Signaling Effects of Civic Initiatives under Legal Uncertainty*

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Abstract

We analyze civic initiatives as strategic interactions between an incumbent mayor, the proposer of the initiative, and a representative voter. We model civic initiatives as ex post checks on the mayor's implementation power, where the mayor has the ability to legally contest the initiative before it takes place. Examples from Central European countries are used to illustrate how our model corresponds to real world conditions. We study how signaling affects both the policy and the mayor's popularity, and show that if a referendum is held, responsiveness improves. Nevertheless, we observe several non-monotonicities plaguing empirical inference, of which two stand out: (i) Having a more adversarial mayor can lead to either the introduction or the withdrawal of an initiative. (ii) If an initiative is legally permitted but not materialized, the mayor may receive an undeserved popularity bonus.

Keywords: civic initiatives, signaling, direct democracy

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1 Introduction

The purpose of a civic initiative is to make the government more responsive to the people, but the literature is fairly mixed on whether initiatives indeed have such effects. Directly, an initiative curbs the actions of the representative through an ex post correcting vote or an ex ante threat (Gerber 1999). Indirectly, however, politicians lose the ability to set policy at the expense of uninformed voters, and the initiative process may come under the purvey of wealthy, economic interests (Broder 2000). Matsusaka and McCarty (2001) further show that initiatives produce more responsive legislatures only when the agency problem is not severe.

The other indirect channels of influence are manifold, ranging from issue unbundling (Besley and Coate 2008; Lacy and Niou 2000), changing the size and diversity of the state interest group population (Boehmke 2002), enhancing trust (Torgler 2005) and committing the candidate to avoid extremes (Hugh-Jones 2008) to improving public investments and thereby growth prospects (Blomberg et al. 2005).

There is a vast empirical research on the strong policy effects of direct democracy (not only initiatives) on the sub-national level, especially for Switzerland, starting from Pommerehne (1978), with recent contributions by Vatter and Rueffli (2003), Armingeon et al. (2004), and Funk and Gathmann (2008). Empirical research on responsiveness, especially on state-level public opinion data in the U.S. (Lascher et al. 1996), taxing and spending policies (Camobreco 1998), happiness (Lascher and Wassner 2007), or legislator-level evidence (Smith 2001) is nevertheless inconclusive, and empirical methodologies of the initiative-studies are subject to substantial criticism (Matsusaka 2001). Also, institutional detail matters a great deal; for example, Blume et al. (2009) find that initiatives increase spending but mandatory referenda constraint it.

To shed more light on the effects of civic initiatives on policies and the popularity of incumbents, we construct a theoretical model of effects of initiatives on a conflict between an existing incumbent and representative voter. We abstract away ex ante effects such as the forward-looking selection of policies, or candidate self-selection. This model features both incomplete information on the part of voters, and legal uncertainty, for which we have detailed case-study evidence in the context of local civic initiatives in Central and Eastern Europe (see Smith 2007). Namely, an initiative does not automatically materialize into a referendum; there are always viable strategic options for an incumbent to delay or obstruct a referendum through court or administrative challenges.

We concentrate on whether the proposer's actions, such as submitting a referendum proposal, waging the campaign and dealing with a legal dispute over the validity of an initiative, may serve as signaling devices of the incumbent's policy position.[1] In our setup, we replicate a standard result: once a referendum is actually held, it serves as an external check on the mayor's implementation power, and responsiveness improves.

In addition to that, there are nevertheless additional signaling effects, which play an interesting

[1] We use the standard game-theoretical notion of signaling, not to be confused with signaling discussed in Matsusaka (2007).

role if an initiative is not submitted, but is legally available. Once the option of an initiative is introduced, it is generally ambiguous whether those incumbents who have not been contested by an initiative provide a more or less responsive policy. This may contribute to explaining why voters trust their politicians less in states with direct democratic institutions (Kelleher and Wolak 2007), even if their information objectively and subjectively improves (Benz and Stutzer 2004). Secondly, we find non-monotonicities and non-linearities in the policy space that complicate Bayesian learning of the voter. Most importantly, if an incumbent becomes in increased conflict both with the voter and proposer of the initiative, a new initiative may be launched, but also an existing one may be withdrawn. Frequency of the use of initiative is thus not indicative of the need for a more stringent control of the incumbent.

The paper is structured as follows: Section 2 motivates our setup. Section 3 constructs primitives of the model. Section 4 solves for signaling perfect Bayesian equilibria, and the following Section 5 studies robustness of the model to parametrical changes. Section 6 summarizes the findings of the article.

2 Motivation

In order to shed light on the model's scope and relevance, we start by motivating its key assumptions and features.

2.1 Asymmetric information

Our first assumption focuses on uncertainty over the preferred policies, instead of uncertainty over the contingencies of the world, or the skills or abilities of the players. Two approaches are outstanding in the literature on initiatives: the informational disadvantage lies on the side of the contesting players (Matsusaka and McCarty 2001; as a one-sided asymmetry also in Hug 2004) or on the side of voters (Gerber and Lupia 1995). We keep the latter, for four reasons: (i) Stochastic popularity shocks that make voter's behavior random on make sense in probabilistic voting models where policy platforms are strategically announced, not just presumed. (ii) Informational advantage is far more plausible on the side of experienced players, i.e. professional politicians and interest groups. (iii) Uncertainty introduces a lottery leading to a status quo bias, depending on the risk-aversion of the contestants. The model then would have to be stated as an application in auction or contest theory, not as a voting model. (iv) Our main interest is in signaling. We want to demonstrate what happens when not only the mayor's, but also the proposer's actions help to reveal the policy position of the mayor. Uncertainty over the voter's action is therefore nothing but pure noise.

2.2 Signaling

Exactly like in Gerber and Lupia (1995), who first recognized and modeled initiative signaling effects, the key mechanisms behind the success of a civic initiative are rational belief updates (Bayesian

learning) of the voters. We assume a representative voter who is asymmetrically informed about the mayor's and proposer's policy positions. A relevant example in the context of local politics could be uncertainty over the distribution of royalties from an installed wind power plant, a typical local infrastructure project. A voter capable of Bayesian learning need not to know precisely what the mayor's preferred distribution will be, yet observing an initiative campaign opposed to the municipal approval of the infrastructure development would allow the voter to rationally update his or her initial beliefs. The substance of the initiative campaign itself may be purely uninformative 'cheap talk,' yet a voter may nonetheless change his or her mind by observing the initiative being submitted. The campaign with an initiative, launched by the proposer, is thus primarily instrumental in revealing the mayor's policy position, and assessing the degree of conflict between the mayor and the voters.

2.3 Legal uncertainty

Another key feature that makes our model rich in results, and distinguishes it from the often-studied U.S. experience, is the incumbent's (or local council's) gate-keeping option. In U.S. municipalities, the formal conditions for proposed initiatives are overseen by non-partisan local or county clerks, who generally do not have a political stake in the propositions that they review. In our model, as in much of Central and Eastern Europe, either the mayor or a local council (usually strongly aligned with the mayor) decides whether formal conditions have been met, and is obliged to call the referendum if everything is in order. However, since the initiatives directly relate to, and often challenge, the policy positions of the mayor (which is not the case for a non-partisan clerk), he or she may also utilize legal opportunities to challenge the initiative, either by claiming that not all formal conditions have been met, or by seeking recourse at a third party. If the third party (in Central and Eastern European countries, this could be regional-level authorities, the Ministry of Interior, or even Constitutional Court) provides rulings or opinions approving the initiative, the mayor suffers a popularity or reputation cost for being overridden. Otherwise, the mayor's status quo policy prevails.[2]

Our evidence indicates that the incidence of obstructions is indeed high, and we also observe frequent cases in which proposers and local governments sue each other for alleged illegal infringement in the referendum process. We can support the point with two anecdotic examples, one from the Czech Republic and the other from Poland. In the first example from the Czech city of Tabor, local residents organized a referendum campaign in 2000 to prevent the city from developing a road through a popular local botanical garden. The mayor, who was opposed to the referendum, sought recourse by contacting district-level state officials, who concurred that the referendum question was

[2] According to Smith (2007), while there are always differences in local referendum laws between countries, referendum legislation in Central European countries has a number of common institutional features. First, referendums are only valid if turnout quorums (sometimes as high as 50%) have been met. Second, local councils decide on the validity of referendum proposals. Third, evaluations by local councils (and third parties) of the appropriateness of referendum questions usually take place after signatures have been collected, rather than beforehand. Fourth, most referendums take place as stand-alone ballots rather than at the time of elections. Lastly, local governments are generally required to provide residents with only minimal information about upcoming referendums, and thus informational boycotts are commonplace.

invalid, claiming that land-use issues are not in the jurisdiction of local government, but of the state. The district authorities then gave an executive order canceling the upcoming referendum (it is doubtful whether the law even granted them such authority). Local activists appealed the issue to the Ministry of Interior and threatened to take the issue to the Constitutional Court. In the face of significant public pressure, the district authorities withdrew their executive order, and the city council in Tabor called the referendum. Local residents voted overwhelmingly to stop the planned road development, in what became the first local civic initiative in the history of the Czech Republic (Smith 2007).

