Universidade do Minho

Documentos de Trabalho

Working Paper Series

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**NIPE WP 5 / 2008**

NÚCLEO DE INVESTIGAÇÃO EM POLÍTICAS ECONÓMICAS
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**URL:**
http://www.eeg.uminho.pt/economia/nipe

* NIPE – *Núcleo de Investigação em Políticas Económicas* – is supported by the Portuguese Foundation for Science and Technology through the *Programa Operacional Ciência, Teconologia e Inovação* (POCI 2010) of the *Quadro Comunitário de Apoio III*, which is financed by FEDER and Portuguese funds.

# Referendum Design, Quorum Rules and Turnout[1]

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**Abstract**

What is the impact of different referenda designs on the willingness of the electorate to vote? In this article, we focus on quorum requirements. We use a rational choice-voting model to demonstrate that certain types of quorum requirements change the incentives each elector faces. In particular, participation quorums induce electors who oppose changes in the status quo and expect to be in the minority to abstain rather than vote. As a result, such quorums decrease turnout. We test this model prediction using data for all referendums held in current European Union countries from 1970 until 2007. We show that that the existence of participation quorums does increase abstention by 10 percentage points.

[1] We are very thankful to the participants at the Lisbon Discussion Group on Institutions and Public Policy at the Social Sciences Institute of Lisbon and the New University's Faculty of Economics, as well as to the participants at the seminar organized by the Núcleo de Estudos em Administração e Políticas Públicas of the University of Minho. In particular we wish to thank the very helpful comments of Susana Peralta, Paulo Trigo Pereira, António Tavares and Sílvia Mendes.

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There seems to be a curious disjuncture in the literature on referendums and electoral turnout. On the one hand, a large body of work has been produced not only about how direct democracy affects policy-making processes and policy outcomes in general, but also about how specific variations in the design of referendum rules are, in and of themselves, likely to be consequential from that point of view (for a review of this literature, see, e.g., Lupia and Matsusaka 2004). On the other hand, scholars interested in explaining electoral turnout have by now uncovered a series of robust relationships between turnout and institutional provisions such as compulsory voting, the electoral system, bicameralism, concurrent elections and other vote-facilitating rules, not to mention the impact of a broad set of political and socio-economic variables (see, e.g., Blais 2006; Geys 2006). And yet, these two strands of the political science literature have seldom met. While the extent to which variations in the institutional design of referendums affect turnout remains a virtually unstudied issue, we also know very little about whether the prevalent propositions about the causes of turnout, empirically supported in the study of legislative, presidential, state or local elections, also find support in what concerns referendums (for exceptions, see Filer and Kenny 1980 and Matsusaka 1993).

One particularly interesting aspect of referendum design concerns quorum rules. In many established democracies, the requirement of simple majority in order for a proposal to pass is coupled with a *participation quorum* or, instead, an *approval quorum* requirement (Venice Commission 2005a, 19). The adoption of such rules is typically seen as a way of avoiding distortions in outcomes resulting from low turnout (LeDuc 2003, 172). However, in recent years, referendum designers have been advised against adopting this sort of rules. On the basis of the Italian and Danish experiences, Uleri (2002) observed that quorum requirements have opened, for supporters of the status quo, an additional course of action: “to set up a campaign of non-mobilisation to the referendum vote”. In this way, abstention can be turned into the functional equivalent of a “No” vote and, as a result, turnout has been lower than what it could be without such quorum requirements. In its “Code of Good Practice on Referendums”, the European Commission for Democracy through Law, known as the Venice Commission, has advised against the adoption of any sorts of quorums in referendums because of the temptation of

"falsification of turnout rates" and the creation of awkward political situations where "the majority will feel that they have been deprived of victory without an adequate reason" (Venice Commission 2007, 22-23).

Our purpose is to shed some light into this discussion, both theoretically and empirically. We use a prototypal rational-choice voting model to highlight how the existence of quorum requirements does change the incentives each individual faces when deciding whether to vote or not. We show that participation quorums produce what can only be described as perverse and paradoxical effects: introduced in order to prevent distortions that result from low turnout, they contribute to decrease turnout and introduce distortions in referendum outcomes. We reach no such conclusions about approval quorums. We then test, and confirm, the main predictions of the model in what concerns the impact of quorums on turnout, using a dataset with information on the about one hundred referendums that have been conducted in the countries that are now members of the European Union from 1970 until today.

Besides theoretically and empirically investigating the consequences of quorum rules in turnout levels, we aim at providing two additional contributions to the literature. First, we will argue that typical ordinary least squares estimation is not the best form to empirically study turnout models with aggregate data. We propose an alternative methodology. Using a bottom-up approach, which starts at each individual's choice modeled as a binary choice model, we derive the implications of that choice for aggregate data and show that estimating a binary choice model, like a logit, is equivalent to estimating by weighted least squares a logistic version of the aggregated data. However, these weights do not represent an *ad hoc* choice. Instead, those weights are a precise consequence of the aggregation of the individual choices. Second, although there are several well-known propositions about the generic causes of turnout, most of the studies have been done while resorting to general elections data. By ascertaining their impact in turnout in referendums, we also provide a further test of the robustness of these propositions across different types of elections.

## A PROTOTYPAL RATIONAL-CHOICE VOTING MODEL

In some political systems, the outcome of a given referendum is determined simply by which option obtains the support of a majority of the actual voters. In other cases, however, this simple majority requirement is coupled with specific thresholds regarding the share of the overall electorate that participate or vote for any of the specific options. If there is a participation quorum, a change in the status quo (typically, the victory for the "Yes" option) requires the support of the majority of the voters and that a given percentage of registered voters take part in the vote. If there is an approval quorum, a change in the status quo requires the support of the majority of the voters and also the support of a certain percentage of the total electorate.

The first article that analyzes turnout requirements in referenda is Côrte-Real and Pereira (2004). Côrte-Real and Pereira are interested in accurate representation, i.e., whether outcomes under different rules are consistent with the whole electorate revealing their preferences through voting. They use a decision axiomatic approach to show that different types of quorums imply different assumptions about the interpretation of abstention. However, they do not show how the existence of quorum rules changes the incentives to vote.

We follow a different approach. We aim simply at illustrating how the existence of a quorum rule may change the incentives to vote. For that purpose, we abstract from every other aspects that may influence the decision of voting and derive a prototypal rational-choice model of voting. We start by assuming no frictions. E.g., following Fedderson and Pesendorfer (1999), we assume that voting is costless. According to this frictionless model, a defender of the referendum proposal will vote "Yes", an opponent will vote "No", and only those who are indifferent should abstain. Then we add frictions (quorum rules), and analyze if they are neutral or, instead, if they change voting incentives.

