Contractual Arrangements of Traders in Chinese Wholesale Markets

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Abstract:

Using a survey data of 700 traders, this study scrutinizes contract choices and enforcement for agricultural traders in China.

This study finds that market service and environment are very important for both contract choices and enforcement. Better market service and environment can increase the propensity of using contract and the probability of contract enforcement both for purchase and sales of products. Education and memberships of special associations are also important for contract choices and enforcement. Higher education and affiliation to special associations for traders can increase the propensity of contracts and reduce contract breaches. However, the formats of contracts, whether contracts are oral or written, are not important for contract enforcement.

Key Words: Agricultural Contract, Trader, Wholesale Market, China

JEL: L14, Q12, Q13

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Introduction

Food supply chains in developing countries are usually longer and more complicate than the counterparts in developed countries due to the active roles of a large number of traders, also called intermediaries, or brokers (Gabre-Madhin and Minten 2003). As shown in Figure 1, the main arena for traders is wholesale markets through which they connect smallholders with processors, retailers and consumers; so that they can help reduce transaction costs and share risks among the market players. They usually buy agricultural products from small farmers, agribusinesses and other traders outside of wholesale markets, and sell them to retailers, agribusinesses, or other traders in the wholesale markets. They usually do not interact with consumers directly.

The studies for China and some African countries find that traders can improve marketing channels, optimize the social search cots, stabilize food supply chain and make markets work for the poor and small farmers, so as to increase farmer incomes and social welfare (Fafchamps and Minten 1999; Gabre-Madhin 2001; Fafchamps, Gabre-Madhin and Minten 2003; Yu, Abler and Peng 2008). Developing countries usually have a large number of smallholders, so that the transaction costs of selling agricultural products to markets are very high and economic exchange is difficult and complex. It usually takes time and effort for buyers and sellers to negotiate, monitor and enforce formal contracts. Social capital can help reduce transactions costs by speeding up search, increasing trust, and facilitating the circulation of market information among traders and farmers (Fafchamps and Minten 1999).

Therefore, the current literature on traders mainly sheds the light on the roles of

social capital of traders. Using the survey data from Madagascar, Malawi and Benin, Fafchamps and Minten (1999, 2002 and 2003), and Fafchamps, Gabre-Madhin and Minten (2003) indicate that the main reason of maintaining a network of personal relationship is that it can help traders increase access to information, regular trade flows, trade credit, and risk sharing, and on the other hand, social capital can boost the productivity of traders. Similar results also have been found for the traders in China. Zeng, Gao and Li (2006) use the survey data for 700 traders and find that social capital can increase the performance of traders, represented by the variable of sales.

In practice, food supply chain can be connected through either market purchase or contracts. In the case of contractual purchase, the studies reveals that breaches of agricultural contracts are very prevalent in many developing and transition countries, such as in some Eastern European transition Countries (Gow and Swinnen 1998, 2001), in Madagascar (Fafchamps and Minten 1999), and in China (Yu, Abler and Peng 2008), and however, the contractual relationship of traders has not been scrutinized in the literature except for Fafchamps and Minten (1999).

As aforementioned and shown in Figure 1 as well, traders act as a bridge between small farmers and consumer markets. As shown in Figure 2, the relationship either with upstream suppliers or with downstream buyers can be divided into two steps: contractual choice and contractual enforcement. The first step is that traders and counterpart transaction parties decide whether to use contracts or not for transactions. The second step is that contracted parties decide whether to breach contracts or not.

Though contracts can help contracted parties share risks and reduce transaction costs, breaches of contracts are very prevalent in developing and transition countries due

3

to oppotunitistic behaviors, such as in China (Yu, Abler and Peng 2008; Guo and Robert 2008). Fafchamps and Minten (1999) observed that traders face a quality or late delivery problem in 1 out of every 13 purchases and a late or non-payment problem in 1 out of every 45 sales in Madagascar.

There are many cases where public institutions do not function well in enforcing contracts in developing and transition economies, such as the absence or ineffectiveness of public institution (Gow and Swinnen 1998, 2001). Even when enforcing a contract is possible it might be very costly. High costs may weaken enforcement of contracts. The parties to a contract might be very opportunistic when enforcement of contracts is very costly (Beckmann and Boger 2004; Yu, Abler and Peng 2008). The situation in China is not quite the same as in other transition and developing economies because of social relationships that step in to fill some of the roles taken by courts in other countries. As Chow(1997) points out, the Chinese legal system might be called a "semi-legal system", and a contract under this legal system usually is enforced partly by an informal social relationship known as *guanxi*. *Guanxi* plays an important role in ensuring that a contract is honored. Yu, Abler and Peng (2008) have scrutinized the contractual relations between farms and processors, and find that traders can help stabilize the contracts.

In this study, using a survey data of 700 traders from China, we construct econometric models to study the contract arrangement and enforcement for traders in China.

Data

The data used in this study is from a survey of wholesale market traders

4

conducted by the School of Agricultural Economics and Rural Development at Renmin University of China in August and September 2004. The survey includes 701 traders in more than 40 wholesale markets scattered in 8 provinces. Using the same data, Zeng, Gao and Li (2006) analyzed the impacts of social capital on traders' performance. However, only 556 respondents are used for this study, and the rest 145 respondents are dropped due to missing or wrong items. The main variables are categorized into 3 groups: contract variables, market environment variables, and traders' operational details and demographic characteristics. The descriptive statistics and explanations to the main variables are shown in Table 1.

The survey indicates that 286 of the 556 traders, or 51% use contracts to buy products from upstream suppliers, including farmers, traders, firms or other suppliers; and 268 or 48% use contracts to sell products to downstream buyers, including traders, firms, retailers or other buyers. That is, about half of traders use contracts to purchase or sell products.

As we mentioned above, breaches of contracts are very prevalent in developing and transition countries; and China is not an exception. The survey finds that behaviors of breaching supplier contracts include (1) Late delivery, (2) Bad Quality, (3) Insufficient Quantity, and (4)Increasing Price; and 227 of the 286 traders with supplier contracts, or 79.4% of them experienced contract breaches from suppliers. On the other hand, the survey also finds that behaviors of breaching downstream contracts include (1) Delay of payments, (2) Less of No Payment, and (3) Decreasing Price; and 212 of 268 traders with downstream contracts, or 79.1% of them experienced contract breaches from downstream.

What are the determinants of the contractual arrangement and enforcement for agricultural traders in China? Contract variables, market environment variables, or traders' operational details and demographic characteristics? We will construct econometric models to study these problems in the following sections.

Furthermore, the survey also finds that most of the contracts are in an oral format in China. As shown in Table 1, about 68.5% of the 286 traders with supplier contracts and 70.9% of the 268 traders with downstream contracts use only oral contracts. Though oral contracts have the same legal effects with written contracts, it may be possible that contracted parties might be more likely to breach oral contracts. We will also test this hypothesis in the rest of this study.

