



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

University of Wisconsin-Madison
Department of Agricultural & Applied Economics

December 2003

Staff Paper No. 466

**Hijackers and Hostages in Non-Binding Linked-Issues
Referenda: Analysis and an Application**

By

Timo Goeschl

**AGRICULTURAL &
APPLIED ECONOMICS**

STAFF PAPER SERIES

Copyright © 2003 Timo Goeschl. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Hijackers and hostages in non-binding linked-issues referenda:

Analysis and an application

TIMO GOESCHL^{*}

*Department of Agricultural and Applied Economics, University of Wisconsin-Madison, Madison 53706,
USA.*

Email: goeschl@aae.wisc.edu

Abstract

Non-binding referenda ('petitions') are an instrument of direct democracy that allows citizens to signal preferences to politicians outside the electoral cycle. This paper analyses a particular form of petitions, so-called linked-issues petitions, which have been described as an 'abuse of direct democracy'. It discusses the use of linked petitions by petition initiators, its take-up by voters in terms of volume and voter motives, and applies the analytical insights to a controversial referendum held in Austria in 2002 that linked issues of transboundary nuclear risk and Eastern enlargement of the European Union.

^{*} This paper has also greatly benefited from the comments of an anonymous referee of this journal as well as those of Andreas Kontoleon. I would also like to thank participants of the Cambridge Research for the Environment Workshops and at the conference on "Sustainable Development in Central Europe" at the University of Minnesota, in particular Michael Getzner, for helpful discussions. The usual waiver applies.

1. Introduction

Non-binding referenda are a popular instrument of direct democracy used in several U.S. states, European countries and public bodies (such as universities). Their stated function is to allow voters to signal their preferences about specific issues outside the electoral cycle to elected representatives without relieving representatives of their decision power. The success of a non-binding referendum is commonly measured in terms of its ability to draw voters to the ballot box. A simple analysis of the participation decision (see section 2) shows that the main challenges for these exercises of direct democracy to recruit voters are free-riding and benefit uncertainty. Linking two issues together in one referendum can be seen as a means for its initiators to respond to these problems by using a popular issue as a vehicle to propel an initiative with much lower chance of electoral success.

Whether issue linkage is in fact a successful response to the problem of voter recruitment in referenda is of interest to politicians, voters and students of public choice. In this paper, I make an attempt to explore analytically and through an empirical example the use of issue linkage by initiators of petitions and its take-up by voters. I also examine the issue of ‘instrumentalization’ since issue linkage has been criticized in policy circles as an ‘abuse of direct democracy’ and as an attempt to ‘hijack’ or ‘instrumentalize’ political issues with widespread support in the population for ulterior purposes.¹ It turns out that a practical definition of ‘instrumentalization’ is helpful for identifying classes of voters participating or abstaining from such a non-binding referendum. I illustrate this analysis with the help of the example of the so-called ‘anti-Temelin’ petition held in Austria in 2002 over the linked issues of Eastern enlargement of the European Union and the operation of a Russian-design nuclear power plant in the Czech Republic.

There is a sizeable literature on the political economy of direct democracy to which this paper contributes. This literature has stressed the importance of heterogeneous costs of participation, free-riding of non-voters on voters, and ‘expressive voting’ for explaining the

results of democratic processes (for a survey, see Mueller 2003). A number of papers on referenda, in particular those on nuclear referenda (Fort and Bunn 1998, Feigenbaum et al. 1988), are closely related to the present paper. I build specifically on the formulation of the voting problem in the presence of voting hurdles developed in (Fort and Bunn 1998) to model participation behavior. One significant difference to that paper is that I consider exclusively petition-style referenda. These are referenda in which the only choice for the voter is to participate or not.² The second important extension is that linked-issues petitions take place in a two-dimensional issue space, which creates additional layers of complexity regarding the voters' decision on whether to participate or not. The third important difference is that the decision to participate can no longer be separated from the voter's preferences regarding the nature of the political process itself. Voters may base their participation decision not only on the substance of the linked petition, but also on the political context in which issues were linked. In other words, the nature of the issue space of the petition and the nature of the process that created the issue space can no longer be separated.

To integrate these additional complexities into the model, the analytical part of the paper develops a modified participation decision model. This enables us to identify a number of distinct effects that jointly determine participation. In the empirical part, the modified participation decision model is implemented through the use of a number of instrumental variables in order to empirically establish the relative strength of the effects identified in the analytical part. Because of identity of individual voters cannot be established, mutually irreconcilable conclusions have been drawn about who participated in the petition under consideration here, predominantly on the basis of pre-petition telephone survey data (ÖGfE 2002, Plasser and Ulram 2002). This paper makes use of the availability of spatially disaggregated data from the actual referendum in order to inform the empirical analysis of voter turnout and to disentangle the motives for participation.

The paper develops in five sections. In the following section, the theoretical background is covered and a modified participation decision model for linked-issue petitions is set out. In

section 3, the relevant background to the empirical example is presented. The empirical approach is set out in section 4, followed by a presentation of the econometric results in section 5 and concluding observations in section 6.

