A Mechanism for Allocating the Expenses of Public Goods: Analyses of a Swedish Government Project

Der-Yuan Yang*

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Department of Economics

University of California

Santa Barbara, CA 93106

E-mail: 6500ydy@ucsbuxa.ucsb.edu

Phone: (805)893-2205

Fax: (805)893-8830

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Abstract: *Private provision of public goods has been investigated by many theoretical frameworks and experiments, most of which are difficult to apply in practice, let alone implement in the public sector. In this paper we offer a theoretical analysis of a Swedish government project's cost-sharing mechanism, which gave participants incentives to misrepresent their willingness to pay (WTP), some to understate, the others to overstate, yet still ended up successfully providing a public good. We find that if the incentive is given randomly to participants, the possibility of misreporting their WTP would be reduced and the true WTP could be induced.*

I. Introduction

The provision of public goods has long been an important focus for economists. Since the market mechanism is not reliable in providing public goods because of the often insurmountable free rider problem, many researchers delineate alternative mechanisms trying to solve the issue. Most of the theoretical frameworks for providing public goods are Pareto efficient; nevertheless, it is questionable whether or not these complicated schemes can be applied in the public sector (see Bohm, 1979 and 1982). Bohm (1982) also reported a Swedish government project using a straightforward mechanism which gave participants incentives to misrepresent their WTP, yet still ended up providing a public good. Our theoretical inspection of the Swedish mechanism may shed light on how the costs of a public good can be shared.

According to Bohm's report, participants in the project were divided into two groups to share the cost: Group 1 (hereafter G1) had to pay a variable charge; group 2 (hereafter G2) a fixed fee, both based on their reported WTP. G1 members had incentives to underreport their WTP, while those in G2 to overreport. The mechanism is successful in the sense that the public good was provided. In this paper we analyze the non-cooperative game underlying the Swedish mechanism and study the properties of Nash equilibrium in which the public good is provided. These properties can be applied to show the existence as well as multiplicity of Nash equilibrium in this mechanism. The incentive to overreport or underreport is shown weakened in a variant of the above mechanism.

II. The Swedish Government Project

In Sweden, census data were generally provided without any cost to users; however, in an attempt to reduce government expenditures, the Swedish government designed a method for the local governments involved to share the cost of the census. In 1982, the Swedish government conducted a nationwide census to acquire statistics for various plans of 297 local governments. The local governments involved were stratified with respect to population size and were divided into two groups. Members of each group had to report their WTP for the project and shared the cost in the following manner. Those in G1 had to pay a certain percentage of their reported WTP, which would not exceed the exact fixed cost to be covered. The percentage could be determined only after the responses had been collected. As for G2, members had to pay a fixed fee of $100, which was determined before responses were collected. If those in G1 stated a zero WTP, or members in G2 a WTP less than $100, they would not be offered the statistics nor would they have to pay anything, even if the project were actually carried out. The project would be implemented if the sum of all respondents' WTP exceeded the total cost, which was estimated at about $40,000. Moreover, they were told that their responses would be publicized, which made it hard for respondents to misreport significantly their WTP.

The statistics of the reported WTP are shown in tables 1 and 2 taken from Bohm (1982). Since the sum of all local governments' reported WTP exceeded $40,000, the project was carried out.[1] G1 had a much higher percentage stating zero WTP than G2, 36% to 23%; if we consider unwillingness to pay for the service, the percentage was about the same for both groups, 36% to 32% for G1 and G2, respectively. At the Sek 500 ($100) level, the percentage of G2 was about twice as much as that of G1, 36% to 18%. There were not many differences in other ranges of WTP responses. G2 members had an incentive to report a WTP as high as possible to increase the chance of getting the statistics, for they had to pay only $100 in any case. In contrast, those in G1 had a tendency to understate their WTP to lower their cost. G1 and G2 could have formed a coalition to report their WTP strategically to minimize their overall cost. But the publication of their reported WTP made collaborations difficult. There was no evidence of any coalition between both groups as the tables show. If we look at the WTP responses above the Sek 500 level and the average WTP, they were neither understated nor overstated very much. Was there any reason that the responses of both groups look so similar? To analyze the incentive problems faced by participants, we model the scenario as a game in strategic form in the following section.

Insert Table 1 about here.

Insert Table 2 about here.

