

Bateman, Ian; Dupont, Diane

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**Political Affiliation And Willingness-To-Pay
For Publicly Versus Privately Provided
Environmental Goods**

by

Ian Bateman and Diane Dupont

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Political Affiliation And Willingness-To-Pay For Publicly Versus Privately Provided Environmental Goods

Ian J. Bateman†

Diane P. Dupont*

† Centre for Social and Economic Research on the Global Environment (CSERGE)
School of Environmental Sciences, University of East Anglia
Norwich UK, NR4 7TJ
+44 (0)1603 593 125
i.bateman@uea.ac.uk

* Department of Economics, Brock University
500 Glenridge Avenue, St. Catharines, Ontario, Canada, L2S 3A1
905.688.5550 x 3129
diane.dupont@brocku.ca

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Keywords: stated preference, public provision, private provision, valuation, political affiliation, water

Ian Bateman is a Professor in the School of Environmental Sciences, University of East Anglia, UK and Diane Dupont is a Professor in the Department of Economics, Brock University, Canada.

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Political Affiliation And Willingness-To-Pay For Publicly Versus Privately Provided Environmental Goods

ABSTRACT

Previous literature has found that politically conservative individuals express a lower willingness-to-pay (WTP) for environmental goods than left-wing supporters. Using data from three surveys valuing water we investigate the role of context by evaluating whether the means of provision (public or private) matters. While left-wing voters have higher WTP for publically provided public goods, right-wing voters have a higher WTP when a good is privately provided. Our findings have implications for values typically obtained for environmental public goods using survey data from constructed markets since scenarios typically describe improvements as being publically provided.

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I. INTRODUCTION

This paper examines the role that political ideology may play in stated preference survey valuation. Social surveys conducted across a number of countries have reported that individuals who support mainstream left-wing parties, such as British Labour and Liberals and American Democrats, are much more likely to be willing to pay higher taxes or prices in order to reduce environmental damage than self-reported right wing supporters such as American Republicans and British Conservatives (Francken, 1986; Neumayer, 2004). The implication is that left-wing voters care more about public goods and environmental issues than right-wing voters and are, thus, more likely to express higher WTP values in valuation surveys. Previous research on preference elicitation, however, has reported that results are sensitive to context and framing (Tversky and Kahnemann, 1981; Mitchell and Carson, 1989; Vatn, 2004; Spash, 2006). This paper investigates the interaction between political views, stated WTP, and the means by which a good is provided (privately or publically). Right wing parties are typically supporters of private property and in favour of a laissez-faire approach to government. Their economic policies have tended to eschew government intervention in favor of market solutions. This suggests that right-wing voters may have a lower stated WTP for a publically provided environmental good than if the same good were privately provided.

In order to investigate this issue of political ideology, means of good provision, and valuation it is necessary to choose a good that can be provided in a variety of ways. Water, as an environmental resource, provides an interesting opportunity to investigate the extent to which survey respondents may provide responses in accordance with ideological or political views. Water resources can provide pure public goods (e.g., biodiversity supported by lakes, rivers and wetlands), collective goods (e.g., improvements in tap water quality undertaken at the waterworks), or private goods (e.g., bottled water, home filtered or treated water). Moreover, insofar as tap water quality is concerned, improvements can be privately undertaken (e.g., through household purchases of water filtration or softeners) or collectively provided (e.g.,

through increasing tariffs to undertake system-wide improvements). Environmental improvements that are water-related have long been the focus of valuation research efforts (Desvousges et al, 1987; Mitchell and Carson, 1989).

After reviewing the literature on how political views may be expected to result in predictable differences in willingness-to-pay values for left and right-wing respondents, we discuss a number of testable hypotheses. We then provide details on the surveys conducted to investigate these issues and report on our estimation results. We find significant results that are consistent with our maintained hypotheses regarding differences in left-wing and right-wing values. Specifically, respondents who self-identify as right-wing voters express higher WTP for environmental goods when they are privately provided and left-wing voters have higher WTP for publically provided environmental goods.

II. LITERATURE REVIEW

Using the scale created by the Comparative Manifesto Project (CMP), British Labour and Green parties are classified as left-wing while the Liberal party is centrist and the Conservative party is right-wing.¹ Using the same scale, the American Republican Party is seen as the party of the right while the Democratic party is viewed as being to its left, although probably it would be seen as more centrist when compared to the British parties of the left (McDonald et al. 2007). A number of different strands in the literature have illustrated how left- and right-wing differences manifest themselves, beginning with social surveys of respondents' expressed desires or preferences about public spending. Lewis and Jackson (1985) surveyed over 900 respondents in Great Britain to obtain views on how support for different types of public expenditures varied by social class and self-reported intended political party support.² They found general support for increasing (government) expenditures by individuals who said they intended to vote Labour, with lesser support for this view by those intending to vote Liberal and

the least support for spending being amongst Conservatives. Interestingly, they found that these political differences were more marked than social-class ones.

Francken (1986) found remarkably similar results in a representative sample survey of the Dutch population. He asked respondents about their views on preferences regarding public spending on four public services (public transportation, legal services, foreign aid and hospitals). Individuals who identified themselves as left-wing supporters tended to report that spending on all four categories was too low while right-wing supporters generally said that it was too high. Voters for the centre party thought that expenditures were “about right”.

