HAL
open science

Referenda under Oath

Nicolas Jacquemet, Alexander James, Stephane Luchini, Jason Shogren

To cite this version:

Nicolas Jacquemet, Alexander James, Stephane Luchini, Jason Shogren. Referenda under Oath. 2010. halshs-00490448

HAL Id: halshs-00490448

https://shs.hal.science/halshs-00490448v1

Preprint submitted on 8 Jun 2010

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

GREQAM

Groupement de Recherche en Economie
Quantitative d'Aix-Marseille - UMR-CNRS 6579
Ecole des Hautes Etudes en Sciences Sociales
Universités d'Aix-Marseille II et III

Document de Travail
n°2010-15

REFERENDA UNDER OATH

Nicolas JACQUEMET
Alexander JAMES
Stéphane LUCHINI
Jason SHOGREN

April 2010

DT-GREQAM

Referenda under Oath*

Nicolas Jacquemet† Alexander G. James‡
Stéphane Luchini§ Jason F. Shogren¶

April 9, 2010

Abstract

Herein we explore whether a solemn oath can eliminate hypothetical bias in a voting referenda, a design commonly promoted in nonmarket valuation exercises for its incentive compatibility properties. First, we reject the null hypothesis that a hypothetical bias does not exist. Second, we cannot reject the hypothesis that people who sign an oath are as likely to vote for the public good (e.g., wind energy R&D) in a hypothetical referenda as in a real one. This result opens interesting avenues for improving the elicitation of preferences in the lab.

Keywords: Dichotomous Choice Mechanism; Hypothetical bias; Oath; Preference revelation.

JEL Classification: C9; H4; Q5

*We thank the Bugas Fund for financial support.

†Paris School of Economics and University Paris I Panthéon–Sorbonne. Centre d'Economie de la Sorbonne, 106 Bd. de l'Hôpital, 75013 Paris. Nicolas.Jacquemet@univ-paris1.fr

‡Department of Economics and Finance, University of Wyoming, Laramie, WY 82071-3985, United States. ajames7@uwyo.edu

§GREQAM-CNRS, Centre de la Vieille Charité, 13236 Marseille Cedex 02. stephane.luchini@univmed.fr

¶Department of Economics and Finance, University of Wyoming, Laramie, WY 82071-3985, United States. JRamses@uwyo.edu

1 Introduction

Stated preference methods remain a popular tool to value non-marketed goods such as environment quality (e.g., Loureiro, Loomis, and Vazques, 2009), reduced risks to life and limb (Svensson, 2009), and recreation (e.g., Deisenroth and Bond, 2009). But stated preference methods remain susceptible to complaints of hypothetical bias – the gap between stated intentions and real economic commitments.[1] In general, the extant literature has collected a long line of evidence that hypothetical bias exists across numerous types of mechanisms designed to reveal preferences truthfully, including the popular valuation institution of binary referendum voting (see e.g., Cummings, Elliott, Harrison, and Murphy, 1997).[2]

Social psychology offers one explanation of hypothetical bias based on the lack of commitment to truth telling (Jacquemet, James, Luchini, and Shogren, 2010). Commitment theory posits a person is more likely to tell the truth after first making a strong promise (see Joule and Beauvois, 1998). Economic experiments support this idea. After pre-play communication, people who make verbal promises about future actions are more likely to keep them when playing in both hold-up and trust games (Ellingsen and Johannesson, 2004; Charness and Dufwenberg, 2006). The solemn oath is a time-tested mechanism used to promote commitment – the bond between a person and telling the truth (see e.g., Sylving, 1959; Kiesler and Sakumura, 1966; Schlesinger, 2008). According to this view, the oath acts as a foot-in-the-door that makes subjects more likely to comply with the content of their promise. In addition, the commitment is stronger when the promise is freely selected and voluntary (Joule and Beauvois (1998); Burger (1999)).

Herein we use experimental methods to test whether the oath will act as a commitment device in referendum voting for a public good (university-based wind power research). The oath is a pragmatic real-world commitment device that is publicly expressed, taken freely and

[1] While exceptions exist, hypothetical bias persists; see Diamond and Hausman (1994); Murphy, Stevens, and Weatherhead (2005); Jacquemet, Joule, Luchini, and Shogren (2009a). Also in a survey of 39 CV studies, Harrison and Rutström (2008) find that 34 of the studies considered suffer from a hypothetical bias, with average hypothetical responses 338% higher than real responses.

