Quantity and Price Auction in Built Heritage Conservation

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Abstract. Conservation agency faces many real challenges in its effort to encourage conservation actions. The presence of uncertainty arises from the relation between conservation actions and their contribution to the social benefit, the involvement of many stakeholders, the intricate and complicated nature of the built heritage conservation works, expose the agency to many hidden action and hidden cost problems. The present paper studied the incentive scheme used by Penang heritage conservation agency. In the current system, the agency identified two conservation works that it will sponsor and house owners are encouraged to submit their works for grant consideration. The decision is based on number of works and intended use of the building. This mechanism was compared with a second condition when the works are regulated and house owners are encouraged to submit their cost. The experimental results show that the market performance of the second condition is more cost effective and efficient than the first condition. Relying on market to decide on works did not help to solve the hidden action problems, sellers underconserve to maximize profit at the expense of environmental benefit. The study also suggested that resorting to regulation might solve the adverse selection problem given the lack of information on social benefit by the Government.

Keywords: Built Heritage Conservation; Conservation Works; Hidden Action and Hidden Cost; Auction; Asymmetry Information.

1. Introduction

Ownership of a built heritage site brings a number of benefits. These may be tangible (e.g., commercial use) or intangible (e.g., enjoyment of its historical and aesthetic value). Such benefits extend to the wider community when these historical buildings provide a tangible link to the community's socio-cultural and religious past. In some cases, these private benefits should provide adequate incentives to the owners to undertake appropriate conservation efforts. However, in the event when the private benefits are lower than the private costs of maintaining the building, the owners would not undertake as much conservation efforts that the society as a whole would desire. If it is required that conservation is provided to the point where marginal cost equals marginal benefit of conservation, private owners will base their decision on the private benefits.

The underprovision of conservation efforts on heritage shops and residential houses in Georgetown, Malaysia is mainly due to its low potential capital return. The historical houses were built before World War II and are located in core zone (109.38 hectares with 2344 houses) and buffer zone (150.04 hectares 2321 houses) [1]. The repeal of Rent Control Act (1966)[2] in 1997 combined with selective urbanization policies in other parts of Penang Island caused many residents to move from inner city George Town to new townships that offered better quality housing and facilities. Many houses were left vacant and heavily dilapidated due to over supply of these pre-war houses and depopulation from the inner city of Georgetown ((Lee et al., 2009);(Nor' Aini et al., 2007)). High restoration costs, complicated conservation guidelines, condition of the buildings, uncertainty of the material costs and market value of the house have contributed to the low private investment in heritage buildings.

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[1] As reported in the "Draft Special Area Plan. George Town. Historic Cities of the Straits of Malacca" (2011), pp. 2-20–2-22 (ungazetted).

[2] The Rent Control Act (1966) introduced after World War II aimed to control rents and ensure the availability of affordable housing.

The Penang heritage conservation grant is based on outcomes and house owners are encouraged to decide their own conservation works, best suited to their house and cost structure. The evaluation of the grant is based on the criteria, 1) contribution to the Outstanding Universal Value; 2) contribution to a sustainable city and 3) improvement towards social and economic conditions. Although roofing and facade are specified as main focus of Think City Sdn Bhd (conservation arm of the Government), house owners are encouraged to submit more conservation works. Grant will be disbursed based on the number of works, the intended use of the building and the contribution to the criteria.

While there are potential benefits to incorporating outcome payments and relying on market to encourage conservation, there are also range of potential problems and costs that need to be considered. There are significant hidden action problems, due to uncertainty about the relationship between the heritage conservation activities and the final outcome. Appropriate conservation activities may be detailed, ongoing and difficult to monitor. It is well known in the literature that such allocation procedure does not overcome the information asymmetry between sellers (i.e., house owners) and buyer (i.e., conservation agency) (Ferroro, 2007; Hart and Latacz-Lohmann 2004; Choe and Fraser 1998).

In terms of cost, owners may understate their true financial standing to qualify for higher amount of grants. Given the uncertainty about condition of a house, it is also likely that the owners will have superior private knowledge about the conservation cost than the agency. Owners can tailor their conservation effort so as to maximize the difference between the grant and their true conservation costs, often at the expense of environmental gains (see, for examples, Stoneham et al., 2003) ;Cason & Gangadharan, 2004)). This hidden cost poses a great financial challenge to the agency given that the conservation fund is limited.

