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The Contracts between Leading Agribusiness Enterprises and Rural Households: Its Effects on Firm-level Export of Agricultural Products

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In this paper, transaction cost is introduced into the general firm-level export behavior model. By so doing, we constructed a theoretical model to explain how connection modes between leading agribusiness enterprises and rural households affect the firm-level agricultural products export. Analyzing the dataset of 561 national leading agribusinesses of the year 2003, we use Tobit model to estimate the firm-level export effect of the connection modes. The empirical result demonstrates that connections in the mode of stock-cooperation or cooperation contracts have a significant positive effect on the enterprises export and export ratio. In addition, the connection with more characteristics of factor contract has stronger effect on export than that with commodity contract characteristics.

INTRODUCTION

The development of leading agricultural enterprises is an important factor in solving the conflicts between “small household” and “large market” in China¹. In recent years, the Leading Agribusiness Enterprises (LAEs) greatly promoted the industrialized organization and strengthened the connection between farmers and enterprises. About 45% of the agricultural industrialized organizations are activated by LAEs². In 2003, more than 52.7 million agricultural households have been attached to LAEs³. On the other aspects, the role LAEs plays in agricultural products exports is also very important. National-level LAEs exporting profits reached \$6,661 million which amount 31.36% of the total export profits of agricultural products⁴. Therefore, we can say that it is LAEs that link the scattered small household with the comprehensive international market.

Though the importance of contracting methods between LAEs and farmers is unquestionable, current research mainly focus on the evolution of contracting methods between LAEs and agricultural household (Zhou & Cao, 2001), descriptive research about the industrialized development of agriculture. Even though there are researches about the relationship between LAE and rural households, their attention has only been attached to “Agricultural Contracts”.

According to the data of national-level LAEs, the average exporting rate of the enterprises which cooperate with the farms in the way of commercial contracting is only 21.4%, while the exporting rate of the enterprises

which cooperated with farms in the ways of cooperation of joint cooperation reached 26.1%. The other ways of cooperation have a much lower exporting rate of 8.9%⁵.

Therefore, by taking both the ways of LAE cooperating with farms and its export, we aim to analyze which kind of effect the ways of LAE–farm cooperation impose on agricultural export. This research can not only further our understanding of the organization patterns of Chinese agricultural industrialization, but can also give us implications to improve current agricultural industrializing patterns.

THEORETICAL MODEL

How to introduce the contracting patterns between LAE and farms into enterprise exporting behavior model

The linkage between farmers and leading processors is an essential procedure before the production. The Modes can be defined as two types, factor bond and commodity bond (Zhou & Cao, 2002). If transaction cost in the market is lower than inner transaction cost, a firm may adopt factor bond with farmers. Before production, transaction cost may come from negotiation about contract, enforcement, and cost from agents (Williamson, 1996). The vertical integration will help firms to reduce two kinds of transaction cost: i) seeking cost, ii) risks from low quality (Barkema & Cook, 1993). When test cost is too high and can not reflect the quality, it will lower market price. In all, vertical integration will reduce transaction cost (Hennessy, 1996)⁶. By so doing, the price can go down to compete with other firms (Economides, 1999).

Enterprise exports are affected by factors like techniques, scale, input etc. A lot of studies on these factors have been conducted, most of which took an in-depth investigation on the level of enterprises (Schlegelmilch and Crook, 1988; Kumar and Siddharthan, 1994; Bernard

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and Jensen, 2001) with their focuses on building empirical model to estimate whether the enterprise export or their export quantities, but few has strict theoretical model frame. The model deduction done by Aitken, Hanson and Harrison (1997) is comparatively strict, they claims that the market selection of enterprises of great representativeness can be described as selling products in different markets with the maximized profits:

$$\begin{aligned} \text{Max}_{q_d, q_f} \quad & p_d q_d + p_f q_f - h(q_d + q_f) - m_d(q_d) - m_f(q_f) \\ \text{s. t.} \quad & q_d, q_f \geq 0 \end{aligned} \quad (1)$$

Among which p , q respectively stands for price and sales quantity, d , f domestic market and international market, h , the production cost, m , the cost of commodity circulation. $q_d \geq 0$ means that the production and sales of a firm at home is naturally more than 0. And $q_f \geq 0$ means that the export of a firm is at least not less than 0. However, instead of discussing export or export rate, they only investigated with whether export as the induced variable. Barrios, Görg and Strobl (2003) expand their study to export rate and considered difference of market.

