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BRIEF

Effects of Bidding Programs on Bidding Competition and Rates Contract Performance Capability Review vs. the Limited Lowest Price Program

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I Research Background & Objectives

- Major factors of efficiency on the public procurement market include the government-designed bidding programs through which winning bidders and winning bids are determined.
 - Bidding programs directly shape the incentives for potential bidders to participate as well as their bidding plans, and ultimately influence the outcomes of procurement contracts.
 - Efficient bidding programs should provide potential bidders with incentives to draft and submit bids that properly cater to the goals of contracts and also be capable of screening and selecting the most suitable bidders.
- Although public procurement market for goods forms a significant part of the procurement market in general in South Korea, little empirical research has been done so far on the effects of bidding programs on bid amounts and rates.
 - According to the Public Procurement Service (PPS)'s Public Procurement Statistics System (ppstat.g2b.go.kr), public procurement contracts for goods accounted for 37 percent of the entire value of transactions, in terms of price, on the public procurement market as of 2017.
 - Entire market = KRW 137 trillion; contract-for-goods market = KRW 52 trillion.
 - Despite the economic and financial significance of public procurement contracts, little empirical research has been done toward enhancing efficiency.
 - As the aging population continues to exert growing pressure on fiscal spending, enhancing the efficiency of public procurement contracts is crucial to improving fiscal sustainability.
- In this study, the authors examine the effects of bidding programs on bid rates concerning major types of goods traded on the public procurement market, with a view to exploring policy implications for enhancing the efficiency of public procurement contracts for goods in general.

- This study analyzes the effects of bidding programs on procurement contracts involving ready-mixed concrete (“remicon”), asphalt concrete (“ascon”) and concrete blocks.
- According to the Public Procurement Statistics System (PPSS), these three types of goods together accounted for public procurement contracts amounting to KRW 5 trillion in total contract price as of 2017. In fact, these three goods were the most, second-most, and fourth-most traded goods on the public procurement market in terms of contract price.
- These three types of goods are known as goods subject to competition among small and medium enterprises (SMEs). As such, the contract performance capability review (CPCR) and the limited lowest price program (LLPP) are the favored bidding programs used to determine suppliers of these goods. This study specifically compares these two bidding programs in terms of their effect on bid rates.

1. Program Overview

A. Public Procurement Market for Goods: General Process

- A public-sector entity in need of a certain good (“ordering agency”) first establishes a budget for purchasing or acquiring that good and then calculates the estimated price of that good according to the budget.
- Estimated price: Pursuant to Article 2 of the Enforcement Decree of the Act on Contracts to Which the State Is a Party (ACS), public-sector entities must estimate the prices of the goods they are about to purchase or acquire so as to use the estimated prices as references in reviewing bid proposals.
- The estimated prices are used to determine whether to open the bidding process to international bidding competition. The organizations that seek to procure goods through such a process must comply with the bidding procedures pursuant to the treaties governing said bids as well as the ACS.
 - This study is concerned with public procurement bids within South Korea only.
- The ordering agency then decides the bidding program or process by which the winning bid is to be selected, in light of the estimated price and the goals and conditions of the contract.
- While general competition should be used to determine the winning bid in principle, the ordering agency may resort to other processes, such as limited competition, competition among designated bidders, or private contracts, depending on the purpose, nature, and magnitude of the contract.
- A bidding program refers to the overall structure or method through which the winning bidder and the winning bid are to be determined. Ordering agencies choose from diverse bidding programs depending on the estimated prices and the nature of the contracts involved.
 - While the ACS provides for a variety of bidding programs, this study examines the CPCR and the LLPP, which are the two most commonly used programs for purchasing remicon, ascon and concrete blocks for the public sector in Korea.
- The ordering agency then posts the bid announcement, detailing the bidding program chosen and the terms and conditions of the contract.

- The ordering agency is to disclose the estimated price as part of the bid announcement, but not the projected price.
- The ordering agency screens and selects the contractor according to the chosen bidding program.
- The contract is then signed and the promised payments are made.
 - The process after signing of the contract is not within the scope of this study.