The second example is from the Polish city of Lomianki, a critical juncture for the planned S7 motorway connecting Warsaw with Gdansk. Lomianki is situated between the Vistula river and the Kampinos National Park, making the precise route of the motorway controversial from an environmental point of view. Local residents opposed to the planned route of the motorway near the national park succeeded in having a local referendum held on the issue in 2006 (the referendum was also supported by the mayor at the time), which was declared invalid due to low turnout (28%; valid referendums in Poland need a minimum of 30% turnout). The next year, residents campaigned for a second referendum on the issue, but faced stiff resistance from another, newly elected mayor, who preferred the S7 route near the national park. Similar to the Tabor example, the Lomianki city council refused to call the referendum due to jurisdictional concerns, claiming that "A local referendum can only relate to matters falling within the scope of tasks and responsibilities of local authorities. The case of so-called public roads and public transport belong to the responsibilities of all three levels of sub-national government, which manage municipal, district and provincial roads, respectively. . . The case of the S7 between Warsaw and Gdansk does not only concern our self-government, but is a national road." The referendum proponents then appealed to the Governor of the Mazowiecki province, who annulled the decision of the city council, pointing out that the Constitution of Poland allow citizens the right to express their opinion on local matters, even in the form of a referendum. The city council then took the issue to the Provincial Administrative Court in Warsaw, which also ruled that the decision of the city council was invalid (ruling sygn. II SA/Wa 2097/07). Rather than accepting the verdict, the city appealed the ruling to the Supreme Administrative Court. The case has yet to be resolved.

While civic initiatives are intended to be mechanisms of citizen decision-making, they are in fact sites of major political and legal contestation. The number of cases is not irrelevant: since the collapse of communism, there have been over a hundred local referendums in each the Czech Republic and Hungary, several hundred in Poland, and the numbers are also growing in other countries, like Bulgaria. There are also dozens of unrealized initiative campaigns due to political disputes. All of the political conflicts observed in the literature and media (Smith 2007) occur when local governments want to prevent a referendum from taking place that could potentially overturn local policy. In this type of game, it is both empirically and theoretically valuable to investigate how signaling between competing players affects policy responsiveness and how initiative outcomes impact the mayor's popularity.

2.4 Lack of commitment

In contrast to Gerber and Lupia (1995), we do not impose Stackelberg leadership where the mayor commits to another policy than his own preferred one. The mayor cannot even bargain to implement a compromising 'initiative-proof' (campaignless) policy through a take-it-or-leave-it offer that the proposer cannot refuse due to entry costs. Thereby, we abstract from elements of bargaining between the mayor and proposer, which appear to be particularly relevant in the local politics (for empirical support drawing from local initiatives in California cities, see Gordon 2009). Introducing mayoral bargaining power to avoid initiatives would nevertheless bring unwelcome features to the model: first, the theory would not explain the occurrence of referenda as such, since referendums would be unrealized threats off the equilibrium path; and second, there would be a question of renegotiation since local projects typically involve sunk costs, and hold-up problems exist. In other words, if sunk costs were present (as in infrastructure projects), early implementation promises could be safely violated since the proposer would lack the incentive to challenge the already carried out investment. To sum up, the absence of commitment devices disregards pre-electoral announcements and electoral competition as such, and assumes also an irreversible mayoral policy.

2.5 Implementation power

Nearly all models allow the proposer to determine the referendum proposal from a continuous policy space. We deviate for two reasons, and in the robustness section we show that this in fact enriches the model. We assume that the single question is a binary choice over two subsets of policies (e.g., whether to allow a wind power plant or not). For typical local policies (mining, local transportation, housing construction), referendum questions are bound to be technically simple and issue specific, therefore restricting policy sets. There does remain a large scope for implementation discretion on the part of the mayor. Partition of the policy set is mostly exogenous, related to a technological feature and/or the investor's plan (e.g., if the city does not approve of an investor-proposed factory with certain technical specifications, the investor will move elsewhere), rather than to the strategic choice of the proposer of the referendum.

The referendum proposal is thus not a full-fledged policy proposal; it only restrains the executive in implementation. Implementation is complex especially if it involves contracting out and outsourcing services related to a public facility, and uncertainty over price developments. We reflect these issues by assuming that the proposer and the voter have to make a binary choice over two subsets (i.e. whether to approve of a project or not), and the mayor selects within the chosen subset. This is close to the founding rational choice model of direct democracy put forward by Romer and Rosenthal (1979), where voters also choose between the level of education spending preferred by the agenda-setter or a default policy.

3 The setup

3.1 Policies and players

Suppose a single referendum question $q \in \Theta$ partitions a convex policy space $\Theta \subseteq \mathbb{R}$ into two convex subspaces H and L, such that $q = \max L = \min H$. The mayor's optimal policy is $m \in H$ and the proposer's optimal policy is $p \in \Theta$. Both have preferences represented by a function $u(x^*, x)$, strictly quasiconcave in $x \in \Theta$, satisfying symmetry[3] $u(x^*, x) = u(x, x^*)$, and differing only in parameter x^* characterizing the optimal policy, $x^* = \arg\max_x u(x^*, x) \in \{m, p\}$.[4] The mayor and the proposer have better information about their optimal policies than the voter. To capture that, we fix their information as complete, whereas the voter's prior belief over the mayor's and proposer's optimal policies is a joint density function $\tilde{B}(m, p) : H \times \Theta \to [0, 1]$, with not necessarily independent marginal densities (i.e., the mayor and proposer's policies may be positively or negatively correlated), where $\tilde{m} := \int_m \int_p m \cdot \tilde{B}(m, p)\, dp\, dm$ is the expected value and $\tilde{\sigma}$ denotes the standard deviation of the mayor's position. Empirically, the lower standard deviation can be attributed to mayors with party affiliation, and higher to unaffiliated independents.

For the voter, we select from the class of strictly quasiconvex cost functions a quadratic form $c(v, x) := (v - x)^2$, where $v \in \Theta$ is the voter's optimal policy, $v = \arg\min_x c(v, x)$. With constant relative-risk aversion in policy deviation, $\text{abs}(v - x)$, this represents the most convenient mean-variance framework, enabling us to easily use second-degree stochastic dominance.

If an initiative is not submitted, or if the referendum is not approved by the court or is lost for the proposer, the mayor is free to implement m; otherwise, the mayor is restricted by implementing a policy inside a subset L, where due to convexity of subspaces and quasiconcavity of preferences, the mayor implements the corner $\max L = q \leq m$. The conflict over policies thus can be represented by a pair of prizes for winning the contest,

$$w^m := u(m, m) - u(m, q), \tag{1}$$

$$w^p := u(p, q) - u(p, m), \tag{2}$$

where the contestants (mayor and proposer) know each other's valuation. Notice that we have either a *pure conflict* ($p \in L$), an *impure conflict* ($p \in H, w^p \geq 0$), or *no conflict* ($p \in H, w^p < 0$). Purely to save notation, suppose the prior beliefs denote only beliefs about the contestants' positions in the presence of a conflict, hence $\tilde{B}(m, p) = 0$ if $w^p < 0$. Using subscripts for partial derivatives, we obtain for the mayor $w^m_m > 0, w^m_p = 0$, and for the proposer, $w^p_p < 0, w^p_m > 0$. We normalize status quo payoff with policy m to $(0, 0)$.