2. Petitions, and the problem of issue linkage

Petitions are a very particular device for aggregating preferences in the population. A petition restricts the vote to the binary choice of participation (or not) in support of a single 'project' or policy scenario (e.g. not to allow the commercialization of genetically modified crops) rather than allowing a choice between various competing alternatives. Participating in a petition and voting in its support are therefore essentially equivalent. The outcome of a petition is measured in terms of absolute level of participation only, with some threshold level of participation required before representatives need to give further consideration to the substance of the referendum.

From the individual voter's point of view, participation in a petition is a discrete decision. Some type of threshold decision model by the individual voter is therefore a common element of the literature on participation in referenda. In its most rudimentary form, the model 'predicts' participation of voter i if and only if

$$E[B_i] > C_i \quad [1]$$

i.e. if the expected benefits associated with voter i 's participation in the vote on the left-hand side of expression [1] exceed the participation costs in terms of inconvenience costs, social costs (compliance pressure) etc. on the right hand. As the literature documents, this formulation of the voter's decision problem has an elegant simplicity, but contains a number of difficulties. The first difficulty is well-known, namely that if all voters act on the basis of expression [1] there is a serious free-rider problem in the voting process. This problem is generic to any form of democratic process in that unless voter i believes to possess the decisive vote, the benefits received after the poll are not conditional on his decision to participate and any positive level of

cost (net of some intrinsic benefit from going to the ballot) will deter participation. The second difficulty is less well covered in the literature and refers to the uncertainty over the benefits of voting and is specific to non-binding referenda. Uncertainty arises because voter i cannot know before the poll at what level of participation elected representatives will act upon the result and – with the referendum being non-binding - if they do, in what form. In other words, even if the voter was perfectly informed about the participation of all other voters, she would not know whether her vote is decisive, and if it was, what policy will result from the referendum. Together with the cost of participation, free-riding and uncertainty over benefits deter a significant proportion of voters from participating in a petition whose substance they support. Evidence on Austria shows that these deterrents are empirically important, with the difference between the expressed desire to participate and actual participation estimated to lie in the order of 25 percent (ÖGfE 2002).

Issue linkage in petitions can be seen as an attempt by petition initiators to counter the problem of participation by linking a particular issue, say **A**, with a modest chance of attracting a significant turnout in the face of free-riding and uncertainty over policy benefits to an issue with widespread support, say **B**. The intuition is that linkage raises the expected benefits of participation for a significant proportion of the voting population and thus induces more voters to attend the poll. Under the most favorable set of circumstances, a linked petition attracts a high number of additional voters without deterring voters for the initial policy **A**.

Issue linkage has been criticized by some observers (see footnote 1) as an attempt to 'instrumentalize' or 'hijack' an issue. One way to interpret these terms is to contrast the composition of voters for the linked petition, denoted by **AB**, against the hypothetical single-issue petitions, denoted by **A** and **B**. Then 'instrumentalization' has two aspects. The first is what might be termed the 'hostage effect': Linkage 'instrumentalizes' voters in favor of **A** in that they participate - because of a linkage - in a petition linked to issue **B** even though they would not have participated in a single-issue petition on **B**. The second aspect of 'instrumentalization' is the 'hijacking effect', defined here relative to **A**: The linked petition **AB** attracts the share of

voters who would not have voted for the single issue **A**, but vote for **AB**. The prime motivation for these voters in participating in **AB** is their interest in propelling **B** rather than supporting **A**. In this sense, there is the possibility of 'hijacking' of issues by voters with primary interests in other policies. However, concern over 'instrumentalization' is likely to miss one important effect of issue linkage, namely the 'opportunistic effect' of recruiting voters who would not have participated in either one of the single issue petitions **A** or **B**, but participate in **AB**. These voters are therefore the real beneficiaries of issue linkage.

Prima facie, it could appear that given a suitable distribution of voters, namely a high volume of potential 'hostages' and 'opportunists', issue linkage is a convenient method for a set of 'hijackers' to increase participation above the level of a single-issue petition. However, two problems arise when linkage is carried out. The first problem is that for most realistic levels of participation cost, linkage in itself generally decreases the area in issue space from which voters can be recruited. This is demonstrated through the use of a spatial model in the appendix. The restriction of issue space imposes conditions on the distribution of voter preferences and hence restricts the choice of issues to which petition initiators can successfully link.

The second limit to the capacity of linkage to increase participation is that voters may derive a benefit from denying initiators of linked petitions their vote. This 'strategic abstention' can be motivated – for instance - by political motives such as the wish to limit the political capital an initiating party can gain from instrumentalizing a popular issue (in particular by voters of a competing party) or by ethical motives such as opposition to the practice of issue linkage. Strategic abstention arises in petitions because its binary nature allows voters to send only one signal, participation or abstention. A revised form of the voter's problem that takes the issue of strategic abstention into account includes the benefits from denying support to a petition on the left-hand side of expression [1] and can be written as

$$\{B|p_i = 1\} > \{C|p_i = 1\} + \{B|p_i = 0\} \quad [2]$$

where $p_i=1$ denotes voter i participating in a petition, and $p_i=0$ denoting non-participation. The benefits, conditional on voter i participating must therefore exceed the costs of participation **plus** the benefits from denying the initiating party implicit support. The magnitude of the benefits from strategic abstention is an empirical matter (see sections 3 and 4), but their impact on participation can obviously be considerable. At the level of aggregate participation, strategic abstention can be seen as a potentially significant countereffect to the ability of a linked-issue petition to recruit voters to the ballot box, in particular to take ‘hostages’. We return to this point below.