We derive a rational-choice model of voting. Our objective is not to provide a general model to explain turnout: for that purpose, a simple rational-choice model, like the one we consider, would be insufficient, and some interesting alternatives, like behavioral models of turnout (see Bendor et al. 2003), are more promising.[1]

## No quorum requirements

Consider an individual who has to decide to vote in a particular referendum. If the referendum passes the derived utility is $U_p$. It the proposal is defeated, the utility derived is given by $U_d$. The expected utility of not voting is given by:

$$EU_{nv} = p_{nv}U_p + (1 - p_{nv})U_d, \quad \textbf{(1)}$$

where $p_{nv}$ is the subjective probability that the proposal will receive the majority of votes, given that the individual does not vote. The expected utility of voting is given by:

$$EU_v = p_v U_p + (1 - p_v)U_d, \quad \textbf{(2)}$$

where $p_v$ is subjective probability that the proposal will be supported by the majority of voters, given that the individual does vote.

The individual will vote if $EU_v > EU_{nv}$. Simple algebra shows that this condition is equivalent to

$$(\mathrm{p_v} - p_{nv})(U_p - U_d) > 0. \quad \textbf{(3)}$$

Note that if the individual is for the proposal, then $(\mathrm{p_v} - p_{nv}) > 0$ and $(U_p - U_d) > 0$. On the other hand, if the elector is against we have $(\mathrm{p_v} - p_{nv}) < 0$ and $(U_p - U_d) < 0$, which implies that condition (3) is met. Therefore, according to this simplified model, those who favor the proposal will vote “Yes”, those who are against it will vote “No”, and only those who are indifferent will abstain.

## Approval quorum

Let’s now assume that there exists an approval quorum. This means that for a proposal to pass, i.e. to change the status quo, not only the majority of the voters will have to vote “Yes” but also a certain percentage of the total electorate will have to vote “Yes”.

Let $p_{a,nv}$ be the subjective probability that the quorum will be met and, simultaneously, that the majority of the voters vote “Yes”, given that the individual does not vote. And $p_{a,v}$ represent the same, given that the individual votes.

The probability that a proposal will pass is given by the probability that both the majority of the voters choose "Yes" and that the approval quorum is met. Therefore, the expected utility of voting, and of not voting, is given by:

$$EU_v = p_{a,v}U_p + (1 - p_{a,v})U_d, \quad \textbf{(4)}$$

$$EU_{nv} = p_{a,nv}U_p + (1 - p_{a,nv})U_d. \quad \textbf{(5)}$$

As before, simple algebra shows that the individual will vote if and only if

$$(\mathrm{p}_{a,v} - p_{a,nv})(U_p - U_d) > 0. \quad \textbf{(6)}$$

Note that if a person favors the proposal, then if the person votes "Yes" both the probability that the proposal will receive the majority of votes and the probability that the quorum is met will increase. Therefore we have $(\mathrm{p}_{\mathrm{a,v}} - p_{a,nv}) > 0$ and $(U_p - U_d) > 0$, and condition (6) is fulfilled. On the other hand, if the person is against the proposal, then whether he/she chooses to vote will have no effect on the approval quorum but it will decrease the probability that the proposal will receive the majority of votes. Therefore we have $(\mathrm{p}_{\mathrm{a,v}} - p_{a,nv}) < 0$ and $(U_p - U_d) < 0$, and condition (6) is fulfilled. As before, the prediction of the prototypal model is that whoever favors or opposes the proposal will vote. Only those who are indifferent will not participate. The implication is that the existence of an approval quorum does not affect the incentives to vote.[2]

## Participation quorum

We turn now to the most common quorum form: the participation quorum. Under this rule, a change in the status quo requires that the proposal receives the approval of the majority of votes and that a certain percentage of electors vote.

Let $p_{p,nv}$ be the subjective probability that the participation quorum will be met and that the majority votes 'Yes', given that the individual does not vote. And $p_{p,v}$ represent the same, given that the individual votes.

Proceeding as before, we have that the expected utility of voting, and of not voting, is given by

$$EU_v = p_{p,v}U_p + (1 - p_{p,v})U_d, \quad \textbf{(7)}$$

$$EU_{nv} = p_{p,nv}U_p + (1 - p_{p,nv})U_d \,. \quad \textbf{(8)}$$

As before, we have that the individual will vote if and only if

$$(p_{p,v} - p_{p,nv})(U_p - U_d) > 0 \,. \quad \textbf{(9)}$$

The reasoning for a person who supports the proposal is the same as with the approval quorum. If the person votes, both probabilities will increase and, therefore, the elector will choose to vote. But if a person opposes the proposal the incentives are mixed up.

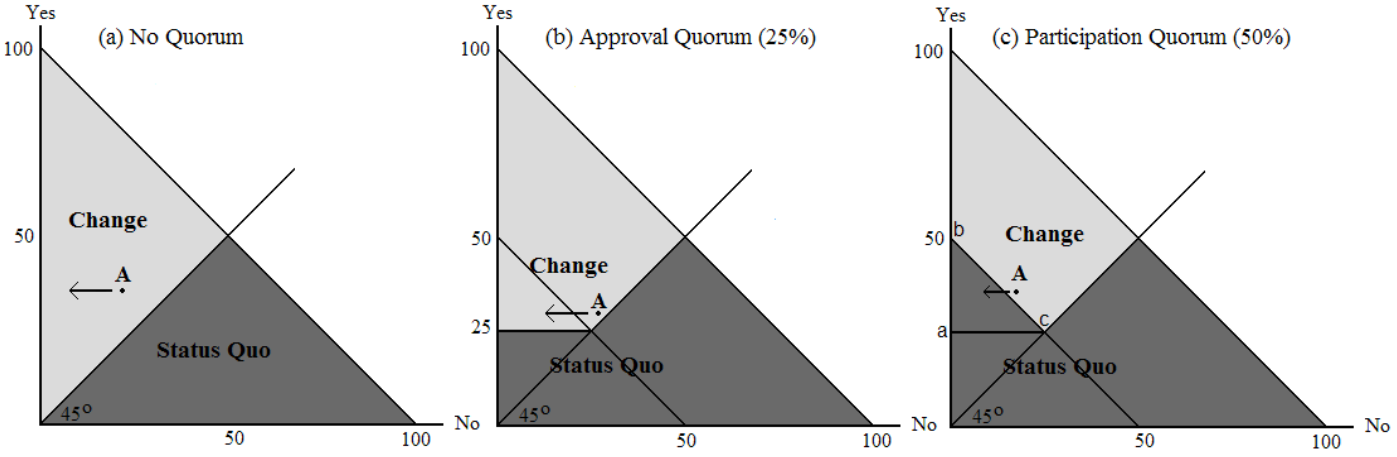
For an opponent of the proposal, $(U_p - U_d) < 0$. So an opponent will vote if and only if $(p_{p,v} - p_{p,nv}) < 0$. If the person votes "No", the probability that the proposal is supported by a majority of votes decreases, but the probability that the quorum is met increases. Therefore, it is possible that, even for a person that opposes the proposal, to have $(p_{p,v} - p_{p,nv}) > 0$; in which case the rational choice is to not vote.[3]

Basically, if an opponent of the proposal believes that there is a solid majority in favor of the proposal but there is a good chance that the participation quorum is not met, then the best chance to defeat the proposal is to support the nonparticipation. The optimal choice is to abstain.