[3] Having a single symmetric function simplifies the voter's inference when dealing with the continua of mayor and proposer types.

[4] In local politics, a proposer is typically a single large NGO or interest group, hence we may disregard the issue of multiple proposers and their cost-sharing mechanisms (cf. Hug and Tsebelis 2002, p. 21). This would definitely become a relevant issue in national referenda.

3.2 Game

The game is divided into proposal and implementation stages. In the proposal stage, policy subset $S \in \{H, L\}$ is selected, possibly through an initiative. In the implementation stage, the mayor selects his or her optimal policy within the given policy subset, which is m for $S = H$ and q for $S = L$. The game starts with the proposer, who either submits an initiative, or acquiesces. If the proposer acquiesces, the mayor implements m. Otherwise, the game proceeds as follows: Submitting an initiative implies an entry cost $e > 0$ for the proposer (costs associated with putting an initiative on the ballot, e.g. signature-gathering within a circulation period, political mobilization, or legal consulting), and the subsequent decision of the mayor to call for the referendum, or launch a legal dispute. The mayor's participation cost is zero, given that the city pays for the mayor's expenses.[5] Next, the mayor either calls for the referendum, or legally disputes the initiative.

If the referendum is called by the mayor, we have an *uncontested referendum*, alternatively called Referendum 1 (R1). The voter then updates his or her beliefs into $B_1(m,p)$, expects $m_1 := \int_m \int_p m \cdot B_1(m,p)\, dp\, dm$ with a standard deviation σ_1, and votes for initiative if $E[c(v,q)|B_1] \leq E[c(v,m)|B_1]$. Given the shape of the voter's cost function, we easily derive that

$$\mathbb{E}[c(v,m)|B_1] = (v-m_1)^2 + \sigma_1^2, \tag{3}$$

which after rearranging yields that the voter supports the initiative rather that the lottery about the mayor's optimal implementation policy if and only if

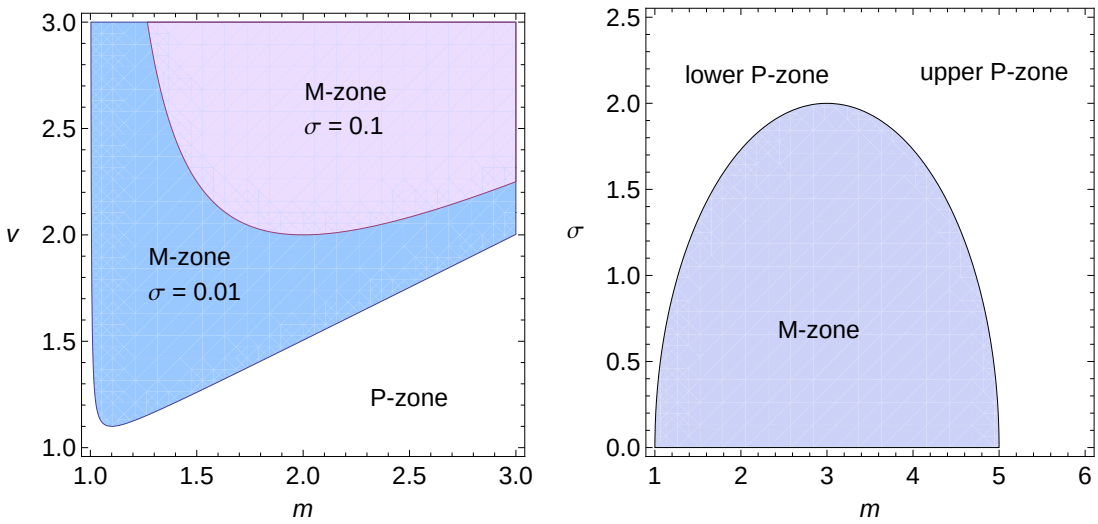
$$\mathbb{E}[c(v,q)|B_1] = (v-q)^2 \leq (v-m_1)^2 + \sigma_1^2 = \mathbb{E}[c(v,m)|B_1], \tag{4}$$

or equivalently $(m_1 - q)(v - m_1 + v - q) \leq \sigma_1^2$. Figure 1 (a) first plots a hyperbolic cylinder showing which lotteries over the mayor's policy are accepted against the constant payoff of policy q.[6] This shows, for a fixed spread of mayoral positions σ, how shifting the mean of the mayor's position changes the chances for his or her reelection, for each type of the voter. This picture is particularly useful for tackling shocks to the voter's position, and for checking the Condorcet-winner property of the median voter's decision. Clearly, the scope for the mayor's reelection increases with the increasing voter's policy position v (i.e. the voter's valuation of the project), and with the decreasing distance of m from v.

Figure 1 (b) is helpful to understand the representative voter's decision making, for any pair of parameters (m, σ), i.e. if riskiness of the mayor varies. (The example is calibrated for $q = 1$ and $v = 3$.) One interesting observation is the presence of three zones: the lower P-zone, the M-zone, and the upper P-zone. The lower P-zone exists if and only if $v \neq q$, i.e., if there is ever a chance for some mayor m with a degenerated distribution $\sigma = 0$ to beat the proposer's policy q. This zone represents situations when riskiness of the mayor outweighs even the fact that in the average, the mayor m is closer to the voter than than the alternative policy q.

[5] We differ from Gerber and Lupia (1995) where the opponent, namely the mayor, must bear a campaign cost.

[6] The example is calibrated for $q = 1$ and $\sigma \in \{0.1, 1\}$.



(a) $\sigma \in \{0.1, 1\}$ (b) $v = 3$

Figure 1: Acceptance zones ($q = 1$)

If the mayor calls for a legal dispute, then the proposer either chooses to retreat (and $S = H$), or escalates the conflict. A legal dispute is won by the proposer with exogenous probability $\omega \in (0,1)$, and lost with the probability $1-\omega$. Uncertainty is typically related to issues such as the legal validity of signatures, the wording of the referendum question, and the jurisdiction of decision-making rights for the local authority. Empirically, some disputes are resolved prior to a court's decision, which may also reflect exogenous (e.g. popularity) shocks leading to concession.

A won dispute implies that the mayor bears a popularity cost $r > 0$ for being convicted (i.e. through some form of moral or legal censure) of obstructing a legally valid referendum.[7] We have then a *contested referendum*, or Referendum 2 (R2), where the voter updates beliefs into $B_2(m,p)$, expects $m_2 := \int_m \int_p m \cdot B_2(\cdot)\, dp\, dm$ with standard deviation σ_2, and votes for the initiative if and only if $c(v,q) \leq E\left[c(v,m)|B_2\right]$. By analogy to (4) derived for uncontested Referendum 1, this amounts to comparing

$$\mathbb{E}\left[c(v,q)|B_2\right] = (v-q)^2 \leq (v-m_2)^2 + \sigma_2^2 = \mathbb{E}\left[c(v,m)|B_2\right], \tag{5}$$

or $(m_2 - q)(v - m_2 + v - q) \leq \sigma_2^2$. The entire game, drawn for a particular realization $(m,p) \in H \times \Theta$, is summarized in Figure 2.

[7] We will also observe an endogenous popularity change that is separate from this popularity penalty; the analysis shall reveal that in normal cases it has a negative sign.

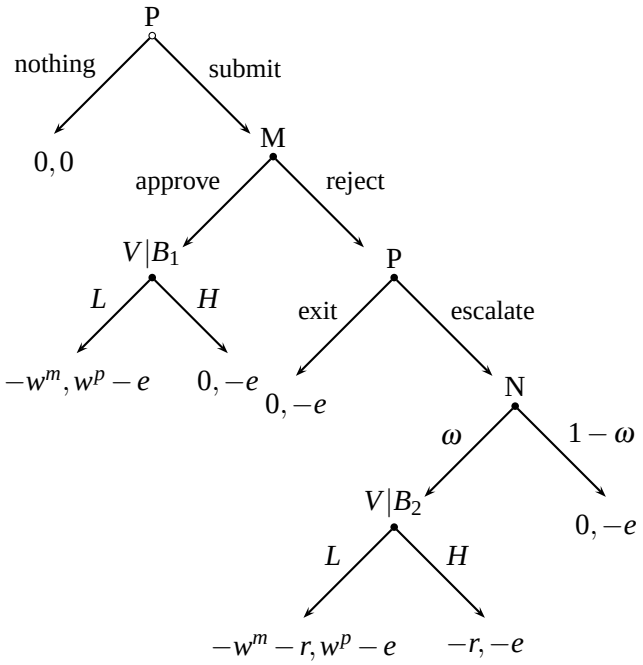


Figure 2: The game tree for a realization $(m, p) \in H \times \Theta$

4 Equilibria

To find perfect Bayesian equilibria, we proceed in two steps. The first is to check for the contestants' (the mayor's and proposer's) best replies as correspondences from the strategy set of the voter. Since the set of actions for the voter is $\{H, L\}$ for both Referendum 1 and 2, we denote the voter's pure strategies HH, HL, LH and LL. For each combination of contestants' positions $(m, p) \in H \times \Theta$ and each voter's strategy, we obtain the optimal contestants' strategies, hence a full strategy profile, and the corresponding payoff function. This is solved in subsection 4.1.

