Project no. CIT5-CT-2005-028647

Project acronym: UPP

Project title: "Understanding Privatisation Policy: Political Economy and Welfare Effects"

Instrument: SPECIFIC TARGETED RESEARCH PROJECT
Thematic Priority:7- "Citizens and governance in a Knowledge-based society"

Deliverable 2.1
"Two theoretical papers on the determinants of privatization policy"

Humberto Llavador
Universitat Pompeu Fabra

Due date of deliverable: 31 January 2008
Actual submission date: 11 June 2008

Start date of project: 01/02/2006 Duration: 2 years

Organisation name of lead contractor for this deliverable:
Universitat Pompeu Fabra

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Salience and Consensus: A Political Competition Model of Privatization Waves*

Humberto Llavador[†]

Universitat Pompeu Fabra

January 2008

Abstract

During the last two decades of the twentieth century, privatization programs enjoyed political success and most (if not all) developed democracies considerably shrunk their state-owned enterprises sector. By the beginning of the new century, however, privatization lost momentum and many attempts failed to obtain enough political support. This paper presents an explanation for these type of policy *waves*. We present a model of electoral competition focusing on the choice of politically salient issues. Two parties compete in elections by choosing the issues that will key out their campaigns. Giving political salience to an issue implies proposing an innovative policy proposal alternative to the status-quo. Parties trade off the issues with high salience in voters' concerns and those with broad consensus on some policy proposal. We claim that successful privatization programs gave political salience and built a social consensus on privatization, making it an appealing issue to likely winning parties.

JEL codes: D72, L33.
Keywords: Privatization wave, political issues, consensus, salience.

*This research has been supported by the European Commission(contract n. HPSE-CT-1990-00007).

[†]Departament d'Economia i Empresa, Universitat Pompeu Fabra, Ramon Trias Fargas, 25-27, 08005 Barcelona Spain; humberto.llavador@upf.edu.

1 Introduction

During the last decades of the twentieth century, a big privatization wave swept industrialized countries. In many cases, this process involved the re-privatization of many companies that had been nationalized a few decades before. In Europe, the privatization program started in the United Kingdom under the first mandates of Mrs. Thatcher, expanding quickly to most (if not all) other countries.[1] However, by the end of 90s, privatization policies lost political momentum and failed to obtain enough social and political support to continue.

Why did political and social support for privatization rise and fall in all countries at approximately the same period? In this paper we present a model of political competition where issues are not given exogenously but rather arise endogenously as parties give them political salience during the electoral campaign. We show that electoral winning policies may not be intermediate moderate positions on which the parties would tend to converge. In contrast to the traditional Downsian model, a policy alternative to the status-quo can be initially presented as an innovative, even 'extreme' proposal by the challenger party in opposition seeking to distance itself from the governmental status-quo. Eventually some policy consensus may be created in the voters' concern, often around innovative alternatives, and enough social consensus about the best alternative to the status-quo makes this policy position in this issue to cease to be the subject of controversy.

In our model, political parties or candidates do not compete to win an election only by 'moving' their policy positions across the policy or ideology space, but rather by shaping the space with choices of issues to which they

[1]See Figure 1 in Bortolotti and Pinotti (forth.)

try to give salience during the electoral campaign. Giving salience to an issue implies proposing an innovative policy proposal on the issue as an alternative to the status-quo policy, as well as talking about it, usually with a value or argument, and making it news with some effort investment in order to making it relevant for voters' electoral decisions.

Our interest in this model derives in great part from the ambiguous empirical validation found for some of the most classical results of traditional Downsian models of electoral competition. Systematic cross-country and long-term empirical observations do not give strong support to canonic results, namely that: (i) parties would converge in their positions in equilibrium (in single-dimensional spaces) and (ii) there would be 'chaos' or at least permanently changing party positions in the space (in multidimensional spaces). In contrast, we rather observe that in well-established democracies political parties both converge on some issues and keep distant positions on some other issues. This does not exclude, however, relatively frequent alternations of parties in government. In our approach, this can be greatly explained by changes in the agenda of relevant issues for different elections.[2]

Our contribution consists in building a formal model by using the fundamental analytical elements of the spatial theory of electoral competition, although changing drastically a few of the assumptions of certain traditional spatial models. On the one hand, we take some basic elements of traditional Downsian models, which can be summarized this way: party's policy positions are well defined; they are accurately estimated by voters; parties care only about winning, and in particular about winning the next election; candi-

[2]Foundational works of the agenda-setting model are the well-known contributions by Stokes (1963) and Petrocik (1996). For discussion with empirical data see Riker, ed (1993), Budge (1993), Budge et al. (2001), Petrocik et al. (2002), Klingemann et al. (2006). See also the critical review by Colomer and Puglisi (2005).

dates are part of a unified team; voters care only about the next election and about the party positions. We also assume that elections take place within a single constituency, between two parties, in a single round, by plurality rule (which is equivalent to simple majority for only two parties), and for a single office. (For discussion of the assumptions in Downs' models, see Grofman (2004)).

In contrast to traditional Downsian models, we assume that the policy space on which parties compete is not given, whether it is single-dimensional or multidimensional, but formed precisely as a consequence of competitive party's strategies. More specifically, our model assumes that political parties do not make electoral decisions simultaneously, based on calculations about other parties' likely strategy, but electoral competition develops in a sequence. There is an incumbent party in government and a challenger party in the opposition. As is usually observed, the incumbent party can have an advantage in promoting issues and setting the agenda because it can present actual policies, that is, policies implemented from the government with concrete consequences on citizens' wellbeing, in contrast to dubious hypothetical results of policy proposals presented from the opposition. But an opposition party or candidate can innovate in the public agenda by politicizing new issues on which it can be able to present potentially winning proposals. The party which moves first, that is, the one giving salience to one issue on which the competition may focus, can have an advantage. Of course, party leaders choose to give salience to an issue because they may think their policy position on the issue will be capable of gaining the favor of the majority of the public. Each party expects a higher probability of victory if its chosen issue becomes salient in the voters' decision.

The issue space is, thus, highly multidimensional. But on each issue electoral competition is single-dimensional. While the agenda, that is, the set of issues on which parties compete, changes from one election to another and even within an electoral campaign as a consequence of party's strategies, there is single-dimensional competition on each issue, once at a time and separately.

Our discussion centers on the criteria for party choices of issues and the subsequent campaign outcomes. A party will choose a priority issue to campaign for if it is a likely winning issue, that is, it has a likely winning position and it is likely to become decisive in the election. Whether an issue will become a winning issue depends on two variables: (i) the ex-ante, pre-campaign *salience* of the issue in voters' concerns and (ii) the voters' support or *consensus* in favor of a policy proposal on the issue.

Parties have to trade off the two variables. If one issue is highly salient in the voters' concerns, but the voters are highly divided about which of two possible policy proposals is better, choosing to campaign on the issue by holding one of the policy alternatives may be risky. Then the incumbent party in government may prefer to defend the status-quo on the issue, which may force the challenger party in opposition to choose another issue which may be less salient among voters. If, on the contrary, there is broad social consensus about the best policy alternative to an unsatisfactory status-quo on one issue, but the issue is not a priority for voters' electoral decision, running on that issue can attract little attention.

Whether parties compete by raising the same issue and proposing two different policy alternatives on it or by choosing different issues does not depend only on voters' priority concerns, but mainly on each party's likelihood to hold potentially winning policy positions. It is always possible that the issues which are considered the most important ones by a majority of voters be not given political salience by parties during the electoral campaign.

We claim that successful privatization programs provided the salience and consensus necessary to make privatization an attractive issue to political parties in other countries and hence a politically viable policy.