3. Empirical background

In the following sections, I give empirical substance to the modified threshold model of participation in non-binding linked-issue referenda by examining the outcome of an actual linked-issue petition, namely the ‘anti-Temelin’ petition held in Austria in January 2002 that linked the issues of Eastern enlargement of the European Union and transboundary nuclear risk. We first set out the procedural characteristics of this ballot and then discuss the relevant background to the vote before presenting the econometric results.

In the case of Austria, the instrument of a petition allows all eligible voters to cast an anonymous and confidential ballot over a set period (usually a week) at their local voting office in support of a petition to the parliament. As is typical for referenda, participation needs to exceed a certain threshold for political action to result. The formal threshold, exceeding which the petition has to be given nominal consideration, is set at 100.000 votes. The politically important informal threshold is usually considered to be one million signatures, corresponding to roughly 17 percent of the eligible vote, which was crossed only by two of the 29 national petitions held since 1955.³ On the other hand, substantive components of petitions that fall short of the threshold are not infrequently incorporated into subsequent policy, thus blurring the

threshold. Constitutional requirements for the initiation of a petition are low enough such that a petition can typically be initiated by a single political party or NGO.

The immediate motivation for the so-called 'anti-Temelín' petition has arisen by virtue of the siting of a nuclear power plant in the Czech Republic (CR) roughly 60 km from the border of neighboring Austria. This power plant consists out of two 1000MW pressurized water reactors based on an originally Russian design. The first reactor commenced operations in 2001 in the face of protests regarding the safety of the power plant by neighboring Austria, a country significantly affected by the Chernobyl disaster. It was accidental that the decision to commence operations at Temelín coincided with the accession negotiations between the CR and the European Union (EU), a process which requires the unanimous consent of the current members of the EU, of which Austria is one. In the relevant petition targeted against the nuclear power plant at Temelín and initiated by the 'Freedom Party', voters were invited to support a parliamentary motion that the government be prevented from signing the accession treaty of the CR to the EU until the nuclear power plant at Temelín is shut down. Over the voting period between January 14 and 21, 2002, the total number of valid ballots cast in support of the petition regarding the nuclear power plant at Temelín was 915,220 out of 5,892,692 eligible, a share of 15.53 percent. With this turnout, the petition fell short of the politically important threshold of one million votes, but it raised fundamental questions regarding the use of issue linkage in petitions before and regarding the interpretation of the outcome after the vote.

The 'anti-Temelín' petition linked two issues that differ markedly in their popularity. While only about 40 percent of the population responded that they opposed the Eastern enlargement around the time of the referendum (Plasser and Ulram 2002), various polls put the share of voters that declare opposition to the civilian use of nuclear power in general between 75 and 80 percent (ÖGfE 2002, MRM 2002). This almost universal appeal of antinuclear policies is commonly seen as the explanation why the issue of Temelín is an attractive candidate for a linked petition for an initiating party with an interest in blocking the Eastern enlargement of the EU (ÖGfE 2002, Plasser and Ulram 2002). It suggests firstly a significant number of voters who

can be taken 'hostage', i.e. who will vote for a petition involving a veto on EU enlargement because the very same petition also targets a source of transboundary nuclear risk. Secondly the preference distribution makes is highly probable on the one hand that 'hijackers' are present in the voting population who will participate despite the linkage of the petition to a nuclear energy issue (for which they would not have voted in a separate petition), and on the other that there are very few voters to be deterred by adding the dimension of nuclear risk to the issue of EU expansion.. And thirdly, it points to a potentially sizeable share of 'opportunists' who can be recruited exclusively through issue linkage.

With voting anonymous, the interpretation of the result of the Temelín petition has been highly controversial. Because the petition linked the issues of EU enlargement and Temelín, there is an identification problem regarding the relative important of each individual issue in separation. Does the vote indeed express voters' concern about Temelín? Or was the widespread anti-nuclear feeling in the population - this is a suspicion frequently voiced- 'hijacked' by opponents of EU enlargement? We take these questions up in the following part.

4. Model and estimation results

The estimation presented here relies on spatially disaggregated voting record. In particular, it builds on the results from 121 highly heterogeneous voting districts. The unit of aggregation is therefore not the individual voter as in other examinations of voting over environmental policy (Mehmood and Zhang 2001, Burkey and Durden 1998, Hamilton 1997), but the aggregate size of the share of votes attracted by the petition in each district. This grouped data is used as the regressand in a weighted least squares (WLS) estimation of a logit model.

The standard approach to grouped data analysis can be applied to the perfect geometrical model by modeling the marginal voter in each district based on the local turnout for the petition and the district-level data on the instrumental variables we will employ. This widely-used approach is generally known as the 'analysis of proportions data' (see for example Greene 2002).