It is noteworthy that environmental spending was not considered to be worthy of meriting a separate spending category of its own during the 1980s in these social surveys of spending preferences in Britain and the Netherlands. In contrast, there was a great deal of interest expressed in the United States during the 1970s-80s on the importance of preserving environmental quality.³ In particular, Tognacci et al. (1972) provided evidence that American Democrats expressed an elevated degree of concern over environmental quality and ecology when compared with Republicans. Dunlap's (1975) work supported this finding and also found that Republican and Conservative supporters consistently had lower rates of pro-environmental attitudes and actions than Democrat and Liberal or left-leaning students. In reviewing the evidence for individuals asked to self-identify on a political spectrum of left to right (as opposed to stating a particular political party), Buttell and Flinn (1978) argued that these results arose from too small and select a sample - a single town (Tognacci et al 1972) and a university student population (Dunlap, 1975). They undertook a state-wide survey to find the correlation between degree of environmental concern and identification as either a Republican or Democrat.⁴ The signs were as predicted and the correlation coefficients were significantly different from zero at either a 1 or 5 % significance level. Results were even more significant when an alternative measure of political/ideological support was used with individuals scoring higher on a scale of liberal values (anti-laissez-faire) having significantly higher expressed degrees of

environmental concern. Jones and Dunlap (1992) broadened the sample size to examine the stability of a general population's views on the environment over time. Using a number of years of data (1973-1990) from General Social Surveys they estimated cross-sectional regressions for each year. Their results revealed a remarkable stability over time. Democrats and political Liberals were found to be consistently more supportive of environmental protection than their counterparts who supported right-wing parties. Elliott, Seldon and Regens (1997) used the same data over a slightly later period (1974-1991) with an ordered probit approach.⁵ They found that, after controlling for various socio-demographic characteristics (e.g., gender, age, income, and race), Democratic supporters and/or those with liberal views were significantly more likely to advocate spending for environmental protection.

Konisky, Milyo and Richardson (2008) tempered an examination of the relationship between environment attitudes and political affiliation with consideration of the role that a respondent's trust in government might play. Like the previous researchers, they found support for the view that, after controlling for other factors, self-identified left and centrist voters (Democrats and Liberals) were more likely to be in favour of more government spending on environmental protection than their right-wing (Conservative) counterparts. They also noted that individuals who expressed greater trust in government actions were more in favour of government efforts to deal with environmental pollution.⁶ The authors raised an interesting point. Specifically, they argued that it was not sufficient to identify the environment as a single issue that could be examined by assuming the existence of a monotonic relationship with political ideology. Rather, they saw the environment has multi-attribute good where one of the key attributes was geographic location. Specifically, they examined the degree of support for public spending on local versus global environmental pollutants according to self-identified political ideology. They found that support for government spending to deal with pollution showed a big decrease by self-professed right wing individuals as the environmental issue moved from local to global pollution.

While the results of these social surveys on preferences are suggestive of left-right differences, they leave an interesting question unanswered; namely, are respondents willing to pay through higher taxes or service fees for the better environmental quality and protection. Neumayer (2004) used cross-country data to examine left- and right-wing differences that might manifest themselves in this context. He found that left-wing parties were more likely to be pro-environmental than their right-wing counterparts. He analysed data from the World and European Values Surveys (1981-84, 1990-93 and 1996-97) and found that self-reported left-wing respondents had statistically different responses from right-wing respondents in 8 of 10 categories including: greater willingness to give priority to environmental protection over economic growth, greater willingness to contribute to environmental organisations, and willingness to pay higher prices and taxes for environmental reasons. Similarly, Torgler and García-Valiñas (2007) used somewhat more recent data (the World Values Survey and European Values Surveys for various years: 1990, 1995, 2000 for the former and 1999 for latter) for Spain alone. Right-wing survey respondents were statistically less likely to agree to pay higher taxes to prevent environmental damages.

Witzke and Urfei (2001) examined data from a survey on Environmental Consciousness and Behavior that obtained information from a representative sample of German respondents. They analyzed responses to a question about whether respondents were in agreement with the principle of paying for environmental protection. Using an ordered probit model they found that right wing voters expressed significantly lower WTP than Green party supporters and, to a lesser extent, left wing voters.⁷ Li et al. (2009) found a similar result in their CVM study of WTP by American citizens for research and development into crop-based and renewable resources that were not dependent on fossil fuels. Voters, who self-identified as more conservative, were significantly less likely to vote yes for a program and, thus, had lower WTPs. Solomon and Johnson (2009) examined a similar issue, again with a CVM approach, in order to obtain estimates of the value to US citizens of reducing climate change. Respondents were asked how

much they would be willing to pay for a program that would see ethanol used as a motor vehicle fuel in order to reduce society's carbon emissions. They found that more conservative voters were significantly less likely to vote for the program than their more left and liberal counterparts.

While it is one thing to say in a stated preference exercise that one is willing to pay more, some research has suggested (Brown and Taylor, 2000) that respondents may say one thing in a hypothetical situation and not carry through in an actual situation. There is a small body of literature that has looked at differential behaviour in actual (experimental) situations. Fehr and Fischbacher (2002) argued that there was a need to include the role of social preferences in people's choices. In particular, they presented results from a number of experimental games that revealed the presence of reciprocity (where actions undertaken by another were perceived either as kind or hostile and the individual responds in a like manner). Anderson, Mellor and Milyo (2005) used a public goods bilateral trust game to test whether self-expressed Democratic (liberal or left-leaning) supporters were more likely to contribute to a group account when such behaviour would be contrary to self-interest.⁸ Second, they tested whether these same individuals chose to trust strangers despite a monetary incentive that would not support such behaviour. They found that there was no tendency for individuals to "play nice" and that, while self described Liberals did make slightly larger contributions to the public good than Republicans, on average, the differences were not statistically significant. On the other hand, they did observe that self-described Liberals behaved in a more trusting and trustworthy manner.⁹ However, such behaviour was observed only when the authors induced inequality through differential fixed payments to players. It was noteworthy that all Liberal players behaved this way, not just the lucky ones (those who happened to be assigned the larger payments).¹⁰

III. HYPOTHESES

The literature provides support for the view that right-wing supporters may express a lower WTP in stated preference surveys for environmental goods than left-wing supporters.

