Estimating the Benefits of Public Procurement Liberalization: A Case Study of Thailand*

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1. INTRODUCTION

The Government Procurement Agreement (GPA) is a plurilateral agreement under the World Trade Organization (WTO) to which 39 countries currently are signatories. Thailand is currently a non-member of GPA and the issue of whether the country should sign the agreement is being debated. It is believed that the agreement brings about two benefits for its signatories. First, as a result of increased transparency and more open competition resulting from the agreement, a signatory country could get better value for the public money spent on goods, services or works. The second is an increase in the size of export markets as a result of purchases by the governments of other member countries. For developing countries, the first kind of benefit is likely to be more important (Srivastava 2003). So far there have been few studies estimating the size of the GPA benefits. Existing estimations are often based on arbitrary or ad hoc assumptions. For example, Srivastava (2003) estimates that the maximum savings of public resources for the central government of India in accessing GPA is about $1.7 billion per year, assuming a simplistic savings rate of 30 percent. Even for countries that have already accessed to GPA, actual savings are estimated based on simple pre- and post-accession comparisons. For example, Choi (2001), who assessed the Korean GPA experience, argues that the cost-saving margin for domestic goods has increased from 5.8 percent from the pre-accession period to 8.5 percent after the accession and from 18.5 to 23.1 percent for imported goods.

The objective of this article is to estimate the potential benefits of accessing to GPA based on available empirical evidence, using Thailand as a case study. As the export opportunities are likely to be small and the impacts of the increase in transparency are difficult to quantify, our study will be limited to an estimation of the benefits resulting from intensified competition. The rest of the paper is structured as follows: the next section states the framework of the analysis and section 3 describes the data sets used in the study. Section 4 develops an econometric model that will be used in section 5 for estimating the benefits of procurement market liberalization under GPA. The last section provides concluding remarks.

2. FRAMEWORK OF THE ANALYSIS

The basic idea of our analysis is that the liberalization of the public procurement market will increase competition due to the participation of foreign suppliers. The intensified competition would then lead to lower expenditure for the procuring agency, and thus generate savings. This insight is supported by a result from the auction theory that a larger number of bidders would result in lower winning bid prices, keeping other factors constant (Klemperer 2004).[1] However, the reduction rate of the winning bid price falls as the number of bidders increases. Assuming independent private values with uniform distribution and risk-neutral bidders, the following relationship between the winning bid price and the number of bidders can be derived:

$$P = \bar{v} - \left(\frac{n-1}{n+1}\right)\left(\bar{v} - \underline{v}\right) \qquad (1)$$

where P is the winning bid price; n is the number of bidders; $\underline{v}$ and $\bar{v}$ are the minimum and maximum private values of bidders. By transforming the above equation into one that expresses a relative price reduction from the starting price, we obtain an equation that can be used for the econometric estimation used in section 4.

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3. DATA

We utilize two data sets to estimate the benefits of the liberalization of the Thai public procurement market. The first data set is from Thailand's public procurement "e-auction" database, maintained by the Comptroller General's Department. This data set will be used to establish a relationship between the number of bidders and the reduction in the winning bid price. The data set has been compiled in line with government policy since 2005, which requires all procuring agencies in the central administration and State-owned enterprises to conduct an online auction for any procurement projects, except consultancy projects, for which the values exceed 2 million baht (roughly US$60,000). Each record in the data set contains the contract number, the type of contract (e.g., purchase of equipment, services, construction or rental contracts), the name of the procuring agency, the bidding date, the starting price for bidding, the winning bid price, and the number of bidders participating. For our study, only projects for which the values exceed GPA thresholds have been selected.[2] The resulting data set contains 3,165 records whose summary statistics are shown in Table1.

The second data set is derived from the World Bank's awarded projects' database, which can be accessed through the World Bank's website. As most of the World Bank's projects are subjected to international competition requirements, the data set can provide a glimpse of the nature of competition in a liberalized market for a non-GPA country like Thailand. The World Bank's project data set contains information on project names, project values, the name of the procuring entity, the method used in selecting suppliers, the number of suppliers participating, and the nationalities of the three lowest bidders. As our goal is to understand the impact of liberalization under GPA on the Thai public procurement market, only projects that have the following characteristics have been selected for the study. First, the projects must be implemented in Thailand, i.e., the procuring agencies must be Thai public agencies. Second, suppliers must be selected based on a competition-based method.[3] Third, the project value must exceed the GPA thresholds. The selected data set contains 42 projects implemented between 2000 and 2006. Table 2 provides a summary of the value of the projects in the data set.