## The deadweight loss of the quorum: the inefficiency triangle

The ideas formalized previously can be illustrated with a simple picture. In Figure 1, let the vertical axis represent the percentage of the population that favors the proposal submitted to referendum. In the horizontal axis we have the people who oppose the proposal. If there are no quorum requirements (left picture), there is a change in the status quo if the outcome of the referendum places the results above the 45 degree line (meaning that the majority of the people vote "Yes"). Note that if an opponent believes that the outcome will be near point A, he/she will have nothing to gain with the abstention. It would just move point A to the left, making Change more likely.

**FIGURE 1. The Deadweight Loss of the Participation Quorum**



In the picture in the middle, we describe a situation where there is an approval quorum of 25 per cent. Therefore to change the status quo the results must be above the 45 degree line and above the 25 percent-Yes line. In this case, the "Status Quo" region is increased, but there is no change in the incentives. If an opponent predicts the outcome A, there is nothing to gain from the abstention. Therefore, this type of rule makes the change of the status quo harder, which may be politically justifiable, but it does not give incentives to voters to mask their preferences.

Finally, in picture in the right, we describe a situation where there is a participation quorum of 50 per cent (common to several European Union countries). The "Status Quo" region is now reduced to the area above the 50 per cent participation rate and above the 45 degree line. If an opponent of the proposal believes that the final results will be in the neighborhood of A, then his/her best bet is not to vote against the proposal, but simply not to show up at the polls. By doing this, the elector is helping the final result to be somewhat to the left of A, moving the final outcome to the "Status Quo" region.

Therefore the participation quorum has one perverse effect and one ironic potential outcome. The perverse effect is that, in some situations it gives incentives to people to mask their true preferences and to abstain, pretending that they are indifferent. The ironic potential outcome is known in the literature as the "No-Show paradox" (see, e.g., Côrte-Real and Pereira 2004): in equilibrium, it is possible that the quorum is not reached precisely because of its existence or, in other words, turnout exceeds the quorum only if this requirement does not exist. Looking at the picture in the right of figure 1, we can see where the distortion in the incentives lays in this case. $\Delta abc$ is the inefficiency triangle, or, if we prefer, the deadweight loss of the participation quorum. This is exactly the kind of situation described in extant analyses of the Italian experience and in the recommendations of the Venice Commission: under participation quorum rules, opponents of the proposal may have incentives to abstain and demobilization becomes a rational strategy to defeat proposals (Uleri 2002; Venice Comission 2007; see also Herrera and Mattozzi 2006).

## DATA AND HYPOTHESES

The model presented in the previous section suggests that participation quorums should be related to lower turnout and that participation and approval quorums should not produce the same effects. In order to test these hypotheses, we collected data on referendums from the Direct Democracy Database, previously located at the Department of Constitutional Law of the University of Geneva and now hosted by the Center for Democracy in Aarau. The database is available online (C2D 2007) and contains information about referendum results and levels of turnout for all countries in the world. Since we needed to obtain reliable measures of a number of other institutional, political and socio-economic variables from other sources, we restricted our analysis to all national referendums that have taken place in the current member states of the European Union from 1970 to (mid-) 2007. A total of 109 national referendums were, therefore, initially considered.

We then excluded from the analysis all referendums where political and institutional conditions may have prevented citizens from freely expressing their preferences. For that purpose, we consulted both the Freedom House indexes (Freedom House 2007) and the Polity IV project's dataset (Marshall et al. 2006), excluding all referendums taking place in countries not rated as 'free electoral democracies' or with a value below 8 in Polity's "Democ" score at the time of the referendum. This led to the direct exclusion of four cases in countries deemed as 'not free' or 'partially free' at the time of the referendums,[4] as well to the indirect exclusion of four additional cases where no measurements of democratic quality of the polity were available for that time period.[5] Finally, we excluded referendums where voters could choose one of more than two alternative options.[6] Overall, only ten cases were excluded from the initial selection, leaving us with a total of 99 cases. See the appendix for a complete list of the referendums included in the analysis.

TABLE 1. Quorum Rules for National Referendums in the European Union Countries

| **Country** | **Participation quorum** | **Approval (or non-rejection) quorum** |
|---|---|---|
| Bulgaria | 50% | - |
| Denmark | - | 40% approval (constitutional amendments)<br>Less than 30% rejection (other cases) |
| Hungary | 50%<br>(only until July 1997) | 25% approval<br>(since July 1997) |
| Ireland | - | Less than 33.3% rejection (legislative extraordinary referendum) |
| Italy | 50% (abrogative legislative referendum) | - |
| Latvia | 50% (except constitutional amendments) | 50% approval (constitutional amendment) |
| Lithuania | 75% (for sovereignty issues)<br>50% (other cases) | 50% approval (sovereignty issues)<br>30% approval (mandatory referendum) |
| Malta | 50% (for abrogative legislative referendum) | - |
| Netherlands | 30% | - |
| Poland | 50% | - |
| Portugal | 50% | - |
| Romania | 50% (constitutional amendments) | - |
| Slovenia | 50% (constitutional amendments) | - |
| Slovakia | 50% | - |

*Source*: Venice Commission (2005b); for Romania, Slovenia and Slovakia, C2D (2007)

Table 1 shows all present European Union member countries where either participation or approval quorums have been imposed for national referendums (in the remaining member-states, no quorums exist). In each case, the figures refer to shares of the electorate whose participation or approval is required for the referendum to be deemed valid. In the specific case of "non-rejection" quorums, they refer to a percentage of electorate voting "No" that, if surpassed, renders a change in the status quo invalid. As we can see, a large number of countries have such provisions for several types of referendums, and Lithuania even imposes both participation and approval quorums.

## Main Hypotheses

The main goal of this article is to assess the impact of quorum rules on referendum turnout. For that, on the basis of the information listed in table 1, we created two dummy variables to represent the two possible quorum rules in force for each referendum: (1) a participation quorum dummy, which takes value one if there is a participation quorum requirement and zero otherwise; and (2), an approval (or non-rejection) quorum dummy, which takes value one if there is such a requirement and zero otherwise. Given our discussion in the previous section, we can state the following hypothesis:

> **H1.: Participation quorum effect.** Referendums held under a participation quorum requirement should have lower turnout than those where such requirement is absent.

But we can make a more precise statement about the effects of a participation quorum. According to our model (see Figure 1.c), supporters of the status quo only have an incentive to abstain when they believe that the majority of the voters will vote for a change. To test this possibility, we build a dummy variable that takes value 1 when the "Yes" option received the majority of the votes and zero otherwise. Similarly, we also created a "No" dummy. Then we estimate the interaction between these variables and the participation quorum variable.[7] Therefore, we can subdivide our first hypothesis:

> **H1.a: Participation quorum effect under a "Yes" majority:** Referendums held under a participation quorum requirement should have lower turnout than those

where such requirement is absent if the "Yes" option receives the majority of the votes.