The plan for the rest of the paper is the following. In section 2 we present a spatial model of agenda formation in which parties compete on one issue at a time. For each issue there is some probability of victory for the party holding the most popular policy alternative. In section 3 we introduce the concepts of issue salience and the degree of consensus. Section 4 characterizes equilibria in terms of salience and consensus, and analyzes when parties choose to compete either on the same issue or on different issues. We find that parties do not compete, in equilibrium, on issues with both low salience among voters and low consensus regarding the best policy alternative. However parties may choose not to campaign on those issues with highest salience in voters' concerns, thus postponing solutions to unpopular status-quo policies with considerable social discontent. Although parties can compete on issues with either high salience or broad consensus or both, the most likely winner candidate always campaigns on the issue with the highest salience and consensus, if it exists. Section 5 concludes.

2 The Model

Consider an incumbent party in government (G) and a challenger party in opposition (O) that compete to win an election by choosing issues and policy positions on the issues. There are N possible issues, and for each issue $i = 1, \ldots, N$, there exists a status-quo policy q_i and two alternatives located on different sides of q_i, which can be called x_i and y_i respectively. If the issue

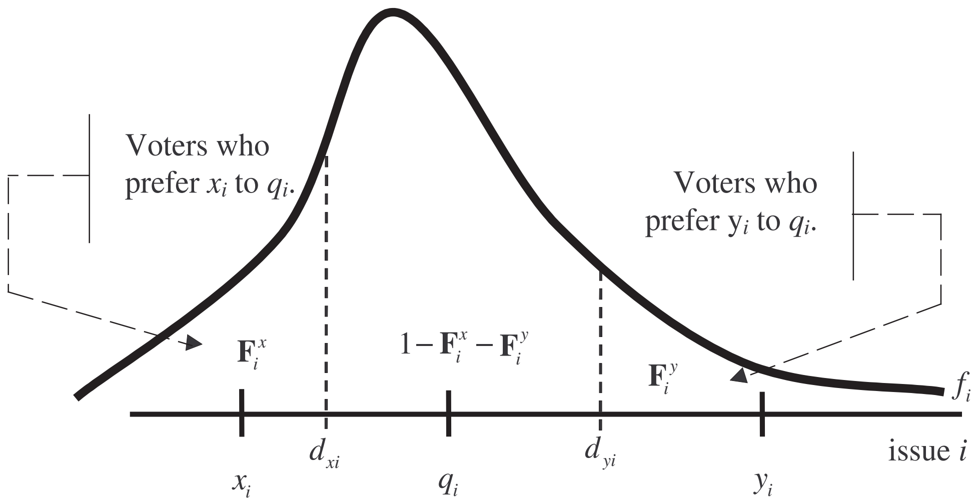

Figure 1: Voters distribution on issue i, giving policy alternatives x_i, q_i (status-quo), and y_i. *Dividing voters* are represented by d_{xi} and d_{yi}.

is, for example, taxes, one of the alternatives implies higher taxes and the other, lower taxes than the status-quo, and similarly for any other issue, so that the two alternatives are more distant from each other than to the status-quo, whether the distance can be located on the left-right ideological axis or on any other relevant issue dimension. Denote the set alternatives by $A_i = \{x_i, q_i, y_i\}$ and assume they are located in this order, $x_i < q_i < y_i$.

Electorate

We assume, in accordance to the standard Downsian one-issue spatial competition analysis, that the voters have preferences over the different alternatives on each issue and vote accordingly. Specifically, each voter has single-peaked preferences on each issue. Hence, for any alternative $a_i \in A_i$ on an issue, whether x_i or y_i, there is always a *dividing voter* $d(a_i, q_i)$ such that every voter on one side of $d(a_i, q_i)$ prefers a_i to q_i, while every voter on the other side of $d(a_i, q_i)$ prefers q_i to a_i. Denote $d_{xi} = d(x_i, q_i)$ and $d_{yi} = d(y_i, q_i)$.

Voters are distributed according to their ideal position following the distribution function F_i. Let $\mathbf{F}_i(a, a')$ be the fraction of citizens who prefer a to a'. Hence, $\mathbf{F}_i(a, a') = F_i(d_i(a, a'))$ if $a < a'$, and $\mathbf{F}_i(a, a') = 1 - F_i(d_i(a, a'))$ if $a > a'$. Denote by $F_i^x = F_i(x_i, q_i)$ and by $F_i^y = F_i(y_i, q_i)$ the support for each one of the alternatives to the status-quo. See Figure 1 for clarification.

Timing

The political game consists of choosing issues on which to compete for the next election. It develops sequentially. First, the government party may decide either not to wait and take the initiative (nw) or to wait (w). Taking the initiative means that the government party chooses one issue i on which it proposes a policy alternative to the status-quo $a_i \in A_i,\ a_i \neq q_i$. Then the opposition party can fight the government's proposal either by defending the status quo q_i or the other alternative on the issue, or by devoting its efforts to raising another issue j on which to propose a policy alternative $a_j \neq q_j, j \neq i$. If, on the contrary, the government decides to wait, the opposition can choose one issue j on which to propose a policy alternative to the status-quo $a_c \in A_c,\ a_c \neq q_c$. Then the government party can either compete on the issue or raise a new issue k ($a_k \neq q_k,\ k \neq c$). We assume that if a party does not propose any policy on an issue it is associated by the voters to the status-quo policy on that issue. Figure 2 depicts the game tree.

The probability of winning on an issue

Through the electoral campaign, parties give salience to issues and one issue becomes decisive to win the election. The winning alternative on the issue

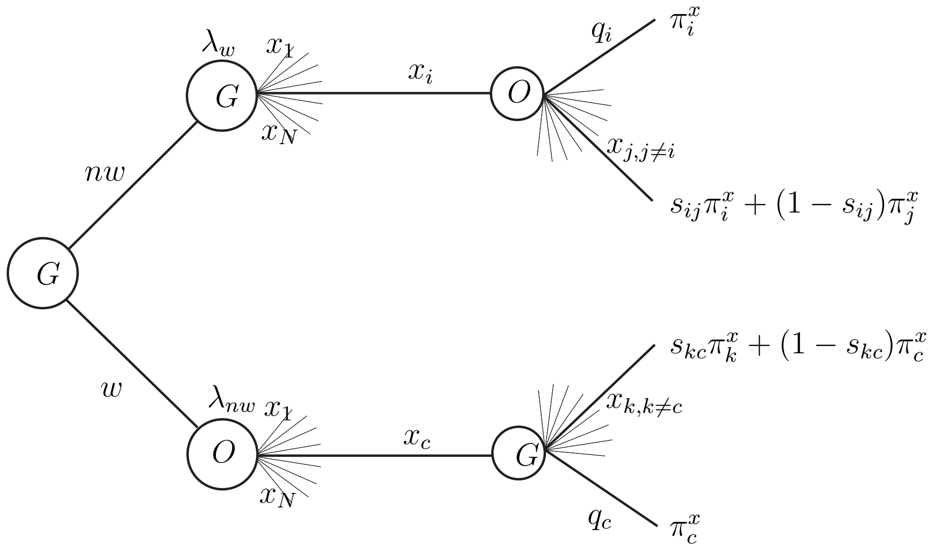

Figure 2: Game Tree showing the timing of the game. Strictly undominated strategies are excluded from the pictures. Payoffs correspond to the government's expected probabilities of victory. λ_w and λ_{nw} refer to the starting nodes of the proper subgames following the government's choice to wait (w) or not to wait and take and action (nw), respectively.

