



Habilitation Thesis

The contingent valuation of public goods revisited

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The Contingent Valuation of Public Goods Revisited

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von Basel und Wald AR

The Contingent Valuation of Public Goods Revisited

Introductory Chapter of the Habilitation Thesis

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1. Introduction

Today, a large body of psychological and economic evidence indicates that individuals often violate the rationality assumptions routinely made in economics. However, economists have pointed out that the predictions of models that assume full rationality of all agents may be valid in spite of violations of individual rationality. For instance, random deviations from rationality may cancel out at the aggregate level, or market forces may “punish” irrational decisions, and market experience may thus promote rational behaviour. An important task of economic research is to examine the conditions under which “economic man” dominates social behaviour (Camerer and Fehr 2006).

Most research on how market and other institutional forces can restore individual rationality has involved laboratory experiments and small private goods or donations to public goods (List 2004). Typically in these settings, the outcome of alternative decisions is reasonably well defined, and most individuals are able to form consistent beliefs about the consequences of the alternative choices. Whether or not the rational players will dominate the aggregate outcome has been found to crucially depend on the *strategic environment* that shapes the interactions between rational and irrational people (Fehr and Tyran 2005)

In other settings of importance, the consequences of alternative decisions are less clearly defined. In collective decisions about complex public policies, for instance, the consequences of alternative decisions are difficult to understand. Whether the individuals are able to “vote their interest” largely depends on the *information environment*. Information transmission from better to less informed individuals may play an important role in individual behaviour and aggregate outcomes, as recently observed in the political science and economic literature (Lupia and Matsusaka 2004, Matsusaka 2005, Mullainathan and Shleifer 2005).

This perspective on voting is different from the traditional economic model of the rational voter. In the traditional model, the voter casts a ballot based on his or her individually perceived utility under the alternative policies (Deacon and Shapiro 1975). Traditionally, the modalities of how relevant information is generated, gathered, and processed in collective

decisions has not been a topic of economic inquiry (Kirchgässner et al. 1999, Frey and Stutzer 2000). Incidentally, the absence of a “structural” model of the decision process has not presented any major problems in the empirical analysis of collective decisions so far. Economists have successfully applied the rational model, although without fully spelling out or understanding its behavioural assumptions (Mueller 2003).

Recently, however, the rational voter model has made a spectacular second career in an entirely different field of application. Hundreds of economists world-wide nowadays use surveys to elicit people’s preferences in hypothetical votes about the provision of public goods and services (Mitchell and Carson, 1989; McFadden, 2001). Preference information from such surveys is widely perceived as a necessary condition for cost-benefit analysis in the public sector. In contrast to the situation in collective decisions, information transmission from better to less informed subjects is precluded in these self-contained hypothetical votes. While “as if” rationality may suffice as a basis for applying the rational model to collective decisions, its application to surveys of this type is predicated on a literal meaning of the rational voter assumption. Even worse, the surveys are based on the assumption that ordinary citizens are unboundedly rational in terms of information processing while acting as fools in the face of opportunities for responding strategically. The validity of this peculiar set of behavioural assumptions has not been empirically established to date. The theoretical and empirical basis of this second career of the rational voter is the topic of this thesis.

My specific aims are threefold. For practical purposes, it would be extremely important to understand how the preferences elicited in those voting surveys about the provision of public goods relate to the preferences revealed in actual collective decisions. Hence, the first aim of this thesis is to provide a systematic empirical comparison of the two different modes of preference elicitation. If the surveys, as it turns out, do not successfully predict the preferences revealed in collective decisions, it is natural to ask why this is not the case. The second aim of this thesis is therefore to study that question using designed field experiments. Finally, given that standard surveys apparently fail to predict voter preferences, it is also of interest to examine how the surveys could be adapted to better suit the task. Thus, the third aim of this thesis is to use the insights from the field experiments to propose an advanced paradigm in the elicitation of preferences for public goods.

The remaining sections of this introductory chapter are organized as follows. Section 2 provides some background on the stated preference elicitation approach that has become known as the “contingent valuation” method. Section 3 outlines the status of research and research gaps at the time this thesis was begun, and describes the research strategy. Section 4

presents three papers comparing willingness to pay in a contingent valuation survey and a public financing vote held three months after and among the same population. This is followed by six papers that examine how income and distance to the policy site determine willingness to pay in a series of voting decisions and surveys. Section 5 is devoted to four field experiments investigating how characteristic differences in incentives and information provision affect choices in voting decisions and surveys. In the final section, I present a paper that uses the insights of the empirical work to propose a new survey approach to eliciting preferences for public goods and services, complemented by some general conclusions.

2. Background on contingent valuation

Forty years ago, Krutilla (1967) argued that there exist preferences for public goods which fail to be reflected by individual behaviour. As a consequence, revealed-preference approaches would not be sufficient to measure the economic values of public goods.¹ Early environmental economists thus decided to break with the economic profession's self-imposed prohibition of the collection of subjective data (Manki 2000). The value elicitation approach that became most popular among environmental economists is known as the contingent valuation method (Mitchell and Carson 1989). In contingent valuation surveys, citizen-consumers are queried in systematic ways to estimate their willingness to pay for public goods.² In the dominant dichotomous-choice variant of this survey approach, a proposed public good is described to a sample of respondents that is representative of a relevant population. The respondents are then confronted with a hypothetical (randomly assigned) money price and asked if they would be willing to pay this amount if the goods were actually provided. The blueprint for this survey procedure, according to its most authoritative commentators, is a popular vote in which citizens decide whether they should tax themselves to provide a specific good at specified costs (Mitchell and Carson 1989, Arrow et al. 1993, Hanemann 1994).³

Landmark contributions to this literature are the proceedings of a workshop sponsored by the U.S. Environmental Protection Agency (Cummings et al 1986), a monograph by

¹ An excellent overview of the approaches for measuring economic preferences for public goods is provided by Pommerehne (1987).

