ECONSTOR

Ahlheim, Michael; Börger, Tobias; Frör, Oliver

Working Paper

Respondent incentives in contingent valuation: The role of reciprocity

FZID Discussion Papers

RESPONDENT INCENTIVES IN CONTINGENT VALUATION: THE ROLE OF RECIPROCITY

Michael Ahlheim, Tobias Börger and Oliver Frör

Respondent incentives in contingent valuation:
The role of reciprocity

Michael Ahlheim, Tobias Börger and Oliver Frör

Respondent incentives in contingent valuation: The role of reciprocity

Michael Ahlheim[1], Tobias Börger[2] and Oliver Frör[3]

1. Introduction

One of the most prominent methods for the appraisal of environmental changes and public projects in the environmental sector is the Contingent Valuation Method (CVM). Since it belongs to the class of stated-preference methods the validity of CVM survey results is under permanent discussion. In this paper we deal with a specific source of potential biases occurring in practical CVM studies: the effects of material incentives on respondent compliance and on stated willingness to pay.

The CVM relies on interviews where a representative sample of all households affected by a certain public project is asked – among other things – their willingness to pay (WTP) for the realization of that project. These individual statements are then extrapolated to assess the social WTP for the project which is interpreted as the monetary value of the social benefits it creates. The social benefits can then be

[1] Prof. Dr. Michael Ahlheim, Lehrstuhl für Volkswirtschaftslehre, insbesondere Umweltökonomie und Ordnungspolitik (520 F), Institut für VWL, Universität Hohenheim, D-70593 Stuttgart, Telefon: (+49) 711 459-23596, Fax: (+49) 711 459-24081, E-mail: ahlheim@uni-hohenheim.de

[2] Dipl.-Vw. Tobias Börger, Lehrstuhl für Volkswirtschaftslehre, insbesondere Umweltökonomie und Ordnungspolitik (520 F), Institut für VWL, Universität Hohenheim, D-70593 Stuttgart, Telefon: (+49) 711 459-22597, Fax: (+49) 711 459-24081, E-mail: t.boerger@uni-hohenheim.de

[3] Dr. Oliver Frör, Environmental Economics, Institut für Umweltwissenschaften, Universität Koblenz-Landau, D-76829 Landau, Telefon: (+49) 6341 280-31534, Fax: (+49) 6341 280-31326, E-mail: froer@uni-landau.de

compared to the project costs in order to decide if its realization is remunerative for society or not.

For the reliability of CVM survey results it is necessary to keep the rejection rate as low as possible and to ensure that respondents consider the questions they are asked carefully and answer them truthfully. Especially in poor countries it has become customary to offer interviewees small gifts or small amounts of money to provide incentives for them to comply with these requirements. Therefore, the intentions behind such incentives are that we want people to comply with the interview request (i.e. minimize the rejection rate), to go to great intellectual efforts to answer all questions even if they have to think hard to answer them (i.e. minimize the item non-response rate), and answer the WTP question truthfully (i.e. minimize the elicitation bias).

With introductory gifts (monetary or in-kind) we want to invoke feelings of gratitude on the side of the respondents to make them reciprocate the favor they have received: "Give and it will be given to you" (Luke 6:38). Unfortunately, we cannot tell in advance how exactly respondents will show their gratitude. Ideally all three of the above stated intended effects will be attained. People's natural desire to reciprocate favors they have received from others might lead them to agree to a CVM interview though they do not feel like it, it might make them think harder about our questions - but at the same time it might also induce them to state a higher than their true WTP for the suggested project in order to show their gratitude. This latter form of gratitude would lead to biased overall WTP and is, of course, not desired.

Actually things are even more complicated. Already the basic question if a gift is helpful at all in triggering the motivation of respondents to answer CVM questions carefully is controversial. In a well-known series of articles, Bruno Frey and his coauthors showed theoretically and based on laboratory experiments that the intrinsic motivation for a certain task can be crowded out by providing extrinsic incentives (Frey 1994, Frey et al. 1996, Frey and Oberholzer-Gee 1997). Also in Gneezy and Rustichini (2000) and Gneezy et al. (2011), examples are given where the introduction of extrinsic incentives deteriorates the performance of certain tasks, especially if these tasks had been considered commendable or pro-social or simply a matter of civic duty before. Referring to a game-theoretic study by Liberman et al. (2004) they conclude: "Moving from no incentive to a positive incentive can dramatically change the framing of the interaction and shift an individual's decision frame from social to monetary." (Gneezy et al. 2011, p. 200). Applying this insight to the CVM interview situation offering an extrinsic incentive might change people's whole view of the interview: without incentive they might consider it their civic duty to

support science by agreeing to the interview and help government make good decisions, but after they are offered an extrinsic incentive (money or in-kind) they look at it as a deal to which they agree only if the compensation balances their effort. Besides these framing effects also other psychological reasons might be responsible for adverse effects of gifting respondents. Interpreting the CVM interview as a kind of a principal-agent game where the interviewer is the principal who cannot be sure about the true mental efforts made by the respondent-agent in answering his questions, an extrinsic incentive might lead to the impression on the side of the agent that the principal does not trust his reliability and scrutiny without extra incentives. This might backfire in that the respondent feels offended by this suspected expression of distrust and lowers his efforts as a consequence (cf. Gneezy et al. 2011, p. 192). This leads us to

> **Research question 1**: Do extrinsic incentives trigger respondents' efforts in answering CVM questions?

If we are determined to trigger respondents' motivation through extrinsic incentives, the question arises which kind of incentive is most suitable in the light of our three intentions stated above. Should we give money or a small in-kind gift? As Gneezy et al. (2011, p. 192) state: "Monetary incentives have two kinds of effects: the standard direct price effect, which makes the incentivized behavior more attractive, and an indirect psychological effect." While the psychological effect might counteract or not our intentions to increase respondents' scrutiny, the price effect always works into the right direction. This seems to speak in favor of money incentives. On the other hand Heyman and Ariely (2004) found in laboratory experiments where candidates had to perform seemingly dull tasks that candy worked better as an incentive than money. Gneezy et al. (2011, p. 201) also point out that your chances to get into bed with an attractive woman is typically not enhanced if you offer her money, an in-kind gift like a bunch of flowers might work much better in this context. This gives rise to

> **Research question 2**: What has a more favorable effect on respondents' diligence in answering CVM questionnaires, money or in-kind gifts?

If you decide in favor of money incentives it is important to find the right amount. Gneezy et al. (2011, p. 191) state that "the basic 'law of behavior' is that higher incentives will lead to more effort and higher performance." But this 'law of behavior' does not represent a universal truth as the authors state shortly after. Also Gneezy and Rustichini (2000) report from experimental studies where they found that (i) both large and small monetary incentives reduced candidates' efforts as compared to a control group where no material incentives were provided and (ii) small monetary incentives reduced efforts more than larger payments. These – at first glance

counterintuitive – findings motivated the title of their article: "Pay enough or don't pay at all". The reason for these results might again lie in the antagonism of the price effect and the psychological effects of monetary incentives. For low payments the adverse psychological effects dominate the price effect, while this imbalance is reversed as payments become larger. These findings lead to our third research question:

> **Research question 3:** Do large money incentives on the one hand and small money incentives on the other have different effects on respondents' diligence in answering CVM questionnaires?

Analogously, regarding in-kind incentives we ask:

> **Research question 4:** Do expensive in-kind incentives on the one hand and less expensive in-kind incentives on the other have different effects on respondents' diligence in answering CVM questionnaires?

As discussed above we do not want gifts or payments to influence respondents WTP statements because this would invalidate our survey results. This leads us to

> **Research question 5:** Do material incentives (monetary or in-kind) affect respondents' stated WTP for the public project under discussion?

In a practical CVM study conducted in Xishuangbanna in southwest China we scrutinize these research questions in detail using field experiments. Applying altogether five different treatments (high and low money payments, high- and low-priced in-kind gifts, no gift at all as a control treatment) we analyze the effects of different forms of gifts on respondents' compliance on the one hand and on stated WTP for an environmental improvement (biodiversity preservation in Xishuangbanna) on the other. We find that all incentives under investigation increase respondents' willingness to answer also intellectually demanding questions with the low monetary incentive performing best. None of the incentives leads to a significant *increase* in average stated WTP as compared to the reference sample. However, the low-value gift, though having the same monetary value as the low money payment, leads to a significant *decrease* of average stated WTP, which might mean that for some reason respondents felt offended by this gift. Further, a two-step Heckman regression analysis shows that monetary and in-kind gifts might both influence respondents' inclination to state a positive WTP instead of zero. Considering the advantages and disadvantages of all kinds of incentives analyzed, our recommendation for future CVM studies is to offer respondents low money payments before the interview in order to trigger their compliance without influencing their WTP statements.