The next subsection 4.2 checks which voter strategies (or, which profiles) survive in equilibrium assessments, if the voter applies Bayesian learning. This will narrow down the set of candidate equilibria. When observing multiple equilibria, we will focus exclusively on those that involve complete separation. In other words, unless the proposer's participation constraint binds, the proposer is expected to signal the existence of conflict by submitting an initiative. This is equivalent to assuming a coordination or tacit strategy-proof collusion between the voter and the proposer. In other words, we focus on the cases when the proposer tends to contest the mayor as often as possible, and the voter anticipates this behavior. Further discussion on separation assumption follows in subsection 4.2.

4.1 Mayor's and proposer's best responses

We first focus on contestants' best responses when an initiative has been submitted. Then, we check the participation constraint of the proposer, recognizing when it pays off for the proposer to collect signatures.

Solving backwards, it is convenient to start with a payoff associated with escalating towards a contested referendum (R2). If the voter in this escalated referendum chooses H, the expected prizes or continuation values are for the mayor and proposer $(-r,0)$; if voter chooses L, the prizes are $(\omega(-w^m-r),\omega w^p)$. For an uncontested referendum (R1), if the voter chooses H, the vector of prizes is $(0,0)$, while if the voter chooses L, the prizes are $(-w^m,w^p)$. We apply this for each particular voter strategy, and thereby obtain the corresponding payoffs.

HH-strategy Voting in both kinds of referenda maintains the status quo. There is no way to implement $q \in L$. Hence, adding the entry cost $e > 0$ above the status quo zero payoff makes the proposer immediately acquiesce, and equilibrium payoffs are $(0,0)$.

HL-strategy The voter is expected to support the initiative only under escalated Referendum 2. The mayor would be willing to escalate if R1's payoff were less than R2's payoff, $0 < \omega(-w^m - r)$, which is however untrue. A win in Referendum 1 is preferred to a potential loss in Referendum 2, and the mayor strategically does not dispute the initiative. Adding the entry cost $e > 0$, the proposer immediately acquiesces instead of allowing for a lost Referendum 1, and equilibrium payoffs are again $(0,0)$.

LH-strategy The mayor can avoid the non-contested referendum by escalating to a contested referendum which he or she wins. The proposer therefore immediately acquiesces, and payoffs are still $(0,0)$.

LL-strategy By elimination, we have so far obtained that a necessary condition for an initiative to be submitted is the LL-strategy, i.e. *both referenda* must be expected to be won by the proposer. First, note that the mayor strictly escalates under LL-strategy if and only if $-w^m < \omega(-w^m - r)$, or $w^m > \frac{r\omega}{1-\omega}$. Under such a condition, the proposer decides to submit an initiative if and only if $\omega w^p - e > 0$ or $w^p > \frac{e}{\omega}$. If the mayor doesn't escalate, the proposer decides to submit an initiative if and only if $w^p > e$. For convenience, denote the above-mentioned threshold levels of the contestants' valuations in the following way:[8]

$$w^m_{R2} := \tfrac{r\omega}{1-\omega} \tag{6}$$

$$\left(w^p_{R1}, w^p_{R2}\right) := \left(e, \tfrac{e}{\omega}\right) \tag{7}$$

Table 1 summarizes the equilibrium nodes, i.e., either R1, R2, or $\varnothing$. It shows that a weak conflict (both prizes low) implies no initiative, moderate conflict (proposer's prize high) brings about an uncontested referendum, and large conflict (both prizes high) brings about a contested referendum.

[8]The subscript always points to the referendum type to which the threshold is related.

Table 1: Equilibrium outcomes under the voter's LL-strategy

Proposer/Mayor		no escalation $w^m \leq w^m_{R2}$	escalation $w^m > w^m_{R2}$
no entry	$w^p \leq w^p_{R1}$	$\varnothing$	$\varnothing$
entry only if R1	$w^p \in \left(w^p_{R1}, w^p_{R2}\right]$	R1	$\varnothing$
entry for R1 and R2	$w^p > w^p_{R2}$	R1	R2

We observe that the existence of an initiative is monotonic in the contestants' valuations w^m and w^p: An initiative is more likely if the proposer's valuation increases, or if the mayor's valuation decreases. The key thing is that this monotononicity property is not preserved for policy positions, because mapping from policy positions to valuations is not monotonic. Specifically, the conditions in Table 1 allow us to split the (pure and impure) conflict zone $\{(m,p) \in H \times \Theta : w^p \geq 0\}$ into three subsets, depending on the equilibrium outcome. The R1 and R2-zones are defined as

$$\mathscr{R}_1 := \{(m,p) \in H \times \Theta : w^p > w^p_{R1}, w^m \leq w^m_{R2}\}, \tag{8}$$

$$\mathscr{R}_2 := \{(m,p) \in H \times \Theta : w^p > w^p_{R2}, w^m > w^m_{R2}\}, \tag{9}$$

and finally in the absence of an initiative, the R0-zone writes

$$\mathscr{R}_0 := \{(m,p) \in H \times \Theta : w^p \geq 0\} \setminus \mathscr{R}_1 \setminus \mathscr{R}_2. \tag{10}$$

Figure 3 depicts the zones in space $m \times p$, which helps to deliver the interesting result stated in Proposition 1. The proposition reflects a different role of the mayor's and proposer's policy positions: whereas the proposer's policy position affects only the proposer's valuation, the mayor's policy position affects *both* the mayor's and proposer's valuations. Hence, a change in m brings about more complex consequences than a change in p, which is of secondary importance to the voter.

Proposition 1 *An increase in the proposer's optimal policy weakens the conflict and makes an initiative less likely. An increase in the mayor's optimal policy strengthens the conflict, which makes an initiative either more or less likely.*

Proof. See the Appendix.

4.2 Voter's beliefs and strategies

If the LL-strategy is expected by the contestants, we may observe three paths along the equilibrium.

1. No initiative ($\varnothing$), with m implemented. All voter's actions are played in out-of-equilibrium nodes, hence they cannot be verified.

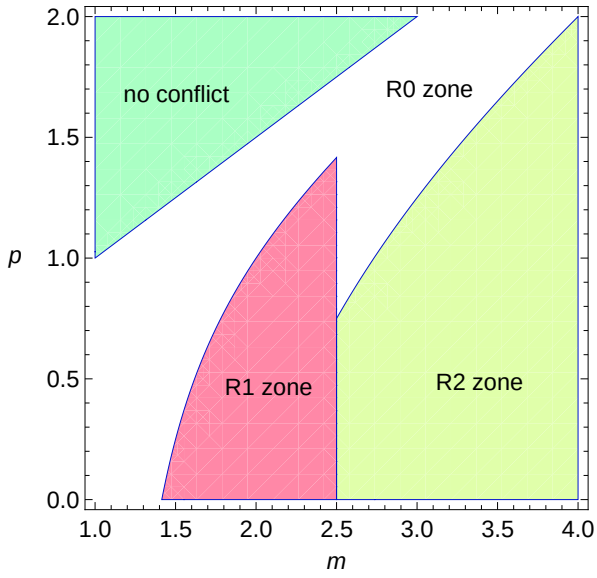


Figure 3: Outcomes under the voter's LL-strategy ($q = 1$)

2. Uncontested referendum (R1), with q implemented. This requires that the profile with LL-strategy is expected by the contestants, the mayor is unwilling to escalate and proposer is willing to bear an entry cost. Since only the uncontested referendum occurs in this equilibrium, the only posterior verified along the equilibrium path is the belief over an uncontested referendum.

