Analysis of Factors Influencing the Accession to the GPA

---Logit and Probit Model Approach

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Abstract— As one of WTO plurilateral agreement, WTO Government Procurement Agreement (GPA) have 44 parties now. China wants to join the agreement, and is on the actively negotiating. According to IMD Competitiveness Yearbook released 1996 to 2014 GPA members' relevant economic data, this paper uses Logit and Probit Mode to analysis the influential factors to access GPA. The empirical study suggests that GDP, GDP per capital, government consumption expenditure, and balance of payment and government transparency have positive and significant influence on accession. According to the result, the paper puts forward the relevant policy suggestion on China's accession to GPA.

Keywords- GPA; Government Procurement; Logit Model; Probit Model; Influential Factors

I. INTRODUCTION

<Government procurement agreement> (GPA) is a plurilateral agreement of WTO, it is already have 44 members. China, as one of the observers for GPA, submitted its first GPA bid in December 2007 and began to join the GPA. Government is the most concentrated and most stable consumer. At present, in the developed countries, the scale of government procurement general GDP by 10% to 15%, shows that the government procurement has an important position in a country. With the continuous development of globalization, and the process of government procurement in the beginning of the process of liberalization, <government procurement agreement> come to the world. In the Tokyo round of GATT negotiations, the countries signed the GPA, the basic principle is transparency and non discriminatory principles into the international government procurement. With the continuous modification and deepening of WTO, it has been modified by the 4th GPA, which aims to regulate the members of the open government procurement market conditions. When a country decides to join the GPA, a series of negotiations should be passed. First of all, a country should decide whether to join the GPA when it is added to WTO. After the start of negotiations with GPA, a country needs to determine which entities are incorporated into the GPA's jurisdiction. In Annex one or two to the GPA agreement, the government of each member shall be separately listed in the announcement of the central government, the secondary government and other agencies that are included in the GPA, and only those institutions are subject to the jurisdiction and constraints of GPA. (For example, many government departments will be removed from the list of their central government). Subsequently, the participants have to choose the scope of the procurement project GPA. As a general rule of GPA, all the goods are included in the range of GPA, and due to the mining, transportation, R&D, transportation and other services and national security are closely related to the general application of GPA from the list of exclusion. Finally, they need to determine the threshold price. The so-called purchase price limit or threshold, the purpose is set, only to achieve a certain amount of procurement, to be bound by GPA. If the limit is high, the number of applicable procurement projects is relatively small, on the contrary, if the provisions of the low limit, the number of agreements applicable to the procurement of more than the number of projects. For each member, they need to determine the 9 (3x3) of the threshold value, 3 categories of products (goods, services and construction) and 3 entities (the central government, the sub-government and other entities).

As early as the beginning of China's accession to the WTO, developed countries in Europe and the United States had asked China together to negotiate and sign the GPA, but because our country do not have a perfect government procurement law and refused to sign. June 2002, China announced the <People's Republic of China Government Procurement Law>, so, the accession to the GPA negotiations also officially put on the agenda. In July 2010, December 2007, November 2011, December 2012 and January 2014, a list of five bids was submitted to WTO Secretariat. From the list of bid submitted by our country, our country's entry strategy shows the following characteristics. 1. China's insistence on developing countries. In accordance with the provisions of special care for developing countries in the GPA agreement, the overall threshold value of our country is higher than the threshold value set by GPA. 2. The open entity in our country is mainly based on the central place, and the place is supplemented by. So far, our commitment to join the GPA central government entities range has increased from 50 to 56, while the central government entities open range from the initial central government entities to entities and their respective administrative agencies in Beijing. At present, the principle of voluntary entry is adopted by the central government entities, which are open to China. Currently, there are 14 provinces and cities in the bid list. 3. The offer reflects the principle of gradual opening. Due to the

uneven development of regional development in China, the local government does not have to understand GPA, so the choice of China's central government entities in the open range, both reflects the sincere attitude of GPA, and the protection of the overall secondary central government entities of the government procurement market play a positive role.

