hypotheses

This section starts with illustrating how the questions and answers in the interviews are transferred to the measurement of different variables, which will be used further for test hypotheses. Table 5 summarizes all the measurements of 8 variables in 12 cases.   Then, the following predicted relations are tested based on the real data: the relations between quality, contract completeness and decision rights allocated to firms (section 5.3.2); the relations between reputation, contract completeness and decision rights allocated to firms (section 5.3.3) ; the relations between uncertainty, contract completeness (section 5.3.4); the relations between firm's specific investment and decision rights allocated to firms (section 5.3.5); the relations between farmer's specific investment and decision rights allocated to firms (section 5.3.6); the relations between monopsony-oligopsony power and decision rights allocated to firms (section 5.3.7). Finally, section 5.3.8 summarizes the findings.

5.3.1 The data on the variables

To test the hypotheses, the (qualitative) answers to the questions regarding each variable have to be transformed to comparable measures (see section 4.4.4 for detailed tactics).   Table 4.5 lists the final results regarding variables.

Case Variable	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Dependent Variables contract completeness decision rights allocated to firms Independent Variables quality reputation	N.A. High (19) High	20 clause High (19) High	N.A. Medium (14) Medium	8 clauses Medium (11) Medium	34 clauses High (17) High	N.A Medium (14) Medium

-brand name capital	National recognized	Local recognized	No brand	Local recognized	Local recognized	Local recognized
-official honor/award	national	provincial	local	local	provincial	No honor/ award
uncertainty	Medium	Medium	Medium	Low	High	Medium
firm's specific investment	High	High	High	Low	High	Medium
farmer's specific investment	Low	Low	Low	Low	Medium	Low
monopsony-oligopsony power	Medium	Medium	Low	High	High	High

Table 5 Independent variables and dependent variables (to be continued)

Case Variable	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12
Dependent Variables contract completeness	N.A.	7 clause	N.A.	8 clauses	Oral	N.A
decision rights allocated to firms	Medium (10)	Medium (11)	Medium (8)	High (20)	Medium (9)	Medium (14)
Independent Variables quality reputation	Medium	Medium	Low	High	Medium	Medium
-brand name capital	Local recognized	Local recognized	No brand	No brand	No brand	Local recognized
-official honor/award	local	provincial	local	provincial	No honor/ award	provincial
uncertainty	Medium	Medium	High	Medium	Low	Medium
firm's specific investment	Low	Medium	Low	Medium	Low	Low
farmer's specific investment	Low	Low	Low	Low	Low	Low
monopsony-oligopsony power	Medium	High	Medium	High	Medium	Medium

Table 5 Independent variables and dependent variables (continued)

It is worth mentioning several variables here. Firstly, not all cases provide the information regarding completeness of a contract, since some firms do not show us the real written contracts. Only case 2, 4, 5, 8 and 10 shows the actual clauses to us. Case 11 is the only case using an oral contract, which is thought to be less complex and complete than written ones. Thus, we can test the hypotheses regarding completeness of contracts in 6 cases.

Secondly, regarding decision rights allocated to firms, we first calculated the number of decision rights assigned to a firm (the result is listed in the last row in table 4). Then, the cardinal number of decision rights allocated to a firm is further transformed to an ordinal ratio to facilitate the testing (see row 3 in table 5). In each case, the firm's actual decision rights are divided by 23 (i.e., the total number of

possible decision rights allocated either to firms or to farmers in our research). If the ratio is smaller than 0.34, then the firm is perceived as allocating a 'low' proportion of all decision rights (i.e., less decision rights are allocated to firms); if it is between 0.34 and 0.67, then the firm is perceived as allocating a 'medium' proportion of all examined decision rights; if it is larger than 0.67, then the firm is perceived as being allocated 'high' proportion of all decision rights. It is obvious that 'high'-marked firms have more decision rights compared with 'medium'-marked firms, and the same with 'medium'-marked firms and 'low'-marked firms. [8]

Thirdly, regarding firms' specific investment, quantitative measures from five questions are first added up, and then the sum is divided by 5 to obtain the equally weighted total measure for this variable. To facilitate testing, this numerical measure is further transformed to an ordinal one. If it is smaller than 3, then the firm's specific investment level is perceived to be 'low'; if it falls between 3 and 4, then the firm's specific investment level is perceived to be 'medium'; If it is larger than 4, then the firm's specific investment level is perceived to be 'high'. The same rule applies to farmers' specific investment.