Econometric Models and Estimation Strategy

As shown in Figure 2, traders' decision on contract can be divided into two steps: contract choices and contract enforcement. Traders and other transaction parties in the first stage decide whether to use a contract to purchase or sell products, and then in the second stage decide whether to enforce a contract if they decide use a contract in the first stage. We can construct econometric models as follows.

- Contract Choices

First, we have an econometric model consisting two probit equations modeling contractual choices both for supplier contracts and for downstream contracts.

$$C_{si} = X_{si}\beta_s + \varepsilon_{si} \qquad \text{(I.A)}$$

$$C_{Di} = X_{Di}\beta_D + \varepsilon_{Di} \qquad \text{(I.B)}$$

Where C_{si} and C_{Di} are binary variables modeling upstream supplier contracts and

downstream buyer contracts, respectively. In equation(I.A), $C_{si} = 1$ denotes that trader

i uses contracts to buy products from upstream, otherwise $C_{si} = 0$; X_{si} is a vector of

exogenous variables determining supplier-contract choices and β_s is the corresponding

coefficients; and ε_{si} is the unobserved heterogeneities and $\varepsilon_{si} \sim N(0, \sigma_s^2)$. Similar with

(I.A), $C_{Di} = 1$ in equation(I.B) denotes that trader i uses contracts to sell products to

downstream buyers, otherwise $C_{Di} = 0$; X_{Di} is a vector of exogenous variables

determining downstream-contract choices and β_D is the corresponding coefficients; and

ε_{Di} is the unobserved heterogeneities and $\varepsilon_{Di} \sim N(0, \sigma_D^2)$.

- Contract Enforcement

If traders and other transaction parties decide to make contracts with up-stream

suppliers or down-stream buyers, they will decide whether to enforce them in the second

stage. We have two equations conditioned on equation (I).

$$B_{si} = Y_{si}\gamma_s + e_{si} \qquad \text{if } C_{si} = 1 \qquad\qquad \text{(II.A)}$$

$$B_{Di} = Y_{Di}\gamma_D + e_{Di} \quad \text{if } C_{Di} = 1 \qquad\qquad \text{(II.B)}$$

Where B_{si} and B_{Di} are binary variables modeling enforcement of upstream

supplier contracts and downstream buyer contracts, respectively. In equation(II.A),

$B_{si} = 1$ denotes that the supplier contract of trader i is breached, otherwise $B_{si} = 0$; Y_{si} is

a vector of exogenous variables determining supplier-contract enforcement and γ_s is the

corresponding coefficients; and e_{si} is the unobserved heterogeneities and $e_{si} \sim N(0, \overset{\sim}{\sigma}_s^2)$.

Similar with (II.A), $B_{Di} = 1$ in equation (II.B) denotes that downstream buyers breach the

contracts, otherwise $B_{Di} = 0$; Y_{Di} is a vector of exogenous variables determining

downstream-contract enforcement and γ_D is the corresponding coefficients; and e_{Di} is the

unobserved heterogeneities and $e_{Di} \sim N(0, \tilde{\sigma}_D^2)$.

Table 2 reports the estimation results for equation system (I.A) and (I.B). There

are three methods to estimate them. The first method is to estimate (I.A) and (I.B)

separately as ordinary probit models. The error terms ε_{si} and ε_{Di} might be correlated, so

that the method seemingly unrelated regression is also proposed for estimating them.

Table 2 shows that the test rejects the null hypothesis of no correlation between ε_{si} and

ε_{Di}. The seemingly unrelated regression is superior to ordinary probit models (Zellner

1962).

Furthermore, (II.A) and (II.B) are conditioned on $C_{si} = 1$ and $C_{Di} = 1$, respectively.

The third method to estimate (I.A) and (I.B) should be combined with (II.A) and (II.B),

respectively. The method of probit model with sample selectivity is also proposed (Van

de Ven and van Praag 1981),. However, the tests can not reject the null hypothesis of no

sample selectivity, shown in Table 3. Therefore, the following discussion for contract

choices is based on the estimation results of the seemingly unrelated regression, even

though the three results are very similar as shown in Table 2.

Table 3 reports the estimation results for equation (II.A) and (II.B). There are two

results. The first method is to estimate (II.A) and (II.B) separately as ordinary probit

models. The second method is the probit model with sample selectivity combining

equation (I.A) and (I.B). As mentioned above, the tests can not reject the null hypothesis

of no sample selectivity. Therefore, the following discussion for contract enforcement is

based on the estimation results of ordinary probit models.

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Discussion

- Supplier-Contract Choices

Table 3 shows that the coefficients for the variables of market service, theft, transportation, education, operational details, capital and employment are statistically significant. A positive sign for market service and a negative sign for theft indicates that a better market service and security environment could increase the probability of using supplier-contracts for purchasing products. The negative sign for own-transportation implies that own-transportation could reduce propensity of contract purchase, and it may be explained by the fact that own-transportation can increase the mobility which may reduce the incentive to make contracts to share risks.

Education is also important for supplier-contract choices. This study finds that low and middle-level educations are less likely to use contracts compared with high education. Particularly, middle-level educations are significantly lower.

Operational details are another important fact for supplier-contract choices. In particular, fresh vegetables and fruits traders are less likely to use contracts compared with other products, because they are very perishable, and long-term contractual relationship does not help too much.

Finally, capital and employment of traders are two variables denoting operational scale. The positive signs for the two variables imply that traders are more likely to use contracts to purchase goods as operational scale increases. The negotiation cost for a contract might be very high, and it might decrease the average cost as scale increases.

- Downstream-Contract Choices

Table 3 also shows that the coefficients for theft, age, edu1, vegetables and membership are statistically significant in downstream-contract choice model. Theft is a proxy for market environment. Similar with the results in supplier-contract choices, the negative sign implies that better market environment could increase the probability of using downstream-contracts for selling products.

The negative sign for age implies that elder traders are less likely to use contracts, because they might have more connections and experiences to sell their products in the market and hence have less incentive to use long-term contracts.

Education is also important for downstream-contract choices. This study finds that low and middle-level educations are less likely to use contracts compared with high education. In particular, low educations are significantly lower.

Similar with the supplier contracts, fresh vegetables traders are less likely to use contracts to sell products to downstream buyers compared with other products, because they are very perishable, and long-term contractual relationship is not important.

The affiliation to special associations is very important for downstream contract choices. A positive sign implies that a membership of a special association is more likely to use contracts to sell their products. It is plausible that a membership could help build up long-term connections among members.

- Supplier-Contract Enforcement

Table 4 shows that contract variables, market environment, and traders' demographic characteristics are very important for the supplier-contract enforcement.

As the share of farmers in the suppliers increase, suppliers are less likely to breach contracts. As Yu, Abler and Peng (2008) proposed that traders might to use informal methods to enforce the supplier contracts with farmers.