However, previous research in non-market valuation has shown that context and the framing of valuation questions play an important role in respondents' decisions (Tversky and Kahneman, 1981; DeShazo, 2002; Vatn, 2004; Spash, 2006). This paper is interested in how framing in the form of public versus private provision and public versus private benefits affect left-wing and right-wing voters differently. We begin by assuming that environmental goods can provide either private use and/or collective/public use benefits and that the two provision types are private and collective/public. This yields a 2x2 matrix, as shown in Figure 1. In each cell we identify a number of specific hypotheses about left-right ordering of values for the combinations of good type/provision type. The null hypothesis in each case is that there is a difference in WTP for respondents on the two ends of the political spectrum. Specifically, classifying Conservatives as right-wing and Labour as left-wing, then we expect right-wing voters to have higher values for private use goods that are privately provided than left-wing voters. Similarly, we expect right-wing voters to have lower values for collective/public use goods (including their non-use aspects) that are publically provided than left-wing voters. With respect to the cell for private use goods that are publically provided we expect the difference in values to depend upon the relative merits of the private use good against the relative disadvantages to right-wing voters of having public provision.¹¹ We turn next to a discussion of the data from three different surveys used to evaluate these hypotheses.

IV. SURVEYS AND DATA

We employ data obtained from three surveys to investigate the hypotheses about the role that political views might play in responses to the valuation of environmental goods and how they were provided. Three types of goods are valued: a public good provided publically, a largely private good provided collectively/publically, and a good that is capable of being provided either privately or publically. Respondents were randomly drawn from the East Anglia region of England, specifically in and around the city of Norwich. The first two surveys were

conducted in 2003 while the third survey was conducted in 2005. In each case, we identified respondents self-reported political affiliations according to their answer to a question asking how they would vote “if there were to be a General Election tomorrow”.

The good valued in the first survey was publically provided and had both public use and non-use characteristics. Specifically, it was the remediation of phosphate induced eutrophication problems affecting nearby rivers and lakes. Our survey design followed established best practice guidelines (Mitchell and Carson, 1989; Arrow et al. 1993), including the use of focus groups and pilot testing.¹² The survey format was dichotomous choice Contingent Valuation (CVM) using face-to-face interviewing. The questionnaire began by presenting information about eutrophication that might occur in the lakes in the region; it then provided details about a new technology at sewage works that would remove phosphates from household sewage. Respondents were asked whether they would be willing to pay an additional annual amount on their water bill in order to pay for the phosphate removal scheme that would prevent excess algae. The additional amounts ranged between £10-£200. A cheap talk script was employed to remind survey respondents about budget constraints. A number of debriefing questions were asked, including one to determine whether the respondent had visited lakes in the region and whether she believed the phosphate scheme would be successful.

Table 1 presents socio-demographic information from the first survey according to a respondent’s answer about political party support.¹³ Most of these variables were found to have statistically identical means across the four political parties with the following exceptions. For Labour and Liberal supporters age and gender were significant different ($p=0.030$ each). For Labour and Conservative voters only age was statistically different with ($p=0.000$). For Labor and Green voters the data showed that age ($p=0.041$) and gender (0.008) were statistically different while for Liberal and Conservative voters age ($p=0.020$), gender (0.024) and belief that the scheme would work ($p=0.013$) differed statistically. A comparison of the Greens with Liberals found age to be the only significantly different variable ($p=0.000$). However, the Greens

and the Conservatives were most different with age ($p=0.000$), income ($p=0.054$), gender ($p=0.006$), and belief ($p=0.097$) all exhibiting statistically significant differences in mean values. There were no statistical differences across the four groups of visits to the Norfolk Broads, a region in Northeastern England that has many lakes.

The second survey valued private use values associated with improvements to collectively provided domestic tap water. While the United Kingdom has had tap water that is amongst the best in the world in terms of consistency of supply and health risk levels, climate change and in-migration have been predicted to reduce the quality of water in the study area (Holman, et al., 2002). Focus group respondents identified two characteristics that could be affected by these changes; namely, the number of days each year on which a household's tap water could smell and taste of chlorine (ST) and the number of days each year on which the household's tap water could be a rusty color (C). Using a discrete choice experiments approach (CE) with face-to-face interviewing, survey respondents were presented with a series of choice tasks where each task asked them to choose between a 'status quo' (SQ) option and an alternative program (Adamowicz et al., 1998).¹⁴ A split sample approach was adopted to allow for the scope sensitivity (large improvement versus small improvement) and a second split sample was used to allow for different information treatments (Bateman et al 2004).¹⁵

Table 2 presents mean values for socio-demographic variables from the second survey according to political affiliation.¹⁶ Most of the socio-demographic variables were found to have statistically identical means across the four political parties with the following exceptions. For Labour and Liberal supporters only the percentage of tap water consumed was significantly different ($p=0.084$). For Labour and Conservative only age was statistically different with ($p=0.005$). For Labour and Green voters the data showed that age ($p=0.001$) and gender ($p=0.082$) were statistically different while for Liberal and Conservative voters only age ($p=0.008$) differed statistically. A comparison of the Greens with Liberals found age and gender

to be the only significantly different variables ($\rho=0.001$ and $\rho=0.097$). The Greens and the Conservatives only differed with respect to age ($\rho=0.000$).

