

# A Study on Infrastructure Evaluation Considering the Reciprocal Motive by CVM

Takahiro YAMAGUCHI<sup>1</sup>, Shogo KAWAKAMI<sup>2</sup>

<sup>1</sup> Student of doctoral course in Eng., Graduate School of Eng., Kansai Univ.

<sup>2</sup> Dept. of Civil and Environmental Eng., Kansai Univ.

**ABSTRACT:** The reciprocal motive has not been dealt with positively in payment motive analysis in Contingent Valuation Method (CVM) until now. In this study, we dealt with individual reciprocal payment motive. In this paper, Transport Accessibility Improvement in the Suita City was evaluated by the CVM investigation in order to verify two following hypotheses. First the WTP (willingness to pay) =0 answers in which the negative reciprocal motive works exist. Second all WTP>0 answers are receiving effect of the positive reciprocal motive. WTP>0 answers and WTP=0 answers were analyzed separately. The individual payment motive was divided into three pieces, self-interest motive, pure altruistic motive, and reciprocal motive. The results demonstrated that first hypothesis was confirmed, but second hypothesis was not confirmed. Originally, it is desirable that the individual's WTP for cooperation to the public work exists. It is desirable that the positive reciprocal motive works. In case of WTP>0, the answer that the positive reciprocal motive was not confirmed as a payment motive may be the answer in which the negative reciprocal motive works. Furthermore, we suggested that the reason why the negative reciprocal motive worked in this investigation occurred from the dissatisfaction for the action and behavior of the planner, the local government.

**KEYWORDS:** Contingent Valuation Method, payment motive analysis, reciprocal motive

## 1. INTRODUCTION

There is the substantial demand for a practical method to measure the value of non-market goods. Measures of value are required for cost-benefit analysis of public goods. The contingent valuation method (CVM) has gained prominence as a major technique for the assessment of the value of Transport Accessibility Improvement, despite of the presence of some criticisms of the CVM. Critics say the value indicated by an answer of CVM includes not only the economic value of public goods but also others.

People have a taste for giving: perhaps they receive status or acclaim, or they simply experience

a "warm glow" from having "done their bit." (Becker 1974). Andreoni (1989) developed a general model of giving including a warm glow. In this model, individuals are assumed to contribute to a public good for two reasons. First, people simply demand more of the public good. Second, people get some private goods benefit from their gift per se, like a warm glow. In the payment motive analysis of CVM, contingent valuation responses reflect the willingness to pay (WTP) for the moral satisfaction of contributing to public goods, not the economic value of public goods (Daniel et al. 1992), an answer of CVM includes both the value of public goods and the moral satisfaction (Kuriyama 1998).

Individuals have a reciprocal motive, in response

to friendly actions, people are frequently much nicer and much more cooperative than predicted by the self-interest model; conversely, in response to hostile actions they are frequently much more nasty and even brutal (Fehr et al. 2000). The positive reciprocal motive can be regarded as a motive in which individual should cooperate in the payment for the public work. In the above motive analysis, the positive reciprocal motive has been handled and the negative reciprocal motive has not been handled. It does not need to handle the negative reciprocal motive in the motive analysis, if all of the individuals are cooperative with the payment for public work. However, it is hard to be said that it does not need to handle the negative reciprocal motive in the present state of our country. It is necessary for the fact to be confirmed experimentally.

In this study, Transport Accessibility Improvement in the Suita City was evaluated by the CVM investigation in order to verify following two hypotheses. First the answers with  $WTP=0$  in which the negative reciprocal motive works exist. Second all answers with  $WTP>0$  are receiving effect of the positive reciprocal motive. Many people desire the execution of the Transport Accessibility Improvement. It may be difficult to find the answer with the negative reciprocal motive in the investigation.

Chapter2 describes the method for confirming the positive reciprocal motive and the method for confirming the negative reciprocal motive. Chapter3 describes the outline of the CVM investigation. Chapter4 discusses the results of confirming the reciprocal motive. Chapter5 presents a conclusion.

## **2. THE CONFIRMATION METHOD OF THE RECIPROCAL MOTIVE IN CVM**

In this chapter, the method for confirming the existence of the positive reciprocal motive in case of  $WTP>0$  and the method for confirming the existence of the negative reciprocal motive in case of  $WTP=0$  are described.

### **2.1 The Confirmation Method of the Positive Reciprocal Motive**

The method for confirming the positive reciprocal motive in case of  $WTP>0$  is described. The households' WTP for the mobility improvement for the social weak includes not only WTP based on self-interest motive but also WTP based on altruistic motive (Matsushima et al. 2000). Consequently, on the question contents which adapt to each three following motives, the suitability of the payment motive is asked by using the paired comparison method. The three motives are self-interest motive, pure altruistic motive and positive reciprocal motive. The question form is shown in Figure 1. The answer is not regarded as an answer in which the positive reciprocal motive works when both of the two following conditions are satisfied.