**H1.b: Participation quorum effect under a "No" majority:** The participation quorum requirement should have no impact on turnout when "No" is in majority.

What to expect concerning the consequences of approval quorums is less evident. According to our model, the existence of an approval quorum should have no effect on turnout. However, Herrera and Mattozzi (2006), in the context of a group mobilization turnout model, argue that the effects of "approval quorums" and "participation quorums" are equivalent. We take a cautious approach and, for now, just hypothesize that the impact of approval quorums should not be positive, although our model does suggest that no impact at all should ensue.

**H2.: Approval quorum effect:** Referendums held under an approval quorum requirement should not have a higher turnout than those where such requirement is absent.

## Other Hypotheses

Any effects of voting quorums on turnout need to be estimated while controlling for a number of other factors known to affect turnout. While controlling for these other variables, we are also testing if several stylized facts about turnout in general elections outlined by the literature (see, e.g., Blais 2006 and Geys 2006) also apply to the case of national referendums.

First, we expect the relationship between *Compulsory voting* and turnout to be positive (see Jackman 1987; Franklin 1999; Blais 2000).[8] Second, we expect that turnout should be higher when referendums are *Concurrent* with other elections (LeDuc 2003, 172; Geys 2006, 652).[9] Third, we test for the effects of voter fatigue in two alternative ways. On the one hand, following extant research (Franklin 2002 and 2004; Rallings et al. 2003), we measure the time (in years or fractions thereof) elapsed since the last national election that has taken place before each referendum and the date of the latter (*Years since last election*). This should a positive effect on turnout. On the other hand, we counted the number of national elections that took place in the four years – the typical electoral cycle

– before the referendum (*Number of elections in last four years*).[10] This should have a negative effect on turnout.

*Closeness,* the absolute difference in percentage points between the "Yes" and "No" in each referendum, is expected to have a negative effect on turnout, as more competitive referendums should increase both the expected utility of voting (Matsusaka and Palda 1993; Dhillon and Peralta 2002) and efforts at voter mobilization (Jacobson and Kernell 1981; Cox and Munger 1989).[11] *Turnout in preceding first-order election*, which should have a positive effect on turnout in referendums, is included not only to take into account the "habit-forming" nature of voting (Gerber et al. 2003) but also to capture country-specific heterogenic effects.[12] *Electorate size* is also included, and should have a negative effect on turnout (Blais and Dobrzynska 1998; Levine and Palfrey 2007).[13] Finally, although previous studies are not encouraging about the inclusion of this type of control (Radcliff 1992; Kostadinova 2003; Fornos *et al.* 2004; Blais 2006), we include an *Economic cycle* variable.[14]

## ESTIMATION AND MODELLING CHOICES

### Linear regression model

Our dependent variable, turnout, is defined as the ratio between the number of people that voted and the number registered to vote. In the political science literature, when dealing with aggregate data, it is common to estimate this type of voting functions using Ordinary Least Squares (OLS). The typical equation (see, e.g., Radcliff 1992 or Kostadinova 2003) to be estimated is given by:

$$TURNOUT = X\alpha + e, \qquad \textbf{(10)}$$

where the $X$ is matrix that represents the independent variables described in the previous section, and $\alpha$ a vector of the associated coefficients.

There are two drawbacks with this specification. First, the turnout variable must be between zero and one. Using a simple OLS regression, this range is not respected for extreme values of the independent variables. This problem can easily be solved by considering a nonlinear transformation of the dependent variable. For example, instead of

TURNOUT, we could use $\log\left(\frac{TURNOUT}{1-TURNOUT}\right)$, which is unbounded. We do not perform this transformation, because the main results were basically the same, but, given the nonlinear transformation, they are slightly more difficult to interpret.

The second drawback is that simple OLS gives the same weight to every observation. It makes no distinction between referendums that occurred in a country with 9 million voters or in a country with 40 million voters. A turnout of 70 percent in France means that more than 26 million people chose to vote, while the same turnout for Portugal means that less than 7 million were persuaded to vote. Therefore, the same turnout rate gives us information about more people in France than in Portugal. Of course, one could perform weighted least squares, where the weights changed with the electorate size, but these weights would always be arbitrary. For example, the weights could be proportional to the electorate size, or to their square root, or to any other monotonic transformation.

## Binary choice model

We can tackle the described weaknesses by looking at the data from a different perspective: the individual perspective. Turnout can just be seen as the aggregated information about the decisions of several individuals. Each individual faces a binary choice: to vote or to abstain.

Turnout in referendum *c* ($\overline{P_c}$) is the proportion of voters that chose to vote. Assume that an individual facing referendum *c* votes with a probability given by $P_c = F(X\beta)$, where F is some distribution function. Assuming that F is strictly increasing, we can solve with respect to $X\beta$: $F^{-1}(P_c) = X\beta$. The choice of the distribution function is quite arbitrary. A typical choice would the Normal distribution, but since it does not have a closed form we would have to rely on Taylor approximations.

For mathematical convenience, we use the logistic distribution function, so we have $P_c = \frac{\exp(X\beta)}{1+\exp(X\beta)}$. Rearranging, we get:

$$\log\left(\frac{P_c}{1-P_c}\right) = X\beta\,. \qquad \textbf{(11)}$$

We do not observe $P_c$, but $\overline{P_c}$ is a consistent estimator. Therefore, we can directly estimate

$$\log\left(\frac{\overline{P_c}}{1-\overline{P_c}}\right) = X\beta + \varepsilon_c\,. \qquad \textbf{(12)}$$

The error term, $\varepsilon_c = \log\left(\frac{\overline{P_c}}{1-\overline{P_c}}\right) - \log\left(\frac{P_c}{1-P_c}\right)$, is heteroskedastic and its variance decreases with the electorate size. Maddala (1983, 29-30) shows that its variance can be consistently estimated by

$$\overline{\sigma}_c^2 = \frac{1}{N_c\left(\overline{P}_c\right)\left(1-\overline{P}_c\right)}, \qquad \textbf{(13)}$$

where $N_c$ is the size of the electorate.

The method we use is a two step estimator. The first step is to estimate Equation (13), using the sample mean ($\overline{P_c}$) instead of the population mean ($P_c$). In the second step, we use this information to estimate Equation (4) using the weighted least squares method, where the weights are given by $1/\overline{\sigma}$. This estimator, also known as the Berkson's minimum logit chi-square estimator, is fully efficient and asymptotically equivalent to a maximum likelihood estimator (see Cameron and Trivedi 2005 for details).

