A Real Problem of Government Purchasing

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1. Introduction

There have been many scandals related to government purchasing in Japan. In this time of deflation, it seems that the number of scandals is increasing because the amount of purchasing (including by the public sector) is decreasing. They say that the companies decided to compete in hard races and do anything, even illegal things, for the sake of contracts. In the morning, we read in the newspaper that the mayor was arrested for getting a bribe for the contract to build the new library(1), and in the evening we find that bid prices were exactly equal to government estimated prices in a fifth of auctions whole year(2). The typical crime is that some company gives a bureaucrat a bribe for a contract and is rewarded for it. A bribe is given for information on the estimated price, or for arranging bidding, or for a nomination of the auction. The price cartels are occasionally accused not only with government purchasing but in general markets as well, in the private sector. These sorts of crimes are investigated and proved by police officers or the Fair Trade Commission. Among various illegal actions, there is one of most important problems with government purchasing is called 'dango', which is the arranging of auctions by nominees. In order to avoid 'dango' the Japanese government, especially the Ministry of Land, Infrastructure and Transport and the Fair Trade Commission have been making efforts. It was enacted that the competitive auction should be involved in the big scale construction like international airports. Administration officers have been ordered to crack down on illegal actions especially 'dango' in government purchasing. The problem is that it is very difficult to prove they are cheating when they are in auctions. The only way to know if they cheat or not is to wait for the rumor or the alleged information to surface. Usually, once this kind of information is exposed, the contract is frozen and investigated. But if we did not find proof, like a receipt of payment for collaboration, we could only accuse the members depending on their confession. This is a real problem for government purchasing.

Before considering this point, the difficulties of proving 'dango', let us review how companies bid for government contracts. There are two types of nominated auctions, general one and appointed one. For our analysis, it makes no difference so that we use one category, the nominated auction.

For example, there is a plan for constructing a new city hall. The city hall planning office is going to hold an auction to make a contract with a general constructing company. The office set the estimated price beforehand, trying to make sure how much will it cost if all regulations, of safety, of building construction, and labor conditions, etc., are satisfied. We must denote here, the office is a comparative amateur as an agent to estimate prices. In usual cases, the sealed-bid auction will be held with nominated companies. The officers know a general competitive auction is demanded but prefer the nominated auction. They explain that the reason for holding the nominated auction is because it would cost much more if they held the general competitive auction to deal with a large number of companies. Let us assume there are number of nominated companies that are going to bid on the city hall construction. The lowest bidder will win if the bid price is lower than or equal to the estimated price. If no one wins, a second bidding will be held. The auction will not end until some company wins.

Now let me explain how they cheat the auction. First of all, the collaboration members, 'dango' group, decide which company will win. The agreed upon winner hand other members the price it is going to bid. The one hands them the first bid price, second and third prices in case the auction is repeated. Other members agree that they are never going to bid lower than these prices. When the auction starts, all members pretend to follow the rules, but they actually keep their own rules. Going through the auction formalities, the agreed upon winner wins and the officer makes a contract with this company.

As long as all members keep quiet, nobody even knows there was 'dango'. Even if the auctions were repeated and the lowest bidders were always same company, there could be no way to prove they cheated. It might be by coincidence at very low probability.

'Dango' is without doubt unfair (and crime). They say its in the nature of construction companies to collaborate. Or, more bluntly, that they tend to be scoundrels. Dose everybody show some tendency to commit fraud? It is easy to determine the reason why they cheat is that they have a peculiar sociality. But it is very difficult to prove that a whole society an inherent tendency to cheat. The many varieties of rigging, involved with printing companies or electronics manufacturers, and listed companies or small-and medium-sized companies suggests that the tendency to cheat is not limited to the construction industry. If constructors rigged an auction, it would be necessary to examine what other industries might do.

Surely we cannot ignore the blame that Japanese corporate culture is much different from the European and American ones and it produces too many frauds. Japanese corporate culture might be different but no one has shown how it caused bid-rigging. It is not only Japanese but other country governments have same kinds of problem. Then we found it is not reasonable to conclude the Japanese construction company peculiarity. We need to examine other causes of 'dango'. If the only way to keep the auction fair is that we should ask companies to play fair voluntarily, then there must be constitutional backing in government purchasing system. And this is what we are going to study this paper. We are here to start with presumption that nomination is the foundation of bid-rigging itself.