Here each district i is characterized by a vector $[n_i, Y_i, \mathbf{x}_i]$ with n_i denoting the number of eligible voters, Y_i the turnout for the vote, and \mathbf{x}_i a vector of common characteristics of the voters within district i . It is then easy to show (see Greene 2002) that a valid estimation procedure relating Y_i to \mathbf{x}_i is given by the so-called logit of Y_i

$$\ln\left(\frac{Y_i}{1-Y_i}\right) = \boldsymbol{\beta}'\mathbf{x}_i. \quad [3]$$

The unbiased and efficient estimator of this model is the weighted least squares estimator

$$\hat{\boldsymbol{\beta}} = \left[\sum_i w_i \mathbf{x}_i \mathbf{x}_i' \right]^{-1} \left[\sum_i w_i \mathbf{x}_i y_i \right] \quad [4]$$

calculated using the known⁴ weights w_i with the property

$$w_i = [n_i \Lambda_i (1 - \Lambda_i)]^{\frac{1}{2}} \quad [5]$$

with Λ_i denoting the (estimated) logistic cumulative probability (i.e. the logit) associated with observation i .

The dependent variable y_i used in this regression is the logit of the turnout Y_i in each district. The estimation procedure on the regressand y delivers a vector of coefficients $\hat{\boldsymbol{\beta}}$ associated with the vector of characteristics \mathbf{x} of the marginal voter. In keeping with the modified threshold model [2], these characteristics should capture the decision-relevant components of the voting population, pertaining to either the benefit or the cost side of the participation threshold.

Since the estimation deals with a linked-issue petition, the benefit side has two principal components, one for each issue. The first component is related to the expected utility gained from a closing down of the nuclear power plant while the second is related to the utility of a veto of the accession of the CR to the EU. Since neither benefit can be directly measured, we need to develop a number of empirically observable variables that can proxy for these underlying measures. Table 1 gives an overview of the variables and data used.

We empirically implement the expected benefits related to a discontinuation of Temelín through a measure of the district-specific expected damage avoided through its shutdown. These

expected accident-related damages will depend positively on both the probability of being affected by an accident at Temelín and the expected value of the marginal damage to assets in case of an accident as well as the expectation regarding the impact of these damages on utility. The probability of being affected is a function of both space and time. In intertemporal terms, it is the cumulative risk over a relevant time horizon (such as the lifetime). This is captured through a demographic variable (AGE70). In spatial terms, the risk is determined by the distance from the (fixed) accident site and of the topography of the area lying between the accident site and the district. In the empirical part, we concentrate on the distance (DISTANCE) between the districts and the nuclear power plant based at Temelín. The value of the assets at risk is more difficult to quantify. In the context of radiation, we focus on human capital assets such as the human capital in the population (EDU1 and EDU2), and the demographics of offspring (AGE15). To take into account the marginal nature of the potential damage from radioactive contamination, we include a measure of the present radioactive soil contamination in the political district as a result of the accident at Chernobyl (LCS).

The expected damages from EU enlargement are implemented through ideological preferences. As instrumental variables for ideology, we use data on the share of the vote achieved by parties in the national election in late 1999, in particular the shares of the political party that championed the blocking of EU enlargement in the 1999 parliamentary election and initiated the ‘anti-Temelín’ petition (FPQ).⁵ Since adverse impacts of EU enlargement on voters are generally expected to operate through the labor market, we include two labor-market related measures as instrumental variables for voters’ economic considerations. The first is the district-level rate of unemployment (UNEM) as a measure of job insecurity. The second is perceived displacement of local workers by workers from Eastern Europe, who make up the vast majority of those requiring a work permit. This is captured in the displacement variable included in the model (DISP) that measures the ratio of work permits issued to foreigners in the political district relative to the district-level rate of unemployment.

A critically important variable in the theoretical model is the cost of participation. As discussed previously, this cost has various components (time, travel cost, opportunity costs, social costs), many of which are not directly observable. To capture the cost of participation, we include two measures: A measure of income in the political district (INCOME) as an indicator of the opportunity costs of time, and the negative logit of the average participation in the last nine petitions since 1996 in each district as an indicator of structural participation cost (COST). The participation data shows structural heterogeneity of 'political proclivity' within Austria that we capture through this variable choice. In other words, political districts differ systematically in the extent to which voters can be mobilized to participate in referenda. The reliance on a behavioral variable to measure participation cost suffers from the drawback of the possible interaction with ideological preferences. However, we could find no statistical evidence of a correlation between structural participation cost and any of the instrumental variables for ideological preferences used in the estimation. This may be explained by the fact that the nine petitions launched since 1996 were initiated by parties across the political spectrum. Previous analysis has indicated the importance of regional political mobilization in the Temelín petition (Plasser and Ulram 2002). This mobilization was most pronounced in two provinces of Austria, Carinthia and Upper Austria where significant resources were spent by the initiators of the petition to recruit voters. These exogenous factors decreased participation cost in the Anti-Temelín vote relative to previous petitions.⁶ We capture the presence of these province-specific effects in two dummies in the equation, one for Carinthia (CAR) and one for Upper Austria (UP).

The last component of the modified threshold model [2] are the benefits from abstention. These are the benefits that accrue to voters that derive a benefit from denying the initiating party their vote. These benefits are operationalized through ideological variables that capture the share of voters that voted for parties favorable to a discontinuation of the use of nuclear power but opposed to the initiators of the petition (GRQ).