3. Contested referendum (R2), with a lottery $(\omega, 1-\omega)$ over (q, m). This again appears only if the LL-strategy is expected by the contestants, and if both the mayor and proposer are willing to escalate. Only the contested referendum occurs in this equilibrium, so only the belief over contested referendum is verified along the equilibrium path.

As typical in sequential incomplete-information games, uniqueness is not preserved. The reason is the existence of out-of-equilibrium beliefs, creating a significant problem for a proposer who wants to signal the mayor's position by submitting an initiative. If the voter suspects that a proposer who meets the willingness requirement to enter the contest for some reasons does not enter, and updates posteriors such that by observing an initiative it is rational to vote against the initiative, a profile with HH (or LH/HL) strategy occurs, and the proposer is indeed forced not to enter.

A natural refinement to this problem are *separating equilibria*, where all proposers who meet participation conditions in Table 1 do submit an initiative with certainty. This is added to the purpose of avoiding cumbersome pooling equilibria that favor the incumbent. As mentioned in the opening part of Section 4, the refinement is equivalent to the absence of a coordination problem between the voter and the proposer. The refinement is plausible for two more reasons: (i) We do not model interaction between voters; coordination failures or traps leading to self-fulfilling negative prophecies should be ruled out. (ii) We will observe below that separation creates a net surplus for the voter in

terms of an improved expected policy. If the voter has leadership, he or she would commit to this separating refinement, as it strictly dominates pooling or semi-separating equilibria.

With this refinement, we have only two possible equilibria:[9]

1. Pooling equilibrium. For all (m,p), the proposer immediately acquiesces. The voter maintains prior beliefs $\tilde{B}$, irrespective whether they support the mayor's expected implementation or corner q. The introduction of an initiative does not have an effect on either the policy or the mayor's popularity.

2. Signaling equilibrium with LL-strategy. If an uncontested referendum is observed, $(m,p) \in \mathscr{R}_1$, the voter updates beliefs into R1-beliefs, and supports the initiative. If a contested referendum is observed, $(m,p) \in \mathscr{R}_2$, the voter updates beliefs into R2-beliefs, and supports the initiative. If an initiative is not observed, $(m,p) \in \mathscr{R}_0$, the voter updates posteriors into R0-beliefs.

We denote the mass of initial beliefs over each zone $i \in \{0,1,2\}$ as ρ_i, where $\rho_0 + \rho_1 + \rho_2 = 1$. Then, each posterior belief satisfies $B_i(m,p) = \rho_i \cdot \tilde{B}(m,p)$ if $(m,p) \in \mathscr{R}_i$, and $B_i(m,p) = 0$ otherwise. At this point, it is useful to recall Figure 3 that illustrates the non-convexity of the R0-zone. Notice that only two extra restrictions bind the posteriors, $\tilde{m} = \sum_i \rho_i m_i$ and $\tilde{\sigma}^2 = \sum_i \rho_i \left[\sigma_i^2 + (m_i - \tilde{m})^2\right]$. The final point to see is that the existence of a signaling equilibrium is conditional on the existence of both referendum paths (or LL-strategy), i.e.

$$(m_j - q)(v - m_j + v - q) \leq \sigma_j^2, \quad j = 1,2. \tag{11}$$

5 Effects of initiatives

5.1 Responsiveness

With signaling equilibrium, we have either of three outcomes: For the mayor and proposer in the R0-zone, there is no change to the status quo. For the R1 and R2-zones, referenda exist and effectively constrain the mayor in implementation (recall LL-strategy). The voter's expected utility of the q-policy across each R1 and R2 zones exceeds the expected utility of the m-policy, by definition of the voter's optimal choice of P within the zones. Thus, ex ante, the expected utility across all realizations cannot decrease with the introduction of an initiative. (Ex post, of course, responsiveness decreases in all cases when the mayor himself or herself is located in M-zone. In such a case, the voter calculates that the average type is located in the P-zone, hence constrains the mayor. This is an inevitable, albeit minimal price paid by the voter for having incomplete information.)

The existence of an initiative has an unambiguously beneficial welfare effect, which is mainly because initiatives do not interact with other features, like the agency problem, the self-selection of abilities, and other aspects of political competition (cf., Gerber and Lupia 1995; Matsusaka and

[9] Recall that in incomplete information game, an equilibrium is of course not a single prediction, but a complete characterization of outcomes for any pair of parameters (m,p).

McCarty 2001). Most of those extra features become relevant if the proposer is not an interest group, but a challenger seeking the mayor's seat.

5.2 Popularity

Given the previous result, the presence of a referendum obviously does not help the mayor in promoting his or her favored policy. Nevertheless, at least in the absence of a referendum, the mayor (we can call him or her the R0-mayor) may become better off. This is the case whenever the absence if an initiative implies the improved precision of the voter's beliefs in mayor's favor. If $(\tilde{m}, \tilde{\sigma})$ falls in the P-zone, but (m_0, σ_0) falls in the M-zone, then the voter interprets the lack of an initiative as implying that the mayor is not as extreme as he or she looked initially, and the mayor receives a popularity bonus. For empirical inference, this is a devastating property, because without any observable action of the contestants, we may obtain a change in the incumbent's popularity.

Proposition 2 *In a signaling equilibrium, an unrealized initiative may increase the mayor's popularity.*

Proof. See the Appendix.

For the R1-mayor, and under some cases also for R2-mayor, two effects are at play with the introduction of an initiative. Compliance with the restriction imposed by a successful referendum makes the policy less valuable, and popularity based on posterior beliefs changes. For the R1-mayor, the latter effect may imply an especially large benefit, since the R1-mayor by approving of the initiative distinguishes him or herself from the extreme R2-mayor. The effect of the mayor's approval of the initiative, and consequently the mayor's increased popularity, looks like a 'bandwagon' effect. In our case, it is a perfectly rational response by the voter, who thereby rewards improved information in a sense that the mayor is not extreme in his or her actions.

5.3 Comparative statics

By comparative statics, we study the effects of parametrical changes on the existence and properties of the signaling equilibrium. Thus, we do not capture the effect of changing (m, p), since this is only a different realization of the mayor's and proposer's policy position across the prior probability density function $\tilde{B}$. These effects have already been fully captured in Proposition 1.

We know that the signaling equilibrium is effectively defined by the voter's acceptance M-zone, and R0, R1 and R2-zones, yielding pairs $(m_i, \sigma_i), i \in \{0, 1, 2\}$ that must deliver a profile with the voter's LL-strategy. Fig. 4 summarizes relations between the variables.

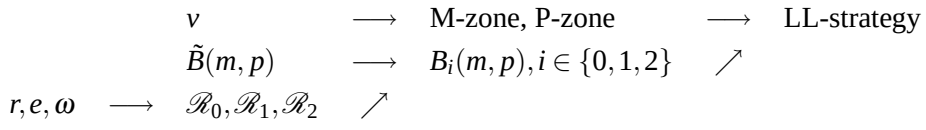


Figure 4: Directions of influence between the variables

5.3.1 Voter's valuation

First, from the voter's optimal decision in (4) and (5), notice that within the acceptance M-zone,

$$v \geq \bar{v} := 2\left(m^2 + \sigma^2 - q^2\right)/(m-q) \tag{12}$$

This yields that the voter's preferences in favor of the mayor are monotonic in v (a single voter valuation threshold $\bar{v}$ separates low and high types), hence for any distribution of voters, the median voter's decision is a Condorcet winner in a collective choice of a group of voters. This justifies our assumption of a single representative (median) voter.

Next, notice from (12) that the boundaries of the acceptance zones in m (keeping q, v and σ constant) are defined as follows:

$$m > \underline{m} := v - \sqrt{v - 2qv + q^2 - \sigma^2} \tag{13}$$

$$m < \overline{m} := v + \sqrt{v - 2qv + q^2 - \sigma^2} \tag{14}$$

As long as the lower P-zone exists ($q < \underline{m}$, and σ is sufficiently small), we may write the acceptance range simply as $\overline{m} - \underline{m}$, and clearly obtain $\frac{d}{dv}(\overline{m} - \underline{m}) > 0$. Fig. 1 (a) indeed illustrates that the voter's acceptance zone enlarges with his or her growing valuation. (The overall effect can be represented by making a vertical move in that figure, and checking the voter's optimal decisions in the horizontal dimension.)