4. METHODOLOGY

The first step in estimating the benefits of market liberalization is to identify the effects of competition on the winning bid price based on our model adapted from the auction theory literature. By using the transformed equation that expresses the relationship between the percentage price reduction and the number of bidders and including some control variables, we obtain the following equation that can be used for our econometric estimation:

Table 1 Descriptive Statistics of the E-Auction Data Set

Objects of procurement	Number of projects	Number of bidders (persons)			Starting price (million baht)		
		Min	Max	Mean	Min	Max	Mean
Central government							
Equipment	1,254	2	24	2.7	7	28,349	53
Material	757	2	34	3.4	7	654	21
Services	367	2	14	3.0	7	2,898	29
Rental	49	2	9	3.4	8	1,446	121
State-owned enterprises and other government entities							
Equipment	187	2	27	3.7	22	1,720	105
Material	224	2	22	3.6	22	510	58
Services	88	2	10	3.4	22	1,760	117
Rental	8	2	11	3.6	22	688	123
All government entities							
Construction	231	2	29	8.4	279	20,709	807

Source: Comptroller General's Department, Ministry of Finance.

Table 2 Value of Projects in the World Bank Data Set (millions of baht)

	Minimum	Maximum	Mean
Goods	7	1,267	224
Consultancy	0.27	96	10
Construction	68	418	158

Source: Awarded projects' database, World Bank (as of August 2008).

$$Pdiscount = \alpha + \beta nbid + \gamma_1 dequip + \gamma_2 dmat + \gamma_3 dservice + \gamma_4 dcon + \eta dsoe + \varepsilon$$

where *Pdiscount* is the resulting percentage reduction in price from the starting price; *nbid* is a variable representing the level of competition and is equal to the ratio (n-1)/(n+1). The rest of the variables are dummy variables included to control for the type of procurement contract (procurement of equipment (dequip), materials (dmat), services (dservice), construction (dcon) or rental contract (base case)) and the type of procuring entity (State-owned enterprises or other government entities other than central government agency (dsoe) or central government agency (base case)).

Box 1 shows the result of our regression analysis using the Comptroller General's Department data set. All coefficients are statistically significant. The coefficient of the variable of our interest, *nbid*, is positive and highly significant. Thus, it is confirmed that an increase in the number of bidders actually reduces the winning price. However, the relationship is non-linear; as the number of bidders increases, the rate at which the winning price is reduced becomes smaller. The regression result also indicates that, controlling for the level of competition, the procurement of goods and services tends to produce a lower reduction in prices than a rental contract, which is used as the base case. Procurement by State-owned enterprises and public entities other than central government entities tends to be roughly two percentage points cheaper than those by central government agencies for similar projects, probably due to the higher volume of purchases of the former.

Figure 1 shows the relationship between the percentage reduction in price and the number of bidders for procurement by central government agencies.

