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On the design of citizens' initiatives in a union of states

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HIGHLIGHTS

- For a successful initiative in a union of states state-specific thresholds need to be reached.
- The campaign organizer rationally decides which states to target.
- Proportional thresholds avoid distortions in the initiative process if constituencies exhibit similar variation of preferences.
- Degressive thresholds are preferable if preference heterogeneity increases in population size.

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ABSTRACT

The paper studies the design of popular initiatives in unions of states. We analyze the effect of state-specific threshold requirements on the incentives of a rational campaign organizer who decides which constituencies to target. If the heterogeneity of preferences in a population increases with its size, *degressively proportional* thresholds satisfy the normative objective of 'neutrality' between individuals from different states. In contrast, thresholds which are *linear* in population size are 'neutral' if a priori no differences between states are acknowledged.

1. Introduction

One of the key innovations in the democratic processes of the European Union (EU) is the introduction of the European citizens' initiative (ECI) as established in the 2009 Treaty of Lisbon. While direct democratic instruments form part of the political culture at the sub-national or national level in many advanced democracies including most of the EU member states and have been used increasingly in the last two decades (see, e.g., Bogdanor, 1994; Setälä, 1999), the ECI is the first attempt of implementing a piece of direct democracy in a union of states.[1] Article 11 (4) of the Treaty provides that

> [...] not less than one million citizens who are nationals of a significant number of Member States may take the initiative of inviting the Commission, within the framework of its powers, to submit any appropriate proposal on matters where citizens consider that a legal act of the Union is required for the purpose of implementing the Treaties.

Being addressed to the European Commission which is responsible for initiating policy proposals and monitoring policy implementation, the ECI promises to give citizens the possibility to exert influence on the political agenda of the EU.[2]

While in most democracies using that instrument a successful initiative either requires the legislature to act or directly triggers a popular vote, EU law-makers are not legally bound to take any legislative action in response to the collection of signatures. In the words of the European Commission, the ECI "does not affect the Commission's right of initiative, it will, however, oblige the Commission, as a college, to give serious consideration to the requests made by citizens" (EU Commission Staff Working Document SEC (2010) 370). If a citizens' initiative is presented according to the rules, the Commission will have to issue a communication within three months of submission.

It seems therefore fair to describe the European Citizens' Initiative as a petition or popular motion which leaves practically full control to the established European political institutions, in particular the Commission. Even though the new right is not nearly as

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1 Starting with a French referendum in March 1972 there has been a number of national referenda *on* Europe, i.e., on enlargement of or accession to the European Union (or its predecessors). In some cases, e.g., the Netherlands, these referenda provided the first instance of direct democracy at the national level.

2 By contrast, a petition (provided for in Articles 24 and 227 TFEU and introduced in 1992) is addressed to the European Parliament.

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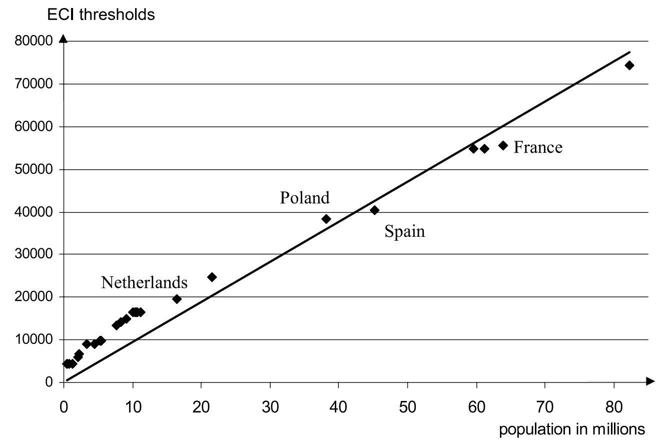

Fig. 1. ECI minimum numbers of signatories and population size.

powerful an instrument as in, e.g., the initiative in Switzerland or various US states, it might still prove to possess certain institutional virtues: arguably, a successful initiative will create sufficient public pressure to put an issue firmly on the EU's agenda, i.e., give some agenda-setting power to the citizens. It forces a visible reaction of the political establishment which otherwise might have neglected (or even intentionally disposed of) the issue. Thus, the ECI at least has the potential to increase transparency and accountability.

