

# The Willingness-to-Pay for the Royal Theatre in Copenhagen as a Public Good

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**Abstract.** In this paper some of the results of a Contingent Valuation (CV)-Study of the Royal Theatre in Copenhagen, Denmark, are presented. The estimated aggregated willingness-to-pay (WTP) for the Royal Theatre through taxes shows that the Danish population wants to pay at least as much as the theatre receives in public subsidies. The visitors comprise only about 7 per cent of the total population, but the non-users' WTP is quite substantial which is the interesting point. It means that the non-users are willing to pay an option price and that the Royal Theatre has non-use value.

**Key words:** contingent valuation, willingness-to-pay taxes, theatre, non-market benefits of the art

## 1. Background and Purpose

In this paper some of the results of a study, with the purpose of valuing a quasi-private cultural good, namely the Royal Theatre in Copenhagen, Denmark, using the Contingent Valuation Method (CVM), are presented.<sup>1</sup> The intention is to investigate if CVM can be used in order to estimate the total value of the Royal Theatre to the Danish population and to study whether the value of the Royal Theatre's non-market benefits can justify the public grants given to the theatre. A CV study of the Royal Theatre is therefore of direct political interest, as it can reveal whether the Royal Theatre "is worth the money" from the taxpayers' point of view.

This application of CVM is quite new. CVM has for the most part been used on environmental goods.<sup>2</sup> In the literature there are only a few examples of utilization of CVM for cultural goods (e.g. Martin, 1994; Throsby and Withers, 1983; Morrison and West, 1986), and most of these studies have used CVM on very broadly defined goods.

This limited use of CVM in the literature of cultural economics is quite surprising, as much of the literature deals with legitimizing public subsidy to the arts. Throsby and Withers (1979) and Frey and Pommerehne (1989) among others have discussed theoretical arguments for public support to cultural activities. There is wide agreement that the main arguments are to be found in positive consumer externalities of different kinds (see section 3), and CVM is the only benefit measurement approach which can be used to quantify the level of consumer externalities generated.

On the other hand, innumerable so-called economic impact analyses have been made, which calculate the short-term economic effects of cultural activities on economic indicators like consumption, employment, income, public revenue in the form of taxes and duties etc. In Bille Hansen (1994, 1995a) the conclusion is reached that these short-term economic effects of cultural activities are not a sound argument for public subsidy to the arts, as the alleged benefits may be no larger than if other public supported activities had been initiated. This would only be the case if, for example, the cultural activities attract a lot of tourists. As the primary purpose of cultural activities is not to attract tourists, but to provide enriching experiences for the citizenry, it seems much more relevant to use CVM to estimate the economic value of cultural activities. Frey and Pommerehne (1989) put it this way:

Those loving the art, and convinced that government should support it, should base their case on different arguments. In particular, they should make an effort to convince other members of society by showing (if possible quantitatively) that positive external benefits outside the market do exist.

In section 2 of this paper a short description of the Royal Theatre's activities are given. In section 3 a utility-model for the Royal Theatre is constructed. In section 4 the CV study is designed. The results are presented in section 5 where the individual stated willingness-to-pay (WTP) are aggregated to the total WTP for the Royal Theatre for the whole Danish population. The question of respondent's information level is among other things discussed in this section. In section 6 the difference between visitors and non- users are analysed. Section 7 concludes the paper.

## **2. The Royal Theatre**

The theatre was founded in 1748 and is the Danish national theatre.<sup>3</sup> It has three stages in Copenhagen, an old stage from 1874, a newer stage and a small stage for experimental plays. It also carries out tours to the rest of Denmark. It is one of the few theatres in the world offering opera, ballet and theatre performances. Around 400,000 tickets are sold every year, but more than two-thirds of the Danish population has never visited the theatre. It receives about DKKm 266 (about \$47 million) in support from the state every year, which is more than 80 per cent of its total budget and about 35 per cent of the total public support for theatres in Denmark, which is given to about 75 different theatres.

The Royal Theatre is chosen as a case because it is a very well defined cultural good. All Danes are familiar with it and know they are already paying for it through taxes. Besides, everybody seems to have an opinion on it. At the same time, the Royal Theatre is one of Denmark's most elitist cultural institutions in the sense that only a very small percentage of the population actually goes to the theatre. As the Royal Theatre is mainly financed by public subsidies it means that the non-users are financing the main part of the theatre's budget through taxes.

Besides, it is shown in Bille Hansen (1996) that consumer surplus for visits at the Royal Theatre only makes up a small part of the public grants given to the theatre. In Bille Hansen (1991) a demand model for subscription sales is estimated on the basis of data for the number of subscriptions sold, average ticket prices, consumer incomes, the number of productions offered etc. in the period 1971/72 to 1988/89. From this model a priceelasticity of  $-0.33$  is calculated.<sup>4</sup> Assuming a priceelasticity of  $-0.33$  is applicable to the total number of tickets sold at the Royal Theatre, a total consumer surplus for visits at the theatre of about DKKm 42 can be estimated, although with a large uncertainty on the estimate. This consumer surplus estimate only covers about 15 per cent of the public grants the theater receives. Thus, if the subsidy shall be justified, it has to be on account of the non-market benefits of the Royal Theatre.

### 3. Utility of The Royal Theatre

A model can be constructed of the individual's utility of the Royal Theatre. It is presumed that an individual has the utility function:

$$U = U(X_u, X_{nu}, Z, Q^0)$$

where

- $X_u$  = visit to the Royal Theatre;
- $X_{nu}$  = existence of the Royal Theatre;
- $Z$  = a vector of all other goods and services;
- $Q^0$  = the present level of quality and supply at the Royal Theatre.

Furthermore, it is presumed that the utility function is well-behaved, continuous, twice differentiable, increasing in the first derivative and falling in the second derivative.

This utility function can be maximized with regard to the existing prices and the consumer's income:

$$\begin{aligned} \text{Max } U &= U(X_u, X_{nu}, Z) \\ \text{s.t. } Y &= p_u X_u + p_{nu} X_{nu} + p_z Z \end{aligned}$$

In theory,  $X_{nu}$  is a vector of a number of sub-components, where the individual sub-components can be defined as follows:

$X_{nuv}$  = *vicarious consumption*: e.g. the pleasure derived from reading critical reviews of the Royal Theatre's performances, even though one has no wish to see them. The entertainment derived from reading about the repeated scandals at the theatre. A sacked director of the opera, strike among stage technicians and the actors' private lives are 'hot material'. Another and more important form of vicarious consumption is *television transmissions* of the Royal Theatre's performances.

$X_{nuu}$  = *educational benefit*: the Royal Theatre forms part of the general education and contributes towards developing abilities and qualifications like, for

example, the provision of public creative ideas and aesthetic standards, of social comment and criticism etc. Besides, the film industry and the media utilize the acting skills and talents which are developed at the Royal Theatre, so that the viewers of a TV drama, for example, have an indirect utility of the Royal Theatre.

$X_{nub}$  = *bequest benefit*: the Royal Theatre comprises an important part of the national cultural heritage and identity, and the continued existence of the Royal Theatre is a significant factor in ensuring that important elements of the national cultural heritage, including the Holberg and the Bourmonville tradition, are preserved and made accessible to future generations.

$X_{nup}$  = *prestige benefit*: e.g. an international recognition of the Royal Ballet can contribute towards national pride and identity, spread Denmark's name abroad, attract tourists etc.

