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Estimating transport costs and trade barriers in China: Direct evidence from Chinese agricultural traders

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Estimating transport costs and trade barriers in China: Direct evidence from Chinese agricultural traders[#]

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Estimating transport costs and trade barriers in China: Direct evidence from Chinese agricultural traders

Abstract:

Using a unique survey data on agricultural traders in China in 2004, this study provides direct evidence on the significance of inter-regional trade barriers and their key components. Our major findings are as follows. (1) The trade barriers within China are fairly small, accounting for about 20 percent of trade value. (2) Transport and non-transport costs respectively contribute 42% and 58% to the trade barriers. (3) Labor and transport-related taxes are the two largest proportions of total transport costs, and respectively accounts for 35% and 30%. (4) Artificial trade barriers created by the government are not sizable as we perceived. (5) Road quality is crucial for reducing transport costs within China: Increasing transport speed by 1 km per hour, the total transport costs for Chinese agricultural traders would decrease by 0.6 percent mainly due to improved fuel-burning efficiency and reduced labor requirement.

Key Words: Transport Costs, China, Agricultural Traders, Infrastructure

1, Introduction

Trade barriers are a major impediment (Eaton and Kortum 2002; Anderson and van Wincoop 2004; Waugh 2010) to market function. However, the compositions of trade costs are still unclear due to lack of direct evidence, as most of the studies are using indirect methods. Consequently, they lead to a lot of debates and improper perceptions in the current literature. Regarding the trade barriers within China, the improper perceptions may include: First, trade barriers in China remain high (Poncet 2003); Second, artificial trade barriers (e.g., due to local protectionism) is a major reason for the high trade barriers in China; (3) Energy cost is a major component of transport costs. These perceptions have not been well scrutinized, and the policies based on these perceptions hence could be misleading.

Specifically, the current studies find that China succeeded in reducing international trade barrier but failed at reducing domestic trade barrier after the launching of economic reform(Poncet 2003), even though China has kept on investing in infrastructure so far and the length of roads in different classes has been increasing (Fan and Chan-Kang 2005). Amiti and Jacorcik (2008) suggest that China's domestic market fragmentation is caused by underdeveloped transport infrastructure and informal trade barriers. Specifically, Park et al. (2002) find that much of the increase in transaction costs in China was due to transport bottle-necks in 1990s, particularly in the booming South. Evidences in many developing countries have shown that road construction and reduction of trade barrier can improve fertilizer use, enhance domestic and international trade, increase agricultural output; boost consumption, and reduce poverty (Binswanger et al. 1993; Jacoby and Minten 2009; Khandker et al. 2009; Minten et. Al. 2009; Yu and Abler 2009); and China is not an exception (Fan et al. 2002; Fan and Chan-Kang 2005; Huang, Rozelle and Change 2004; Tian and Yu 2012). Pinstrup-Andersen and Shimokawa (2007) have a comprehensive review about the impacts of rural infrastructure on agricultural development.

Young (2000) proposed that China economic reform caused a fragmented internal market with fiefdoms controlled by local officials whose economic and political benefits are tied to protected local industries. The hypothesis that market distortions in China caused by high inter-provincial trade barrier is challenged by Holz (2009) who declared that China's economic reform concerns avoiding the swamp of trade barriers, and the increasing size of highway can significantly reduce the barriers. On the other hand, it cannot be deniable that the toll fees of highways are believed to be an important component of trade barriers which is a substantial part of final prices for food products, even though Chinese governments take some special measures to reduce the transport costs.

Little evidence is available on why the trade barriers are high and what the main component of trade barriers is. Much research has focused on artificial trade barriers and extrapolates on it. For instance, Young (2000) pointed out the declining price gaps in China results from reduced local protectionism. Research focusing on the physical trade barriers, specifically, transport costs, is only conducted in a very limited way. There is a reason to believe that the system of market economy has not been well developed in China.

To this end this paper contributes new evidence, and more direct evidence to the literature. In particular, we will use a unique survey data for agricultural traders from China in 2004 to decompose the trade costs into different components and examine their determinants as well.

Particularly, the existing literature on transport costs has emphasized on the time value of passengers and its related logistics design. Very little evidence exists on the direct effect of transport time on the transport cost, so that simple econometric models will be used to exam the impacts of distance, road condition and transport time on transport cost of agricultural trade in China.