There are some distinguished previous papers about the auction theory, McAfee and MacMillan [1987], Milgrom and Weber [1982]. And Kanemoto [1991] refers the optimal competitive auction system for the public sectors. But it has not been attempted to describe what really they do at the bid-rigging. We shall describe the procedure of bid-rigging, 'dango', in a mathematical framework and discuss related problems, and implications, what constitutional backing exists, what the purchasing system is supposed to be, and what kind of policy must be implimented. In order to analyze these matters, this paper will procede as follows.

Section 2 shows the model of how cheating is done, described in a mathematical framework.

Section 3 discusses the implications of the model, and points out the difficulties involved with government purchasing. We will see how governments generally suffer from illegal actions and what efforts they make to solve problems.

Section 4 is the concluding remarks.

2. The Models

In this section we set up the auction model to illustrate how the members bid if they play fair, and what competitive equilibrium comes out. After this we shall get in the argument of 'dango', bid-rigging. Let us review the auction theory referring to McAfee and MacMillan [1987], and Milgrom and Weber [1982].

The seller is a government, which has one indivisible unit of a project for sale. More precisely, a government sells the right of contract for the project. Assume there is one government and n potential buyers, bidders. We have to be careful not to be confused that the words seller and buyer are used opposite their usual meanings. We follow the usage of game theory, which indicates that the government actually purchases the public project that is denoted Y. Y has common value and is a unit and indivisible, in other words, common usage of fiscal policy. The government holds a sealed-bid auction for purchasing the public project. The estimated price set (the government budget) had been fixed beforehand secretly, and it has range between $[p^l, p^h]$ where $p^l < p^h$. If the bid price is not included to this estimated price set, then the auction will be repeated. If there are some bids included to the estimated price set, then the lowest bidder will win. The auction will be repeated, say m times, by the time when some bidder will win.

There are n potential buyers, bidders in an auction. They are denoted with evaluation of the project, $0 < v_1 < \cdots < v_i < \cdots v_n < 1$, and the *i-th* bidder knows how much value v_i the project has. They know their own estimated value of the project v_i, which is independent and uniformly distributed, $v_i \in [0, 1]$. They also know other bidders evaluations are distributed between $[0, 1]$ but never what exactly they are. In this context, evaluations are types of bidder. Bidders simultaneously submit bids $b_i \in [0, 1]$, which are included to the bid price set $(b_1, b_2, b_3, \cdots, b_n)$. The lowest bidder is a winner j and its bid price is denoted $b_j{}^*$, the utility is $b_j{}^* - v_j$.

Example 1: To solve this problem let us focus on the 1 government and 2 agents case. Assume there is a government will purchase a public project and held an auction to contract the company for it.

Two companies, $i=1, 2$, have their values of the project v_1 and v_2. They know their own value but they have no way to know other's value. The value v_i is independent and uniformly distributed on between $[0, 1]$, and companies know this fact. The bid price $b_i>0$, $i=1, 2$, is independent and uniformly distributed on between $[0, 1]$. We denote the winner's bid price by b^*, then i-th utility function is b^*-v_i. The government hold a sealed-bid auction, so the companies submit bids simultaneously. If the minimum bid b_i is belonged to the estimated price set $[p^l, p^h]$, then the company i win. If not, then the auction is repeated. If both companies bid the same prices and those are belonged to the estimated price $[p^l, p^h]$, then they decide the winner by the lottery. So that their revenue functions can be written as follows.

$$u_i(b_i, v_i)=\begin{cases} b_i-v_i & \text{if } b_i<b_j \\ (b_i-v_i)/2 & \text{if } b_i=b_j \\ 0 & \text{if } b_i>b_j \end{cases} \qquad for\ i, j=1, 2, i\neq j,$$

where u_i is the revenue function, b_i and b_j are bid prices of company i and j, v_i is the project value of i. Then we have the auction space A_i and the type space T_i. The game G is

$$G=\{A_1, A_2\ ;\ T_1, T_2\ ;\ b_1, b_2\ ;\ u_1, u_2\} \qquad A_i=[0, \infty),\ T_i=[0, 1].$$