In the next section we will review the existing literature on reciprocity and incentives in surveys. In section 3 we describe our empirical study in Xishuangbanna and in section 4 we discuss our results. Section 5 contains some concluding remarks.

2. Respondent incentives and reciprocity in surveys

The reaction of survey participants to incentives provided for the participation in an interview has been studied both theoretically and empirically. After introducing some theoretical approaches to explain reciprocal behavior originating in survey methodology and game theory an overview of empirical findings on the effect of incentives in surveys is provided.

2.1. Theoretical approaches to explain reciprocal behavior in surveys

The methodological literature on respondent incentives in face-to-face, mail and telephone surveys basically distinguishes conditional from unconditional incentives on the one hand and categorizes cash payments and in-kind gifts on the other. An unconditional incentive is an upfront gift that is not linked to the completion of the survey interview, whereas a conditional incentive is handed over after the interview is completed as a kind of reward for the respondent's effort. Sometimes an unconditional incentive is provided even a certain time before the actual survey interview is carried out. In this case a notification of the upcoming interview (regardless of its form) is sent to the respondent by mail and contains the money amount or in-kind gift.

There are several theoretical approaches to explain the effect of incentives on respondents to a survey interview. Weinreb et al. (1998) maintain that the fact of gifting respondents to a survey triggers two things: Firstly, it stresses the instrumental nature of the interviewer-respondent relationship in the eyes of the latter and, secondly, it represents an attempt to ease the imbalance of that relationship. These authors argue that the relationship between interviewer and respondent is unequal because it is solely the interviewer (or rather the researcher) who imposes the rules of the interview and profits from its results. The incentive is therefore a means of reducing this inequality and thus to raise the position of the respondent. Consequently, one approach to theoretically explain incentive effects in surveys assumes that respondents conduct a rational *cost-benefit analysis* of the interview situation and take the incentive as a benefit of the completion of the interview (Biner and Kidd 1994). Since the incentive raises the benefits while the costs (in the form of

time spent and cognitive effort) remain unchanged, the likelihood of taking part in the survey rises. This theory would imply a linear relationship between the value of the incentive and the response rate of a survey, which is not unambiguously supported by the empirical literature (see below). Therefore, another explanation originates in social exchange theory, in which an incentive paid before the interview is regarded as an *expression of trust* of the interviewer. The fact that such a "token of appreciation" (Ryu et al. 2006) is provided places the survey in a social context and thus motivates the respondent to put more effort into answering the survey questions in exchange (Shettle and Mooney 1999). Related to this theory is the idea of the incentive invoking a *norm of reciprocity* (Gouldner 1960, Wetzels et al. 2008). After receiving the incentive the respondent feels compelled to return this favor by giving something back; he feels the "gratitude imperative" of receiving a gift (Schwartz 1967) and therefore responds to this expression of trust with higher effort and more willingness to comply with the request to take part in the survey.[4]

Apart from the survey literature, several theoretical approaches to explain reciprocal behavior have been developed in the field of game theory. Individuals are ready to forgo part of their own benefit in order to respond to the (positive) behavior of others either because they have an aversion against inequity (Fehr and Schmidt 1999, Bolton and Ockenfels 2000) or because they react to the intentions of others (Dufwenberg and Kirchsteiger 2004, Rabin 1993). Further, this strand of literature explicitly distinguishes reciprocity from cooperation, retaliation and altruism. While cooperation or retaliation in repeated interactions is driven by the desire to increase future utility, reciprocity is a reaction to behavior in the past which is not necessarily motivated by further interactions in the future. Altruism is not triggered by past kind or unkind behavior but is rather a "form of unconditional kindness" (Fehr and Gächter 2000). In a very detailed and most interesting survey on reciprocity, Kolm (2006) identifies three different reasons or motives for reciprocity: (1) "comparative, matching, compensatory, or balance reciprocity", where returning a favor received before aims at reestablishing a balance between two parties which has been disturbed by the initial favor; (2) "liking reciprocity" where you give something to a person because you like her or him (the liking can result from a gift you obtained from her before or from some other reason); (3) "continuation reciprocity" where you return a gift or favor and at the same time expect your gift to be returned again and so on

---

[4] Note that these explanations for the influence of respondent incentives on survey response rates are not mutually exclusive and that even within one respondent more than one processes may be at work (Shettle and Mooney 1999).

(Kolm 2006, pp. 421-422). The introductory gift in CVM surveys obviously aims at invoking the first category, i.e. compensatory reciprocity.

2.2. Empirical evidence of the impact of respondent incentives in surveys

Experimental studies done in the field of survey methodology so far robustly find incentives to raise response rates regardless of the administration mode of the survey with unconditional incentives performing better than conditional ones (Church 1993, Simmons and Wilmot 2004, Singer et al. 1999, Teisl et al. 2006). Another regular finding is that cash incentives work better in decreasing overall nonresponse than in-kind incentives (Ryu et al. 2006, Singer et al. 1999). Ryu et al. (2006) explain this with the general usability of money compared to specific in-kind gifts. In addition, when employing the latter, researchers have to be careful when selecting the specific gift to be used, since its symbolic meaning may change according to different contexts and respondents (Weinreb et al. 1998). Regarding the effect of the value of the incentive on response rates, the empirical literature offers differing insights. While most studies have found that the higher the value of the incentive the higher the response rate (James and Bolstein 1990, Wetzels et al. 2008, Yu and Cooper 1983), other studies did not detect such a positive relationship (Hidano et al. 2005, Stratford et al. 2003). Concerning the quality of the data, there is much evidence that respondent incentives at least do not foster response bias and often improve response completeness and accuracy by reducing item non-response (James and Bolstein 1990, Shettle and Mooney 1999).

Evidence of the fact that the norm of reciprocity provides a more plausible explanation of reciprocal behavior than a rational cost-benefit analysis is also provided by research in experimental economics. In this framework, several classical laboratory experiments can be employed to investigate why people behave reciprocally, such as the ultimatum game (e.g. Camerer and Thaler 1995), the gift-exchange game (Alpizar et al. 2008, Falk 2007, Fehr et al. 1993, Nicklish and Salz 2008), or the trust or investment game (Berg et al. 1995). Empirical evidence in all of these games shows that individuals regularly deviate from purely self-interested behavior and respond to kind actions of others with the same kind behavior. In a field experiment involving charitable donations, Falk (2007) mentions the "gift-exchange hypothesis" referring to the fact that donations can be expected to be more likely when a gift is provided with the charitable organization's appeal for funds than when no gift is provided. The data support this hypothesis. In a field experiment involving contributions to a national park in Costa Rica, Alpizar et al. (2008) find that the

provision of small gifts only marginally increases voluntary contributions. Taking the cost of the gifts into account, the authors conclude that such a procedure is not economical from the perspective of the researcher.

In the field of survey-based environmental valuation, the choice of the appropriate value of the incentive is very difficult because the researcher must avoid creating a feeling of coercion in the respondent by giving an amount that is far too high. This means that the *norm of reciprocity* must not become compulsion (Whittington 2004). Besides these ethical considerations, the behavioral effects of monetary and in-kind respondent compensation in environmental valuation surveys have received but little attention so far. In an experimental two-wave CVM study, Hidano et al. (2005) demonstrate the effects of reciprocity on respondent motivation and thus on their cognitive effort. In their study, reciprocity is induced by both an up-front payment to the respondent and by an especially nice and friendly treatment of the respondent by the surveyor. The results show that a high unconditional payment compared to a low payment significantly increases two out of four measures of respondents' cognitive effort. However, these results were not compared to a sample without gift provision.

2.3. Methodological approach of this study

The present study aims at a systematic investigation of the consequences of providing respondent incentives in CVM surveys following the above mentioned five research questions. This study should provide a basis for the researchers' decision whether to provide an incentive or not and, if yes, which kind of incentive. To this end, we adopt a field-experimental approach to study the influence of reciprocity on CVM survey responses. We employ a split-sample procedure with five different treatments randomly assigned to the respondents. In addition to a control group of respondents that did not receive an incentive (the base version), two treatments were administered with monetary incentives (high and low value cash amounts) and two split samples were administered with in-kind presents (high and low-value gifts equivalent in value to the two monetary incentives) (cf. figure 1). Within this experimental setting we then analyze the effects of the different treatments on a number of indicators for respondent effort, data quality and, finally, the WTP statement.