The third survey was designed explicitly to shed light upon differences in WTP expressed by right and left wing respondents according to whether a specific good was provided either publically or privately. The good, an improvement to water quality that reduced water hardness, lent itself to this framework.¹⁷ The survey took place during the summer of 2005. It consisted of in person interviews in the region of East Anglia, an area known for hard water since the majority of water for household usage is collected from underground chalk reservoirs. Survey respondents were first provided with information about how water hardness arose in their area and the benefits of water softening units. This information was presented in both a visual and oral manner to facilitate understanding.

Using a split-sample format, respondents were asked two contingent valuation questions. One sample was first asked to value a water softening unit installed in the home (PRIVATE). This question was followed by one asking the respondent to value the water softening unit installed at the waterworks (PUBLIC). The second sample was asked the questions in the opposite order. WTP was elicited in two different ways via the use of payment cards (Mitchell and Carson, 1981). The first used a stepwise approach, denoted STEP (Bateman et al. 2004). Respondents were asked whether they would be willing to pay a stated amount of annual additional water bill charge beginning with a low of £5 and proceeding sequentially to a high of over £200. If they said yes, they were asked the next highest value. Once they said no, they were shown the highest amount that they had agreed to pay and the next highest amount to which they had said no. They were then asked to verify what the maximum amount would be that they would be willing to pay for the service. The second valuation method used the same range of values but in this case the interviewer asked each value in a random order, denoted RANDOM and respondents were asked to give a yes or no response to the stated value. After all of the values were asked the respondent was then quoted

the highest amount that she/he had agreed to and the next highest amount refused. At this point, the respondent was asked to state the maximum amount that she/he would pay for the water softening service.

Table 3 presents mean values pertaining to the socio-demographic characteristics of survey respondents according to political affiliation.¹⁸ Most of the socio-demographic variables were found to have statistically identical means across the four political parties with the following exceptions. For Labour and Liberal supporters age ($p=0.027$), gender ($p=0.000$) ownership of a water softener ($p=0.065$) were significantly different. For Labour and Conservative the same variables, age ($p=0.000$), gender ($p=0.029$) ownership of a water softener ($p=0.092$), were significantly different. For Labour and Green voters the data showed that gender ($p=0.000$), income ($p=0.000$), and ownership ($p=0.063$) were statistically different. For Liberal and Conservative voters age ($p=0.000$), gender ($p=0.009$), income ($p=0.005$) and ownership ($p=0.001$) were significantly different. A comparison of the Greens with Liberals found income and ownership to be the only significantly different variables ($p=0.000$ and $p=0.001$). The Greens and the Conservatives differed with respect to age ($p=0.000$) gender ($p=0.070$), and income ($p=0.000$).

In addition to the socio-demographic information, Table 3 shows the maximum stated values given by respondents for the two types of goods: water softener privately provided (PRIVATE) and water softener publically provided (PUBLIC). The average value on the privately provided good by a Conservative voter was significantly higher than that of the Green or Labor voter (both $p=0.002$). On the other hand, the average value for the public good was significantly greater for the Liberal voter when compared with the Green ($p=0.000$), Labor ($p=0.045$), and Conservative ($p=0.026$) voters. The expressed difference in a respondent's average WTP was calculated as the PUBLIC WTP minus PRIVATE WTP. Thus, a negative value indicated a higher value when the good was privately provided than when it was publically provided. Conservative voters had significantly higher WTP when the good was privately provided

whereas labor and liberal voters did not express significant differences in valuations. Greens, however, were similar to Conservatives.

V. EMPIRICAL RESULTS

Public Good, Publically Provided

We estimated the likelihood of responding yes to the WTP question using a probit model with a number of explanatory variables. In addition to the bid amount, we conditioned responses on a number of socio-demographic variables including: gender, income, age, and age squared. We also included a dummy variable to indicate whether the respondent had undertaken past visits to the lakes in the region and another dummy variable to indicate that the respondent had expressed a belief that the phosphate scheme would be successful. Finally, we included three dummy variables for Liberal, Conservative and Green voters. Thus, the reference respondent was a Labour voter.

As Table 4 shows the bid value was negative and highly significant, as expected. In addition, the income variable was positively and highly significant; however, neither age, nor its squared value, nor gender, were significant determinants. Belief that the scheme would work had a significant and positive affect on the likelihood of a respondent saying yes to the phosphate removal program, although previous visits did not. In contrast to what seems to be little variation resulting from socio-demographic variables, we obtained very strong results from the incorporation of the dummy variables to indicate political affiliation. Conservative voters were significantly less likely to say yes to any bid value than the base voter, Labour; however, Liberals were not. On the other hand, the significant and positive coefficient for Greens indicated that they were more likely to say yes to any bid value than the base voter. Using sample means for the explanatory, we calculated the WTP values for each of the groups assuming that they believed in the scheme and had visited the lakes in the area. The estimated

means (estimated standard deviations) were: Green: £169 (30), Labour £144 (24), Liberal £140 (28) and Conservative £115 (27). Tests of equivalence for these estimated mean WTP supported the hypothesis that left-wing supporters have higher WTP than right-wing supporters (for example, a test of the Labour and Conservative values had a p-value of 0.0249). This result is similar to that obtained in previous work by Li et al (2009) and Solomon and Johnson (2009). From this one might be tempted to conclude, as others have, that right-wing voters consistently have lower values for environmental goods.