Intuitively, if we start with a rational choice model, then we should look at turnout as a sum of individual decisions. Therefore, the correct way to proceed is with a binary choice model, which looks at the individual and not at the aggregate: turnout is just the aggregate information, which tell us the proportion of potential voters that chose to vote; hence, it can be interpreted as an estimator of the expected value of a binary decision. Given this interpretation, the observed turnout rate is just a sample mean, a consistent estimator of the population mean. The variance of this estimator decreases with the number of observations. Therefore a turnout rate of a big country, like France, is an estimator of the population mean with a lower variance than the turnout rate for a small

country, like Portugal. This implies that simple OLS residuals are heteroskedastic. An efficient estimation must take this into account, giving more weight to referendums occurring in countries with larger electorates. The advantage of this approach is that the weights' formula is not arbitrary but, instead, a precise implication of the modeling choice. If, instead, we believed that a group turnout model was appropriate, and that turnout was the result of the actions of political parties and other interest groups (like in Holbrook and McClurg 2005's model of campaign mobilization, for example) then ordinary least squares would be an appropriate choice.

# ESTIMATION RESULTS

## Ordinary Least Squares

Table 2 reports the OLS estimation results for Equation (10). The control variables with statistically significant estimated coefficients are in line with previous results in the literature and have the expected signs. Thus, compulsory voting has a strong positive impact in the turnout rates (more than 20 percentage points). The positive and significant coefficient for turnout of the preceding first-order election confirms the idea that voting is a habit-forming activity and may also be helping us capturing country heterogenic specific effects. Closeness of the election (here measured by the margin of victory) also displays the expected sign: the higher the margin the lower the turnout. If the margin of one of the choices in the referendum over the other increases by ten percentage points, then turnout is expected to be 1.5 percentage points lower. Finally, voter fatigue seems to be a play in what concerns lower levels of turnout. This is true independently of the way we measure the voter fatigue, although that the results for *Number of elections* reach greater statistical significance.

TABLE 2. Predicting Voter Turnout in Referendums (OLS estimation)[15]

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Participation quorum | -0.067*<br>(0.036) | | -0.076**<br>(0.036) | |
| (Participation quorum)*(No dummy) | | -0.026<br>(0.056) | | -0.044<br>(0.057) |
| (Participation quorum)*(Yes dummy) | | -0.084**<br>(0.041) | | -0.089**<br>(0.040) |
| Approval quorum | 0.126***<br>(0.042) | 0.131***<br>(0.043) | 0.134***<br>(0.041) | 0.138***<br>(0.042) |
| Compulsory voting | 0.235***<br>(0.060) | 0.225***<br>(0.061) | 0.213***<br>(0.058) | 0.206***<br>(0.059) |
| Concurrent | 0.025<br>(0.049) | 0.027<br>(0.049) | 0.050<br>(0.047) | 0.050<br>(0.048) |
| Years since last election | 0.036**<br>(0.017) | 0.034*<br>(0.017) | | |
| Number of elections in the last 4 years | | | -0.035***<br>(0.011) | -0.034***<br>(0.012) |
| Margin of victory | -0.172***<br>(0.056) | -0.150**<br>(0.062) | -0.173***<br>(0.055) | -0.155**<br>(0.060) |
| Turnout in preceding election | 0.416**<br>(0.023) | 0.420**<br>(0.180) | 0.369**<br>(0.175) | 0.373**<br>(0.176) |
| Electorate size | -0.019<br>(0.013) | -0.020<br>(0.013) | -0.012<br>(0.013) | -0.013<br>(0.013) |
| Economic cycle | -0.002<br>(0.002) | -0.002<br>(0.003) | -0.001<br>(0.003) | -0.001<br>(0.003) |
| Constant | 0.267**<br>(0.133) | 0.259*<br>(0.134) | 0.436***<br>(0.144) | 0.424***<br>(0.145) |
| $R^2$ | 0.468 | 0.473 | 0.495 | 0.498 |
| Adj. $R^2$ | 0.414 | 0.413 | 0.444 | 0.441 |
| White Heteroskedasticity Test | 60.35<br>(p-value 0.13) | 64.91<br>(p-value 0.22) | 63.21<br>(p-value 0.08) | 69.28<br>(p-value 0.13) |

Standard errors between parentheses
* indicates statistical significance at the 10% level, ** at the 5%, and *** at the 1%

The remaining control variables are individually not significant. A Likelihood Ratio test, with p-values above 0.25 for all models, confirms that estimated coefficients for these variables are jointly not significant. The position of the economy in the business cycle seems irrelevant, confirming most previous studies that have included this type of variable. But other results contradict previous findings. For example, the parameter for size of the electorate is not statistically significant, although it has the expected sign. But the most surprising of these non-significant estimates is the irrelevance of concurrent elections, even if it is true that it has the expected sign. It may be due to the fact that only in twelve of the ninety-nine observations does this variable have a value different from zero. We should recall, however, two things. First, the finding of a positive impact of concurrent elections was not among the most robust in the literature (Geys 2006, 652). Second, several of these referendums were held concurrently not with first-order elections (presidential elections in France or legislative elections elsewhere) but with "second-order" elections, i.e., European Parliament or presidential elections in semi-presidential systems, which are themselves not particularly mobilizing, as the literature suggests (Flickinger and Studlar 1992).

Given that the results are broadly in line with the literature, and noting that tests for heteroskedasticity show no evidence of this pathology,[16] we can confidently test for the effects of quorum rules. And the findings are striking. The estimated effects for the participation quorum confirm the ideas not only of existing country case studies (Uleri 2002) but also of our formal prototypal model. In sum, participation quorums have a negative impact on turnout. Even more interesting, as we can see with the results for models 2 and 4, this negative impact is associated to victories of the "Yes" option. When the "No" option receives the majority of the votes, the impact of the participation quorum is statistically insignificant. This result lends support to the implications of our prototypal rational-choice model, which predicted that the supporters of the "No" option would have an incentive to abstain only with they assigned a big probability that the "Yes" would receive the majority of the votes. The estimated effects are not only statistically significant but also politically relevant. According to these results, the mere existence of a participation quorum may lead to a decrease in the participation rate of eight percentage points. Of the 99 referendums in our dataset, 40 took place under participation quorum

requirements; about half of those had turnout levels below 50 percent. In several of those cases, the absence of a participation quorum could very well have had contributed to lead turnout above that threshold.

However, contrary to the predictions of the model, through which approval quorums should have no impact, the OLS estimation shows a positive effect of approval quorums on turnout, of about 13 percentage points. Again, these effects would be politically relevant. They mean, for example, that for the last Portuguese referendum, which took place in 2007, if Portugal had an approval quorum instead of a participation quorum, a turnout of about 65 percent was to be expected on this basis, instead of the realized 44 percent.

## Minimum logit chi-square estimator

As we argued previously, OLS estimation presents important efficiency problems when dealing with election data and is inconsistent with an individual-level approach to the decision to vote. The previous results need therefore to be contrasted with the estimation results of Equation (12) using the minimum logit chi-square estimator. These results, presented in table 3, reinforce the conclusion we had reached about the impact of the participation quorum rules, which now appears to be even more significant than before, confirming hypothesis H1 (models 1 and 3).