The bidder i (company i) decides the bid price in count of its own value v_i and j's bid price which bidder i guess the bidder j may discount somehow from the true value. Then i's bidding function which shows the mapping from T_i on A_i is;

$$b_i(v_i) \qquad \text{for} \quad i=1, 2.$$

These two companies have the strategy $(b_1(v_1), b_2(v_2))$, and this is the Bayesian-Nash equilibrium when the strategy solve the optimal problem;

$$Max(b_i-v_i)P(b_i<b_j)+1/2(b_i-v_i)P(b_i=b_j). \qquad \cdots(1)$$

When $P(b_i=b_j)=0$, we have the optimal problem as follows;

$$Max\ (b_i-v_i)P(b_i<b_j). \qquad \cdots(2)$$

Assume that the strategy of company i and j are linear and both predict other might discount its own value, then we have;

$$b_i(v_i)=a_i+c_iv_i \qquad \text{for} \quad i=1, 2,$$

where a_i is the lowest price of bid and c_iv_i is discounted value of i with discount rate $c_i(0\leq c_i\leq 1)$. When the company 2 bids $b_2(v_2)=a_2+c_2v_2$, if and only if

$$b_1<a_2+c_2v_2,$$

then the company 1 wins. In this case the problem (2) can be written

$$Max(b_1-v_1)P\{v_2>(b_1-a_2)/c_2\}.$$

Let us think about company 1's best response. The company 1 tries to make the expected value $(b_1-v_2)\{v_2>(b_1-a_2)/c_2\}$ maximum. It is meaningless for the company 1 to bid higher than the company 2's highest bid and far lower than the lowest bid. So it might be said that the company 1 will bid between a_2 and a_2+v_2 ; $a_2\leq b_1\leq a_2+v_2$.

And the company 1's strategy is

$$b_1(v_1)=\begin{cases}(v_1+a_2)2 & \text{if } v_1\geq a_2\\ a_2 & \text{if } v_1<a_2.\end{cases}$$

By the assumption, the linear conditions of $b_1(v_1)$ are $a_2\leq 0$, $1<a_2$. Because that a_2 is the lowest bid of the company 2, we can neglect $1<a_2$. When $a_2\leq 0$, we have

$$b_1=(v_1+a_2)2,$$

so that $a_1=a_2/2$ and $c_1=1/2$. By the contrary,

$$b_2=(v_2+a_1)/2.$$

We get $a_i\leq 0$, $a_j=a_i/2$ and $c_i=1/2$ for $i=1, 2$. Finally, by using $a_1=a_2=0$ and $c_1=c_2=1/2$, we have the equilibrium

$$b_i(v_i)=v_i/2 \qquad \text{for} \quad i=1, 2.$$

Example 2 : We can expand this solution and conclusion to the n agents case simply. There are one government and n potential bidders, companies, to attend the auction. The government is going to make the contract with one of these companies for the project. Assumptions about the goods and participants are same as above and notation should be changed on demand.

The company i decides it's bid price b_i thinking that other $(n-1)$ companies bid discounted their value by rate of k, e.g., the company 1's bid becomes

$$b_1<kv_i \qquad \text{for} \quad i=2, 3, 4, \cdots, n.$$

The company 1's probability of winning is $(b_1/k)^{n-1}$, and it's expected bid value becomes

$$(b_1-v_1)(b_1/k)^{n-1}.$$

Setting the optimization problem and solving it the same way of the Example 1, we have the Bayesian-Nash equilibrium.

$$Max(b_i-v_i)(b_i/k)^{n-1} \qquad \text{for} \quad i=1, 2, 3, \cdots, n.$$

$$b_i(v_i)=(n-1)(v_i/n) \qquad \text{for} \quad i=1, 2, 3, \cdots, n.$$

As long as all bidders keep to the auction rules and play fair, the bid price depends on their own evaluation of the project and the number of the players. And the free competitive auction makes the bid price lower than the nominated one because of the equilibrium. The more players, the lower the price becomes.