The connection between farms and LAE is the stage before production and can be divided according to the types of contract-factor contract and commodity contract (Zhou & Cao, 2002). Because market transaction cost is higher than management cost (internal trade cost), the enterprise adopted the way of factor contract. Since transaction cost mainly arises from contract drafting, negotiation, supervised execution etc., it is closely related to agency cost (Williamson, 1996). Barkema and Cook (1993) proposed in their research of pork market vertical integration to reduce these two kinds of costs through vertical integration: (1) seeking cost; (2) risk cost of acquiring low quality raw materials. When the test cost is outrageous and can not fully reflect the quality of commodity, the test result will affect market price. Vertical integration can probably reduce this transaction fee (Hennessy, 1996). Then the price will be lowered and market shares increase.

At present little attention has been paid to the export of enterprises, if it had any, they did not analyze the effect of the cooperation pattern between upper and lower producers at the pre-production stage on enterprise export. In fact, to neglect this point is to neglect the effect of raw materials. Studies on contract and transaction cost brought a new idea to the solution of this problem, that is the contracting pattern not only lead to the difference of transaction costs, but also influence enterprise export. In this paper we will try to find out the effects of different transaction cost on enterprise export.

Introduction of transaction cost and modification of enterprise export model

In the model built by Aitken, Hanson and Harrison (1997), production cost and selling circulation cost are all simple quadrics and only the circulation cost difference of exporting products and domestic-sold products are taken into consideration, but the effect of technical stan-

dard and inspection & quarantine standards difference on production cost are neglected⁷. As we stated above, the enterprise may have to deal all kinds of transaction costs when acquiring raw materials and the transaction costs varied with contracting patterns. Williamson (1996) believed that only through comparing systems, that is to compare one contract with another one, can their own transaction cost be estimated. In this sense, we only need to compare the transaction cost of all kinds of contracts. It is unnecessary for us to accurately calculate transaction cost.

Therefore, we the following assumptions:

- i) Agricultural enterprises face perfect competitive market⁸;
- ii) Transaction costs of enterprise-farm cooperation relating to contracting patterns can be separated, that is only one part of the transaction cost are relevant to enterprise-rural household cooperation patterns.
- iii) Every enterprise should adopt one pattern to cooperate with rural household ;
- iv) In the interval where the production is positive, transaction cost increase with production.
- v) All cost forms are simple quadrics (Aitken *etc.*, 1997; Barrios *etc.*, 2003).

Under these premises, we recount the cost of agricultural products as following form:

$$\begin{aligned} C(q_d, q_f) = & h_d(q_d) + h_f(q_f) + T(q_d + q_f) + m_d(q_d) + \\ & m_f(q_f) + F \end{aligned} \quad (2)$$

Among which, F is the fixed cost.

While the production cost and circulation cost can be expressed as,

$$h_l(q_l) = \frac{a_l}{2} q_l^2 + g_l q_l \quad (3)$$

$$m_l = \frac{b_l}{2} q_l^2 + c_l q_l \quad (4)$$

Among which, $a_l > 0$ and $b_l > 0$, $l = d$ or f . Different from the model proposed by Aitken *etc.*, we believe that exporting products and domestic-sold products are different in production cost, a_l and g_l are correlated with the techniques of the enterprise and other factors that may cause cost difference; a lot of meanings were attached to b_l and c_l ⁹, whether products are exported or sold domestically, they are affected by all kinds of factors such as the product certification, the enterprise credit grade *etc.*, which lead to their cost difference. Meanwhile, the organization system can also influence the export in certain degree.