The quality of direct democracy and whether it achieves its desired effect hinges on the design of the relevant procedures which receives increasing attention by policy-makers and citizens, and in the scientific literature (e.g., Aguiar-Conraria and Magalhães, 2010; Barankay et al., 2003; Gerber, 1996; Herrera and Mattozzi, 2010).

In its preamble the respective EU regulation stipulates that the procedures for the citizens' initiative should ensure "that citizens of the Union are subject to similar conditions for supporting a citizens' initiative regardless of the Member State from which they come" and "that a citizens' initiative is representative of a Union interest" (Regulation No 211/2011 of the European Parliament and of the Council of 16 February 2011 on the citizens initiative). It goes on to establish (i) 1,000,000 signatures as the overall threshold, (ii) the requirement to meet minimum numbers of signatures in at least seven member states, (iii) a time limit of twelve months for signature collection. With respect to (ii) the regulation says that

> In order to ensure similar conditions for citizens to support a citizens' initiative, [..] minimum numbers should be degressively proportional.

The relationship between population size and the required minimum numbers of signatures given in the regulation is shown in Fig. 1. A least squares power-law regression of the thresholds τ_i on population sizes n_i results in $\tau_i = c \cdot n_i^{0.56}$ with $R^2 \approx 0.96$. As a reference, Fig. 1 also includes the best-fit linear regression (with coefficient 0.009 and $R^2 \approx 0.93$).

One plausible desideratum is to treat individuals from different member states equitably in the following sense: ceteris paribus two states j and k ought to be equally "attractive" from the point of view of an initiative organizer. In particular, the threshold requirement relative to population size should not be harder to satisfy in one state than in any other. Which arrangement of state-specific thresholds $\tau_1, \ldots, \tau_m$ satisfies this norm? In order to answer this question we first study the allocation of resources to different states by a campaign organizer who wishes to make the initiative successful.[3] Intuitively, the best solution to the problem of threshold selection seems to be plain proportionality. We use our model to show that the choice of the state thresholds reflects specific assumptions about heterogeneity in the various populations. To the extent that these assumptions are warranted or not, the initiative could be biased by design towards either the smallest or the largest states.

The rest of this paper is organized as follows. In Section 2 we introduce the theoretical model. Results are presented in Section 3. A brief conclusion follows in Section 4.

2. A simple model of the initiative process

Consider a *union* formed by a large society of *n citizens*. Assume a partition of the population into *m states*, and for $j = 1, \ldots, m$, let state j consist of n_j people. Of course, $\sum_j n_j = n$.

The citizens are to decide within a fixed time span $[0, T]$ whether or not to endorse by their signature a legislative proposal, the *initiative*. With probability $\theta_j \in [0, 1]$ an individual in state j is realized to strictly prefer the initiative proposal to the status quo. More specifically, the θ_j's of citizens in state j are taken to be *independently and identically distributed* (i.i.d.) random variables with density function f_{θ_j} and cumulative distribution function F_{θ_j}.

The initiative is put forward by the initiative organizer who allocates campaign resources to the various states in an effort to make the initiative successful. Not signing is a weakly dominated strategy for a citizen who prefers the initiative, thus, if given the opportunity, we assume that she will actually decide to sign.

If the *per-capita-resources* spent in state j are r_j ($r_j \geq 0$), the (independent) probability that an individual there has the opportunity to approve or disprove of the proposal is captured by the function $\psi_j(r_j) : \mathbb{R}_+ \to [0, 1]$, which is twice continuously differentiable, and *sufficiently concave*. Specifically, we assume $\psi_j^2(r_j)$ to be concave. For large n_j, this is very close to assuming that the uncertain number of potential signatories is Poisson distributed with expected value $\psi_j(r_j)n_j$. Then, the total number of signatures S_j in state j follows a mixed Poisson distribution with mean $\mathbf{E}[\theta_j]\psi_j(r_j)n_j$.