5.3.2 Quality, contract completeness and decision rights allocated to firms

The data shows that four cases require high quality products while seven cases require medium quality products. Regarding high quality cases, case 1 specifies high quality standards based on Japanese strict regulation on pesticide residuals, case 2 specifies high quality standards based on ISO9002 and HACCP, case 10 are certified with ISO9000 and HACCP, and case 5 requires strict Organic Food standards. The remaining cases, except case 9, specify relatively lower quality standards based on national quality standards Non-Pollution Food and Green Food. Notice that case 9 is the only one being thought as low-quality case. The interviewee in this case claimed that the firm required the farmers to meet Non-pollution Food quality, however, after detailed discussion, we found that this firm's vegetables were not certified as NPF at all, and no detailed quality requirement equivalent to NPF were specified in contracts. Thus, compared with other cases, the quality requirement in case 9 is rather low.

Before we go further to test hypothesis 1, we illustrate the quality requirements with some example cases (i.e., cases 1, 2, 3 and 4). Both case 1 and 2 have a strict quality requirement for vegetables. In case 2, the clause I4 of the contract reads, 'Contractor A sets up specific quality standards for all procured vegetables (based on ISO 9002 and HACCP)'. In case 1, the manager interviewed spent nearly 15 minutes to describe the importance of high quality requirement and how the firm tries to guarantee the quality by contracting instead of by procuring from the market. In this case, 90% of the vegetables are exported to Japan. Japan has strict regulation on pesticide residuals, antibiotics and additives of exported fresh and processed vegetables, especially since 2002. To deal with Japan's rising demand for high quality, an office is set up in Japan to acquire the most recent information on legal requirements and regulation on food. The firm specifies strict quality requirements when procuring vegetables. To measure and test quality, the firm has invested around 20 million Yuan in laboratories. It has bought 2 expensive pesticide residual testing machines, and is going to buy a new one, which costs 310,000 Yuan. Case 3 and Case 4 have a relatively lower quality requirement. In case 3, the firm

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[8] Another way to transforming this cardinal number to ordinal number is to first calculate the average value of all ratios. In our case, it is 7.23/12=0.6. Then, the firm with the ratio of larger than 0.6 can be perceived to have more decision rights than the firm with a ratio smaller than 0.6. In this way, there are only two values: high or low. We did do this calculation as a way to check the reliability of the main-text transforming tactic, and the result shows that the two methods do not differ much.

also exports processed vegetables to Japan. It once had HACCP certification. However, the manager told us they only require NPF standard when procuring vegetables. In case 4, the firm sells fresh vegetables in domestic markets. NPF and GF are required when procuring vegetables from contracted growers.

In the four high quality cases, i.e., case 1, 2, 5, and 10, the proportion of decision rights allocated to firms are marked as 'high', which means more decision rights are allocated to firms. As the quality standard requirement is decreased to a medium level in case 3, 4, 6, 7, 8, 11and 12, the proportion of decision rights allocated to firms is also decreased to 'medium' and thus less decision rights are allocated to firms. As the quality standard requirement is further decreased to a low level in case 9, the proportion of decision rights to firms remains at 'medium' level. However, further compared with the exact number of decision rights to firms in all medium-quality cases, the firm in case 9 has the least decision rights, i.e., 8 (see the last row in table 4).   Therefore, the data shows that quality is positively related with the decision rights allocated to firms, thus hypothesis 7 is supported.

Since only 6 cases provide the information on the completeness of contracts, we could only check these 6 cases. The 6 cases vary in the firm's quality standards, which gives us a nice setting to test hypothesis 1. Quality is high in the cases 2, 5 and 10, while quality is medium in the case 4, 8 and 11. In the high-quality cases 2 and 5, the number of clauses are rather high, that is 20 and 34 respectively. However, in a third high-quality case 10, the number of clauses is fairly small, i.e., 8.9 In the medium-quality cases 4, 8 and 11, the number of clauses is correspondingly 8, 7 and oral, which implies that the contracts are relatively less complete. Thus, as the quality increases from medium level to a high level, the clauses of a contract tends to increase and consequentially the completeness of a contract is increased. Therefore, the data shows that quality is positively influencing the completeness of contracts, and thus the hypothesis 1 is supported.