is the one having the median voter on its side regarding the dividing voter. However, there can be uncertainty on the outcome of the election. We use the error-distribution model (see Roemer, 2001, page 45). For each issue i we assume that parties know the distribution of the citizenry F_i but, given a pair of alternatives, they are only confident on the fraction of citizens who will vote for one alternative up to a margin of error. That is, recalling that $\mathbf{F}_i(a, a')$ is the fraction of citizens who prefer a to a', parties only know that the alternative a will receive $F_i(a, a') \pm \beta$ votes, for some $\beta > 0$. In particular, parties believe that the actual fraction of voters who will vote for a against a' is uniformly distributed on the interval $E(a, a') = [F_i(a, a') - \beta, F_i(a, a') + \beta]$. It is implied that $F_i(a, a') - \beta < \frac{1}{2} < F_i(a, a') + \beta$. Thus, the probability $\pi_i(a, a')$ of victory of an alternative a on issue i against another alternative

a' is the probability that a receives more than 50% of the votes, that is the probability that a random variable uniformly distributed on $E(a, a')$ is greater than one-half:

$$\pi_i(a, a') = \frac{F_i(a, a') + \beta - \frac{1}{2}}{2\beta} \tag{1}$$

Hence all alternatives have a positive probability of victory, which depends on their share of the vote $F_i(a, a')$, and the level of uncertainty, represented by the value of β.[3]

For the probability of winning on issue i with the policy alternatives x_i, y_i, we will use the notation $\pi_i^x = \pi(x_i, q_i)$ and $\pi_i^y = \pi(y_i, q_i)$. For simplicity, we assume that one of the alternatives, which we call x_i, has advantage and higher probability of victory than the other alternative y_i. This can be easily arranged without loss of generality by placing all the alternatives with relatively higher probability of victory on the same side of the issue space for every issue. That is, $\pi_i^x > \pi_i^y$ for all $i = 1, \ldots, N$. Note that $0 < \pi_i^x + \pi_i^y < 1$, since there is also some positive probability for the status-quo to win.

For the shake of exposition, and also without loss of generality, we order the issues $i = 1, \ldots, N$ for the probability of victory of the advantaged alternative x_i:

$$\pi_1^x > \pi_2^x > \cdots > \pi_{N-1}^x > \pi_N^x \tag{2}$$

We assume that a party cannot win by proposing an alternative already claimed by the other party. This implies that a party proposing a policy alternative on one issue takes the alternative and hence forces the other

[3]Considering that the probability of victory could be zero or one for some ranges of β would complicate the analysis without changing the results.

party to defend something different if it wants to compete on the same issue. In particular, the challenger party cannot win against the government party by defending the status-quo on one issue unless the government has proposed an alternative to the status-quo on the issue.

Parties' objective: The expected probability of victory

In order to make an issue decisive in the election parties try to make it 'salient' in voters' decision. First, there is some ex-ante or pre-campaign salience of the issues, which reflects voters' concerns. The interest of voters regarding which issues should be more important in the election can be formed as a consequence of personal experiences, as well as media emphases, interest groups' promotions or uncontrolled events. Let us call the pre-campaign salience of issue $i, s_i \in [0,1]$.

Second, parties campaign by giving salience to certain issues in order to shape the policy space and induce the subsequent voters' decisions. Let us call the post-campaign salience the probability that after parties have campaigned on issues i and j, one of the issues, k, becomes decisive, $s_{ij}^{(}k)$.

Definition 1 *Define the* ***post-campaign salience*** *of issue k when parties have politicized issues i and j, s_{ij}^k, as the post-campaign probability that issue k becomes the decisive issue.*

We assume that parties give salience to issues by politicizing them under the following conditions

Assumption 1 *Given a pair of issues i and j,*

1. $s_{ij}(k) = 0$ *for all* $k \notin \{i,j\}$, *and*

2. $s_{ij}(i) = \frac{\sigma_i}{\sigma_i + \sigma_j}$ *if* $i \neq j$.

The first point implies that, since issues take salience during the electoral campaign because the parties campaign on them, an issue not raised in the electoral campaign cannot be decisive. Voters cannot choose to vote for a party on the basis of issues which have tot been given salience. The second point constructs post-campaign salience of issues when the parties focus on different issues on the basis of pre-campaign salience by using Bayes rule.

It follows from the definition that $s_{ij}(i) = 1 - s_{ij}(j)$ and $s_{ij}(k) = s_{ji}(k)$. To simplify notation, we will write $s_{ij} = s_{ij}(i)$ whenever there is no ambiguity.

Both the government and the opposition parties want to win the election. When parties compete on the same issue, this issue becomes decisive and their probability of victory coincides with their probability of holding the winning policy position on that issue. On the other hand, when parties campaign on different issues, the probability of victory is the expected probability of holding the winning policy position on the decisive issue. Formally, we define the **expected probability of winning** P for a party proposing an alternative on issue i (a_i), while the other party proposes an alternative on issue j (a_j), as

$$\Pi(a_i, a_j) = \begin{cases} \pi_i(a_i, a_j) & \text{if } j = i, \\ s_{ij}\, \pi_i(a_i, q_i) + (1 - s_{ij})\,(1 - \pi_j(a_j, q_j)) & \text{if } i \neq j. \end{cases} \quad (3)$$

Let Π_{G} and Π_{O}represent the expected probabilities of winning for the incumbent party in government and the challenger party in opposition, $\Pi_{\mathrm{G}}(a_i, a_j) = 1 - \Pi_{\mathrm{O}}(a_j, a_i)$. Hence, both the government and the opposition choose one issue and an alternative on the issue in order to maximize their expected probability of victory.

Political equilibrium

We focus the analysis on subgame perfect equilibria, the standard concept in sequential games with complete information. Such equilibria are characterized by (1) the government choosing (*i*) whether to take the initiative or to wait, (*ii*) a policy alternative on one issue in case of taking the initiative, and (*iii*) a strategy in response to each possible policy alternative proposed by the opposition; and by (2) an opposition choosing (*i*) a strategy in response to each policy alternative proposed by the government in case it takes the initiative, and (*ii*)a policy alternative on one issue to propose in case the incumbent government does wait. The strategies must be optimal responses in each subgame. Because this is a finite, zero-sum game, a subgame perfect equilibrium always exists and parties will have the same probabilities of victory in all equilibria.

3 Salience and consensus

It seems logical that the degree of pre-campaign salience of an issue should be related to the degree of social discontent with the status-quo policy on the issue. In this sense, we measure the salience of issue i as inversely related to the agreement or consensus with the status-quo policy on that issue. Therefore, high-salience issues indicate that a large group of voters $(F_i^x + F_i^y)$ disagree on the status-quo on that issue.

Definition 2 *Let σ_i be the* ***pre-campaign salience*** *of issue i. Then $\sigma_i = F_i^x + F_i^y$.*

However, social discontent with the status-quo, and hence high pre-campaign salience, does not necessarily imply a broad consensus on the best policy alternative to the status-quo. It may be, on the contrary, that the voters are highly divided on which alternative would be better than the status-quo.

Definition 3 *Let* ζ_i *be the* ***degree of consensus*** *with the policy alternatives on issue* i*. Then* $\zeta_i = \max\{F_i^x, F_i^y, 1 - F_i^x - F_i^y\}$.

The maximum value of ζ_i is 1, when there is total consensus with either the status-quo or one of the policy alternatives, and the minimum value of ζ_i is 1/3, when the three alternatives have equal support, $F_i^x = F_i^y = 1 - F_i^x - F_i^y = 1/3$.