( i ) The respondent makes a comparison between the positive reciprocal motive and the self-interest motive and the respondent selects "definitely the self-interest motive".

( ii ) The respondent makes a comparison between the positive reciprocal motive and the pure altruistic motive and the respondent selects "definitely the pure altruistic motive".

When the answer does not satisfy both of the two conditions the answer is regarded as an answer in which the positive reciprocal motive works. The self-interest motive means that the motive in which individual does not feel the concern for others, and expects the benefit from the public work. The pure altruistic motive means that the motive in which individual feels the concern for others and does not expect the benefit from others and obtains the mental

satisfaction of the self. The positive reciprocal feels the concern for others and expects the benefit motive means that the motive in which individual from others.

Please check the most likely suitable place as a payment motive.

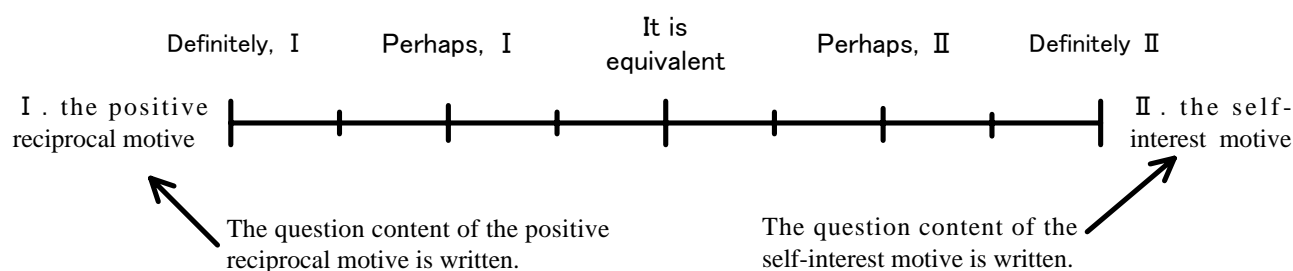


Figure 1 the question form of the paired comparison method

## 2.2 The Confirmation Method of the Negative Reciprocal Motive

In WTP=0 case, the answer with the payment value based on self-interest motive or pure altruistic motive is discriminated from the answer without the payment value based on self-interest motive and pure altruistic motive. In spite of WTP=0, the answer with the payment value based on self-interest motive or pure altruistic motive is regarded as an answer in which the negative reciprocal motive works. The answer without the payment value based on self-interest motive and pure altruistic motive is regarded as an answer with no value of the public work.

## 3. THE OUTLINE OF THE CVM INVESTIGATION

### 3.1 The Evaluation Object

Two kinds of Transport Accessibility Improvement in the Suita City are used for the payment motive analysis by CVM. The first one is the improvement of the sidewalk as a hardware improvement. The second one is barrier-free education for the primary school children as a software improvement. Both the two works are the evaluation objects for a respondent of the interview. Since the expectation of the people for the barrier-free is high in our country,

it is considered that the negative reciprocal motive will not work easily. The Suita City is located in the north part of Osaka prefecture. The distance from the center of metropolis, Osaka City to the Suita City is within 10km. The traffic condition is convenient. Suita is a city with a population of about 350,000. The population aged more than 65 years occupies about 15% in the entire population of Suita City.

### 3.2 The Design of the Questionnaire

The additional burden in annual installments system of the tax was adopted as WTP payment form, because it is valid to evaluate the project moderately. The cost of the project is burdened by all households in the Suita City. Combining Double-Bounded Dichotomous Choice with Payment Card was adopted as the Elicitation Method. For a respondent who answered “No” in the first phase of Double-Bounded Dichotomous Choice, we ask using the Payment Card. The purpose is to reduce the 0 yen answer. The merit of the Double-Bounded Dichotomous Choice is simple to reply for respondents, and is having small biases. It is required that the respondent assumes both two works to be carried out, and answers WTP for each work.

Table 1 shows question contents of three motives described in 2.2. In case of WTP>0, on the questions

the suitability of the three payment motives are asked by using the paired comparison method. In case of  $WTP=0$ , firstly whether the respondent feels the value based on self-interest motive and the value based on pure altruistic motive as payment motive is asked as shown in table 1. Secondly, the reason for refusing the payment is asked directly to the respondent. Table 2 shows the question votes to ask the contrariety reason. The answer in which the respondent does not feel the value based on self-interest motive and the value based on pure altruistic motive is regarded as an answer with no value for the work. The answer is not regarded as an answer in which the negative reciprocal motive works. The answer in which the respondent feels the value based on self-interest motive or the value based on pure altruistic motive is regarded as an

answer in which the negative reciprocal motive works. However, the answer which selects the 1st as the reasons for refusing the payment in spite of feeling self-interest value or pure altruistic value for the public work would not be regarded as an answer in which the negative reciprocal motive works.