5.3.2 Priors on contestants' valuations

Both a mean-preserving increase in the spread and a spread-preserving increase in the mean may introduce but also eliminate signaling. This is driven by two factors:

1. *Double P-zone.* A move of (m_1, σ_1) and (m_2, σ_2) up from the lower P-zone to M-zone disables signaling, whereas a move up in the same direction, from the M-zone to the upper P-zone, may rather introduce signaling.

2. *Double criterion.* The position in the acceptance zone is determined by stochastic second-order dominance, namely by both the mean and spread of the mayor's position. A shift of density $\tilde{B}$ leads to an increase in the mean m_1, but may dramatically decrease σ_1, and the resulting effect is not towards the upper P-zone, but inwards to the M-zone.

The existence of risk may even imply that an escalating mayor is more popular to the representative voter than a non-escalating mayor, even if $v < m_1 < m_2$.[10] The relatively larger popularity of an escalating (extreme) mayor is whenever $\sigma_1 \gg \sigma_2$, such that

$$\mathbb{E}[c(v,m)|B_1] = (v-m_1)^2 + \sigma_1^2 > (v-m_2)^2 + \sigma_2^2 = \mathbb{E}[c(v,m)|B_2]. \tag{15}$$

In other words, improved precision (elimination of extremes) may be more valuable to the voter than convergence to his or her bliss point.

To improve the predictive power of the model, there is one plausible way to eliminate at least (m_2, σ_2) out of the lower P-zone (to be henceforth denoted $\mathscr{P}_L$), and thereby avoid unsigned effects related to the double P-zone. We know that the escalation condition defines $w^m > w^m_{R2}$. From $w^m_m > 0$, the escalation must be satisfied above some threshold value, $m > \hat{m}$. Thus, if $\hat{m} > \max\{m \in \mathscr{P}_L\}$, then $(m_2, \sigma_2) \cap \mathscr{P}_L = \varnothing$.

5.3.3 Legal uncertainty

An increase in the rate of initiative approvals ω simultaneously affects both the mayor and the proposer. For the mayor, the escalation condition then requires a larger value w^m:

$$\frac{dw^m_{R2}}{d\omega} = \frac{r}{(1-\omega)^2} > 0 \tag{16}$$

For the proposer, the R1-entry condition is unchanged, but the R2-entry condition yields a lower required level of w^p:

$$\frac{dw^p_{R1}}{d\omega} = 0, \frac{dw^p_{R2}}{d\omega} = -\frac{e}{\omega^2} < 0 \tag{17}$$

This is equivalent to shifting the right (or East) boundary of R1-zone in the Eastern direction, and the the upper (or North) boundary of R2-zone in the Northern direction (see Fig. 3). The resulting increase (precisely put, a non-decrease) in m_1 is unambiguous. (Recall that w^m_{R2} and dw^p_{R1} define the $\mathscr{R}_1$ set, hence boundaries of R1-zone, as in Fig. 3). In contrast, a change in m_2 is ambiguous, given two simultaneous changes: (i) An intermediate mayor does not escalate into R2-referendum, but (ii) a low-valuation proposer tends to enter R2-referendum if the mayor is extreme. The former effect itself increases m_2, but the latter effect may go in the opposite direction if there is a sufficiently strong positive correlation between the mayor and proposer's type, hence having a low-valuation proposer who enters R2 is a signal of having a low-valuation (not so extreme) mayor with a high probability.

Notice also the possible popularity bonus for an extremist mayor: the larger willingness of the proposer to accept escalation brings new (m,p) types into R2-zone, and if the majority of the mayor's types are intermediate, then m_2 drops. In other words, an escalated referendum will change the policy as proposed by the initiative, but the effect on the popularity of the mayor will not be as bad as before.

[10] Notice that under such a condition, both mayors are expected to be in the upper P-zone, where the voter's preference for the mayor is decreasing in both mean and spread.

To sum up, the effects of initiatives on policy and popularity may be completely unrelated to each other.

5.3.4 Entry and reputation costs

Growing entry costs only decrease the proposer's willingness to entry, for both entries into the R1 and R2-zones:

$$\frac{dw^m_{R2}}{de} = 0, \frac{dw^p_{R1}}{de} = 1 > 0, \frac{dw^p_{R2}}{de} = \frac{1}{\omega} > 0 \tag{18}$$

This is equivalent to shifting the upper boundary of R1-zone in the Southern direction, and the the upper boundary of R2-zone also in the Southern direction (see Fig. 3). The resulting effect on m_1 and m_2 is ambiguous. Even the effect on the mayor's popularity cannot be discerned, since worse signaling may be to the benefit of any party (it depends whether the mayor's types eliminated from signaling are relatively more or less dispersed).

An opposite case is an increase in the reputation cost which only affects the mayor's escalation condition:

$$\frac{dw^m_{R2}}{dr} = \frac{\omega}{1-\omega} > 0, \frac{dw^p_{R1}}{dr} = 0, \frac{dw^p_{R2}}{dr} = 0 \tag{19}$$

The only effect is on the intermediate values of m, where a looser entry condition for the proposer binds, hence we observe extra non-escalated referenda. Both m_1 and m_2 must increase or at least remain constant, because the increase in w^m_{R2} is equivalent to shifting the right boundary of R1-zone in the Eastern direction.

5.4 Robustness check

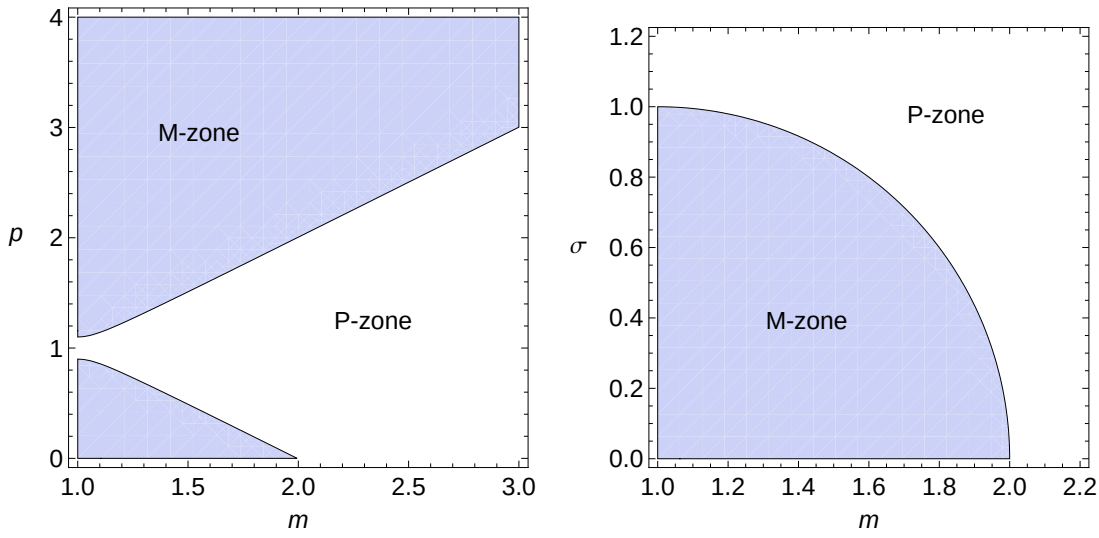
5.4.1 Unrestricted proposal

Once we eliminate the assumption of binary choice over sets, there is a vote between p and m, which implies two effects. First, the voter's uncertainty diminishes, since the proposal $p \in \Theta$ is revealed once an initiative is submitted. Proposing an initiative restricts beliefs to a single-dimensional $\tilde{B}(m|p)$ function.[11] Second, the contestants' prizes are equivalent, which introduces a zero-sum element to their conflict. This is evident once we recall that $u(x^*, x)$ is symmetric, which gives $u(m,p) = u(p,m)$, and consequently

$$w^p = u(p,p) - u(p,m) = u(m,m) - u(m,p) = w^m. \tag{20}$$

Figure 5 (a) calibrates the voter's ex ante preference over the mayor and the proposer (assuming $\sigma = 1, v = 1$). Panel (b) shows the same voter's preferences (again $v = 1$) for a particular realization of $p = 2$, where σ may vary. The figures can be directly compared with acceptance zones in Figure 1.