The results for models 2 and 4 are accurately consistent with the hypotheses H1a and H1b, revealing that a participation quorum has a deterrence effect on the act of voting when potential electors believe that the majority of the voters prefer a change in the status quo. Looking at the marginal effects of the statistically significant variables for an "average" country, once more we observe that these effects are politically significant. It is not easy to acknowledge more compelling evidence for the negative impact of participation quorums on turnout.

The most interesting change in the results from OLS to a binary choice model is that the estimated coefficient for the "approval quorum" is no longer significant in any of the four estimated models. This reduction in the significance occurs because approval quorums tend to be found in small countries, such as Denmark or Lithuania. With this estimator, these observations receive a smaller weight. Thus, as a consequence of moving from OLS

to a binary choice model, we reach results that are fully consistent with the prototypal rational-choice model. Basically we confirm, from this perspective, that approval quorums do not affect the willingness of the electorate to vote.

**TABLE 3. Predicting Voter Turnout in Referendums (logit chi-square estimation)[17]**

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| | Coeffs | Marginal effects | Coeffs | Marginal effects | Coeffs | Marginal effects | Coeffs | Marginal effects |
| Participation quorum | -0.407*** (0.125) | -0.10 | | | -0.409*** (0.129) | -0.10 | | |
| (Participation quorum)x x(No dummy) | | | -0.122 (0.178) | | | | -0.165 (0.188) | |
| (Participation quorum)x x(Yes dummy) | | | -0.525*** (0.134) | -0.13 | | | -0.508*** (0.139) | -0.13 |
| Approval quorum | 0.269 (0.296) | | 0.319 (0.290) | | 0.300 (0.305) | | 0.341 (0.302) | |
| Compulsory voting | 1.345*** (0.172) | 0.33 | 1.271*** (0.173) | 0.31 | 1.258*** (0.179) | 0.31 | 1.204*** (0.179) | 0.30 |
| Concurrent elections | 0.169 (0.284) | | 0.176 (0.278) | | 0.271 (0.290) | | 0.277 (0.287) | |
| Time since last election | 0.227*** (0.065) | 0.06 | 0.220*** (0.063) | 0.05 | | | | |
| Number of elections in the last 4 years | | | | | -0.128** (0.050) | -0.03 | -0.109** (0.050) | -0.03 |
| Margin of victory | -0.871*** (0.202) | -0.22 | -0.663*** (0.220) | -0.16 | -0.900*** (0.208) | -0.22 | -0.722*** (0.229) | -0.18 |
| Previous turnout | -0.215 (0.655) | | -0.259 (0.641) | | -0.162 (0.674) | | -0.205 (0.666) | |
| Electorate size | -0.070 (0.080) | | -0.051 (0.079) | | -0.048 (0.083) | | -0.036 (0.082) | |
| Business cycle | 0.002 (0.021) | | -0.005 (0.021) | | 0.003 (0.022) | | -0.003 (0.022) | |
| Constant | 0.497 (0.504) | | 0.408 (0.495) | | 1.081** (0.523) | | 0.952* (0.522) | |
| $R^2$ | 0.565 | | 0.588 | | 0.539 | | 0.555 | |
| Adj. $R^2$ | 0.521 | | 0.541 | | 0.493 | | 0.504 | |
| White Heteroskedasticity Test | 61.59 (p-value 0.11) | | 72.68 (p-value 0.08) | | 63.81 (p-value 0.08) | | 67.52 (p-value 0.16) | |

Standard errors between parentheses
* indicates statistical significance at the 10% level, ** at the 5%, and *** at the 1%

In what concerns the control variables, the results are broadly similar to the ones in table 2. The estimated coefficients which were statistically not different from zero are even more insignificant now (both individually and jointly). The only change is in the estimated parameter for turnout in the previous election, which is now statistically insignificant. One possible interpretation of this result is that the same variables that explain the decision of each individual to vote (or to abstain) in a referendum are also explaining his/her decision to vote in the previous first-order election. If this interpretation is correct, then the value added by this variable is irrelevant and its coefficient should be close to zero, in which case the statistically significant coefficients found in previous studies, which invariably used simple OLS, or one of its versions, would be a symptom of a misspecification bias. On the other hand, it is possible that referenda have idiosyncratic features that make them not directly comparable to other elections. It is too early to draw a definite conclusion on this subject and more studies are needed on this regard.

## CONCLUSION

What are the effects of quorum requirements in referendums on turnout rates and what is the best statistical methodology to deal with aggregate turnout levels? To our knowledge, our study is the first to address this topic with the help of a prototypal rational choice vote model. We also discussed the best way to empirically test the predictions of the model, approaching the data using two different methodologies: Ordinary Least Squares and a binary choice model (Berkson's minimum logit chi-square estimator). The results were not identical, making clear that the modeling choice is not of minor importance.

Both approaches do show, however, that the existence of a participation quorum for referendums has a negative effect on turnout, generalizing a hypothesis first suggested by case studies and empirically confirming the implications of our formal theoretical treatment of the subject. We also find, regardless of the estimation strategy adopted, that several of the propositions advanced in the literature about the causes of turnout also seem to hold in the case of referendums. More competitive referendums, held under compulsory voting rules and under conditions less promoting of voter fatigue tend to be characterized by higher levels of turnout. In what concerns approval quorums, however,

their impact is not as clear cut. While OLS results suggest that approval quorums enhance turnout, this conclusion is not robust to the modeling choice. We do consider, however, that the binary choice model approach is more correct, both for statistical reasons (because more weight should be given to observations of big countries, as they involve the behavior of more people) and theoretical reasons (we modeled each individual's decision and, therefore, we prefer a statistical model that makes that assumption).

Direct democracy is becoming increasingly common in Western democracies (Setälä 1999; Scarrow 2001; LeDuc 2003) and public support for referendums is high and arguably rising (Dalton et al. 2001; Donovan and Karp 2006; Bowler et al. 2007). The institutional design of referendums is, therefore, an issue that is likely to raise increasing attention on the part of policy-makers and citizens alike. The existence of quorum rules is one crucial aspect of that design, common to many European democracies, and typically seen as a way of preventing active minorities from imposing their will or even as a way of lending resistance to the status quo. However, although these are acceptable goals from a normative point of view, there are good reasons to reject participation quorums as a way to achieve them. As the Venice Commission's 'Code of Good Practice on Referendums' (2007) puts it, participation quorums allow minorities to impose their viewpoints by deserting the ballot-box while, in general, tend to increase abstention. Our theoretical analysis supports to this recommendation and our empirical analysis puts a figure on this effect: the existence of a participation requirement reduces the participation rate in referenda by ten percentage points. Referendum designers should take heed of the Commission's recommendations. As for approval quorums, the implications of both model and the empirical results is that whatever the reasons that may advise or discourage referendum designers regarding their use, it is clear that their effects on turnout should not be one of them.