[2] In 1993 the National Oceanic and Atmospheric Administration (NOAA) appointed the Contingent Valuation Panel to determine under what conditions CV yields reliable value estimates. Among a host of recommendations, the panel reported that proper CV surveys should be administered via the voting referendum format (Arrow, Solow, Portney, Leamer, Radner, and Schuman, 1993). A voting referendum has two advantages. First, relative to alternative formats, subjects may find it more familiar and realistic. For example, casting a vote on a proposition to raise taxes to pay for public roads is effectively a CV survey in which the elicitation format is that of the voting referendum. Second, the NOAA report concluded the referendum format is less susceptible (though not immune) to hypothetical bias relative to other formats such as an open ended questionnaire.

signed, appears an extreme and more accentuated commitment device than a verbal promise or a written undertaking. In the "oath" treatments, subjects can freely sign a form by which they swear to tell the truth in the experiment. Our experimental results support the notion that the oath can reduce hypothetical bias. Under the oath, stated hypothetical preferences decrease by a significant level, and we observe no significant difference between real and hypothetical voting behavior. The oath seems to commit people to a behavioral act: to vote in a hypothetical referendum as if it were real. The referendum results support the findings in Jacquemet, Joule, Luchini, and Shogren (2009b) who observed that people bid more sincerely after taking an oath in a hypothetical private good Vickrey second-price auction. These results suggest the oath has promise (no pun intended) to create the commitment needed to better link intentions and actions in nonmarket valuation, and perhaps beyond.

2 Experimental Design

We use a 2x2 experimental design in which the treatments are: (i) hypothetical and real referenda and (ii) voting with and without a solemn oath to tell the truth. In the real treatments, the monitor endowed each subject with $15.00 and provided them the opportunity to donate the $15.00 towards a public good. In the hypothetical treatment, participants were told to "*imagine they have been given $15.00*" and were then given the opportunity to hypothetically donate towards the same public good.

The preference elicitation mechanism was a voting referendum. Subjects voted either "yes" or "no" to decide whether each group member would donate their money. If more than 50% voted "yes," everyone donated their money. The public good valued was the University of Wyoming Wind Energy Research Center (WERC). We conducted a preliminary survey to assess subjects' perception of the good to be valued. One hundred and twenty-one students from introductory economics courses – who did not participate in the experiment – were surveyed and asked the following question: "*Do you consider the advancement of wind energy technology to be a good thing?*" 93% answered "Yes"(113 of 121), supporting that a vast majority of subjects consider wind energy technology to be a public good.

Prior to voting, subjects were given the following description of WERC,

> *Energy in the United States is largely derived from non-renewable resources such as oil, coal and natural gas. Environmental scientists argue that in addition to providing a cleaner source of energy, harvesting wind energy is important because of its renewable characteristics; the advancement of wind technology offers a buffer to dwindling stocks of non renewable energy sources...important breakthroughs in technology must*

occur to increase wind energy consumption in the United States. To that regard, the University of Wyoming will soon establish a wind energy research center. The center will provide natural scientists and engineers with the ability to advance wind energy technology. According to the School of Energy Resources (SER) director, the Wind Energy Research Center will be "a program that's probably as impressive as anybody's in the country." The success of the Wind Energy Research Center has and will continue to be dependent on private and public charitable donations. Referencing why the center was not developed years ago, Jonathan Naughton, a University of Wyoming professor of Mechanical Engineering, says that "The problem has always been funding."

Subjects then indicated their donation preference by circling either "yes" or "no" on an answer sheet which was turned in face down.

Before each real treatment, subjects were assured that donations would be given to WERC. An envelope and a check made out to WERC were presented to the group and it was announced that, "*After the experiment has ended, this check will be made out for the appropriate donation amount and anyone can accompany us to mail the check to WERC when the experiment has ended*".

The only change to the procedure in the oath treatments is a preliminary stage based on an oath form. The oath, provided in Figure 1, reads, "*I, the undersigned swear upon my honor that during the entire experiment, I will tell the truth and always provide honest answers.*" This solemn oath is distributed for signing before any information is provided about the experiment. Note, the informational content of the oath focuses on truth-telling in itself, and does not describe either the hypothetical bias issue or the potential shortcomings of CV studies under hypothetical incentives. Signing the oath was not required to participate in oath treatments, though no participant chose not to sign it. Note, this prevents the results from being influenced by endogenous selection of subjects into the truth-telling promise.