B. Goods Subject to Competition Among SMEs

- The policy of identifying and designating goods subject to competition among SMEs is an important part of the public procurement market in Korea.
- Where the goods to be acquired by an ordering agency are subject to competition among SMEs, different bidding programs apply pursuant to the Act on Facilitation of the Purchase of SME-Manufactured Products and Support for Development of Their Markets (SME Market Support Act).
- Goods subject to competition among SMEs are goods produced by SMEs that the Minister of SMEs and Startups recognizes and designates as in need of state support for market development, pursuant to Articles 6 and 7 of the SME Market Support Act.
- Ordering agencies about to purchase or acquire these goods must do so by organizing limited competition among SMEs or competition among designated SMEs.
- While, in principle, ordering agencies must conduct the CPR in purchasing these goods, they may resort to other bidding programs to maximize the efficiency of their purchases or otherwise support SMEs.

C. Main Bidding Programs

- There are a variety of bidding programs used on the Korean procurement market today, including qualification review, lowest price, and negotiation-based contract programs. This study, however, focuses on the two main bidding programs popularly used in determining contractors for remicon, ascon and concrete block procurement.

(1) CPR

- While the overall CPR process overlaps greatly with the qualification review program (QRP), details of the scoring rubric and price estimations are different.
- The ordering agency starts evaluating bidders who have submitted the lowest prices below the projected price, in ascending order of the prices submitted, and grants the bid to the bidder whose overall score is 88 points or higher.
- The detailed rubric of evaluation applied to bidders competing for contracts with estimated prices of KRW 1 billion or greater is shown in Table 1.
 - Different criteria and points are used depending on the amounts of estimated prices involved.

Table 1. Detailed Criteria for the CPR

Type	Indicator	Description	Points
Total			100
I. Capability to supply goods	1. Supply records	A. Goods equivalent to or higher/better than those demanded in bid B. Goods similar to those demanded in bid	5
	2. Technical capability	A. Technical personnel B. Accumulation of production technologies	10
	3. Management status	A. Credit rating	30
II. Bid price			55
III. Credibility	1. Quality assurance and other measures of trustworthiness	A. Technical and/or design-related certificates B. QA process C. Environmental management D. Customer service E. Policy preference for small businesses F. Policy preference for other factors (enterprises owned by women or people with disabilities, enterprises hiring people with disabilities, etc.)	+ 3 To - 2
	2. Diligence with contracts	A. Delays in supply B. Unfair subcontracting	
IV. Grounds for disqualification	I. Defects in supply capability	A. Bankruptcy/insolvency that interferes with the performance of contract (except bidders who are carrying out court-ordered normalization processes, such as legal management and authorization of composition)	-30

Source: Detailed Criteria of Contract Performance Capability Review Before Purchasing Goods Subject to Competition Among SMEs.

■ While the points are added up in a process similar to that involved in the QRP, the winning bid price must reach 91 percent of the projected price, as of 2014, in order to win the perfect score in the bid price category.

Table 2. Formulae for Determining Winning Bid Prices Under the CPR

Period	Formula
Before December 31, 2013	$\text{Points} = 55 - 4 \times \left[\frac{88}{100} - \left(\frac{\text{Bidder-submitted price}}{\text{Projected price}} \right) \times 100 \right]$
January 1, 2014 and afterward	$\text{Points} = 55 - 4 \times \left[\frac{91}{100} - \left(\frac{\text{Bidder-submitted price}}{\text{Projected price}} \right) \times 100 \right]$

Source: Detailed Criteria of Contract Performance Capability Review Before Purchasing Goods Subject to Competition Among SMEs.

(2) LLPP

● The LLPP selects the bidder that has submitted the lowest price of bidders who submitted prices above the bid price floor.

■ According to Article 10.2 of the Ministry of Strategy and Finance (MOSF)'s Executive Standards for Government Bids and Contracts, an ordering agency that receives bids from two or more bidders is to grant the bid to the bidder that has submitted the lower or lowest price among bidders who propose prices that are 88 percent or above the bid price floor.

■ In other words, the LLPP limits the winning bid rates to 88 percent.

