Green Barriers and China's Agricultural Product Export: Is There Any Relationship?

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Abstract

As an agricultural country, the export of China's agricultural products are often suffered the restrictions from the green barriers. The positive green barriers can regulate the agricultural production in China, and promote the agricultural development and international trade; on the other hand, the negative green barriers would increase the cost of trade, trade friction, and prevent the development of international trade. So the research of influence of green barriers on China's agricultural products is very realistic. According to the influence of green barriers on China's agricultural exports, the corresponding countermeasures can be made to deal with the green barriers and improvement of China's competitiveness in the international competition. This study examines the causes, influences and methods of green barriers on China's agricultural products export based on the questionnaires of 200 staffs of agricultural trade companies in Xi'an of Shaanxi province in China. To address this issue, Partial Least Square method is applied and the empirical result shows that there is a positive and significant effect from causes, influences, and methods towards the China's agricultural products export.

Keywords: green barriers, agricultural product, export, China

1. Introduction

The green barrier is one of the most frequent measures in developed countries from the 1990's (Feng, 2007). As an agricultural country, the export of China's agricultural products are often suffered the restrictions from the green barriers. The positive green barriers can regulate the agricultural production in China, and promote the agricultural development and international trade; on the other hand, the negative green barriers would increase the cost of trading, even cause trade friction, and prevent the development of international trade.

Green barriers are also called environmental barriers and green protectionism, which is a new trade barrier since 1990s. Buyers will impose green barriers on sellers' export when the buyers want to protect their own limited resources, human, animal, plant health and ecological environment in the modern international trade. Green barriers take place when importers have strict environmental protection laws and regulations to manage their own environment and technology standards.

The green barriers are becoming not only the serious challenges faced by China's agricultural export products but also the biggest obstacle for China's agricultural exports (Yu, 2010). To deal with the green barriers, it is important to identify the causes of green barriers on China's agricultural products export, which are from both import and export countries. The limited agricultural technology of China is one significant cause. Due to the limited agricultural technology of China, the agricultural export products can't meet the high environmental standards mentioned in "green barriers" of the import countries. In the process of export, the quarantine system, import standards and complex inspection process that are regulated by the import countries are also the main causes. The complex process built by import countries is the biggest obstacle for China's agricultural products export.

As agricultural trade plays a key role in China's foreign trade, how to break restrictions of green barriers

impacted on agricultural export products and how to effectively regulate China's agricultural production with the correct use of the green barriers are the big problems for China's future development (Wang & Liu, 2007). By changing the negative influence and making use of the positive in influences of green barriers in China, the sustainable development of China's agricultural trade can also be promoted in the future.

In most previous researches, the authors focus on the negative influences of green barriers. But the green barriers also have positive influences on the agricultural products export. The most significant issue for further exploration in the study is to effectively take use of the positive influences to improve China's agricultural products export. This study will make an empirical analysis of the positive influences of green barriers with questionnaires. Therefore, examining the relationship between green barriers and China's agricultural products export is the general objective of this study. More specifically the examination of the relationship between the causes, influences, and methods of green barriers with China's agricultural product export is taken into account in this paper.

The focus of geographic location is Xi'an of Shaanxi province in China. One of the core industries in Xi'an is agricultural products export, and recently the agricultural products export in Xi'an is developing increasingly. So Xi'an is chosen to be the geographic location for this research. The unit of analysis focus of the study is 200 staffs of agricultural trade companies in Xi'an of Shaanxi province in China. The agricultural trade companies have comprehensive views about the green barriers. The research methods in this paper are questionnaire survey. SPSS and PLS will be used to analyze the data collecting from the survey.

The organization of this paper is as follow: section 2 reviews the literature, section 3 describes the methods used, section 4 presents the empirical results and section 5 concludes.

2. Literature Review

Green barriers are also called environment barriers, and green protectionism. Because the importers of products want to protect their own limited resources, human, animal, plant health and ecological environment in the modern international trade, through the formulation and implementation, they issued strict environmental protection laws and regulations to achieve environment protection and technology standards. The green barriers prevent foreign products enter into the domestic markets. Their aim is to protect domestic products and one of the new type non-tariff barriers (Feng, 2007).

2.1 Causes of Green Barriers

After China entered into WTO, most of the developed countries set up green restrictions to the export products of China. This leads the dramatic dropping of China's commodities, especially the agricultural products. The domestic and foreign experts have done a lot of research about the green barriers in China.