The positive sign for theft implies that bad market environment may increase the probability of supplier-contract breaches.

Gender and education play import roles in supplier-contract enforcement. Males are less likely to breach contracts and low-level education is more likely to breach contracts.

An affiliation to special associations is very important for downstream contract choices. A negative sign implies that a membership of a special association is less likely to breach contracts. It is plausible that a membership could help build up long-term connections among members, and the associations can push members to enforce contracts.

- Downstream-Contract Enforcement

Table 4 shows that contract variables and traders' demographic characteristics are very important for the downstream-contract enforcement, while the variables of market environment are not statistically significant.

A negative sign for the variable of share of retailers in downstream buyers implies that downstream buyers are less likely to breach contracts as the percent of retailers increase, because retailers usually need long-term supplier contracts to keep their customers.

Age and education also play import roles in supplier-contract enforcement. The elder and low-level education are more likely to breach contracts.

Finally, similar with supplier-contract enforcement, a negative sign for the member of special associations implies that a membership of a special association is less likely to breach contracts. It is plausible that the associations can push members and other parties to enforce contracts.

It is worth noting that the formats of contracts are not important for contract enforcement either for supplier contracts or for downstream contracts.

Conclusions

Using a survey data of 700 traders, this study scrutinizes contract choices and enforcement for traders, to find the roles of traders in the food supply chains in China.

Market service and environment are very important for both contract choices and enforcement. This study finds that better market service and environment can increase the propensity of using contract both for purchase and sales of products, and also can increase the probability of contract enforcement in particular for supplier contracts. Therefore, provision of good service and environment in the wholesale market is very important   for reducing transaction costs and increasing market efficiency.

Education and affiliations to special associations are also important for contract choices and enforcement. Higher education of traders can increase the propensity of contracts in the market and also can possibly reduce contract breaches. Also, memberships of special associations can increase the propensity of contracts in the market and also can possibly reduce contract breaches.

This study also finds that the formats of contracts (oral or written?) are not important for contract enforcement either for supplier contracts or for downstream contracts.

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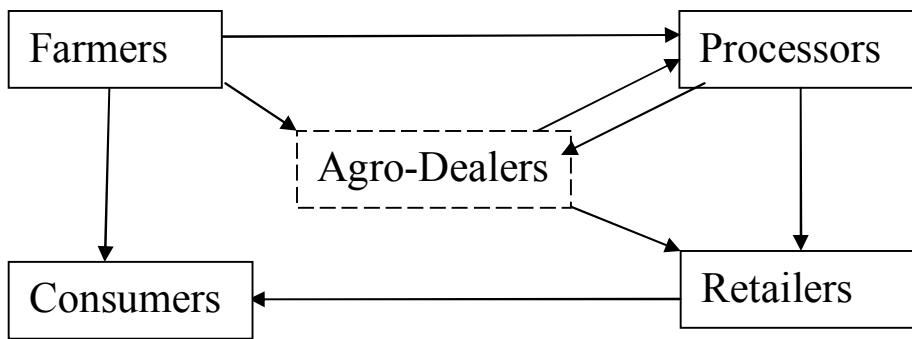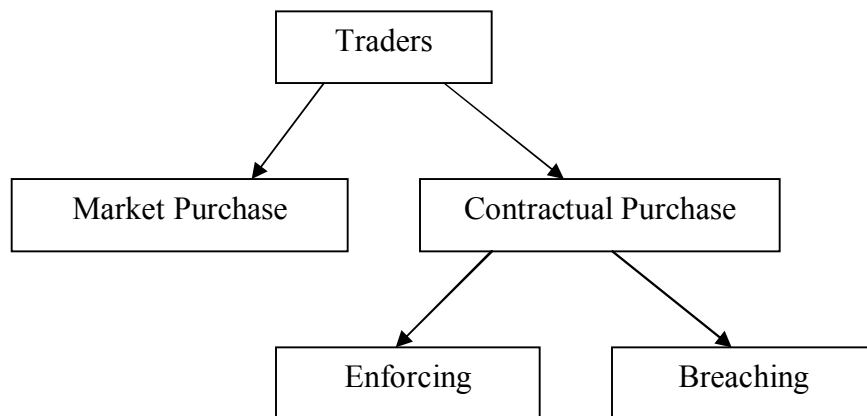 Guo Nong Cun Guan Cha),* 2006 No.2:33-48.

Figure 1 Food Supply Chain

Figure 2   Contract Choice and Enforcement

Table 1. Descriptive Statistics

Descriptive Statistics		Total		Supplier Contract				Downstream Contract			
				S_Contract=1		S_Breach =1		B_Contract=1		B_Breach=1	
Variable	Explanations	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Sample Size		556		286		227		268		212	
Supplier Contract											
S_Contract	Having long-term supplier contracts=1; otherwise =0	0.514	0.500	1.000	0.000						
S_Breach	Experienced supplier contract breaches=1; otherwise=0			0.802	0.399						
S_Trader	Percent of traders in the suppliers (%)			37.242	45.189	36.612	45.221				
S_Farmer	Percent of farmers in the suppliers (%)			31.582	43.909	30.247	43.550				
S_Oral	All supplier contracts are oral=1; Otherwise=0			0.685	0.465	0.683	0.466				
Downstream Contract											
B_Contract	Having long-term buyer contracts=1; otherwise =0	0.482	0.500					1.000	0.000		
B_Breach	Experienced buyer contract breaches=1; otherwise=0							0.791	0.407		
B_Trader	Percent of traders in the buyers (%)							38.670	39.869	38.575	39.478
B_Retailer	Percent of retailers in the buyers (%)							31.453	37.849	29.623	37.157
B_Oral	All downstream contracts are oral=1; Otherwise=0							0.709	0.455	0.689	0.464
Market Environment											
Wholesale market	Wholesale market service assessment: very good=5; good=4; fair=3; bad=2, very bad=1	3.576	0.916	3.657	0.834	3.692	0.760	3.619	0.864	3.660	0.831
Theft	Experienced thefts in 2003 =1; otherwise=0	0.842	0.365	0.818	0.386	0.841	0.366	0.799	0.402	0.811	0.392
Trader Information											
Transport	Transported by themselves =1; otherwise=0	0.192	0.395	0.157	0.365	0.167	0.374	0.179	0.384	0.184	0.388
Age	Age	39.313	9.472	38.528	9.736	38.529	9.811	38.090	9.157	38.684	9.501
Male	Male=1; Female=0	0.788	0.409	0.787	0.410	0.758	0.429	0.791	0.407	0.778	0.416
Marriage	Married=1; Otherwise=0	0.925	0.265	0.902	0.298	0.894	0.308	0.914	0.281	0.920	0.272
Edu1	Elementary school education or lower=1; otherwise=0	0.205	0.404	0.189	0.392	0.207	0.406	0.149	0.357	0.175	0.380
Edu2	Middle school education=1; otherwise=0	0.498	0.500	0.462	0.499	0.449	0.499	0.504	0.501	0.476	0.501
Leader	Being a official or a community leader before=1; otherwise=0	0.079	0.270	0.101	0.302	0.101	0.302	0.101	0.302	0.090	0.286
Vegetable	Fresh vegetables=1; otherwise=0	0.441	0.497	0.346	0.477	0.326	0.470	0.358	0.480	0.377	0.486
Fruits	Fresh fruits=1; otherwise=0	0.160	0.367	0.168	0.374	0.167	0.374	0.187	0.390	0.175	0.380
Capital	Capital (1000 Yuan)	358.175	885.994	459.667	993.484	473.772	1059.342	525.120	1177.894	470.689	1082.820
Employ	Have long-term employers =1; otherwise=0	0.362	0.481	0.462	0.499	0.467	0.500	0.425	0.495	0.401	0.491
Membership	Affiliated to a special association=1; otherwise=0	0.101	0.301	0.136	0.344	0.115	0.319	0.146	0.353	0.127	0.334