Private Good, Collectively Provided

We assumed that respondents chose the option (status quo versus an alternative program) that offered the highest utility. Since each respondent answered 17 choice tasks, we had a panel dataset. We incorporated fixed preferences in responses made by one respondent by adopting Train's (2003) mixed logit (ML) formulation. This assumed that the utility obtained by person i from alternative j in choice situation t was given by equation (1).

$$U_{ijt} = \beta_i' x_{ijt} + \varepsilon_{ijt} \quad t = 1, \dots, T \quad (1)$$

In this equation the vector x represented variables that related both to attributes of choices and characteristics of respondents. The β_i were coefficients for the variables for respondent i and represented this respondent's tastes. The ε_{ijt} were the random terms; they were assumed to be *iid* extreme value. Unlike in a standard logit model, the coefficients were assumed to vary over the respondents in the population with density $f(\beta)$. The density was parameterized by θ , the mean and covariance of the β 's in the population. The respondent was assumed to know her own β and random error terms and to choose the option in each choice task that gave her the highest utility. However, we did not know these values and could only observe the choices made in response to the values of the alternatives presented to respondents and their characteristics. The unconditional probability that person i made the sequence of T choices (m_1 through to m_T) was given by equation (2):

$$P_{im} = \int L_{im}(\beta) f(\beta) d\beta$$

where

(2)

$$L_{im}(\beta) = \prod_{t=1}^T \left[\frac{e^{\beta_i x_{imt}}}{\sum_j e^{\beta_i x_{jmt}}} \right]$$

We assumed a normal distribution in order to obtain estimates of the mean and variance of the β s on for the status quo attribute specific constant, smell and taste, and color parameters for respondents in the population (Train, 2003).¹⁹ Characteristics included in the parameterization were socio-demographic (income, age, age squared, gender, percentage of tap water consumed, an index to represent degree of previous bad experiences with tap water), choice task format (a variable indicating that a large change as opposed to a small change in attribute levels and a dummy variable to indicate that a respondent was in the SEQ information treatment), and political dummies for each of Liberals, Greens, and Conservatives. Thus, the reference individual indicated that she would have voted Labour.

As Table 5 shows the estimated coefficient on household cost was negative and significant, as expected. An increase in the cost of an alternative program relative to the status quo lowered utility. Similarly, the estimated coefficients for the means of the two attributes were negative and very significant. Recall, an increase in either of these attributes meant more disutility (greater numbers of days of unpleasant smell/taste or color in one's tap water). The estimated standard deviations for these parameters were significantly different from zero, indicating that there was heterogeneity in how respondents reacted to changes in these attributes. Finally, the mean of the status quo attribute specific constant was positive but not significantly different from zero. Thus, a Labour voter (reference respondent) did not have a predisposition for choosing the status quo option over the alternative program.

Since the estimated standard deviation for the status quo parameter was significantly different from zero, this suggested a great deal of heterogeneity amongst respondents. As the estimated coefficients in Table 5 show, the factors that drove this heterogeneity were the

information treatment variable (SEQ) and the three political dummy variables. Each of the three political interaction terms (SQASC*CONSERVATIVE, etc.) was negative and significantly different from zero but only barely at the 10 % significance level (with the exception of the Greens). Since the magnitudes of these coefficients were all less than the Status Quo Attribute Specific Constant, this meant that all voter types had a preference for the Status Quo but with different emphasis. In particular, Conservative, Green, and Liberal responses were similar to one another and slightly different from Labour in having a smaller Status Quo preference. On the other hand, the marginal WTP for changes in attributes were insensitive to political views. Recall, however, that this was largely a private good that was being evaluated.

Private Good both Publically and Privately Provided

Using data from the third survey we estimated two models. The first took as its dependent variable the difference between the expressed WTP when publically provided and the WTP when privately provided. Thus, a negative value indicated a higher WTP when privately provided. The explanatory variables included a number of socio-demographic variables (gender, age, age squared, household income, a dummy for ownership of a water softener), and dummy variables indicating Conservative, Liberal and Green voters. In addition, we included dummy variables to indicate whether the private provision question was answered first and whether the random payment card approach had been used in order to account for possible order and/or question format effects. Estimated standard errors were constructed using White's robust method. The reference point was a Labor voter who saw the public provision question first using the random payment card approach.

As Table 6 shows, the estimated coefficients supported the hypothesis that, for conservative voters, the WTP for a publically provided good was significantly smaller than for the same good when privately provided. While Green voters had similar results, there were no significant differences in these values for Labour or Liberal voters. Older voters expressed

significantly higher values for the good when publically provided relative to private provision. However, higher income led to significantly higher values in the case of private provision. Looking at possible format effects, we found that when the private good question was asked first, the resulting difference in public versus private values was positive and significant indicating that Conservative voters were likely to raise their valuation for a publically provided good. In addition, for Conservative voters the random payment card format led to a significant positive difference in values (public provision WTP greater than private provision WTP). Finally, the dummy variable indicating that the household already owned a water softener was not a significant determinant of the difference in the public versus private value, other than for Greens. In this case, they had a significantly higher public value than private value.

The second model estimated with these data evaluated the likelihood of a respondent with certain characteristics being classified into one of three groups: group 1 individuals expressed a WTP for private provision that was greater than for public provision; group 2 individuals expressed no difference in the WTP values, and group 3 individuals had higher WTP when there was public provision rather than private provision. As the ordering variable increased, the public provision WTP became larger relative to the private provision WTP. The reference voter was again the Labour voter and the same explanatory variables were used as before. The negative and significant coefficient for Conservative meant that there were much lower odds of a Conservative being in group 3, that is, having a WTP when a good was publically provide that was greater than the WTP for the private provision option. Respondents in the payment card treatment were more likely to be in group 1, as were older respondents. Ownership of a water softener did not have a significant impact upon group membership. If the private provision question was asked first, then Conservatives were more likely to express a higher value (however, this was not significant). To conclude, Labour, Liberal and Green voters were most likely to belong to group 2, that is, no significant difference in the WTP under public

or private provision. However, Conservatives were significantly more likely to be in group 1; thus they were more likely to express a higher WTP in the private provision case.