As mentioned by Zhu, Guo and Lan (2008), the environmental standards of developed countries are generally much higher than those of the developing countries. Especially a few developed countries make different standards for the imported products and domestic products, which makes the products of developing countries have more difficult to enter into the developed markets.

The comparative advantage of price in developing countries is an indirect cause of green barriers (Ren, 2010). Developing countries are often rich in resources, especially China. The rich natural resources make the lower price of exported products from developing countries. With the comparative advantage of price, the developing and developed countries will have an enormous trade surplus. The developed countries due to the protection of their domestic market, will work out a policy with strict technical standards (Zhao, 2004).

2.2 Influence of Green Barriers

Song (2009) analyses the formation and the new characteristics of green barriers in the global economic crisis. The author also points out that the new developing dynamic of each country's green barriers in the global economic crisis, and mainly from the laws and regulations puts forward the measures of green barriers for China.

ChenXu (2009), points out that green barriers has the duality, on the one hand, they are used by some developed countries as a limit or hinder of foreign products or services to enter into the international market and the developed countries, and have certain "legitimate" status; On the other hand, they objectively protect the global natural environment, original resources and human health. In view of this situation, on the one hand China can strengthen the propaganda of education and legislation to solve the green barriers in the international trade (Huang, 2007); On the other hand, China should reasonably use the green barriers in the international trade to improve the agricultural products' quality, and improve the technology innovation of China's agricultural products.

At present many areas of China have make corresponding measures for the green barriers. For example, the implementation of "Definite List System" in Japan has affected the exports of eel and tea in Jiang Xi province. In order to solve the problem, the Inspection and Quarantine Institutions of Jiang Xi province add a technology group to deal with the "Definite List System" and the new European Food Hygiene Regulations. This technology group specially analyses the influence and measures for Jiang Xi export commodities to deal with "Definite List System", and report information to the relevant departments and enterprises, give consultation, and solve problems (Green, 2012). To some degree, the technology group has made great progress. The Chinese products that are most seriously affected by "green barriers" in global trade include agricultural products, textiles and clothing, leather products, electronic products and so on (Chen, 2009).

The WTO accession has significantly lowered the tariff level to an average of 3.8% in developed countries and 14% for developing countries (Huang, 2007). The drop in tariff should presumably increase the market share of Chinese tea in importing countries, but that unfortunately did not happen. China's tea export, with its major markets in EU and Japan, has been substantially affected by the increasingly stringent pesticide residue control standards promulgated by China's trading partners (Zheng, 2003).

2.3 Methods to Deal with Green Barriers

Yu (2010) mentioned that many global experts have done quite a lot research about the negative influence of the green barriers on China agricultural products export and made deeply detailed analysis of the countermeasures, but proposed less ideas on the positive impact. Only through analyzing both the positive and negative influences, China can put forward the corresponding measures for the green barriers in the light of these influences.

Yin (2009) argued that developing green industries and enhancing China's international image are the necessary methods to deal with green barriers. At present, China's trade dependence has been higher than the U.S., Japan, India and Brazil. If China only focuses on improving openness, due to the deteriorating terms of trade, it will result in an outflow of resources. Therefore China should improve the quality of trade and optimize trade structure, which make China's products achieve the environmental standards and improve the quality of export products. There are three important factors.

As a developing country, China has little environmental and security standards and even no standards for majority products. So an effective measurement to deal with green barriers is to improve the domestic environmental and safety standards. Efforts to integrate the standards of international and developed country are still a beginning and continue to advance slowly. The Measures on the Management of Environmental Standards, promulgated by SEPA, reflect a growing awareness and recognition of international or developed-country environmental standards (Seffens, 2011). It provides that the Chinese monitoring organization may use current international standards and standards in developed countries when verbalizing new environmental standards.

Therefore, based on the literature above quoted and also the objectives of the paper, following hypotheses will be tested:

Hypothesis 1: There is a significant relationship between the causes of green barriers and China's agricultural product export.

Hypothesis 2: The impact of green barriers influencers toward China's agricultural product export is significant.

Hypothesis 3: The impact of effective solutions of green barriers toward China's agricultural product export is significant.

2.4 Research Model

In this paper, the relationship between green barriers and China's agricultural products export (dependent variable) is investigated. In order to vividly show the green barriers in China, this study will identify three aspects of green barriers, which are causes, influences and methods (independent variables). The three aspects are also the three steps to analyse green barriers in China. To analyse green barriers, the causes are the first step. Then identifying the influences is the second step. The last step is the suitable methods based on causes and influences.