5. SAVINGS FROM MARKET LIBERALIZATION

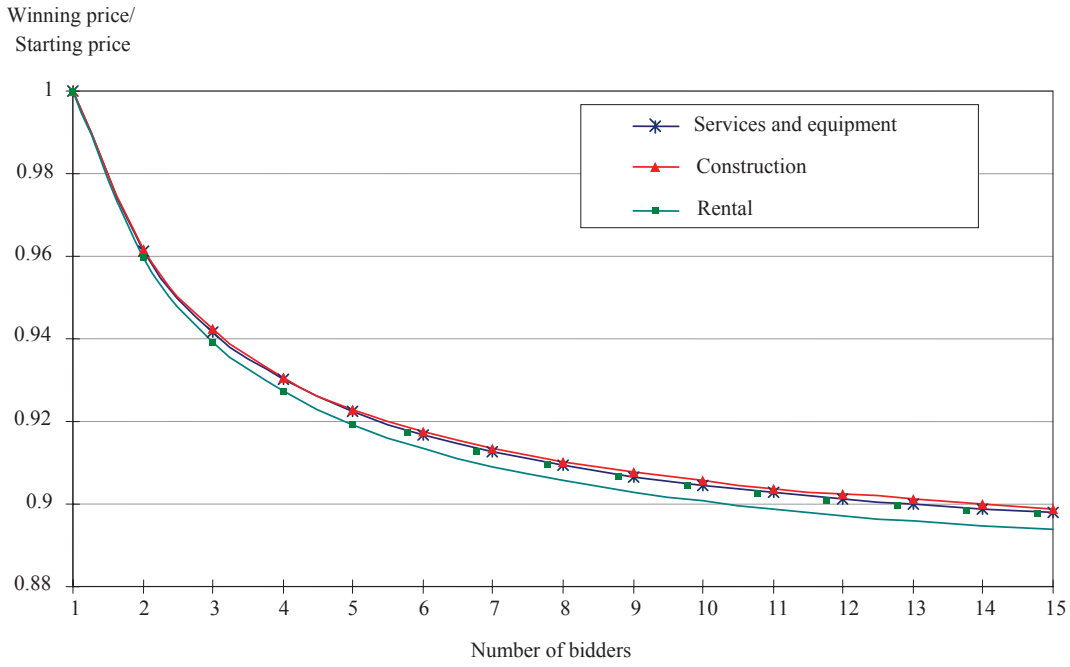
In this section, we estimate potential savings in public expenditure arising from the liberalization of the public procurement market under GPA. For comparison, we also estimate the potential savings from a hypothetical liberalization under Japan-Thailand Economic Partnership Agreement (JTEPA), a bilateral trade

Box 1 Summary of the Regression Analysis

$$Pdiscount = \underset{}{0.03} + \underset{(2.91)}{0.12}\,nbid - \underset{(13.86)}{0.04}\,dequip - \underset{(-4.49)}{0.05}\,dmat - \underset{(-6.02)}{0.04}\,dservice - \underset{(-4.69)}{0.05}\,dcon + \underset{(-5.42)}{0.02}\,dsoe \quad (7.36)$$

t-statistics of estimated coefficients are shown in parentheses.

Figure 1 Relationship between the Number of Bidders and Price Reduction (Central Government Agencies)



Source: Authors.

agreement between Thailand and Japan.[4] Before we can use the econometric model developed in the last section to assess the impacts of liberalization, we must estimate the extent of the possible increase in competition due to the liberalization. In other words, we need to estimate the additional number of bidders resulting from the liberalization. Here we turn to our reduced World Bank data set for a clue about how many foreign bidders are likely to participate in a liberalized Thai public procurement market.

Unfortunately, although the World Bank's data set records the number of bidders in each project, only the nationalities of the three lowest bidders are reported. As a result, the number of foreign bidders from GPA member countries cannot be known with certainty and must be stated as a range between the minimum (assuming all the unreported bidders to be non-GPA nationals) and the maximum (assuming all the unreported bidders to be GPA nationals). For example, consider a project that has seven bidders with only one out of the three lowest bidders reported to be a supplier of a GPA country. In this case, the minimum number of GPA bidders is one (assuming all the unreported four bidders to be non-GPA nationals), and the maximum number is five (assuming all the four unreported bidders to be GPA nationals). The number of Thai and Japanese bidders can be estimated in a similar way. We also assumed that the minimum number of Thai bidders is the same as the average number of bidders in the domestic e-auction projects with similar characteristics.[5] Table 3 shows the expected number of bidders in each liberalization scenario.

We are now in a position to combine the results of an additional number of bidders in each scenario with the regression results to estimate the savings in public expenditure due to the liberalization of the procurement market. The savings are calculated for the budget year 2007. Based on our estimation, the Thai government could save up to 2.5 percent of its public expenditure, if its procurement market is liberalized under GPA (see Table 4). This would translate into an annual savings of 328-3,334 million baht (US$10-101 million), as shown in Table 5. Most of the potential savings are from lowering the costs of construction projects. For comparison, the savings from the liberalization under JTEPA is estimated to be between 26 million baht and 45 million baht per year, one or two orders of magnitude lower than the case of GPA.