This paper intends to study two quasi-market mechanisms when there are hidden action and hidden cost problems. Quasi-maket refers to combination of competitive market and regulator's intervention to decide on allocation of resources. The paper compares the market performance of a mechanism when conservation agency can regulate the types of conservation works and allow the competitive bidding to allocate conservation subsidy, with another mechanism when cost is regulated and conservation works are decided by competitive bidding. The latter condition mimics the present system in which the agency relies on the market to decide on how much conservation work to be carried out.

2. Experimental Design

2.1. Participants

The study conducted two experimental treatments to investigate the market performance of two quasi-market mechanisms. The participants of the experiment were undergraduate students recruited from class announcements. They were from different faculties in Universiti Sains Malaysia and were not allowed to participate in more than one treatment. There were 36 students in the first treatment, when the students were required to submit conservation works and conservation cost was determined by the "Government", and 33 students in the second treatment when students competitively bid for conservation cost and type of works were determined by Government. The first treatment is referred as CONS treatment and the second treatment as PRICE treatment throughout the paper.

2.2. Experimental Design and Procedures

All the sessions were conducted in experimental laboratory in School of Social Sciences, Universiti Sains Malaysia. The experiment was conducted using z-tree ((Fischbacher, 2007)). Upon entering the lab, the participants were seated randomly and were given 7 minutes to read the instructions[3]. Participants had to answer 5 exercises related to the experiment in order to make them understand the experiment. The experimenter explained the rules and procedures and answered to any query before the experiment was started. Each treatment lasted less than two hours, and the average income earned was USD20, which was paid to the participants privately immediately after the experiment.

Each treatment had 13 rounds in which participants could make different decision, and each round consisted of two stages. The first stage was a decision making stage, in which sellers (i.e., house owners)

[3] The instructions are available upon request from the corresponding author.

had to make decision on how many types of conservation works to be carried out (in CONS treatment) and how much is the conservation cost to be submitted (in PRICE treatment).

In stage one, in the CONS treatment, conservation cost was given and the sellers could decide on type of conservation work from the list of 8 items. Government could choose an amount from the $60,000, $65,000, $70,000, $75,000, $80,000 and $85,000 randomly to be given to the sellers. After knowing the grant amount, the sellers had to decide on types of work to be carried out. There were 8 different restoration works that sellers could choose; 1) leaking roof, 2)internal plumbing, 3) wall painting, 4)anti termite treatment, 5)external wall finishes, 6)structural steelwork, 7)flooring and 8)landscaping. These are among the usual conservation works encountered in built heritage conservation in Malaysia (Woon & Lim, 2010).

In PRICE treatment, the Government had identified types of conservation work, and sellers were required to submit conservation cost. In each round, Government randomly chose more than one items of conservation work from the same list. After knowing the specified works, the sellers were required to submit a price to the Government. Each round, each seller had different conservation works and cost to reflect heterogeneity of sellers.

In stage two, all the submissions were ranked by the conservation agency based on the lowest cost per conservation work. Total conservation fund of one million would be disbursed until it was exhausted. On average, 22 sellers received the conservation fund and the remaining sellers were not successful. The individual ranking and profit (i.e., grant received minus conservation cost) were then relayed to each seller.

3. Results

3.1. Market Performance

In the laboratory auction literature, the performance of the auction refers to the allocative efficiency; allocation of limited resources to its best use. In conservation auction, this efficiency is achieved when the grant is allocated to the projects which could bring the highest benefit or value to the society at the lowest cost (Cason et al., 2003 and Chan et al., 2003). However, unlike other conservation works, ex post benefit and value of the built heritage conservation is not measurable and easily quantified. Given the constraint, the allocation is determined by a rule which reflects the preference ordering of the conservation agency (Che, 2992 and Dasgupta & Spulber, 1990). The allocation of conservation fund is based on the specified conservation works agreed to be carried out by the owner (Schuster, 1997. pp49-81 and Morris, 1992).

The first market performance measure is the markup of actual conservation cost per activity spent in the auction, as the percentage of conservation cost per activity spent if the agency knows the true conservation cost. The second performance measure is the sellers' profit, which is measured by actual cost paid minus true conservation cost. High profit represents that the conservation agency overspends relative to the true conservation cost. Lower sellers' profit is better from the agency's perspective. The third indicator is the number of conservation works carried out by the owners.

Fig and Fig 1 show the price markup and profit level according to number of conservation works in the two treatments. The markup of price submitted and profit level are clearly higher in the CONS treatment than in PRICE treatment. This difference is significant when the number of conservation works is low (e.g. from 1 to 5). The markup and profit level decreases with the number of conservation work.