III. The Non-cooperative Game Underlying the Swedish Mechanism

As previously mentioned, in order to share the cost of the project, the Swedish central government had to divide the local governments into two groups (G1, G2); it also determined a uniform percentage imposed on those assigned to G1 and a fixed fee for G2 members. The total cost of the project is denoted by W, participant *i*'s true WTP by w_i. Given the central planner's choice of (G1, G2, α, β), the local governments decided on their private provision of the public good simultaneously and independently by reporting their WTP to the central government. The interaction among the local governments participating in the project can be represented by a game in strategic form. To delineate the game, we must specify the set of players of the game, N, strategy sets, Σ, and payoff functions of players, U, in accordance with the central planner's choice of (G1, G2, α, β)[4].

The set of players N is the set of all of the local governments participating in the project, while the strategy set for player *i* is $\Sigma_i = \{\sigma_i | \sigma_i \geq 0\}$, where $\sigma_i \in \Sigma_i$ represents player *i*'s reported WTP. Player *i*'s payoff function, U_i, is determined as follows:

Given $\sigma \in \Sigma = \Sigma_1 \times \Sigma_2 \times \ldots \times \Sigma_n$,

$$U_i(\sigma) = \begin{cases} 0, \text{ if } \sum_{j\in N} \sigma_j < W \text{ or } i \in G1 \text{ and } \sigma_i = 0 \text{ or } i \in G2 \text{ and } \sigma_i < \beta & (1) \\ w_i - \alpha\sigma_i, \text{ if } \sum_{j\in N} \sigma_j \geq W \text{ and } i \in G1, \sigma_i > 0 & (2) \\ w_i - \beta, \text{ if } \sum_{j\in N} \sigma_j \geq W \text{ and } i \in G2, \sigma_i \geq \beta & (3) \end{cases}$$

If the public good is not offered or players' WTP does not satisfy the required threshold, then player *i*'s payoff is zero, as shown in (1). For those assigned to G1, if they report a positive WTP, then the payoff is their true WTP minus their cost, when the public good is provided, as (2) indicates. Finally, (3) shows that G2 members eligible for the service will garner a payoff equal to their true WTP minus the fixed fee paid, provided the public good is produced.

Given $\sigma \in \Sigma$, $i \in$ N, let $\sigma_{-i} = (\sigma_1, \sigma_2, \ldots, \sigma_{i-1}, \sigma_{i+1}, \ldots, \sigma_n)$ represent the collection of strategies of players other than i, and $\Sigma_{-i} = \Sigma_1 \times \ldots \times \Sigma_{i-1} \times \Sigma_{i+1} \times \ldots \times \Sigma_n$ is the set of all such strategy collections. In symbolic form, the game is denoted by $\Gamma = \{\Sigma_i, U_i\}_{i \in N}$. Having specified the game, we are ready to characterize their best responses. By simply reporting a zero WTP, each player can guarantee himself at least a zero payoff. Players' payoff reflects their strategies accordingly, as the following lemma indicates.

Lemma Let $\sigma_{-i} \in \Sigma_{-i}$. For $i \in$ G1, the best response mapping $\sigma_i(\sigma_{-i})$ of i is:

$\sigma_i(\sigma_{-i}) = 0$, if $W - \sum_{j \neq i} \sigma_j > w_i/\alpha$; $\sigma_i(\sigma_{-i}) = W - \sum_{j \neq i} \sigma_j$, if $0 < W - \sum_{j \neq i} \sigma_j \leq w_i/\alpha$; and $\sigma_i(\sigma_{-i})$ is not well defined, if $\sum_{j \neq i} \sigma_j \geq W$. For $i \in$ G2, the best response mapping $\sigma_i(\sigma_{-i})$ of i is: $\sigma_i(\sigma_{-i}) = \{\sigma_i | \sigma_i \in [0, \beta)\}$, if $w_i < \beta$, and $\sigma_i(\sigma_{-i}) = \{\sigma_i | \sigma_i \geq \max(\beta, W - \sum_{j \neq i} \sigma_j)\}$, if $w_i \geq \beta$.

Proof: For $i \in$ G1, if $W - \sum_{j \neq i} \sigma_j > w_i/\alpha$, then to enjoy the public good the amount i has to make up is greater than w_i/α, rendering i's payoff negative; consequently, i's best response is to report a zero WTP. When $0 < W - \sum_{j \neq i} \sigma_j \leq w_i/\alpha$, player i has to report at least $W - \sum_{j \neq i} \sigma_j$, to make the sum of all players' reported WTP not less than the total cost. Since this amount is less than w_i discounted by α, it is optimal for i to have the project implemented. Thus, the best response is W-$\sum_{j\neq i}\sigma_j$. Finally, the best response is not well defined if $\sum_{j\neq i}\sigma_j \geq$ W, since i can get the service by stating any positive infinitesimal WTP.