The gathering of signatures in state j can be thought of as a counting process $\{S_j(t), t \in [0, T]\}$, i.e., a stochastic process that keeps count of the number of events (signatures) that have occurred in period $[0, t]$. Obviously, $S_j(t)$ is non-negative and integer-valued for all $t \in [0, T]$. Furthermore, $S_j(t)$ is non-decreasing in t.[4] Specifically, we consider a mixed Poisson process $\{S_j(t), t \in [0, T]\}$:

Definition 1. A mixed Poisson process $\{S_j(t), t \in [0, T]\}$ is a continuous time counting process with state space $\mathbb{N}$ and counting distribution $\Pr(S_j(t) = k)$ of the form:

$$\Pr[S_j(t) = k] = \int_0^\infty e^{-tx\psi_j(r_j)n_j} \frac{(tx\psi_j(r_j)n_j)^k}{k!} dF_{\theta_j}(x), \tag{1}$$

where F_{θ_j} is referred to as the structure function given by $F_{\theta_j}(x) = \Pr(\theta_j \leq x)$ with $F_{\theta_j}(0) = 0$.[5]

If the random variable θ_j is degenerate at some x (>0), then we have a *homogeneous* Poisson process. By contrast, a non-degenerate structure function models the situation that statements of support come from a heterogeneous population where the probability to strictly prefer the initiative proposal varies from one individual to another (or from one socio-demographic group

[3] In this paper we assume a single organizer as seems fit for an initiative like the ECI. By contrast, Strömberg (2008) analyzes the incentives to allocate campaign resources to the constituencies in the context of an election between *competing* candidates.

[4] For a rigorous, extensive treatment of stochastic processes see Ross (1996).

[5] Examples of mixed Poisson processes $\{\tilde{S}_j(t), t \in [0, T]\}$ include the Pólya process and the Sichel process which use a Gamma and a generalized inverse Gaussian distribution as structure functions, respectively. For more information on mixed Poisson processes see Johnson and Kotz (1985) and Grandell (1997).

to another). For example, citizens of different age or gender might differ in their opinions on the proposal, as will farmers, urban dwellers, and so forth.

If $\mathbf{r} = (r_1, \ldots, r_m)$ is the vector of per-capita resource allocations and the time horizon T is normalized to 1, then the initiative organizer's expected payoff is given by the following assumption:

$$U(\mathbf{r}) = \sum_{j=1}^{m} \frac{\mathbf{E}[S_j(1)]}{\mathbf{E}[W_j(\tau_j)]} - c \sum_{j=1}^{m} n_j r_j. \tag{2}$$

The goal of the organizer is to maximize the number of signatures he can expect to gather within the time limit of one year, less the resources he spends in trying to get these signatures. However, the organizer needs to meet state-specific thresholds τ_j in a subset of states. As the probability of "making signatures count" is inversely related to the expected waiting time $\mathbf{E}[W_j(\tau_j)]$ until the threshold in state j is reached, we can interpret (2) as the expected utility of the campaign at date $t = 1$ seen from $t = 0$. The denominator $E[W_j(\tau_j)]$ can be seen as capturing time discounting. The parameter c denotes the marginal cost of raising resources. It may be thought of as the disutility associated with the fundraising effort.

3. Analysis and results

Proposition 1. *The optimal resource allocation* $\mathbf{r}^*$ *of the initiative organizer satisfies*

$$\frac{n_j}{\tau_j} \frac{\mathbf{E}[\theta_j]\psi_j(r_j)\psi_j'(r_j)}{\int_0^1 \frac{1}{x} dF_{\theta_j}(x)} = c \quad \textit{for all } j. \tag{3}$$

Proof. In a mixed Poisson process with structure function F_{θ_j}, expected waiting time until the τ_jth event is

$$\mathbf{E}[W_j(\tau_j)] = \tau_j \int_0^1 \frac{1}{x\psi_j(r_j)n_j} dF_{\theta_j}(x) \tag{4}$$

(see e.g. Rolski et al., 1999, p. 369). Then, (2) can be written as

$$U(\mathbf{r}) = \sum_{j=1}^{m} \frac{\mathbf{E}[\theta_j]\psi_j(r_j)n_j}{\frac{\tau_j}{\psi_j(r_j)n_j} \int_0^1 \frac{1}{x} dF_{\theta_j}(x)} - c \sum_{j=1}^{m} n_j r_j. \tag{5}$$

The initiative organizer chooses $\mathbf{r}$ to maximize (5) subject to the constraints that $r_j \geq 0$ for all j. The first-order conditions for this problem are given by (3).