What made the auction the most popular way of governments' purchase is the belief that every player stays within the rules. There have been, however, many bid-rigging reported. Here we have two distinct types of bid-rigging, one is cheating 'in the auction' and another is 'out of the auction'. 'In the auction', the members agreed to their own rules to keep through the auction but pretend to play fair. Our example shown in the section 1 belongs to this category. They had agreed who would win, and try to let him win pretending to keep the government rules. 'Out of the auction', they bid normally and someone wins in according with the game rules. Before or after the bid they divide the benefits from the auction among all members. There are several examples ; the auction winner orders the company which is one of members and they agreed as a ‘subcontractor’. In this case, the government contracts the winner but the project is actually completed by the subcontactor. Another example is that the winner pays ‘the price of win’ to other companies. This payment means to compensate other members’ opportunity cost. In the Kunashiri Island case(3), the winner paid some money to the companies those desired to get contract not to join the auction and paid companies that were not interested in the contract to join the auction. It calls for further consideration to analyze ‘out of the auction’ case. To follow up this matter would involve us in other factors than our main subject and take us beyond the scope of this paper. So we will focus attention on the ‘in the auction’ case.

To examine what actually happens in the auction if the nominees violate the government rules and obey their own, let us take an example. The following is the typical case of ‘dango’. Example 3 : There is the government going to have some project and show the auction rule to contract for the project. The auction will be sealed-bid and the only nominated companies can bid. There 6 nominated companies numbered 1, 2,⋯, 6. These 6 companies agreed that the company 1 would be a winner before the auction started. The company 1 hand its bid prices to others ; ¥5.15 million for the first bid, ¥5.05 million for the second bid, and ¥4.90 million for the third bid. The government estimated price range is $[p^l, p^h]=[\text{¥}4.00\ million, \text{¥}5.00\ million]$.

Once the auction starts, they pretend not to know each other and to play by the rules. But they keep to their secret arrangement. In the first bid, the company 1 bid ¥5.15 million so that others bid higher than that. Their bid are (5.15, 5.18, 5.19, 5.20, 5.30) in order. The lowest bid 5.15 is bigger than the government estimated highest price ¥5.00, so no one wins and the auction continue. In the second bid, the company 1 bid ¥5.05 million and others bid higher than this. Their bid prices are (5.05, 5.07, 5.08, 5.09, 5.10, 5.10). The lowest bid ¥5.05 is bigger than ¥5.00, no one wins and the third auction is held. In the third bid, the company 1 bid ¥4.90 million and others bid higher than this. Their bid prices are (4.90, 4.95, 4.98, 5.00, 5.00, 5.05). The lowest bid is belonged to the government estimated price set, so that the company 1 wins and gets the contract.

What has to be noticed here is that the first place (lowest bid) of each stage is always made by the same company. If the auction were repeated, then it would be at first place forever, or surely it would win. The doubt about the fairness might be pointed out, but it is difficult to prove they have cheated. We know if there had been bid-rigging, some company would have been the lowset bidder through out the auction. But the fact we face is the only conclusion that the company that had been stayed at first places won. Occupying the first place by one company is the necessary condition of its winning. However, it is not the sufficient condition, because no one can prove the cheating from the fact that the winner kept the first place through the auction. It might be by coincident. We have to remark that the difficulty with governments to keep auctions fair is caused by this point. Even if the government saw that the company 1 kept occupying the first place, they could not accuse it. Although the government has been trying to keep auctions fair seriously, as long as the way of purchase is the sealed-bid auction, it is absolutely impossible to make games clearly fair. This is the real problem of government purchasing.

Let us rewrite the above example more formally. To formulate the problem, we need to introduce the set theory. As a preliminary, we assume ordinal conditions for algebra of set are satisfied and start with ordering set theory, relations.

We will denote the relation by $\leq$ on a set A, and we have preliminary conditions as follows.

Condition 1 : reflexivity

$a \leq a \qquad \forall a \in A.$

Condition 2 : antisymmetry

$a \leq b,\ b \leq a \rightarrow a = b \qquad \ni a,\ b \in A.$

Condition 3 : transitivity

$a \leq b,\ b \leq c \rightarrow a \leq b \leq c \quad \ni a,\ b,\ c \in A.$

Then here come some definitions of order available.

Definition 1 : order relation

If a relation $\leq$ on set A satisfies condition 1, 2 and 3, then the relation $\leq$ is said to be order relation on set A.

Definition 2 : comparability

If $a \leq b$ or $b \leq a$ for some a and b belong to set A, a and b are comparable with the relation $\leq$.