[11] With marginal densities independent, this function is constant for all p. Otherwise, submitting p restricts the voter's beliefs to a p-contingent posterior.



(a) parameters (m, p) (b) parameters (m, σ)

Figure 5: The voter's choice ($v = 1$)

To find the R0, R1 and R2-zones, we have to distinguish between three possibilities, depending on the mayor's escalation condition:

1. A very low value of escalation, $\frac{\omega}{1-\omega} r < e$. The mayor escalates always when the proposer enters, hence only R2 occurs, for a sufficiently high prize. However, since R1 is out of equilibrium, we cannot sustain the LL-profile with certainty (the voter, observing R1, can update beliefs arbitrarily, even to the support of the mayor), and therefore this case is not a strict signaling equilibrium.

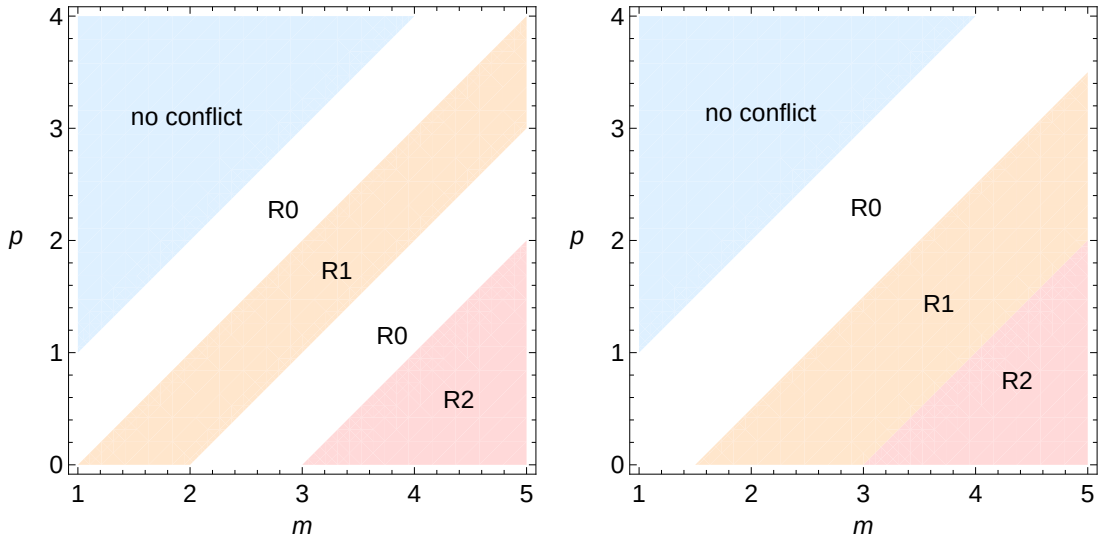
2. An intermediate value, $e \leq \frac{\omega}{1-\omega} r < \frac{e}{\omega}$. This is a case indicating non-monotonicity, as we found it: with a growing prize, we first have no initiative (R0), then an uncontested referendum (R1), then again no initiative (R0), and finally a contested referendum (R2). Figure 6 (a) illustrates this possibility.

3. A high value, $\frac{e}{\omega} \leq \frac{\omega}{1-\omega} r$. Here, monotonicity preserves, which shows Figure 6 (b).

This extension shows that if the proposer can reveal its preference through submitting p for the ballot, the voter's learning and the game become even easier. Non-monotonicity from the degree of conflict to the equilibrium state either exists for all proposer types, or does not exist at all. Other comparative statics results also preserve.

5.4.2 Campaign cost

Adding an escalation campaign cost γ for the proposer is plausible. In the specific context of the Czech Republic, we find that this cost is typically very small, in comparison to the entry cost; there



(a) intermediate escalation (b) high escalation

Figure 6: R0, R1 and R2-zones for different escalation conditions

is also a low-cost assistance by the Czech NGO Environmental Law Service that offers its services in referendum lawsuits. Other countries have similar public law associations. In any case, the cost enters both the proposer's willingness to escalate and the decision to submit. The willingness to escalate writes $\omega w^p - \gamma - e > -e$, or $w^p > \frac{\gamma}{\omega}$. The decision to submit is now $\omega w^p - \gamma - e > 0$, or $w^p > \frac{\gamma+e}{\omega}$. The total effect is that we only have to re-write the R2-entry condition as the latter condition, $w^p > \frac{\gamma+e}{\omega}$. To sum up, no structural effect on the equilibrium exists.

5.4.3 Probabilistic voting

The extension towards voter uncertainty, as modeled in the prevailing literature on local referenda, is relatively straightforward. It requires either the introduction of a stochastic valuation (and stochastic acceptance zone), or stochastic parameters of entry and escalation constraints. In either case, the main effect is on the entry and escalation constraints, as the contestants bear additional risk. Stochasticity would explain why some referenda are lost by the risk-averse proposer, which is an empirical regularity, but otherwise does not add anything else to our explanation. In particular, our paper finds that a sufficient condition for the existence of a contested referendum is completely unrelated to uncertainty over voting behavior, but rather related to *legal* uncertainty. Exogenous legal uncertainty creates a positive expected value of escalation both for the mayor and the proposer, comparing to the reservation utility of a unilateral retreat. The mayor's expected value drives his or her decision on the selection between the types of referenda, and the proposer's valuation is important for his or her willingness to enter.

6 Conclusions

Our model of the signaling effects of initiatives, where a referendum restrains the mayor's implementation power, confirmed that an initiative leading to a referendum improves the policy. Nevertheless, we observe some other interesting effects, particularly when initiatives are legally permitted, but effectively not observed.

Firstly, there's non-monotonicity in mapping from the mayor's type to the proposer's decision whether to submit an initiative or not, and this non-monotonicity plagues the informational inferences of the voter. This is also an obstacle for empirical inference of an external observer: ceteris paribus, the lower frequency of initiatives is not indicative of lower conflict between the mayor and the voter, because whether a conflict becomes transformed into an initiative depends also on the distribution of the proposer's preferred points.

More specifically, the mayor's option of obstructing the initiative proposal implies two types of referenda, an uncontested one (immediately approved) and a contested one (ordered by the court or an administrative authority). An uncontested referendum credibly signals that the mayor is in a weak conflict with the proposer, whereas a contested or escalated referendum signals a strong conflict. An increase in conflict translating into the mayor's willingness to escalate however may also lead the proposer to avoid the conflict. We observe that for *intermediate* values of the conflict, a referendum thus need not take place at all.

Secondly, in the absence of an initiative, there exists an extra effect on the mayor's popularity. A voter has to discriminate between several explanations of the absence of an initiative—a conflict is too weak, or in intermediate levels, or the proposer is too weak—and one possibility is that his rational learning results in an update of priors in favor of the mayor. Having an available but unrealized initiative may paradoxically bring a popularity bonus for the mayor, if we compare it to the case without legally permitted initiatives.

Lastly, even if we rule out multiple equilibria, several non-monotonicity results still limit the scope of comparative research. For instance, if the court approves referenda more often, hence decreases the mayor's prize from escalation, then the average mayor who escalates the conflict might be paradoxically less extreme. Or, if the proposer's entry costs increase, hence the proposer becomes weaker on the average and weakly conflicting mayors tend to enter the contest, then the average mayor who escalates might be even more extreme.

Appendix

Proofs of Propositions

Proof of Proposition 1. We know that we are in a conflict zone, $p \leq m$, hence an increase in p or a decrease in m weakens the conflict, and vice versa. As to the proposer: Since $w_p^p < 0$, an increase in the proposer's policy position decreases his or her prize, but does not affect the mayor's prize. Table 1 clearly identifies a threshold value for the proposer's prize, where the no-initiative result switches to

either R1 or R2. Thus, there is also a threshold value for the proposer's policy position below which the absence of an initiative turns into an initiative, and vice versa.