² The term public good as used here only refers to a good provided by government. It does not necessarily indicate that the good is excludable or subject to congestion.

³ For classic economic interpretations of voting see Bowen (1943) and Deacon and Shapiro (1975).

Mitchell and Carson (1989), a panel report commissioned by the U.S. Department of Commerce through the National Oceanic and Atmospheric Administration (Arrow et al. 1993), a special issue in the Journal of Economic Perspectives (Portney 1994), the proceedings of a workshop sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy (Bjornstad and Kahn 1996), and a special issue in the Journal of Risk and Uncertainty (notably McFadden 1999). Inside the environmental economics community, the scepticism about the method resounding in the earlier “reference operating conditions” (Cummings et al., 1986, p. 104) gave way to a vague optimism and claims that “CV findings can be meaningful” (Mitchell and Carson, 1989, p. 171) and that “CV studies convey useful information” (Arrow et al., 1993, p. 4610). The Exxon Valdez oil spill in 1989 highlighted the potential relevance of the method for litigation and public policy and triggered the phase of intensive research on stated preference methods that continues to this day.

The theoretical foundations referred to in contingent valuation research are the standard theory of consumer choice and the theory of public goods (e.g. Fisher 1996, p. 19). An individual utility function is represented as:

$$u(x, z), \tag{1}$$

where x is a vector of market goods and z is a vector of environmental goods. It is assumed that the individual maximizes utility by choosing among the market goods. The problem is

$$\max u(x, z) \quad \text{s.t. } p x = y, \tag{2}$$

where p is a vector of prices and y is disposable income. The constrained optimization yields ordinary demand functions

$$x_i = h_i(p, z, y) \quad i = 1, \dots, n \tag{3}$$

where i indexes the i th market good. The indirect utility function is then defined as the maximum utility that can be attained given income and prices,

$$v(p, z, y) = u[h^*(p, z, y), z]. \tag{4}$$

Suppose that one element z of the z vector is increased, with no change in any of the other elements, prices, and income. Indicating states before and after the increase with superscripts 0 and 1, respectively, one can write $z^1 > z^0$ and

$$u^1 = v(p, z^1, y) > u^0 = v(p, z^0, y) \quad (5)$$

The compensating variation measure of the utility change can be represented in terms of the indirect utility function,

$$v(p, z^1, y - c) > u^0 = v(p, z^0, y) . \quad (6)$$

The compensating variation measure, c , is the amount of money that, if extracted from the individual after the change in z from z^0 to z^1 , will leave him or her just as well off as before the change. Since the environmental good is a public good, total willingness to pay for the change is given by aggregating over individuals. This framework encompasses passive-use value, since utility is not limited to utility from *using* z .

In the typical case of the dichotomous-choice question format, the response model can thus be written as in economic models of voting, with the implicit willingness to pay derived from the yes and no choices (e.g. Deacon and Shapiro 1975),

$$\begin{aligned} \text{if } & v(p, z^1, y - c) > v(p, z^0, y) && \text{vote yes} \\ \\ \text{if } & v(p, z^1, y - c) > v(p, z^0, y) && \text{vote no} \\ \\ \text{if } & v(p, z^1, y - c) = v(p, z^0, y) && \text{indifferent} \end{aligned} \quad (7)$$

The implicit behavioural assumption of the model is that, apart from random error, the respondents “know their preferences” and that they do not have (or realize) an opportunity to make a gain from answering strategically. The validity of these assumptions in stated choices about public goods with their peculiar cognitive demands and incentive properties has not been established empirically (McFadden 1999). These untested assumptions of the behavioural model are arguably a central weakness of the approach.

Other, perhaps comparatively minor, issues of the theoretical framework concern (among others) the appropriate choice of measure of value (willingness to pay or willingness

to accept) (Hanemann 1991, Horowitz and McConnell 2002, 2003) and how externalities in consumption (such as altruistic preferences) should be taken into account.

3. Research gaps and research strategy

3.1. Status of research by the turn of the century

Some of the most authoritative criticisms of the contingent valuation (CV) approach are expressed in Kahneman and Knetsch (1992), Diamond and Hausman (1994), Green et al. (1998), Kahneman et al. (1999), McFadden (1999), and McFadden (2001). This criticism is grounded in *internal* validity tests. For instance, McFadden (1994) found that stated willingness to pay for 57 nature reserves was only about 50 percent higher than willingness to pay for a single nature reserve. However, this and similar results by Boyle et al. (1994) turned out to be elusive, since they can always be rationalised using a decreasing marginal utility argument (see e.g. Hanemann 1994). *External* validity tests of stated preferences for the collective provision of public goods were not available (Schläpfer, Deacon and Hanley 2005). The conventional wisdom in environmental economics was simply that there is no opportunity to validate stated preferences for public goods.

