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The impact of transaction costs on farms' selection of circulation mode of agriculturall products based on the investigation of farms planting gannan navel orange

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ABSTRACT

The planting and marketing of navel orange has already become a pillar industry in Jiangxi province of China. Farmers are confronted with the problem how to select circulation mode to sell their navel orange for maximum advantage. We exploit the survey data of farmer planting navel orange, based on the multinomial regression method, to study the effect of transaction cost on farms' circulation mode choice. The results show that the farmer's characteristics and the transaction costs, including information cost, negotiation cost, execution cost and transportation cost et al., have significant impact on farm's choice, but different characteristics and costs show diverse influences. In order to dispose of the problems current existing in the circulation of navel orange, the relevant departments of government should take great efforts to cultivate the leading processing and sales enterprises, and enhance their market competitiveness. The organizational degree of farmers and the construction of farmer cooperatives can be strengthened to improve the farmers' ability of acquiring information and reduce their transaction cost. Moreover, the transaction information platform of navel orange should be constructed to reduce farmers' obtaining formation cost and executive cost.

KEYWORDS

Transaction cost; Circulation pattern; Gannan navel orange; Farmer's selection.

INTRODUCTION

Gannan region in Jiangxi province is one of the most suitable area planting navel orange. Since the 70's of last century, the industry scale of navel orange continues to be expanded in this region, and Gannan region is expected to become the first place of planting area in the world. According to the forecast, the production output of navel orange will reach 3,000,000 tons in 2015. But along with the growth of navel orange output, the contradiction between small farmers and big market becomes increasingly prominent. In the process of navel orange circulation, there exists a series of problems, including inefficient value chain, unstable trading relationship and income inequality et.al. the unavailability of circulation channels has become an primary factor constraining the industry development of navel orange in Gannan. So to perfect the circulation channels of navel orange plays an important role in improving the enthusiasm for production and economic benefits of farmers, and achieving the sustainable development of the local leading industries. Transaction cost theory can provide a good perspective to study the influential factors for farmers' choice of different circulation patterns. In recent years, Scholars at home and abroad quantitatively analysis farmers' circulation pattern choice affected by different transaction costs, including information cost, negotiation cost, supervision or enforcement costs et al.[1, 2, 3]. Probit and Ordered Probit model are commonly used to conduct empirical research of multiple agricultural products, including beef, potatoes, tomatoes, apples, pig grain et al. The main method idea is to consider the ratio of specific transaction volume accounted for the total turnover as dependent variable. But this method is limited to its explanatory ability, and can only analyze the impact of transaction cost on farmers' choice of particular transaction object. In this paper, Multinomial Logit model is adopted to study influence factors in the process of selecting circulation modes of Gannan navel orange[4]. This model can explain in detail how different transaction costs to affect the choice of navel orange circulation channels.

DATA SOURCES AND SAMPLE STATISTICS

The sample data in this paper are sourced from the research team's investigation results in Ganzhou city of Jiangxi province. Ganzhou can be chosen as the investigation region based on two main cause: it is an important place of navel orange production; and there exists diverse circulation channels of navel orange. Although the planting area and production output of navel orange grow stably in recent years, the common problems such as farmer's low income and sales difficulties also appear frequently. The farmers in three counties of Ganzhou were chosen by stratified random sampling method, and investigated in detail through modified questionnaires. We obtain 220 effective questionnaires, and interview local officials and manager in charge of navel orange industry and cooperatives respectively. According to the statistics data, the farmers planting navel orange are engaged in agriculture for ten years above, and are general older. More than sixty percent of famers have the ages around 40 to 50 years. The educational level of surveyed farmers is low, and the proportion of farmers with middle school below is more than 50 percents. As to the planting scale, more that 50 percents of the famers only possess orchard area less than 0.5 hectare. These farmer's typical characteristics conform to the actual state of Gannan navel orange industry (as shown in TABLE 1).

For the investigation results of circulation mode selection, farmers planting navel orange mainly adopt one of four agriculture product's circulation modes, including "farmers and sales", "farmers and leading enterprises and sales", "farmers and cooperative and sales", "farmers and broker and dealer

sales". Most of investigated farmers select the mode of "farmers and broker and dealer sales" to market their navel orange.