It involves the cost benefit analysis of GPA, and the scholars only carry on the standard research, which is the lack of convincing. Therefore, the Swiss based International Institute of management released the "World Competitiveness Yearbook" and the government procurement in 1996 to 2014 related data, using Logit and Probit models, analysis on existing affects the GPA members and observers joining GPA factors and on this basis to negotiations on China's accession to the GPA, and the future of government procurement development put forward relevant policy recommendations.

II. RESEARCH METHODS

A. *Logit and Probit mode*

Probit model is a generalized linear model, obey normal distribution. The simplest Probit model is that the Y is a 0,1 variable, and the probability of event occurrence is dependent on the explanatory variables, namely P (Y=1) =f (X), i.e., the probability of Y=1 is a function of F, where X (.) is subject to standard normal distribution. If f (.) is the cumulative distribution function, then it is Logit model. Logit model is the earliest discrete choice model, but also the most widely used model. Logit model is Luce (1959) is first derived from IIA, and Marschark (1960) is proved to be consistent with the maximum utility theory. Logit model is widely used because of its obvious characteristics, and the model is fast and easy to use. When the model selection set does not change, but only when the level of the variables changes, it can be easily solved by the choice of the selected branches in the new environment of the selected branches of the selected probability. According to IIA characteristics of Logit model, the selection of the reduction or increase of the branch does not affect the ratio of the selected probability to other choices. Therefore, it can be removed from the model, and can be used directly in the model.

This paper will analyze the main factors affecting the entry of GPA, based on the Probit model and the Logit model, through 1996 to 2014 years to join the GPA country.

B. *DATA SOUSE*

This paper selects the data from the 42 members of the GPA in 1996 to 2014, and will be added to the GPA as a dummy variable as the explanatory variable (the addition of Montenegro and New Zealand in 2015 is not within the scope of the analysis). The data of this paper comes from the <World Competitiveness Yearbook> published by the International Institute of management development (IMD). The annual publication of the Yearbook in 1989 and once a year, it contains the world's 58 major countries and regions of the 300 indicators for analysis. It's considered the world's first and most recognized competitive rankings. IMD world competitiveness of a major bright spot is the statistical data and the questionnaire survey. Among the 312 indicators, 126 indicators were taken from statistical data (hard index), and the data from the 113 index data

were collected from the questionnaire (soft index). There are 73 indicators as a reference background, this paper selected the following indicators:

1) Hard index. Hard indicators are derived from official statistics of the country, including GDP, GDP per capita, the proportion of the total trade balance of GDP, the proportion of government spending and government spending accounted of GDP.

2) Soft index. The data obtained through questionnaire survey. By the subjects (usually large enterprises in various countries) by the use of 6 point scale of the questionnaire to answer questions. Answer 1 said the most negative attitude; answer 6 expressed the most positive attitude. The researchers converted the answer to 0-10's score by data processing. Soft indicators used in this paper include:

a) Degree of trade protection: This indicator is expressed in the questionnaire as "trade protection will not damage your business behavior", because the problem is expressed as a negative statement, so this is a reverse indicator, that is, the higher score indicates the low level of trade protection.

b) Government transparency: This indicator is expressed in the questionnaire as "the transparency of government policy is satisfactory". It should be explained that the transparency of the government here is a general sense of government transparency, and is not specific to the transparency of government procurement. Taking into account the availability of data, as well as people's general view, the greater transparency of government procurement is also more transparent, so that the transparency of the government is equivalent to the transparency of government procurement.

In this paper, join GPA assignment is 1, and the GPA value is 0. The time for each member to join the GPA is shown in the following table.

TABLE I THE TIME FOR EACH MEMBER TO JOIN THE GPA

Parties	Join times
United States, Canada, Japan, Norway, Switzerland, Israel, January 1, 1996 Austria, Belgium, Denmark, Finland, Germany, France, Greece, Ireland, Italy, Luxemburg, Holland, Portugal, Spain, Sweden, United Kingdom	January 1, 1996
Cyprus *, Czech, Estonia, Hungary, Latvia *, Lithuania, Malta *, Slovakia, Slovenia	May 1, 2004
Bulgaria, Romania	January 1, 2007
Croatia	January 1, 1997
Hong Kong, China	June 19, 1997
Iceland	April 28, 2001
South Korea	January 1,1997
Liechtenstein *	September 18, 1997
The Aruba *	October 25, 1996
Singapore	October 20,1997
Taiwan, China	July 15, 2009
Montenegro	July 15, 2015
New Zealand	August 12, 2o15

Note: the countries with * are not included in the statistics of IMD, taking into account that the economies of these countries are relatively small, so it will not be a big impact on the conclusions of the study.