For $i \in$ G2, if $w_i < \beta$, a best response is any $\sigma_i(\sigma_{-i}) \in [0, \beta)$, because i's payoff will be negative if he reported a WTP greater than or equal to β. If $w_i \geq \beta$, then $\sigma_i(\sigma_{-i}) = \{\sigma_i | \sigma_i \geq \max(\beta, W- \sum_{j\neq i}\sigma_j)\}$. That is, i's best strategy is to state an amount not less than the greater of the fixed cost or the difference between the total cost and all others' contribution, since he has to pay only β no matter how much more he reports. The proof is completed.

By definition, a Nash equilibrium of this game is a strategy profile σ^* such that $U_i(\sigma^*_i, \sigma^*_{-i}) \geq U_i(\sigma_i, \sigma^*_{-i})$ for all $\sigma_i \in \Sigma_i$ and all $i \in$ N. In a Nash equilibrium every player's reported WTP is incentive compatible; in the sense that no player can gain by alternating his strategy unilaterally. With the above characterization of players' best responses, we are ready to establish the conditions which a Nash equilibrium with the provision of the public good must satisfy.

Theorem 1 Let (G1, G2, α, β) be the central planner's selections and σ^* be a Nash equilibrium such that the census data is provided. Then, $0 < W - \sum_{j\in G2}\sigma^*_j \leq \sum_{i\in G1} w_i/\alpha$.

Proof: Let σ^* be a Nash equilibrium such that the public good is supplied. That is, $\sum_{i\in G1}\sigma^*_i + \sum_{j\in G2}\sigma^*_j \geq$ W. Suppose $\sum_{j\in G2}\sigma^*_j \geq$ W. Let $i \in$ G1, then $\sum_{j\neq i}\sigma^*_j \geq \sum_{j\in G2}\sigma^*_j \geq$ W. By the above lemma, player i's response is not well defined. Thus, σ^* cannot be a Nash equilibrium. This shows that W - $\sum_{j\in G2}\sigma_j^*$ > 0 must be satisfied. In addition, the least payoff a player can guarantee himself is 0, which implies $\sigma^*_i \leq w_i/\alpha$ for all $i \in$ G1. Thus, W - $\sum_{j\in G2}\sigma_j^* \leq \sum_{i\in G1}\sigma_i^* \leq \sum_{i\in G1} w_i/\alpha$. This completes the proof.

The theorem above shows that at any Nash equilibrium, as long as the public good is provided, the situations under which G1 members may report infinitesimal WTP have to be eliminated. Consequently, the offering from both G1 and G2 must be greater than or equal to the total cost; the sum of G1 members' reported WTP has to be less than the sum of their true WTP discounted by α, the maximum feasible reported WTP; and the sum of all G2 members' contribution ought to be less than the total cost. These conditions can be applied to establish the existence of a Nash equilibrium, in which the public good is supplied. However, these conditions also indicate that the Nash equilibrium in this game is not unique.

From the tables provided, we can test how well the theorem works. Bohm (1984) reported that the percentage imposed on G1 members was 100%. If we assume local governments' reported WTP is their true WTP, then apparently, the theorem is satisfied. The total cost minus the contribution from all G2 members is equal to Sek 78,169, which is, of course, greater than zero, and less than all of G1 members' true WTP discounted by 100%, i.e. Sek 113,350. Every local government seemed to have made their best choice given others' strategies, resulting in a Nash equilibrium, and the public good was supplied.

Remark: Given (W, $\{w_i\}_{i\in N}$), by theorem 1, a sufficient condition for the existence of a Nash equilibrium with the public good provided is that there exists a partition {G1, G2} of N and two constants α, β such that $0 < \beta \le w_i$, $i \in N$, $0 < \alpha \le 1$ and $0 < W - \#(G2)\beta \le \sum_{i\in G1} w_i / \alpha$.

One may argue that theoretically G2 members can report an infinite amount, which will violate the constraint and make the scheme collapse, since no matter how much they report, they only have to pay β. However, practically there seems to be a limit on G2's strategies; if local governments cannot get the data from the central government, they can conduct the census themselves; the cost of providing the data on their own would be the limit of their reported WTP, which will never be infinite. Moreover, every local government has a limited budget; it is not plausible that any local government can report an infinite WTP, considering especially that the reported WTP would be publicized.