Even though it is analytically possible to differentiate various motives which explain why the existence of the Royal Theatre is incorporated in the consumers' utility function, it is difficult to isolate and measure each element separately. Therefore breaking down of the non-use value into subcomponents will not be made.

The consumers' willingness-to-pay problem can subsequently be presented such that the consumer has to minimize the expenditure function:

$$e(P_u, P_{nu}, P_z, Q^0, U^0) = \min\{p_u X_u + p_{nu} X_{nu} + p_z Z \mid U(X_u, X_{nu}, Z, Q^0) = U^0\}$$

It is presumed that the utility function is separable, such that  $Z$  does not affect the estimation of  $X_u$  and  $X_{nu}$ , in other words, the price of  $Z$  is exogenously given. This means that the expenditure function can be written with  $p_z$  implicit:

$$e(p_u, p_{nu}, Q^0, U^0)$$

$p^*$  is the *choke price* – in other words the price high enough to make the demand zero. The total value of the Royal Theatre can hereafter be defined using Hicks' *compensating surplus measure*,  $KS$  (the consumer stays at the same utility level), as

$$KS = e(p_u^*, p_{nu}^*, Q^0, U^0) - e(p_u^0, P_{nu}^0, Q^0, U^0)$$

at the existing prices, income and preferences.

Inserting the indirect utility function, the following is obtained

$$KS = e[(p_u^*, p_{nu}^*, Q^0, U^0(p_u, p_{nu}, P_z, Y)) - e(p_u^0, P_{nu}^0, Q^0, U^0(p_u, p_{nu}, P_z, Y))]$$

which indicates that personal income and various factors, influencing the preferences of the individual, for example education, will affect the value of the Royal Theatre.

This is the value in a deterministic world. In a *world with uncertainty* the utility will become the ex ante expected value. Uncertainty can be introduced into the expenditure function by:

1.  $i$  possible states,  $S_i$ , which each have the probability  $\pi_i$ , where

$$\sum_{i=1}^i \pi_i = 1$$

2. uncertainty with regard to the present level of quality and supply at the Royal Theatre,  $Q^0$  (uncertainty on the supply side).  $q_k$  is the probability for a level  $Q_k$ , where

$$\sum_{k=1}^k q_k = 1$$

With uncertainty, the relevant concept becomes the *planned expenditure function*, where  $E(U^0)$  = the expected utility. The ex ante expected value thus becomes:

$$KS = e(p_u^*, p_{nu}^*, \pi^0, q^0, E(U^0)) - e(p_u^0, p_{nu}^0, \pi^0, q^0, E(U^0))$$

It is hereby presumed in accordance with the theory that the option value (*OV*) should not be seen as a separate benefit category, but as a correction factor to the total value in a deterministic world (Mitchell and Carson, 1989; Randall, 1991). In accordance with Cicchetti and Freeman (1971) the option value can be defined as the difference between the option price (*OP*) and the expected consumer surplus ( $E(CS)$ ):

$$OV = OP - E(CS).$$

The option value can be positive, negative or zero, and several contributions in the literature have dealt with the conditions under which one can predict the size and the sign of the option value (for example Smith (1984); Freeman (1984); Plummer and Hartman (1986)). There is agreement about the fact that for practical empirical purposes, option price is the correct benefit measure (see for example Bohm (1975); Graham (1981); Bishop (1982); Freeman (1993)). In relation to CVM it is thus the option price, which must be revealed, in other words, the maximum amount the consumer is willing to pay under conditions of uncertainty about future preferences, personal income, prices and supply.

#### 4. Design of the CV Study

CVM is a survey-based methodology where a sample of a population is asked about their maximum WTP for (a specified change in) a (public) good. Values for the good are then inferred from this respondents' decisions. The method is called the contingent valuation method (CVM) because the responses depend on a hypothetical market which the interviewer describes to the consumer (Mitchell and Carson, 1989).<sup>5</sup> CVM has created a vehement debate among economists because

economists traditionally have a strong bias in favour of estimates that are inferred from observed behaviour as opposed to stated preferences such as those revealed in CV studies. On the other hand, CVM is the only method capable of estimating the total value (use, non-use and option value) of a good.<sup>6</sup>

#### 4.1. THE SAMPLE

The study encompasses a random sample of the Danish population over 16 years old. In all 1,843 people have been interviewed by telephone, with a follow-up visit for those who did not have a telephone or could not be reached by telephone. The interviews took place in autumn 1993 in connection with an extensive study of the population's cultural and leisure-time habits (Fridberg, 1994).<sup>7</sup>

The data material is good in the sense that the whole population was asked – not just those who go to the Royal Theatre. In this respect, this CV study differs from other studies (e.g. Dubgaard, 1996), where it is exclusively the direct users who have been asked. It could be claimed that the sample has its limitations because it is only Danes who have been interviewed (see criticisms of Frey, 1995). The foreign willingness-to-pay has been assumed to be zero, and thus the tourists' willingness-to-pay is supposed not to exceed the ticket price. This could be seen as a shortcoming because some of the Royal Theatre's audience are tourists,<sup>8</sup> who probably also have a consumer surplus for their visits to the theatre. On the other hand, the tourists do not pay Danish taxes and for this reason it seems reasonable only to estimate the willingness-to-pay of Danes.

#### 4.2. WELFARE CONCEPT

It is the maximum WTP for the Royal Theatre continuing its activity at the present level which is to be estimated – or formulated in a different way: the isolated welfare loss as a result of closing down the Royal Theatre. The correct welfare measure in connection with valuation of the Royal Theatre is therefore WTA – in other words the smallest amount respondents are willing to accept in compensation for doing without the good. Using Mitchell and Carson's (1989, p. 41) new interpretation of property rights,<sup>9</sup> it is, however, clear that the question of the citizenry's WTP can be put in two ways (which also is in accordance with Gordon and Knetsch, 1979):

1. What is the maximum amount the citizenry is willing to pay (WTP) for the Royal Theatre to continue its activities at the present level?
2. What is the minimum level of compensation the citizenry is willing to accept (WTA) if the Royal Theatre is closed down?

On account of the many disappointing results with the WTA-measure,<sup>10</sup> the WTP measure is used in this study. The NOAA panel (Arrow et al., 1993) likewise recommend a conservative design in CV-studies, which among other things is achieved by using WTP instead of WTA measures.<sup>11</sup> For theoretical discussions

and explanations of the disparity between WTP and WTA see e.g. Hanemann (1991), Knetch and Sinden (1984, 1987), Kahneman and Tversky (1979).

It should be noted that it has been implicitly presumed that the Royal Theatre is an *indivisible good*. Either we have the Royal Theatre – or we do not. If Denmark is to have a national stage with three different performing arts, an orchestra and the obligations stated in the Theatre Act with regard to universal appeal, education and quality, then this requires a certain-sized stable company of artists, who have been trained in the traditions which the theatre is attempting to maintain and continue. The Royal Orchestra cannot carry out productions of all the great works if it is reduced to half the size, and the Royal Ballet cannot carry out productions of Bournonville ballets with only half the number of dancers. Alternatively a question could have been asked concerning the WTP for *marginal changes in the level of activity*, as the number of performances can of course be varied. But here the purpose of the analysis should be considered. First and foremost it is the intention to investigate if CVM can be used in order to estimate the total value of the Royal Theatre to the Danish population and to study whether the value of the Royal Theatre's non-market benefits can justify the public grants given to the theatre. The citizenry's WTP for marginal changes in the supply is therefore of limited interest.<sup>12</sup>

Besides, another problem should be noted, namely that CVM does not include an optimizing algorithm, i.e. the good is presented to the respondents as it is. It is assumed the supply is already technical efficient in the sense that the activities are so perfectly run, than no improvement is possible without having to give up some other goal (*x*-efficiency). This assumption is rarely met, and in Bille Hansen (1991) it is shown that large opportunities actually exist for improvements in technical efficiency at the Royal Theatre.