As aforementioned, the current quantitative trade studies, such as the gravity models, have indicated that trade costs are an impediment (Eaton and Kortum 2002; Anderson and van Wincoop 2004; Waugh 2010) particularly to international trade. However, the compositions of trade costs are still unclear which lacks direct evidence, as most of the studies are using indirect methods. In light of this, this study also can be helpful, to some extent, for filling the gaps in the trade literature.

The paper is organized as follows: Section 2 introduces the approaches to decomposing trade costs, and the econometric models for estimating the determinants of main components in transport costs; Section 3 describes the data and survey methods, which is followed by discussions of the empirical results in Section 4. Finally, Section 5 draws conclusions.

2, Data

The data used in this study are from a face-to-face survey of wholesale market traders conducted in August and September 2004, which includes 700 traders in more than 40 wholesale markets scattered among 8 provinces: Beijing, Henan, Ningxia, Sichuan, Shandong, Shanxi, Yunnan and Zhejiang. The questionnaires included detailed information of the traders, such as demographic and family background, social capital, revenue, and costs. Within the 700 traders, only 224 reported detailed information on trade barriers and transport costs and hence employed in this study. Among these traders, 162 use contracted transporters, 46 samples transport goods by themselves, and 16 use both. These traders report information on 210 specific transport routes in total.

A number of traders in our sample had experience using trucks to transport. For these traders, the survey requested detailed information on the total transport costs and the breakdown, including the expenses on fuel, labor[1], toll, fines, food and lodging, and others. In the next part we will take a careful look at the determinants of fuel costs, and total variable costs as well.

3, Econometric Models

3.1 Measuring trade barrier and its components

The trade barrier includes the logistics costs of transporting the goods, including expenses on transport, storage, and sales tax. It should reflect on the costs that incur between purchasing and selling of traders. Hence, we may calculate the trade barriers as traders' markup rates net of their profit rates:

$$\text{Trade barriers} = \text{Traders' Markup Rate} - \text{Traders' Profit Rate} \quad (1)$$

Where the traders' markup rate is defined as the ratio of the difference between their sale value and their purchase price to their sale value. Deducting the trade barriers from gross markup rate is the net profit rate to traders. A nice feature of our data is that both the markup and profit rates are reported by the traders. Hence, trade barriers can be inferred directly.

It is then important to be able to disentangle transport costs from non-transport related costs,

[1] Here the labor cost is only defined as the wage paid to transporters, excluding the costs of food and lodging.

such as artificial barriers established by local governments. Since our survey data also contain direct information on the transport costs for each transaction, we can calculate the weight of transport cost in total trade barriers (TCW) as follows for each transaction:

$$TCW = Transport\ Cost / (Trade\ barriers * Transaction\ volume) \quad (2)$$

Our data also allow us to further break down the total transport costs into fixed costs and variable costs. Specifically, fixed costs include the maintenance costs, insurance expense, and some fixed transport-related taxes (such as registration costs and road-use fee); variable costs include the expenses on fuel, labor, toll, meals and lodging, and fines.

The tolls and fines are also of particular interest because they may reflect the local protectionism that has been emphasized by the existing studies on trade barriers in China. It is important to note that the tolls and fines are not necessarily fully due to local governments' intention to protect local market. The tolls may reflect the costs of infrastructure (e.g., maintenance costs). The fines may reflect the social costs of transport (e.g., accidents). In these cases, both tolls and fines should also be considered part of the transport costs.

3.2 Estimating the determinants of transport costs

In order to further infer what determine the fuel costs, an important component of transport costs[2], below we proposed a regression model.

3.2.1 Fuel Costs

$$\ln(Fuel_i) = \alpha_0^F + \alpha_1^F \ln(Dist_i) + \alpha_2^F \frac{Dist_i}{Time_i} + Z\beta^F + \gamma_j^F + \varepsilon_i^F \qquad (3)$$

Here $Fuel_i$ is the fuel cost for route *i*. This model decomposes the determinants of fuel costs into four factors: the actual distance of transport, $Dist_i$, road quality measured by average transport speed $\frac{Dist_i}{Time_i}$; the fixed effects of the locations of traders γ_j^F, which may capture the effect of unobserved regional characteristics on fuel prices; and other determinants Z, such as the trader's age, education ,gender, traders' operational details . Different operational details, such as vegetables and aquaculture products, may have different cost structures. ε_i^F is a random variable with a mean of zero.

The econometric model for fuel costs provides direct evidence on the importance of time to transport costs. In particular, better road infrastructure may increase transport speed, thus increasing fuel-burning efficiency.