TABLE 1 : The basic describe of sample farmers' characteristics

Items	Options	The number of households	Percentage in total amount (%)
Planting area	Below 0.3 hectare	57	25.9
	0.3 to 0.6 hectare	83	37.73
	Over 0.6 hectare	60	27.27
The age of householder	Below 40 years	56	25.45
	40 to 50 years	129	58.63
	Over 50 years	35	15.91
The education level of householder	Primary school and below	37	16.82
	Junior middle school	91	41.36
	High school and above	92	41.82
The number of years of planting navel orange	Below 5 years	24	10.9
	5 to 10 years	67	30.45
	Over 10 years	129	58.63

MODEL CONSTRUCTION AND VARIABLE DECLARATION

In order to investigate the transaction cost factors affecting the circulation pattern choice of farmers planting navel orange, this paper refers to the predecessor research results[5, 6], and adopt multinomial logit model to describe the chosen probability of circulation channel by farmer planting navel orange. These variables and descriptive illustrations are described in TABLE 2, 3, and 4.

TABLE 2 : Variables and descriptive illustrations

Choice variables	Illustration
The circulation channel choice of farmer planting navel orange (y)	"farmers and sales"=0; "farmers and leading enterprises and sales"=1; "farmers and cooperative and sales"=2; "farmers and broker and dealer sales"=3.

TABLE 3 : Variables and descriptive illustrations I

Farmer characteristics variables	Illustration
Farmer's age	The actual farmer's age (years)
Educational level of farmer	Primary school and below =1; Junior middle school =2; High school and above =2
Participation in the agricultural product circulation organization	Yes=1;No=0
Navel orange planting scale	Planting area (Mu)
If any family members is engaged in non-agricultural industries	Yes=1;No=0
The farming duration	The specific number of years
Information cost variables	Illustration
If farmers know the market conditions of navel orange	Yes=1;No=0
What kind of market conditions of navel orange known by farmer	Retail market=1; Wholesale market=2; Supermarket=3; others=4
If farmers acquire the market price of navel orange through middlemen	Yes=1;No=0

When to know the market price of navel orange	Know the price at the time of sale=1, Know the price before the sale=0
The way of getting in touch with buyer	Contact by themselves =1; Through brokers=1; Buyer take the initiative to contact =3

TABLE 4 : Variables and descriptive illustrations II

Negotiation costs	Illustration
Farmer's perceptions of the fair degree of the price	Fair=1; Some unfair=2; unfair =3
The price difference between self marketing and intermediary sales modes	Great differences=1; Few differences=2; No difference=3
The grade difference between farmer and buyer	Great differences=1; Few differences=2; No difference=3
If farmers sign sales contract with buyer	Yes=1;No=0
If farmers know buyer before transaction	Yes=1;No=0
What types of buyers known by farmers	broker =1; wholesalers=2; Consumer=3; cooperative=4; leading enterprises=5; others
Execution cost	Illustration
Exchange time	The specific number of times
Payment method	Cash=1; on credit =2; Other method=3
If there is a debt	Yes=1;No=0
If the quality of navel orange need to be tested	Yes=1;No=0
Transportation costs	Illustration
The traffic conditions of farmers' location	Good=1; general=2; Bad=3
The distance between the location of the sale and farmer	The specific numerical
Traffic vehicles owned by farmers	Large vehicle=1; small vehicles =2, without any vehicles=3

EMPIRICAL RESULTS ANALYSIS

The statistics dates are processed by using Stata 9.0 software packet, and the regression results are presented in TABLE 5 and 6. The results show that the model performs well generally. The characterization of transaction cost and farmers achieve a high significant level, and their influence directions are same as the expected directions.