Table 2 the question votes to ask the contrariety reason

Table 1 question contents of three motives


### 3.3 The Outline of the Execution

Two kinds of questionnaire survey were carried out from the November, 2005 to December, 2005. First, the survey forms were handed and then they were collected by mail. Second, the survey forms were put in the post of the house and then they were collected by mail. The survey was randomly carried out in the whole Suita City. 1050 questionnaire survey forms were distributed, and 277 forms were able to be collected. The collection rate is 26.4%.

## 4. THE RESULTS OF CONFIRMING THE RECIPROCAL MOTIVE

In this chapter, the answer with the negative reciprocal motive in  $WTP=0$  case and the answer with the positive reciprocal motive in  $WTP>0$  case are confirmed. The results are discussed.

Table 3 shows the number of replies and WTP

the payment

the question contents for the

for each work. Table 4 shows the number of WTP>0 answers and the number of WTP=0 answers. Non-filling up answer and the answer in which respondent checked the multiple for the question on pair comparison were regarded as the invalid answer. Table 5 shows the validation results of the positive reciprocal motive and the negative reciprocal motive.

Table 3 the number of replies and WTP for each work

	the number of replies	WTP for each work	the number of the valid answers
the hardware improvement	277	2,066	260
the software improvement	277	798	262

The unit for the WTP is yen/year/household.

Table 4 the number of WTP>0 and WTP=0 answers

	the number of the valid answers for payment motive investigation	the number of WTP>0 answers	the number of WTP=0 answers
the hardware improvement	243	199	44
the software improvement	250	196	54

Table 5 the validation results of the reciprocal motive

	the number of the answers with the positive reciprocal motive in case of WTP>0	the number of the answers with the negative reciprocal motive in case of WTP=0
the hardware improvement	126 (63)	31 (70)
the software improvement	130 (66)	39 (72)

In case of WTP>0, there are 126 answers in which the positive reciprocal motive works in the investigation for the hardware improvement. There are 130 similar answers in the investigation for the software improvement. The proportions for valid answers of each category are shown in the parenthesis. In the investigation for the hardware improvement, the 73 answers in which respondent replied that the positive reciprocal motive did not correspond to the payment motive compared to the self-interest motive and the pure altruistic motive

were confirmed. The 66 similar answers were confirmed in the investigation for the software improvement. In both works, less than 70% of answers with WTP>0 were receiving effect of the positive reciprocal motive.

In case of WTP=0, there are 31 answers with the negative reciprocal motive in the investigation for the hardware improvement. There are 39 similar answers in the investigation for the software improvement. The proportions for the valid answers of each category are shown in the parenthesis. In both works, more than 70% of answers with WTP=0 were receiving effect of the negative reciprocal motive. In case of the hardware improvement, the following were not confirmed as the answer in which the negative reciprocal motive worked. There are 6 answers which do not recognize the value for the hardware improvement and there are 7 answers which recognize the value for the hardware improvement but can not afford to pay for it. In case of the software improvement, there are 11 answers which do not recognize the value for the software improvement and there are 4 answers which recognize the value for the software improvement but can not afford to pay for it.

Table 6 shows the results of the reasons for refusing the payment in case of WTP=0. The left numeric values show the results for the hardware improvement. The right numeric values show the results for the software improvement. The respondents who selected the 1st are not regarded as a respondent with the negative payment motive. The reasons why the negative reciprocal motive works in this investigation are discussed here with the results of respondents who selected the 2nd to 7th. In both works, contrariety reason of respondents who selected "other" occurs from the dissatisfaction for the action and behavior of the city planner. These

results indicate that the reason why the negative reciprocal motive works in this investigation occurs from the dissatisfaction for the action and behavior of the planner.

Table 6 the results of the reasons for refusing the payment in case of WTP=0

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## 5. CONCLUSION

In the CVM payment motive analysis, the positive reciprocal motive has been handled and the negative reciprocal motive has not been handled. However, it is necessary to handle the negative reciprocal motive in the present state of our country. This paper confirmed the works of the negative reciprocal motive and the positive reciprocal motive. We suggest that the WTP=0 answers in which the negative reciprocal motive works exist and the WTP>0 answers in which the negative reciprocal motive works may exist. Furthermore, we suggest that the reason why the negative reciprocal motive works in this investigation occurs from the dissatisfaction for the action and behavior of the planner, the local government.

## REFERENCES

1. I recognize the value of the work but can not afford to pay for it. 7, 4

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2. It is irrelevant for the self. 0, 0

3. I can not consent to the city planner's action of the past. 17, 16

4. I can not consent to the method of payment. 8, 11

5. I can not consent to the execution timing. 0, 0

6. I can not expect good works in the future of the city. 12, 12

7. Other ( ) 10, 17

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