#### 4.3. ELICITATION METHODS

Two *question formats* have been chosen:

1. direct, open-ended questions
2. should the state spend “more – the same – less” questions.

The reasons for this choice are based on the following considerations:

*Firstly*, the WTP questions had to be fitted into a larger study of the cultural habits of the Danes (Fridberg, 1994). This meant a number of limitations in the study design, as it was given beforehand that the study was to be carried out as telephone interviews. Dichotomous choice seems to be the method which is most in favour at the moment (cf. Arrow et al., 1993). The problem is that it is very expensive to use, and on account of economic limitations it was, therefore, not possible to use this method. *Secondly* a number of positive reasons can be given for choosing open-ended questions. Open-ended questions will always be preferred in an ideal world as they provide most information. The reason for dichotomous

choice being recommended is that it facilitates the respondents' choices, which makes sense if the valuation of a good is such an unusual task for the respondent, that s/he finds it difficult to offer a satisfactory answer. It can thus be difficult on the spur of the moment to say how much one is willing to pay to rescue the "black-spotted toad", if one has never seen it and never given a thought to its worth, or perhaps been totally unaware that it even existed. The Royal Theatre is, however, known to everybody, and having to pay for the Royal Theatre through taxes is not unfamiliar – almost everybody knows that they already make payments to it. Perhaps they do not know how much they pay,<sup>13</sup> but they know that they pay something. In a situation like this where the good is familiar, and not least where the fact that the respondent has to pay for the good is a commonplace one, experience shows that open-ended questions function in a satisfactory manner (Mitchell and Carson, 1989).

The influence of how much information is given to the respondents before the interview has been tested in a small experiment using a split sample. The sample was divided randomly into two equally large groups. One half received the information that all Danes over the age of 18 pay on average about DKK 60 (about \$10.5) a year to the Royal Theatre through taxes. The other half did not get this information.

The NOAA panel (Arrow et al., 1993) places a decisive emphasis on the fact that the respondents are explicitly made aware of their budget restriction as well as possible substitutes for the good which is to be valued. The respondents were made aware of their budget restriction by being asked if they "would still pay more if it was necessary to raise taxes". The more serious problem with "warm glow" (Diamond and Hausman, 1994), where respondents are willing to pay for "something beneficial for the arts", but do not mind what precisely they are paying for (the good has many close substitutes), does not seem to be a problem in this study, as the Royal Theatre is a very well-defined good which does not have any close substitutes.

## **5. Willingness-to-Pay for the Royal Theatre: Results**

### **5.1. STATED INDIVIDUAL WILLINGNESS-TO-PAY**

The individual WTP for the Royal Theatre varies from DKK 0 to DKK 8,000, and the same variation is found in the amount the respondents believe they pay towards the theatre. The median is DKK 60 – equal to the actual average amount paid to the theatre a year by each taxpayer – and this is regardless of whether the respondent has received this information or not. On the other hand, a clear tendency can be seen for the respondents who have received information to have a lower WTP compared to those who have not received information. This is clear in both the 95 per cent and 75 per cent fractiles.

The distribution of the WTP responses for the whole sample is also presented in Figure 1, where the amounts, any of the respondent are willing to pay, are plotted



Table I. Fractiles for the individual WTP per year for the Royal Theatre

Fractiles %	DKK			
	All	With information	Without information	Believed payment
0	0	0	0	0
5	0	0	0	0
25	8	50	0	50
50	60	60	60	100
75	100	90	200	400
95	600	200	1,000	1,250
100	8,000	5,000	8,000	8,000

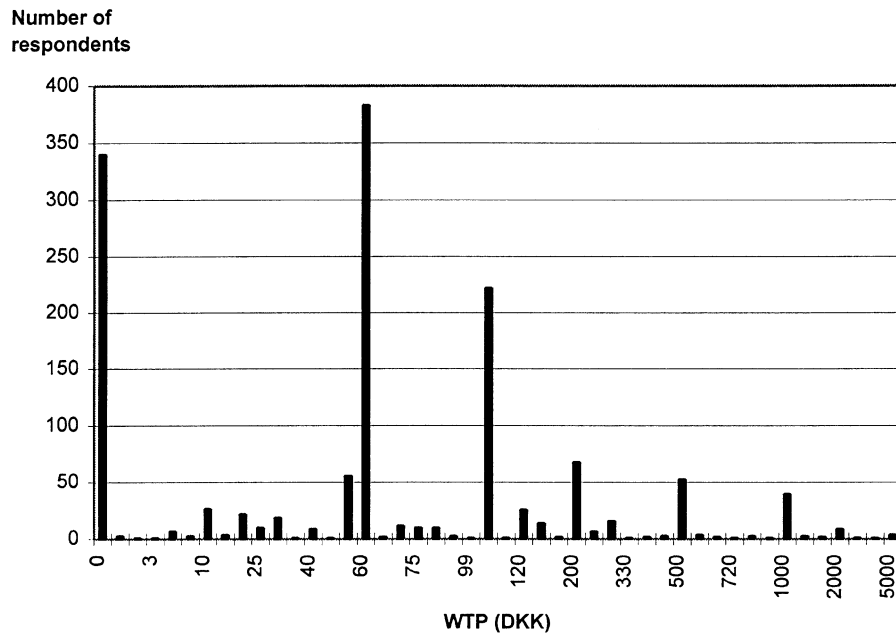


Figure 1. Distribution of WTP bids.

on the  $X$  axis, while the number of respondents, who have stated this amount, is plotted on the  $Y$  axis.

Figure 1 illustrates an interesting picture.

Firstly, there is a relatively large proportion of zero bids, although this is hardly surprisingly. Indeed, one might in fact have expected it to be larger since only approximately 7 per cent of the Danish population has been to the Royal Theatre within the last year (for more information about the users, see section 6 in this

Table II. Response rate for the open-ended valuation questions

	Sample group	Do not know	Responses	Response rate
With information	903	74	829	92
Without information	925	342	583	63
Believed payment	926	552	374	40
In all	1,843 <sup>a</sup>	431 <sup>b</sup>	1,412	77

<sup>a</sup> Of these, 9 not available.

<sup>b</sup> Of these, 15 not available.

paper). 340 people, the equivalent of 18 per cent of the respondents, have stated a WTP for the Royal Theatre of DKK 0.

*Secondly*, the WTP clusters around a few round figures, namely DKK 50–60, DKK 100, DKK 200, DKK 500, DKK 1,000, and DKK 2,000.

*Thirdly*, the growth in the bids given can, approximately, be described using a logarithmic distribution (exclusive of the zero-bids). The higher the amount given, the greater the distance to the next bid on the scale.

The WTP behaviour which the figure reflects is not particularly surprising. The respondents do not know their preferences well enough to be able to state whether they are willing to pay DKK 89.50 or 107.75 towards the Royal Theatre. On the other hand they are quite clear about whether the theatre is worth DKK 100, DKK 200 or DKK 500 to them. In addition to this, the increasing distance between the amounts reflects a falling marginal utility per DKK. If a respondent is willing to pay approx. DKK 50, then it is not without importance whether the price is DKK 50 or DKK 100. If on the other hand the respondent is willing to pay approx. DKK 3,000, it does not matter whether the price is DKK 3,000 or DKK 3,050.