VI. DISCUSSION AND CONCLUSIONS

The last few decades have borne witness to an increasing recognition of the role played by the environment in providing myriad goods and services enjoyed by consumers. Efforts to obtain the relevant values have relied, for the most part, upon stated preference techniques using hypothetical constructed markets. In most cases, scenarios describing the improvement in the environmental good were couched in terms of the need for increased public expenditures to see the project through. Previous research has showed that context is important (Tversky and Kahneman, 1981; Vatn, 2004; Spash, 2006) and the results from this study support that. This paper looked at the issue of political ideology and, specifically, at whether values differed according to the context (public or private) in which the good might be provided. We estimated models using data from three different stated preference survey formats that all involved the valuation of environmental goods provided from water resources. The data were all drawn from the same geographic region in England and from the same time period. We found significant results that were consistent with maintained hypotheses regarding left-wing and right-wing differences in values. Specifically, right-wing voters expressed higher WTP for environmental goods when there were privately provided and left-wing voters had higher WTP for publically provided environmental goods.

Since environmental goods are almost always described in these surveys as being publically provided, the findings in this paper suggest that WTP from non-market valuation methodologies may result in biased results. If right-wing voters oppose public provision, then WTP elicited in this type of survey may be an understatement of the true value of the benefits to the individual of the good itself. Our findings suggest that future non-market valuation survey work could profit from the routine collection of political affiliation data along with more traditional

socio-demographic information. In addition, when employing non-market valuation approaches to obtain values relating to environmental goods, researchers should consider the means of provision described in constructed markets as an important contextual element whose influence needs to be investigated.

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TABLE 1
 Socio-demographic Variables by Political Affiliation From Publically Provided, Public Good Survey

	Conservative	Green	Liberal	Labour
Income (£)	23762.40 (14855.6)	20608.70 (14611.01)	21950.0 (14750.70)	23076.00 (14750.70)
Male	0.49 (0.50)	0.34 (0.48)	0.38 (0.49)	0.48 (0.50)
Age	52.78 (18.49)	41.24 (16.07)	48.57 (19.36)	44.96 (17.88)
Believe Scheme Work	0.60 (0.49)	0.68 (0.47)	0.71 (0.45)	0.67 (0.47)
Visited	0.91 (0.30)	0.95 (0.22)	0.93 (0.26)	0.92 (0.27)
Observations	202	138	240	263

TABLE 2
 Socio-demographic Variables by Political Affiliation From Publically Provided, Private Good Survey

	Conservative	Green	Liberal	Labour
Income (£)	25338.50 (15804.30)	23760.00 (14851.40)	24236.80 (16940.80)	26142.90 (17223.0)
Male	0.49 (0.50)	0.37 (0.49)	0.49 (0.50)	0.50 (0.50)
Age	54.72 (18.99)	40.20 (14.89)	48.50 (19.26)	48.18 (18.48)
Water % Tap	60.89 (41.53)	65.31 (38.87)	56.97 (41.21)	65.36 (40.45)
Bad Water Experience (scale of 4 to 16)	6.72 (8.83)	6.12 (2.54)	6.47 (2.77)	6.26 (2.59)
Observations	130	75	152	147

TABLE 3
Socio-demographic Variables by Political Affiliation From Survey Valuing Public versus Private Provision

	Conservative	Green	Liberal	Labour
Income (£)	31920.00 (13349.52)	14823.53 (8020.70)	25935.48 (10892.73)	29136.99 (13411.56)
Male	0.48 (0.50)	0.29 (0.46)	0.27 (0.45)	0.66 (0.48)
Age	50.64 (17.08)	36.35 (19.87)	32.64 (11.72)	37.37 (12.92)
WTP for Private Provision (£)	59.67 (36.88)	39.26 (14.52)	57.89 (55.20)	44.10 (22.02)
WTP for Public Provision (£)	43.00 (26.34)	19.12 (13.11)	59.30 (55.83)	44.44 (26.92)
Public WTP- Private WTP (£)	-16.67 (30.76)	-20.15 (36.21)	1.41 (12.42)	0.34 (20.16)
Own Water Softener	0.28 (0.45)	0.32 (0.47)	0.06 (0.24)	0.16 (0.37)
Observations	75	34	64	73

TABLE 4
Probit Regression Using Publically Provided, Public Good Survey Data

	Estimated Coefficient	Estimated Standard Error	p-value
Income	0.1620 -04 *	0.3580E-05	0.0000
Male	-0.0626	0.0941	0.5060
Age	-0.0010	0.01500	0.9470
Age Squared	-0.7030E-05	0.0002	0.9630
Visited	0.1635	0.1712	0.3390
Believe Scheme Work	0.3699 *	0.0987	0.0000
Liberal	-0.0425	0.1198	0.7230
Green	0.2531 ***	0.1440	0.0790
Conservative	-0.2940 *	0.1269	0.0210
Constant	0.2687	0.3785	0.4780
Bid Value	-0.0102 *	0.0011	0.0000
LLF	-502.1952		
LLF (Slopes = 0)	-583.9523		
χ^2 (df=10)	135.14		
McFadden's Pseudo R ²	0.1400		

* 1 % significance, ** 5 % significance, *** 10 % significance

TABLE 5
Mixed Logit Regression Using Private Good, Publically Provided Survey Data