Definition 3 : total order (linear order)

The relation $\leq$ on set A is total (liner) ordering, if any two elements of A are comparable with the relation $\leq$.

Definition 4 : ordered set

A set A ordered by the relation $\leq$ is said to be ordered if for every pair $a \in A$ and $b \in A$ there exists $c \in A$ such that $a \leq c$ and $b \leq c$.

If there is a relation $\leq$ defined on set A, the pair of the set A and the relation $\leq$ is called the ordered set and denoted $(A, \leq)$.

Definition 5 : totally ordered subset

Let M be an arbitrary subset of ordered set $(A, \leq)$, and M is not an empty set. If and only if $a \leq b$ for any pair $a \in M$ and $b \in M$, the relation $\leq_M$ is defined on set M and it is written $a \leq_M b$. When this is held, the ordered set $(M, \leq_M)$ is called the totally ordered subset of the ordered set $(A, \leq)$.

Definition 6 : maximal, minimal, greatest and least element

If there is an element $a \in A$ such that $x \leq a$ for every $x \in A$, a is said to be the maximal element of A, denoted $maxA$.

If there is an element $a \in A$ such that $a \leq x$ for every $x \in A$, a is said to be the minimal element of A, denoted $minA$.

If for an element $a \in A$, there is no $x \in A$ such that $a < x$, a is said to be the greatest element of A.

If for an element $a \in A$, there is no $x \in A$ such that $x < a$, a is said to be the least element of A.

Theorem 1:

If there exists $a = maxA$, a is the unique greatest element of A.

If there exists $a = minA$, a is the unique least element of A.

Remark that there may be greatest and least elements, though there are not $maxA$ and $minA$.

Definition 7 : upper bound, lower bound

Let M be a totally ordered subset of $(A, \leq)$, and M is not empty.
If there is some $a \in A$ for any $x \in A$ such that $x \leq a$, a is said to be an upper bound of M.
If there is at least one upper bound of M, M is said to be bounded from above.
If there is some $a \in A$ for any $x \in A$ such that $a \leq x$, a is said to be a lower bound of M.
If there is at least one lower bound of M, M is said to be from below.
If M is both upper and lower bounded, M is said to be bounded.

Let M^* be a set of all upper bound of M, and M_* be a set of all lower bound of M. That M is bounded from above means that $M^* \neq \phi$ where ϕ indicates empty set. And that M is bounded from below means that $M_* \neq \phi$.

Theorem 2:

Suppose M is a totally ordered subset of $(A, \leq)$, and M is not empty.
If M is bounded from above, then there is the least element of M^*.
If M is bounded from below, then here is the greatest element of M_*.

Definition 8 : supremum, infimum

When $M^* \neq \phi$ and there exists the least upper bound $minM^*$, $minM^*$ is said to be the supremum written in the form $supM$.

When $M_* \neq \phi$ and there exists the greatest lower bound $maxM_*$, $maxM_*$ is said to be the infimum written in the form $infM$.

We have known follows by the definitions ; suppose $b = supM$,

i) $x \leq b$ for any $x \in M$.
ii) $x \leq a$ for some $a \in A$ and any $x \in M$, implies $b \leq a$.

Theorem 3:

Suppose N *is a set of all natural numbers,* N *is the totally ordered set with* $\leq$. *An arbitrary nonempty subset of* N *has the least element.*

Proof: Let M be a nonempty subset of N.
i) Because $M \neq \phi$, M has at least one element. Assume $1 \in M$, then $1 = minM$. Then, let us assume that the Theorem 3 holds if some natural numbers lower or equal to n belong to M.
ii) For $n+1 \in M$, if some natural numbers lower or equal to n belong to M, the theorem holds. If there is no natural number lower or equal to n in M, then $n+1 = minM$.
Combining i) and ii), we obtain the theorem. (*Q. E. D.*)

Now we are here able to formulate the bid-rigging with the set theory in solid framework.

Assume there are one government and n-number companies, which make the company set $C = (1, 2, 3, \cdots, i, \cdots, n)$. The government going to held the auction to make the contract for some project. The contract (or the project) cannot be shared in plural companies, then we say the goods is indivisible unit.