Table 1: Variable descriptions

Variable	Description	Min	Max	Mean	Source
Dependent	Ratio of votes in support of petition to eligible votes	0.06	0.48	0.18	BMI
<i>Demographics</i>					
DISTANCE	Distance of capital of political district to nuclear power plant in km	68.62	407.90	206.1	BEV
LCS	Log of the average soil contamination with Caesium 137 of soil sample points in political district on May 1, 1986 in kBq per m ²	1.33	4.12	2.6	FEA
AGE15	Ratio of number of children under 15 years of age to number of eligible voters	0.08	0.44	0.23	STAT
AGE70	Share of voters of age 70 years and above	0.06	0.30	0.16	STAT
EDU1	Share of eligible voters with a high school degree as highest educational attainment	0.02	0.23	0.06	STAT
EDU2	Share of eligible voters with a university degree as highest educational attainment	0.01	0.28	0.05	STAT
<i>Ideology</i>					
GRQ	Share of vote for the Green Party in 1999 parliamentary elections	0.02	0.20	0.07	BMI
FPQ	Share of vote for the Freedom Party in 1999 parliamentary elections	0.18	0.43	0.27	BMI
<i>Economics</i>					
INCOME	Average annual taxable income of earners in political district in 1999 in 1000 EURO	23.80	57.62	34.50	STAT
UNEM	District-level rate of unemployment	4.3	15.9	9.1	AMS
DISP	Ratio of employees requiring work permit to unemployed	0.07	2.78	0.74	AMS
<i>Participation</i>					
COST	Negative logit of average participation in preceding nine petitions	2.26	3.28	2.60	BMI
CAR/UP	Provincial dummies	0	1	N/A	N/A

5. Estimation results

In this section we present the estimation results for the regression model expressed in equation [4] using the relevant variables detailed in the previous section. Table 2 presents the results for the WLS regression and the expected sign for each coefficient. The three most

significant findings are that - first of all - the specification chosen on the basis of the geometrical model achieves a good overall fit. This supports the empirical usefulness of the theoretical approach developed in section 2. The second important finding is the overwhelming dominance of spatial factors in explaining participation in the petition. This points towards the relative importance of the expected damages associated with the nuclear power plant as a driving force in voters' participation and can be interpreted as evidence for the 'hostage effect'. The third is that the coefficients of the two ideological variables differ substantially in statistical terms. This helps to identify the presence of the 'hijacking' and 'strategic abstention' effects. We comment on these findings in greater detail below.

In our estimation, proximity to Temelín stands out as the overriding factor explaining participation in the vote. The distance from Temelín explains almost half of the variance in the dependent variable. Consistent across the models is a linear decline in the odds ratio of participation of between 0.25 to 0.4 percent per km distance. This highlights the role of the probability of being affected by an accident at Temelín in explaining participation in the petition and corroborates earlier survey findings on the motivation for signing the petition (ÖGfE 2002).⁷ The high participation rates in areas close to Temelín suggests that in these districts, participation in a single-issue petition on Temelín only would have been significantly above the average petition participation rate. Conversely, the decline in the odds ratio also shows that with increasing distance, the share of the population recruitable for the petition decreased systematically. The strength of the spatial effect implies that issue linkage made it possible to recruit a significant volume of voters as 'hostages' by tying together the issues of Eastern enlargement and Temelín.

Other components measuring benefits from the possible reduction of the transboundary nuclear risk represented by Temelín are also highly significant. The theoretical link between the age structure in the population and the cumulative risk from exposure to an accident is supported by the negative effect of the share of voters above 70 years of age on participation who face a much lower cumulative risk from the operation of Temelín than younger age groups.

On the other hand, a higher share of children under the age of 15 increases – as expected – the odds ratio. This effect can be explained both by reference to the human capital children represent for voters as well as to bequest motives.⁸ Likewise, a higher level of education in the district increases unambiguously the participation in the vote. Education up to university degree level roughly halves this effect, however. On the one hand, this is surprising as voters with higher human capital would be expected *ceteris paribus* to derive a greater benefit from a reduction in risk. On the other, the reduction in participation can be interpreted by reference to these voters basing their voting decision on a more informed estimate of the benefits of voting for a highly unlikely policy scenario (see Plasser and Ulram 2002) and by reference to these voters behaving in politically more sophisticated ways, such as abstaining for strategic or procedural reasons. In other words, more educated voters may be more inclined to elude the ‘hostage’ effect.

A final determinant of participation is experience of previous nuclear contamination as a result of a nuclear accident (LCS). The estimation shows that voters living in districts with a higher stock of radioactive soil contamination following Chernobyl are less likely to participate in the petition. This is contrary to the expected sign of the coefficient based on the conjecture that the marginal damage curve being increasing in the stock of radioactive material in the environment would increase the benefits from a discontinuation of the Temelín plant for voters in areas with a higher stock of existing contamination. One way to interpret this finding is that voters’ experience of the welfare effects of a nuclear accident may be positively related to the stock of radioactive contamination. In this case, the marginal damage effect would be interacting with an ‘affective’ effect studied in the literature on risk perception, which predicts that voters with less experience of a risk have a higher willingness to avert exposure to it (Kahneman 1994, Kahneman and Snell 1992), which would explain the empirical finding.