- If the projected price is disclosed, all participating bidders would submit prices at 88 percent of the projected price. The multiple projected price requirement, however, ensures that the final projected price is chosen at random. The bidder who is able to predict the projected price most accurately therefore wins the bid.

2. Data

•• This study draws upon the data from remicon, ascon, and concrete block contracts from 2011 to 2016 that the Public Procurement Service (PPS) entered via the digital public procurement platform.

■ The data is available from the Open Public Procurement Information Portal (data.g2b.go.kr).

•• Table 3 shows the details of different bidding programs used by the PPS.

Table 3. Distribution of Bidding Programs by Good & Frequency

(Unit: Number of contracts)

	Goods		
	Remicon	Ascon	Concrete blocks
Mode of competition			
Private contracts	1,585 (40.18%)	1,773 (53.26%)	356 (72.65%)
General competition	66 (1.67%)	32 (0.96%)	1 (0.20%)
Limited competition	2,294 (58.15%)	1,524 (45.78%)	133 (27.14%)
Nominated competition	0 (0.00%)	0 (0.00%)	0 (0.00%)
Bidding program			
Other (on-site bidding)	39 (0.99%)	27 (0.81%)	1 (0.20%)
QRP	49 (1.24%)	13 (0.39%)	1 (0.20%)
LLPP	626 (15.87%)	210 (6.31%)	64 (13.06%)
CPCR	2,073 (52.55%)	1,411 (42.39%)	130 (26.53%)
LPP	986 (24.99%)	1,536 (46.14%)	294 (60.00%)
NBCP	172 (4.36%)	132 (3.97%)	0 (0.00%)
DQCP	3,945 (100.00%)	3,329 (100.00%)	490 (100.00%)

Note: Figures in parentheses indicate the proportion to the total number of competitions or bids held for each category of good.

Source: created by the authors

- Private contracts and limited competition are the favored modes of competition.
 - Private contracts are used when there is only one producer, when the bid announcement has been made twice or more, or when the good concerned is a technological invention from an SME. The bidding program to be used in this case is the lowest-price program (LPP).
 - While MOSF Standards require that private contracts are to be used for contracts with estimated prices below KRW 50 million, most ordering agencies opt for the LLPP by requiring quotes from two or more bidders for each contract.
 - Limited competition and the CPRC are used in most other cases.
- The LLPP, the CPRC, and the LPP are the favored bidding programs.
 - While the LPP appears to have been used most frequently, this is because there have been numerous private contracts involving only a single bidder.
 - The bidding programs used by the PPS in competitive bids on remicon, ascon and concrete block procurement are therefore the CPRC and the LLPP.
- The characteristics of remicon, ascon and concrete procurement contracts can be summarized as follows:
 - Where there is only a single producer of the needed goods, and that producer satisfies the conditions for private contracts (i.e., the product is a technological invention of an SME), the ordering agency grants the bid according to the LPP in a private contract.
 - If the bidders involved do not satisfy the conditions for private contracts, but the needed goods have an estimated price below KRW 50 million, the ordering agency grants the bid according to the LLPP in a private contract.
 - Limited competition and the CPRC are used in all other cases.

3. Results of Analysis

- This study analyzes the effects of bidding programs (i.e., the CPRC and the LLPP) on successful bid rates in public procurement contracts over remicon, ascon and concrete blocks.
 - Specifically, this study examines how the successful bid rates change when the LLPP is used instead of the CPRC.
- “Article numbers” were used to identify and exclude private contracts, for which bidders satisfied the terms and conditions for private contracts, from the contracts subject to analysis in order to prevent the problem of endogeneity arising from the nature of the products concerned.
 - “Article numbers” refer to the numbers of articles (and their paragraphs) in the PPS policy laying down the grounds upon which specific types of bidding programs are to be used. Examples include “single producer,” “goods subject to competition among SMEs,” and “estimated prices below KRW 50 million.”
 - Most contracts decided according to the LPP were thus excluded from the scope of analysis.
- As estimated prices also imply differences in the characteristics of goods, analysis was further confined to contracts with estimated prices below KRW 100 million.
- The central question guiding this study is therefore which bidding program—the CPRC or

the LLPP—would maximize the financial efficiency of public procurement contracts over remicon, ascon or concrete blocks, with estimated prices below KRW 100 million.