## APPENDIX

### TABLE A.1 List of referendums included in the analysis

| Country | Date | Subject | Issues | Turnout (%) | Yes (%)* |
|---|---|---|---|---|---|
| Austria | 05-Nov-1978 | Nuclear power | 1 | 64 | 49 |
| | 12-Jun-1994 | EU membership | 1 | 81 | 67 |
| Cyprus | 24-Apr-2004 | Unification | 1 | 89 | 76 |
| Czech Republic | 14-Jun-2003 | EU membership | 1 | 55 | 77 |
| Denmark | 21-Sep-1971 | Lower voting age | 1 | 86 | 56 |
| | 02-Oct-1972 | EC membership | 1 | 90 | 63 |
| | 19-Sep-1978 | Lower voting age | 1 | 63 | 54 |
| | 27-Feb-1986 | Single European Act | 1 | 75 | 56 |
| | 02-Jun-1992 | Maastricht Treaty | 1 | 83 | 49 |
| | 18-May-1993 | Edinburgh Agreement | 1 | 86 | 57 |
| | 28-May-1998 | Amsterdam Treaty | 1 | 75 | 55 |
| | 28-Sep-2000 | European currency | 1 | 89 | 47 |
| Estonia | 28-Jun-1992 | Voting rights and Constitution | 2 | 67 | 44 |
| Estonia | 14-Sep-2003 | EU membership | 1 | 64 | 67 |
| Finland | 16-Oct-1994 | EU membership | 1 | 71 | 57 |
| France | 23-Apr-1972 | EEC enlargement | 1 | 60 | 68 |
| | 26-Jun-1988 | New Caledonia | 1 | 37 | 80 |
| | 20-Sep-1992 | Maastricht treaty | 1 | 70 | 51 |
| | 24-Sep-2000 | Reduction of presidential term | 1 | 30 | 73 |
| | 29-May-2005 | European Constitution | 1 | 69 | 45 |
| Greece | 08-Dec-1974 | Form of government | 1 | 76 | 69 |
| Hungary | 29-Jul-1990 | Presidency | 1 | 14 | 86 |
| | 16-Nov-1997 | NATO membership | 1 | 49 | 85 |
| | 12-Apr-2003 | EU membership | 1 | 46 | 84 |
| | 05-Dec-2004 | Double nationality and hospitals | 2 | 37 | 52 |

| | | | | | |
|---|---|---|---|---|---|
| Ireland | 10-May-1972 | EC membership | 1 | 71 | 83 |
| | 07-Dec-1972 | Church privileges and voting age | 2 | 51 | 84 |
| | 05-Jul-1979 | Adoptions and electoral system | 2 | 28 | 92 |
| | 07-Sep-1983 | Prohibition of abortion | 1 | 53 | 67 |
| | 14-Jun-1984 | Voting rights | 1 | 46 | 75 |
| | 26-Jun-1986 | Legalization of divorce | 1 | 61 | 37 |
| | 26-May-1987 | Single European Act | 1 | 44 | 70 |
| | 18-Jun-1992 | Maastricht Treaty | 1 | 57 | 69 |
| | 25-Nov-1992 | Abortion laws | 3 | 65 | 60 |
| | 24-Nov-1995 | Legalization of divorce | 1 | 62 | 50 |
| | 28-Nov-1996 | Bail reform | 1 | 29 | 75 |
| | 30-Oct-1997 | Confidential meetings | 1 | 47 | 53 |
| | 22-May-1998 | N Ireland and Amsterdam treaty | 2 | 56 | 62 |
| | 11-Jun-1999 | Local government | 1 | 51 | 78 |
| | 07-Jun-2001 | Nice Treaty and others | 3 | 35 | 46 |
| | 06-Mar-2002 | Human life in pregnancy | 1 | 43 | 50 |
| | 19-Oct-2002 | EU enlargement | 1 | 49 | 63 |
| | 11-Jun-2004 | Citizenship | 1 | 54 | 79 |
| Italy | 13-May-1974 | Revoking divorce laws | 1 | 88 | 41 |
| | 12-Jun-1978 | Party subsidies and police powers | 2 | 81 | 44 |
| | 17-May-1981 | Abortion laws and others | 5 | 79 | 32 |
| | 09-Jun-1985 | Wage indexation | 1 | 78 | 46 |
| | 08-Nov-1987 | Nuclear power and others | 5 | 65 | 72 |
| | 18-Jun-1989 | MEP's mandate | 1 | 81 | 88 |
| | 03-Jun-1990 | Hunting laws and others | 3 | 43 | 92 |
| | 09-Jun-1991 | Electoral law | 1 | 63 | 96 |
| | 18-Apr-1993 | Drug laws and others | 8 | 77 | 55 |
| | 11-Jun-1995 | Union rights and others | 12 | 57 | 49 |
| | 15-Jun-1997 | Judiciary and others | 7 | 30 | 66 |
| | 18-Apr-1999 | Representation | 1 | 50 | 91 |
| | 21-May-2000 | Campaigns and others | 7 | 32 | 62 |
| | 07-Oct-2001 | Federalism | 1 | 34 | 64 |
| | 15-Jun-2003 | Labor law and others | 2 | 26 | 86 |

| | | | | | |
|---|---|---|---|---|---|
| Italy (cont.) | 13-Jun-2005 | In vitro others | 4 | 26 | 77 |
| | 25-Jun-2006 | Constitution | 1 | 54 | 39 |
| Latvia | 03-Oct-1998 | Naturalization | 1 | 69 | 47 |
| | 13-Nov-1999 | Pensions Law | 1 | 25 | 94 |
| | 21-Sep-2003 | EU membership | 1 | 73 | 67 |
| Lithuania | 23-May-1992 | Presidentialism | 1 | 59 | 73 |
| | 14-Jun-1992 | Withdrawal of USSR troops | 1 | 76 | 92 |
| | 25-Oct-1992 | Constitution | 1 | 75 | 78 |
| | 27-Aug-1994 | Privatizations and others | 8 | 37 | 89 |
| | 20-Oct-1996 | Budget and others | 4 | 52 | 77 |
| | 10-Nov-1996 | Land purchases | 1 | 40 | 52 |
| | 11-May-2003 | EU membership | 1 | 64 | 92 |
| Luxembourg | 10-Jul-2005 | EU Constitution | 1 | 90 | 57 |
| Malta | 08-Mar-2003 | EU membership | 1 | 91 | 53 |
| Netherlands | 01-Jun-2005 | EU Constitution | 1 | 62 | 38 |
| Poland | 18-Feb-1996 | Privatization and economic reforms | 5 | 33 | 23 |
| | 25-May-1997 | Constitution | 1 | 43 | 53 |
| | 08-Jun-2003 | EU membership | 1 | 59 | 77 |
| Portugal | 29-Jun-1998 | Legalize abortion | 1 | 32 | 49 |
| | 08-Nov-1998 | Regionalization | 2 | 48 | 36 |
| | 11-Feb-2007 | Legalize abortion | 1 | 44 | 59 |
| Romania | 19-Oct-2003 | New Constitution | 1 | 56 | 92 |
| | 19-May-2007 | Impeachment of President | 1 | 44 | 74 |
| Slovakia | 22-Oct-1994 | Privatizations | 1 | 20 | 94 |
| | 26-Sep-1998 | Privatizations | 1 | 44 | 84 |
| | 11-Nov-2000 | Early elections | 1 | 20 | 95 |
| | 17-May-2003 | EU membership | 1 | 52 | 92 |
| | 03-Apr-2004 | Early elections | 1 | 36 | 87 |
| Slovenia | 10-Jan-1999 | Power plant | 1 | 27 | 20 |
| | 17-Jun-2001 | Artificial insemination | 2 | 36 | 27 |
| | 19-Jan-2003 | Telephone fees and railroads | 2 | 31 | 48 |
| | 23-Mar-2003 | EU and NATO membership | 2 | 60 | 66 |
| | 21-Sep-2003 | Sunday salers | 1 | 27 | 58 |