3.2.2 Total Variable Costs

Alternatively, we shall also replace the fuel costs in the foregoing models by the total variable transport costs, which also include other costs, such as food and lodging, fines and tolls. This shall

[2] The most important component in the variable transport costs is labor costs. However, the sample size is only 25, and it is too small to conduct an econometric exercises.

give us a gross effect of transport conditions on transport costs:

$$\ln(TPCost_i) = \alpha_0^T + \alpha_1^T \ln(Dist_i) + \alpha_2^T \frac{Dist_i}{Time_i} + Z\beta^T + \gamma_j^T + \varepsilon_i^T \qquad (5)$$

The function of total transport costs are similar to that of fuel function, including distance, road quality, regional effects, and some other demographic variables of the trade.

3.3 Sample Selection Bias

In theory, the estimation of the models above may suffer from sample selection bias. This is because what we observe in the data are actual trades, which happen only when traders find transport costs low enough. Hence, some high-trade-costs routes may not be observed. This sample selection may generate estimation biases if some determinants of transport costs are unobserved. This is a major issue in applied econometric analysis (see Chapter 17 of Wooldridge, 2002, for detailed analysis).

One way to address the issue is to apply the Heckman's two-step procedure. In the first step, we would need to estimate a probit model of whether the traders at location *i* would trade with location *j*. In particular, we estimate the following model

$$Trade_{ij} = 1[\hat{Z}\varphi + \varepsilon_{ij} > 0] \qquad (6)$$

where 1[.] is an indicator function, and the trade between location i and j can be determined by a vector of exogenous variables $\hat{Z}$, such as the characteristics of the traders and their locations.

We then can obtain the inverse Mills ratio from equation (6) which can be included in the regressions of functions of transport costs. If the coefficient of the inverse Mills ratio is significant, it indicates that the selection bias is present.

4 Empirical findings and discussions

4.1 The components of trade barriers

First, we calculate the trade barriers and the share of transport costs in trade barriers (Table 1). In our 224 observations, the average markup rate is about 25.66%, and the profit rate is 7.48%, so that the trade barriers are 18.18%, which is not so large as we thought. Anderson and van Wincoop (2004) report that trade barriers for developed countries fall in a range between 40% and 90%; and Waugh (2010) even reports that the median value of the trade costs for all countries is as high as 192%. Within the trade barriers, only 42% are due to transport costs, and the rest 58 % is caused by non-transport trade barriers. It implies that the non-transport trade barriers in China are still relatively high.

We break down the non-transport trade barriers in details in Table 2, which indicates that the non-transport costs are quite fragmented, including processing costs, employees' and own wages, financial costs, communication costs, non-transport taxes, rent costs, market charges, storage costs, theft loss, utilities costs, license costs, bribery costs, and other costs. According to our survey, the three largest non-transport costs are due to rent, processing costs and employees' wage, which respectively account for 12.5%, 5.5% and 4.3% in total trade costs. Surprisingly, non-transport taxes by government are only about 2.9% in total trade costs, not as high as we had imagined.

Table 1 also presents the structure of trade barriers for different transport means, including contracted transport, self-transport, and mixed transport involving both contracted transport and self-transport. Comparing the contracted transport with self-transport, we find that traders with contracted transport have slightly higher markup rate and slightly lower profit rate, so that the trade barriers for contracted transport are higher. The difference between the trade barriers might be caused by the higher transport cost for contracted transport. The share of transport costs in trade barriers is 44.50% for contracted transport, while the number is only 35.01% for self-transport. It is plausible that self-transport might internalize some costs, or some opportunity costs are not reported by the traders.

Note that both trade barriers and transport costs are the lowest for traders with mixed transport meanings which use both contracted transport and self-transport. It could be that these traders use portfolios of transport meanings to minimize transport costs and trade barriers.

For self-transport traders, information is available to break down their transport costs into fixed and variable costs. We found that they are about equally sizable (Table 1).

In addition, transport costs might differ for different commodities due to different transport requirements. For instance, Chinese consumers often demand living fish in the market, so that transport of fish is often very costly. Table 3 demonstrates the trade barriers and weight of transport cost in trade barriers for different commodities which include vegetables, meat, aquaculture products, and eggs. It indicates that the profit rates for the four commodities are quite similar which fall in a range between 4% and 8%. However the markup rate for vegetables is close to 30%, significantly higher than other commodities, as the numbers for meat, aquaculture products and eggs are only 14%, 15% and 9%, respectively. The high markup rate for vegetables mainly results from a high trade barrier, which is as high as 21%, perhaps due to the perishable nature of vegetables, and the feature of less value per unit of bulk.