Coefficient Name	Estimated Coefficient Value	Estimated Standard Error	p-value
Status Quo Attribute Specific Constant (mean)	1.2754	1.3045	0.3282
Status Quo Attribute Specific Constant (standard deviation)	2.7433 *	0.1624	0.0000
Smell Taste Attribute (mean)	-0.4567 *	0.1264	0.0003
Smell Taste Attribute (standard deviation)	0.2229 *	0.0184	0.0000
Color Attribute (mean)	-0.6715 **	0.2323	0.0048
Color Attribute (standard deviation)	0.4028 *	0.0310	0.0000
Household Cost	-0.1196 *	0.0042	0.0000
SQASC*SEQ	0.7049 **	0.3296	0.0325
SQASC*LARGE	0.4315	0.3340	0.1965
SQASC*AGE	0.0587	0.0514	0.2538
SQASC*AGESQ	-0.0005	0.0005	0.3016
SQASC*WATPER	-0.0042	0.0042	0.3224
SQASC*INCOME	-0.7832E-05	0.1100E-04	0.4767
SQASC*BADEXP	0.0754	0.0643	0.2412
SQASC*CONSERVATVE	-0.7753 ***	0.4699	0.0990
SQASC*LIBERAL	-0.7343 ***	0.4404	0.0954
SQASC*GREEN	-1.1067 **	0.5122	0.0307
SMELL*SEQ	0.0035	0.0312	0.9111
SMELL*LARGE	-0.0011	0.0319	0.9715
SMELL*AGE	0.0060	0.0048	0.2152
SMELL*AGESQ	-0.3061E-04	0.4883E-04	0.5307
SMELL*WATPER	-0.00024	0.0004	0.5524
SMELL*INCOME	-0.2051E-05 **	0.1033E-05	0.0471
SMELL*BADEXP	-0.0078	0.0063	0.2123
SMELL*CONSERVATVE	-0.0267	0.0438	0.5423
SMELL*LIBERAL	-0.0312	0.0413	0.4499
SMELL*GREEN	0.0558	0.0499	0.2634
COLOR*SEQ	-0.0014	0.057592	0.9808
COLOR*LARGE	-0.1220 **	0.058809	0.038
COLOR*AGE	-0.0032	0.008987	0.721
COLOR*AGESQ	0.5809E-04	0.9214E-04	0.5284
COLOR*WATPER	0.0011	0.0007	0.158
COLOR*INCOME	-0.1242E-05	0.1907E-05	0.5149
COLOR*BADEXP	0.0075	0.0115	0.5131
COLOR*CONSERVATVE	0.0778	0.0813	0.3386
COLOR*LIBERAL	0.0346	0.0763	0.6503
COLOR*GREEN	0.0804	0.0913	0.3786
LLF	-5938.885		

LLF (Slopes = 0)	-2798.729		
χ^2 (df=37)	6280.312		0.0000
McFadden's Pseudo R ²	0.5287		

* 1 % significance, ** 5 % significance, *** 10 % significance

TABLE 6
OLS Regression Using Privately or Publically Provided Good Survey Data

Coefficient Name	Estimated Coefficient Value	Estimated Standard Error (robust)	p-value
Income	-0.0004 ***	0.0001	0.0054
Male	3.2077	3.6922	0.3859
Age	0.8566 **	0.3552	0.0167
Age Squared	-0.0086 **	0.0036	0.0182
Conservative	-36.1598 *	11.7043	0.0023
Liberal	-4.0448	6.1382	0.5106
Green	-22.5369 **	11.0315	0.0422
Private Good First	-5.9000	4.6481	0.2056
Private Good First*Conservative	22.8397 *	7.7062	0.0034
Private Good First*Liberal	7.3277	6.1952	0.2381
Private Good First*Green	-1.5473	8.2514	0.8514
No Water Softener	0.8484	4.6727	0.8561
No Water Softener*Conservative	-2.7188	9.9913	0.7858
No Water Softener*Liberal	-1.2216	5.7275	0.8313
No Water Softener*Green	24.7146 *	7.5690	0.0013
Random Payment Card	-10.6887 **	4.7101	0.0242
Random Payment Card*Conservative	24.9004 **	7.8660	0.0018
Random Payment Card*Liberal	6.0900	5.6584	0.2830
Random Payment Card*Green	-6.3915	8.9871	0.4777
Constant	-1.3380	9.2278	0.8848
Adjusted R ²	0.2264		

* 1 % significance, ** 5 % significance, *** 10 % significance

TABLE 7
Ordered Logit Regression Using Privately or Publically Provided Good Survey Data

Coefficient Name	Estimated Coefficient Value	Estimated Standard Error	p-value
Income	0.15933E-04	0.1153E-04	0.1670
Male	0.1821	0.3008	0.5451
Age	0.1234 *	0.0476	0.0096
Age Squared	-0.0013 **	0.0005	0.0145
Conservative	-2.5728 *	0.7853	0.0011
Liberal	-0.3050	0.6774	0.6525
Green	-1.0994	0.8993	0.2215
Private Good First	-0.2504	0.4756	0.5985
Private Good First*Conservative	0.7761	0.7021	0.2690
Private Good First*Liberal	0.0179	0.6686	0.9786
Private Good First*Green	-0.3717	0.9845	0.7058
No Water Softener	0.2890	0.4747	0.5427
No Water Softener*Conservative	-0.4686	0.7518	0.5330
No Water Softener*Liberal	-0.0934	0.6529	0.8863
No Water Softener*Green	0.7185	1.1861	0.5446
Random Payment Card	-1.2191 **	0.4837	0.0117
Random Payment Card*Conservative	2.3095 *	0.7023	0.0010
Random Payment Card*Liberal	0.7164	0.6504	0.8863
Random Payment Card*Green	-0.9687	0.9913	0.3285
Constant	-0.5106	1.0538	0.6280
McFadden Pseudo R ²	0.2277		
LLF Restricted (only constant)	-260.2881		
LLF	-228.4056		

* 1 % significance, ** 5% significance, *** 10 % significance

FIGURE 1

Matrix of Good Type and Provision Type

	Private Use Good	Public Use Good (including non-use)
Private Provision	Right-Wing Value > Left-Wing Value	
Public Provision	Right-Wing Value \geq Left-Wing Value	Right-Wing Value < Left-wing Value

Endnotes

¹ The Comparative Manifesto Project (CMP) has coded party policies for a large number of countries and created a scale ranging from left to right (Adams et al. 2004). Other left-wing British parties are Communist and Social Democrats while the Christian and Nationalist parties belong to the right-wing parties. Agrarians are seen as centrist.