It follows from the definitions that salience and consensus are not independent from each other. For example, as suggested before, low salience of an issue indicates broad consensus with the status-quo policy on the issue. Formally, we can write $\zeta_i = \max\{F_i^x, 1 - \sigma_i\}$. Therefore, we can interpret the degree of consensus as the maximum between the consensus with the status quo $1 - \sigma_i$ and the consensus with the best policy alternative to the status-quo F_i^x. The following propositions describe the relations between issue salience and policy consensus.

Proposition 1 *Let* σ_i *and* ζ_i *be the pre-campaign salience and the degree of consensus on issue* i*, respectively. Then,*

$$\max\left\{\frac{\sigma_i}{2}, 1 - \sigma_i\right\} \leq \zeta_i \leq \max\{\sigma_i, 1 - \sigma_i\}.$$

Proposition 2 *For each issue:*

1. *As consensus with the status-quo decreases, the salience of the issue increases.*

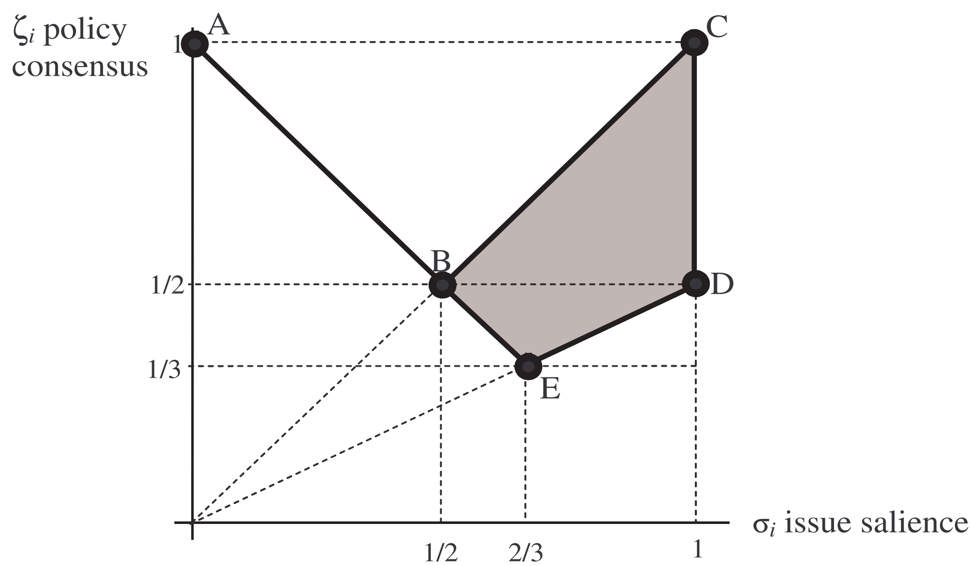

Figure 3: The set of feasible pairs of issue salience and policy consensus (σ_i, ζ_i).

2. *As consensus with some policy alternative to the status-quo increases, the minimum feasible salience increases and the maximum feasible salience does not decrease:* $F_i^x \leq \sigma_i \leq \min\{2\,F_i^x, 1\}$

See Figure 3 for a graphic representation of the set of feasible pairs of values for issue salience and policy consensus. Three segments of possible issues to be chosen by the parties and become decisive during the electoral campaign can be distinguished.

First, the declining diagonal $\overline{\mathrm{AB}}$ captures all those issues which take relatively low salience among voters' pre-campaign concerns ($\sigma_i < 1/2$) because there is relatively high consensus with the status-quo policies on the issues $\zeta_i > 1/2$. They are not likely to arise in the election because of their low salience.

Second, the smaller downside triangle $\overset{\triangle}{BCD}$ includes all those issues with relatively high salience ($\sigma_i > 1/2$), but relatively low policy consensus ($\zeta_i < 1/2$). These issues are not likely to arise in the election either. Despite their relatively high salience, there exists significant division among the voters about which one of the two policy alternatives to the status-quo must be preferred, which opens diverse possibilities for party's choices. These two segments correspond to the set of not-likely successful issues.

Proposition 3 *An issue i exhibits $\pi_i^x < 1/2$ if and only if either the issue is non-salient ($\sigma_i < 1/2$) or, even if it is salient ($\sigma_i > 1/2$) there is low consensus on the best policy alternative to the status-quo ($\zeta_i < 1/2$).*

Finally, the rectangular triangle in the upper-right corner $\overset{\triangle}{BDE}$ encompasses all those issues which take relatively high salience ($\sigma_i > 1/2$) and on which a policy alternative to the status-quo obtains relatively high consensus ($\zeta_i > 1/2$). These are the most likely chosen issues, as they offer a high probability of victory. In fact, as we show later in section 4 (Proposition 5), the government will always choose an issue within this set $\overset{\triangle}{BDE}$, if there is any..

4 Equilibrium results

We follow standard backward induction to find equilibria. We start by finding the optimal actions of the players at each final decision node and continue working back to the beginning of the game.

Before proceeding to solve for equilibria, observe that, as the better alternative to propose is x_i and defending the status quo q_i is always a better response to x_i than proposing y_i, proposing a policy alternative y_i is a strictly dominated strategy. Therefore, we can disregard these alternatives when finding equilibria. We already took this observation into account when we represented the game tree in Figure 2.

Subgames Γ_w and Γ_{nw}

Let Γ_w and Γ_{nw} be the two proper subgames following the incumbent's decision to take the initiative or to wait. (Their initial nodes are labeled as λ_{nw} and $\lambda_w$in Figure 2.) These two subgames are symmetric, and hence it suffices to analyze only one of them. Denote the first mover of each subgame (G in Γ_{nw} and O in Γ_w) as player 1, and the second mover as player 2. The following proposition and its corollary characterize the best response correspondence for player 2.

Proposition 4 *Let $BR(x_i)$ be the set of best responses of player 2 to the proposal x_i by player 1. Then*

1. $q_i \in BR(x_i)$ *if and only if* $1 - \pi_i^x \geq \max_{k \neq i} \pi_k^x$.
2. $x_j \in BR(x_i)$ *if and only if* $1 - \pi_i^x \leq \pi_j^x$, *and* $\left(\pi_j^x - (1 - \pi_i^x)\right) s_{ji} \geq \left(\pi_k^x - (1 - \pi_i^x)\right) s_{ki}$ *for all* $k \neq i, j$.

An implication of Proposition 4 is that whether the best response is to defend the status quo or to raise a new issue is independent of the pre-campaign salience. This result applies to the full game, as discussed below.

We can construct now the best response for player 2 to a policy proposal x_i by player 1.

Corollary 1 *Consider the policy proposal$x_i \in A_i$.*

1. If $i > 1$, then

$$BR(x_i) = \begin{cases} q_i & \text{if } \pi_i^x < 1 - \pi_1^x, \\ \{q_i, x_1\} & \text{if } \pi_i^x = 1 - \pi_1^x, \\ \arg\max_{x_k \neq x_i} \Pi(x_i, x_k) & \text{if } \pi_i^x > 1 - \pi_1^x. \end{cases} \tag{4}$$

2. If $i = 1$,

$$BR(x_1) = \begin{cases} q_1 & \text{if } \pi_2^x < 1 - \pi_1^x, \\ \{q_1, x_2\} & \text{if } \pi_2^x = 1 - \pi_1^x, \\ \arg\max_{x_k \neq x_1} \Pi(x_k, x_1) & \text{if } \pi_2^x > 1 - \pi_1^x. \end{cases} \tag{5}$$

The full game

Consider the full game where the incumbent party may either take the initiative and propose a policy alternative on some issue (and hence play the subgame Γ_{nw}), or hold to the current situation and wait for the challenger to propose some alternative (and play subgame Γ_w).