Surprisingly, Table 3 also indicates the weights of transport cost in trade barriers are quite similar for different commodities, and around 40%.

We also break down the fixed costs into maintenance costs, insurance, transport-related taxes, and other fixed costs, which are reported in Table 4. We find that transport-related taxes are the most sizable, accounting for 64.19% of fixed transport costs for self-transport traders, or about 30% of total transport costs. The maintenance costs and insurance costs are only about 14.23% and 3.83%, which are much less substantial. Reducing government taxes on transportation could significantly lower the fixed transport costs, so to the trade barriers as well.

Table 5 looks at the components of variable transport costs. It is interesting that both all means of transport and truck transport have the similar structures in variable costs. Particularly, labor costs are most sizable in total variable costs, and the share is around 70% either for all means of transport or for truck transport. In other words, the share of labor costs in total transport costs would be over 35%, which eventually is the largest proportion.

The fuel costs and the artificial barriers created by tolls and fines are also substantial, but far less important than labor costs. In the observed samples for all means of transport, the share of fuel costs is 13%, and both the costs for toll and fines are only around 5%. In contrast, for the samples of truck transport, the share of fuel costs is as high as 27%, but the costs for toll and fines are as low as 3% and 1%, respectively.

4.2 Determinants of trade barriers

In this section we proceed to estimating the key determinants of transport costs. The econometric models have been shown in Section 2. The estimation results are presented in Table 6, which include the estimations for fuel function, and total variable cost, and each with an ordinary least squares model (OLS), a fixed-effects model (FE) and a Heckman sample selection model (Heckit). Comparing the three models, we find that their results are quite consistent either for the fuel cost function or for the total variable cost function.

The coefficients for the inverse Mills ratio are not statistically significant for both functions, so that there is no significant evidence of sample selection problem in our study. In addition, the F-tests for fixed effects indicate that there is significant regional difference for total variable cost equation, but not for the fuel equation. It makes sense that fuel price are uniformly set by the central government, and the regional difference should be insignificant after controlling other variables. In contrast, the regional difference for other costs, such as labor, could be significant. Hence, the following discussion for fuel function will be based on the OLS estimation, while the discussion for total variable cost function will be based on the fixed-effects models.

Interestingly, the demographic variables, such as gender, education, and age are not statistically significant for transport costs. It does make sense that transport costs are not related to demographic characters, and they are determined by distance, road condition and operation details.

4.2.1 The model of fuel costs

The results of fuel costs function are reported in the column 1, 2and 3 of Table 6. The coefficient of the log of distance is 1.19, close to one, suggesting that the fuel cost is proportional to the transport distance. Moreover, we also find that the coefficient of the variable of average speed -0.019 and statistically significant at 5% level, which suggests that road infrastructure with higher quality would reduce fuel cost. In particular, the speed increase by 1 km per hour now, which can reduce fuel costs by 1.9% due to an increase in fuel efficiency.

In addition, the operation details are also important for fuel costs. The coefficient for meat transport is 0.678 and statistically significant at 5%, while the coefficients for other commodity dummy variables, such as vegetables, aquaculture products and eggs are not significant. It implies that meat transport requires more fuels than other products, which might results from the fact that transport of meat products often requires cooling system in order to keep them fresh, and hence more fuels are needed.

4.2.2 The model of total variable transport costs

We now turn to estimating the model of total variable transport costs. This significantly increases our sample size because the traders tend to be more likely to report the total costs. Moreover, this also allows that to estimate the gross effect of transport conditions on transport costs. Similarly, we include the distance and road quality in the regression. Note that this road quality may not be limited to the channels of fuel, and it may also affect labor[3], toll, fines, and meals and lodging costs that are also included in the reported transport costs if the distance is given. The results indicate that both distance and road quality respectively are statistically significant at 1% and 5%, implying they are very important for transport costs.

First, the coefficient for logarithm of distance is 0.88, slightly lower than 1, which might result from the scale effects in distance.

Second, the coefficient for the variable of speed is -.006, which implies that good road quality could significantly decrease the transport costs. Specifically, if the speed increases by 1 km per hour, the total direct transport costs could be reduced by 0.6%. As aforementioned, if the distance is given, bad road quality could significantly increase the transport time, which would increase fuel costs, labor costs, and the loss of agricultural products due to perishment. On the

[3] It may increase sufferings for transporters for bad road condition.

contrary, the results support that traders do benefit from the improvement of infrastructure investment in China.