16

Table 2. Estimation Results for Equation (I)

	Probit				SURE				Probit with Sample Selectivity			
	Supplier Contract		Downstream Contract		Supplier Contract		Downstream Contract		Supplier Contract		Downstream Contract	
	Coef.	z	Coef.	Z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Market_Service	0.107	1.69*	0.061	0.97	0.107	1.70*	0.063	1.00	0.102	1.65*	0.071	1.12
Theft	-0.258	-1.67*	-0.368	-2.39**	-0.256	-1.67*	-0.367	-2.40**	-0.273	-1.72*	-0.374	-2.43**
Transport	-0.320	-2.14**	-0.101	-0.70	-0.318	-2.14**	-0.105	-0.72	-0.366	-2.48**	-0.075	-0.52
Age	-0.009	-1.35	-0.016	-2.41**	-0.009	-1.40	-0.016	-2.42**	-0.009	-1.26	-0.015	-2.30**
Male	0.098	0.70	0.083	0.60	0.099	0.71	0.084	0.61	0.072	0.50	0.080	0.58
Marriage	-0.348	-1.50	-0.005	-0.02	-0.357	-1.54	-0.003	-0.01	-0.369	-1.60	0.021	0.09
Edu1	-0.095	-0.58	-0.352	-2.12**	-0.097	-0.59	-0.350	-2.10**	-0.093	-0.56	-0.372	-2.24**
Edu2	-0.227	-1.74*	-0.095	-0.73	-0.224	-1.71*	-0.094	-0.73	-0.245	-1.88*	-0.105	-0.82
Leader	0.265	1.14	0.290	1.29	0.275	1.17	0.294	1.31	0.203	0.88	0.267	1.17
Vegetable	-0.442	-3.55***	-0.295	-2.37**	-0.445	-3.59***	-0.296	-2.38**	-0.456	-3.59***	-0.300	-2.44**
Fruits	-0.280	-1.67*	0.054	0.33	-0.288	-1.69*	0.054	0.33	-0.300	-1.76*	0.054	0.33
Ln(Capital)	0.103	2.47**	0.052	1.29	0.099	2.41**	0.050	1.25	0.097	2.32**	0.058	1.43
Employ	0.308	2.31**	0.128	0.97	0.314	2.36**	0.132	1.01	0.321	2.39**	0.109	0.84
Membership	0.279	1.42	0.458	2.32**	0.273	1.40	0.456	2.33**	0.307	1.55	0.493	2.52**
Intercept	-0.429	-0.69	0.148	0.25	-0.369	-0.60	0.165	0.28	-0.303	-0.49	0.003	0.00
					ρ =0.353							
					Test of $\rho=0$: chi2(1) = 24.82***							
Wald Test for the Model	chi2(14)=69.49***		chi2(14)=51.06***		chi2(30) = 96.41***							
Log Likelihood	-345.961		-356.916		-662.55							
Pseudo R2	0.102		0.073									

***, ** and * denote 1%, 5% and 10% significant level, respectively.

Table 3. Estimation Results for Equation (II)

	Probit				Probit with Sample Selectivity			
	Supplier Breach		Downstream Breach		Supplier Breach		Downstream Breach	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
S_Trader	-0.004	-1.35	-	-	-0.002	-0.75	-	-
S_Farmer	-0.005	-1.82*	-	-	-0.003	-0.91	-	-
S_Oral	0.215	0.92	-	-	0.139	0.61	-	-
B_Trader	-	-	-0.004	-1.55	-	-	-0.004	-1.58
B_Retailer	-	-	-0.008	-2.66**	-	-	-0.006	-2.74***
B_Oral	-	-	-0.317	-1.46	-	-	-0.301	-1.65*
Market_Service	0.165	1.40	0.167	1.44	0.178	1.98**	0.115	1.18
Theft	0.432	2.07**	0.132	0.55	0.114	0.30	0.246	1.17
Transport	0.251	0.96	0.051	0.21	-0.043	-0.13	0.113	0.55
Age	0.004	0.33	0.028	2.45**	-0.003	-0.32	0.030	3.14***
Male	-0.552	-2.09**	-0.215	-0.89	-0.306	-0.76	-0.198	-0.95
Marriage	-0.429	-1.22	-0.244	-0.71	-0.511	-1.90*	-0.170	-0.60
Edu1	0.446	1.72*	0.733	2.19**	0.244	0.81	0.718	2.48**
Edu2	0.109	0.52	-0.094	-0.49	-0.062	-0.31	-0.037	-0.22
Leader	0.474	1.37	-0.484	-1.57	0.450	1.48	-0.554	-2.02**
Vegetable	-0.092	-0.43	0.310	1.42	-0.355	-1.43	0.369	2.06**
Fruits	-0.194	-0.74	-0.221	-0.88	-0.319	-1.50	-0.213	-0.98
Ln(Capital)	0.095	1.38	0.004	0.05	0.123	2.26**	-0.019	-0.32
Employ	-0.162	-0.77	-0.257	-1.27	0.082	0.30	-0.293	-1.71*
Membership	-0.593	-2.32**	-0.464	-1.78*	-0.246	-0.59	-0.547	-2.45**
Intercept	-0.302	-0.29	0.232	0.21	-1.075	-1.37	0.706	0.73
$\rho^{'}$					0.865		-0.998	
Test of $\rho^{'} = 0$					chi2(1) = 0.68		chi2(1) = 2.22	
Wald Test for the Model	chi2(17)=29.07**		chi2(17)=38.67***		chi2(17)=41.08***		Chi2(17)=63.10***	
Log Likelihood	-127.365		-120.921		-472.508		-477.053	
Pseudo R2	0.0953		0.1197					

***, ** and * denote 1%, 5% and 10% significant level, respectively.

Contractual Arrangements of Traders in Chinese Wholesale Markets

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Contractual Arrangements of Traders in Chinese Wholesale Markets

Abstract:

   Using a survey data of 700 traders, this study scrutinizes contract choices and enforcement for agricultural traders in China.