Transaction cost (associated with enterprise-rural household cooperation) function is as follow:

$$T(q_d + q_f) = \frac{t}{2} (q_d + q_f)^2 + \frac{t'}{2} (q_d + q_f) \quad (5)$$

Among which, t and t' can be written as:

$$t = \sum_{k=1}^k 1(k=x) t_k, \quad t' = t_0 + \sum_{k=1}^k 1(k=x) t'_k \quad (6)$$

Among which, $t > 0$ and $t' > 0$, they only relates to cooperation pattern, k is the type of contract a firm adopts, K is the number of the contract patterns, x means a specific contract type exiting in the market by which farmers sell their products to firms, t_k and t'_k are transaction cost indexes with relative meaning and only related to contract patterns. $1(k=x)$ is a kind of specific function. If $k=x$, $1(k=x)$ will be equal to 1. t_0 is the other measures of factors concerning supervision, for example, the enterprise motivation mechanism and transaction-related service. Knoeber and Thurman (1995) noticed in their study of the industrialization of roasted chicken that the manufacturing company supplied chicken, feedstuff and offer veterinary service to producers, and the producers supply capital in the form of labor force and chicken farm. Because chicken-raising need a large-scale sunk investment, they believed that the processors give the incentive investment willingness a credible signal which induced the self-selection of high quality producer to solve the problem of adverse selection, this kind of signal does not exist in vertical integration.

So, the profit maximization aim of typical agricultural products enterprises can be recounted as:

$$\begin{aligned} \text{Max}_{q_d, q_f} \quad & \pi = p_d q_d + p_f q_f - h_d(q_d) - h_f(q_f) - T(q_d + q_f) \\ & - m_d(q_d) - m_f(q_f) - F \\ \text{s. t.} \quad & q_d, q_f \geq 0 \end{aligned} \quad (7)$$

The hypotheses of export sales export proportion

Put formulas (3), (4), (5) into formula (7) and get the maximization condition, we can get the export sales which maximizes the profits as following equation,

$$EX = p_f q_f = \frac{p_f}{a_f + t + b_f} (p_f - g_f - t q_d - t' - c_f) \quad (9)$$

It is obvious that if there was the m th and n th ways of household-enterprise contracting, since $t_m > t_n$, $t'_m > t'_n$, then we get $EX(m) < EX(n)$. That indicates that enterprises adopting contracting ways of lower cost export more.

Since the export and input are negatively associated with each other and affected by the scale, we eliminate this through investigating export:

$$\begin{aligned} ER = & \frac{\frac{p_f}{a_f + t + b_f} (p_f - g_f - t q_d - t' - c_f)}{\frac{p_f}{a_f + t + b_f} (p_f - g_f - t q_d - t' - c_f) + \frac{p_d}{a_d + t + b_d} (p_d - g_d - t q_f - t' - c_d)} \\ & (10) \end{aligned}$$

According to formula (9), the effects of different exchanging cost on export rate are complicated. It is possible that even if enterprise adopting low-transaction-cost contract have large export quantity, a large domestic sales growth which leads its export rate lower than that

of enterprises adopting contract of higher costs. The direction which is affected by enterprise export rate may not be certain, but we have to point out that it is the current situation that China's high-quality agricultural products are mainly exported to foreign countries. The costs of supplying high quality agriculture product to enterprises are comparatively higher, and generally speaking, $p_f > p_d$. Especially, in China, agricultural products for exporting are usually considered as an exchange for foreign profit. So the agricultural products are in higher quality and higher price. Moreover, strategy of success through quality is a national trade policy in China. Thus the export rate is possibly increase with the contract-caused exchange cost decrease.

On the basis of the above analysis, we propose the following hypothesis:

Enterprises tend to export the products, when the exchange cost of contract is low.

DATA SOURCE

The data we used are all from the 2003 audit materials of 582 national-level LAEs collected by agricultural industrialization office of Ministry of Agriculture. Because the dataset of 21 LAEs are incomplete, we only have 561 validate samples. The audit materials include basic data of the total investment, real estate, assets liability ratio, total sales, domestic sales, exports, credit grade, ownership etc., data which demonstrate product characteristics like main product types, enterprise certification, even data that illustrate LAE-rural household cooperation patterns such as whether enterprises supply services to the rural households, whether they purchase agricultural products at protection price, patterns with which the LAEs promote rural households. Since there are serious standards for LAE and all of them are selected with strict audition, we believe that the samples used in this paper represent the most important part of LAE in China¹⁰.