A. Sample Description

In this paper, the statistical characteristics of the variables are used, including sample number, mean, variance, maximum and minimum values. It shows that in addition to the degree of protection of the soft index is larger than the others; the rest take the natural logarithm makes the data smoother.

B. Model Destimation

Use Logit and Probit model as regression, the result is shown as TableⅢ

TABLE II REGRESSION RESULTS

	Logit Model		Probit Model	
y	Coefficient	z	Cofficient	z
lngdp	0.632**	2.34	0.384***	2.52
lnpgdp	0.971***	2.55	0.650***	2.67
lngce	0.183*	-2.15	0.0872*	-2.05
bot	0.059***	-2.56	0.036***	-5.76
t	0.016	1.3	0.007	1.12
tr	0.118***	6.44	0.060*	1.81
p	0.0001	0.23	0.000	0.59
Constant	-12.403*	-2.88	-8.723**	-2.13
Statistical Index				
Prob > chi2	0.000		0.000	
Pseudo R2	0.3024		0.3024	

Note: *within the 90% confidence interval, * * in the 95% confidence interval, * * * in the 99% confidence interval

Since the selection model is Probit model and Logit model, it is necessary to make a quantitative analysis of the explained variables, and the marginal treatment is needed, that is, dy/dx, the results are shown in Table Ⅳ:

TABLE III

Delta-method	Logit Model		Probit Model	
	dy/dx	z	dy/dx	z
lngdp	0.089***	2.67	0.094***	2.8
lnpgdp	0.137**	2.47	0.159**	2.67
lngce	-0.020***	-2.87	-0.020***	-3.06
bot	0.008*	1.65	0.008***	3.85
t	0.002	0.42	0.001	0.47
tr	0.017***	4.41	0.014***	5.41
p	0.000	0.32	0.000	0.59

Note: *within the 90% confidence interval, * * in the 95% confidence interval, * * * in the 99% confidence

The following are the marginal effects of GPA on whether to join the GDP, the number of GPA per unit will have a positive impact on the accession of GPA, GDP per unit will be 14% (logit) to 16% (probit), the positive impact of trade balance, the possibility of adding GPD increased by 8/1000, more than three indicators from the side show a country's economic strength, can be concluded

that the stronger the economic power, the more likely to join GPA, in real terms. As for the trade balance, the percentage of GDP, the possibility of joining GDP has 0.8% positive effects. In reality, the trade balance shows an economic trade status, the trade surplus increased, which is the agreement of the GPA, which can improve the economy. Finally, the transparency of government per unit, for the addition of GPA has a positive impact on 1.7%, the

C. Empirical Snalysis

From the statistical index of Table Ⅱ, Prob > chi2=0, the two models have a significant overall data estimation. R2 Pseudo value is equal to 0.3024, indicating that the model has 30% data interpretation ability, because the data is a cross section data, it achieves a good explanation ability of thirty.

It can be seen from Table III that in addition to the degree of protection of the soft index and government debt accounted for GDP in the model is not significant, and the rest are more significant. The marginal value of GPA in the trade protection degree is 0 in the two models. The number of the table is 0.00020 (probit) and 0.00018 (logit), the value of the two points is small, the degree of trade protection has no effect on whether to join GPA. There are two possibilities that which are not significant. First of all, it may be because the output of a country's advantage projects is greater than the protection of the industry's revenue, which will lead to the country's accession to the GPA. Secondly, it may be because of the high demand for protection and make it choose not to join. Both in the real world trade is the frequent occurrence of those things, so it is easy to cause the explanation on the variable is not significant. In addition, it is needed to realize that in the study, the degree of trade protection is the soft index data. From the angle of investigation, there is the possibility of the deviation of the system. In addition, the government spending accounted for GPD of the explanatory variables is not significant. Generally speaking, national governments spending, the more likely that the country will tend to join GPA, thereby saving government procurement funds, improve the efficiency of government procurement. Unfortunately, in the existing data, the proportion of government spending accounted for GPA and whether the addition of GPA did not show a significant correlation, which may be related to the slow data.