   This study finds that market service and environment are very important for both contract choices and enforcement. Better market service and environment can increase the propensity of using contract and the probability of contract enforcement both for purchase and sales of products. Education and memberships of special associations are also important for contract choices and enforcement. Higher education and affiliation to special associations for traders can increase the propensity of contracts and reduce contract breaches. However, the formats of contracts, whether contracts are oral or written, are not important for contract enforcement.

Contractual Arrangements of Traders in Chinese Wholesale Markets

Introduction

Food supply chains in developing countries are usually longer and more complicate than the counterparts in developed countries due to the active roles of a large number of traders, also called intermediaries, or brokers (Gabre-Madhin and Minten 2003). As shown in Figure 1, the main arena for traders is wholesale markets through which they connect smallholders with processors, retailers and consumers; so that they can help reduce transaction costs and share risks among the market players. They usually buy agricultural products from small farmers, agribusinesses and other traders outside of wholesale markets, and sell them to retailers, agribusinesses, or other traders in the wholesale markets. They usually do not interact with consumers directly.

The studies for China and some African countries find that traders can improve marketing channels, optimize the social search cots, stabilize food supply chain and make markets work for the poor and small farmers, so as to increase farmer incomes and social welfare (Fafchamps and Minten 1999; Gabre-Madhin 2001; Fafchamps, Gabre-Madhin and Minten 2003; Yu, Abler and Peng 2008). Developing countries usually have a large number of smallholders, so that the transaction costs of selling agricultural products to markets are very high and economic exchange is difficult and complex. It usually takes time and effort for buyers and sellers to negotiate, monitor and enforce formal contracts. Social capital can help reduce transactions costs by speeding up search, increasing trust, and facilitating the circulation of market information among traders and farmers (Fafchamps and Minten 1999).

Therefore, the current literature on traders mainly sheds the light on the roles of

social capital of traders. Using the survey data from Madagascar, Malawi and Benin, Fafchamps and Minten (1999, 2002 and 2003), and Fafchamps, Gabre-Madhin and Minten (2003) indicate that the main reason of maintaining a network of personal relationship is that it can help traders increase access to information, regular trade flows, trade credit, and risk sharing, and on the other hand, social capital can boost the productivity of traders. Similar results also have been found for the traders in China. Zeng, Gao and Li (2006) use the survey data for 700 traders and find that social capital can increase the performance of traders, represented by the variable of sales.

In practice, food supply chain can be connected through either market purchase or contracts. In the case of contractual purchase, the studies reveals that breaches of agricultural contracts are very prevalent in many developing and transition countries, such as in some Eastern European transition Countries (Gow and Swinnen 1998, 2001), in Madagascar (Fafchamps and Minten 1999), and in China (Yu, Abler and Peng 2008), and however, the contractual relationship of traders has not been scrutinized in the literature except for Fafchamps and Minten (1999).

As aforementioned and shown in Figure 1 as well, traders act as a bridge between small farmers and consumer markets. As shown in Figure 2, the relationship either with upstream suppliers or with downstream buyers can be divided into two steps: contractual choice and contractual enforcement. The first step is that traders and counterpart transaction parties decide whether to use contracts or not for transactions. The second step is that contracted parties decide whether to breach contracts or not.

Though contracts can help contracted parties share risks and reduce transaction costs, breaches of contracts are very prevalent in developing and transition countries due

to oppotunitistic behaviors, such as in China (Yu, Abler and Peng 2008; Guo and Robert 2008). Fafchamps and Minten (1999) observed that traders face a quality or late delivery problem in 1 out of every 13 purchases and a late or non-payment problem in 1 out of every 45 sales in Madagascar.

There are many cases where public institutions do not function well in enforcing contracts in developing and transition economies, such as the absence or ineffectiveness of public institution (Gow and Swinnen 1998, 2001). Even when enforcing a contract is possible it might be very costly. High costs may weaken enforcement of contracts. The parties to a contract might be very opportunistic when enforcement of contracts is very costly (Beckmann and Boger 2004; Yu, Abler and Peng 2008). The situation in China is not quite the same as in other transition and developing economies because of social relationships that step in to fill some of the roles taken by courts in other countries. As Chow(1997) points out, the Chinese legal system might be called a "semi-legal system", and a contract under this legal system usually is enforced partly by an informal social relationship known as *guanxi*. *Guanxi* plays an important role in ensuring that a contract is honored. Yu, Abler and Peng (2008) have scrutinized the contractual relations between farms and processors, and find that traders can help stabilize the contracts.

In this study, using a survey data of 700 traders from China, we construct econometric models to study the contract arrangement and enforcement for traders in China.

Data

The data used in this study is from a survey of wholesale market traders

4

conducted by the School of Agricultural Economics and Rural Development at Renmin University of China in August and September 2004. The survey includes 701 traders in more than 40 wholesale markets scattered in 8 provinces. Using the same data, Zeng, Gao and Li (2006) analyzed the impacts of social capital on traders' performance. However, only 556 respondents are used for this study, and the rest 145 respondents are dropped due to missing or wrong items. The main variables are categorized into 3 groups: contract variables, market environment variables, and traders' operational details and demographic characteristics. The descriptive statistics and explanations to the main variables are shown in Table 1.

The survey indicates that 286 of the 556 traders, or 51% use contracts to buy products from upstream suppliers, including farmers, traders, firms or other suppliers; and 268 or 48% use contracts to sell products to downstream buyers, including traders, firms, retailers or other buyers. That is, about half of traders use contracts to purchase or sell products.

As we mentioned above, breaches of contracts are very prevalent in developing and transition countries; and China is not an exception. The survey finds that behaviors of breaching supplier contracts include (1) Late delivery, (2) Bad Quality, (3) Insufficient Quantity, and (4)Increasing Price; and 227 of the 286 traders with supplier contracts, or 79.4% of them experienced contract breaches from suppliers. On the other hand, the survey also finds that behaviors of breaching downstream contracts include (1) Delay of payments, (2) Less of No Payment, and (3) Decreasing Price; and 212 of 268 traders with downstream contracts, or 79.1% of them experienced contract breaches from downstream.

What are the determinants of the contractual arrangement and enforcement for agricultural traders in China? Contract variables, market environment variables, or traders' operational details and demographic characteristics? We will construct econometric models to study these problems in the following sections.

Furthermore, the survey also finds that most of the contracts are in an oral format in China. As shown in Table 1, about 68.5% of the 286 traders with supplier contracts and 70.9% of the 268 traders with downstream contracts use only oral contracts. Though oral contracts have the same legal effects with written contracts, it may be possible that contracted parties might be more likely to breach oral contracts. We will also test this hypothesis in the rest of this study.