IV. A Revision of the Swedish Mechanism

According to the distribution of WTP responses, 27% of G1 members reported Sek 500, which seemed to serve as a guideline even for members who had to pay a percentage of their reported WTP. As for those reporting zero WTP, since they would not have to pay anything, nor would they get the service, they were not free riders in this case. Nine percent of G2 members reported a WTP greater than zero and less than Sek 500; though they still needed the census data, they were not eligible to acquire it. In this section we offer a revision which would reduce players' incentives to misreport their WTP.

In the original Swedish mechanism the differences among local governments are not taken into account; all G1 members pay the same percentage of their reported WTP, while those in G2 pay an identical fixed fee, regardless of the differences among local governments. The size of population and sovereignty, the ability to raise taxes, and the current budget all will affect their WTP and strategies regarding the census. Presumably, the wealthier, the more densely populated, and the broader the territory, the higher the WTP those local governments would report, for the statistics would be more valuable. Consequently, under our revision, the local governments assigned to G1 would pay a different percentage of their reported WTP. Similarly, those chosen for G2 would pay a disparate fixed fee, instead of a uniform sum in the original setting. As the project specified, all local governments knew in advance which group they belonged to, inducing them to understate or overstate their WTP. Therefore, in addition to different percentage levy and disparate fixed fee, we assume that each local government is randomly assigned to G1 with probability θ, to G2 with probability $(1 - \theta)$, where $\theta \in (0, 1)$. Local governments must report their WTP prior to the realization of their assignments, that is, before they are informed to which group they have been assigned.

Except for the random group assignment, the other rules concerning allocating the public good and sharing the cost are the same as before. In other words, given players' strategies $(\sigma_1,...,\sigma_n)$, the census will be conducted as long as $\sum_{j \in N} \sigma_j \geq W$ and player *i* will get the data if *i* is assigned to G1 and $\sigma_i > 0$, or assigned to G2 and $\sigma_i \geq \beta_i$. Player *i*'s strategy set Σ_i in this new scenario is the same as before. However, Player *i*'s expected utility function U_i: $\Sigma_1 \times \Sigma_2 \times ... \times \Sigma_n \rightarrow \Re$ is determined as follows, given $(\sigma_1,...,\sigma_n)$:

$$U_i(\sigma_i, \sigma_{-i}) = \begin{cases} \theta(w_i - \alpha_i\sigma_i) + (1 - \theta)(w_i - \beta_i), \text{ if } \sum_{j\in N}\sigma_j \geq W \text{ and } \sigma_i \geq \beta_i & (4) \\ \theta(w_i - \alpha_i\sigma_i), \text{ if } \sum_{j\in N}\sigma_j \geq W \text{ and } 0 < \sigma_i < \beta_i & (5) \\ 0, \text{ if } \sum_{j\in N}\sigma_j < W \text{ or } \sigma_i = 0 & (6) \end{cases}$$

In case the public good is provided and *i* reports a WTP not less than β_i, then he will be eligible for the expected payoff from being assigned to either G1 or G2, as shown in (4). Whereas (5) indicates that when the sum of all reported WTP exceeds the total cost, if his reported WTP is positive but less than the required fixed fee, he will get a positive expected payoff when assigned to G1 and zero to G2. For the last case (6), if the public good is not supplied or player *i*'s reported WTP is equal to 0, then his expected payoff will be zero.

With the above specification of expected payoff, players' strategies can be precisely determined under certain circumstances.

Theorem 2: Let (α, β, G1, G2, θ) and $\sigma_{-i} \in \Sigma_{-i}$ be given. If $0 < W - \sum_{j\neq i}\sigma_j < \beta_i$ and $w_i > \beta_i + \theta\alpha_i\beta_i/(1 - \theta)$, then players' best response is exactly β_i.

Proof: If the public good is not provided, the payoff to players will be zero only. Player *i* can make up the difference between the total cost and all others' contribution by reporting a WTP equal to β_i. Let $\sigma_i \in \Sigma_i$ be any strategy. If $\sigma_i < \beta_i$, then $U_i(\sigma_i, \sigma_{-i}) = \theta(w_i - \alpha_i\sigma_i)$. If $\sigma'_i = \beta_i$, then $U_i(\sigma'_i, \sigma_{-i}) = \theta(w_i - \alpha_i\beta_i) + (1 - \theta)(w_i - \beta_i)$. If $w_i > \beta_i + \theta\alpha_i\beta_i(1 - \theta)$, then the player is better off by reporting σ'_i. Under this case, the player will report at least β_i. Note that for any $\sigma_i > \beta_i$, $U_i(\sigma_i,$

σ_{-i}) = $\theta(w_i - \alpha_i\sigma_i) + (1 - \theta)(w_i - \beta_i)$ under the given conditions. Thus, $U_i(\beta_i, \sigma_{-i}) >$ $U_i(\sigma_i, \sigma_{-i})$ for any $\sigma_i > \beta_i$, implying that the best response is exactly β_i.