3. Research Method

Quantitative research is chosen to be the main approach of this research. The data collection of this study will use survey, which is a non-experimental method. In survey research, respondents answer questions through interviews or questionnaires. In order to ensure the reliability of the survey, it is important that the questions are made appropriately. This research will use cross-sectional surveys. Cross-sectional surveys are used to gather information on a population at a single point in time. The sampling technique used in this paper is Cluster

Sampling. This research focuses on the agricultural trade companies in China. All the samples are collected in Xi'an of Shaanxi province since the core industry of Xi'an is agriculture.

Structural Equation Modelling (SEM) is a statistical technique which is used to test and assess the causal relationships with the help of numerical data and qualitative hypothesis. SEM allows both confirmatory and exploratory modelling, meaning they are suited to both theory testing and theory development (Gurevitch, 2000). Confirmatory modelling usually starts out with a hypothesis that gets represented in a causal model. In this research, the research model can be looked as the confirmatory modelling. The data collected through the questionnaire will be tested by Partial Least Square (PLS).

PLS is a method for building analytical models when the factors are greatly collinear. It emphasizes on forecasting the responses and not trying to understand the original relationship between the variables. Like any SEM, a PLS model includes a structural part imitating the relationships between the hidden variables and a measurement element. It shows how the hidden variables and their indicators are connected, but it also has a third element-the weight relations, which are used to evaluate the values of hidden variables (Dijkstra, 1985).

The first reason to choose PLS is that PLS estimation is useful for research with a small sample size, and therefore it may be used in situations where other approaches are unsuitable. In this research, the sample size can't be big enough to test the relationship among different variables due to the limited time. What's more, PLS is more convenient in testing combinative reflective and formative constructs, and probably one of the most vital criteria of PLS is that it can model both reflective (effect) and formative (cause) indicators (Geladi & Kowalski, 1986). In this research, PLS regression analysis will be used to test the relationship between the causes, influences of green barriers on China's agricultural products export and related methods to deal with green barriers. To measure the strength of the relationships between the three independent variables and one dependent variable mentioned above, correlation analysis is accompanied to reflect the significance, direction and strength.

4. Empirical Findings

As mentioned earlier, the initial target of respondents was set at 200 in 50 agricultural trade companies in Xi'an of Shaanxi province in China, and the total responses achieved 144 at the end of the collection period. If calculated in percentage, this represents a 72% response rate. Table 1 provides some basic descriptive statistics.

Table 1. Summary of respondent's profile (n = 144)

Variables	Category	Frequency	Valid percent (%)
Role	Executive	54	37.5
	Manager	52	36.1
	Director	27	18.8
	Chairman	11	7.6
	Secondary	12	8.3
Education	Diploma	24	16.7
	Bachelor	84	58.3
	Postgraduate	24	16.7
Working experience	Less than 3 years	49	34.0
	3-5 years	52	36.1
	5-7 years	11	7.6
	7-10 years	22	15.3
	Above 10 years	10	6.9
Employees	20-49	111	77.1
	50-99	25	17.4
	100-249	7	4.9
	250 and above	1	0.7
Ownership	Private	117	81.3
	Public	27	18.8
Products	Vegetable	49	34.0
	Fruit	37	25.7
	Tea	25	17.4
	Agricultural product	15	10.4
	Others	18	12.5

4.1 Reliability

Reliability test is to test whether the reliability of the data was available or not. Once the Crobach's alpha values of all the constructs in this paper are all more than 0.70 which is the lowest level for the Cronbach's alpha suggested by Hair (1998), it is reliable. In this research, all the data collected was tested separately according to the variables and the values ranged from 0.771 to 0.843. As a result, we can conclude that all the constructs within this research achieve to the necessary standards in terms of reliability. Table 2 shows the results.

Table 2. Summary of reliability test

Constructs	Items	Cronbach's Alpha
Agricultural trade	A1, A2, A3, A4, A5	0.797
Causes	C1, C2, C3, C4, C5, C6	0.771
Influences	I1, I2, I3, I4, I5	0.786
Methods	M1, M2, M3, M4, M5, M6, M7, M8, M9, M10	0.843

4.2 PLS Outer Model Evaluation

The research model in the study has four reflective constructs: agricultural trade (dependent factor), causes of green barriers, influences of green barriers, and methods of green barriers. Table 3 and 4 show the results of the outer model evaluation of the reflective constructs (convergent validity-individual item reliability, composite reliability and AVE; discriminant validity-correlation and AVE^2).