5.3.3 Reputation, contract completeness and decision rights allocated to firms

Two kinds of measurements are adopted to measure reputation: brand name capital and official honor/award. Firstly, let us look at the first measurement of reputation: brand name capital. The 12 cases exhibit large differences. The firm in case 1 has a national well-recognized brand. In 2005, the firm spent 1,000,000 Yuan in advertising. The firms in cases 2, 4, 5, 6, 7, 8 and 12 have local well-recognized brands, while the firm in case 3, 9, 10 and 11 have not registered brands at all.

The interviews indicate that firms may not be very interested in establishing brands. For example, in case 1, although the advertising fee is large compared with the other cases, the fee is quite small compared with its sale volume (i.e., 2.6 billion Yuan).   The manager told us that the advertisement is mainly for selling vegetable and related products in domestic markets. If only selling products to abroad, managing and maintaining the relationships with old customers are more important than acquiring recognition in foreign markets. In other word, if not for domestic marketing, the firm will not spend too much in advertising. This consideration is also reflected in other cases. The general director also showed no interest in advertising the firm's brand in case 2. We were told that managers having a good relationship with large foreign customers are vital for the success of a firm, not any brand on itself. In case 3, the manager even told us directly his firm will not waste the money in registering a

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[9] We check the reasons why the number of clauses in high-quality case 10 is so small. We found in this case, the firm contracts with farmers via a cooperative. Cooperatives, as member-owned and member-managed governance structure, have advantage in coordinating its members, thus it is less necessary to specify a detailed contracts. This may be the reason why the contractual terms are less complex compared with other firms.

brand. Compared with these foreign-market-oriented firms, domestic-market-oriented firms hold different views regarding brands and advertisement. For example, in case 4 where the firm is mainly active in the domestic market, the two interviewees agree that branding is important. The firm spent 6,000 Yuan in advertising in 2005.

It is not clear if brand name capital positively influence the completeness of a contract or not. In the 6 cases providing the completeness information of contracts, 4 cases have local brands, while 2 have no registered brands. For the 4 cases with the locally recognized brand names, the number of clauses varies from the lowest 7 to the highest 34 with the average of 17. For the 2 cases with no brands, case 10 has 8 clauses while case 11 uses an oral contract. When brand name capital is increased from a no-brand level to a local-recognized level, the number of clauses in a contact may decrease (see case 8), or may increase (see cases 2, 4 and 5). Therefore, we can not say confidently that brand name capital positively influences the completeness of a contract.

We cannot draw a conclusion on the brand name capital and decision rights allocation either. In case 1, a national-recognized brand name is associated with a high proportion of decision rights allocated to the firm. When brand name capital decreases from a national-recognized level to a local-recognized level, the proportion of decision rights allocated to firms either maintain a high level (see cases 2 and 5) or decrease to a medium level (see cases 4, 6, 7, 8 and 12). Till now, it seems that there may be a positive relationship between the two variables. However, as brand name capital further decreases (i.e., no registered brands), the proportion of decision rights allocated to firms still maintain a medium level (see cases 3, 9 and 11) or even increase to a high level (see case 10). Thus, the data does not show the predicted relationship.

Secondly, let us check the second measurement of reputation: official honor/award. The 12 cases are distinguished by considering four levels regarding official honors/awards. One case (i.e., case 1) has several national honors/awards, five cases have several provincial honors/awards, and four cases have several local honors/awards, while two cases have no official honor/award. In detail, the firm in case 1 is the most well recognized, because it is awarded 'national dragon-head enterprise' and meanwhile acquired several national awards such as '500 Leading China Manufacturing Enterprise', '100 Leading China Food Enterprise', etc. The firms 2, 5, 8, 10 and 12 acquire several honors or awards from provincial governments, such as 'provincial dragon-head enterprise'. The firms 3, 4, 7 and 9 are honored or awarded as 'local dragon-head enterprise' by local governments. In the cases 6 and 11, the two firms claim they have not acquired any honors/awards from local governments.