When these individual WTP bids are aggregated to the total WTP in the Danish population for the Royal Theatre using Kaldor-Hicks' compensation criterion, one has to be aware of a series of conditions and maybe make some adjustments. These conditions are discussed in the following section.

## 5.2. NON-RESPONSE

It is not unusual to receive a high non-response rate to open-ended valuation questions. It can cause problems for the representativeness of the study, if a large number of respondents have not responded to single questions (item non-response). The response rate is shown in Table II.

It can be seen from the table that only 8 per cent have responded "don't know" to the question about their WTP for the Royal Theatre, when they received information about the amount taxpayers contribute on average towards the theatre. Thirty-seven per cent on the other hand found it impossible to form an opinion about the valuation question without having any information about the actual expenses. All in all, this

adds up to a response rate of 77 to the open-ended valuation question, which must be said to be satisfactory.

The question is, however, whether the average WTP for the 1,412 people who have responded to the question can be presumed to be representative for the whole sample of 1,843 people. If different groups of the population have different WTP and these groups in addition have a different tendency to respond to the valuation question, this will give rise to a *sample non-response bias*. When the “don’t know” respondents’ characteristics are compared with the whole sample, the “don’t know” do not stand out to any significant degree. Sample non-response bias does not, therefore, seem to be any serious problem.<sup>14</sup>

### 5.3. PROTEST BIDS AND TRUNCATION

Another problem to be discussed is how to interpret the zero bids. There are two possibilities:

1. they are presumed to be a true expression of a WTP of DKK 0.
2. they are viewed as “protest bids” and sifted out from the final study material because they are not presumed to be an expression of a WTP of DKK 0, but on the contrary a protest against the study.

How to interpret the zero bids is a problem which has been discussed a great deal in the CVM-literature, first and foremost because a much bigger proportion of zero bids, than is the case in this study, has been obtained from the majority of CVM analyses. The method most often used to investigate why the respondents have a WTP of DKK 0 is simply to ask them (see for example Dubgaard, 1996).<sup>15</sup> In this way one can get an impression of why the respondents have answered zero. In this study the respondents have not been asked such questions, and therefore it cannot be directly ascertained whether the zero bids are an expression of protest or whether they reflect the true preferences of the respondents. Indirect evidence indicates, however, that the zero bids are an expression of the respondent’s “true” preferences.

*Firstly*, it does not seem unlikely that 18 per cent of the Danish population has a WTP of DKK 0 for the Royal Theatre. In fact, one might have expected the proportion to be larger. The direct users of the Royal Theatre comprise a very small proportion of the Danish population, and one could well imagine that many people feel that their utility of the theatre is equal to zero and they are therefore not interested in paying for it.

*Secondly*, protest answers crop up in particular if the respondents look upon the study as illegitimate, either because they do not think that it is reasonable to have to pay for the good, or because they think that the good cannot be “assessed in terms of cash”. These problems must be presumed to be relatively small in this study, as it is well known to respondents that they pay for the Royal Theatre, and that there

is nothing reprehensible in valuating a theatre as one might perhaps feel about a threatened species of animal.

*Thirdly*, it is possible to investigate indirectly whether it is reasonable to assume that the zero bids are an expression of “true” preferences by investigating whether the respondents belong to a group for which one might expect a low WTP, in other words, people who never go to the theatre, live a long way from Copenhagen, have a low income etc. This seems to be the case. Practically all the respondents who have stated a zero bid are non-users. There are only two users, and the respondents otherwise have all the characteristics one might expect. They live further away from Copenhagen, have lower incomes, lower level of schooling and education, they are less culturally orientated, to a higher degree men and there are more self-employed, blue-collar workers and unemployed and fewer white-collar workers and students than is the average for the population. This indicates that the zero bids are real bids and not protest bids.<sup>16</sup>

The bids at the other end of the scale – in other words the very high bids, which go right up to DKK 8,000 – can also provide cause for deliberation. Truncation (removal of the very high bids) is often used if one believes that some bids are unrealistically high. In this study there are 20 bids which are above DKK 1,000 and seven bids which are above DKK 2,000. Are these bids an expression of a real WTP? Also here there are clear indications that the stated WTP is an expression of a real WTP. The 20 people who have stated a WTP above DKK 1,000 live closer to Copenhagen, have a higher income, a higher level of schooling, more of them have undergone higher education, they are more culturally orientated, there are more white-collar workers and students than is the average for the population, and there are no self-employed, unemployed or pensioners at all.

Besides, it might be of interest to investigate how the average is affected if these high bids are removed. *The average WTP for the whole sample group lies at DKK 154* (see Table VI). If the highest bid of DKK 8,000 is removed, the average is reduced to DKK 146. If the seven bids above DKK 2,000 are removed, the average is reduced to DKK 128, and if the 20 bids above DKK 1,000 are removed, the average is reduced to DKK 111.

If the average is used to aggregate the individual WTP to the WTP of the Danish population as a whole, one ought thus to be relatively certain that the observations which are truncated away are in fact unrealistically high, as truncation means that the average is considerably altered. In the following, only the bid of DKK 8,000 is removed, as several factors point towards the fact that this is a protest bid.<sup>17</sup>

#### 5.4. STRATEGIC BEHAVIOUR

Incentives to strategic behavior has been known since Samuelson (1954). In the literature experiments have been implemented to investigate empirically the extension of strategic behavior (see e.g. Bohm, 1972; Marwell and Armes, 1981; Schneider and Pommerehne, 1981). Most studies seem to conclude that strategic behav-

ior is not dominating (see Mitchell and Carson, 1989), but no clear evidence is established. Strategic behaviour might cause strategic bias in CV studies if the respondents believe that by giving misleading answers to the valuation questions they can influence the result to their own advantage.

In this survey *non-users* might want a bigger part of the theatre's budget to be financed by box-office receipts and a smaller part by taxes. In this way, non-users might be inclined to free-ride and state a WTP *below their true WTP*. On the other hand, *the users* will be interested in the opposite and therefore they will be inclined to answer strategically and *overestimate* their WTP if thereby achieving that a bigger part of the good is financed collectively through taxes leading to a reduction of direct user-payment.

No effort was made to try to measure the extension of strategic behavior, e.g. by means of Bohm's (1979) interval method, where half of the sample is given incentives to overstate their true WTP while the other half is given incentives to understatement. Indirect evidence can, however, be given.

It has been analysed whether the seven persons who stated a WTP of more than 2,000 DKK might be considered to be strategic bidders by investigating to what extent they use the Royal Theatre. Four of them do not visit the Royal Theatre at all so nothing indicates that they are strategic bidders. The other three, who visits the Royal Theatre, have a WTP of 3,000, 4,000 and 5,000 DKK respectively. This WTP does not seem unrealistically high. The person, who has a WTP of 5,000 DKK, has been to the Royal Theatre more than six times within the last year, and a ticket for the Royal Theatre costs only about 100 DKK on average. A WTP of 5,000 DKK does therefore not seem unrealistic if we compare it with market behaviour in other countries. For instance in the Metropolitan Opera or the Vienna Opera you might pay 1,000 DKK for a ticket. There are thus indications that the high bids are not strategic answers, but an indication of a high consumer surplus even though no definitive evidence can be given. Besides, strategic behaviour can of course not be limited to these extreme answers.