3. Empirical study

3.1. Project description

We apply our research approach in a CVM survey aiming at an assessment of the social value of the conversion of rubber plantations into natural forests in Xishuangbanna, Yunnan Province (southwest China) counteracting the widespread deforestation in that area. Deforestation as a result of rising demand of agricultural land is an often reported environmental problem. In the case of tropical Southeast Asia one of the main drivers of this development is the cultivation of rubber trees (*Hevea brasiliensis*). Xishuangbanna Prefecture, which is located at the southernmost rim of Yunnan Province in China, has also been witnessing this rapid expansion of rubber monocultures at the expense both of the formerly tropical rainforest coverage and traditional systems of shifting cultivation.

As a consequence of the special climatic conditions of the area as a transition zone between the tropics and subtropics, Xishuangbanna abounds in plant and animal species and has long been recognized as a biodiversity hotspot. While it only accounts for 0.2% of the land area of the People's Republic of China, the region is home to 25% of all plant species in the country (Xu 2006). The major part of the area is covered by different subtypes of tropical forest, which is the main ecological characteristic of that region. This flora and fauna make Xishuangbanna an ecologically and geographically special region in China.

However, this traditional setting has been disturbed in recent years by the fast spreading of rubber monocultures. Since the price for natural rubber continues to be very high and since it is possible to cultivate rubber trees even on steep mountain slopes, more and more primary and secondary forest land has been transformed into rubber plantations. In addition to the undeniable economic benefits for the rubber farmers and the region as a whole, this trend, which has continued into the new century, entails a multitude of negative ecological and environmental consequences. First and foremost, the replacement of natural forests and traditional shifting agricultural land by both large-scale and small-scale rubber plantations leads to a huge loss of biodiversity (Ziegler et al. 2009). Moreover, the existence of monocultures threatens the whole hydrological system of the area. This includes the problem of increased precipitation run-off, which reduces rainwater infiltration (Ziegler et al. 2009), and the increased use of pesticides and chemical fertilizers in the plantations, which endangers water quality in local rivers and streams. The clearing of forest on sloped land further leads to soil erosion, increasing also the risk of landslides (Ziegler et al. 2009). Overall, it becomes clear that the economic benefits

of rubber cultivation, which are obvious in the region, are bought at an ever increasing ecological and environmental price.

The scenario to be evaluated by respondents in the present study is a reforestation project implemented in a nearby nature reserve area. The 'Return Rubber into Forest' project as it is called in the survey was designed to resemble the sloping land conversion program (Bennett 2008), a policy measure implemented nationwide by the Chinese government and well known to the survey population. During the survey interview, respondents were informed that existing rubber plantations in the nature reserve area would be transformed back into forest and that the following consequences could be expected from this renaturation effort. Firstly, the original forest area would be partially restored, which would provide habitat for a number of rare plant and animal species. In addition, reforestation would lead to better water quality in local rivers because less pesticide would have to be brought out. This would further result in less pesticide contamination in agricultural food products and the whole local ecosystem.

Subsequently, the payment vehicle is introduced. Respondents are informed that a fund would be set up by the local government, to which all citizens would have to contribute. The payments would have to be made every three months over a time-span of five years. WTP statements have to be made on a payment card (PC). These payment specifications were the result of a number of in-depth interviews with local citizens and several rounds of so-called citizen expert group (CEG) meetings (Ahlheim et al. 2010). In these discussion meetings, features of the survey study and the questionnaire were discussed with a group of citizens who are representative of the survey population. Valuable insights could be gained regarding the structure and wording of the questionnaire as well as the type of gifts used for the reciprocity experiments.

The questionnaire used for this survey consisted of five parts. After an introduction to the purpose of the study the first part contained questions regarding the respondent's knowledge and familiarity with the environmental problem. After that, parts two and three introduced the project scenario and the payment scenario to the respondent, respectively. Part four, the elicitation questions, forms the core of the interview, in which the respondent was presented the PC and asked to indicate his maximum WTP for the proposed reforestation project. The last part consisted of a series of demographic and attitudinal questions that aim at an assessment of potential determinants of WTP.

3.2. Survey and treatment implementation

The survey was conducted in early summer 2009. All interviews were carried out in-person by a group of local interviewers who were recruited and trained especially for the purpose of this survey. In order to ensure the representativeness of the results with respect to the overall population of the study area a random sample of households was drawn. The local government provided a complete list of all housing units in the urban area of Jinghong, indicating how many households reside in each unit. Based on these data a random list of addresses was generated and the interviewers were sent specifically to those designated addresses. In case the selected household could not be interviewed, interviewers were told to approach the neighboring household. Interviews were conducted seven days per week in the late afternoon and early evening when most people are at home.

As to the monetary gifts, the specified amount of cash (30 RMB or 15 RMB) was handed to the respondent in an envelope. The two main criteria for the selection of suitable in-kind gifts were that they should be usable by all respondent households and that their value is sufficiently obvious to respondents. In discussions with local citizens during and after the CEG meetings it became clear that these criteria are fulfilled best by a 1kg bag of washing powder worth 15 RMB and a bath towel worth 45 RMB.

Value \ Type	Monetary	In-kind
High	30 RMB	Bath towel
Low	15 RMB	Washing powder

Figure 1: Classification of respondent gifts

In those treatments where a gift was provided, respondents were informed about this in the introduction to the interview and the gift was shown to them. The gift was handed over regardless of whether the interview was completed or not, i.e. as an unconditional incentive. Especially in the rather rural districts of the survey area we faced the risk that news about the provision of gifts might spread while the survey is still being conducted. In order to avoid such biasing effects, interviews in those districts were completed in a single day with an appropriately high number or interviewers working simultaneously. The aim of this procedure was to prevent that respondents who already know about the gifting would expect any type of compensation when accepting to be interviewed. Altogether, it was planned to

conduct a total of 1,000 interviews equally distributed among the 5 treatments, i.e. 200 interviews per treatment.

3.3. Hypotheses under investigation

Treatment effects are the differences in experimental outcomes with and without treatment and can have different forms. Consequently, the influence of respondent incentives in a CVM context can be analyzed with respect to a range of criteria. The overall objective should be to find that type of interview setting (i.e. respondent gift) which increases respondents' level of thought and resulting data quality but leaves their WTP statements unbiased, i.e. leads to truthful WTP answers. In the introduction and in section 2 we discussed the way respondent incentives might invoke reciprocal behavior and thus might pressurize the respondent who has received a gift prior to the interview to "pay something back" when completing the questionnaire. At this point the question arises, which strategies of "paying back" respondents actually use. In this study we consider three different kinds of possible reciprocal behavior of CVM respondents:

Behavior 1: Respondents are motivated by the incentive to put more effort into answering also difficult questions.

Behavior 2: Respondents do not value the presented scenario at all but, nevertheless, feel obliged now by the material incentive to state a positive WTP instead of zero.

Behavior 3: Respondents who would state a positive WTP even without material incentives now feel obliged by the incentive to state a higher than their true WTP.

Behavior (1) is intended by providing material incentives to respondents: It leads to an increase in the response rates of sensitive and cognitively challenging questions and possibly to better reflected answers. This reduction of item non-response increases the data quality of the survey. This behavior will be measured by a comparison of the response rates of such questions across the 5 treatments. Behavior 1 corresponds with research questions (1) to (4) explained in the introduction in section 1. Behaviors (2) and (3), in contrast, are undesired and should be avoided. They represent biases of stated WTP since respondents report a higher than their true WTP. These two kinds of behavior correspond with research question (5) in section 1.

To scrutinize the effects of behaviors (2) and (3) we will compare stated WTP across treatments, i.e. the fraction of zero responses, mean WTP and the distribution

12

of WTP statements. Adopting a positive perspective on the reciprocal behavior of respondents in CVM surveys, we want to test the following three hypotheses which refer to the three kinds of behavior mentioned above:

(H1) Both monetary and in-kind incentives increase the effort respondents put into answering the questionnaire.

(H2) The provision of monetary as well as in-kind incentives increases the likelihood that people state a positive WTP as compared to the base treatment without such incentives.

(H3) The provision of monetary and in-kind incentives increases the average stated WTP as compared to the base treatment without such incentives.

4. Results

4.1. Socio-demographic characteristics of the split samples

As shown in table 1 our survey falls slightly short of the planned number of interviews due to some unusable datasets in every treatment. The table also displays means and standard deviations of major household characteristics across the four treatments and the control group.[5] While mean number of household members, level of education, household income in RMB and the fraction of male respondents do not differ significantly, the Kruskal-Wallis test rejects the null hypothesis of equal means for respondent age at the 1%-level and number of children at the 5%-level of confidence. That means that except for these household characteristics the five split samples do not differ significantly.