As is shown is Table 1, the average total assets is 736.8 million RMB, average fixed assets is as high as 277.4 million RMB, average liability/asset ratio is 46.9%, average profit is 33.8 million RMB with an average profit rate as 7.1%.

Table 1. Description of Leading Enterprises

	Mean	Standard Error	Min	Max
Total Assets (million RMB)	736.8	2303.7	11.6	45908.3
Fixed Assets (million RMB)	277.4	749.9	7.07	15551.7
Liability/Asset Ratio (%)	46.9	14.7	1	97.9
Profit (million RMB)	33.8	79.2	-2.8	975.0
Profit Margin (%)	7.1	8.7	-18.2	91.5

From the perspective of industry structure, 45.3% of the enterprises are engaged in crops processing or productions with crops as the raw materials; and about 32.8% of the enterprises take livestock breeding products as raw materials. Enterprises (because its raw material can be products of either planting industry or livestock breed-

ing industry, so it is considered separately) producing oil or grease is of 8.0%. And enterprises of other industry are of 21.4%¹¹.

We can then take a look at ownership of the enterprises. More than 50% of them are limited liability companies with unclear ownership, following are the 32.3% of mixed ownership with shareholders system; in addition, there are 7.7% state-owned enterprises, 2.5% collectively-owned enterprise, 2.5% joint ventures of Hongkong, Macao and Taiwan, 2.1% overseas-funded enterprises, 2.0% enterprises and sino-foreign joint ventures with a small portion of 0.4%.

From the leading enterprise-rural household connecting modes, contracting mode takes the largest portion of 85.0%, cooperation or share system mode take 8.9% and 6.1% enterprises are of the other modes. Besides, 61.7% of the leading enterprises have exporting business. In accordance with our study objective, we connect these two factors together and get Table 2. It is found that the export amount and export rate vary with enterprises with different connecting modes. Enterprises adopting cooperative or shareholding cooperative mode have the largest export amount and the highest exporting rate and enterprise adopting connecting modes other than cooperation mode and contract mode has the smallest exporting amount and the lowest exporting rate¹². Therefore, we can conclude that there is certain relation between LAEs export and their modes connecting rural households.

Table 2. The LAEs' Export and Their Modes Connecting Rural Households

LAEs' Modes Connecting Rural Households	(Share Holding) Cooperative		Contract		Others	
	Mean	SD	Mean	SD	Mean	SD
Export (million USD)	16.3	35.1	11.8	42.0	7.2	15.5
Export Rate (%)	26.1	68.9	21.7	36.6	9.0	19.3

Note: S. E. refers Standard Deviation.

METHODOLOGY

For the sake of estimation, we write (9) and (10) into the following liner pattern, namely the export amount of enterprise i is as follow:

$$EX_i = \alpha_1 p_{fi} + \alpha_2 q_{di} + \eta t_i + \delta W_i + \beta V_i + \gamma D_i + u_{fi} \quad (11)$$

Among which, t_i is relative transaction cost, W_i is the portion of the transaction cost unaffected by agricultural availability. Vector V_i is production cost including the effect of production input on cost. Vector represents all kinds of cost of transaction and marketing, including manufacturing cost. As it is stated in the previous part, scale factor might affect the exporting amount of the enterprises, so we have to estimate the exporting rate equation.