All answers are elicited through a paper and pen survey, which asks for various individual information (gender, age) and vote. In oath treatments, one last question is added about how influential the oath was on behavior.[3] To minimize the cost of the experiment, subjects were solicited to participate in the experiment during class time and thus were not paid for participating. All treatments were run in freshman and sophomore composition introductory economics classes. This resulted in subjects being fairly homogeneous in age and place of birth but diverse with regards to major of study, political affiliation and parental income (see

[3]The survey distributed in oath treatments is provided as supplementary material.

Figure 1: Oath form used in the experiments

SOLEMN OATH

I undersigned ..... swear upon my honour that, during the whole experiment, I will:

Tell the truth and always provide honest answers.

Signature.....

Appendix A).[4] Another result of this strategy is that sample sizes depended on the number of students in class the day of the experiment and thus varied across treatments. Overall, the subject pool was 47.2% female, average age 20 years, 29.3% Democrat and 44% Republican.

Table 1: Treatments and Summary Statistics

Treatment	Sample size	"Yes" responses	
		Frequency	Percentage
Hypothetical no oath	68	60	88.2%
Hypothetical with oath	47	36	76.5%
Real no oath	37	22	59.4%
Real with oath	32	22	68.7%

Note. For each treatment, the Table provides the number of subjects and the number of "yes" votes observed, along with the resulting share.

3 Experimental results

Table 1 summarizes the votes elicited in each treatment, and Table 2 provides the results from non-parametric comparisons between treatments. Two key results emerge. First, we reject the null hypothesis that a hypothetical bias does not exist when voting over contributions to wind energy technology advancements – confirming our *ex ante* presumptions. Nearly 88.2% of the subjects voted "yes" in the Hypothetical no oath treatment; whereas about 59.4% voted "yes" in the Real no oath treatment. As shown in Table 2, this difference is significant at the 1% level according to non-parametric proportions tests. Second, we observe a strong impact of signing the oath on voting behavior in a hypothetical context. Signing the oath induces a 11.7% decline in the "yes" response rate in the hypothetical referendum, with very high statistical significance. In the real treatment, the oath induces a 9.3 percent increase in "yes" responses, although this difference is not statistically significant. In such a real context, the oath may work to decrease the number of protest responses, by which a subject returns a "no" response in an effort to protest the experiment. Protest bids tend to decrease real, affirmative response rates. These two effects of the oath seem enough to filter out the hypothetical bias. Based on the proportions tests provided in Table 2, we cannot reject the null hypothesis that people who sign the oath are as likely to vote "yes" in the hypothetical referenda as they are in the real one. This result supports the notion that people are capable and willing to provide the equivalent of "real" responses to hypothetical questions after the oath is signed.

We asses the robustness of these two results by conditioning the effect of the treatments on participants' characteristics. Table 3 provides the results from a probit regression of the

[4] A survey handed out after the experiment ended asked subjects, in addition to the other relevant statistics, to state the approximate yearly income of their parents, not their own income. Given the average participant was approximately 21 years old, parent income was decided to be a more revealing statistic.

Table 2: Proportion tests

Test	Z statistic	p-value
Real: with oath VS no oath	0.800	0.21
Hyp: with oath VS no oath	1.652	0.05
Real VS Hypo: no oath	3.405	0.00
Real VS Hypo: with oath	0.774	0.22
Real no oath VS Hypo with oath	1.686	0.05

Note. The last two columns report the statistic and p-value of 2×2 non-parametric comparisons between treatments.

decision to vote "yes" on individual characteristics and treatments effects measured by three dummy variables (*Hypothetical*, *Hypothetical* × *Oath* and *Real* × *Oath*). The reference observation is a male from Midwest neither democrat nor republican in *Real*.[5] The effect of covariates is quite in line with what have been found in similar studies. Women were significantly more likely to vote "yes" than men, a result consistent with the literature on charitable giving (see, for instance, Andreoni, Brown, and Rischall, 2003, who found women are more likely to give to charitable organizations when contributions are small). We find that being from the West Coast (generally considered either California, Oregon or Washington) significantly decreased the likelihood of voting "yes". This support the results from Gittell and Tebaldi (2006) that find substantial variation in charitable giving among U.S states. Additionally, while California and Oregon were ranked slightly above average in terms of charitable giving in 2002, they find that Washington was well below average. Last, parental income does not significantly impact voting behavior. Income insignificance is consistent with Forbes and Zampelli (1997), but not Bowen (1999) who estimated Canadians with twice the income were twice as likely to volunteer for public service relative to poorer Canadians.