On the matter of EU enlargement, instrumental variables capturing the ideological and economic orientation of voters were used. The estimates show that there is no statistically significant evidence of ideologically driven support. Districts with a higher share of voters

supporting the party that initiated the ‘anti-Temelín’ petition and opposed EU enlargement in the 1999 national elections (FPQ) do not experience a systematic increase over average petition participation in the anti-Temelín vote. The result is significant for the interpretation of the petition since it indicates that few voters participated exclusively on the basis of the petition offering an opportunity to delay the EU accession of the CR. In the vernacular of the analytical section, we can say that there is little evidence for the ‘hijacking’ effect being present in this petition result. Similar results emerge from a measure of the economic dimensions of EU enlargement to the East. Employees observing a high degree of substitution of local workers by ‘cheaper’ labor from Eastern European countries could be expected to favor a delay of EU enlargement in order to decrease labor market competition. However, there is no evidence that the rate of unemployment (UNEM) or perceived displacement of workers by foreigners (DISP) impact significantly on the turnout.

While not driving the ‘hijacking effect’, ideological factors appear to be important drivers of strategic abstention. The estimation shows that a percent increase in the share of the vote for the Green Party in the 1999 national elections is associated with a reduction in the odds ratio of participation in the Temelín petition by 9.8 percent. This finding lends strong empirical support to the idea that voters derive a benefit from withholding their votes if these would go towards a petition initiated by a political opponent. This runs counter to the ‘hostage’ effect since voters for the Green Party could be expected to share a strong sentiment against the operation of nuclear power plant in close proximity to the national border.

Participation costs (INCOME and COST) have a clear negative effect on participation in the Temelín vote. Those districts with high income or high structural cost (indicated by generally weak participation on average) were systematically less likely to produce a high turnout in this petition as well. It is also clear from the results on the provincial dummy variables (CAR and UP) that by spending resources, initiators of petitions can significantly reduce participation costs. In the case at hand, resources spent on decreasing participation costs roughly halved the

impact of these costs on the odds ratio for participation.⁹ This allows recruiting voters who would not have turned out to vote in other parts of the country.

Table 2: WLS estimates for the Temelín logit

Independent Variable	Expected sign of coefficient	Estimated coefficient
DISTANCE	(-)	-0.002467*** (0.000381)
AGE15	(+)	0.852113* (0.510160)
AGE70	(-)	-1.874923*** (0.703632)
EDU1	(+)	3.044182** (1.748274)
EDU2	(+)	-1.558619* (1.0003641)
LCS	(+)	-0.043960* (0.025670)
GRQ	(?)	-4.584312*** (1.317003)
FPQ	(+)	-0.350770 (0.453224)
INCOME	(-)	-0.011500** (0.003970)
DISP	(+)	0.026949 (0.46827)
UNEM	(+)	-0.0081717 (0.010885)
COST	(-)	-0.686696*** (0.122183)
CAR	(+)	0.370696*** (0.080217)
UP	(+)	0.305580*** (0.069219)
Intercept		1.281654*** (0.392664)
No. observations		121
R ² (adj.)		0.923

Note: Standard errors are reported (in parentheses) below the coefficient estimates.
 *** Statistically significant at the 1-percent level
 ** Statistically significant at the 5-percent level
 * Statistically significant at the 10-percent level

6. Conclusion

In this paper, we have presented a number of analytical considerations regarding issue linkage in an important instrument of direct democracy, namely petitions. We find that initiators of petitions face considerable obstacles to recruiting a significant share of potential voters for the ballot due to free-riding and uncertainty over benefits. Linkage can therefore be seen as an attempt by initiators to increase the benefits from participation without raising the cost.

The analysis of issue linkage shows that there are three effects that work in favor of issue linkage, namely the ability to enlist otherwise non-participating voters (referred to as ‘hostages’ and ‘opportunists’ in the paper) and the ability to maintain existing supporters (‘hijacking’). However, two effects limit its use. The one is the restriction on issue space linkage imposes, while the more important one is the benefit it creates for voters to strategically abstain from the poll.

The empirical case discussed in the paper is characterized by a distribution of preferences that are ideally suited for issue linkage. Despite this, the petition did not cross the politically important threshold. We find that the issue linkage successfully recruited hostages to the polls, but that it also failed to generate a sizable hijacking effect. Finally, strategic abstentions further reduced the number of voters. These results highlight that linkage can be a useful instrument in order to overcome participation problems in petitions, but that there are theoretical limitations on its use of empirical relevance. The results from the provincial dummy variables demonstrate the significant reduction in the voting hurdle through spending resources on voter mobilization.

Appendix

This appendix demonstrates the impact of expanding the dimensionality of the set of alternatives on the area of issue space for the case of linked-issues referenda. Multi-dimensionality has been studied in social choice theory before in the context of majority voting procedures (Newing and Black 1951, Tullock 1967, Grandmont 1978, Caplin and Nalebuff 1988). We build on this literature, in particular on the analytical device of the 'perfect geometric model' (Tullock 1967), to explore the impact of increasing dimensionality on the participation of voters in a petition. One change we apply to the 'perfect geometrical model' is to introduce a cost for participating in the petition.