As the following theorem shows, the type of equilibrium depends only on the probabilities of victory of the best two policy alternatives. In particular, whether parties compete on the same issue or raise different issues is independent of the pre-campaign issue salience, which reflects voters' some interest.

Theorem 1 *Consider an agenda-setting political competition game.*

1. *If $\pi_1^x \leq 1/2$ or $\pi_1^x \geq 1 - \pi_1^x > \pi_2^x$, then both parties compete on the same issue.*

2. *If $\pi_1^x > \pi_2^x > 1 - \pi_1^x$, then parties focus on different issues.*

The intuition is not difficult to grasp. If there is not a good (likely successful) issue on which to propose a new policy alternative ($\pi_1^x \leq 1/2$), then, at equilibrium, the government waits and defends the status-quo on all issues. If there is a single best-alternative which is better than defending the status-quo and much better than any other alternative ($\pi_1^x \geq 1 - \pi_1^x > \pi_2^x$), then the government takes the initiative and proposes that policy alternative, while the opposition is forced to defend the status-quo on that issue. Finally, if there exist promising policy alternatives on two issues ($\pi_1^x > \pi_2^x > 1 - \pi_1^x$), the two parties raise different issues on the basis of issue salience and policy consensus.

Equilibrium results can be presented in terms of issue salience and policy consensus.

Theorem 2 *Consider an agenda-setting political competition game in which σ_i is the degree of issue salience and ζ_i is the degree of policy consensus.*

1. *Let $\sigma_1 < 1/2$, then both parties focus on the same issue. If the degree of issue salience is low, the government defends the status-quo on all issues and the opposition chooses the issue on which there is a policy alternative with the broadest consensus. They may not choose the most salient issue.*

2. *Let $\sigma_1 > 1/2$ but $\zeta_1 < 1/2$, then both parties focus on the same issue. If some issue takes high salience among voters, but there is no broad consensus on the best policy on the issue, the government chooses an issue on which a policy alternative has broad consensus, and the opposition defends the status-quo on that issue. They may not choose the most salient issue.*

3. *Let $\sigma_1 > 1/2$ and $\zeta_1 > 1/2$, then the government chooses an issue with high salience and broad policy consensus. If there exist another issue on which there is sufficiently broad consensus on the best policy alternative to the status-quo, the opposition chooses that issue and parties focus on different issues. Otherwise the government proposes the best policy on some salient issue and the opposition defends the status-quo on that issue. In any case, the most salient issue may not be chosen.*

The following results show that the incumbent government benefits from a higher probability of winning and always chooses an issue with relatively high salience and consensus (within the set $\overset{\triangle}{\text{BDE}}$ in Figure 3), if there is any.

Corollary 2 *Let $\rho = \max_i \min_{j \neq i} \Pi_{\mathrm{G}}(x_i, x_j)$. The incumbent government wins with probability $\max\{\rho, 1 - \rho\} > 1/2$.*

Proposition 5 *Suppose there exists at least one issue i with $\sigma_i > 1/2$ and $\zeta_i > 1/2$, then the issue chosen by the government at equilibrium exhibits $\sigma_G > 1/2$ and $\zeta_G > 1/2$.*

However, it is interesting to note that we cannot extend this latest result to the opposition.

Example 1

Consider an election in which three potential issues have the following salience and consensus values:

$$(\sigma_1, \zeta_1) = (0.95, 0.60); (\sigma_2, \zeta_2) = (0.55, 0.51); (\sigma_3, \zeta_3) = (0.90, 0.49).$$

By Proposition 5 the government will choose either issue 1 or issue 2 (since on issue 3 the degree of policy consensus is low). It seems clear that the incumbent government will take the initiative and choose issue 1, which is more salient and has broader consensus than issue 2. However, for the opposition to choose an issue, it is relevant to see that on issue 2 there is broader policy consensus than on issue 3, but issue 2 is much less salient. In this case, the trade-off is favorable to issue 3. At equilibrium, the opposition does not choose issue 2, which has $\sigma_2 > 1/2$ and $\zeta_2 > 1/2$, but chooses x_3 instead.[4] Hence Proposition 5 does not apply to the opposition party.

Let us show now a few more numerical examples to illustrate how parties competing in setting the electoral agenda can overlook the concerns of the electorate, as represented by issue salience, by either choosing to defend the unpopular status-quo on the issue or not talking about it at all.

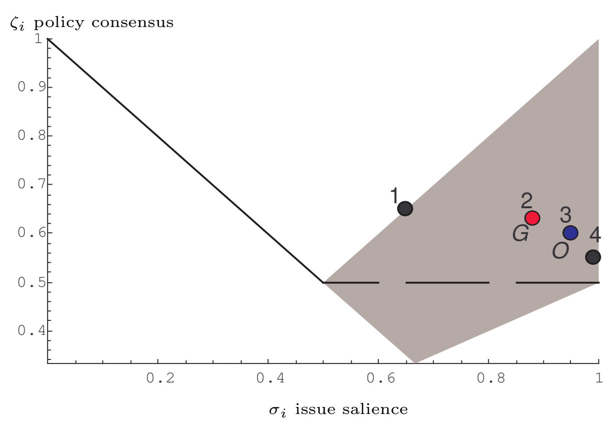

Figure 4: Example 2. Neither the most salient issue nor the issue with the highest consensus are chosen at equilibrium. The government and the opposition choose issues G and O, respectively. See Appendix B for computational details.

Example 2

Consider an election in which four potential issues have the following salience

[4] Appendix B provides the Mathematica program used to find equilibria for the examples in the paper.

and consensus values:

$$(\sigma_1, \zeta_1) = (0.65, 0.65); (\sigma_2, \zeta_2) = (0.88, 0.63);$$
$$(\sigma_3, \zeta_3) = (0.95, 0.60); (\sigma_3, \zeta_3) = (0.99, 0.55),$$

as represented in Figure 4.

In equilibrium, government and opposition focus on different issues, 2 and 3 respectively. Specifically, the government takes the initiative and announces x_2 and the opposition responds by choosing x_3. Both parties overlook issues 4, which is the most salient issue, and issue 1, which is the one with highest consensus. However, they focus on issues with higher consensus than issue 4 and more salience than issue 1.

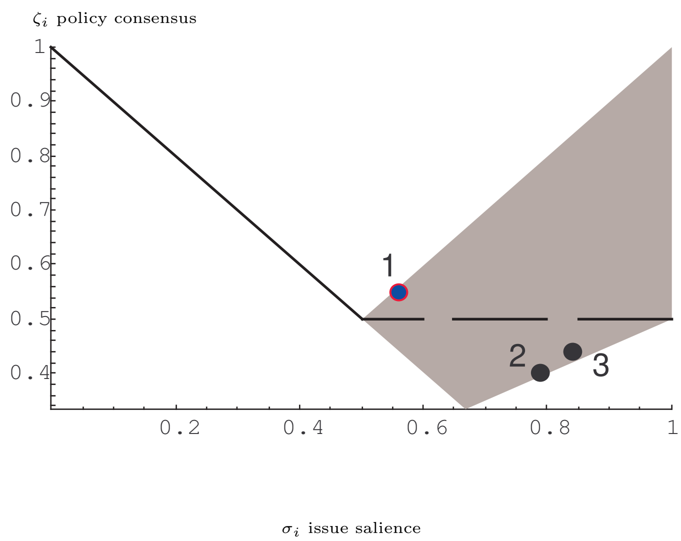

Figure 5: Example 3. Parties focus on the least salient issue. The government and the opposition focus on issue 1, the former promoting the policy proposal x_1 and the opposition defending the status-quo q_1. See Appendix B for computational details.