(1)Effect of famers' characteristics on the circulation mode selection of farmers

The estimation results show that farmers' education level, if any family members is engaged in non-agricultural industries, and participation in the agricultural product circulation organization will result in the farmers more willing to choose the circulation patterns of "farmers and leading enterprises and sales" and "farmers and cooperative and sales". The results from empirical evidence also show that the effects of farmer characteristics on the mode of "farmers and leading enterprises and sales" exhibit a high degree of consistency to the effects on the mode of "farmers and cooperative and sales". Compared to the "farmers + sales" transaction mode, the characteristics of planting scale and duration have significant positive effects on the choice of "farmers and broker and dealer sales" mode. This shows that, in the case of other conditions unchanged, farmers largely planting navel orange more willing to choose brokers and dealers as sales objective. The results of the investigation show that 84.53% of the farmers planting more than 0.6 hectare choose brokers and dealers to sold, while 31.74% of the farmers planting less than 0.3 hectare choose above sales mode.

(2) Effect of information cost on the circulation mode selection of farmers

Compared to the "farmers and sales" transaction mode, information cost impose relatively less effect on the "farmers and leading enterprises and sales" mode and "farmers and cooperative and sales" mode. Empirical data also confirm the above-mentioned circulation patterns are more rely on strong contract to connect and stabilize relationship among the parties in circulation system. Compared to the "farmers and sales" circulation pattern, if farmers know the market conditions of navel orange and when

to know the market price of navel orange are significant variables influencing the mode choice of "farmers and cooperative and sales" and "farmers and broker and dealer sales". This should be as a for-profit economic organizations for cooperation, its profitability is constrained by its own qualities in which the ability to access information is an important aspect. There are difficulties in accessing to accurate market information for farmers, while the brokers and dealers are dominant to obtain market information.

TABLE 5 : The regression results of Gannan navel orange fruit circulation mode influence factor I

Variables	"farmers and leading enterprises and sales"	"farmers and cooperative and sales"	"farmers and broker and dealer sales"
Farmer's age	0.14(2.43)	0.32*(1.5)	0.86**(2.57)
Educational level of farmer	2.13**(0.33)	2.87*(0.21)	0.64(1.23)
Participation in the agricultural product circulation organization	3.32*(0.51)	2.61*(0.46)	1.23(0..81)
Navel orange planting scale	-1.02(-1.78)	-0.34(-1.24)	-0.936*(-0.78)
If any family members is engaged in non-agricultural industries	2.18*(0.63)	2.37**(0.39)	0.93(0.47)
The farming duration	0.73(1.32)	1.71(1.51)	1.46*(0.81)
If farmers know the market conditions of navel orange	-0.71(-1.84)	-1.23**(-1.42)	-2.73**(-1.48)
What kind of market conditions of navel orange known by farmer	-0.46(9.23)	-0.63(9.23)	-1.98*(9.23)
If farmers acquire the market price of navel orange through middlemen	0.58(0.73)	0.39(0.56)	0.18(0.38)
When to know the market price of navel orange	1.27*(0.46)	1.32**(0.79)	0.37*(0.93)
The way of getting in touch with buyer	-0.74*(-0.8)	-1.03**(-0.51)	-0.79(-0.49)
Farmer's perceptions of the fair degree of the price	2.61*(2.46)	1.37*(2.09)	4.37**(1.95)

Note: The numbers in the parentheses denote the z-values; ** Statistical significance at the 1% level; * Statistical significance at the 5% level.

TABLE 6 : The regression results of Gannan navel orange fruit circulation mode influence factor II

Variables	"farmers and leading enterprises and sales"	"farmers and cooperative and sales"	"farmers and broker and dealer sales"
The price difference between self marketing and intermediary sales modes	1.88**(1.75)	1.34*(1.26)	3.17**(1.49)
The grade difference between farmer and buyer	2.81**(2.47)	1.34*(2.01)	4.31**(1.78)
If farmers sign sales contract with buyer	-3.42**(-0.67)	-2.79**(-0.81)	-3.01*(-0.79)
If farmers know buyer before transaction	0.23(1.82)	0.83*(2.39)	1.83**(2.74)
What types of buyers known by farmers	1.33*(0.89)	3.21*(0.91)	0.79**(0.74)
Exchange time	1.48**(0.54)	0.34*(0.94)	0.17**(0.36)
Payment method	4.82**(2.84)	2.74*(2.76)	1.73**(2.51)
If there is a debt	0.23*(1.52)	1.35*(1.79)	0.63**(0.94)
If the quality of navel orange need to be tested	-4.76**(-0.39)	-3.82*(-0.75)	-0.74**(-0.92)
The traffic conditions of farmers' location	4.37**(2.04)	0.73**(1.76)	3.08*(2.47)