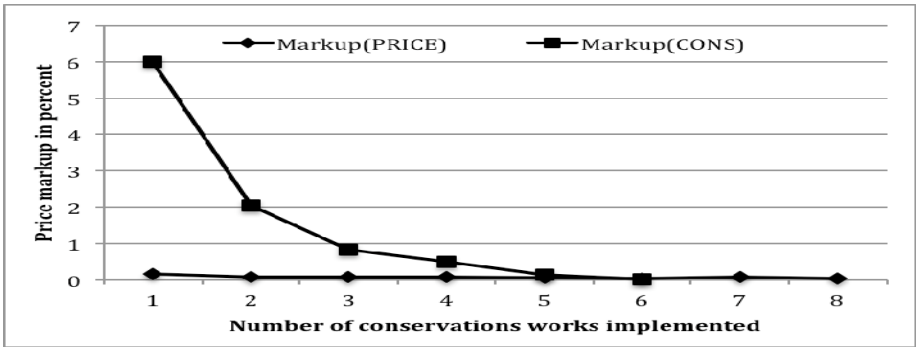

Fig 1: The markup of price over true cost in percent

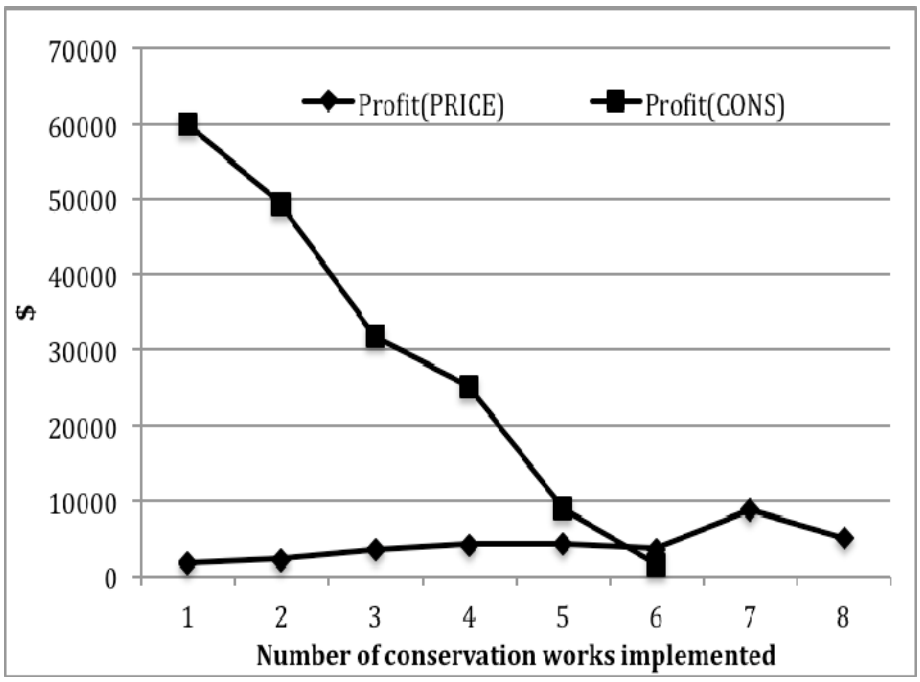

Fig 1: The profit level (Subsidy - cost) of the two treatments

Since house owners in the CONS treatment received fix amount of grant, market performance of the two treatments is compared based on the same amount of conservation grant. Fig 2 compares the number of conservation works and the corresponding profit levels for the two treatments. Given the amount of grant, bidders in CONS treatment earn higher profit than house owners in PRICE treatment. This is mainly due to the lower number of conservation works carried out by sellers in CONS treatment.