Table 3. Statistical results of outer model evaluation before removing

Constructs	Indicator	Loading
Agricultural products export	A1	0.731
	A2	0.208
	A3	0.801
	A4	0.745
	A5	0.457
Causes	C1	0.397
	C2	0.761
	C3	0.611
	C4	0.823
	C5	0.771
	C6	0.846
Influences	I1	0.404
	I2	0.735
	I3	0.814
	I4	0.806
	I5	0.539
Methods	M1	0.845
	M2	0.645
	M3	0.439
	M4	0.832
	M5	0.311
	M6	0.776
	M7	0.547
	M8	0.795
	M9	0.857
	M10	0.808

Table 4. Statistical results of outer model evaluation after removing

Construct	Indicator	Loading	Composite Reliability	AVE	AVE^2
Agricultural trade	A1	0.731	0.85	0.67	0.82
	A3	0.801			
	A4	0.745			
Causes	C2	0.761	0.86	0.73	0.84
	C4	0.823			
	C5	0.771			
	C6	0.846			
Influences	I2	0.735	0.87	0.74	0.86
	I3	0.814			
	I4	0.806			
Methods	M1	0.845	0.84	0.71	0.83
	M4	0.832			
	M6	0.776			
	M8	0.795			
	M9	0.857			
	M10	0.808			

Table 5. Correlations of latent variable

Correlations of Latent Variable	Agricultural trade	Cause	Influence	Method
Agricultural trade	1.00	-	-	-
Cause	0.32	1.00	-	-
Influence	0.45	0.49	1.00	-
Method	0.52	0.37	0.47	1.00

As showing in Table 3, the individual reliability of the four variables suggests non-reliability of several items while they had loading values smaller than 0.70. Based on the questionnaire, two of Agricultural trade (A2&A5), two of Cause (C1&C3), two of Influence (I1&I5) and four of Method (M2, M3, M5, M7) are removed from the research model before testing for the further analysis because of their smaller loading values.

After removing the items with lower loading values, the outer model can be re-evaluated. From Table 4 and 5, the composite reliability, AVE, AVE^2 and correlations of the existed items are showed. The remaining items of every variable can make adequate explanatory power for testing the model later. The composite reliability values of the four variables range from 0.84 to 0.87. The AVE values of the items are above 0.50, ranging from 0.67 to 0.74. Thus it indicates a good and suitable constructs and its underlying indicators.

For the discriminant validity, the AVE^2 values were all much higher than the correlations between the independent variables. These results suggested that that the selected measures were valid and reliable enough for the further test.

4.3 Structural (Inner) Model Evaluations

In section 4.2, the requirements of convergence and discriminant validities were finished, with the estimated values for all tests holding above the standard numerical. The next step is to evaluate the structural (inner) component (refer to Table 6 and Figure 1).

Table 6. Structural (inner) model evaluation

Hypothesis Relationships	Value
	$R^2 = 0.581$
C-A (H1)	$\beta = 0.195{***}$, t = 5.703
I-A (H2)	$\beta = 0.217{**}$, t = 4.698
M-A (H3)	$\beta = 0.222{***}$, t = 4.871

***, ** denotes significant at 1% and 5% respectively

A=Agricultural trade, C=Causes of green barriers, I=Influences of green barriers, M=Methods to deal with green barriers
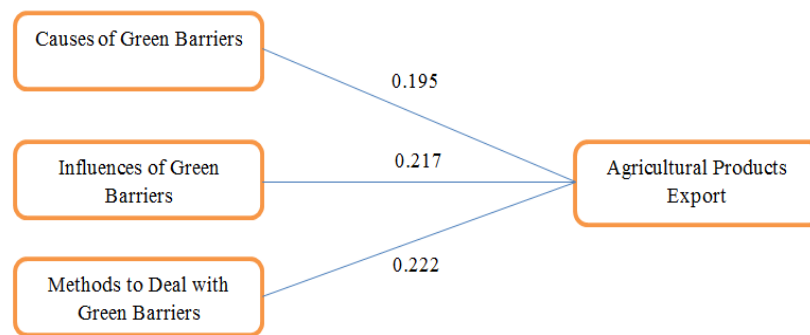
Figure 1. Structural (inner) model evaluation

4.4 Hypotheses Testing

As the result showed in Table 4, the structural (inner) association is positive and significant at 1% significance level (β = 0.195; t = 5,703) between cause (C) of dependent variables with agricultural trade (A). The result makes support for Hypothesis 1; there is a significant relationship between the causes of green barriers and China's agricultural product export. For the hypothesis 2, the impact of green barriers influencers toward China's agricultural product export is significant, and the inner association also shows positive and significant. The influences of green barriers and agricultural trade export are significant at 5% level (β= 0.217, t = 4.698), which implies that hypothesis 2 is well supported. The methods to deal with green barriers and agricultural trade export are significant and positive at 1% level (β = 0. 222, t = 4.871). Therefore hypothesis 3, which is the impact of effective solutions of green barriers toward China's agricultural product export, is also supported.