It follows from strict concavity of ψ_j^2 $(j = 1, \ldots, m)$ that the objective function is strictly concave in $\mathbf{r}$. Thus, the necessary conditions are also sufficient for a (global) maximum. □

Under additional assumptions about ψ the following comparative statics results obtain:

Corollary 1. *Let* $F_{\theta_j}(x) \leq F_{\theta_k}(x)$ *for every* x*, i.e.,* $F_{\theta_j}(\cdot)$ *first-order stochastically dominates* $F_{\theta_k}(\cdot)$*. If* ψ^2 *is a concave function and thresholds are set proportional to population sizes, then* $r_j^* \geq r_k^*$.

Proof. Compared to $F_{\theta_k}(\cdot)$, $F_{\theta_j}(\cdot)$ attaches weakly – and for some levels for x strictly – higher probability to citizens having a support probability of at least x. By the fact that $1/x$ is a decreasing function we can conclude that

$$\int_0^1 \frac{1}{x} dF_{\theta_j} \leq \int_0^1 \frac{1}{x} dF_{\theta_k}.$$

Moreover, it follows from first-order stochastic dominance that $\mathbf{E}[\theta_j] \geq \mathbf{E}[\theta_k]$.

Note that concavity of ψ^2 implies $(\psi^2)'' = (2\psi\psi')' \leq 0$, i.e., $\psi\psi'$ is monotonically decreasing in r_j for all j. In order to satisfy (3) it is necessary that

$$\psi(r_j)\psi'(r_j) \leq \psi(r_k)\psi'(r_k),$$

i.e., $r_j^* \geq r_k^*$. □

If ψ is sufficiently concave we can unambiguously say that the organizer allocates more resources per capita to some state j the greater the a priori inclination to support the initiative in that state.

Corollary 2. *Let* $F_{\theta_k}(\cdot)$ *be a mean-preserving spread of* $F_{\theta_j}(\cdot)$*. If* ψ^2 *is a concave function and thresholds are set proportional to population sizes, then* $r_j^* \geq r_k^*$.

Proof. Let $H(z)$ be a distribution function with a mean of zero, i.e., $\int z dH(z) = 0$. Since $F_{\theta_k}(\cdot)$ is a mean-preserving spread of $F_{\theta_j}(\cdot)$ and $v(x) = 1/x$ is convex for $x > 0$, we can conclude that

$$\begin{aligned} \int v(x) dF_{\theta_k}(x) &= \int \left(\int v(x+z) dH(z) \right) dF_{\theta_j}(x) \\ &\geq \int v\left(\int (x+z) dH(z) \right) F_{\theta_j}(x) \\ &= \int v(x) dF_{\theta_j}(x) \end{aligned}$$

from Jensen's inequality. Then condition (3) requires $\psi(r_j)\psi'(r_j) \leq \psi(r_k)\psi'(r_k)$, which is achieved by choosing $r_j^* \geq r_k^*$ following the argument used in the proof of Corollary 1. □

Even when the expected level of support is identical in two different states, the campaign organizer optimally allocates more resources per capita to the state where the distribution of preferences in the population is 'more concentrated', i.e., where the population is less fragmented.

A natural normative objective for the design of initiative rules is that the procedures should not introduce any biases which result in certain parts of the populace being excluded from participation to some degree. A necessary condition regarding the minimum numbers of signatures in different states is captured by the following

Postulate of Neutrality:
Thresholds should be chosen such that, all other things equal, any two individuals in different states have the same chance of being targeted by a rational initiative organizer.

Now suppose that for a certain initiative proposal, the distribution of preferences is identical across states. In this situation, Proposition 1 immediately yields

Corollary 3. *If* $F_{\theta_j} = F_{\theta_k}$ *and* $\psi_j(r_j) = \psi_k(r_k)$ *for all* j, k*, then neutrality requires that thresholds* $\tau_1, \ldots, \tau_m$ *are set proportional to population sizes.*

If the initiative planner faces the same basic conditions in two states his per-capita effort is the same only if threshold are chosen proportional to populations size. In turn, if the premise of Corollary 3 is true degressive thresholds such as those devised for the ECI would introduce a serious bias in favor of the most populous states. The thresholds would then induce the organizer not to consider campaigning in small states as it would be relatively harder there to obtain the minimum number of support statements.