The unsatisfactory intellectual state of affairs around the turn of the century is nicely illustrated by the following observation: Asked to explain why stated preferences for public goods fail to produce widely accepted estimates of value, many researchers in the field would answer that this is due to the non-binding nature of the choices. Somewhat surprisingly, it had escaped their attention that non-binding referendum decisions such as pre-election polls conducted only days before a referendum typically produce very good predictions of actual voting, while stated preference responses about unfamiliar (private) goods were typically far off the mark. This simple paradox showed that a consistent explanation of “hypothetical bias” was lacking. Important gaps in the literature at that time can be summarised as follows.

(1) *Lack of external validity tests for public goods.* – All previous empirical research on the “external validity”⁴ of contingent valuation had involved private goods or donations to public goods, despite the fact that the interest of the method in environmental economics comes from its potential ability to elicit preferences for collectively provided public goods

⁴ External validity refers to comparisons of stated values with decisions involving actual payments.

and services (Bjornstad and Kahn 1996). Not a single study had compared CV responses with voting behaviour in a subsequent referendum, in spite of a prominent recommendation to do so (Arrow et al. 1993; see section 4.1). Furthermore, not a single study had tried to compare estimates of parameters such as the income elasticity in CV surveys with estimates from referenda, although income elasticities from surveys had long been suspected of being too low to conform with economic theory (e.g. McFadden 1994; see section 4.2).

(2) *Widespread misperception of the incentive compatibility issue.* – The most authoritative writings on CV claimed that in dichotomous choice questions, respondents have no incentive to misrepresent their values (Mitchell and Carson 1989, Arrow et al. 1993, Hanemann 1994). This presumption, which seems to be based on the assumption that all respondents equate the (random) costs presented in dichotomous-choice questions to the true costs if the policy is implemented, thus became conventional wisdom in textbooks (see e.g. Ward 2006, p. 182) and leading environmental economic journals such as *Land Economics* and the *Journal of Environmental Economics and Management* (see e.g. Champ et al. 2002, Horowitz and McConnell 2002; see section 5.1).

(3) *Limited links to the positive analysis of choices about unfamiliar goods.* – There was an almost general lack of reference to empirical work on *how* individual make choices about unfamiliar public goods. Although a few critical authors had noted that voters in referenda base their decision on a wide range of information sources from the political debate (e.g. Baron 1996, Shapiro and Deacon 1996), no one had pursued this line of research. The connection to the political science literature on preference formation in voting decisions (e.g. Lupia 1994) was not made. And although the “quality uncertainty” of proposed public goods places the survey respondent in a similar situation as a buyer of a used car, a link to the literature on asymmetric information had not been established (e.g. Akerlof 1970, Milgrom and Roberts 1986; see section 5.2).

(4) *Lack of ideas to solve the problems of the behavioural model.* – Apart from “cheap talk” designs (Cummings and Taylor 1999) and *ex-post* corrections of bias by “calibration” (Arrow et al. 1993) and other statistical adjustments (Herriges and Shogren 1996), there existed virtually no ideas for addressing the problems of the behavioural model. The most important recent innovation was perhaps the application of attribute-based conjoint analysis to choices about public goods (Adamowicz et al. 1998, Hanley, Wright and Adamowicz 1998, Schneider and Zweifel 2004; see section 6). Most of the established scholars were preoccupied with work to improve the statistical methods for analysing stated choices.

3.2 Research strategy 2001-2007

Given these gaps, I saw excellent opportunities to cover new ground between the literature on voting behaviour and the literature on stated preferences for public goods.

My basic strategy was to use information from public referendum processes in Switzerland as a major “control” and source of null hypotheses in analyzing how individuals respond to referendum-type contingent valuation surveys. There were three main reasons for this choice. First, the ultimate objective and *raison d’être* of contingent valuation in environmental economics is the estimation of passive use values – those values no other standard valuation method can possibly measure (e.g. Bjornstad and Kahn 1996). Only voting, the closest substitute of consumer choice in decisions about public goods (Bowen 1943), can serve as a criterion to establish or reject the validity of stated passive use values. Second, the NOAA panel on contingent valuation (Arrow et al. 1993) and other authoritative voices in the field had long advocated the public referendum as a blueprint for survey design and a potential paradigm for validity tests involving public goods. Finally, I saw excellent opportunities for external validity tests based on datasets from Swiss referenda. In spite of the recommendation by the NOAA panel and other scholars, no one had seriously pursued this approach.

Details of the research agenda developed mostly during the first two years of my research, between 2001 and 2003. The main creative task was to devise experimental protocols that would allow me to conduct first field tests of critical hypotheses about stated preferences as applied to *public goods*. Finally, after *explaining* why stated preferences in standard surveys do not predict actual votes, I used the referendum blueprint again, this time as a source of inspiration in *solving* the two longstanding problems, viz. the incentive compatibility issue and the question how to appropriately provide scenario information in surveys about public goods.