### 5.5. OVERSTATEMENT OF WILLINGNESS-TO-PAY?

CVM reveals responses to *hypothetical* questions and therefore it has been claimed that CVM often leads to an overstatement of WTP (e.g. Bohm, 1994).

One very common way of dealing with this problem is to make the respondents explicitly aware of their budget restriction, for instance by asking if they still want to pay their stated amount, if it becomes necessary to raise taxes. In this study 1,160 respondents have answered "too little money" at least one time in response to the question about whether the state uses "too much money – a fitting amount – too little money" on a number of cultural purposes. These respondents have also been asked whether they still think that the state ought to use more money, if it becomes necessary to raise taxes. This question was included as a reminder of the

Table III. The significance of the budget restriction

	Are the respondents prepared to accept higher taxes?			
	Yes	No	Don't know	In all
No. of respondents answering "too little money"	440	641	79	1,160
Of which the ones who answered the WTP question	353	524	54	931
Average WTP (DKK)	215	152	124	174
Adjusted average WTP (DKK)	215	43	124	113

respondents' budget restriction. The responses to this question are distributed as shown in Table III.

If the responses are to be taken at face value, an obvious method would be to set the WTP at DKK 60 for all the respondents who have answered "no" to the tax-question and who have a WTP exceeding DKK 60. This applies to 189 out of the 524 respondents who answered the WTP question. Using this method the average is reduced from DKK 174 to DKK 113 for the 931 respondents who answered "too little money" and the WTP question.

The remaining 481 respondents who answered "a fitting amount" or "too much money" have an average WTP of DKK 114. On the basis of this a WTP of DKK 113 can be calculated, where the respondents' budget restriction has been taken into account. This is the equivalent of a reduction of approximately 27 per cent in relation to an unadjusted average of 154 DKK.

By doing this one does not reach a correct estimate of the aggregate WTP, since there can be respondents who want to pay their stated WTP even though they do not want taxes to raise. But the correction is a way to ensure that the benefit estimate reached is a conservative estimate. It can therefore be viewed as a response to the general problem, that CVM reveals responses to *hypothetical* questions and especially when CV-studies relates to a single issue, they can lead to overstatement of WTP or lack of consistency with other expenditures in the respondents overall budget.

### 5.6. MEDIAN OR AVERAGE?

Having a median of 60 DKK and an average of 154 DKK (see Table VI) the aggregated WTP for the Royal Theatre will of course be totally dependent on whether the median or the average is used, because the distribution is extremely skewed to the right. Many CV-studies have focused on the difference between the average and the median (Kahneman and Knetsch, 1992; Carson, 1991) and the question of which measure of average is the “correct” one to use has been much discussed. Especially in the United States it is often the median which is chosen (see for example Hanemann, 1994), and the choice is by and large made on the basis of two considerations:

*Firstly*, the median is a very stable figure which is not influenced by extreme observations, which can be an advantage when one is not sure whether the extreme values are an expression of a real WTP.

*Secondly*, the argument can be put forward that the alternative to a CV-study is not to let the market find an equilibrium price, but on the contrary to conduct a referendum concerning subsidy to the Royal Theatre.<sup>18</sup> If a referendum is conducted, it is of the median value which will be chosen, as the median value is the value which the median voter would prefer. One must, however, be aware of the fact that even though the median is in harmony with normal democratic selection processes with regard to public goods, it is the average WTP which is in harmony with the potential Pareto criterion, which would enable the winners to compensate the losers. There are thus advantages and disadvantages, regardless of which of the two measures of average one chooses, and in Europe (exclusive of Switzerland) the average is often preferred.

### 5.7. WITH OR WITHOUT INFORMATION?

One of the purposes of this study is to test explicitly what the information about price of the good means for the respondents’ valuation, i.e. what a Dane on average pays to the Royal Theatre per year through taxes.

According to economic theory supply and demand are separate notions, which means that the respondents’ preferences and their WTP are independent of the production costs and the price of the good. It can therefore be claimed that it is irrelevant information to give respondents information about the average price of the good in a CV study. This seems, however, not to be the case since the results show that this information has a significant effect on the respondents’ valuation.

The question of how much information respondents should be given in a CV interview, is a question which is far from being settled in the literature, and surprisingly enough only very few studies have explicitly dealt with this problem<sup>19</sup> and almost all these studies have dealt with the influence of information about the good or information about substitutes or complementary goods – not information about the price of the good.<sup>20</sup> Boyle (1989) has studied what marginal changes in information means for the respondents’ valuation. The result shows that increased

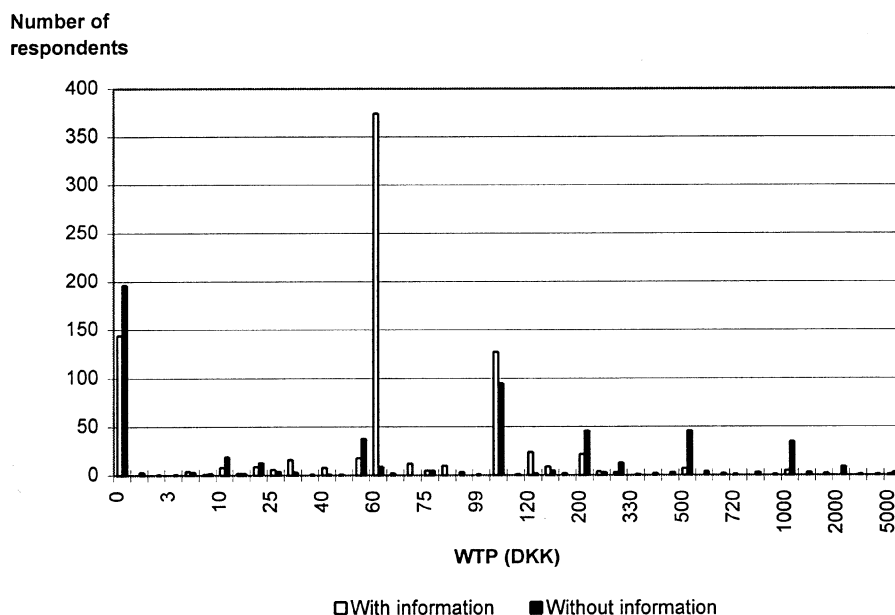


Figure 2. Distribution of WTP bids for respondents receiving or not receiving information concerning actual expenditure.

information does not alter the average WTP. The variance is, on the other hand, significantly reduced so that more information improves the precision of the estimates. In addition, information about the actual costs meant that the number of zero bids, protest bids and “don’t know” responses became significantly fewer. This indicates that the best results are achieved by giving the respondents as much information as possible, including information about the actual costs.

This is confirmed by Bohm (1972, 1984) who argued for the respondent being given all relevant information (including information about the level of activities, current public expenditure on the good etc.) as he believes that a situation with full information is the most realistic one. Carson and Mitchell (1984) likewise believe that a situation with information provides the best results (see Smith and Desvovges, 1986).

In this study there is no doubt that the information about what a Dane on average pays to the Royal Theatre has had a significant effect on the respondents’ valuation. Figure 2 illustrates the distribution of WTP bids for respondents receiving and not receiving information respectively.