5. Conclusion and Discussion

The main objective of this study was to examine the relationship between green barriers and China's agricultural trade export. According to the research model, both the causes and influences of green barriers have connection with the agricultural trade export. What's more, the methods to deal with green barriers will have dramatic impact on the agricultural trade export.

At first, it is obvious that the first independent variable-causes of green barriers significantly relate to the dependent variable-agricultural products export based on the analysis result. The various causes of green barriers, such as the strictly environmental standard and import process of the importers, will impact on the agricultural trade. The underlying significance of this result implies the main causes of green barriers are imposed during the process of agricultural products export, while the remaining items in the questionnaire are related to the process. Therefore, the agricultural trade companies in China should pay attention to the causes of green barriers.

Next, there is a positive and significant relationship between the influences of green barriers (second independent variable) and agricultural products export (dependent variable). This is a key variable because it would reflect directly on the influences of green barriers on China's agricultural trade export. Based on the data analysis, trade associations should focus on the influences of green barriers. The basic responsibility of trade association is to guarantee the legal right of China's agricultural trade companies in the international market and protect them against the unfair treatments from the importers.

Finally, the method to deal with green barriers (third independent variable) also shows a positive and significant relationship with agricultural products export (dependent variable). Therefore, the results from the analysis have shown that appropriate methods to deal with green barriers will impact on the agricultural trade export. As the official representative, China's government can take a lot of methods to deal with green barriers effectively and better. For example, government should establish "green concept" in the agricultural industry and effectively use the rules of WTO to help domestic agricultural trade companies. With the help of these official methods, agricultural trade export of China can have a bright future.

References

Chen, X. (2009). *The green barriers and the strategies*. Beijing: China Higher Education Press.

Dijkstra, T. (1985). *Latent Variables in Linear Stochastic Models: Reflections on Maximum Likelihood and*

Partial Least Squares Methods (2nd ed.). Amsterdam, The Netherlands: Sociometric Research Foundation.

Feng, Z. X. (2007). *The theory and policy of international trade* (2nd ed.). Shanghai: Shanghai Jiao Tong University Press.

Geladi, P., & Kowalski, B. (1986). *Partial Least-Squares Regression: A Tutorial*. Analytica Chimica Acta. http://dx.doi.org/10.1016/0003-2670(86)80028-9

Green, J. (2012). *Green Agriculture*. Retrieved from http://chinawestproducts.com/05/08/green-agriculture-2

Gurevitch, Z. (2000). *The Serious Play of Writing: Quantitative Inquiry*. New Jersey: Hampton Press.

Huang, Q. (2007). Green barrier disguises face of protectionism. *China Daily, 8*(15). Retrieved from http://www.chinadaily.com.cn/opinion/200708/15/content_6027388

Ren, X. (2010). *Green Barrier to China's Export*. Retrieved from http://www.termpaperwarehouse.com/essay-on/Green-Barrier-To-China-s-Export/69190

Seffens, A. (2011). *Stumbling over Green Barriers*. Retrieved from http://www.freedomworks-.org/blog/aseffens/stumbling-over-green-barriers

Song, X. H. (2009). *The legal strategies of green barriers in the current global economic crisis*. Beijing: China Higher Education Press.

Yin, F. (2009). *Green Barriers and International Trade*. Beijing: China Higher Education Press.

Yu, H. Z. (2010). Overcoming Green Barriers: China's First Five Years into the WTO. *Journal of International Market, 12*(3), 54-78.

Zhao, M. (2004). Influence of green barriers on China's export trade and countermeasures. *Journal of China Circulation Economy, 20*(7), 15-24.

Zheng, P. (2003). *New research on green barrier and countermeasures under the WTO framework*. Shanghai: Shanghai Jiao Tong University Press.

Zhu, Z. D., Guo, Y. D., & Lan, Y. S. (2008). *International trade* (3rd ed.). Beijing: China Higher Education Press.

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