Example 3

Consider an election in which three potential issues have the following salience and issue values, as shown in Figure 5:

$$(\sigma_1, \zeta_1) = (0.56, 0.55), (\sigma_2, \zeta_2) = (0.84, 0.44), (\sigma_3, \zeta_3) = (0.79, 0.40).$$

By Proposition 5 the government chooses issue 1, the only one with both salience and consensus above 1/2. The opposition does not choose issues 2 or 3 because there is low consensus on the best policy on those issues, but it rather challenges the government on the same issue 1. The electoral campaign focuses on the least salient issue. But if the issue chosen by the government, 1, benefited from significantly broader policy consensus and had, thus, higher probability of victory, the opposition would choose another issue (issue 2 in the example).

These are just specific examples to show possible occurrences. To approach more general results, we can note that parties will not choose the issue with both the lowest salience and the highest controversy or lowest consensus on the appropriate policy. But regarding highly salient issues, if there is not sufficiently broad consensus on a policy alternative, the opposition party may choose not to challenge a highly insatisfactory status-quo policy and the incumbent government may survive in spite of its bad policy performance.

5 Conclusion

When in the early 80's, after winning the 1979 election, Mrs. Thatcher introduced her privatization program, this was a very innovative policy fiercely opposed by the trade unions and by the Labour party. However, the majority enjoyed by the Conservative party in Parliament granted her the possibility to implement it, gaining momentum after the 1983 re-election. This success gave political salience to privatization and generated a policy consensus that expanded to other countries. High salience and broad consensus made privatization an attractive issue likely to be adopted by electoral winners.

Similar stories could be told for different places and moments regarding once innovative policies, such as civil rights for ethnic minorities, transnational free trade, women's equal rights, a general system of social security, suppression of the compulsory military service, international justice for crimes against humanity, balanced budgets, etc. None of these proposals were initially intermediate compromises between distant alternative policies, but were highly innovative when they were formulated for the first time. However, policy consensus was eventually built on these and other issues after some success.

We have presented an agenda-setting formal model of electoral competition. We have used the fundamental analytical elements of the spatial theory, but, in contrast to traditional Downsian models, we have assumed that the policy space is not given, but formed precisely as a consequence of competitive party's strategies. In order to win the election, parties choose to give salience and campaign on those issues on which they expect their policy proposals will obtain voters' broad support.

Parties have to trade off the pre-campaign salience of each issue in voters' concerns and the voters' support or consensus in favor of the policy alternatives on the issue. We have found that, although parties will not compete on irrelevant issues (those with both low salience among voters and divisive policy proposals), indeed the issues which are considered the most important ones by a majority of votes may not be given salience during the electoral campaign. The equilibrium results depend only on the probability of victory of the best policy alternatives that parties can propose.

This may be a surprising result, but it may be a reasonable one after all. Even if there is extensive public concern on some issue, if there is not a single policy proposal on the issue which can attract broad consensus, focusing on that issue might produce high division and polarization among both parties and voters. Important issues in people's concerns can, thus, be solved through electoral competition only when a policy alternative appears as clearly superior to voters' eyes. In the absence of a likely successful policy alternative, parties can choose not to give salience to the issue, thus maintaining the status-quo policy even if it is unsatisfactory for voters.

In the short term, mediocre policies broadly rejected by the electorate, as well as incumbent parties with no good performance in government, may survive for lack of a sufficiently convincing alternative. In the long term, broad policy consensus can be accumulated on an increasing number of issues, but not in the order of importance in voters' concerns.

In future work we plan to discuss a multi-election dynamic process. Some of the qualitative findings of the model might be also valid also for alternative settings, including multiparty elections in which two larger parties have strong influence on agenda formation by giving salience to their preferred issues, obtain most votes and lead the subsequent formation of government.

A Proofs

Proof of Proposition 1

Because $F_i^x \geq F_i^y \geq 0$ and $\sigma_i = F_i^x + F_i^y$ (Definition 2), $\frac{\sigma_i}{2} \leq F_i^x \leq \sigma_i$. It follows then that

$$\max\left\{\frac{\sigma_i}{2}, 1-\sigma_i\right\} \leq \max\left\{F_i^x, 1-\sigma_i\right\} = \zeta_i \leq \max\left\{\sigma_i, 1-\sigma_i\right\}.$$

□

Proof of Proposition 2

1. The consensus with the status-quo is measured as $1-F_i^x-F_i^y = 1-\sigma_i$. It trivially follows that the consensus with the status-quo decreases as salience increases.

2. By definition, $\sigma_i = F_i^x + F_i^y$. Since $F_i^x \geq F_i^y \geq 0$and $F_i^x + F_i^y \leq 1$, it follows that $F_i^x \leq \sigma_i \leq \min\{2F_i^x, 1\}$.

□

Proof of Proposition 3

First, from expression (1), $\pi_i^x = \frac{F_i^x+\beta-1/2}{2\beta}$. Hence $\pi_i^x < \frac{1}{2}$ if and only if $F_i^x < \frac{1}{2}$.

We proceed now to prove the proposition.

1. ($\Rightarrow$) Let $\pi_i^x < \frac{1}{2}$ and assume that $\sigma_i > \frac{1}{2}$. Then $\zeta_i = \max\{F_i^x, 1-\sigma_i\} < \frac{1}{2}$, since both terms in the maximization are less than 1/2.

2. ($\Leftarrow$) If $\sigma_i < \frac{1}{2}$. Then $F_i^x = \sigma_i - F_i^y < \frac{1}{2}$, and so $\pi_i^x < \frac{1}{2}$.Finally, if $\sigma_i > \frac{1}{2}$ and $\zeta_i < \frac{1}{2}$, then $\zeta_i < \max\{F_i^x, 1-\sigma_i\} < \frac{1}{2}$, implying that $F_i^x < \frac{1}{2}$ and so $\pi_i^x < \frac{1}{2}$.

□

Proof of Proposition 4

1. We know that $q_i \in BR(x_i)$ if an only if $\Pi_2(q_i, x_i) \geq \Pi_2(x_k, x_i)$ for all $k \neq i$. That is, if and only if

$$1 - \pi_i^x \geq s_{ki}\, \pi_k^x + (1 - s_{ki})\,(1 - \pi_i^x) \text{ for all } j \neq k.$$

Simplifying this expression we obtain that $q_i \in BR(x_i)$ if and only if $1-\pi_i^x \geq \pi_k^x\ \forall i \neq j$, which is equivalent to the condition in the statement: $1 - \pi_i^x \geq \max_{k\neq i} \pi_k^x$.

2. Similarly, $x_j \in BR(x_i)$ if and only if $\Pi_2(x_j, x_k) \geq \Pi_2(q_i, x_i)$ and $\Pi_2(x_j, x_i) \geq \Pi_2(x_k, x_i)$ for all $k \neq i, j$. The first condition is equivalent to $s_{ji}\, \pi_j^x + (1 - s_{jk}\,(1 - \pi_i^x) \geq 1 - \pi_i^x$, that is, $\pi_j^x \geq 1 - \pi_i^x$. The second condition implies that for all $j \neq i, k$,

$$s_{ji}\, \pi_j^x + (1 - s_{ji}(1 - \pi_i^x) \geq s_{ki}\, \pi_k^x + (1 - s_{ki}(1 - \pi_i^x)$$

Simplifying, $\left(\pi_j^x - (1 - \pi_i^x)\right) s_{ji} \geq (\pi_k^x - (1 - \pi_i^x))$. □

Proof of Corollary 1

Recall that $\pi_1^x > \pi_2^x > \pi_i^x$ for all $i > 2$. Observe that

$$\Pi(x_j, x_i) = s_{ji}\pi_j^x + (1 - s_{ji})(1 - \pi_i^x) = (1 - \pi_i^x) + s_{ji}(\pi_j^x - (1 - \pi_i^x)).$$

Hence, maximizing $\Pi(x_j, x_i)$ with respect to x_j for a given x_i is equivalent to maximizing $s_{ji}\left(\pi_j^x - (1 - \pi_i^x)\right)$ −the expression in part 2 of Proposition 4. Therefore, the results follow directly from Proposition 4.