The exporting rate of enterprise i is as follow:

$$ER_i = \alpha_{R1} p_{fi} + \alpha_{R2} q_{di} + \alpha_{R3} p_{di} + \eta_R t_i + \delta_R W_i + \beta_R V_i + \gamma_R D_{ii} + u_{Ri} \quad (12)$$

Considering that there are large amount of enterprises have no exporting business, we adopt Tobit model to avoid the effect of 0 values on the result. Moreover, because exporting price and exporting amount data are not available, we choose not to introduce them into this model. So, based on the previous analysis and the empirical model design standard, we adjust formula (11) and (12) accordingly as follow:

$$\begin{aligned} EX_i^* &= \eta_1 coo_i + \eta_2 con_i + \delta_1 far_i + \delta_2 far_i^2 + \delta_3 ser_i \\ &+ \delta_4 pro_i + \beta_1 avc_i + \beta_2 avc_i^2 + \beta_3 hit_i \\ &+ \beta_i IND_i + \gamma_1 cre_i + \gamma_2 iso_i + \gamma_s INS_i + u_{fi} \\ u_{fi} | z &\sim \text{Normal}(0, \sigma^2) \\ EX_i &= \max(0, EX_i^*) \end{aligned} \quad (13)$$

$$\begin{aligned} ER_i^* &= \eta_{R1} coo_i + \eta_{R2} con_i + \delta_{R1} far_i + \delta_{R2} far_i^2 + \delta_{R3} ser_i \\ &+ \delta_{R4} pro_i + \beta_{R1} avc_i + \beta_{R2} avc_i^2 + \beta_{R3} hit_i \\ &+ \beta_{Ri} IND_i + \gamma_{R1} cre_i + \gamma_{R2} iso_i + \gamma_{R3} INS_i + u_{fi} \\ u_{Ri} | z &\sim \text{Normal}(0, \sigma^2) \\ ER_i &= \max(0, ER_i^*) \end{aligned} \quad (14)$$

In the above model, z represents all the independent variables, while IND is a group of dummy variables that represent the industries an enterprise engaged in and INS is a group of dummy variables of enterprise system, β_i and γ_s are the corresponding index.

According to the above empirical model, we list all the variables and description data in Table 3.

To verify the hypothesis, we focus on the indices η_1 and η_2 of coo and con . If both η_1 and η_2 are greater than zero, we can conclude that the exporting amount of enterprise adopting contracting or cooperation modes is larger than that of the enterprises adopting other contracting modes. Namely the hypothesis is verified. Of course, the comparison between values of η_1 and η_2 are also a topic we are interested in.

EMPIRICAL RESULT

A line of Table 4 reports the estimation result of exporting amount equation, equation (13); while line B reports the estimation result of exporting rate equation, equation (14), in which effects of scale are eliminated.

Tobit model estimation pursues the maximization of logarithm likelihood value. The logarithm likelihood value -3523.19 of exporting amount equation is obviously greater than that of exporting rate equation with a value of -417.19.

The Implication of Contract Modes on Export

As it was shown in the empirical results, the hypothesis was tested. The firms connected with farmers through

Table 3. Descriptive Statistics for Dependent Variables and Independent Variables

Symbol	Dependent Variable	Note	Mean	SD
<i>EX</i>	Export	Export (Ten Thousand USDs)	1187.4	4025.6
<i>ER</i>	Export Rate	(Export×8.277) / Sales	0.215	0.400
	Independent Variables	Note		
<i>t</i>	modes connecting rural households			
<i>coo</i>	(share-holding) cooperative	Dummy Variable	0.089	0.285
<i>con</i>	contract	Dummy Variable	0.850	0.357
<i>W</i>	other transaction cost			
<i>far</i>	number of connected farmers		93904.9	273123
<i>ser</i>	offer services to farmers	Dummy Variable	0.975	0.156
<i>pro</i>	exerting protective price	Dummy Variable	0.938	0.242
<i>V</i>				
<i>avc</i>	variable cost	Million RMB	4.043	15.2
<i>hit</i>	high-tech enterprise	Dummy Variable	0.444	0.497
<i>IND</i>	product type			
<i>IND₁</i>	planting products	Dummy Variable	0.453	0.498
<i>IND₂</i>	livestock products	Dummy Variable	0.328	0.470
<i>IND₃</i>	edible oil	Dummy Variable	0.080	0.272
<i>D</i>	other factors may affect export			
<i>cre</i>	credit rating	A=1; AA=2; AAA=3;	2.367	0.677
<i>iso</i>	passed ISO9000	Dummy Variable	0.857	0.350
<i>INS</i>	firm institution			
<i>INS₁</i>	Hong Kong, Macao, Taiwan	Dummy Variable	0.025	0.156
<i>INS₂</i>	Joint Advanture	Dummy Variable	0.004	0.060
<i>INS₃</i>	exclusively foreign-owned	Dummy Variable	0.021	0.145
<i>INS₄</i>	State Owned Enterprise	Dummy Variable	0.077	0.266
<i>INS₅</i>	collective owned	Dummy Variable	0.025	0.156
<i>INS₆</i>	private owned	Dummy Variable	0.020	0.139
<i>INS₇</i>	mixed owned	Dummy Variable	0.301	0.459