Still, degressive thresholds can be rationalized, namely by the plausible assumption that large populations are more diverse than smaller ones. Alesina and Spolaore (2003, p. 1029) state that "the average cultural or preference distance between individuals is likely to be positively correlated with the size of the country".

A well-motivated institutional designer committed to the postulate of neutrality might want to take differing preference heterogeneity into account. Note that greater preference heterogeneity in large states (while mean preference does not vary across states) amounts to saying that $F_{\theta_k}(\cdot)$ is a mean-preserving spread of (or second-order stochastically dominated by) $F_{\theta_j}(\cdot)$ whenever $n_k > n_j$. Thus, combining the Postulate of Neutrality and Corollary 2 results in

Proposition 2. *Let $\mathbf{E}[\theta_j] = \mathbf{E}[\theta_k]$ and ψ^2 be a concave function. If $n_k > n_j$ implies that $F_{\theta_k}(\cdot)$ is a mean-preserving spread of $F_{\theta_j}(\cdot)$ then neutrality requires thresholds $\tau_1, \ldots, \tau_m$ to be degressive in population size.*

Reversely, proportional thresholds in the presence of size-related heterogeneity would give rise to a bias towards the smallest states as the desire to reduce uncertainty makes those most attractive for the initiative organizer.

In case of the ECI the underlying assumptions about preference heterogeneity in different states could in principle be recovered from the choice of thresholds — if one is willing to make additional assumptions about the type of the distribution of probabilities θ_j. However, design recommendations should rather be based on qualitative information (such as size-dependent heterogeneity) rather than on any specific distributional assumptions which could at best have empirical support at a particular point in time. The aim to create a long-lasting, fair constitution offers good reasons for pretending that $\mathbf{E}[\theta_j] = \mathbf{E}[\theta_k]$ even if it is not, i.e., different propensities to support initiative proposals should not be taken into account. By contrast, the observation that preference heterogeneity increases in population size could still be 'behind a veil of ignorance' and thus be relevant in institutional design.

4. Concluding remarks

This paper has developed a simple model of the initiative process in a union of states in order to address the issue of the 'neutral' design of threshold requirements. State-specific thresholds affect the allocation of campaign resources and thus citizens' chances to get informed and involved. As equal possibilities of participation form part of democratic legitimization and contribute to citizens' identification with the polity, it is desirable that the institutional design should not bias the initiative process in favor of certain states. The basic intuition that thresholds proportional to population size achieve such a normative objective is shown to be correct if no differences between states are to be acknowledged. Yet, if preference heterogeneity increases in group size then degressively proportional thresholds as selected for the ECI can be justified on 'neutrality' reasons. It is worth remarking that potential positive economies of scale would point into the opposite direction, namely towards greater attractiveness of large populations for campaigners. By a 'principle of insufficient reason' argument one might conclude that thresholds which are linear in population size are most recommendable in the absence of sound and reasonably steady information. Whether size-dependent heterogeneity is such a piece of information is, eventually, an empirical question.

Many other aspects of the design of direct democratic procedures are outside the scope of this paper but provide promising directions for future research. First, we have not considered the issue of maximizing the representativeness of an initiative. In the ECI votes from seven out of 27 EU member states are in principle sufficient. For an initiative which only confers a right to put an issue on the agenda, this requirement might already seem severe, whereas for a legislative initiative which would lead to a binding referendum in which all citizens of Europe take part at the same time the same requirement would be rather slack.

Second, other factors will make an initiative organizer prefer one state over another, e.g., language barriers (having more languages involved increases the costs of campaign), the degree of urbanization (big cities are more suitable for street campaigning), etc. A potential remedy for such biases might be provided by 'flexible' rules (see Gersbach, 2005 for suggestions of 'flexible' democratic mechanisms in other contexts) such as lowered or increased overall requirements depending on how diversified the composition of the supporters is.

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