■ This study compares the CPRC and the LLPP only due to the limits of the available data.

●● See Table 4 for descriptive statistics on remicon, ascon, and concrete block contracts with estimated prices below KRW 100 million.

Table 4. Remicon, Ascon, & Concrete Block Procurement Contracts with Estimated Prices Below KRW 100 Million: Descriptive Statistics

Goods	Bidding program	Statistics type	Estimated price (in KRW million)	Number of bidders	First-choice bid rate (%)	Successful bid rate (%)
Remicon	LLPP	Mean	33	1.67	98.2	98.2
		SD	10	0.555	2.25	2.17
		Obs	625	347	223	216
	CPCR	Mean	71	2.08	98.1	98
		SD	15	0.35	1.96	1.95
		Obs	475	118	106	101
Ascon	LLPP	Mean	33	2.98	96.8	97.2
		SD	9	6.06	3.95	3.54
		Obs	209	132	88	82
	CPCR	Mean	72	2.29	96.3	96.2
		SD	16	0.981	4.26	4.3
		Obs	291	86	79	76
Concrete blocks	LLPP	Mean	31	2.31	95.9	95.9
		SD	9	1.26	3.9	3.9
		Obs	64	26	17	17
	CPCR	Mean	69	5	90.4	90.4
		SD	12	3.24	5.2	5.2
		Obs	46	17	15	15

Source: created by the authors

■ Remicon contracts have the highest mean successful bid rate and the smallest mean number of bidders.

■ While there is little difference in the mean bid rates of remicon contracts between the two bidding programs, the differences widen with respect to ascon and concrete block contracts.

- The effects of bidding programs vary by the types of goods concerned, suggesting that industrial characteristics play a role as much as bidding programs in determining successful bid rates.

■ Overall, the mean successful bid rates of contracts determined by the CPRC are not higher than those of the LLPP.

•• Bidding programs may affect bid rates via the following two paths.

■ First, the bidding program may change the number of bidders participating in the bid, so that the resulting difference in the intensity of competition changes the successful bid rates.

■ Second, while the bidding program makes no difference to the number of participating bidders, the differences in which the bidder and the bid are selected may change the bid rate.

•• A regression analysis was performed to determine which of these paths was the case.

■ The dependent variable is the bid rate (%), and the CPCR dummy and the concrete block dummy form the base category.

■ The number of participating bidders was included in Equation (1) only in order to examine the possible effect of competition.

■ The term of interaction between bidding programs and type of good was included to examine the possible effects of the type of good on the choice of bidding programs.

•• Regression analysis reveals that the number of participating bidders is the path via which the bidding programs affect bid rates.

Table 5. Effects of the LLPP & the CPCR on Successful Bid Rates

Bid rate (%)	(1)	(2)
LLPP dummy	2.097 (1.451)	4.488*** (1.621)
Remicon dummy	0.804 (0.942)	1.937** (0.929)
Ascon dummy	0.501 (0.974)	1.124 (0.990)
CPCR*Remicon	3.073** (1.449)	5.985*** (1.545)
CPCR*Ascon	1.933 (1.535)	5.024*** (1.630)
Estimated price	-0.020** (0.010)	-0.035*** (0.011)
Number of participating bidders	-1.250*** (0.264)	-
Constant	97.910*** (1.597)	92.251*** (1.521)
Year dummy	Y	Y
R2	0.3557	0.2520
Obs.	507	507

Notes: 1. Of contracts with estimated prices below KRW 100 million, only those whose cited legal grounds were either “goods subject to competition among SMEs” or “estimated prices below KRW 50 million” were analyzed.

2. Unit for the estimated price variable is KRW 1 million.

3. The asterisks, *, **, and ***, respectively indicate significance levels of 10, five, and one percent.

4. Figures in parentheses indicate standard errors.

Source: created by the authors

■ With the number of bidders held the same, bidding program does make a difference in successful bid rates for remicon contracts. Specifically, the LLPP applied to remicon contracts has the effect of lowering the successful bid rate by 3.07 percentage points, when the number of bidders is held the same, while the same program does not exert a statistically significant influence on the successful bid rates concerning the other two types of goods.