The treatment effects are very robust to this conditioning. The coefficient associated with the dummy variable *Hypothetical* is positive and significant at the 1% level, indicating a clear hypothetical bias. Being in the hypothetical treatment induces a 34.5% increase in the probability of "yes" as compared to real. The interaction term *Hypothetical* × *Oath* measures the treatment effect of implementing an oath in the hypothetical treatment. The effect is

[5]We also regressed the variance on *Hypothetical* but found no evidence of heteroskedasticity. The associated LR statistic and p-value are -0.21 and 0.645. These regressions follow up on Louviere (1996) suggestion that the distribution of hypothetical stated preferences may have a larger variance than that for real responses, and Haab, Huang, and Whitehead (1999) point that heteroskedasticity should be tested and corrected for if necessary in tests for hypothetical bias.

Table 3: Probit regression

	Coefficient	Odds ratio	p-value
Treatment effects			
Constant	0.255	-	0.698
Hypothetical	1.140	0.347	0.000
Hypothetical × Oath	-0.677	-0.213	0.032
Real × Oath	0.242	0.063	0.469
Participant's characteristics			
Female	0.628	0.173	0.007
Age (years)	-0.002	-0.001	0.935
Income (×10k$ per year)	0.003	0.001	0.885
Pacific coast	-0.561	-0.183	0.098
South	-0.720	-0.249	0.191
East	-0.620	-0.209	0.194
Democrat	-0.004	-0.001	0.991
Republican	-0.314	-0.089	0.269

Note. Probit regression of individual yes vote on treatment dummies and individual characteristics. Joint nullity test: LR = 29.26 with p= 0.002. Obs. prob = 0.762 ; Pred. prob = 0.799

negative (-0.677), and significant ($p = 0.032$). Conditionnal on observable heterogeneity of the subject pool, the oath induces a 21.2% decrease in the probability of "yes" votes in the hypothetical context. The conditioning further weakens the effect of oath in the real context: the oath induces a slightly higher (6.1%) rate of "yes" answers, which is far from being significantly different from 0 ($p = 0.469$). A Wald test cannot reject the null hypothesis that $Hypothetical \times Oath + Real \times Oath = 0$ (Wald=2.15 with $p = 0.142$). This indicates that the probability of saying "yes" in hypothetical with oath is not statistically different from the probability of saying "yes" in real.

4 Conclusion

Preferences elicitation methods – even relatively straightforward approaches like a binary voting referenda – can suffer from hypothetical bias. Herein we explore in a referendum experiment whether signing a solemn oath to tell the truth can reduce hypothetical bias. Our results suggest the oath can work to eliminate the hypothetical bias: the oath causes hypothetical "yes" response rates to significantly decrease, while real "yes" response rates remained statically identical. Having subjects (freely) sign an oath to provide honest answers

makes them more likely to do so even without any actual economic commitment.

Beyond the particular application of our results to contingent valuation studies, this evidence suggests one can improve the accuracy of preferences elicited in the lab through commitment devices such as an oath. This will remain a speculative interpretation of our results as long as oath has not been applied to a wider range of experimental applications. Further research will explore this avenue.

References

Andreoni, J., E. Brown, and I. Rischall (2003): "Charitable Giving by Married Couples: Who Decides and Why Does It Matter?," *Journal of Human Resources*, 38(1), 111–133.

Arrow, K., R. Solow, P. R. Portney, E. E. Leamer, R. Radner, and H. Schuman (1993): "Report of the NOAA Panel on Contingent Valuation," *Federal Register*, 58(10), 4601–4614.

Bowen, K. (1999): "Religion, Participation, and Charitable Giving: a report," *Ottawa: Volunteer Canada.*

Burger, J. M. (1999): "The foot-in-the-door compliance procedure: A multiple-process Analysis and Review," *Personality and Social Psychology Review*, 3, 303–325.