4.2. The influence of incentives on respondents' effort

As mentioned above, a criterion frequently applied to test the influence of respondent incentives is the response rate to certain questions in the survey. The upper part of table 2 provides response rates to sensitive questions asking for the WTP statement, household income and ethnicity of the respondent. Correspondingly, the lower part of table 2 shows the fractions of respondents who have completed all items of cognitively challenging question sets, such as the evaluation of the single

---

[5] A list of all variables employed in this study including descriptions, sample means and standard deviations is provided in table A.1 in the appendix.

scenario elements, environmental attitudes or a psychological scale to assess the respondents' propensity to answer in a socially desirable manner.[6] It can be seen that for all questions under investigation response rates are higher in the incentive treatments compared to the control group, albeit not all differences are significant. Looking only at significant increases in response rates, the low monetary treatment shows the best results. Except for the elicitation question, four rises in response rates are significant as compared to the control group. Although the other incentive treatments lead to a significantly higher response rate for the WTP question, there are fewer significant differences regarding the other questions.

	Control	15 RMB	30 RMB	Powder	Towel	Chi²	df	p-value
						Kruskal-Wallis test		
N	196	194	185	196	198			
Age	38.05	35.92	33.82	36.96	34.90	17456	4	0.002
(std. dev.)	(0.89)	(0.89)	(0.88)	(0.83)	(0.79)			
Househ. members	3.18	3.24	3.09	3.36	3.03	6001	4	0.199
(std. dev.)	(0.12)	(0.11)	(0.10)	(0.10)	(0.10)			
Children	0.95	0.86	0.74	1.02	0.82	12940	4	0.012
(std. dev.)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)			
Education	3.98	3.91	3.92	3.98	3.96	556	4	0.968
(std. dev.)	(0.09)	(0.09)	(0.07)	(0.09)	(0.09)			
Household income	3001	3003	2646	2465	2698	5881	4	0.208
(std. dev.)	(175)	(217)	(152)	(134)	(165)			

	Control	15 RMB	30 RMB	Powder	Towel	df	Chi² asymp. Sig.	exact Sig.
Male	0.48	0.41	0.38	0.44	0.49	4	0.128	0.129
s.d.	(0.04)	(0.04)	(0.04)	(0.035)	(0.04)			

Table 1: Household demographics across the treatments (Chi-squared and Kruskal-Wallis Tests)

---

[6] The propensity of a respondent to answer to survey questions in a socially desirable manner is assessed by a modified version of the Balanced Inventory for Desirable Responding (BIDR) (cf. Paulhus 1991).

These results support our hypothesis (H1) in that we can observe a significant effect of the incentives on respondent efforts as measured by significantly decreasing item nonresponse rates. A comparison of the different incentive treatments suggests that this effect is largest under the low-value monetary incentive (15 RMB) and in general rather limited under the in-kind incentive treatments.

Sensitive question	Control	15 RMB	p	30 RMB	p	Powder	p	Towel	p
WTP question	97.0%	98.0%	0.544	99.5%	0.072	99.5%	0.059	99.5%	0.061
Household income	86.1%	93.4%*	0.016	90.3%	0.204	90.4%	0.192	91.0%	0.131
Ethnic group	98.5%	100.0%	0.086	98.9%	0.722	99.0%	0.674	99.0%	0.666

Question set	Control	15 RMB	p	30 RMB	p	Powder	p	Towel	p
Scenario evaluation	96.5%	99.5%*	0.035	99.5%*	0.043	99.0%	0.100	99.0%	0.097
Scenario rating	98.0%	100.0%*	0.047	100.0%	0.054	99.5%	0.187	99.0%	0.423
Env. Attitudes	87.1%	92.4%	0.081	93.5%*	0.034	89.3%	0.495	93.5%*	0.032
Social desirability	82.7%	90.4%*	0.024	87.6%	0.172	87.8%	0.149	87.9%	0.137

Table 2: Response rates to sensitive and cognitively challenging questions (p-values for t- / U-Tests in comparison to the control group)

4.3. The influence of incentives on stated WTP

Next, we analyze the effect of incentive provision on WTP statements, mean WTP and the form of WTP distribution across treatments. Table 3 shows the estimates of mean WTP for the five treatments. While the low cash amount of 15 RMB in the LO_MONEY treatment exhibits virtually the same mean WTP as the control group, mean WTP estimates in all other treatments differ, however only the lower WTP of the low in-kind treatment (LO_INKIND) in comparison to the control group is significant. As we see from table 3, mean WTP of the HI_MONEY and the HI_INKIND treatment are higher than mean WTP of the control group, but the differences to the control group are not significant.

Greater and significant differences can be observed for the fraction of zero-WTP statements across the treatments. Here, it shows that all incentive treatments exhibit a lower fraction of zero responses as compared to the control group, most of which are quite drastic. Yet, except in the low in-kind treatment no significant effect on the fraction of zero responses is observed. Thus, the information contained in table 3 is

somewhat inconclusive. While according to the hypothesis (H2) stated above no significant increase in mean WTP compared to the control group is observed (we even see a significant decrease for the low in-kind treatment), there seems to be a strong effect on the propensity of respondents to state positive versus zero WTP amounts when confronted with an incentive. It is, therefore, necessary to analyze the WTP responses across the 5 treatments in more detail. Figure 2 displays the relative frequencies of WTP statements for each treatment separately.

Treatment	N	mean WTP	Fraction of zero-WTP statements
Control group	196	41.17	21.94%
LO_MONEY (15 RMB)	194	40.66	12.37%*
HI_MONEY (30 RMB)	185	46.22	8.11%**
LO_INKIND (Washing powder)	196	29.06*	19.90%
HI_INKIND (Bath towel)	198	43.35	13.13%*

Table 3: Mean WTP estimates and zero-WTP responses across treatments. The 1%-(**) and 5%-significance levels (*) indicate significant differences of the fraction of zero-WTP statements in the treatments in comparison to the control group.
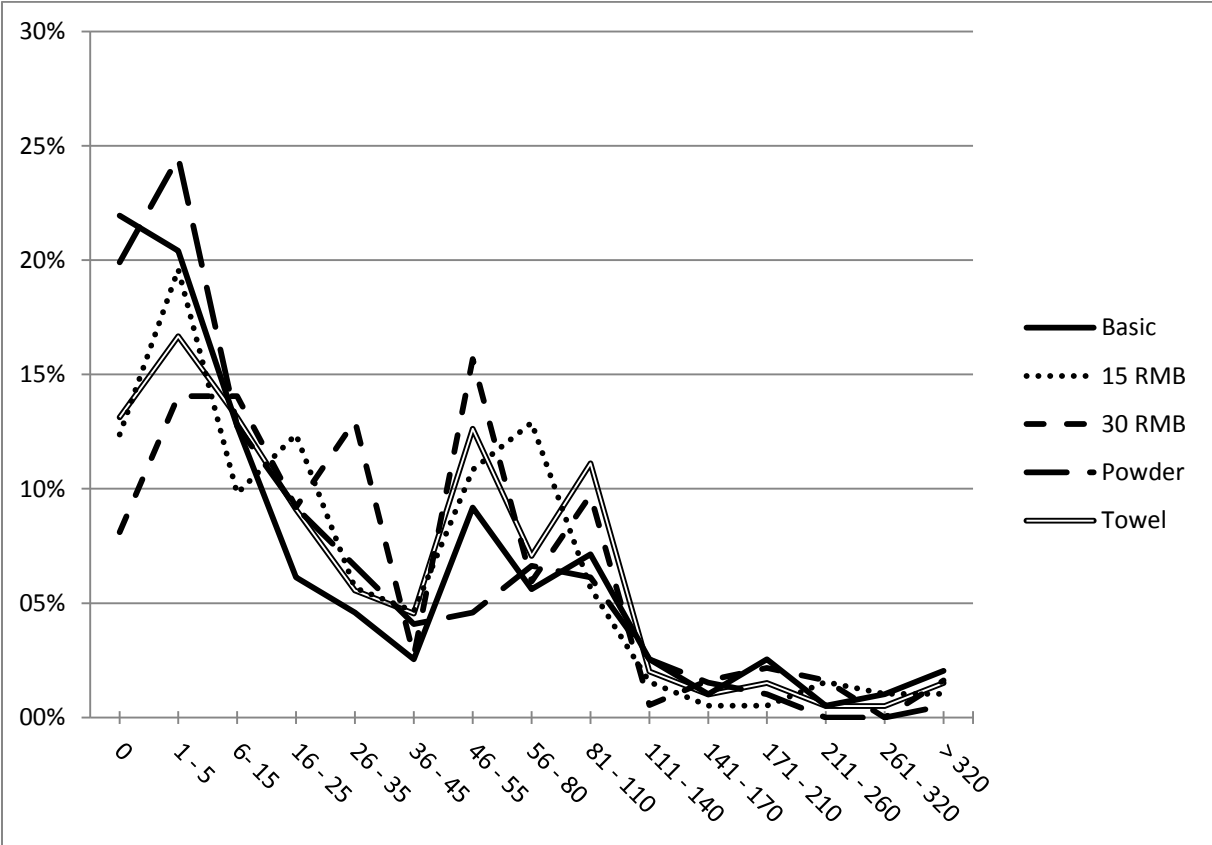