4. Do contingent valuation surveys predict preferences revealed in collective decisions?

4.1. Willingness to pay in voting decisions and surveys

According to the prestigious NOAA panel on contingent valuation (Arrow et al. 1993),

“...the ability of CV-like studies to predict the outcomes of real-world referenda would be useful evidence on the validity of the CV method in general. The test we envision is not an election poll of the usual type. Instead, using the referendum format and providing the usual information to the respondents, a study should ask whether they are willing to pay the average amount implied by the actual referendum. The outcome of the CV-like study should be compared with that of the actual referendum. The panel thinks that studies of this kind should be pursued as a method of validating and perhaps even calibrating applications of the CV method.”

By the turn of the century, no one seemed to have taken this recommendation of the NOAA panel seriously.

The first research project of this thesis started with a fortunate coincidence. A PhD student at the Department of Agricultural Economics of the ETH Zurich had conducted a referendum-type CV survey to estimate citizens' willingness to pay for landscape protection in the canton of Zurich, Switzerland (Roschewitz 1999). Three months later, the citizens of the canton were called to vote on a proposed increase of the canton's annual budget for nature and heritage protection by 10 million Swiss Francs. Using the survey data, the aggregate vote records and the data from a voter survey, I had the opportunity to make the first comparison of willingness to pay in a survey with (implicit) voter willingness to pay for virtually the same public good.

Two main conceptual issues had to be resolved. First, the comparison could not be a fully controlled comparison of hypothetical *vs.* actual choices as in previous studies about hypothetical *vs.* actual choices about *private* goods. There were many other differences between the two preference elicitation approaches, notably with regard to sources of information. Our conclusion was that these differences were *inherent* characteristics of the two different elicitation approaches. In voting-based tests of the external validity of CV, controlling these differences is neither possible nor desirable. The second conceptual issue concerned how point estimates of willingness to pay could be derived from aggregate voting returns in a financing referendum. Using a rationale that is related to the median voter model of public choice theory (Borcherding and Deacon 1972), we developed a framework for this task

(Schlöpfer, Deacon and Hanley 2005). This amounted to the first external validity test of a contingent valuation survey about a public good with passive use world-wide. The outcome of this test was troubling. In Schlöpfer, Roschewitz and Hanley (2004) we report the results from an in-person comparison of contingent valuation survey responses and subsequent voting behaviour. A substantial proportion of the survey responses were not consistent with self-reported actual voting decisions, suggesting an upward bias of stated willingness to pay. The official aggregate vote records made it clear that these results cannot be explained by errors in self-reported votes. In Schlöpfer and Hanley (2006), we use the framework developed in Schlöpfer, Deacon and Hanley (2005) to contrast stated willingness to pay with willingness to pay inferred from aggregate voting returns and tax liability distributions which were available from standard sources. We find that stated willingness to pay exceeds voter willingness to pay by an estimated 560 percent to 4,900 percent, depending on whether extremely or less conservative assumptions are applied.

4.2. Determinants of willingness to pay in voting decisions and surveys

In addition to comparing willingness to pay between votes and surveys on the same issue and among the same population, it is also of interest to compare *determinants* of willingness to pay for public goods between surveys and votes. Of particular interest is the *income elasticity* of willingness to pay, since these estimates have potentially important implications for the financing of public goods. Specifically, they indicate how the costs of a policy may be distributed across incomes to secure broad political support in a democratic system. Income elasticity estimates reported in contingent valuation studies tend to be much smaller than those found in the literature on collective choice (Borcherting and Deacon 1972). They are typically around 0.3, while economic intuition and estimates of *demand* elasticity from the collective choice literature rather suggest a value around 1 or even higher. This disparity has received surprisingly little attention by environmental economists.

Flores and Carson (1997) rationalize this discrepancy by showing that theoretically the income elasticity of *demand* and of *willingness to pay* for a good may differ widely. Voting-based estimates of the elasticity of willingness to pay were not available at the time. The available studies analyzing environmental votes did either not include income among the regressors or were concerned with regulative rather than financing proposals (Deacon and Shapiro 1975, Fischel 1979). To estimate the voting-based income elasticity of willingness to

pay (rather than of demand) environmental financing decisions with approximately known tax consequences must be observed.

In a series of research projects, we thus examined the income elasticity of aggregate vote proportions in Swiss environmental financing referenda. Given a proportional or progressive relevant tax schedule, a positive sign on income in voting regressions would suggest an elasticity greater than 1. Our analyses of voting decisions on the financing of landscape management and river restoration indeed suggest an income elasticity of willingness to pay in excess of 1 (Schlöpfer and Hanley 2003, Schlöpfer and Witzig 2006, Deacon and Schlöpfer 2007). Furthermore, in an application of the median voter model (Borcherding and Deacon 1972) to cantonal expenditures for landscape management in Switzerland, we also find that the income elasticity (of demand) exceeds 1 (Schlöpfer 2007a). Finally, in a meta-analysis of income effects in surveys. The evidence suggests that low income elasticity estimates are an artefact of the method (Schlöpfer 2006c).⁵

In two further papers we examine how *distance* to policy sites affects willingness to pay (for river restoration) in a survey (Hanley, Schlöpfer and Spurgeon 2003) and in a vote (Deacon and Schlöpfer 2007). Stated willingness to pay for a single-river project was found to decrease with distance. However, aggregate values based on the distance–willingness-to-pay relationship were not compatible with aggregate stated willingness to pay for an all-rivers restoration programme. The voting behaviour was sensitive to the ecological status of local rivers. However, as in the survey, the voting did not relate to the number of affected river miles in the ways economic theory would predict.