All companies agree on their own secret rule to arrange the auction. But they pretend to keep the government rule through the auction and bid to obey their own arranging rule. This arranging rule is that they choose the one who will win the auction to make contract and others support it. Practically, the agreed upon winner hand its bid prices to other members beforehand and other members bid not to be lower than that.

The government estimated price set is $[p^l, p^h]$, where p^l is the lowest estimated price and p^h is the highest one. If the bid prices are included to this government estimated set, the lowest among them will win. If no bid are in the set, then the auction will be repeated.

Let us denote the *i-th* company's *j-th* bid as b_{ij}. We have the set B_j, which is the set of the bid prices of the *j-th* bid. Suppose the relation $\leq$ holds Conditions 1, 2 and 3, it is order relation and let us define the order $\leq$ on set B_j to get the ordered set $(B_j, \leq)$. In the following context, B_j means this ordered set.

In the first bid, for example, the set of bid price becomes $B_1 = (b_{i1}, b_{31}, b_{41}, b_{71}, \cdots)$, where $b_{i1} < b_{31} < b_{41} < b_{71}$. By the theorem, there is the only one minimum element, $minB_1 = b_{i1} > p^h$, then no one wins. In the second, there comes the set $B_2 = (b_{i2}, b_{52}, b_{42}, b_{82}, \cdots)$ and $minB_2 = b_{i2} > p^h$, then no one wins. The auction continues and finally, in the *m-th* bid, we have $B_m = (b_{im}, b_{2m}, b_{5m}, \cdots)$ and $minB_m = b_{im} \in [p^l, p^h]$, so that the *i-th* company wins to make the contract with the government, and its profit can be written $b_{im}\text{-}v_i$.

On proof of this conclusion, little needs to be shown. Assume N is the set of all natural numbers, i.e., the totally ordered set. It is clear that B_j is not the empty set and the totally ordered subset of N. Theorem 3 implies B_j has the minimum element.

3. Policy implications

For the present, we shall confine our attention to the nominated auction. As section 2 has shown, as long as the nominated auction is preferred to the perfect competitive auction, bid rigging is successful and difficult for us to stop. Once nominees agree upon their own rules that they choose the winner, it is simple and easy for them to play their roles. They only need to be careful not to bid lower than the agreed upon winner, that is, they only have to focus on prices. The model is constructed by sealed bid auction game and preliminaries of set theory. It automatically supplies us with a clue.

This model gives us two facts, nominees cheat and one winner is agreed upon. If we make sentences of these two facts, then we will obtain logical relations as follows:

Fact A: [Nominees rig an auction.]

Fact B: [First place occupant through an auction win.]

i) *Fact A* implies *Fact B*. : true.

ii) *Fact B* implies *Fact A*. : false.

Considering i), antecedent is true and consequent is true, then implication is true. However, consequence of ii) has enough room for another possibility; nominee plays fair, so that implication is false. It is clear that A is a necessary condition of B. However, A is not sufficient condition to prove B. And we could state this is exactly the point of difficulty that governments are facing.

Cheating 'in the auction', 'dango', is the case that every player pretends keeping the government rule but actually obey their own rule. The bid-rigging is not the modern invention. It is very old crime. In Japan, the crime of 'dango' is defined in the criminal law. The case is defined as 'dango' if following three conditions, 1), 2) and 3) hold. There is no disagreement to approve this definition to analyze the problem in the economic frameworks. So we introduce those conditions here;

1) All members of participants had agreed upon their own rule than the government rule.

2) They keep their own rule through the bidding.

3) There is inefficient benefit for the members contrarily the government loses.

Our model presents these three procedures.

To prevent nominees agreeing beforehand, by governments' explanation, the lists of nominees are not supposed to be open. So that they cannot know which companies will attend the auction. But usually there is an official meeting that supplies auction nominees some information about the project and purchasing, and they know which companies will apply and have a good chance to make an agreement before the auction. It is not reasonable for governments to try to make the nominated auction be competitive. Ordinarily, public projects are held in each area, prefecture, city etc. and it has own industrial community. This community might be called a network which has good information and power. Nominated auctions tend to be collections of these information and power and it seems difficult for governments to control them.