Table 4. Estimation for Export Rate and Export

	A-model	B-model		A-model	B-model
<i>t</i>			<i>D</i>		
<i>coo</i>	2471.53* (1358.90)	0.34** (0.14)	<i>cre</i>	97.15 (358.41)	0.034 (0.038)
<i>con</i>	1634.68 (1131.38)	0.23** (0.12)	<i>iso</i>	1082.49 (746.57)	0.22*** (0.078)
<i>W</i>			<i>INS</i>		
Log (<i>far</i>)	462.38*** (166.08)	0.031* (0.017)	<i>INS₁</i>	2803.64** (1423.87)	0.34** (0.15)
<i>ser</i>	1449.63 (1673.162)	0.12 (0.17)	<i>INS₂</i>	2783.56 (3628.85)	0.45 (0.38)
<i>pro</i>	-2178.15** (1083.17)	-0.20* (0.11)	<i>INS₃</i>	1241.47 (1556.89)	0.23 (0.16)
<i>V</i>			<i>INS₄</i>	2147.82*** (926.78)	-0.067 (0.099)
Log (<i>vc</i>)	943.95 *** (206.44)	-0.00019 (0.022)	<i>INS₅</i>	-2878.64 (1635.43)	-0.33* (0.17)
<i>hit</i>	-205.97 (493.13)	-0.085* (0.052)	<i>INS₆</i>	1585.81 (1718.93)	0.34* (0.18)
<i>IND</i>			<i>INS₇</i>	-774.05 (566.30)	0.068 (0.059)
<i>IND₁</i>	169.67 (517.58)	-0.011 (0.054)	Constant	-20686.59*** (3610.90)	-0.58 (0.38)
<i>IND₂</i>	-202.82 (561.51)	-0.114** (0.059)	Log Likelihood	-3523.19	-417.19
<i>IND₃</i>	-469.63 (918.88)	-0.28*** (0.099)	R square	0.1033	0.0661

Note: The standard errors are in the parenthesis. *, ** and *** refers to significant at the level of 0.1, 0.05 and 0.01. Specifically, the R square here is the square for correlated efficient between real value and estimated value of independent variable.

contract export more. This trend remains after we get rid of the scale effects. The coefficient of cooperative mode or share-holding cooperative mode is 0.34 and significant at 5% level. Both the coefficients and significant levels of cooperative mode are more than those of contract mode. In another word, for export, cooperative mode works better than contract mode.

Cooperative mode offers a kind of factor bond from firm to farmers. This kind of bond is lower in transaction cost. In the specification of model, we found that the firms connected with farmers through contract mode export more. Factor bond will work better for connecting firms and farmers. To begin with, firms will control stricter on quality. And quality control is easier to be realized.

Moreover, an enterprise will gain a stable material source after cooperate with farmers through share-holding, collective or cooperatives. Under cooperative mode, farmers usually share profit with firms. Farmers become the workers in firms or share holders in some sense. Even somebody plays both roles. By so doing, rural households who produce for enterprises would like to bound themselves to processors. In some sense, they are in the common. And this result in lower transaction cost of firms. This kind of saving is from negotiation before production, management in production, trade after production, enforcement and so on.