It can clearly be seen that the information, that taxpayers on average pay DKK 60 a year to the Royal Theatre through taxes, concentrates the distribution around the DKK 60 value, and 45 per cent of the respondents who have been given information have indeed answered DKK 60. This indicates a clear anchoring bias.<sup>21</sup>

The difference in the two samples applies both with regard to the average WTP, the dispersion and the proportion of zero bids and “don’t know” responses, which



Table IV. Comparison of results: with and without information

	Average WTP (DKK)	Dispersion	Don't know (%)	Zero bid (%)
With information	79	205	8	16
Without information	259	627	37	21
In all	154	442	23	18

Table V. "Information bias" for users and non-users

	Users		Non-users	
	With information	Without information	With information	Without information
Average TWP (DKK)	205	693	<b>68</b>	232
Dispersion	638	810	<b>90</b>	605
Believed payment (DKK)	–	277	–	410

is illustrated in Table IV. Without information both the average willingness-to-pay, the dispersion, the proportion of "don't know" answers and zero bids are significant bigger than those of the group who received information.<sup>22</sup>

The bigger proportion of zero bids in the group without information indicates that some of these zero bids are protest bids which contradicts the current conclusion in section 5.3 that protest bids do not seem to be a problem.

A hypothesis could be that the big difference in the average WTP for the sample respectively with and without information is due to the different proportions of non-responses in the two samples. If it is assumed as an extreme that everybody who answered "don't know" in the sample without information have a WTP of DKK 0, the average WTP is reduced to DKK 163, which still is much more than the average WTP for the sample with information. Hereby, it can be concluded that the difference in average WTP is not due to different response rates.

Another hypothesis could be that information particularly influence the respondents who are not very familiar with the good – in this case the non-users of the Royal Theatre. The reason is that respondents unfamiliar with the good will be more uncertain of what the theatre is worth to them than the users and therefore will be more inclined to make their valuation on the basis of an initial value leading to an anchoring bias. The hypothesis is partly confirmed by Table V.

The average WTP for non-users receiving information is DKK 68 – in other words very close to the amount actually paid – and the dispersion is small (90 compared to more than 600 in the other three groups in the table). On the other hand the users reduce their average WTP more than the non-users when they receive information. But this has to be seen in relation to the fact that the user's average WTP without information is far bigger than the non-users. The average is reduced

by DKK 488 for users and DKK 164 for non-users. In both cases the average WTP is reduced by 70 per cent.

It is also interesting that the non-users on average think they pay much more to the Royal Theatre through taxes than they actually do (almost 7 times as much), and the non-users' overstatement are far bigger than the users, which on average "only" think they pay 4.5 times as much as is actually the case. This confirms greater knowledge among users than non-users.

The question is therefore, which situation best elicits the respondents' "true" preferences. Arguments both for and against information can be put forward.

*Against information* is the fact that respondents who are unsure will often tend to make a valuation on the basis of an initial value (Mitchell and Carson 1989, p. 240). The final evaluation will therefore be biased towards the initial value with an associated anchoring bias. Information about the actual average amount paid to the Royal Theatre can be interpreted as "the correct value", which clearly in this study has led to anchoring bias and thereby prevented the respondents' "true" WTP from being expressed.

On the other hand, *in favour of information* is the fact that it can be of assistance to the respondent in the valuation process. In the same way that the consumer is confronted with the price of a good in trade on the private market, after which s/he can decide whether the good is worth the money, the information about an average "price" for the Royal Theatre can help the respondent in his/her deliberations about whether the theatre is worth DKK 60 in relation to his/her income and the price for other goods, or whether it is worth more or less than the DKK 60 and if so by how much. This is first and foremost confirmed by the smaller proportion of "don't know" answers and zero bids for the group with information.

More general, it is a question as to whether we look at the "technical" problem of anchoring bias as more serious than the danger that respondents give more or less random answers because they are uncertain about the hypothetical valuation situation.<sup>23</sup>

## 5.8. AGGREGATED WILLINGNESS-TO-PAY FOR THE ROYAL THEATRE

The aggregated, unadjusted WTP for the Royal Theatre is illustrated in Table VI.

It can be seen that an annual subsidy of DKKm 266 is paid to the Royal Theatre, and one can *conclude that the citizenry's WTP is of a magnitude which at the least measures up to the public subsidy which is given to the theatre.*<sup>24</sup>

There is, however, no unequivocal measure of the aggregated WTP, as it depends upon assumptions made with regard to which estimate best reflects the citizenry's "true" preferences.

The aggregated WTP for the Royal Theatre can be found by either using the median or the average, and subsequently multiplying this figure by the number of taxpayers. If the *median* is used it can be seen that the aggregated WTP adds up to DKKm 270 in all, which is about the same as the subsidy which is actually

Table VI. Aggregated (unadjusted) willingness-to-pay for the Royal Theatre

	Average DKK	Median DKK	Dispersion	Taxpayer (1,000) 1992	Aggregated average DDKk	Aggregated median DKKk	Public subsidy to Royal Theatre (DKKk) 1994
With information	79	60	205		350	270	
Without information	259	60	627		1,165	270	
Believed payment	399	100	891		1,795	450	
In all	154	60	442	4,498	690	270	266

given to the theatre. It can also be seen that the median has the convenient property of being stable regardless of whether the respondents have received information about the average expenses or not. This indicates that *the political process actually functions well and that the result are in accordance with the preferences of the median voter*. But as mentioned earlier, it is the average WTP which is in harmony with the potential Pareto criteria and economic efficiency.

*The average* is bigger than the median, because the distribution is clearly skewed to the right. If the average is used for aggregating WTP, a far higher value is obtained, namely DKKk 690. Besides, there is a big difference between the samples, who received or did not receive information respectively. If the average for respondents *receiving information* is used, an aggregate WTP of DKKk 350 is obtained, while the average for the sample *not receiving information* gives an aggregated WTP of over DKK 1 billion, which is four times as much as the subsidy which is in fact given to the Royal Theatre.

A serious problem is thus the significant difference in the average for respondents with and without information about actual expenditure on the Royal Theatre. Arrow et al. (1993) argue in favour of the fact that one should always choose the conservative estimate, and that a conservative estimate can be encouraged by giving the respondents information about the money which is currently being spend on the good.

But in this study we are not especially interested in a conservative estimate, but in a “true” estimate. It is difficult to know which one of the two averages best reflects the respondents’ “true” preferences, and the truth possibly has to be found somewhere in the middle. Inspired by Bohm’s (1979) interval method regarding strategic bias there is reason to believe that the “true” WTP is somewhere in the middle of the averages for the groups with respectively without information. The average of 154 DKK for the whole sample is possibly not far from the truth.

The above sections discussed other aspects influencing which estimate to choose and corrections to make in order to reflect the aggregated WTP for the Royal Theatre in the best possible way. The discussion showed that there seems to be no need to correct for sample non-response bias. However, it seems reasonable to remove the

Table VII. Proportion of the Danish population who had been to the Royal Theatre (1993)

No, never go there	Yes, within the last. . .				Yes, but more than 1 year ago
	week	month	half year	year	
68.4	0.4	1.0	2.8	3	24.4
How many times within the last year?					
1-2 times	3-5 times	More than 5 times	Don't know		
5,8	1,1	0,8	92,3		

highest bid of 8,000 DKK which reduces the average to 146 DKK. Protest bids do not seem to be a serious problem, but a small number of the zero bids in the sample without information are possibly protest bids. Also, if we draw the respondents' attention to their budget restrictions the WTP is reduced by about 27 per cent. Having made these corrections an average WTP of 104 DKK appears, and thus an aggregated WTP of 467 million DKK.