□

Proof of Theorem 1

We proceed case by case.

1. Let $\pi_1^x \leq 1/2$. Then $1 - \pi_1^x > \frac{1}{2} \geq \pi_1^x > \pi_i^x$ for all i>1. Therefore, for all issue i, $BR(x_i) = q_i$ (Corollary 1) and both parties compete on the same issue.

2. Let $\pi_1^x \geq 1 - \pi_1^x > \pi_2^x$. This is a similar case to 1. $BR(x_i) = q_i$ for all i (Corollary 1).

3. Let $\pi_1^x > \pi_2^x > 1 - \pi_1^x$. Let (a_1^*, a_2^*) be the policy alternatives of an equilibrium outcome. We only need to show that $a_2^* = x_i$ for some i and hence parties give political salience to different issues.Suppose that, contrary to what we want to prove, $a_2^* = q_k$ for some k. Then $(a_1^*, a_2^*) = (x_k, q_k)$ and player 1 wins with probability $\Pi(x_k, q_k) = \pi_k^x$. It follows from Corollary 1 that $\pi_k^x \leq 1 - \pi_1^x$. However, $\Pi(x_1, BR(x_1)) = \min_{i>1} s_{1i}\pi_1^x + (1 - s_{1i})(1 - \pi_i^x) \geq 1 - \pi_1^x > \pi_k^x$, since $1 - \pi_i^x \geq 1 - \pi_1^x$ and $\pi_1^x > 1 - \pi_1^x$. But then x_1 is a better choice than x_k for player 1, a contradiction with (x_k, q_k) being the equilibrium policies. Therefore, it cannot be that $a_2^* = q_k$ and parties must give political salience to different issues.

□

Proof of Theorem 2

1. Because $\sigma_1 < 1/2$, then $\pi_1^x < 1/2$ (Proposition 3). From Theorem 1, both parties focus on the same issue, and hence, at the equilibrium of the subgame Γ_s ($s = \{w, nw\}$) player 1 chooses x_1 and player 2 defends the status-quo q_i against any alternative x_i. Player 1 wins with probability π_1^x. Therefore, $\Pi_G(\Gamma_w) = 1 - \pi_1^x \geq \pi_1^x = \Pi_G(\Gamma_{nw})$, where (abusing notation) $\Pi_G(\Gamma_s)$ represents the incumbent government's expected probability of victory associated to any Nash Equilibrium of the subgame Γ_s. Therefore, at

the equilibrium path of the full game the opposition chooses x_1 while the incumbent government defends the status-quo in all issues. Thus both parties focus on the issue with the highest consensus on the most popular alternative to the status-quo F_1^x, since F_i^x is a monotone increasing transformation of π_i^x (see (1)) and $\pi_1^x > \pi_i^x$ for all i (see (2)).Consider the following example. $(F_1^x, F_1^y) = (0.3,\ 0.1)$, $(F_2^x, F_2^y) = (0.25,\ 0.2)$ and $F_i^x < F_2^x$ for all $i > 2$. Observe that $\frac{1}{2} > \pi_1^x > \pi_2^x > \pi_i^x$ for all $i > 2$ since $\pi_j^x < \frac{1}{2}$ if and only if $F_j^x < \frac{1}{2}$. Hence, since both parties focus on issue 1 at equilibrium and $\sigma_2 = 0.42 > 0.4 = \sigma_1$, they do not choose the most salient issue.

2. This is similar to the previous case. From Proposition 3, $\pi_1^x < 1/2$. Theorem 1 implies again that both parties focus on issue 1, the one with the highest consensus on the most popular alternative to the status-quo. Consider the following example. $(F_1^x, F_1^y) = (0.4,\ 0.2)$, $(F_2^x, F_2^y) = (0.35,\ 0.3)$ and $F_i^x < F_2^x$ for all $i > 2$. Then $1/2 > \pi_1^x > \pi_2^x > \pi_i^x$ for all $i > 2$, $\sigma_2 = 0.65 > 0.6 = \sigma_1 > 1/2$ and $1/2 > \zeta_2 = 0.45 > 0.4 = \zeta_1$. Hence they do not choose the most salient issue.

3. Since $\sigma_1 > 1/2$ and $\zeta_1 > 1/2$, it follows from Proposition 3 that $\pi_1^x > \frac{1}{2}$, and so $\zeta_1 = F_1^x > \frac{1}{2}$ (Definition 3). We claim that whenever $\sigma_2 > \zeta_1$ and $\zeta_2 > 1-\zeta_1$ parties focus on different issues. By Theorem 1, it suffices to show that $\pi_2^x > 1-\pi_1^x$, which is equivalent to $F_2^x > 1-F_1^x$. First, $\sigma_2 \equiv F_1^x + F_1^y > \zeta_1$ implies $F_2^x + F_2^y > F_1^x$ (Definition 2), and so $1 - F_2^x - F_2^y < 1 - F_1^x$. Secondly, $\zeta_2 > 1 - \zeta_1$ implies $\max\{F_2^x, 1 - F_2^x - F_2^y\} > 1 - F_1^x$. Finally, it follows that $F_2^x > 1 - F_1^x > 1 - F_2^x - F_2^y$. Examples 2 and 3 in the text show that the most salient issue may not be chosen. □

Proof of Corollary 2

We know that $\rho = \max_i \min_j \Pi_1(x_i, x_j)$ and $1-\rho$ are the values of the games Γ_{nw} and Γ_w, respectively, and that the incumbent government can choose the subgame to play by waiting or taking the initiative. Therefore, the government will choose the subgame with the highest value and hence its probability of winning will be $\max\{\rho, 1-\rho\}$.

□

Proof of Proposition 5.

1. Assume that there exists an issue i such that $\sigma_i > \frac{1}{2}$ and $\zeta_i > \frac{1}{2}$. From Proposition 3, $\pi_i^x > \frac{1}{2}$ and hence $\pi_1^x > \frac{1}{2}$ (since $\pi_1^x > \pi_i^x$ for all $i = 1, \ldots, N$). Hence we only need to show that if the incumbent government chooses issues G, then $\pi_G^x > \frac{1}{2}$. We show this by contradiction.

2. Suppose that $\pi_G^x < \frac{1}{2}$.

1. Then $\pi_2^x > 1 - \pi_1^x$, otherwise the government could choose issue 1 at equilibrium and obtain $\Pi_G^* = \pi_1^x > \frac{1}{2}$.

2. Because $\pi_2^x > 1 - \pi_1^x$ we know by Theorem 1 that parties choose different issues and, by Corollary 2, $\Pi_G^* > \frac{1}{2} > \Pi_O^*$.

3. Moreover, it must be that $\pi_O^x < \frac{1}{2}$. Otherwise $\Pi_G^* = s_{GO}\,\pi_G^x + (1 - s_{GO})\,(1 - \pi_O^x) < \frac{1}{2}$, a contradiction with (ii).

4. If the government does not wait (Γ_{nw}), it must be that $\Pi_O^* \geq s_{iG}\,\pi_i^x + (1 - s_{iG})\,(1 - \pi_G^x)$ for all $i \neq G$.Since $\Pi_O^* < \frac{1}{2}$ and $1 - \pi_G^x \geq \frac{1}{2}$, it follows that $\pi_i^x \leq \frac{1}{2}$ for all $i \neq G$. But this is a contradiction with the initial assumption that $\pi_1^x > \frac{1}{2}$.