The relationship between official honor/award and the completeness of contracts is investigated now. In case 11 with no official honor/award, an oral contract is used, which represents the less complete contract. In case 4 with local honor/award, the number of clauses is 8. Till now, the prediction holds as we expect. However, when we look into the remaining 4 cases, which all have provincial honors/awards, the number of clauses remains the same (see case 10) or increase in three cases (see case 2 and 5), while it is decreased to 7 in one case (see case 8). Since one case offers an opposite relationship, we can not say confidently that there is a positive relationship between the two variables. Therefore, hypothesis 2 regarding a positive relationship between reputation, either measured by brand name capital or measured by official honor/award, and the completeness of contracts is not supported by the data.

The relationship between official honor/award and decision rights allocated to firms is investigated now. For the one case with national honors/awards, the proportion of decision rights allocated to firms is high. For the four cases with provincial honor/award, it is either high (see cases 2, 8 and 10) or

medium (see case 12). For the four cases with local honors/awards, it is all medium, while for the 2 cases with no honor/award, it is medium. Thus, as the firm acquires a higher-ranked government honors/awards, which implies that the reputation is more established and recognized at a larger scale than the local environment, more decision rights are allocated to firms. Therefore, the data shows that there is a positive relationship between reputation, measured by official honor/award, and decision rights allocated to firms. It means that hypothesis 8 regarding a positive relationship between reputation, measured by official honor/award, and decision rights allocated to firms is supported.

5.3.4 Uncertainty and contract completeness

In general, two firms characterize the market by a high level of uncertainty, and eight firms think that the market is characterized by a medium level of uncertainty, while two firms perceive the uncertainty of the market to be at a low level. For the six cases with the information regarding the completeness of contracts, one firm ranks the market as highly uncertain, and three firms rank it as medium uncertain, while two firms rank it at   low level of uncertainty.

        For the two cases with low uncertainty, case 11 uses an oral contract (i.e., the least complete), while case 4 has 8 clauses in its written contract. For the three cases with medium uncertainty, the number of clauses is increased to 8 in case 10,   and 20 in case 2, while it is decreased to 7 in case 8. For the case with high uncertainty, the number of clauses is increased dramatically to 20. Thus, low uncertainty is associated with a less complete contract, while high uncertainty is associated with a more complete contract. However, the data on medium uncertainty does not show a clear prediction. Therefore, we think the hypothesis 3 is partly supported. More data or alternative measurement regarding uncertainty may be adopted to test the robustness of this hypothesis in future research.

5.3.5 Firm's specific investment and decision rights allocated to firms

In the twelve cases, firms make specific investments regarding physical investment as well as human capital investment. In four cases, the firm perceives its specific investments to be at a high level, and three cases classify that its specific investment at a medium level, while the firm in five cases classifies its specific investment as a low level.

For the five cases with low firm's specific investment, the proportion of decision rights allocated to firms is all ranked as 'medium'. As the firm's specific investment is increased from a low level to a medium level, the proportion of decision rights allocated to firms remains at a medium level (see cases 6 and 8) or increase to a high level (case 10). As the firm's specific investment is further increased from a medium level to a high level, three cases shows that the proportion is increased to a high level too, and only one case remains at the same medium level. What we learn from the four cases is, therefore, as specific investment is increased, the decision rights allocated to firms are increased as well. That is to say, the level of specific investment by firms is positively related with the decision rights allocated to firms.

5.3.6 Farmer's specific investment and decision rights allocated to firms

In eleven cases, the farmer grower is thought to have a low level of specific investment, and only one case (case 5) perceives the farmer grower to be at a medium level of specific investment. For the remaining cases with low farmer's specific investment, the proportion of decision rights allocated to firms is either high (in three cases) or medium (in seven cases). As the farmer's specific investment is increased to a higher level, the proportion of decision rights allocated to firms is increased to a higher level too (see case 5), which is contradictory to our prediction. Thus, the hypothesis regarding a

negative relationship between farmer's specific investment and decision rights allocated to firms is not supported. It means that farmer's specific investment is not the determining factor regarding the allocation of decision rights. The reason may be, although farmers made specific investment, this investment seems to be too limited to drive farmers in the direction of arguing for more decision rights.

5.3.7 Monopsony-oligopsony power and decision rights allocated to firms

In all twelve cases, firms have some monopsony-oligopsony power. This is in accordance with the fact that farmer growers are weak in most transactions. In five cases, the firm is perceived to have a high level of monopsony-oligopsony power, and in six cases, the firm has a medium level of monopsony-oligopsony power, while only in one case (i.e., case 3) the firm has a low level of monopsony-oligopsony power.