Econometric Models and Estimation Strategy

As shown in Figure 2, traders' decision on contract can be divided into two steps: contract choices and contract enforcement. Traders and other transaction parties in the first stage decide whether to use a contract to purchase or sell products, and then in the second stage decide whether to enforce a contract if they decide use a contract in the first stage. We can construct econometric models as follows.

- Contract Choices

First, we have an econometric model consisting two probit equations modeling contractual choices both for supplier contracts and for downstream contracts.

$$C_{si} = X_{si}\beta_s + \varepsilon_{si} \qquad \text{(I.A)}$$

$$C_{Di} = X_{Di}\beta_D + \varepsilon_{Di} \qquad \text{(I.B)}$$

Where C_{si} and C_{Di} are binary variables modeling upstream supplier contracts and

downstream buyer contracts, respectively. In equation(I.A), $C_{si} = 1$ denotes that trader i uses contracts to buy products from upstream, otherwise $C_{si} = 0$; X_{si} is a vector of exogenous variables determining supplier-contract choices and β_s is the corresponding coefficients; and ε_{si} is the unobserved heterogeneities and $\varepsilon_{si} \sim N(0, \sigma_s^2)$. Similar with (I.A), $C_{Di} = 1$ in equation(I.B) denotes that trader i uses contracts to sell products to downstream buyers, otherwise $C_{Di} = 0$; X_{Di} is a vector of exogenous variables determining downstream-contract choices and β_D is the corresponding coefficients; and ε_{Di} is the unobserved heterogeneities and $\varepsilon_{Di} \sim N(0, \sigma_D^2)$.

- Contract Enforcement

If traders and other transaction parties decide to make contracts with up-stream suppliers or down-stream buyers, they will decide whether to enforce them in the second stage. We have two equations conditioned on equation (I).

$$B_{si} = Y_{si}\gamma_s + e_{si} \qquad \text{if } C_{si} = 1 \qquad\qquad\qquad \text{(II.A)}$$

$$B_{Di} = Y_{Di}\gamma_D + e_{Di} \quad \text{if } C_{Di} = 1 \qquad\qquad\qquad \text{(II.B)}$$

Where B_{si} and B_{Di} are binary variables modeling enforcement of upstream supplier contracts and downstream buyer contracts, respectively. In equation(II.A), $B_{si} = 1$ denotes that the supplier contract of trader i is breached, otherwise $B_{si} = 0$; Y_{si} is a vector of exogenous variables determining supplier-contract enforcement and γ_s is the corresponding coefficients; and e_{si} is the unobserved heterogeneities and $e_{si} \sim N(0, \tilde{\sigma}_s^2)$. Similar with (II.A), $B_{Di} = 1$ in equation (II.B) denotes that downstream buyers breach the contracts, otherwise $B_{Di} = 0$; Y_{Di} is a vector of exogenous variables determining

7

downstream-contract enforcement and γ_D is the corresponding coefficients; and e_{Di} is the

unobserved heterogeneities and $e_{Di} \sim N(0, \tilde{\sigma}_D^2)$.

Table 2 reports the estimation results for equation system (I.A) and (I.B). There

are three methods to estimate them. The first method is to estimate (I.A) and (I.B)

separately as ordinary probit models. The error terms ε_{si} and ε_{Di} might be correlated, so

that the method seemingly unrelated regression is also proposed for estimating them.

Table 2 shows that the test rejects the null hypothesis of no correlation between ε_{si} and

ε_{Di}. The seemingly unrelated regression is superior to ordinary probit models (Zellner

1962).

Furthermore, (II.A) and (II.B) are conditioned on $C_{si} = 1$ and $C_{Di} = 1$, respectively.

The third method to estimate (I.A) and (I.B) should be combined with (II.A) and (II.B),

respectively. The method of probit model with sample selectivity is also proposed (Van

de Ven and van Praag 1981),. However, the tests can not reject the null hypothesis of no

sample selectivity, shown in Table 3. Therefore, the following discussion for contract

choices is based on the estimation results of the seemingly unrelated regression, even

though the three results are very similar as shown in Table 2.

Table 3 reports the estimation results for equation (II.A) and (II.B). There are two

results. The first method is to estimate (II.A) and (II.B) separately as ordinary probit

models. The second method is the probit model with sample selectivity combining

equation (I.A) and (I.B). As mentioned above, the tests can not reject the null hypothesis

of no sample selectivity. Therefore, the following discussion for contract enforcement is

based on the estimation results of ordinary probit models.

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Discussion

- Supplier-Contract Choices

Table 3 shows that the coefficients for the variables of market service, theft, transportation, education, operational details, capital and employment are statistically significant. A positive sign for market service and a negative sign for theft indicates that a better market service and security environment could increase the probability of using supplier-contracts for purchasing products. The negative sign for own-transportation implies that own-transportation could reduce propensity of contract purchase, and it may be explained by the fact that own-transportation can increase the mobility which may reduce the incentive to make contracts to share risks.

Education is also important for supplier-contract choices. This study finds that low and middle-level educations are less likely to use contracts compared with high education. Particularly, middle-level educations are significantly lower.

Operational details are another important fact for supplier-contract choices. In particular, fresh vegetables and fruits traders are less likely to use contracts compared with other products, because they are very perishable, and long-term contractual relationship does not help too much.

Finally, capital and employment of traders are two variables denoting operational scale. The positive signs for the two variables imply that traders are more likely to use contracts to purchase goods as operational scale increases. The negotiation cost for a contract might be very high, and it might decrease the average cost as scale increases.

- Downstream-Contract Choices

Table 3 also shows that the coefficients for theft, age, edu1, vegetables and membership are statistically significant in downstream-contract choice model. Theft is a proxy for market environment. Similar with the results in supplier-contract choices, the negative sign implies that better market environment could increase the probability of using downstream-contracts for selling products.

The negative sign for age implies that elder traders are less likely to use contracts, because they might have more connections and experiences to sell their products in the market and hence have less incentive to use long-term contracts.

Education is also important for downstream-contract choices. This study finds that low and middle-level educations are less likely to use contracts compared with high education. In particular, low educations are significantly lower.

Similar with the supplier contracts, fresh vegetables traders are less likely to use contracts to sell products to downstream buyers compared with other products, because they are very perishable, and long-term contractual relationship is not important.

The affiliation to special associations is very important for downstream contract choices. A positive sign implies that a membership of a special association is more likely to use contracts to sell their products. It is plausible that a membership could help build up long-term connections among members.

- Supplier-Contract Enforcement

Table 4 shows that contract variables, market environment, and traders' demographic characteristics are very important for the supplier-contract enforcement.

As the share of farmers in the suppliers increase, suppliers are less likely to breach contracts. As Yu, Abler and Peng (2008) proposed that traders might to use informal methods to enforce the supplier contracts with farmers.