higher government transparency, the more mature the economic system, the more perfect, in the process of economic globalization, so it may not be afraid, or have a higher ability to resist risk, so will be more inclined to join GPA. The implications of the above data are: the opening of the government procurement market is closely related to the economic development of a country, a country's macroeconomic situation is better, the government procurement more inclined to market opening, a country's macroeconomic situation worse, the government procurement more inclined to market closed.

IV. ENLIGHTENMENT TO CHINA'S ENTRY INTO GPA

Through the Logic and Probit model, the influence factors of joint GPA on the existing GPA members are studied, which will be a great inspiration to China's entry into GPA and the future development of government procurement:

A. Maintain the Economic Growth

GDP's growth will leads to the response of a country's economy booming. The national income increases, the consumption ability is also enhanced. At the same time, GDP also represents the country's products, engineering and service import demand, as well as the import supply capacity, for the development of the government procurement of the breadth and depth of the breadth and depth of development, but also for China's accession to the GPA to increase the discourse. China as a rising developing country, in order to ensure the steady growth of government procurement and increase the proportion of government procurement, attention shall be paid to the establishment and maintenance of large economic problems and deepen strategic cooperation.

B. Enhance Government Transparency

The transparency of government has a high degree of correlation among the factors that affect a country's entry into GPA, so it is helpful for our country to carry out the GPA negotiation. In addition, GPA requires each member to establish a mechanism for the purchase of a complaint within the country. This is an indispensable part of the national procurement system, the government procurement in China is also in urgent need of such a mechanism, it is conducive to the elimination of corruption in the procurement process, and promote the transparency of government procurement market, so as to achieve high quality and efficient government procurement market.

C. Amend the Relevant Laws

China's <Government Procurement law> and <Tendering and Bidding Law> is not coordination and compared to GPA is too simple problems. So, first of all, it is needed to straighten out the two laws applicable scope. At the same time, to further accelerate the introduction of corresponding laws and regulations, to refine and supplement the above two laws. In details are given more of the implementation of the standards, to ensure that the government procurement in our country is in the laws and rules of the state, and supplemented by the local government procurement laws and regulations as a supplement and ensure coordination and consistency of laws and regulation

D. Fully Understanding and Flexible Application of GPA Related Terms

In order to attract more developing countries, and achieve global trade liberalization, GPA regulated the relevant provisions and technical assistance for developing countries. China should further study the relevant provisions, the implementation of a series of protective measures, and resolutely refused to make concessions. To based on their actual situation, in the relationship between people's livelihood, national security, the local content of government procurement, in order to support the development of domestic enterprises and the growth of infant industries.

E. Cautiously Opening up the Domestic Government Procurement Market

For the characteristics of GPA's existing members of the government procurement market in the internal and external double standards, China's accession to the GPA process should follow the rules of GPA, take a step by step strategy, including open time, regional and open range of the gradual. At the same time, China need to reference to international practice, the government procurement market need to show a tight to the world and loose to the domestic, trying to get to the greatest extent into the foreign government procurement market at the same time.

V. CONCLUSIONS

According to the IMD Competitiveness Yearbook released 1996 to 2014 GPA members' relevant economic data, this paper using Logit and Probit Mode to analysis the influential factors to access GPA. The empirical study suggested that GDP, GDP per capital, government consumption expenditure, and balance of payment and government transparency have positive and significant influence on accession. According to the result, the relevant policy suggestions are put forward on China's accession to GPA. From the result of the regression of the model, it is suggested China to maintain the economic growth, enhance the government transparency, amend the relevant laws, get fully understand the GPA terms and flexibly use it and cautiously opening the domestic government procurement market, in order to join the GPA successfully and promoted the China's government procurement.

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