The two-dimensional representation of the perfect geometrical model assumes a uniform density function $g(.)$ defined over some issue space in \square^2 and restricted to a set $A = [0, 1]^2$. The preferences of each voter i are denoted by $Z_i = (v_i, t_i)$ where v and t is the additional dimension under consideration. Policy alternatives such as the status quo X and the petition P are denoted in v - t -space as (v_X, t_X) and (v_P, t_P) , respectively.

In keeping with the Tullock's geometrical model, the utility function of voter i is of the form

$$u_i(Z) = u(Z_i) = -\|Z_i - X\| \quad [6]$$

with X a fixed alternative in \square^2 . The utility function evaluates positions in the set of alternatives in terms of the Euclidean distance between the vectors Z_i and X . Euclidian utility functions require that the preferences over the two dimensions are linearly independent. This is the only type of relationship between the issues that we need to rule out in this context. Given participation costs c , voters will participate in the petition P offered as an alternative to the baseline scenario X if

$$-\|Z_i - P\| - c > -\|Z_i - X\| \quad [7]$$

Note that expression [7] governs the participation choice in a setting with an arbitrary number of dimensions. Given [7], the locus of the set of marginal voters in the two-dimension issue space A , $\{(v, t) | v=v_m, t=t_m\}$, is defined by the points t_m and v_m that fulfil the condition

$$-\sqrt{(v_m - p_v)^2 + (t_m - p_t)^2} + \sqrt{(v_m - x_v)^2 + (t_m - x_t)^2} = c \quad [8]$$

Expression [8] defines the boundary of a cone whose area is the share of votes for the petition. We can define a function $t_m = t_m(V, P, X, c)$ such that the share of votes S is given by

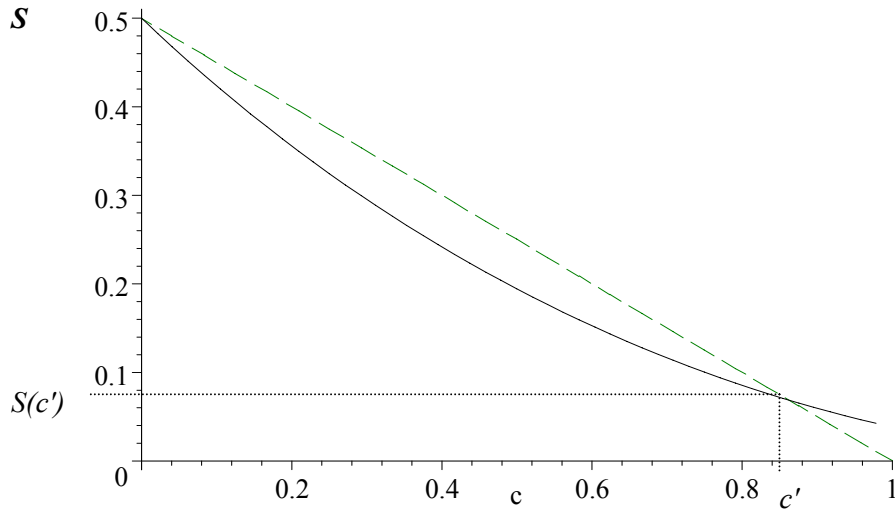
$$S = \int_{v_m(t=0)}^1 t_m(V, P, X, c) dv \quad [9].$$

For a given combination of V , P , X , and c , we can evaluate expression [9] numerically. Assuming corner locations for the status quo point X and the petition point P , we transform equation [9] into the share of eligible votes attracted by the petition:

$$\int_{\frac{1}{2}(c+2)\frac{c}{c+1}}^1 \left(v - \frac{c}{2(c^2 - 1)} \left(2vc - c^3 - \sqrt{4v^2 \left(2 - c^2 + \frac{c^2}{v} - \frac{c^2}{v^2} - \frac{2}{v} + \frac{1}{v^2} \right) + c^4} \right) - \frac{1}{2}c^2 \right) dv \quad [10]$$

Expression [10] can be evaluated numerically for some choice of c . The numerical analysis shows that the relative share of issues space covered by a linked versus single issue petitions is substantially determined by the cost of participating in the petition.

Figure 2: Share of votes S for single and linked petition under varying participation cost c



As figure 1 shows, single issue (dashed line) and linked petitions (solid line) do equally well in the absence of participation cost ($c=0$). As costs rise, however, the issue space covered by single-issue petitions dominates that covered by linked petitions *ceteris paribus* for most of the range of the cost parameter. This dominance is greatest for an intermediate range of costs. However, as the cost rises further we reach a point c' above which linked petitions achieve a higher share of the vote S . This means that only when costs increase to a point where almost all voters are deterred from participation, then a linked petition will cover a greater area of issue space than a single-issue petition.

Notes

¹ See for example the commentaries about the empirical case discussed in this paper in leading newspapers in Germany and Switzerland (SZ, Jan. 23, 2002, FAZ, Jan. 23, 2002, Welt, Jan. 23, 2002, Basler Zeitung, Jan. 23, 2002).