Charness, G., and M. Dufwenberg (2006): "Promises and Partnership," *Econometrica*, 74(6), 1579–1601.

Cummings, R. G., S. Elliott, G. W. Harrison, and J. Murphy (1997): "Are Hypothetical Referenda Incentive Compatible?," *Journal of Political Economy*, 105(3), 609–621.

Deisenroth, D., J. L., and C. Bond (2009): "Non market valuation of off-Highway vehicle recreation in Larimer County, Colorado: Implications of trail closures," *Journal of Environmental Economics and Management*, 90(11), 3490–3497.

Diamond, P. A., and J. A. Hausman (1994): "Contingent Valuation: Is Some Number better than No Number?," *Journal of Economic Perspectives*, 8(4), 45–64.

Ellingsen, T., and M. Johannesson (2004): "Promises, Threats and Fairness," *Economic Journal*, 114(495), 397–420.

Forbes, K. F., and E. M. Zampelli (1997): "Religious Giving by Individuals: A Cross Denominational Study," *American Journal of Economics and Sociology*, 56(1), 17–30.

Gittell, R., and E. Tebaldi (2006): "Charitable Giving: Factors Influencing Giving in the U.S. States," *Nonprofit and Voluntary Sector Quarterly*, 35, 721–36.

Haab, T. C., J.-C. Huang, and J. C. Whitehead (1999): "Are Hypothetical Referenda Incentive Compatible? A Comment," *Journal of Political Economy*, 107(1), 186–196.

Harrison, G. W., and E. E. Rutström (2008): "Experimental Evidence on the Existence of Hypothetical Bias in Value Elicitation Methods," in *Handbook of Experimental Economics Results*, ed. by C. R. Plott, and V. L. Smith, vol. 1, chap. 81, pp. 752–767. Elsevier, Amsterdam.

Jacquemet, N., A. James, S. Luchini, and J. Shogren (2010): "Social psychology and environmental economics: a new look at ex ante corrections of biased preference evaluation," *CES Working Paper*, (16).

Jacquemet, N., R.-V. Joule, S. Luchini, and J. Shogren (2009a): "Do people always pay less than they say? Testbed laboratory experiments with IV and HG values," *GREQAM WP*, 09(44).

——— (2009b): "Eliciting Preferences under Oath," *CES Working paper*, 09(43).

Joule, R., and J. Beauvois (1998): *La soumission librement consentie*. Presses Universitaires de France, Paris.

Kiesler, C., and J. Sakumura (1966): "A test of a model for commitment," *Journal of Personality and Social Psychology*, 3(3), 349–353.

Loureiro, M., J. Loomis, and M. Vazques (2009): "Economic valuation of environmental damages due to the Prestige oil spill in Spain," *Environmental and Resource Economics*, 4(4), 537–553.

Louviere, J. (1996): "Combining Revealed and Stated Preference Data: The Rescaling Revolution," *Paper presented at the Association of Environmental and Resource Economists workshop, Lake Tahoe, Calif.*

Murphy, J. J., T. Stevens, and D. Weatherhead (2005): "Is Cheap Talk Effective at Eliminating Hypothetical Bias in a Provision Point Mechanism?," *Environmental and Resource Economics*, 30(3), 327–343.

Schlesinger, H. J. (2008): *Promises, Oaths, and Vows: On the Psychology of Promising*. Analytic Press, New-York (NJ).

Svensson, M. (2009): "The value of a statistical life in Sweden: Estimates from two studies using the "certainty approach" calibration," *Accident Analysis and Prevention*, Forthcoming.

Sylving, H. (1959): "The Oath: I," *The Yale Law Journal*, 68(7), 1329–1390.

A Sample characteristics

Statistic	Percent (N=184)
Gender	
Male	52.71%
Female	47.28%
Age	
average	20
max	47
min	17
Location	
Midwest	78.88%
Pacific Coast	10.32%
East Coast	4.89%
South	3.80%
Not born in the U.S	2.17%
Parent Income (k$ per year)	
0 to 15	6.52%
16 to 35	8.69%
36 to 70	36.95%
71 to 90	12.50%
91 to 120	21.19%
121 to 200	8.15%
201 +	5.97%
Politics	
Green Party	0.54%
Democrat	29.34%
Republican	46.73%
Libertarian	4.89%
Independent	18.47%