Kanemoto [1991] points out the problems of 'dango', and one of them is that winning auction depend on simply prices and with no reference to quality. As it points out, the quality the winner might produce has been ignored ; however there comes new act is promulgated to response to this matter. 'The comprehensive evaluation method,' that evaluates each applicant by prices, engineering levels and accounting conditions. The following serves an example of this idea ; Okayama city attempts to examine the plans of all nominees if rates of bid price to estimated price keeps appearing unnaturally very high. The very important point of this method is government must have enough expertise to survey, examine and judge companies. It sounds as if governments have much more information and ability about constructions than constructing companies.

It seems that this attempt let nominees avoid risks but has no immediate effect on them to stop 'dango'. To prevent 'dango', a more crucial shot is needed. The point is that there may be some practical reason for them to do, and contrarily, no practical reason to refuse 'dango'.

Considering practical reasons why nominees keep 'dango' rules, there emerge fears of revenge. Why do they keep 'dango' rules though there is a strong motive for nominees to break ? If one broke their rule and bid a little lower price, it would make a big profit. The answer is, they say, there might be revenge from other members. Once the company left the collaboration, it might be ostracized forever. Or no company would take out insurance for a betrayer. (There is the system of insurance that companies must be guaranteed to complete projects. Applicants for projects must submit their guarantors to the office and usually they name each other.) Or other members would bid to defend in the auction next time.

There are other considerations. Let us think about practical reasons for keeping governments' rules. Generally to say, obeying laws depend upon how severe penalty would be involved and how criminal laws are designed. To consider this point, we cannot deny that the laws about government purchasing are too mild. Depending on cases, they might be ordered to pay heavy fine by the Fair Trade Commission, but competitive injury is two years or less in jail or ¥2.50 million or less fine(4). By judging cost benefit analysis, no one can insist this penalty is too severe. Because once the project has been completed, it might bring them money as 100 times as much. We have to remark that the model of auction has no effect on applicants playing fair. Auction is the way to make prices fair by competition, which means the competition will bring about small profit and there is little incentive for bidder to obey the rules. Breaking the auction rules is illegal and we have to find the way to keep it fair, but the problem is the model has no enhancement to make nominees play fair. It is assumed that nominees play fair and keep the rule and whether they obey rules or not depends upon themselves, not the system.

To put the matter simply, as long as nominated auction is applied, there is no way to be found to make it fair technically. The only way governments can enforce is to arrange surrounding conditions but not touch the auction system itself. Then again, if the only way for nominees to play fair is begging eagerly, it is time to abandon the nominated auction, isn't it ?

4. Concluding Remarks

This model is not very difficult itself, but trying to explain bid-rigging is the new attempt. It seems that the Japanese government and public sectors in general have suffered from illegal practices in auctions, but also failed to make it fair. Surely many attempts have been made for removing causes of 'dango' from auctions. Those attempts, however, might be said to be 'first aid'. For example, to stop companies from meeting and agreeing to their own rules, which enable them to decide who would win beforehand, a better more competitive auction should be assigned. This is very simple way to solve the problem. Why, then, is the nominated auction still the most popular way for government purchasing ? The answer by the government is that it would cost us much more if competitive auctions were held than nominated ones. They say they cannot manage numerous entries or would need to hire more agents.

There is the very important fact that government is a comparative amateur in judging plans companies offer. In other words, there is information asymmetry. Auctions are supposed to maintain gaps of information between governments and companies by competition. At this point, we must admit auctions are the best way for governments to find contract partners. We can say with fair certainty that competition leads to fair prices that prevent companies from enjoying monopolistic profit because they own good information.

It has been one year since 'fair auction contract act'[(5)] was enhanced. And the new 'anti-official made dango law'[(6)] was approved and promulgated couple weeks ago (in 2002). Some prefectures and cities are reported to have attempted policies for fair auction. For example, Miyagi and Saitama prefectures will hold lottery to change nominees if 'dango' information is dropped. This policy is aimed to confuse collaborative agreements.

Iwate, Toyama and other prefectures modify contracts to add sentences about compensatory damage. By this law, companies all paid their penalty off by the expiration treaty in Mie prefecture. The Newspapers surprisingly reported this case because this is the first case accused by the prefecture not ombudsmen. It inspired us that there has been something changing in government purchasing.