■ When we allowed the bidding program to determine the number of participating bidders, other results were observed.

- The LLPP increases the successful bid rates on concrete blocks by 4.49 percentage points in comparison to the CPR.

- The LLPP lowers the successful bid rate by 1.5 percentage points than is the case under the CPR with respect to remicon contracts.

- In procuring ascon worth less than KRW 100 million in estimated price, the LLPP ensures greater efficiency (lower successful bid rates) than the CPR.

●● The effects of bidding programs measured, with the number of bidders controlled, reflect the very designs of the programs, and not effects of the number of bidders or intensity of competition on bid rates.

■ In contrast, the results of analysis, without the number of bidders controlled, reflect the effects of both program designs and given level of competition.

●● The level of competition in bidding thus exerts a sizable effect on bid rates.

■ In particular, the differences in bid rates on ascon and concrete blocks are exclusively the outcomes of changes in the intensity of competition.

- The increase in the average number of bidders under the LLPP lowers the bid rates on ascon, while the decrease in the average number of bidders under the LLPP raises the bid rates on concrete blocks.

■ With the number of bidders not controlled, applying the LLPP to remicon contracts lowers the bid rate by 1.5 percentage points in comparison to the CPR. With the number of bidders controlled, the program decreases the bid rate by 3.07 percentage points.

- This means that, with the number of bidders held constant, the LLPP, by design, would reduce the bid rate by 3.07 percentage points in comparison to the CPR. Given the LLPP's effect on reducing the number of participating bidders, however, its net effect would amount to 1.5 percentage-point reduction in the bid rate.

1. Increasing Incentives for Bidders to Participate

- In order to enhance the efficiency of public procurement contracts over remicon, ascon, and concrete blocks, it is important to increase bidders' incentives to participate.
- The intensity of competition determined differences in bid rates in the case of ascon and concrete blocks, while the same factor explains approximately 50 percent of the differences in bid rates on remicon.
- It is important to maximize the number of bidders participating in public procurement bids.
- Bidding programs should be redesigned to offer greater incentives for participation to bidders, and other policy measures are needed to increase the level of competition in procurement bids in general.
- Eligibility criteria that have little to do with the capability required to perform contracts should be eliminated to encourage more bidders to participate.
- The cooperative-centered bidding practice regarding remicon and ascon discourages bidder competition. It is thus important to limit the eligibility of cooperatives to participate in bids.
- Contract values should be reduced to enable more and more businesses to participate in bidding. Greater supervision is needed over the public procurement market against collusion.

2. Differentiating Bidding Programs by Type of Good

- The extents to which bidding programs affect bid rates vary by type of good.
- Whereas the LLPP reduced successful bid rates on remicon and ascon, it did the opposite with respect to concrete blocks.
- Legal grounds are needed to apply different bidding programs to different types of goods.
- The ACS allows ordering agencies to apply different bidding programs according to different estimated prices and characteristics of the goods concerned (e.g., goods subject to competition among SMEs, goods exclusively produced by certain producers only).
- There is, however, no legal grounds upon which ordering agencies may use different bidding programs depending on the types of goods they seek to purchase.

IV Anticipated Effects

- This study examines the effects of different bidding programs used in remicon, ascon, and concrete procurement contracts on bid rates.
- The extents to which different bidding programs affect bid rates vary by type of good. Participation and competition of bidders is another important factor.
- Policy measures are needed to increase bidder participation and new legal grounds should be introduced to enable ordering agencies to use different bidding programs for different types of goods.
- These changes are needed to improve the efficiency of public procurement contracts.
- Greater participation by bidders in the public procurement market would not only increase the efficiency of public procurement contracts, but also lead to industrial progress by enabling more competitive bidders to win bids.

Works Cited

Heewoo Kang and Bitmaro Kim, *A Study on Reforming the Korean Public Procurement System*, KIPF 2017.