Figure 2: Relative distribution of WTP responses

An econometric model of the two-step decision of WTP

In order to account for the two potential biasing behaviors (2) and (3) we apply a special regression model. Here, it is assumed that the respondent selects a specific WTP amount in a two-step decision process. As a first step, he decides whether to state a positive WTP or to state zero. In case, the respondent is generally willing to pay for the proposed project, he selects the specific amount in the second step of the decision process. The determinants of the decision process either to select a positive amount or not may well be different from the ones of deciding about the specific WTP amount. This is especially the case when respondents are given an incentive since, as explained above, it may lead either to behavior (2) or (3) or even both. The appropriate estimation model to detect the two separate sets of determinants of both processes is a two-step selection model based on Heckman (1979). By applying this approach it is possible to simultaneously estimate the respective factors that influence the two decision processes of stating WTP. The model can be written as follows (cf. Heckman 1979, Greene 2003):

$$z_i^* = \boldsymbol{\alpha}' \boldsymbol{w_i} + u_i \tag{1}$$

with

$$z_i = \begin{cases} 1 \ \ if \ \ z_i^* > 0 \\ 0 \ \ if \ \ z_i^* = 0 \end{cases} \tag{2}$$

$$y_i = \boldsymbol{\beta}' \boldsymbol{x_i} + e_i \qquad \text{if } z_i = 1 \tag{3}$$

where

$$e_i, u_i \sim N[0,0, \sigma_e^2, \sigma_u^2, \rho] \tag{4}$$

Equation (1) is the so-called selection equation and models whether respondent *i* chooses a positive WTP ($z_i = 1$) or zero WTP ($z_i = 0$). The vector $\boldsymbol{w_i}$ denotes the variables explaining the selection process and $\boldsymbol{a}$ the respective coefficients (determinants). Equation (3), often termed outcome equation, models the specific (positive) WTP amount y_i stated by respondent *i*, the vector $\boldsymbol{x_i}$ denotes the explanatory variables and $\boldsymbol{\beta}$ the respective coefficients of this process. ρ stands for the correlation coefficient between the error terms in both equations, e_i and u_i. The expected WTP given that it is positive can then be modeled jointly and can be expressed as

$$E[y_i|z_i^* > 0] = \boldsymbol{\beta'x_i} + \rho\sigma_e\lambda_i(-\boldsymbol{\alpha'w_i}/\sigma_u) \tag{5}$$

with $\lambda_i(-\boldsymbol{\alpha'w_i}/\sigma_u) = \phi(\boldsymbol{\alpha'w_i}/\sigma_u)/\Phi(\boldsymbol{\alpha'w_i}/\sigma_u)$ denoting the inverse Mill's ratio. Estimating equation (5) then yields both the coefficient estimates $\boldsymbol{\beta}$ of the outcome equation as well as the coefficients $\boldsymbol{\alpha}$ of the selection equation in a joint estimation process. From these coefficient estimates the potential influences of behaviors (2) and (3) on stated WTP can be analyzed. For both sets of coefficients the marginal effects can be computed, as well.

Results of the two-step model for reciprocity

As already shown in table 3 the relative frequency of zero-WTP responses is lower in all treatments as compared to the control group. Obviously, the provision of a gift increases the likelihood of observing behavior (2), i.e. stating a positive WTP amount. This increase (corresponding to a lower fraction of responses in the first interval) is most pronounced in the high-value monetary treatment (HI_MONEY). From figure 2 it can now well be observed that these reduced fractions of zero-WTP statements consistently correspond to much higher frequencies of responses in the first positive interval on the payment card, i.e. 1-5 RMB, when incentives are used. We can even observe that now the responses in this interval have the highest relative frequency of the whole WTP distribution in every incentive treatment. From this observation it must be concluded that the use of incentives significantly induces some respondents not to state a zero-WTP (which they would have stated in the case of no incentives) and shift their response into the first interval of positive WTP amounts. Thus, we clearly observe behavior (2) in our treatments, however, the consequences of this behavior appear to be negligible since the induced shift of WTP statements is very small.

The results concerning the assumed behavior (3) are more complex. Therefore, in a next step we will analyze the decision to state a positive WTP and on the specific WTP amount jointly in a Heckman two-step model as laid out above. In this model we aim to identify the determinants that drive the two processes and investigate whether they differ systematically.

	Model 1		Model 2	
	N = 892		N = 679	
	Coefficient	**p-value**	**Coefficient**	**p-value**
Outcome equation: dependent variable: WTP interval midpoint				
AGE	-0.414	0.163	-0.415	0.251
MALE	3.553	0.567	3.287	0.662
MARRIED	-13.145	0.059	-15.345	0.073
CHILD			10.531	0.214
SATIS			11.451*	0.036
EDUCATION	6.954*	0.013	8.930**	0.008
INCOME	0.006**	0.000	0.005**	0.005
UNCONCERN			3.525	0.368
INSTRUMENT			-4.318	0.224
EMOCARE			-4.409	0.340
OBJECTIVE			-2.077	0.553
LO_MONEY	-8.450	0.445	-9.454	0.426
HI_MONEY	-6.241	0.618	-6.813	0.574
LO_INKIND	-18.048	0.072	-19.642	0.097
HI_INKIND	-4.327	0.690	-3.372	0.774
CONSTANT	36.014	0.110	-9.474	0.735
Selection equation: dependent variable: posWTP				
HHHEAD			0.257	0.081
TAXES			-0.655**	0.000
MALE			-0.368**	0.007
SATIS			0.245**	0.009
UNCONCERN			-0.131*	0.022
EMOCARE			0.208**	0.000
LO_MONEY	0.388*	0.013	0.534*	0.011
HI_MONEY	0.623**	0.000	0.737**	0.001
LO_INKIND	0.048	0.741	0.111	0.554
HI_INKIND	0.352*	0.022	0.375	0.054
CONSTANT	0.723**	0.000	0.262	0.514
rho	0.000		0.010	
Test_rho	1.000		0.963	

Table 4: Two-step regression models of WTP statements

Table 4 displays the results of two different model specifications. In these models the independent variable, *posWTP* , in the selection equation is equal to one if the respondent states a positive WTP and zero for respondents selecting "0 RMB". The dependent variable of the second step model, the outcome equation, is the midpoint of the PC interval selected by the respective respondent. The left-hand side of the table (model 1) is a basic model including in the selection equation only the treatment dummies. It turns out that all coefficients except the one of the low-valued in-kind gift treatment are significantly positive, meaning that the probability of stating a positive WTP response is significantly higher in the two monetary and in the high-valued in-kind gift treatments compared to the control group. This result confirms the observation in figure 2, that these three treatments substantially reduce the fraction of zero responses relative to the control group without incentive.

Table 5 shows the marginal effects of this selection model, i.e. the extent to which the likelihood of stating a positive WTP amount changes from providing no incentive in the base version to providing an incentive in the respective treatment. As can be seen the provision of the high-value monetary incentive clearly has the strongest impact on the likelihood of stating a positive WTP. The quantitative impact of the small money amount is approximately equal to that of the high-value in-kind gift. A comparison of only the monetary gifts reveals that the high amount exhibits a much stronger effect on *posWTP* than the low money amount. This shows that there is a clear and strong positive relationship between the value of the monetary incentive and the likelihood of stating a positive WTP.

	Model 1		Model 2	
	Effect	p-value	Effect	p-value
HHHEAD			0.050	0.080
TAXES			-0.128**	0.000
MALE			-0.072**	0.006
SATIS			0.048**	0.008
UNCONCERN			-0.026*	0.020
EMOCARE			0.041**	0.000
LO_MONEY	0.094*	0.012	0.104**	0.010
HI_MONEY	0.151**	0.000	0.144**	0.001
LO_INKIND	0.012	0.741	0.022	0.555
HI_INKIND	0.085*	0.021	0.073	0.052

Table 5: Marginal effects of the first-step selection model

Looking at the outcome equation of model 1 in table 4, the effect of certain demographic variables on the amount of WTP can be seen. While the level of education (*EDU*) and household income (*INCOME*) as expected have a significantly positive influence, the fact that the respondent is married (*MARRIED*) has a negative effect on WTP, which is a somewhat surprising and unusual result in the context of the valuation of environmental goods. Concerning the different incentive treatments, it turns out that merely the low-value in-kind incentive affects stated WTP amounts negatively, i.e. respondents in this treatment state systematically lower WTPs than those in the control group. No significant effect on the specific WTP amount can be found for the remaining three gift treatments. The important result here is that although these incentives increase the likelihood of stating a positive WTP (as shown in the selection equation) they do not significantly influence the specific amount once the decision to state a positive WTP has been made.