Different commodities may have different transport costs. Particularly, we find that the variable transport cost for aquaculture products is significant higher than other products. It might be result from the fact, as aforementioned, most Chinese consumers demand living fish, which can significantly increase the variable costs, due to the loss of fish death. In contrast, the variable transport cost for eggs is significantly lower, which might be due to the fact that eggs are less perishable than other products.

Third, an F-test however rejects the null hypothesis of no systematic difference in total variable costs across different regions in China. The differences might result from other costs, such as lodging and food, and tolls and fine, rather than fuel and labor costs.

5 Conclusion and implications

With unique data set on the traders of agricultural goods in China, this study provides direct evidence on the trade barriers and their determinants within China, and enriched the current literature of trade analysis from an empirical perspective as well. We find that trade barriers in China are sizable, amounting to around 20 percent of the value of trade. About 40 percent of the trade barriers are due to transport-related costs. This may imply that non-transport costs account for around 60 percent of the trade barriers in China.

Non-transport costs are quite fragmented in China, including processing costs, employees' and own wages, financial costs, communication costs, non-transport taxes, rent costs, market charges, storage costs, theft loss, utilities costs, license costs, briberies, and other costs. According to our survey, the three largest non-transport costs are due to rent, processing and employees' wage, respectively accounting for 12.5%, 5.5% and 4.3% in total trade costs. Surprisingly, non-transport taxes by government are only about 2.9% in total trade costs, which indicates that artificial barriers created by the government are not as sizable as we had thought.

Trade barriers differ for different products. Particularly, trade barriers for vegetables are significantly higher than other commodities, which might result from the perishable nature of vegetables and the feature of less value per unit of bulk.

We then decompose transport costs into fixed costs and variable costs, which are equal sizable in total transport cost. Surprisingly, the labor costs are the most import factor in total transport cost. It contributes to about 70 percent of the total variable transport costs, or accounts for more than 35% total transport costs. The second most important factor appears to be the transport-related taxes such as registration fees and road use fees, accounting for more than 60 percent of the fixed transport costs, or around 30 percent of the total transport costs. While road tolls and fines are quite trivial, and add-up of the costs only accounts for 5 percent of the total transport costs.

We further estimated key determinants of transport costs. We find that transport cost increases almost proportionally to transport distances (with a slight scale effect). More importantly, the quality of road approximated by the transport speed is a significant factor of transport costs. Given the distance, if transport speed increases by 1 km per hour, the total transport costs would decrease by 0.7%. This saving in transport costs happens through at least two channels: increasing fuel-burning efficiency and reducing the demand for labor.

Compared with the estimated trade costs in the current literature, such as Anderson and van Wincoop (2004) and Waugh (2010), a trade cost of 20% in this study is very low, which indicates that market friction is fairly small in China. However, it should be pointed out that our study only looks at one link in the long food supply chain.

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Table 1 Trade Barriers and Transport Costs

	Full Sample		*Contracted Transport*		*Self-Transport*		*Mixed Transport*	
	%	S.D.	%	S.D.	%	S.D.	%	S.D.
Markup Rate	25.66	19.82	27.61	20.32	20.84	18.74	19.73	14.45
Profit Rate	7.48	7.57	7.63	7.76	7.24	7.52	6.58	5.81
Trade Barriers	18.18	16.14	19.98	16.72	13.60	13.96	13.15	12.72
Weight of Trans. in Trade Barriers	42.05	28.66	44.50	28.58	35.01	29.48	37.49	24.40
Fixed Transport Costs Rate					51.81	40.92	14.65	23.08
Variable Transport Costs Rate					48.19	40.92	31.20	36.89
No. of observations	224		162		46		16	

Table 2 Trade Barriers and Non-Transportation Costs

Trade Costs	Proportion (%)
Transport Costs	42.05
Non-Transport Costs	
Processing Costs	5.45
Employees' Wage	4.29
Interests and Other Financial Costs	0.83
Telephone and Other Communication Costs	3.35
Value-Added Tax and other Government Taxes (excluding tax on transport)	2.92
Rent Expenditure	12.51
Market Charges	1.58
Storage Costs	1.53
Theft Loss	0.77
Other Non-transport Costs (Own wage, utilities, briberies, license costs, other loss, etc.)	24.73
Total Trade Costs	100

Note: The sample size is 224.