The positive sign for theft implies that bad market environment may increase the probability of supplier-contract breaches.

Gender and education play import roles in supplier-contract enforcement. Males are less likely to breach contracts and low-level education is more likely to breach contracts.

An affiliation to special associations is very important for downstream contract choices. A negative sign implies that a membership of a special association is less likely to breach contracts. It is plausible that a membership could help build up long-term connections among members, and the associations can push members to enforce contracts.

- Downstream-Contract Enforcement

Table 4 shows that contract variables and traders' demographic characteristics are very important for the downstream-contract enforcement, while the variables of market environment are not statistically significant.

A negative sign for the variable of share of retailers in downstream buyers implies that downstream buyers are less likely to breach contracts as the percent of retailers increase, because retailers usually need long-term supplier contracts to keep their customers.

Age and education also play import roles in supplier-contract enforcement. The elder and low-level education are more likely to breach contracts.

Finally, similar with supplier-contract enforcement, a negative sign for the member of special associations implies that a membership of a special association is less likely to breach contracts. It is plausible that the associations can push members and other parties to enforce contracts.

It is worth noting that the formats of contracts are not important for contract enforcement either for supplier contracts or for downstream contracts.

Conclusions

Using a survey data of 700 traders, this study scrutinizes contract choices and enforcement for traders, to find the roles of traders in the food supply chains in China.

Market service and environment are very important for both contract choices and enforcement. This study finds that better market service and environment can increase the propensity of using contract both for purchase and sales of products, and also can increase the probability of contract enforcement in particular for supplier contracts. Therefore, provision of good service and environment in the wholesale market is very important   for reducing transaction costs and increasing market efficiency.

Education and affiliations to special associations are also important for contract choices and enforcement. Higher education of traders can increase the propensity of contracts in the market and also can possibly reduce contract breaches. Also, memberships of special associations can increase the propensity of contracts in the market and also can possibly reduce contract breaches.

This study also finds that the formats of contracts (oral or written?) are not important for contract enforcement either for supplier contracts or for downstream contracts.

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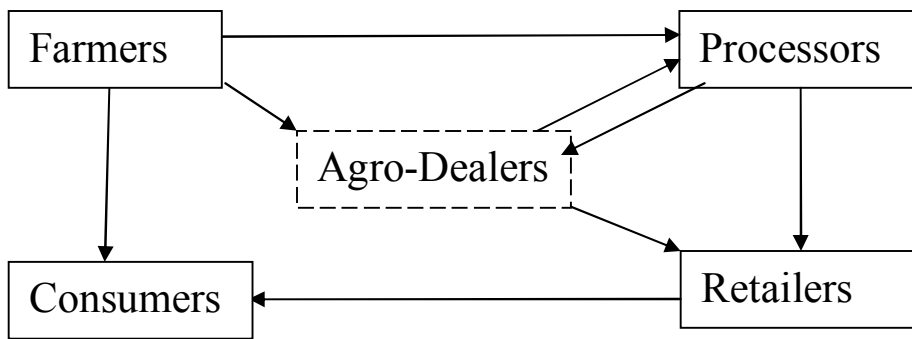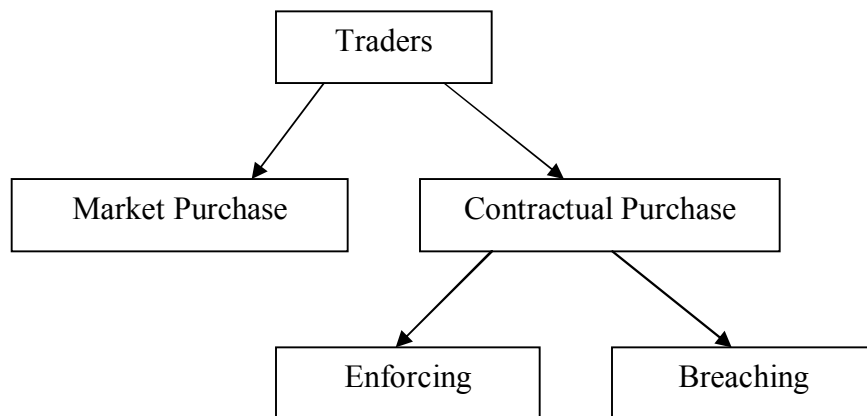
Figure 1 Food Supply Chain

Figure 2   Contract Choice and Enforcement

Table 1. Descriptive Statistics

Descriptive Statistics		Total		Supplier Contract				Downstream Contract			
				S_Contract=1		S_Breach =1		B_Contract=1		B_Breach=1	
Variable	Explanations	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Sample Size		556		286		227		268		212	
Supplier Contract											
S_Contract	Having long-term supplier contracts=1; otherwise =0	0.514	0.500	1.000	0.000						
S_Breach	Experienced supplier contract breaches=1; otherwise=0			0.802	0.399						
S_Trader	Percent of traders in the suppliers (%)			37.242	45.189	36.612	45.221				
S_Farmer	Percent of farmers in the suppliers (%)			31.582	43.909	30.247	43.550				
S_Oral	All supplier contracts are oral=1; Otherwise=0			0.685	0.465	0.683	0.466				
Downstream Contract											
B_Contract	Having long-term buyer contracts=1; otherwise =0	0.482	0.500					1.000	0.000		
B_Breach	Experienced buyer contract breaches=1; otherwise=0							0.791	0.407		
B_Trader	Percent of traders in the buyers (%)							38.670	39.869	38.575	39.478
B_Retailer	Percent of retailers in the buyers (%)							31.453	37.849	29.623	37.157
B_Oral	All downstream contracts are oral=1; Otherwise=0							0.709	0.455	0.689	0.464
Market Environment											
Wholesale market	Wholesale market service assessment: very good=5; good=4; fair=3; bad=2, very bad=1	3.576	0.916	3.657	0.834	3.692	0.760	3.619	0.864	3.660	0.831
Theft	Experienced thefts in 2003 =1; otherwise=0	0.842	0.365	0.818	0.386	0.841	0.366	0.799	0.402	0.811	0.392
Trader Information											
Transport	Transported by themselves =1; otherwise=0	0.192	0.395	0.157	0.365	0.167	0.374	0.179	0.384	0.184	0.388
Age	Age	39.313	9.472	38.528	9.736	38.529	9.811	38.090	9.157	38.684	9.501
Male	Male=1; Female=0	0.788	0.409	0.787	0.410	0.758	0.429	0.791	0.407	0.778	0.416
Marriage	Married=1; Otherwise=0	0.925	0.265	0.902	0.298	0.894	0.308	0.914	0.281	0.920	0.272
Edu1	Elementary school education or lower=1; otherwise=0	0.205	0.404	0.189	0.392	0.207	0.406	0.149	0.357	0.175	0.380
Edu2	Middle school education=1; otherwise=0	0.498	0.500	0.462	0.499	0.449	0.499	0.504	0.501	0.476	0.501
Leader	Being a official or a community leader before=1; otherwise=0	0.079	0.270	0.101	0.302	0.101	0.302	0.101	0.302	0.090	0.286
Vegetable	Fresh vegetables=1; otherwise=0	0.441	0.497	0.346	0.477	0.326	0.470	0.358	0.480	0.377	0.486
Fruits	Fresh fruits=1; otherwise=0	0.160	0.367	0.168	0.374	0.167	0.374	0.187	0.390	0.175	0.380
Capital	Capital (1000 Yuan)	358.175	885.994	459.667	993.484	473.772	1059.342	525.120	1177.894	470.689	1082.820
Employ	Have long-term employers =1; otherwise=0	0.362	0.481	0.462	0.499	0.467	0.500	0.425	0.495	0.401	0.491
Membership	Affiliated to a special association=1; otherwise=0	0.101	0.301	0.136	0.344	0.115	0.319	0.146	0.353	0.127	0.334