Further evidence in the support of the validity of the CVM analysis can be found in Bille Hansen (1996) where it is shown that a number of socio-economic factors are able to explain WTP in a way that is consistent with theory.<sup>25</sup> Thus, if respondents consider that the Royal Theatre has non-use value, if they attend or participate in many other cultural activities, have a high income, an upper secondary certificate and have undergone higher education, are women and live close to the capital, then the probability of having a high WTP is increased. On the other hand, being unemployed means that the probability of having a high WTP is reduced. The estimated results indicate that different socio-economic factors are able to explain the WTP in a way predicted by theory, as both the significance of the parameter estimates and the signs are equivalent to expectations. But this check of the theoretical validity of the CV study say of course nothing about whether *the size* of the WTP is correct, since it is only a check on the variation.

## 6. The Visitors at the Royal Theatre

The users of the Royal Theatre differ noticeably from the non-users, who on the other hand do not differ to any considerable degree from the "average Dane". The users differ decisively from the "average Dane", primarily with regard to where they live, with regard to level of schooling and occupational training and with regard to how culturally orientated they are.

Only a small proportion of the Danish population actually visits the Royal Theatre. In 1993, only approximately 7 per cent had been there within the last year, while 68 per cent never had been there (see Table VII).

Table VIII. Willingness to pay for users and non-users respectively

	Average WTP (DKK)	
	Users	Non-users
With information	205	68
Without information	693	232
In all	368	137
Aggregated WTP (DKKm)	121	561

It is possible to compare these answers with the actual number of visitors. In 1993, the Royal Theatre had an audience of 421,000. There are 4.2 million Danes above the age of 15. Of these 5.8 per cent visited the Royal Theatre 1–2 times, 1.1 per cent 3–5 times and 0.8 per cent 6 times or more. This corresponds to there having been about 819,000 visitors in the Royal Theatre – i.e. about twice as many as the actual number of spectators. The respondents in the interview survey seem therefore to some degree to have answered on the basis of their intent rather than their actual behaviour. If we sort out the inconsistent answers<sup>26</sup> the number of visitors comes to about 710,000 – still much more than the actual number of spectators. This indicates a clear “overstatement of desired behaviour”.

In these calculations the interval mid-point of the number of visits has been used. It is supposed that people who answered 1–2 times have been there 1.5 times on average, respondents answering 3–5 times have been there 4 times, and respondents who answered 6 times or more have been there 8 times on average. However, it is uncertain whether this is correct or not. It is very likely that the major part of the respondents, who say they have been there 1–2 times, only have been there once. If a conservative estimate is made supposing that respondents who stated that they had been there 1–2 times actually only went there once, respondents stating 3–5 times only went there 3 times, and respondents stating 6 times or more only went there 6 times, this corresponds to an audience of 508,000. This indicates a “overstatement” of about 20 per cent, and can be interpreted as a kind of “*compliance bias*”.

The difference between the WTP for users and non-users respectively is illustrated in Table VIII.

It can clearly be seen here that users have a considerably larger WTP than non-users. The average WTP is DKK 368 for users and DKK 137 for non-users. If the aggregated WTP for users and non-users respectively is calculated, an aggregated WTP of DKKm 121 for users, and DKKm 561 for non-users is obtained. The WTP of users, in other words, comprises approximately 18 per cent of the total WTP, in spite of the fact that the users only comprise approximately 7 per cent of the total population.

But it is even more interesting to turn around the conclusion: *The non-users' WTP makes up far the biggest part of the total WTP for the Royal Theatre, namely about 82 per cent.*<sup>27</sup>

## 7. Conclusion

CVM has not previously been used for this type of cultural good, and the results provide reason for a certain optimism. Firstly, the results show that the Danish population in fact is willing to pay the amount the theatre costs in state subsidy. Even though a large proportion of the Danish population never visit the theatre, they are willing to pay an optionprice for the possibility of being able to go there and for the non-use value of the theatre, i.e. educational value, bequest value, prestige value and vicarious consumption.

In this way the public subsidy to the Royal Theatre can be legitimized on the basis of the preferences of the population. The citizens' assessment of *the quality* of the Royal Theatre is used as the basis of the valuation and in this way the purpose of the theatre is explicitly taken into account in the economic valuation. As the primary purpose of culture is to provide enriching experiences for the citizenry and not to attract tourists it seems much more relevant to use CVM – as opposed to economic impact studies – to estimate the economic value of cultural activities.

It is another matter whether CVM can be used to cope with day-to-day political decisions. The answer is no. For this purpose the method is too expensive, requires too much work and the uncertainty of the estimates is too large. CVM can only be used regarding big questions – e.g. about State grants for the Royal Theatre. In these cases CVM is, however, well suited to get an estimate of the total value of a cultural good which has public good characteristics.

## Appendix

### THE QUESTIONNAIRE

One half of the sample received information about actual average taxpayments to the Royal Theatre and were asked the question:

*All Danes over the age of 18 pay on average about DKK 60 (about \$10.5) a year to the Royal Theatre through taxes. How much are you willing to pay at the most to the Royal Theatre through taxes?*

Response categories: amount in DKK. . . , don't know.

The other half was not given information about the average taxpayments to the Royal Theatre and was asked the following two questions:

*All Danes pay to the Royal Theatre through taxes. How much are you willing to pay at the most to the Royal Theatre through taxes?*

Response categories: amount in DKK. . . , don't know.

*How much do you think Danes over the age of 18 pay on average to the Royal Theatre each year through taxes?*

Response categories: amount in DKK. . . , don't know.

Besides, the respondents were asked if they think the state uses “*too much, the right amount, or too little money*” for a number of cultural purposes, including the Royal Theatre. These questions have been included in order to compare the responses to the open-ended questions with the preferences revealed in public opinion surveys. In this paper, however, only the results of the direct, open-ended questions will be presented and discussed.

In addition, the respondents were asked a question with the purpose of revealing whether they consider the Royal Theatre to have a non-use value:

*Do you think that the Royal Theatre has value for people other than those who go there, because it has a significance for the country's cultural level, attracts tourists or for other reasons?*

Response categories: yes, no, don't know.

Finally, the respondents were asked whether they go to the Royal Theatre, and if this is the case, how often. They were also asked about their other cultural activities, and likewise asked a number of questions concerning their socioeconomic status, including gender, age, level of schooling, occupational training, marital status, number of dependent children, income etc.