The distance between the location of the sale and farmer	-0.53(-0.68)	-0.17*(-0.98)	-2.18*(-0.75)
Traffic vehicles owned by farmers	0.37(2.13)	0.62(1.95)	1.92*(0.13)

Note: The numbers in the parentheses denote the z-values; ** Statistical significance at the 1% level, * Statistical significance at the 5% level.

(3) Effect of negotiation cost on the circulation mode selection of farmers

Compared to the "farmers and sales" circulation pattern, the variables of negotiation cost impose not significant influence on two circulation patterns including "farmers and leading enterprises and sales" and "farmers and cooperative and sales". This is mainly because the "farmers and leading enterprises and sales" circulation pattern is naturally stable and has relatively low negotiation cost. At the same time, cooperative rely on long term cooperation relationship to bind each members in the "farmers and cooperative and sales" circulation pattern. Compared to the "farmers and sales" circulation pattern, the farmers' perception of the price fairness and the contract signed significantly affect the circulation pattern of "farmers and broker and dealer sales". Empirical study shows that compared with farmers, brokers and dealers have stronger financial strength and information advantages in this circulation pattern, all of which makes the wholesalers occupy the dominant position in the process of signing negotiations with farmers.

(4) Effect of execution cost on the circulation mode choice of farmers

Compared to the "farmers and sales" circulation pattern, payment mode and debt in transaction process do not significantly affect the farmers to choose other circulation pattern. The reason may be, no matter which kind of circulation mode, using cash is the main payment in the navel orange marketing process in Gannan. Whether need to test the quality of navel orange will impose significant negative influence on choosing circulation pattern of "farmers and broker and dealer sales". Therefore, farmers still care the product quality test in sales. The time spent in transaction will obvious effect famers to trust the circulation pattern of "farmers and cooperative and sales". So decreasing the time spent in transaction will more help farmers accept this circulation pattern.

(5) Effect of transport costs on the circulation mode choice of farmers

Compared to the "farmers and sales" circulation pattern, the variables in the transportation cost impose relatively less effect on the "farmers and leading enterprises and sales". This is mainly because the leading enterprises have already basically solved the transportation problems of navel orange. But transportation cost significantly affect the farmers to choose the circulation modes of "farmers and cooperative and sales" and "farmers and broker and dealer sales". Statistical results confirm the transportation cost imposes significant influence on the two kinds of circulation patterns.

CONCLUSIONS

In this paper, based on previous theoretical and empirical research, the actual surveyed famers' dates in Ganzhou City are exploited based on the transaction cost theory. The effects of transaction cost on the farmer's choice of circulation patterns of Gannan navel orange are analyzed using the multinomial regression method.

The analysis results reveals several interesting findings: First, in the view of the transaction cost saving, farmers' organizational behavior (such as famers join the co-operative and leading enterprises) will help them to safeguard and promote the profit of farmers, but different organizational forms embody transaction costs with significant differences. Compared to the "farmers and sales" circulation pattern, other circulation modes can be ranked by the saving values of transaction cost from low to high as: "farmers and leading enterprises and market", "farmers and cooperative and market" and "farmers

and broker and dealer sales". Second, different aspects of farmer characteristics show diverse effects on the different circulation patterns. Third, Transaction costs are the main factors that influence the farmers choice's circulation pattern of navel orange.

Based on the above findings, the relevant departments of the government should pay attention to the following points in the formulation process of Gannan navel orange circulation system: First, the department should take great efforts to cultivate the leading processing and sales enterprise, and enhance their market competitiveness. Second, in order to improve the ability of acquiring information of farmers and reduce their transaction cost, the organizational degree of farmers and the construction of farmer cooperative should be strengthened. Third, the transaction information platform of navel orange should be constructed to reduce the obtaining formation cost and executive cost.

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