There are two shortcomings in the above estimation. First, the ranges of the benefits from the overall liberalization and the liberalization of the construction sector in particular are rather wide. This is inevitable due to the nature of the World Bank data set. Second, the estimated savings may be underestimated for two important reasons. First, we assumed that the costs of foreign and domestic suppliers to be the same. In some cases, especially in projects related to high-technology which tend to be of high project value, foreign suppliers may have lower costs than domestic firms. Second, our estimation has not taken into account the impacts of the increase in transparency due to the GPA requirements. Thus, we have omitted potential benefits from less corruption and collusion.

6. CONCLUDING REMARKS

We have quantified the benefits of the liberalization of the Thai public procurement market under GPA. We find that the potential savings of public expenditure is less than 2.5 percent, which is much lower than the figure used in previous literature (e.g., Srivastava 2003). Still the savings can be significant in absolute terms for large sectors, such as the construction of public works. We also find that liberalization under bilateral agreements such as JTEPA would yield substantially less benefit than the plurilateral liberalization under GPA. As a result, it would be much more beneficial for Thailand to access to GPA than engage in bilateral trade agreements.

Table 3 Expected Number of Bidders in Different Liberalization Scenarios

	Base case (no liberalization)	JTEPA		GPA	
		Min	Max	Min	Max
Central government					
Equipment	2.68	2.68	2.68	3.08	4.28
Material	3.42	3.42	3.42	3.82	5.02
Service/consultant	3.04	3.04	3.04	3.9	6.18
Rental service	3.41	3.41	3.41	3.81	5.01
State enterprises and other government entities					
Equipment	3.73	3.93	4.13	4.93	7.13
Material	3.57	3.97	4.17	4.77	6.97
Service/consultant	3.38	3.38	3.38	3.88	4.88
Rental service	3.63	3.83	4.03	4.83	7.03
All government entities					
Construction	8.42	8.42	8.42	8.42	17.42

Source: Authors' estimates.

Table 4 Estimated Savings from Procurement Liberalization (percentage)

	JTEPA		GPA	
	Min	Max	Min	Max
Central government				
Equipment	0	0	0.6	1.9
Material	0	0	0.4	1.4
Service/consultant	0	0	1	2.5
Rental Service	0	0	0.5	1.5
State enterprises and other government entities				
Equipment	0.2	0.4	1	2.1
Material	0.5	0.6	1.1	2.2
Service/consultant	0	0	0.6	1.4
Rental service	0.2	0.4	1.1	2.2
All government entities				
Construction	0	0	0	1.2

Source: Authors' estimates.

Table 5 Savings in Pubic Expenditure Due to Liberalization under GPA and JTEP

	JTEPA		GPA	
	Min	Max	Min	Max
Central government				
Equipment	0	0	126	389
Material	0	0	27	85
Service/consultant	0	0	31	77
Rental service	0	0	22	71
Subtotal for central government	**0**	**0**	**206**	**622**
State enterprises and other government entities				
Equipment	12	23	61	125
Material	12	18	32	66
Service/consultant	0	0	22	55
Rental service	2	3	8	17
Subtotal for State enterprises and other entities	**26**	**45**	**123**	**264**
All government entities				
Construction	0	0	0	2,448
Total	**26**	**45**	**328**	**3,334**

Source: Authors' estimates.

ENDNOTES

1 In most auction settings, bidders are "buyers" of goods sold in the auction market. A rise in the number of bidders will result in a higher winning bid price. On the contrary, in public procurement, bidders are "sellers" of goods or services. An increase in the number of bidders will result in a lower winning price.

2 In the case of central government agencies, the thresholds are SDR 130,000 for goods and services and SDR 5 million for construction. The thresholds for local governments are higher for goods and services.

3 We consider three of the World Bank's selection methods as "competition-based:" international competitive bidding (ICB), quality and cost-based selection (QCBS), and quality-based selection (QBS). The last two methods are used for the consultancy projects.

4 Thailand and Japan have concluded JTEPA without liberalizing their public procurement markets. However, they are expected to renegotiate on many issues, including public procurement liberalization, within five years from implementing the agreement.

5 In reality, while the number of Thai bidders may be lower in international biddings than in domestic biddings due to the expectation of increased competition, we simply assume the two numbers to be the same for the sake of convenience.

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