| | | | | | |
|---|---|---|---|---|---|
| | 04-Apr-2004 | Rights ethnic minorities | 1 | 32 | 4 |
| Slovenia (cont.) | 25-Sep-2005 | Public broadcasting | 1 | 31 | 50 |
| | 07-Dec-1978 | New Constitution | 1 | 67 | 92 |
| Spain | 12-Mar-1986 | NATO membership | 1 | 59 | 53 |
| | 20-Feb-2005 | European Constitution | 1 | 42 | 77 |
| Sweden | 13-Nov-1994 | EU membership | 1 | 83 | 52 |
| | 14-Sep-2003 | Euro | 1 | 83 | 42 |
| United Kingdom | 05-Jun-1975 | EC membership | 1 | 65 | 67 |

* For multiple issue referendums, the percentage of “Yes” vote presented is the one for the issue where the absolute difference between the percentages of Yes and No votes was smallest.

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[1] See Aldrich 1993, Blais 2000, and Dhillon and Peralta 2002 for thorough reviews of the strengths and weaknesses of the rational-choice approach.

[2] A similar case could me made for a "non-rejection" quorum, where passing the proposal requires that the percentage of the electorate voting against it is below a certain threshold. Since the implications are basically the same, we do not present them here.

[3] To see this, just consider an extreme case. Assume that that are 10 people eligible to vote, with 5 of them in favor of the proposal, 1 against, and 4 indifferent. Assume that there is a participation quorum that requires the participation of 6 people. Finally, suppose that the person who is against is almost sure (probability one) that the 5 supporters will vote yes, and that the 4 indifferent will abstain. In this extreme case, we have $\left(\mathrm{p}_{p,v} - p_{p,nv}\right) = 1 > 0$.

[4] Namely, the December 15th 1976 referendum in Spain; the November 29th 1987 referendum in Poland; the May 29th 1989 referendum in Hungary; and the December, 8th 1991 referendum in Romania.

[5] These are, obviously, the 1990 independence referendum in Slovenia and the 1991 independence referendums in the Baltic countries.

[6] These are the Swedish March 1980 referendum on nuclear power and the Slovenian December 1996 referendum on the electoral system, where, in both cases, three different alternatives were presented.

[7] Instead of creating a dummy variable, we could use, instead, the margin of victory for the "Yes" option. The problem with this choice would be that, according to our model, this margin in itself is an endogenous variable. If the status quo supporters expect to be in minority, then they have an incentive to abstain and, therefore, increase the margin of victory of the "Yes" option. In coding the "Yes" dummy, in cases where a referendum was held on multiple issues, we coded the variable as 1 only when the "Yes" option prevailed in all issues.

[8] In our set of cases, only eleven referendums were held under compulsory voting. These include the Greek November 1974 referendum on the form of government (monarchy or republic), all referendums held in Italy until 1993 (the year when compulsory voting was abolished) and the 2005 referendum in Luxembourg on the European Constitution. We created a dummy variable that takes value 1 in those cases and 0 in all the others.

[9] Twelve referendums in our dataset were held concurrently with other elections, including legislative, presidential (in semi-presidential systems) and European Parliament elections. We created a dummy variable that takes value 1 in those cases and 0 in all the others.

[10] We take into account all types of national elections, including legislative, presidential (in semi-presidential systems), and European Parliament elections, as well as, of course, other referendums. In the case of two-round presidential or legislative elections, we count both rounds.

[11] In the cases where referendums were held simultaneously on multiple issues, we selected the smallest absolute value of the difference between the "Yes" and "No" votes. Although this way of measuring election closeness is common in the political science literature (used in about 70 percent of the studies included in the meta-analysis by Geys 2006), we are aware that it introduces endogeneity problems. Ideally, we should consider an *ex ante* measure of closeness (such as that provided by electoral polls), but these are very difficult to find for so many different referendums, some of them taking place in the 1970s. However, this possible bias is not very important for our purposes, since we are primarily interested on the coefficients of other variables (the quorum dummies) and there is no reason to believe that the coefficients of those variables are particularly affected by this choice. In any case, to be sure that our inferences are not severely affected by this endogeneity problem, we re-estimated each model excluding this variable (see note 15). Since there is no a priori reason to believe that this variable is correlated with the other explanatory variables, this omission does not affect the consistency of the other coefficient estimates (see Greene 2008).

[12] With only about ninety-nine observations, it is unrealistic to include a dummy variable for each country, with the obvious over-fitting consequences (furthermore, for some countries we only have one observation). Including in the model the level of turnout in the previous "first-order" election can thus capture country-specific effects. If, in a particular country, turnout is expected to be higher for some idiosyncratic reason not captured by the other control variables, this should be revealed by a high turnout in previous elections. By "first-order" (Reif and Schmitt 1980), we mean the elections upon which the formation of the executive is dependent: presidential elections in France and legislative elections in the remaining cases. Source: International IDEA 2007.

[13] Given the huge variability of the population size, we follow the suggestion in Blais and Dobrzynska 1998, and use the logarithmic transformation of the population size, measured as the number of registered voters at the time of elections. Source: International IDEA 2007.

[14] Measured as the difference between the growth rate of the year of the referendum and the average growth rate of the two previous years. Source: IMF World Economic Outlook and Eurostat.

[15] If we exclude the variable margin from all estimated models, the estimated coefficients and their significance do not change in a relevant way, although the adjusted R2 drops, as we would expect from dropping a significant variable. Therefore, it is reasonable to infer that the endogeneity problem we have discussed before is not contaminating the results.

[16] Although there is no decisive evidence of heteroskedastic residuals, we also re-estimated all models using White Heteroskedasticity-Consistent Standard Errors. The results are basically unaltered.

[17] See note 15.

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