As for the mayor: An increase in the mayor's type increases the prizes for both the mayor and the proposer, $w_m^m > 0$ and $w_p^m > 0$. This creates two opposite effects: the proposer's stake grows, but also the risk of escalation goes up. If the latter effect prevails, Referendum 1 may change into the absence of an initiative. Figure 3 clearly shows that this occurs for a non-empty subset of intermediate values of w^p in the neighborhood of the critical mayor's threshold, where $w_{R2}^m = \frac{\omega r}{1-\omega}$. It's existence is evident from boundedness and continuity of the marginal utilities in x, and $\omega \in (0,1)$ yielding $e < \frac{e}{\omega}$. □

Proof of Proposition 2. We construct a simple distribution $\tilde{B}(\cdot)$ satisfying the desired property. Let $\mathscr{R}_0, \mathscr{R}_1, \mathscr{R}_2$ be singletons, hence $\sigma_0 = \sigma_1 = \sigma_2 = 0$, and $\rho_0 = \rho_1 = \rho_2 = \frac{1}{3}$. The mayor's escalation condition requires $m_1 < m_2$. To show an increase in popularity with R0-beliefs, we set $m_0 < m_1$, where $(m_0, 0)$ falls into M-zone, and $(m_1, 0)$ falls into the upper P-zone. As a consequence, $(m_2, 0)$ also falls into the upper P-zone. The only thing for to $(m_0, 0)$ to increase popularity over $(\tilde{m}, \tilde{\sigma})$ is to assure that $(\tilde{m}, \tilde{\sigma})$ also falls into the upper P-zone. Since $\tilde{m} = \sum_i \rho_i m_i$, this requires only to set m_1 sufficiently high. At the same time, setting m_1 high will increase $\tilde{\sigma}$ as long as $2m_1 > m_0 + m_2$ (or equivalently $m_1 > \tilde{m}$), because

$$\tilde{\sigma}^2 = \tfrac{1}{3}\sum_i (m_i - \tilde{m})^2 = \tfrac{1}{9}\sum_i \left(2m_i - \sum_{j \neq i} m_j\right)^2, \tag{21}$$

and for $2m_1 > m_0 + m_2$

$$\frac{d\tilde{\sigma}}{dm_1} = \sqrt{\frac{2}{3}}\left(m_0^2 + m_1^2 + m_2^2 - m_0 m_1 - m_0 m_2 - m_1 m_2\right)^{-\frac{2}{3}}(2m_1 - m_0 - m_3) > 0. \tag{22}$$

To sum up, since both $d\tilde{m}/dm_1 > 0$ and $d\tilde{\sigma}/dm_1 > 0$, an increase in m_1 must reach a threshold where a voter's expected cost

$$(v - \tilde{m})^2 + \tilde{\sigma}^2 > (v - q)^2, \tag{23}$$

and the policy $(\tilde{m}, \tilde{\sigma})$ falls into the upper P-zone. □

References

[1] Armingeon, K., F. Bertozzi Fabio and Giuliano Bonoli (2004) 'Swiss Worlds of Welfare', *West European Politics* 27(1): 20–44.

[2] Benz, M. and A. Stutzer (2004) 'Are voters better informed when they have a larger say in politics? Evidence for the European Union and Switzerland', *Public Choice* 119: 31–59.

[3] Besley, T. and S. Coate (2008) 'Issue Unbundling via Citizens' Initiatives', *Quarterly Journal of Political Science* 3(4): 379–397.

[4] Blomberg, S., H. Brock, D. Gregory D., and A. Weerapana (2005) 'The Impact of Voter Initiatives on Economic Activity', *European Journal of Political Economy* 20(1): 207–226.

[5] Blume, L., Müller, J., Voigt, S. (2009) 'The economic effects of direct democracy—a first global assessment', *Public Choice* 140: 431–461.

[6] Boehmke, F. J. (2002) 'The Effect of Direct Democracy on the Size and Diversity of State Interest Group Populations', *Journal of Politics* 64 (3): 827–844.

[7] Broder, D. S. (2000) *Democracy Derailed: Initiative Campaigns and the Power of Money*. Harcourt, New York.

[8] Camobreco, J. F. (1998) 'Preferences, Fiscal Policies, and the Initiative Process', *Journal of Politics* 60(3): 819–829.

[9] Funk, P. and C. Gathmann (2008) 'Estimating the Effect of Direct Democracy on Policy Outcomes: Preferences Matter!' Working Paper, Stanford University.

[10] Gerber, E. R. (1999) *The Populist Paradox: Interest Group Influence and the Promise of Direct Legislation*. Princeton, NJ: Princeton University Press.

[11] Gerber, E. R., and A. Lupia (1995) 'Campaign Competition and Policy Responsiveness in Direct Legislation Elections.' *Political Behavior* 17(3): 287–306.

[12] Gilland Lutz, K. and S. Hug (2006) 'A cross-national comparative study of the policy effects of referendums.' CIS Working Paper 22-2006.

[13] Gordon, T. M. (2009) 'Bargaining in the shadow of the ballot box: causes and consequences of local voter initiatives', *Public Choice* 141: 31–48.

[14] Hug, S. (2004) 'Occurrence and Policy Consequences of Referendums: A Theoretical Model and Empirical Evidence', *Journal of Theoretical Politics* 16(3): 321–356.

[15] Hug, S. (2005) 'The political effects of referendums: An analysis of institutional innovations in Eastern and Central Europe', *Communist and Post-Communist Studies* 38: 475–499.

[16] Hugh-Jones, D. (2008) 'Explaining Institutional Change: Why Elected Politicians Implement Direct Democracy', Jena Economic Research Papers 2008-085. (October 24, 2008). Available at SSRN: http://ssrn.com/abstract=1289258.

[17] Hug, S. and G. Tsebelis (2002) 'Veto Players and Referendums Around the World', *Journal of Theoretical Politics* 14(4): 465–515.

[18] Kelleher, C. A. and J. Wolak (2007) 'Explaining public confidence in the branches of state government', *Political Research Quarterly* 60: 707–721.

[19] Lacy, D. and E. M. S. Niou (2000) 'A Problem with Referendums', *Journal of Theoretical Politics* 12(1): 5–31.

[20] Lascher, E. L., M. G. Hagen and S. A. Rochlin (1996) 'Gun Behind the Door? Ballot Initiatives, State Policies and Public Opinion', *Journal of Politics* 58(3): 760–775.

[21] Lascher, E., Wassmer, R. (2007) 'Reconsidering Claims about the Secondary Benefits of Direct Democracy'. Mimeo, Department of Public Policy and Administration, California State University, Sacramento.

[22] Lupia, A. and J. G. Matsusaka (2004) 'Direct Democracy: New Approaches to Old Questions', *Annual Review of Political Science* 7: 463–482.

[23] Matsusaka, J. G. (2001) 'Problems with a Methodology Used to Evaluate the Voter Initiative', *Journal of Politics* 63: 1250–1256.

[24] Matsusaka, J. G. (2007) 'Disentangling the Direct and Indirect Effects of the Initiative Process'. Working Paper, USC Marshall School of Business.

[25] Matsusaka, J. G. and N. M. McCarty (2001) 'Political Resource Allocation: Benefits and Costs of Voter Initiatives', *Journal of Law, Economics and Organization* 17(2): 413–448.

[26] Pommerehne, W. W. (1978) 'Institutional Approaches to Public Expenditure: Empirical Evidence from Swiss Municipalities', *Journal of Public Economics* 9: 255–280.

[27] Romer, T., and H. Rosenthal (1979) 'The elusive median voter', *Journal of Public Economics* 12: 143-170.

[28] Smith, D. A. (2001) 'Homeward Bound?: Micro-Level Legislative Responsiveness to Ballot Initiatives', *State Politics and Policy Quarterly* 1(1): 50–61.

[29] Smith, M. L. (2007) 'Making Direct Democracy Work: Czech Local Referendums in Regional Comparison' in P. Delwit, J. Pilet, H. Reynaert, K. Steyvers (eds.), *Towards DIY-Politics? Participatory and Direct Democracy at the Local Level in Europe*. Brugge: Vanden Broele.

[30] Torgler, B. (2005) 'Tax morale and direct democracy', *European Journal of Political Economy*, 21: 525–531.

[31] Vatter, A. and C. Rueffli (2003) 'Do Political Factors Matter for Health Care Expenditure? A Comparative Study of Swiss Cantons', *Journal of Public Policy* 23(3): 325–347.