It is interesting to point out that the size of a firm is not the reason determining the level of monopsony-oligopsony power. For example, firm 4 is rather small in terms of permanent employees or in terms of fixed capital investment, however, this firm is perceived to have a larger bargaining power. Two reasons may explain high monopsony power. One factor is the market in which the firm operates. Take case 4 as example again. This firm mainly deals with fresh vegetables in domestic markets. When asked about the competitiveness of the market in which the firm operates, we were told that the competition is not very intensive. The reason is that they develop a market niche by making use of the rapid rise of supermarkets. The firm signs contracts with supermarkets to supply them with high-quality fresh vegetables. Since most agricultural firms around this firm are less sensitive to the development of supermarkets, it establishes its success in marketing to supermarkets. The other factor is the size of growers from whom the firm procures vegetables. Larger growers may have more channels to market their products, and may attract more firms to do business with them. In contrast, small farmers have fewer alternatives to contract with other firms because they are small in size and may lack a good reputation. For example, in case 1 where the largest firm with only medium monopsony-oligopsony power, the smallest contracted landing scale for one grower is 100 mu. However, the small firm in case 4 contracts with more than 200 farmers, and each farmer's contracting land is only around 2 or 3 mu.

For the case with low monopsony-oligopsony power, the proportion of decision rights allocated to firms is ranked as medium. As the monopsony-oligopsony power is increased to a medium level, the proportion of decision rights allocated to firms either remains at a medium level (in 4 cases) or increases to a high level (in 2   cases). As the proportion of decision rights allocated to firms is further increased to a high level, 2 cases show a high level of the proportion of decision rights allocated to firms and 2 cases show a medium level of the proportion of decision rights allocated to firms. Therefore, the hypothesis regarding a positive relationship between firm' monopsony-oligopsony power and allocated decision rights is partly supported.

5.3.8 Summary

We summarize the empirical results in table 6. Among the 8 hypotheses, 4 are supported, 2 are partly supported, while 2 are not supported. Two main findings are as follows. Firstly, quality positively influences the completeness of a contract. Secondly, when the firm deals with a high quality product, has a well-recognized reputation, and has made substantial specific investments, more decision rights will be allocated to the firm when contracts are signed.

Hypothesis	Dependent Variable	Independent variable	Predicted sign	Empirical result
1	Contract completeness	Quality	+	Supported
2	Contract completeness	Reputation	+	Not supported
3	Contract completeness	Uncertainty	-	Partly supported
4	Decision rights allocated to firms	Firm's specific investment	+	Supported
5	Decision rights allocated to firms	Farmer's specific investment	-	Not supported
6	Decision rights allocated to firms	monopsony-oligopsony power	+	Partly supported
7	Decision rights allocated to firms	Quality	+	Supported
8	Decision rights allocated to firms	Reputation	+	Supported

Table 6: Empirical results

6 Conclusion and future research

We empirically examine the determinants of the completeness of a contract and the allocation of decision rights / decision rights in the context of fruit and vegetable contracting. Three main conclusions follow. Firstly, it is shown that the extent of completeness of a contract and allocation pattern of decision rights varies substantially across different supply chains in China. This observation is in consistent with many other studies. Secondly, a contract will become more complex when the firm designing the contract sells high quality products. In addition, market uncertainty may determine the completeness of a contract too, while reputation will not determine the completeness of a contract. Thus, the predictions regarding uncertainty (approached by market uncertainty in our research) and contracting value (approached by quality and reputation) is partly supported by our empirical findings.

Thirdly, under contract farming, many decision rights are shifted from farmers to firms. Quality, reputation and specific investments by firms positively influence the number of decision rights allocated to agri-business firms under contract farming, while monopsony-oligopsony power and specific investments by farmers do not play a role in allocating decision rights.

There are several directions for future research. First, this research is limited by the size of the sample, which consists of only 12 contract farming networks. Collecting more data regarding new cases will help to test the robustness of our findings. Especially, regression analysis can be adopted and add additional value to the generalization issue if more than 50 cases are selected. Second, this research is focused on the fruit and vegetable sector. New sectors will again help to test the robustness of our findings.

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