Table 2. Estimation Results for Equation (I)

| | Probit | | | | SURE | | | | Probit with Sample Selectivity | | | |
| | Supplier Contract | | Downstream Contract | | Supplier Contract | | Downstream Contract | | Supplier Contract | | Downstream Contract | |
	Coef.	z	Coef.	Z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Market_Service	0.107	1.69*	0.061	0.97	0.107	1.70*	0.063	1.00	0.102	1.65*	0.071	1.12
Theft	-0.258	-1.67*	-0.368	-2.39**	-0.256	-1.67*	-0.367	-2.40**	-0.273	-1.72*	-0.374	-2.43**
Transport	-0.320	-2.14**	-0.101	-0.70	-0.318	-2.14**	-0.105	-0.72	-0.366	-2.48**	-0.075	-0.52
Age	-0.009	-1.35	-0.016	-2.41**	-0.009	-1.40	-0.016	-2.42**	-0.009	-1.26	-0.015	-2.30**
Male	0.098	0.70	0.083	0.60	0.099	0.71	0.084	0.61	0.072	0.50	0.080	0.58
Marriage	-0.348	-1.50	-0.005	-0.02	-0.357	-1.54	-0.003	-0.01	-0.369	-1.60	0.021	0.09
Edu1	-0.095	-0.58	-0.352	-2.12**	-0.097	-0.59	-0.350	-2.10**	-0.093	-0.56	-0.372	-2.24**
Edu2	-0.227	-1.74*	-0.095	-0.73	-0.224	-1.71*	-0.094	-0.73	-0.245	-1.88*	-0.105	-0.82
Leader	0.265	1.14	0.290	1.29	0.275	1.17	0.294	1.31	0.203	0.88	0.267	1.17
Vegetable	-0.442	-3.55***	-0.295	-2.37**	-0.445	-3.59***	-0.296	-2.38**	-0.456	-3.59***	-0.300	-2.44**
Fruits	-0.280	-1.67*	0.054	0.33	-0.288	-1.69*	0.054	0.33	-0.300	-1.76*	0.054	0.33
Ln(Capital)	0.103	2.47**	0.052	1.29	0.099	2.41**	0.050	1.25	0.097	2.32**	0.058	1.43
Employ	0.308	2.31**	0.128	0.97	0.314	2.36**	0.132	1.01	0.321	2.39**	0.109	0.84
Membership	0.279	1.42	0.458	2.32**	0.273	1.40	0.456	2.33**	0.307	1.55	0.493	2.52**
Intercept	-0.429	-0.69	0.148	0.25	-0.369	-0.60	0.165	0.28	-0.303	-0.49	0.003	0.00
					ρ =0.353							
					Test of $\rho = 0$: chi2(1) = 24.82***							
Wald Test for the Model	chi2(14)=69.49***		chi2(14)=51.06***		chi2(30) = 96.41***							
Log Likelihood	-345.961		-356.916		-662.55							
Pseudo R2	0.102		0.073									

***, ** and * denote 1%, 5% and 10% significant level, respectively.

Table 3. Estimation Results for Equation (II)

	Probit				Probit with Sample Selectivity			
	Supplier Breach		Downstream Breach		Supplier Breach		Downstream Breach	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
S_Trader	-0.004	-1.35	-	-	-0.002	-0.75	-	-
S_Farmer	-0.005	-1.82*	-	-	-0.003	-0.91	-	-
S_Oral	0.215	0.92	-	-	0.139	0.61	-	-
B_Trader	-	-	-0.004	-1.55	-	-	-0.004	-1.58
B_Retailer	-	-	-0.008	-2.66**	-	-	-0.006	-2.74***
B_Oral	-	-	-0.317	-1.46	-	-	-0.301	-1.65*
Market_Service	0.165	1.40	0.167	1.44	0.178	1.98**	0.115	1.18
Theft	0.432	2.07**	0.132	0.55	0.114	0.30	0.246	1.17
Transport	0.251	0.96	0.051	0.21	-0.043	-0.13	0.113	0.55
Age	0.004	0.33	0.028	2.45**	-0.003	-0.32	0.030	3.14***
Male	-0.552	-2.09**	-0.215	-0.89	-0.306	-0.76	-0.198	-0.95
Marriage	-0.429	-1.22	-0.244	-0.71	-0.511	-1.90*	-0.170	-0.60
Edu1	0.446	1.72*	0.733	2.19**	0.244	0.81	0.718	2.48**
Edu2	0.109	0.52	-0.094	-0.49	-0.062	-0.31	-0.037	-0.22
Leader	0.474	1.37	-0.484	-1.57	0.450	1.48	-0.554	-2.02**
Vegetable	-0.092	-0.43	0.310	1.42	-0.355	-1.43	0.369	2.06**
Fruits	-0.194	-0.74	-0.221	-0.88	-0.319	-1.50	-0.213	-0.98
Ln(Capital)	0.095	1.38	0.004	0.05	0.123	2.26**	-0.019	-0.32
Employ	-0.162	-0.77	-0.257	-1.27	0.082	0.30	-0.293	-1.71*
Membership	-0.593	-2.32**	-0.464	-1.78*	-0.246	-0.59	-0.547	-2.45**
Intercept	-0.302	-0.29	0.232	0.21	-1.075	-1.37	0.706	0.73
$\rho^{'}$					0.865		-0.998	
Test of $\rho^{'}=0$					chi2(1) = 0.68		chi2(1) = 2.22	
Wald Test for the Model	chi2(17)=29.07**		chi2(17)=38.67***		chi2(17)=41.08***		Chi2(17)=63.10***	
Log Likelihood	-127.365		-120.921		-472.508		-477.053	
Pseudo R2	0.0953		0.1197					

***, ** and * denote 1%, 5% and 10% significant level, respectively.