5. Why do contingent valuation surveys fail to predict preferences revealed in collective decisions?

Our voting-based external validity tests (section 4) showed that stated preferences for public goods fail to predict voting choices in terms of both willingness to pay values and important explanatory patterns.

There seemed to be two main potential explanations for the observed “hypothetical bias”: (i) the hypothetical nature of the costs presented in the surveys (i.e., *not* the hypothetical nature of the proposed good) and (ii) the absence of cues such as the stances

⁵ These patterns also suggested a behavioural explanation of the low values found in surveys (see section 5.3).

adopted by major parties or other information providers from which respondents could glean a decision. The implications of these issues are discussed in a paper which I submitted to the European Conference of Environmental and Resource Economists. Furthermore I submitted a commentary paper to *Land Economics*, in which the implications of the hypothetical costs for the incentive compatibility of survey questions about public goods are expounded.⁶ In the winter of 2002/2003, I designed two field experiments to address the two possible explanations of bias in CV studies.

5.1. Experiment on the role of incentive compatibility

In the standard referendum survey format, the costs or “price” of the proposed policy is randomly assigned to respondents (see e.g. Arrow et al. 1993). A typical interval for the cost figures presented in these “random bid” designs is between \$1 and \$500. Hence, the cost figure presented to an individual respondent does not necessarily correspond with his or her expected value if the policy is actually implemented. For instance, a student may be confronted with a hypothetical tax increase of \$500 for some minor public good improvement. In this situation, a respondent who “knows his interests” and is able to form consistent beliefs about his or her willingness to pay relative to the mean (or median) value of the survey can make a gain by answering strategically (Green et al. 1998, Schläpfer and Bräuer 2007). We thus use a field experiment to explore the potential for a new “theoretically incentive compatible” wording of the valuation question as theoretically developed by Green et al. (1998). The results are negative (Schläpfer and Bräuer 2007), suggesting that simple manipulations of the wording are not able to induce demand revealing responses about hypothetical proposals. The only way to reliably suppress strategic answering thus seems to be to avoid strategic opportunities by presenting policies with credible cost figures, as implemented for the first time in the experiments that are presented in the following section.

⁶ Both papers were rejected. From this experience, I concluded that empirical evidence is needed to make the point. Only years later, I learned that at least the comment to *Land Economics* had not gone down entirely unnoticed, as it is now cited in a paper on the history of contingent valuation by Smith (2006) and in Flores and Strong (2007).

5.2. Experiments on cognitive limitation and the role of simplified heuristics

There exists correlation evidence from political scientists showing that apparently rational voting in referenda hinges on simplified heuristics based on “information shortcuts” such as knowledge about the positions of major political parties (Lupia 1994, Lupia and McCubbins 1998, Bowler and Donovan 1998). However, the role of such heuristics had not yet been experimentally examined in a setting involving real policy issues and political institutions. In the second strand of experimental research, we therefore conducted experiments to investigate the effects of knowledge of party positions in choices about complex policy proposals.

In Schläpfer, Schmitt and Roschewitz (2007), we present a field experiment in which the control treatment is a standard attribute-based stated-preference survey, usually referred to as “conjoint analysis” or “choice experiment” in the literature (e.g. Louviere et al. 2000), although with one important distinction. The costs of the proposed (land use) policies are formulated as a *percentage* change in taxes, rather than as the usual money amounts (see section 5.1).⁷ This formulation allowed us to solicit one-fits-all voter recommendations from a range of relevant national-level political parties and interest groups, which were included with a subsample of the (mailed) survey. This novel field approach was successfully implemented in that most of the parties and interest groups contacted cooperated in the experiment (see Appendix in Schläpfer, Schmitt and Roschewitz 2007).

The main results of this first experiment are as follows. Relative to the control group, non-response in the valuation questions dropped by about 40% percent when the respondents had access to party positions; mean estimates of willingness to pay for the public goods dropped by about 50 percent. Figure 1 presents the implicit willingness to pay for major land uses obtained from respondent groups with and without access to the party positions. Furthermore, the responses from urban, periurban and rural subsamples tended to be more in line with these populations’ voting behaviour in recent decisions about similar public goods (Schläpfer, Schmitt and Roschewitz 2007).

⁷ This formulation of the costs also had important further implications as explained in section 5.3.