To check for the robustness of these results we extend the regression model and include a larger set of explanatory variables both in the selection and the outcome equation (model 2). Regarding the selection equation, the likelihood of stating a positive WTP is positively influenced by the fact that the respondent is the head of the household (*HHHEAD*), the overall level of life satisfaction (*SATIS*) and the environmental attitude factor *EMOCARE*. The latter taps a feeling of emotional care for the natural environment in the respondent. On the contrary, the fact that respondents think that local residents are already paying enough taxes (*TAXES*), the respondent is male (*MALE*) and the environmental attitude factor *UNCONCERN* significantly lower the probability of stating a positive WTP. The latter factor assesses the degree to which a respondent is mindlessly unconcerned about current environmental problems. In the outcome equation in the upper part of table 4, among the newly included explanatory variables only the level of life satisfaction has a significant effect. It turns out that the more satisfied the respondent is with his life, the higher is his stated WTP. Both from a general perspective and regarding the effects of the incentive treatments, model 2 confirms the findings of the first model. The fact that the same pattern of significant dummy variables can be found when including further explanatory variables into the model is evidence for the robustness of the above results.

Further aspects of reciprocal behavior

While in our field experiments we found evidence of behavior (2) but not of behavior (3) we want to investigate a further aspect that emerged from an

observation of the WTP distribution graphs of each single treatment (figure 2). The distribution of the HI_MONEY treatment where respondents were given an up-front incentive of 30 RMB shows a peak at the 26-35 RMB interval which appears only in this treatment. This observation leads to the suspicion that some respondents were especially attracted to select the interval as their WTP that corresponds to the paid incentive, at least at first sight. Those respondents may have had the intention to pay back the amount received as incentive. We term this effect "direct reciprocation". Ironically, such thinking clearly results in a behavioral fallacy since the payment scenario explains that the stated amounts are to be paid every three months over the next five years, i.e. those respondents would agree to paying back 20 times as much as they received as an incentive.

We test this hypothesis with a probit model where the variable BID30, i.e. a binary variable indicating whether the respondent has chosen the interval around 30 RMB, is used as the dependent variable. In this simple model which is shown in table 6 we regress the respective variable on the different treatment dummies in order to test whether indeed the interval containing the 30 RMB incentive amount was chosen significantly more often in the HI_MONEY treatment. The result support this hypothesis since, as expected, we find that in in the BID30-model only the HI_MONEY dummy has a significant effect.

Dependent variable:	BID30	
N = 969	Coeff.	p-value
LO_MONEY	0.103	0.629
HI_MONEY	0.558**	0.004
LO_INKIND	0.182	0.381
HI_INKIND	0.093	0.663
CONSTANT	-1.686**	0.000
Pseudo R-squared	0.023	

Table 6: The direct reciprocation effect

Thus, we show that in our study the specific incentive amount can serve as an attractor for some respondents (here about 9% of respondents) when selecting their individual WTP amounts on the payment card. This behavior, even if it is rationalized by the noble intention to pay back the amount received as an incentive to participate in the survey, is rather surprising since it leads to a drastic overpayment due to the

repeated payment schedule. At this point, direct reciprocation needs to be regard as a preliminary and tentative hypothesis and it needs to be investigated whether it can be replicated in future CVM surveys using monetary incentives.

5. Discussion and conclusions

In this study we wanted to scrutinize the effects of material incentives on respondent behavior in CVM surveys. Experimental as well as model-based theoretical studies found in the literature show contradictory results regarding the effects of material incentives on the compliance of candidates in experiments who are asked to fulfill some specific task. CVM surveys represent a principal-agent setting where interviewers are the principals who ask respondents (the agents) to answer their questions as conscientiously and truthfully as possible. Like in the traditional principal-agent model the efforts of respondents cannot be judged directly by the principals. Therefore, we took the fact whether certain more complicated questions were answered or not as an indicator for respondent conscientiousness. We confronted four different incentive treatments (low money payment, high money payment, low-price in-kind gift, high-price in-kind gift) with the performance of a control group where no material incentives were provided. Based on five research questions which resulted from the respective literature we analyzed respondent reactions to material incentives provided before a CVM interview.

Our results regarding respondent compliance in terms of item non-response are as mixed as could be expected from the literature. The best performance in the sense of the lowest item non-response rate was reached by the low money payment of 15 RMB. This performance was significantly better than the control group in most items at the 5% level and in all items at the 10% level. The performance of the high money payment (30 RMB) was worse than that of the low money treatment but still in two items better than the control group at the 5% significance level and in four items better than the control group at the 10% level. The high-value in-kind gift (towel) performed significantly better than the control group at the 5% level in only one item and at the 10% level in three items followed by the low-value in-kind gift which surpassed the control group in only one item at the 10% level. So we have a clear ranking with the low money payment treatment showing the best performance followed by the high money payment and the high-value in-kind gift, while the low-value-in-kind gift shows no effect at all at the 5% significance level as compared to the control group and only one at the 10% level.

Answering our first research question ("Do extrinsic incentives trigger respondents' efforts in answering CVM questions?") we can say that all but one respondent incentives have a significantly positive effect on respondent compliance in the sense that they tend to lower the item non-response rate as compared to the control group. This means that from our study we cannot confirm the wide-spread crowding-out hypothesis for CVM surveys, since none of the treatments with a material incentive lead to a worse performance as compared to the control group. Instead it seems that traditional reciprocity considerations and feelings of gratitude determine respondents' reactions to the incentives offered.

Regarding the second research question ("What has a more favorable effect on respondents' diligence in answering CVM questionnaires, money or in-kind gifts?") we find that money shows a better performance than in-kind gifts of the same value. This demonstrates that the doubts regarding money as an incentive arising from other contexts (cf. Heyman and Ariely 2004 or Gneezy et al. 2011) cannot be confirmed for CVM surveys, at least not from our study.

With respect to the third research question ("Do large money incentives on the one hand and small money incentives on the other have different effects on respondents' diligence in answering CVM questionnaires?") our explanations are not as clear and convincing as before. From our study we cannot confirm the advice of Gneezy and Rustichini (2000) "Pay enough or don't pay at all" for CVM surveys. While they found in a different experimental environment that no payment performs best, followed by the high payment before the low payment, in our study the low money payment shows the best performance regarding respondent compliance and is followed by high money payment, while both perform better than no monetary incentive at all. The fact that any money incentive is better than no incentive at all can be explained by reciprocity considerations, but it is rather unclear why the 'basic law of behavior' according to which "higher incentives will lead to more effort and higher performance" does not seem to hold here. Maybe there are some unknown psychological effects at work here but they could not be identified from our data.

Things are different with respect to research question 4 ("Do expensive in-kind incentives on the one hand and less expensive in-kind incentives on the other have different effects on respondents' diligence in answering CVM questionnaires?"). Here the high-value in-kind gift has a much more favorable effect on respondent compliance than the low-value gift, which is in accordance with the "basic law of behavior" as well as with reciprocity considerations.

While our recommendations derived from research questions 1 to 4 are rather clear ("Use a low money payment as an incentive to trigger respondent compliance in

CVM surveys") we have not yet taken into account possible effects of compliance incentives on stated WTP in the sense of research question 5 ("Do material incentives (monetary or in-kind) affect respondents' stated WTP for the public project under discussion?"). Here we find that the low money payment treatment leads to practically the same average WTP as the control group while the high money payment treatment and the high-value in-kind gift treatment lead to higher average stated WTP than the control group, though these differences are not significant. Most surprising is the effect of the low-value in-kind gift on average WTP which is significantly *lower* than that of the control group. One possible explanation is that the choice of the low-value gift (washing powder) was inappropriate and that this gift was perceived as a kind of insult so that respondents "paid us back" by understating their true WTP. This shows how important thorough pretesting is when CVM surveys are conducted in foreign cultures.

Summing up, from our study we derive the recommendation to use moderate money payments as incentives to motivate respondents to answer CVM questions conscientiously, so that item non-response rates are minimized. We urgently recommend thorough pretesting in order to assess an amount of money considered appropriate by respondents, since this amount will differ between different social and cultural environments. In contrast to other studies, in our survey in-kind gifts turned out to be much less helpful as incentives than money payments. Also the choice of the "right" in-kind gift seems to be much more difficult than we expected, so that moderate money payments are our first choice as respondent incentives in CVM surveys.