As it was discussed above, contract mode has its own advantage. But firms need to establish some ties to prevent farmers from opportunism behavior to gain this kind of advantage. If the prices of agricultural products do not increase a lot, rural households will not default. However, if the prices of agricultural products raise a lot and are much higher than the contract prices before production, rural households may not enforce the contract. A small-scale farmer will take little risk and cost to break a contract. So the punishment from breaking a contract will not make a rural household to enforce a contract (Guo, 2006).

As a comparison, other connection modes may decrease the transaction cost of firms. If a firm procure material through market, it may face difficulties such as: i) difficulties to monitor the quality; ii) a kind of special transaction cost, seeking cost, including seeking for material source, seeking for qualified agricultural products; even iii) cost from bargaining for prices.

Implication of other transaction cost

The numbers of farmers who have trade connection with firm have positive effects with firm export. But this number is lower in significant level when export rate is taken as dependent variable. So this independent variable is significantly related with scale. After getting rid of scale effect, the significant level is lower than before. It seems that service offered to farmers will help firms to export. But the t-test is not significant. It is hard to measure how good the service is. If firms offer farmers seed, fertilizer, pesticide and food safety guidance which meet export standard, it will be good for export. The protective price is negatively correlated with the export of firms. The significant level decreases after we get rid of scale effect. The reasons may be: exerting protective price will make cost of firm increase. It may set a lowest price for a firm, the firm will not buy agricultural material and will reduce its export.

Other determinants of export

The technology level of a firm is negatively correlated with its export. It reflects the export situation of Chinese agricultural export. The agricultural products exported are mainly primary agricultural products. This is usually the aim of firms engage in agricultural development. As the improving of technology, export of firm will increase. So the t-test is not significant. The credit level has no significant effect on export. It really matters for export to pass ISO9000 certification. Because the certification may

help products overcome trade barriers. Firm institution and industry will also affect export.

CONCLUSION

The connecting mode of leading agribusiness and rural household has a significant impact on the connection between China's small rural household and international market. From the perspective of transaction cost, we analyze different effects and effects mechanism of different connecting modes through investigating the effect of connecting modes between national level leading agribusiness and rural household imposed on their export amount and export inclination.

Results of theoretical and empirical study indicate that connecting mode with more potent contracting features is beneficial to export, connecting modes with more characteristics of commercial contract also has positive effect on export though its effect is not as significant as that of factor contracting mode. Besides, other connecting modes including external market have little promotion effect on export.

After eliminating scale factor effect, the effect of connecting mode on LAE' export is more significant. LAE adopting shareholder system or cooperation system connecting rural household has more inclination to export and LAE adopting contract mode also has this inclination though it is not as strong as that of LAE of previous types.

NOTES

- ¹ Document No 1 of 2007, the guideline of Chinese agricultural policies, evaluated leading processors as "an important force to lead farmers to develop modern agriculture".
- ² Niu, 2006.
- ³ The source of China's overall export data is from Monthly Statistics of Ex & Import of Agricultural Products published by Ministry of Commerce. The export data of national leading agribusiness is generated from our dataset not quoted official statistics.
- ⁴ The source of data is the same with note 2.
- ⁵ The source of data is from Agriculture Industrialization Office of Ministry of Agriculture.
- ⁶ Vertical integration is equal to linkage through factor bonds.
- ⁷ Quality control can be considered as a pressure of processing. It will make the production slow, even stop. So the cost comes out (Klein & Brester, 1997). The production of two different commodities with different quality control can be considered as two productions. Perrin (1999) used to consider beef and beef with ray exposure as two different productions.
- ⁸ Zeng & Peng (2007) offered some details about this premise.
- ⁹ According to Aitken *et al.* (1997) and Barrios *et al.* (2003), $b_i = b_d$. It refers to the equality of marginal revenue. But in our paper, we divided the export and home sale market as two different markets. So $b_i \neq b_d$.
- ¹⁰ National leading processors should meet a lot criterion, such as firm's organizations, assets, financial situation, connection to farmers and competence.
- ¹¹ Some firms engage in not only one industry.
- ¹² Other mode mainly refers to procurement in market.

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