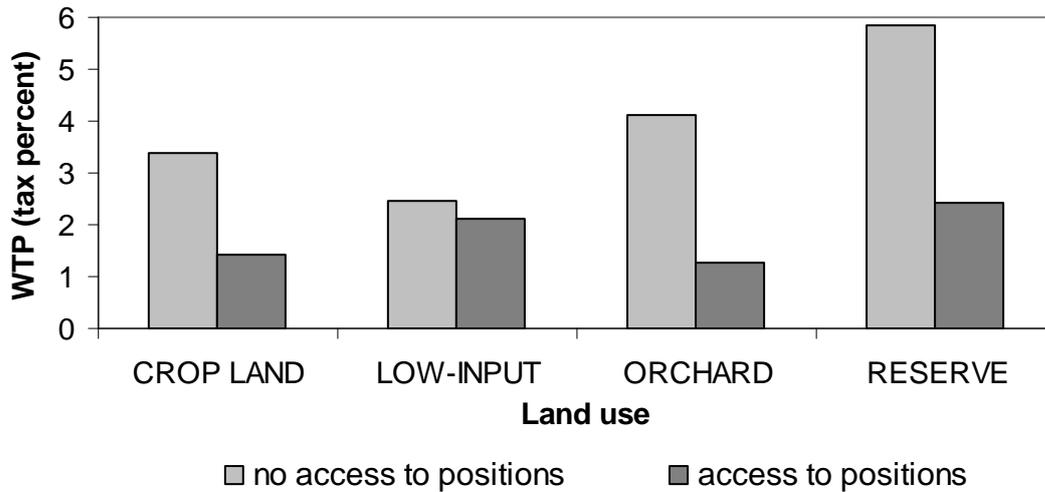


Figure 1. Stated willingness (WTP) for conversion of high-intensity grassland to the alternative uses crop land, low-input agriculture, orchards including hedgerows, and nature reserves. Only the data for the taste group who stated to generally prefer “more” public spending for landscape management is shown (data from Schläpfer, Schmitt and Roschewitz 2007).

In Schläpfer and Schmitt (2007) we orthogonally combine access/no access to party positions with a treatment designed to detect “anchoring” effects. Anchoring effects relate to uninformative cues. For example, the cost figures presented in dichotomous-choice questions should not be relevant for willingness to pay responses (e.g. Green et al. 1998). However, the cues offered significantly affected the survey responses. The results further suggest that heuristics based on *informative* cues – the party positions – can “crowd out” *non-informative* cues such as the random cost figures presented in the survey. This finding demonstrates that our survey approach using party positions may help resolve longstanding problems with cognitive limitation in surveys about unfamiliar public goods. In additional analyses of the two experiments described so far, we examined how individual tastes for the public good (in terms of preferences for more or less spending on them) interact with party information (Schläpfer 2006b, Schläpfer 2007b). These analyses cast new light on how voters and survey respondents map from tastes (or ‘attitudes’, to use the term of the psychologists) into the preferences observed in surveys and votes (cf. Baron Kahneman et al. 1999, Ariely et al. 2003).

In Schläpfer and Soliva (2007), we report a third field experiment that examines how the party positions affect respondent groups with different (self-reported) party preferences. We find that voter groups with widely differing political orientation modified survey

responses when the raw information about the policy proposal was supplemented with voter recommendations from major parties and interest groups (Figure 2).

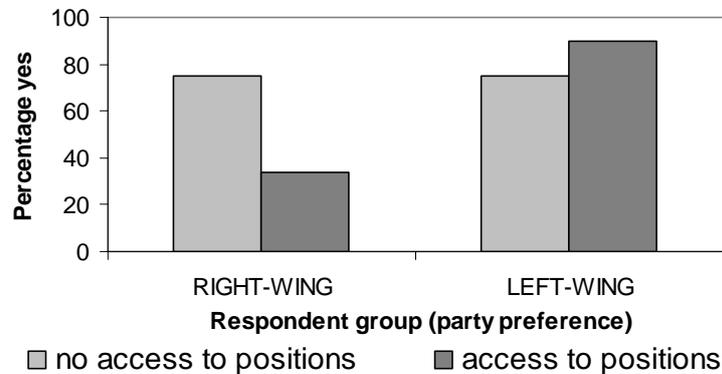


Figure 2. Percentage voting yes on a proposed agricultural support programme to prevent further land abandonment in the Swiss Alps (data Schlöpfer and Soliva 2007).

These results demonstrate that the respondents were able to “vote their preferences” on the (environmental) policy issue only when they had access to the party positions but not otherwise (which is the standard survey format). In this study we also propose an interpretation of the results in the context of asymmetric information and signalling. In this interpretation, the party positions reduce quality (and benefit) uncertainty in policy proposals involving unfamiliar public goods.

5.3. Hypothetical prices, simplified heuristics, and income elasticity in surveys

There are further implications of the percentage-change-in-taxes formulation of the costs referred to above. A first consequence of the formulation is that the costs of the proposed policy must remain within a range of credible amounts to reduce opportunities for answering strategically (see section 5.1). A second consequence regards the implications of potential “anchoring” and “updating” behaviour in surveys (McFadden 1994, Flores and Strong 2007). In Schlöpfer (2006c) and in Schlöpfer and Bräuer (2007) we discuss these consequences. Since anchors in the form of hypothetical cost figures in standard surveys are the same for high and low incomes, they cause willingness to pay values of high and low incomes to converge. In the updating case, high incomes with their high expected tax bills will update the

hypothetical cost figures upward and essentially answer a different question than that posed by the researcher. However, when the costs are presented as a realistic percentage change in taxes, updating behaviour is less likely. Therefore, anchoring (and any updating) behaviour will not be systematically correlated with respondent income (Schlöpfer 2006c, Schlöpfer and Bräuer 2007). Hence, compared to the standard format, the control treatment in our experiments have desirable properties with regard to incentive, anchoring, and updating problems.⁸