We now discuss how the uncertainty of group assignments plays a critical element in reducing participants' incentives to misrepresent their true WTP. Assuming the public good is provided, in the original setting, if player *i* in G2 reports a WTP σ_i greater than β_i, the cost is always β_i; while in the revised scenario the expected cost will be $\theta\alpha_i\sigma_i + (1 - \theta)\beta_i$. The difference between the former and the latter is $\theta(\alpha_i\sigma_i - \beta_i)$, which means when σ_i is greater than β_i/α_i, he has to pay more in the revised version than in the original mechanism. Hence, player *i* has less incentive to overreport in our revision. If the player belongs to G1 and reports a WTP less than β_i, the cost difference between both settings is $(\theta - 1)\alpha_i\sigma_i \leq 0$, which means the less player *i* reports the less he has to pay in the revision than in the original mechanism; however, player *i* will have to sacrifice the expected payoff $(1 - \theta)(w_i - \beta_i)$. Consequently, the incentive to underreport is also reduced.

V. Discussion

The mechanism used in this Swedish project is easy to understand and readily implementable. Moreover, from the analyses presented above, we know that there are some intrinsic properties which distinguish this framework from other researchers' proposals introduced below. Samuelson (1954) asserted that market mechanism is not able to provide public goods optimally, but he recognized that some other possible solutions to the problem do exist. Though many researchers had contributed their work in designing alternative mechanisms, major breakthroughs were not seen until the 1970s.

Bohm (1971) attempted to devise a mechanism which would reveal people's demand for public goods. In addition to his complicated theoretical framework, Bohm (1972) conducted an experiment as well, which might be the prototype of this Swedish mechanism. The incentive structure is very similar: all participants were divided into groups, giving some members incentives to overstate their WTP, the others to understate. Knowing participants' incentives to misrepresent their WTP, we can obtain the upper bound and the lower bound of their true WTP for the public good. Therefore, this approach, the so-called interval method (Bohm, 1979), is able to estimate the true WTP, especially when the lower bound and the upper bound do not deviate very much. However, being able to estimate the true WTP is not equal to revealing the true demand for the public good. The interval method purposely gives some participants incentives to understate their WTP, the others to overstate; as our analyses have suggested, some adjustments are necessary for the approach to be able to reveal the true WTP.

Clarke (1971) also proposed a demand-revealing mechanism for public goods. In his design, every participant has to report his demand for a public good, which amounts to a very difficult problem practically. Even for three bundles of consumption goods, individuals might have inconsistent ranking in preferences. Consequently, we can hardly expect individuals to reveal their true demand for public goods, which have no markets at all. Furthermore, the scheme is difficult to understand, which makes it hard to pass through the modern democratic procedures. Clarke's proposal is difficult to use in the public sector.

In addition to elaborating Clarke's mechanism, Tideman and Tullock (1976) offered an example of "choices between two options." In this instance, participants have to report their valuations for two projects only, not a demand schedule; therefore, this procedure is much easier to implement. Walker (1981) also presented a simple scheme that can achieve a Lindahl equilibrium in providing public goods. For both procedures, participants' payments for the public good depend on others' reported valuations rather than their own, in order to eliminate the free rider problem. This feature makes both designs less desirable than Clarke's, where an individual's payment directly relates to his true demand.

Based on Bohm's interval method, this Swedish project clearly delineates an enforceable guideline for the public sector. It seems that we have found one practical demand-revealing mechanism for allocating the expenses of public goods, though some modifications have to be made. The reasons for the project's success are multiple: first, the central government has complete control over the census data and can effectively eliminate the free rider problem. Secondly, as the theorem developed in section III has shown, there exists a simple incentive compatible constraint, under which a Nash equilibrium exists and the public good is provided. All the central planner has to do is to establish an appropriate fixed payment, which can be easily calculated from the total cost of the project. Thirdly, the publication of WTP responses deters local governments from forming coalitions. Without this threat, strategic behaviors may be rampant and make the scheme collapse. Finally, local governments are not sensitive to differential pricing, nor are they profit-oriented. If the project involves individuals or private businesses, the idea of charging different prices for the same service may arouse discrimination concerns. In fact, Bohm (1982) also reported a bus line project which failed because of the union's objection. People could not accept different pricing for the same bus ride even though they might have indeed experienced disparities in benefits.