² As Fort and Bunn (1998) have shown, this decision dominates the decision in the voting booth by orders of magnitude. In petitions, several hurdle issues covered in Fort and Bunn (1998) do not arise since voters do not have to register in advance of the vote and there is no possibility of voting against the petition.

³ Since the population of Austria has been expanding over time, increasing the eligible vote from 4.8 million for the first petition in 1964 to 5.9 million in 2002, the relative importance of this threshold has been decreasing however.

⁴ The variance of the error term is heteroskedastic since it systematically depends on the group size n_i .

⁵ To ensure that the assumption about linear independence between the axes of the set of alternatives is not violated for the variables chosen as instruments, we ran an auxiliary regression on the relationship between *RATIO* and *DISTANCE* and *FPO* and *DISTANCE* and other distance measures to the closest border point of an Eastern European EU candidate country. If the ratio of Green to Freedom Party votes (or the share of votes for the Freedom Party) varied systematically with proximity to Temelín in particular or Eastern borders in general, then the variables used to model the t - and v -axes would be highly collinear and affect the interpretation of the results. However, the relationship between *RATIO* as well as *FPQ* and each one of the distance measures is not significant and in the case of *FPQ* consistently exhibits a positive coefficient. This means that the anti-EU enlargement stance in the 1999 national election did not enhance the political success of the Freedom Party in areas located closer to

the borders with candidate countries. More importantly still, it shows that the assumption about linear independence is not compromised through the particular choice of instrumental variables.

⁶ In Carinthia, the Freedom Party was the governing party at the time of the petition and therefore in a position to mobilize effectively its supporters for a petition it had initiated. Likewise, in Upper Austria, the mobilization of the population through both the Freedom Party, but also other anti-Temelín groups created significant bandwagon effects. See (Plasser and Ulram 2002) for an analysis.

⁷ This is an interesting empirical example of spatial discounting expressed through a petition device. A comparison between this disutility diffusion function and technical diffusion functions predicted by accident experts constitutes an interesting possible extension of the present work. See Perrings and Hannon (2001) for an analytical discussion.

⁸ Data on households with children under 15 would be have been more adequate, but this data is not available.

⁹ To check the robustness of the dummy variables, we ran estimations with a separate dummy for each province. Carinthia and Upper Austria are the only provinces differing at a 5 percent significance level from the other provinces.

Data Sources

AMS: Austrian Labor Market Service. Provides online data on labor market data. <http://www.ams.or.at>

BEV: National Mapping Agency. Provides online GIS data. <http://www.bev.gv.at>

BMI: Federal Ministry of the Interior. Election data etc.: <http://www.bmi.gv.at>

STAT: Statistical Office. <http://www.statistik.at>

References

- Burkey, M.L. and G.C.Durden (1998): The Political Economy of Clean Air Legislation. *Environmental and Resource Economics* 11, 119-134.
- Caplin, A. and B. Nalebuff (1988): On 64% majority voting. *Econometrica* 56, 787-814.
- Feigenbaum, S., L. Karoly and D. Levy (1988): When Votes Are Words Not Deeds: Some Evidence from the Nuclear Freeze Referendum. *Public Choice* 58(3), 201-16.
- Fort, R. and D.N. Bunn (1998): Whether One Votes and How One Votes. *Public Choice* 95(1-2), 51-62.
- Greene, W. (2002): *Econometric Analysis*. 5th edition. Prentice Hall.
- Grandmont, J-M. (1978): Intermediate preferences and majority rule. *Econometrica* 46: 317-330.
- Kahneman, D. (1994). New challenges to the rationality assumption. *Journal of Institutional and Theoretical Economics*, 150, 18-36.
- Kahneman, D., & Snell, J. (1992). Predicting a changing taste. *Journal of Behavioral Decision Making*, 5, 187-200.
- Kalt, J. and M. Zupan (1984): Capture and Ideology in the Economic Theory of Politics. *American Economic Review* 74(3), 279-300
- Mehmood, S. and D. Zhang (2001): A Roll Call Analysis of the Endangered Species Act Amendments. *American Journal of Agricultural Economics* 83(3), 501-12.

-
- MRM 2002, Survey of Austrian Attitudes Towards the Civilian Use of Nuclear Power. MAFO Report. Vienna.
- Mueller, D. (2003): Public Choice III. Cambridge: Cambridge University Press.
- Newing and Black (1951): *Committee Decisions with Complementary Valuation*. London: William Hodge.
- Österreichische Gesellschaft für Europapolitik (ÖGfE) (2002): *Ein Volksbegehren am Prüfstand*. Wien: ÖGfE.
- Pashigian, P. (1985): Environmental Regulation: Whose self-interests are being protected? *Economic Inquiry* 23, 551-584.
- Perrings, C. and B. Hannon (2001): An introduction to spatial discounting. *Journal of Regional Science* 41(1), 23-38.
- Plasser, F. and P. Ulram (2002): *Analyse des Volksbegehrens 'Veto gegen Temelin': Wer hat unterschrieben*. Wien: Fessel-GfK-Institut.
- Tullock, G. (1967): The general irrelevancy of the general impossibility theorem. *Quarterly Journal of Economics* 81(2), 256-270.