To sum up, our findings suggest the following consistent explanation of hypothetical bias in the contingent valuation of public goods. As Lupia (1994) and other political scientists concluded from their evidence, voters use simplified heuristics based on informative cues from competing, reputable information providers to make choices about unfamiliar public goods. Left to their own devices, i.e. in self-contained surveys, many respondents “do not know their preferences”, which explains well-known empirical phenomena such as inflated willingness-to-pay values (Schlöpfer and Hanley 2006) and “insensitivity to scope” or “part-whole bias” (Boyle et al. 1994, Hanley, Schlöpfer and Spurgeon 2003). In addition, many respondents anchor their choices on non-informative cues such as the hypothetical costs presented (e.g. McFadden 1994, Schlöpfer and Schmitt 2007). Finally, many do not believe that the presented cost figures correspond to the costs if the policy is implemented (Champ et al. 2002) and may update these figures, based on knowledge of their true annual tax bill (Flores and Strong 2007). Logically, the direction of any anchoring or updating is then systematically correlated with respondent income, causing income effects observed in stated preference surveys to be biased downward (Schlöpfer 2006c, Schlöpfer and Bräuer 2007). Hence, all of the major “anomalies” observed in the contingent valuation of public goods can be ultimately traced to the random-cost design in combination with the lack of informative cues that serve as a basis for simplified heuristics (Schlöpfer 2006a). It is difficult to escape the conclusion that these findings importantly modify the existing paradigm in contingent valuation research.

⁸ For the experiments reported in section 5.2, this desirable control was rather a “disadvantage”, of course, because it would tend to reduce the effect of the party positions. On the other hand, it provided an interesting testable hypothesis: the hypothesis that the income elasticity estimates in our new experiments should be similar to those in voting decisions (and different from those in standard surveys). The data analyses nicely confirmed this expectation. The income elasticity estimate in Schlöpfer, Schmitt and Roschewitz (2007) is about 1.

6. Conclusions

6.1. Contingent valuation research

The NOAA panel report on contingent valuation – the most authoritative guideline for contingent valuation research – suggests the public referendum as a blueprint for survey design (Arrow et al. 1993). Ironically, the panel failed to acknowledge the central implications of the blueprint for survey design. With regard to the information issue, the conclusion would be to give the survey respondents access to a similar competitive information environment as voters are “given” in actual elections. With regard to the incentive issue, the conclusion would be to use referendum questions involving *credible* costs – and thus minimal opportunities for strategic answering.

The chapters of this thesis show that the current paradigm in the contingent valuation of public goods is deeply flawed. More surprisingly to economists, the standard explanation of bias in stated preferences for public goods – the non-binding nature of the responses – appears to be flawed as well. As mentioned in section 3.1., voter polls conducted shortly before a ballot reliably predict voting outcomes despite the fact that decisions are non-binding. The failure of stated preferences to predict votes can be usefully decomposed into three distinct problems: (i) cognitive limitation of respondents, (ii) policy costs that differ from expected costs if the policy is actually implemented and (iii) lack of motivation on the part of respondents to carefully consider the issues presented. The non-binding nature of the decision is not among them.

In Schläpfer (2006a) we present the good news. Preference elicitation procedures for public goods can take forms that are fundamentally different from those currently known as “contingent valuation”. Each of the distinct problems of the standard approach finds its specific solution. The evidence presented in this thesis points to a new survey paradigm in which cognitive limitations and strategic and motivational incentives are taken into account in much the same ways as in real voting decisions (Schläpfer 2006a) as follows.

(1) For tax-financed public goods, the costs in dichotomous-choice questions should be specified as a percentage change in taxes. The cost figures should be within the range of the expected tax increase if the good is actually provided.

(2) The questions should be formulated as a policy referendum. A sub-sample of the respondents should be offered access to information about the positions of reputed policy

experts with known and widely different political orientation. This information must be solicited based on the original, final questionnaire. Organizations refusing to provide their positions should also be mentioned in the information supplied to the respondents. The comparison of survey responses with and without the party information then provides a check of how well the isolated choices predict the decisions in a vote with competing information providers.

(3) The no-vote option should be salient. Due to the special legitimacy of public votes, response rates higher than typical turnouts in actual votes are unlikely to improve the political or legal standing of the survey results. In this light, the goal in surveys may rather be to obtain a sampling bias similar to that in actual voting decisions.

This new survey paradigm promises to solve most if not all of the major known problems of conventional contingent valuation surveys (cf. Bjornstad and Kahn 1996). At least partly, it eliminates the severe restriction on the sources of information available to the respondents; it breaks up the information monopoly of the researcher; it presents the costs of the good as a credible change in taxes or other payments rather than as often incredible absolute amounts; it thereby greatly reduces the possibility that respondents do not believe the costs presented in the survey and hence their opportunity for strategic answering; and it provides incentives for a careful survey design and administration due to the increased publicity of the survey process.

Ongoing and planned research will show if this approach holds the promise of providing consistent and policy-relevant estimates of consumer values for public goods and services. Although we applied the new survey approach in Switzerland, its primary potential is clearly to survey preferences where the political setting usually prevents citizens from directly influencing political decision-making. Examples include autocracies, representative democracies with a tendency towards entrenched party politics, or international organisations entrusted with the provision of public goods. The survey approach can thus be seen as a promising new avenue among recent attempts to widen the perspective in the valuation of public goods (Frey and Stutzer 2002, van Praag and Baarsma 2005).