Table 3 Trade Barriers and Transport Costs for Different Commodities

	Vegetables		*Meat*		*Aquaculture Products*		*Eggs*	
	%	S.D.	%	S.D.	%	S.D.	%	S.D.
Markup Rate	**29.27**	20.39	13.67	6.03	15.31	11.23	8.50	3.95
Profit Rate	7.83	7.94	6.33	3.21	6.20	4.49	4.11	3.42
Trade Barriers	**21.44**	16.78	7.33	3.79	9.11	9.45	4.39	1.20
Weight of Trans. In Trade Barriers	44.11	28.94	38.72	16.25	42.12	31.50	44.43	35.05
No. of observations	162		3		10		7	

Table 4 Decomposition of Fixed Transport Costs

	Self-Transport		*Mixed Transport*	
	%	S.D.	%	S.D.
Maintenance Costs	14.23	17.67	9.78	9.50
Insurance	3.83	5.58	1.95	2.28
Transport-related Taxes	64.19	29.65	68.70	27.59
Other Fixed Costs	17.76	17.58	19.56	19.63
No. of observations	34		10	

Table 5 Decomposition of Variable Transport Costs

	All Means of Transport		*Truck Transport*	
	%	S.D.	*%*	S.D.
Fuel Cost	13.41	17.83	27.46	21.29
Labor Cost	75.56	24.16	69.02	20.30
Toll	5.63	11.97	2.81	3.10
Fines	5.32	10.43	0.71	2.36
Other Costs	0.08	0.41	0.00	0.00
Sample Size	28		11	

Note: We excluded the samples with zero labor costs here. In our survey, some respondents mistakenly thought the labor cost was zero if they transported by themselves.

Table 6 Estimation of the Determinants of Transport Costs

	ln(Fuel)			*ln(Total cost)*		
	OLS	FE	Hekit	OLS	FE	Heckit
Female	0.102	0.012	0.161	0.135	0.084	0.183
(1=Female, 0=male)	(0.53)	(0.13)	(0.72)	(0.74)	(0.68)	(0.66)
Education	-0.059	-0.126	-0.112	0.011	-0.023	0.010
	(-0.82)	(-1.66)	(-1.12)	(0.20)	(-0.41)	(0.09)
Age	0.003	0.001	0.000	0.007	0.006	0.012
	(0.29)	(0.06)	(-0.03)	(0.76)	(0.77)	(1.14)
ln (Distance)	1.190	1.176	1.047	0.923	0.881	0.906
	(9.90***)	(39.15***)	(13.49***)	(16.08***)	(20.85***)	(17.60***)
Distance/Time	-0.019	-0.013	-0.020	-0.006	-0.006	-0.006
	(-2.38**)	(-3.59***)	(-3.30***)	(-3.24***)	(-2.08**)	(-2.75***)
Vegetable	-0.156	-0.160	-0.840	0.287	0.241	0.242
	(-0.76)	(-1.66)	(-2.30**)	(1.25)	(1.70)	(0.44)
Aquaculture Products	0.176	0.159	0.241	1.905	1.626	2.080
	(0.68)	(0.86)	(0.62)	(3.63***)	(4.78***)	(3.41***)
Meat	0.678	0.513	0.583	0.541	0.292	0.589
	(2.15**)	(7.79***)	(1.15)	(1.42)	(1.18)	(0.70)
Eggs	-0.203	-0.333	0.230	-0.237	-0.489	-0.125
	(-0.65)	(-1.28)	(0.57)	(-0.50)	(-7.55***)	(-0.20)
Intercept	-0.291	-0.041	-0.290	0.842	1.258	-0.566
	(-0.37)	(-0.07)	(-0.24)	(1.70)	(1.80)	(-0.26)
Mills Ratio			0.635			0.79
			(0.75)			(-0.55)
F-tests for Fixed-Effects		F(6, 55) = 1.55			F(8, 192) = 1.91*	
No. of Obs.	71			210		

Note: (1) The variables included in the selection functions are female, education, age, age squared, marriage, Vegetable dummy, Meat dummy, Aquaculture Products dummy, Eggs dummy, and dummy of Beijing.
(2) Education: 1-Illiterate;2-Primary School without Completion; 3- Primary School with Completion; 4-Middle School; 5-High school; 6- Vocational School; 7-3-year college; 8- 4-year college or above.
(3) ***, ** and * denote the significant levels of 1%, 5% and 10%, respectively.
(4) Robust t-ratios are reported in ().