Expanding our observation from the ways of nominated auctions, there is movement toward change. Accounting law prohibits that the estimated price is open to applicants before auctions. Making big profit, companies tend to avoid bidding too low and usually it makes bids less competitive. Almost every company keeps higher price and this does not mean there is a serious effort to make project quality better or cost less. Besides, the typical auction crime is giving a bribe to an officer ; sometimes it is the mayor, for the estimated price. So that opening estimated prices has been demanded, but it is impossible because of the accountancy law. However, the Minister of Land, Infrastructure and Transportation stated if some small city could do it (open the estimated price) then we could do, too.

Considering the information gap, Yamagata and Tokushima prefectures teamed up with 'construction G-men', who are professionals to investigate and lead projects. Mie prefecture started to pay construction companies every month. To expect collecting information about market cost movements and subcontractors situations, it check improvement of construction and reward to pay. This is revolutionary because usually 40 % is paid at the contract and the remainder will be paid when the project finished. This popular payment system has made small companies bid higher to get money advance.

Contempt for the rules can be thought of in three ways, legal, moral, and economic aspects. Considering the legal aspect, you may go to the courtroom, or before that to the lawyer. This category belongs to the study of law. Considering the moral aspect, you may go to the philosopher to ask the way human beings must be. This belongs to moral science. Considering the economics of the issue, people use cost benefit analysis.

Ordinarily, people obey the law for practical reasons. No one can blame them because it is natural for us to think about the merits and demerits of obeying rules. Even a five year old kid calculates the cost of stealing a piece of candy. She may imagine that she would be scolded by her parents and compares that to her hunger. It is hard to believe a five year old kid's morality ; she does not care what is good or bad. She only knows what is her parents like and dislike. And when we look at contempt rules by grownups and companies, we find there are no difference between a five year old kid and them. They make decision by calculating cost of breaking the law, cost benefit analysis.

From this point of view, we may conclude how the law is kept. As long as the cost of breaking the rules is much higher than the benefits from it, they obey the law. Then the reason why no one can stop bid-rigging is there is no practical reason for companies to stop; We can conclude that the penalty is too low for them. And we may realize that usually government purchasing is 10 to 100 times the money as is the penalty if they are caught. Besides, they may consider the probability of success very high by their experiences.

If there are the solid reasons for nominated auctions to be assigned then much more sever penalties should be involved. But as we mentioned above, there have been new attempts at government purchases and it is raising cost. The government explanation why nominated auctions are preferred to perfect competitive auctions was that they cost us. Then the question may come up. Which would be more expensive, competitive auctions or some revolutionary form of purchasing ?

This series of attempts has just started and nobody knows their effects precisely, but it seems they are welcomed by judging news sources. This is because people may not think that increasing penalties is the best way. We reckon the system is good when it brings benefits to both sides. In other words, obeying the auction rules would merit governments but not nominees. Then there is the idea to design the purchase system such that brings benefits to both sides, companies and governments, i.e., tax payers.

The above discussions implies that there is no enforcement of action rules. We have to conclude that some other method of government purchases is needed. There already have been some attempts by the public sector. In designing the purchase system, we should remark that it is the one that brings merits to both sides. Then it may be suggested that to abandon nominated auctions.

We only analyzed the difficulty of keeping nominated auction fair, though it sounds to omit some important procedure, we would like to propose the way instead. The way that lot first and investigation second is the one of alternatives. We choose the company that has the right to make contract with the government by lottery. And then it should be investigated sever whether it can complete the project. If it were disable to do, then that company must not enter next projects.

We have discussed the problems of government purchasing focusing on nominated auctions. Some forward investigation and consideration should be undertaken to determine the best alternative for government purchasing. The matter will be future research.

Notes

(1) The mayor of Shimozuma city was arrested for committing the auction competitive injury in 2002.

(2) Ex-secretaries of a lower house member in Japan were reported to arrange auctions through their consultant company in at least the year of 1999 ; ‘Gyosai-toshikaihatsu-kenkyusho’ case.

(3) Mitsui Bussan used ¥70million for the electricity plant construction in Kunashiri Island in 2000.

(4) Article 96-3(1) of the Japanese Criminal law.

(5) Law number 82 of 2001.

(6) Law number 101 of 2002.

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