² They found that Conservative supporters were, by and large, content with maintaining spending on the following items: schools and education, housing, roads, assistance to industry, defense, local government and unemployment. However, they were in favour of increased spending on hospitals and health service, help for the old, and police and the law courts. Areas where they would like to see reduced spending were: social security, nationalized industries, foreign aid and the Common Market. Self-proclaimed Labour supporters, on the other hand, wanted increased spending on health, pensions, schools, housing, roads, and assistance to industry. They only favored cuts to foreign aid and Common market activities. All other items they saw as being at a status quo.

³ Rohrschneider (1993) used Eurobarometer surveys for a number of years (1982, 1984, 1986, and 1989) to look at indicators of environmental values amongst European nations. He found that environmentalism exercised only a weak overall influence on political party views in Great Britain in the early years. However later evidence (1989) suggested that the British Labour party appealed to individuals who claimed to support environmental action.

⁴ The dependent variable in Buttell and Flinn (1978) is the sum of responses to three questions whose responses are on a 5-point Likert scale. Question 1 asks “are you for expanded governmental efforts to control air and water pollution?”, while Question 2 states “industry should be allowed to handle pollution its own way” and the final question says “pollution laws have gotten too strict in recent years”. These last two were reverse scored. Dunlap et al. (2001) provide an extensive overview of the relationship between political ideology and support for environmentalism in the United States. .

⁵ Their model was intended to provide expected probabilities for one of three choices: survey respondent says there is too little environmental spending, environmental spending is just about right, or there is too much environmental spending.

⁶ Even after the authors controlled for the level of trust in government they found that...“ideologically conservative individuals [are]...less likely to support further government action” (p. 1078).

⁷ They assigned those not willing to pay a value of 0, while maybes were given a value of 1. Finally, those individuals who stated they were willing to pay were assigned a value of 2.

⁸ Mestelman and Feeny (1988) reported some evidence that ideology influences free riding in public goods but did not link it to political affiliations.

⁹ They sent more tokens to their randomly matched partner and also returned more tokens.

¹⁰ One possible reason as to why they found little variation in responses is that players were relatively homogeneous (college students between the ages of 18-22).

¹¹ The cell pertaining to public use goods that are privately provided is not necessarily empty; however, the presence of market data obviates the need for non-market valuation.

¹² The data and survey format are described in more detail in Bateman et al. (2009). The CVM stated preference format was the one and one half bound. Respondents were told in advance the range of possible bid values and randomly selected to be in one of two samples: the upper-lower sample (where respondents were asked whether they would agree to the upper value for the program first and then only asked the lower value if they said no) and the lower-upper sample (where respondents were asked whether they would agree to the lower value for the program first and then only asked the upper value if they said yes). In the current paper we examined the response to the initial bid value. In one of our estimations we included a dummy variable for the sample type and interacted this with political views; however, none of these coefficients was significantly different from zero. These results are available from the authors.

¹³ We interviewed 1254 randomly selected households and, after removing observations that did not provide this information, our sample size was 843.

¹⁴ The SQ was defined as the likely level of tap water problems to be experienced over the coming year. Our work with focus groups suggested that reasonable status quo levels were 10 days per year for the ST

attribute and 5 days per year for the C attribute in the absence of any intervention (a zero increase in the water bill) to address these problems. Four alternative levels were chosen for each of the attributes: (ST had 0, 3, 6 and 10 days), (C had 0, 1, 3, and 5 days), and the annual increase to the water bill was chosen to be one of £10, 20, 30, or 50. We adopted a full factorial design of 64 combinations and divided these into four equal blocks in order to present each respondent with 16 choice tasks. Each respondent faced 17 choice tasks since the first task was repeated at the very end of the sequence to allow for an examination of ordering effects (Day et al., 2009).

¹⁵ Respondents who answered our “SEQ” version of the survey were presented with choice tasks in the typical sequential manner; that is, the choice response for one task was elicited prior to the presentation of any information about subsequent choice tasks. The alternative treatment provided respondents with details of all attributes and levels used in the study prior to the initial choice task.

¹⁶ Of the total sample of 861 randomly selected individuals, 282 respondents indicated that they would either vote for another party, did not know, would not vote or were not prepared to say how they would vote. Other observations did not have complete data on one or more of the variables. After removing individuals who did not indicate how they would vote and incomplete responses, we had 504 respondents, each of whom provided answers to 17 choice tasks.

¹⁷ Calcium and other minerals dissolving into the water supply cause water hardness. When rain falls it contains little or none of these minerals but as it runs over and through rocks minerals dissolve into it. Water hardness can be reduced through the use of water softening units that can either be installed in an individual’s home (private provision) or at the waterworks (public provision). Benefits include better tasting water and greater appliance efficiency since hard water increases scale deposition.

¹⁸ In total 400 individuals answered the survey. Of this number 47 did not answer both public and private valuation questions; hence, they were dropped from the sample leaving 353 complete observations. We also dropped respondents who did not answer the voting question leaving a final sample size of 244.

¹⁹ Five hundred Halton draws were chosen to simulate the probabilities.