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## Notes

1. This study constitutes a main part of my Ph.D. in economics: “Studies in Cultural Economics”, University of Copenhagen, Institute of Economics.
2. A recent bibliography (Carson et al., 1995) lists 2,000 studies and papers from over 40 countries on many topics, mainly environment, but also transportation, sanitation, health, the arts and education.
3. In Bille Hansen (1991), the activities of the Royal Theatre are described in more detail.
4. The estimate is around the same size as estimates found in other studies, e.g. O'Hagan (1994) found a priceelasticity of  $-0.41$  for visits at ‘the Abbey’ theatre in Dublin, estimated on data for the period 1967–1991. And Gapinski (1984) found an ownpriceelasticity of  $-0.657$  for the Royal Shakespeare Company, by estimating a demand function on data for the period 1965–1980.
5. For general view of the theoretical and empirical issues involved see e.g. Mitchell and Carson (1989), Braden and Kolstad (1991) and Freeman (1993).
6. Much of the current debate in the United States about CVM is centered around the use of CVM involving litigation over natural resources damages, e.g. the State of Alaska used CVM to assess the natural resources damages from the Exxon Valdez oil spill (Carson et al., 1992). In

connection with the big catastrophe in March 1989, where the super tanker Exxon Valdez struck the rocks near Alaska and spilt 11 million gallons crude oil in the ocean, the National Oceanic and Atmospheric Administration (NOAA) established an independent government panel chaired by the Nobel Prize winners Kenneth Arrow and Robert Solow. The panel were to advise NOAA on the following question: "Is the contingent valuation method capable of providing estimates of lost non-use or existence values that are reliable enough to be used in natural resource damage assessments?". The panel's conclusion was that "CV studies can produce estimates reliable enough to be a starting point for a judicial process of natural resource damages – including passive use-values". The panel's guidelines and conclusions are to be found in Arrow et al. (1993). Hausman (1993) contains a set of papers highly critical of CV presented at a symposium sponsored by Exxon. A series of articles presenting a general view and different perspectives on CV have appeared in a 1994 issue of Journal of Economic Perspectives (Diamond and Hausman, Hanemann, Portney).

7. The choice between whether the study should be carried out by way of postal, telephone or face-to-face interviews was thus given in advance. The general attitude in the literature seems to be that face-to-face interviews are preferred to telephone interviews, which are in turn preferred to postal interviews (for example, Arrow et al., 1993; Mitchell and Carson, 1989). The reason given for this is that CV questions often involve complex scenarios, which require careful explanation and at times visual aids. This is, however, not the case in this study, because the Royal Theatre is a well-known good. Moreover, telephone interviews are less sensitive with regard to interviewer bias.
8. We do not know for certain how big a part of the Royal Theatre's audience are foreigners. From the Royal Theatre's analysis of the audience made in 1995 it is seen that tourists make up 4 per cent of the tickets sold in August. This figure seems small compared with an earlier inquiry which showed that almost one third of the visitors at the August performances were tourists. The two inquiries thus give quite different results. Besides, August is not a typical month, but a month when many tourists visit Denmark.
9. Mitchell and Carson (1989) have suggested a new interpretation of property rights in connection with public goods which require regular payment in order to maintain the present level of quality: "Since the consumer is already paying for the good on a regular basis, the Hicksian compensating surplus for this case is the amount the consumer is willing to pay to forgo the reduction in the quality level of the good and still be as well off as before. This is measured in a CV study in the following way. The respondent would be informed that she is already making annual payments in some relevant form – higher prices and taxes, for example – to provide the current quality level of a good such as air visibility. She would then be asked to state the maximum payment that she is willing to make to preserve this quality level before she would prefer a quality reduction. To use a referendum analogy, the consumer is asked to set the highest amount she would be willing to pay annually in taxes for a given program which guarantees to maintain the present level of supply of a good for the next and succeeding fiscal years."
10. A great number of empirical studies have shown that WTA is systematically larger than WTP for the same good, and the difference is far greater than can be explained by the income effect. The difference can in certain cases be of the magnitude 1:10. For an overview see Kahneman, Knetsch and Thaler (1990) and Cummings, Brookshire and Schultze (1986).
11. It should be noticed that the recommendations of the NOAA panel have not been immune from criticism, see e.g. Harrison (1993) and Mäler (1993).
12. I should also be noted that the response of those attending the Royal Theatre might be biased by the fact that it offers ballet, opera and theatrical productions and the "mix" might alter through time.
13. In this study the respondents' information level has been tested as they were also asked how much *they believe they pay* on average through taxes to the Royal Theatre.
14. *Sample selection bias* is more difficult to discover and correct, as it is present if respondents who have not responded to the valuation question differ from the other respondents in their group (respondents with the same education, income, etc) by being less interested in the good, and therefore also having a lower WTP. As no problems with sample non-response bias seem to occur in this study, no steps have been taken to make corrections for sample selection bias.



15. In Dubgaard (1996) for example, 82 per cent of the respondents with zero bids said that they had stated DKK 0, because they were “against paying”, which can clearly be classified as a protest bid. The situation is, however, different in his study, as the respondents were asked about their WTP for Mols Bjerger (a Danish recreational area), where no tradition for payment exists, as it does with the Royal Theatre. Besides, Dubgaard (1996) has only asked the visitors at the place (Mols Bjerger), and one must assume that all visitors attach a certain value to it. The same is not the case in this study, where non-users have also been asked. One must therefore expect a certain proportion of real zero bids.
16. When analysing more closely the sample with respectively without information about the “price” of the good it is shown that a small part of the zero bids in the sample without information is considered to be protest bids.
17. It is a woman, 58 years old, who lives in Køge (a provincial town outside Copenhagen). She is unmarried, 9–10 years schooling and skilled labourer. She has a net income of about 100,000–119,000 DKK per year and has never been to the Royal Theatre. She has not received information and she also believes that a Dane pays 8,000 DKK in average per year to the Royal Theatre through taxes.
18. Frey (1995) argues in favour of carrying out a referendum instead of using CVM. As emphasized in the comments of Bille Hansen (1995b) a referendum is, however, no realistic political alternative to CVM in most countries apart from Switzerland.
19. Bergstrom, Dillman and Stoll (1985), Bergstrom, Stoll and Randall (1990), Samples, Dixon and Gowen (1986) are some of the few studies which have dealt with this important problem. See Hanely and Munro (1992) for an overview of this literature.
20. An exception is Throsby and Withers (1983).
21. It is possible to test whether the information concerning actual expenditure gives rise to an anchoring bias by testing whether the two distributions can be presumed to be the same, e.g. by using a Komolgorov-Smirnov test (cf. McFadden and Leonard, 1993). The result shows, not surprisingly, that the two distributions are significantly different.
22. The question of whether the proportion of “don’t know” responses and zero bids are significantly different in the samples for groups with and without information respectively has been tested in a binomial distribution.
23. The concept “hypothetical bias” is often mentioned in connection with CV-studies. In this case where the good (the Royal Theatre) is well-known to everybody and respondents know that they already pay something to the theatre through taxes, there is a high degree of familiarity, which, *ceteris paribus*, should minimize the “hypothetical bias”.
24. Luckily, in this survey the aggregated willingness-to-pay is bigger than or equal to the public grant received by the theatre irrespective of which estimate is chosen. If this had not been the case far bigger problems would have arisen concerning the conclusion of the study.
25. See e.g. Schulze and Ursprung (1996) and Frey and Pommerehne (1989) for testable hypotheses about determinants of preferences.
26. Thirteen per cent of the users give inconsistent answers to the two questions about their visits to the Royal Theatre.
27. In a forthcoming paper (and in Bille Hansen, 1996) an effort is made to try to separate the aggregated WTP into different benefit categories (consumer surplus for visits to the theatre, non-use value and option price) using both a reductionistic method and a model-based separation taking socioeconomic characteristics into account. The estimates show that of the aggregated WTP for the Royal Theatre the consumer surplus of private consumption *ex post* makes out 6–9 per cent, option price amounts to 56–67 per cent, while non-use value makes out 35–37 per cent. Besides, the consumer surplus estimate for visits to the theatre *ex post* using CVM is compared to the consumer surplus measure estimated from a demand curve using actual, historical market data. From attendance numbers and ticket prices during a period of 20 years a demand curve is estimated from which a consumer surplus estimate can be derived. This estimate is compared to the CVM-estimate, and it is shown that the two estimates are approximately of the same magnitude.

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