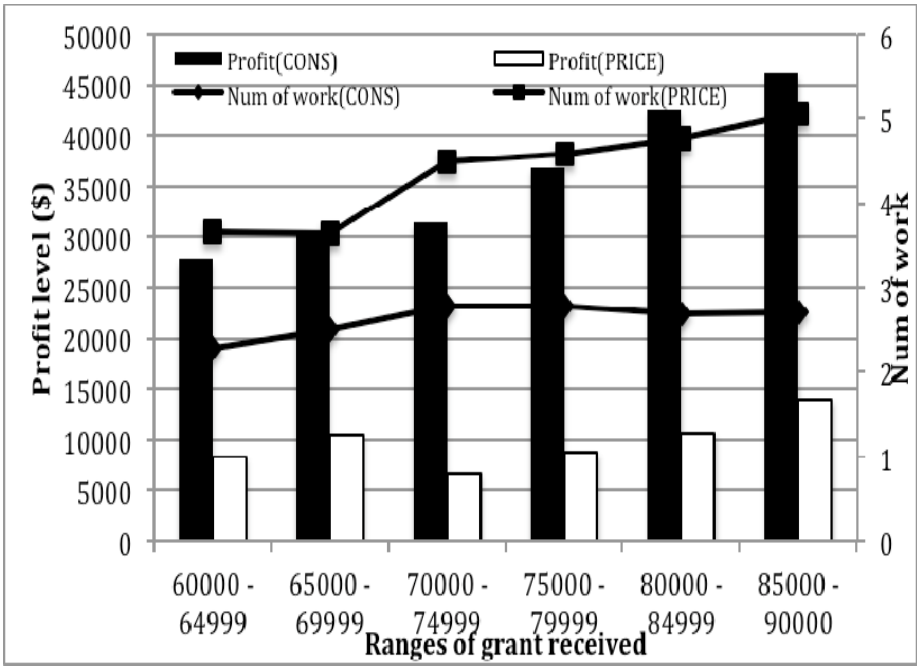

Fig 2: Profit level according to grant applied in the two treatments

Table 1compares the two market performance measures using a panel regression. It includes interaction terms to discriminate the treatment effect. Regression result in column one shows that sellers' profit is higher by $69094 in CONS treatment compared to PRICE treatment. Holding other variable constant, for each increase of number of conservation work, owners in the CONS treatment earn $12194 higher than owners in the PRICE treatment. Result in column two indicates that percentage of markup is 600% over true conservation cost in the CONS treatment and for every unit increase of number of conservation work, the markup is 200% different from PRICE treatment.

Table 1: Panel regression on market performance indicators

	Sellers' profit	Percentage of markup from true cost	Grant submitted
	(1)	(2)	(3)
Constant	6650.91*** (2.56)	0.1275 (0.99)	5711.87** (2.00)
D1=1 if CONS and 0 otherwise	69049.64*** (18.21)	6.1228*** 31.39	69387.59*** (18.31)
True cost	-0.5145*** (-2.39)	-3.91E-6 (-0.36)	0.4468** (2.06)
D1 * true cost	-2.0064*** (-2.39)	-0.0002*** (-9.72)	1.9746*** (3.36)
Num of works	6000.65** (1.85)	0.0317 (0.20)	6551.01** (2.01)
D1* num of works	12194.37* (1.52)	2.1744*** (5.24)	11568.51** (2.43)
N	373	373	373
Significance of the model (p-value)	<0.0001	<0.0001	<0.0001

Note: The dummy variable D1 = 1 if CONS treatment and 0 if PRICE treatment.
The numbers in the parentheses are z-values. *** is 1% significance level,
** is 5% significance level and * is 10% significance level.

Taken together, the most significant conclusion that can be drawn from Table 1 and Fig is that system which combines regulation and market could help conservation agency to efficiently allocate resources. Since types of works are easier to identify and monitor than cost, agency may specify works that match its preferences. At the same time, relying on the competitive market may help the agency to reveal the true cost and mitigate the hidden cost problems. This quasi-market system is necessary as lack of quantifiable information renders allocation of resources to its highest conservation benefit not possible.

4. Conclusion

This paper studies two different market mechanisms in allocation of built heritage conservation grants. In the first mechanism, conservation agency has approximated and specified the conservation cost, which may act as reserve price, and the allocation of the grants are based on number of conservation works submitted by the house owners. In the second mechanism, conservation works are specified by the agency and the allocation of grants is decided based on conservation cost submitted by the house owners. The first mechanism mimics the present practice in Penang heritage conservation. The agency has specified two conservation types and the amount approved would be based on these works. House owners were encouraged to submit application with more works than what has been identified by the agency.

The present study finds that the first mechanism is not able to encourage conservation. House owners strategically game the market by submitting low number of conservation works to maximize profit. On the contrary, when the sellers compete for grants through competitive bidding given that the works are determined by the agency, allocation of resources are more efficient. In this second market mechanism, competitive cost bidding ensures more cost effectiveness in allocation of grants.

Given the presence of many stakeholders and lack of mechanism to measure each contribution to the social preferences, free market mechanism may not be able to encourage these stakeholders to provide conservation works. In view of the huge potential for hidden actions among the house owners, agency may adopt regulation to decide on conservation work and allow competitive market to decide on cost. This could potentially make the situation more manageable.

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