VI. Conclusion

In this Swedish government project, members who had to pay only a fixed fee were given strong incentives to overreport their WTP. However, the maximum reported WTP is only $2,000, higher than the fixed fee $100, but far less than the total cost $40,000, let alone reaching infinity. Only one percent of the local governments reported a WTP greater than $1,000. The theoretical possibility of an infinite WTP did not appear to be a problem. In contrast, 36% in G1 and 23% in G2 reported zero WTP, i.e., 34% as a whole did not want the service, including those who reported less than $100 in G2. The low demand for the census data, rather than overstated WTP, might have caused the scheme to fail. In the end, the census was conducted since the sum of all local governments' reported WTP was greater than the total cost. G1 members paid 100% of their reported WTP and the charges to all participants amounted to Sek 160,000; the central government paid Sek 40,000 (Bohm, 1984).

The success of this Swedish mechanism seems to be a coincidence; however, in the original mechanism we find a necessary condition under which a Nash equilibrium exists and the public good is provided, and there is no unique Nash equilibrium in this game. The incentive compatible constraint can be easily satisfied, but the possibility of an infinite WTP from G2 members makes that argument questionable. Nevertheless, if the local governments are uncertain to which group they will be assigned, the incentive to overreport or underreport is weakened. In that context, the uncertainty of group assignment not only reduces players' strategic responses, but also eliminates the possibility of infinite WTP.

We can revise the cost-sharing scheme of the Swedish project in the following way. If participants know in advance to which group they will be assigned, there is always a tendency to overstate or understate their WTP, even with the threat of publishing the results. Thus, random assignments of groups are preferable, in order to reduce players' strategic responses, as the revised framework indicates. Besides, a two part pricing may be desirable; i.e., each participant must pay a fixed fee plus a variable charge, depending on his WTP. Since the benefits of projects completed in one region from using the census data would spill over to other parts of the nation, it is mutually beneficial for all participants to share some of the cost, even if they do not need the service. The revised cost-sharing system may ameliorate some possible defects of this Swedish project's allocating mechanism, such as participants' low demand for the public good and the tendency to misrepresent their true WTP.

Perhaps the following result is what we expect: each player shares the total cost according to his true WTP weighted by all others' true WTP, i.e. $\sigma_i = w_i W / \sum_j w_j$, which may seem more favorable and equitable. Inducing the more favorable reported WTP may need a much more complicated design than this Swedish government project's cost-sharing mechanism, while an intricate scheme is not feasible politically because of the characteristics of modern democratic processes. For the present, at least we have found a demand-revealing mechanism which works in the public sector. Of course, there is still room for improvement; further experiments and research will reveal the potential of the revised framework.

Endnotes

1. Sek is Swedish Kronor, the currency of Sweden. One U.S. dollar was about 5 Sek at that time. The sum of reported WTP was Sek 235,181, which exceeded the fixed cost $40,000, i.e., Sek 200,000.

2. Hanusch, H. (Eds.), (1984). *Public Finance and the Quest for Efficiency,* Proceedings of the 38th Congress of International Institute of Public Finance, Copenhagen, 133. Detroit: Wayne State University Press.

3. Ibid. p. 133.

4. In the Swedish mechanism, the percentage, α, imposed on G1 members was determined after collecting everyone's response, whereas in our framework, α is assumed known before players report their WTP. Under the original specification, a game with incomplete information is required to analyze the scenario. Our framework simplifies the analysis. However, we have a revision in section IV to consider other complications.

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Table 1[2]

Aggregate and average WTP (in Kronor, $1 = Sek 5 approx.)				
	No. of governments		Total	Average
	Total	Responded	WTP	WTP
Group 1	140	137	113,350	827
Group 2	139	137	121,831	889
Total	279	274 (98%)	235,181	

Table 2[3]

Distribution of WTP responses						
	Both groups		Group 1		Group 2	
Sek	number	percentage	number	percentage	number	percentage
0	81	30	49	36	32	23
1-499	26	9	14	10	12	9
500	74	27	25	18	49	36
501-999	12	4	5	4	7	5
1000	34	12	19	14	15	11
1001-5000	44	16	24	18	20	15
> 5000	3	1	1	1	2	1
	274	100	137	100	137	100