References

Ahlheim, M., Ekasingh, B., Frör, O., Kitchaicharoen, J., Neef, A., Sangkapitux, C. and Sinphurmsukskul, N. (2010): Better than their reputation: Enhancing the validity of contingent valuation mail survey results through citizen expert groups, *Journal of Environmental Planning and Management*, 53, 163-182.

Alpizar, F., Carlsson, F. and Johansson-Stenman, O. (2008): Anonymity, reciprocity, and conformity: Evidence from voluntary contributions to a national park in Costa Rica, *Journal of Public Economics*, 92, 1047-1060.

Bennett, M. T. (2008): China's sloping land conversion program: Institutional innovation or business as usual?, *Ecological Economics*, 65(4), 699-711.

Berg, J., Dickhaut, J. and McCabe, K. (1995): Trust, reciprocity, and social history, *Games and Economic Behavior*, 10, 122-142.

Biner, P. M. and Kidd, H. J. (1994): The interactive effects of monetary incentive justification and questionnaire length on mail survey response rates, *Psychology and Marketing*, 11, 483-492.

Bolton, G. E. and Ockenfels, A. (2000): ERC: A theory of equity, reciprocity, and competition, *The American Economic Review*, 90, 166-193.

Camerer, C. and Thaler, R. H. (1995): Anomalies: Ultimatums, dictators and manners, *Journal of Economic Perspectives*, 9, 209-219.

Church, A. H. (1993): Estimating the effects of incentives on mail-survey response rates: A meta-analysis, *Public Opinion Quarterly*, 57, 62-79.

Dufwenberg, M. and Kirchsteiger, G. (2004): A theory of sequential reciprocity, *Games and Economic Behavior*, 47, 268-298.

Falk, A. (2007): Gift exchange in the field, *Econometrica*, 75, 1501-1511.

Fehr, E. and Gächter, S. (2000): Fairness and retaliation: The economics of reciprocity *The Journal of Economic Perspectives*, 14, 159-181.

Fehr, E., Kirchsteiger, G. and Riedl, A. (1993): Does fairness prevent market clearing? An experimental investigation, *The Quarterly Journal of Economics*, 108, 437-459.

Fehr, E. and Schmidt, K. M. (1999): A theory of fairness, competition, and cooperation, *The Quarterly Journal of Economics*, 114, 817-868.

Frey, B. S. (1994), How Intrinsic Motivation Is Crowded in and out, *Rationality and Society*, 6, 334-352.

Frey, B. S., and F. Oberholzer-Gee (1997), The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-out, *American Economic Review*, 87, 746-755.

Frey, B. S., F. Oberholzer-Gee, and R. Eichenberger (1996), The Old Lady Visits your Backyard: A Tale of Morals and Markets, *Journal of Political Economy*, 104, 1297-1313.

Gneezy, U., Meier, S., Rey-Biel, P. (2011), When and Why Incentives (Don't) Work to Modify Behavior, *Economic Perspectives* 25(4), 191-210.

Gneezy, U., Rustichini, A. (2000), Pay enough or don't pay at all, *Quarterly Journal of Economics,* 115(3), 791-810.

Gouldner, A. W. (1960): The norm of reciprocity: A preliminary statement, *American Sociological Review*, 25, 161-178.

Greene, W. H. (2003): Econometric analysis, 5th edition, Upper Saddle River.

Heckman, J. J. (1979): Sample selection bias as a specification error, *Econometrica*, 47, 153-161.

Heyman, J., and Ariely, D. (2004), Effort for Payment: A Tale of Two Markets. *Psychological Science*, 15(11): 787–793.

Hidano, N., Kato, T. and Izumi, K. (2005): Reciprocity, consequentiality and willingness-to-pay in contingent valuation: An experimental panel analysis on climate changes. Working paper Tokyo Institute of Technology.

James, J. M. and Bolstein, R. (1990): The effect of monetary incentives and follow-up mailings on the response rate and response quality in mail surveys, *Public Opinion Quarterly*, 54, 346-361.

Kolm, S.C. (2006), Reciprocity: its scope, rationales, and consequences, in: Kolm, S.C. and Ythier, J. M. (eds.), Handbook of the economics of giving, altruism and reciprocity, vol. 1, 371-541.

Liberman, V., Steven M. S., Ross, L. (2004), "The Name of the Game: Predictive Power of Reputations versus Situational Labels in Determining Prisoner's Dilemma Game Moves." Personality and Social Psychology Bulletin, 30(9): 1175–1185.

Nicklish, A. and Salz, T. (2008): Reciprocity and status in a virtual field experiment. Working paper MPI for Research on Collective Goods, Bonn.

Paulhus, D. L. (1991): Measurement and control of response bias, in: Robinson, J.P., Shaver, P.R. and Wrightsman, L.S. (eds.) Measures of personality and social psychological attitudes, 17-59, San Diego.

Rabin, M. (1993): Incorporating fairness into game theory and economics, *The American Economic Review*, 83, 1281-1302.

Ryu, E., Couper, M. P. and Marans, R. W. (2006): Survey incentives: Cash vs. in-kind; face-to-face vs. mail; response rate vs. nonresponse error, *International Journal of Public Opinion Research*, 18, 89-106.

Schwartz, B. (1967): The social psychology of the gift, *American Journal of Sociology*, 73, 1-11.

Shettle, C. and Mooney, G. (1999): Monetary incentives in U.S. government surveys, *Journal of Official Statistics*, 15, 231-250.

Simmons, E. and Wilmot, A. (2004): Incentive payments on social surveys: A literature review, *Social Survey Methodology Bulletin*, 53, 1-11.

Singer, E., Van Hoewyk, J., Gebler, N., Raghunathan, T. and McGonagle, K. (1999): The effect of incentives on response rates in interviewer-mediated surveys, *Journal of Official Statistics*, 15, 217-230.

Stratford, N., Simmonds, N. and Nicolaas, G. (2003): National travel survey 2002: Incentives experiment report. UK Department for Transport, London.

Teisl, M. F., Roe, B. and Vayda, M. E. (2006): Incentive effects on response rates, data quality, and survey administration costs, *International Journal of Public Opinion Research*, 18, 364-373.

Weinreb, A. A., Madhavan, S. and Stern, P. (1998): "The gift received has to be repaid:" Respondents, researchers and gifting. Conference paper at the Annual Meeting of the Eastern Sociological Society, Philadelphia.

Wetzels, W., Schmeets, H., van den Brakel, J. and Feskens, R. (2008): Impact of prepaid incentives in face-to-face surveys: A large-scale experiment with postage stamps, *International Journal of Public Opinion Research*, 20, 507-516.

Whittington, D. (2004): Ethical issues with contingent valuation surveys in developing countries: A note on informed consent and other concerns, *Environmental and Resource Economics*, 28, 507-515.

Xu, J. (2006): The political, social, and ecological transformation of a landscape, *Mountain Research and Development*, 26, 254-262.

Yu, J. and Cooper, H. (1983): A quantitative review of research design effects on response rates to questionnaires, *Journal of Marketing Research*, 20, 36-44.

Ziegler, A. D., Fox, J. M. and Xu, J. (2009): The rubber juggernaut, *Science*, 324, 1024-1025.

Appendix

Variable	Description	Mean	Std. dev.
AGE	Age of the respondent	35.96	12.051
MALE	Gender of the respondent (1 = male, 0 = female)	.44	.497
MARRIED	Marital status of the respondent (1 = married, 0 = not married)	.62	.486
CHILD	Does the respondent have a child (1 = yes, 0 = no)	.66	.475
SATIS	Level of overall live satisfaction	3.21	.674
EDUCATION	Level of education	3.95	1.202
INCOME	Household income	2,764	2,295
UNCONCERN	Environmental attitude factor: No concern for environmental problems	.05	1.027
INSTRUMENT	Environmental attitude factor: Seeing primarily the instrumental value of the natural environment	-.05	1.033
EMOCARE	Environmental attitude factor: Caring for the environment on an emotional level	.05	.995
OBJECTIVE	Environmental attitude factor: Objectively acknowledging the existence of environmental problems	.00	.999
LO_MONEY	Treatment dummy: low-valued monetary gift (15 RMB)	-	-
HI_MONEY	Treatment dummy: high-valued monetary gift (30 RMB)	-	-
LO_INKIND	Treatment dummy: low-valued in-kind gift (washing powder)	-	-
HI_INKIND	Treatment dummy: high-valued in-kind gift (bath towel)	-	-
HHHEAD	The respondent is the household head (1 = yes, 0 = no)	-	-
TAXES	"Taxes and fees of residents in Jinghong are already so high that there should be no additional financial burden." (1 = yes, 0 = no)	1.38	.486

Table A.1: Description of variables used in the regression models

FZID Discussion Papers

Competence Centers:

IK: Innovation and Knowledge
ICT: Information Systems and Communication Systems
CRFM: Corporate Finance and Risk Management
HCM: Health Care Management
CM: Communication Management
MM: Marketing Management
ECO: Economics
SE: Sustainability and Ethics

Download FZID Discussion Papers from our homepage: https://fzid.uni-hohenheim.de/71978.html

Nr.	Autor	Titel	CC
01-2009	Julian P. Christ	NEW ECONOMIC GEOGRAPHY RELOADED: Localized Knowledge Spillovers and the Geography of Innovation	IK
02-2009	André P. Slowak	MARKET FIELD STRUCTURE & DYNAMICS IN INDUSTRIAL AUTOMATION	IK
03-2009	Pier Paolo Saviotti and Andreas Pyka	GENERALIZED BARRIERS TO ENTRY AND ECONOMIC DEVELOPMENT	IK
04-2009	Uwe Focht, Andreas Richter, and Jörg Schiller	INTERMEDIATION AND MATCHING IN INSURANCE MARKETS	HCM
05-2009	Julian P. Christ and André P. Slowak	WHY BLU-RAY VS. HD-DVD IS NOT VHS VS. BETAMAX: THE CO-EVOLUTION OF STANDARD-SETTING CONSORTIA	IK
06-2009	Gabriel Felbermayr, Mario Larch, and Wolfgang Lechthaler	UNEMPLOYMENT IN AN INTERDEPENDENT WORLD	ECO
07-2009	Steffen Otterbach	MISMATCHES BETWEEN ACTUAL AND PREFERRED WORK TIME: Empirical Evidence of Hours Constraints in 21 Countries	HCM
08-2009	Sven Wydra	PRODUCTION AND EMPLOYMENT IMPACTS OF NEW TECHNOLOGIES – ANALYSIS FOR BIOTECHNOLOGY	IK
09-2009	Ralf Richter and Jochen Streb	CATCHING-UP AND FALLING BEHIND KNOWLEDGE SPILLOVER FROM AMERICAN TO GERMAN MACHINE TOOL MAKERS	IK

Nr.	Autor	Titel	CC
10-2010	Rahel Aichele and Gabriel Felbermayr	KYOTO AND THE CARBON CONTENT OF TRADE	ECO
11-2010	David E. Bloom and Alfonso Sousa-Poza	ECONOMIC CONSEQUENCES OF LOW FERTILITY IN EUROPE	HCM
12-2010	Michael Ahlheim and Oliver Frör	DRINKING AND PROTECTING – A MARKET APPROACH TO THE PRESERVATION OF CORK OAK LANDSCAPES	ECO
13-2010	Michael Ahlheim, Oliver Frör, Antonia Heinke, Nguyen Minh Duc, and Pham Van Dinh	LABOUR AS A UTILITY MEASURE IN CONTINGENT VALUATION STUDIES – HOW GOOD IS IT REALLY?	ECO
14-2010	Julian P. Christ	THE GEOGRAPHY AND CO-LOCATION OF EUROPEAN TECHNOLOGY-SPECIFIC CO-INVENTORSHIP NETWORKS	IK
15-2010	Harald Degner	WINDOWS OF TECHNOLOGICAL OPPORTUNITY DO TECHNOLOGICAL BOOMS INFLUENCE THE RELATIONSHIP BETWEEN FIRM SIZE AND INNOVATIVENESS?	IK
16-2010	Tobias A. Jopp	THE WELFARE STATE EVOLVES: GERMAN KNAPPSCHAFTEN, 1854-1923	HCM
17-2010	Stefan Kirn (Ed.)	PROCESS OF CHANGE IN ORGANISATIONS THROUGH eHEALTH	ICT
18-2010	Jörg Schiller	ÖKONOMISCHE ASPEKTE DER ENTLOHNUNG UND REGULIERUNG UNABHÄNGIGER VERSICHERUNGSVERMITTLER	HCM
19-2010	Frauke Lammers and Jörg Schiller	CONTRACT DESIGN AND INSURANCE FRAUD: AN EXPERIMENTAL INVESTIGATION	HCM
20-2010	Martyna Marczak and Thomas Beissinger	REAL WAGES AND THE BUSINESS CYCLE IN GERMANY	ECO
21-2010	Harald Degner and Jochen Streb	FOREIGN PATENTING IN GERMANY, 1877-1932	IK
22-2010	Heiko Stüber and Thomas Beissinger	DOES DOWNWARD NOMINAL WAGE RIGIDITY DAMPEN WAGE INCREASES?	ECO
23-2010	Mark Spoerer and Jochen Streb	GUNS AND BUTTER – BUT NO MARGARINE: THE IMPACT OF NAZI ECONOMIC POLICIES ON GERMAN FOOD CONSUMPTION, 1933-38	ECO

Nr.	Autor	Titel	CC
24-2011	Dhammika Dharmapala and Nadine Riedel	EARNINGS SHOCKS AND TAX-MOTIVATED INCOME-SHIFTING: EVIDENCE FROM EUROPEAN MULTINATIONALS	ECO
25-2011	Michael Schuele and Stefan Kirn	QUALITATIVES, RÄUMLICHES SCHLIEßEN ZUR KOLLISIONSERKENNUNG UND KOLLISIONSVERMEIDUNG AUTONOMER BDI-AGENTEN	ICT
26-2011	Marcus Müller, Guillaume Stern, Ansger Jacob and Stefan Kirn	VERHALTENSMODELLE FÜR SOFTWAREAGENTEN IM PUBLIC GOODS GAME	ICT
27-2011	Monnet Benoit Patrick Gbakoua and Alfonso Sousa-Pozab	ENGEL CURVES, SPATIAL VARIATION IN PRICES AND DEMAND FOR COMMODITIES IN CÔTE D'IVOIRE	ECO
28-2011	Nadine Riedel and Hannah Schildberg-Hörisch	ASYMMETRIC OBLIGATIONS	ECO
29-2011	Nicole Waidlein	CAUSES OF PERSISTENT PRODUCTIVITY DIFFERENCES IN THE WEST GERMAN STATES IN THE PERIOD FROM 1950 TO 1990	IK
30-2011	Dominik Hartmann and Atilio Arata	MEASURING SOCIAL CAPITAL AND INNOVATION IN POOR AGRICULTURAL COMMUNITIES. THE CASE OF CHÁPARRA - PERU	IK
31-2011	Peter Spahn	DIE WÄHRUNGSKRISENUNION DIE EURO-VERSCHULDUNG DER NATIONALSTAATEN ALS SCHWACHSTELLE DER EWU	ECO
32-2011	Fabian Wahl	DIE ENTWICKLUNG DES LEBENSSTANDARDS IM DRITTEN REICH – EINE GLÜCKSÖKONOMISCHE PERSPEKTIVE	ECO
33-2011	Giorgio Triulzi, Ramon Scholz and Andreas Pyka	R&D AND KNOWLEDGE DYNAMICS IN UNIVERSITY-INDUSTRY RELATIONSHIPS IN BIOTECH AND PHARMACEUTICALS: AN AGENT-BASED MODEL	IK
34-2011	Claus D. Müller-Hengstenberg and Stefan Kirn	ANWENDUNG DES ÖFFENTLICHEN VERGABERECHTS AUF MODERNE IT SOFTWAREENTWICKLUNGSVERFAHREN	ICT
35-2011	Andreas Pyka	AVOIDING EVOLUTIONARY INEFFICIENCIES IN INNOVATION NETWORKS	IK
36-2011	David Bell, Steffen Otterbach and Alfonso Sousa-Poza	WORK HOURS CONSTRAINTS AND HEALTH	HCM
37-2011	Lukas Scheffknecht and Felix Geiger	A BEHAVIORAL MACROECONOMIC MODEL WITH ENDOGENOUS BOOM-BUST CYCLES AND LEVERAGE DYNAMICS	ECO
38-2011	Yin Krogmann and Ulrich Schwalbe	INTER-FIRM R&D NETWORKS IN THE GLOBAL PHARMACEUTICAL BIOTECHNOLOGY INDUSTRY DURING 1985–1998: A CONCEPTUAL AND EMPIRICAL ANALYSIS	IK

Nr.	Autor	Titel	CC
39-2011	Michael Ahlheim, Tobias Börger and Oliver Frör	RESPONDENT INCENTIVES IN CONTINGENT VALUATION: THE ROLE OF RECIPROCITY	ECO

FZID

FORSCHUNGSZENTRUM FZID

Universität Hohenheim

Forschungszentrum

Innovation und Dienstleistung

Fruwirthstr. 12

D-70593 Stuttgart

Phone +49 (0)711 / 459-22476

Fax   +49 (0)711 / 459-23360

Internet www.fzid.uni-hohenheim.de