6.2. Other fields of research

The research presented in this thesis is heavily focused on contingent valuation. However, by extending the experimental analysis of individual decision-making to collective decisions about public goods, it also contributes to knowledge in a number of other fields. The

empirical insights contribute to the research on preference formation in psychology (e.g. Payne et al. 1999, Ariely et al. 2003), economics (e.g. McFadden 1999) and the political sciences (e.g., Lupia and Matsusaka 2004); they enrich economic models of voting and their interpretation (e.g. Deacon and Shapiro 1975); they complement previous evidence on bounded rationality and deliberation costs (e.g. Conlisk 1996); and they suggest an interesting interpretation of the political market mechanism in the light of asymmetric information and signalling (e.g. Stiglitz 2002). Furthermore, the novel two-stage survey approach opens up new opportunities for experimental studies of human behaviour involving complex public goods and payoff structures that are not individually understood by the subjects. In the following I offer some conclusions for related fields of inquiry.

Economic models of voting.—Our findings suggest that previous economic models of voting are incomplete in the sense that they do not explicitly account for the role of contextual information generated by non-voting political institutions such as parties and public debate (Schneider 1985, Piketty 1999). Incompleteness of the model may not have any major drawbacks as long as the analysed political system provides access to reasonably reliable signals (Lupia and Matsusaka 2000, Druckman 2004). This condition may be approximated in the competitive information environments of voting decisions in Switzerland, the United States, or other jurisdictions where the complementary institutions have evolved over time. However, our results suggest that it may be necessary to extend the model in situations where reliable signals cannot be taken for granted. The perspective of our experiments may thus also contribute to the emerging field of behavioural public finance (Cafferey and Slemrod 2006).

Preference formation.—Research on social psychology and public opinion has identified a number of empirical regularities on how people form preferences in the political and social spheres (Druckman and Lupia 2000, Murphy and Shleifer 2004, Druckman 2004). However, for the important empirical context of collective decisions about public goods, the current empirical evidence bearing on these regularities rests on observational, or correlative, studies. In these studies, the role of the contextual factors is potentially confounded with individual characteristics. To separate the effects of the contextual factors and the individual characteristics, it is necessary to conduct experiments in which the contextual factors of interest are fully controlled for. The studies reported in section 5.2 provide the first such experiments in a setting with real policy issues and political institutions. In the light of psychological research, these experiments show for the first time how voters use heuristics to map from individual attitudes into dollar preferences (Kahneman et al. 1999). The experimental approach also goes a decisive step in the direction of McFadden's (1999)

suggestion that “careful attention to the processes that consumer use to define tasks and construct preferences may allow one to look behind the superficial errors to uncover stable principles, attitudes, and preferences up which a new economic analysis might be built”. Furthermore, the responses in the experiments demonstrate a similar pattern of “coherent arbitrariness” as Ariely et al. (2003) have demonstrated with private goods, suggesting that the role of party positions in preference formation parallels that of prices in competitive markets (cf. Lupia and Matsusaka 2004).

Asymmetric information and political markets.—Confronted with examples of bounded rationality, economists tend to rescue standard theory by putting the bound on information instead (Conlisk 1996).⁹ Such an interpretation can also be applied to our experimental results (Schlöpfer and Soliva 2007). In this perspective, the party positions integrated in our experiments take on a role that is similar to the role of signals in the literature on asymmetric information (Akerlof 1970, Riley 1975, Stiglitz 2002). In choices about public goods, the problem of quality uncertainty is pervasive, and signalling by reputable, competing information providers may be necessary for political markets to function. This interpretation of signalling can thus be seen as a simple extension of the analysis of asymmetric information to public goods and political markets. This said, the study by Schlöpfer and Soliva (2007) also suggests that quality uncertainty alone may hardly suffice to explain the confusion of isolated voters confronted with those complex land use policies. Information costs and bounded rationality are intimately connected (Conlisk 1996), and this is nicely demonstrated by the effects of the party positions on item non-response rates in our experiments.

Rationality and institutions.—It is well known that there are critical physiological limits on human cognition (e.g. Simon 1955); on the other hand, individuals are known to often act approximately “as if” unboundedly rational (e.g. Friedman 1953). The constructive question about bounded rationality is *when* and *why* bounded rationality is likely to be important (Conlisk 1996, Smith 2004, Camerer and Fehr 2006). Referendum voting is a context in which individuals act “as if” unboundedly rational, while contingent valuation is a context in which they do not. Perhaps nowhere is bounded rationality more striking than in our experiments on the use of heuristics. Institutions can heal psychological anomalies (e.g. Frey and Eichenberger 1994, Slembeck and Tyran 2004). However, research presented in this

⁹ Indeed, the preference for the information bound appears to have been the main reason why a reviewer of the *Journal of Public Economics* rejected the paper Schlöpfer (2007b).

thesis demonstrate that it would be foolish to assume that appropriate institutions can be taken for granted in all settings of economic importance.

“Induced-information” experiments.—The two-stage survey approach, in which a first stage of the experiment is used to generate the information environment of the second-stage, opens up new avenues for experimental research. It may allow crucial extensions from laboratory games and markets for chocolate bars and sports cards to decisions about those complex public goods in which policy makers are typically interested and where leadership and heuristics based on signals from better informed individuals play a key role (Schlöpfer and Schmitt 2007, Cavalcanti 2007).

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