5. If the government waited at equilibrium, the opposition could always choose issue 1 and guarantee a probability of victory of at least $\underline{\Pi}$:

$\underline{\Pi} = \min_{i \neq 1} s_{i1}\, \pi_1^x + (1 - s_{i1})\, (1 - \pi_i^x) \leq \Pi_O^*$.Because $\Pi_O^* < \frac{1}{2}$ and $\pi_1^x > \frac{1}{2}$, it follows that $\pi_i^x \geq \frac{1}{2}$ for all i. But this is a contradiction with the government choosing an issue with $\pi_G^x < \frac{1}{2}$.

Therefore we have proved that at equilibrium $\pi_G^x > \frac{1}{2}$ and so (by Proposition 3) $\sigma_G > \frac{1}{2}$ and $\zeta_G > \frac{1}{2}$.

□

Appendix B: *Mathematica* code

▪ The list of issues

Provide the initial n issues, characterized by the support to each alternative: F_i^x and F_i^y.
The program takes the uncertainty parameter $\beta = 1/2$, so that $\pi_i^x = F_i^x \in (0, 1)$; defines σ_i, ζ_i, and π_i^x; create the lists of issues nSC and nP, where issues are characterized by (σ_i, ζ_i) and (π_i^x, π_i^y), respectively; and print the list of issues and plot it in the different spaces.

```
nI = {{F1x, F1y}, {F2x, F2y}, {F2x, F3y}, ...};
n = Length[nI];
nI = Reverse[Sort[nI]];
Table[
 {σ[i], ϛ[i], πx[i], πy[i] } = {Plus @@ nI[[i]],
   Max[nI[[i, 1]], 1 - Plus @@ nI[[i]]], nI[[i, 1]], nI[[i, 2]]}, {i, n}];
nSC = Table[{σ[i], ϛ[i]}, {i, n}];
nP = Table[{πx[i], πy[i]}, {i, n}];
<< Statistics`DiscreteDistributions`
Print["nSC = {(σi,ϛi)}i=1,...,n =", nSC];
plotSC = ListPlot[nSC, PlotStyle → PointSize[0.03],
   AxesOrigin → {0, 1 / 3}, PlotRange → {{0, 1}, {1 / 3, 1}},
   AxesLabel → {"σi", "ςi"}, DisplayFunction → Identity];
gSC = Show[
   {plotSC,
    Graphics[
     {GrayLevel[.7], Polygon[{{1 / 2, 1 / 2}, {1, 1}, {1, 1 / 2}, {2 / 3, 1 / 3}}]}],
    Graphics[{GrayLevel[.7], Line[{{0, 1}, {1 / 2, 1 / 2}}]}],
    Graphics[
     {GrayLevel[.9], Dashing[{0.15, 0.05}], Line[{{1, 1 / 2}, {1 / 2, 1 / 2}}]}],
    plotSC},
   DisplayFunction → $DisplayFunction];

Print["nπ = {(πxi,πyi)}i=1,...,n =", nP];
plotP = ListPlot[nP, PlotStyle → PointSize[0.03], AxesOrigin → {0, 0},
   PlotRange → {{0, 1}, {0, .5}}, AxesLabel → {"πxi", "πyi"}, DisplayFunction → Identity];
gP = Show[
   {plotP,
    Graphics[{GrayLevel[.7], Polygon[{{0, 0}, {1 / 2, 1 / 2}, {1, 0}}]}],
    Graphics[
     {GrayLevel[.9], Dashing[{0.15, 0.05}], Line[{{1 / 2, 0}, {1 / 2, 1 / 2}}]}],
    plotP},
   DisplayFunction → $DisplayFunction];
```

▪ Find an equilibrium

Define the payoff function for party 1. Compute player 1's probability of victory for each reaction of player 2 (with the last value corresponding to the status-quo), and exclude the issue raised by player 1 (function *pay1r*). Compute the best response to x_i (br[i]) as the issue that minimizes pay1[i], and define v[i] = $\mathrm{Min}_{j \neq i}\, \Pi 1[x_i, x_j]$. Print the list of best responses. Compute the maximum value for player 1 taking into account that player 2 will reacts optimally (*value* is the payoff of the game). Finally, find the equilibrium strategies. In case of more than one maximinimizers, we choose randomly

```
fΠ1[πx1_, σ1_, πx2_, σ2_] := If[σ1 == 0 && σ2 == 0, 0, σ1/(σ1 + σ2) πx1 + σ2/(σ1 + σ2) (1 - πx2)]
tablepay1[i_] := Append[Table[fΠ1[πx[i], σ[i], πx[j], σ[j]], {j, n}], πx[i]]

tablepay1r[i_] :=
 Drop[Append[Table[fΠ1[πx[i], σ[i], πx[j], σ[j]], {j, n}], πx[i]], {i}]
v[i_] := Min[tablepay1r[i]]
br2[i_] := Module[
  {pos, zz, qq},
  pos = Flatten[Position[tablepay1[i], v[i]]];
  zz = If[pos == {n + 1}, i, pos[[1]]];
  zz]
Print["{Π1(x1,BR2(x1)),...,Π1(xn,BR2(xn))} =", pay1 = Table[v[i], {i, n}]]
Print["value =", value = Max[pay1]]
issue1 =
  (tpos = Position[pay1, value]; tpos[[Random[Integer, {1, Length[tpos]}]]])[[1]];
issue2 = br2[issue1];
If[value > 1 / 2, issues = {ιG, ιO} = {issue1, issue2},
 issues = {ιG, ιO} = {issue2, issue1}]
```

■ Collect and present the information at equilibrium. Plot the equilibrium outcome.

The outcome presents the following information: "same issue" or "different issues"; the issue chosen by the government and the opposition $\{\iota_G, \iota_O\}$; the probability that the issue chosen by the government becomes decisive s^*_{GO}; and the probability of victory of the government Π_G.

It also plots the issues in the $<\sigma_i, \zeta_i>$ and $<\pi^x_i, \pi^y_i>$ spaces. In case of different issues, the issue chosen by the government is in blue and the issue chosen by the opposition is in red.

```
If [ιG == ιO,
 Print["Same issue"]
 Print["{ι_G,ι_O} =", {ιG, ιO}];
 Print["s*_GO =", sGO = 1];
 Print["Π_G =", ΠG = πx[ιG]];
 Show[
  gSC,
  Graphics[{PointSize[0.025], RGBColor[1, 0, 0], Point[nSC[[ιG]]]}],
  Graphics[{PointSize[0.025], RGBColor[0, 0, 1], Point[nSC[[ιO]]]}]
 ];
 Show[
  gP,
  Graphics[{PointSize[0.025], RGBColor[1, 0, 0], Point[nP[[ιG]]]}],
  Graphics[{PointSize[0.025], RGBColor[0, 0, 1], Point[nP[[ιO]]]}]
 ],

 Print["Different issues"];
 Print["{ι_G,ι_O} =", {ιG, ιO}];
 Print["s*_GO =", sGO = σ[ιG] / (σ[ιG] + σ[ιO])];
 Print["{π^x_G,π^y_G,σ_G} =", {πGx, πGy, σG} = {πx[ιG], πy[ιG], σ[ιG]}];
 Print["{π^x_O,π^y_O,σ_O} =", {πOx, πOy, σO} = {πx[ιO], πy[ιO], σ[ιO]}];
 Print["Π_G =", ΠG = fΠ1[πGx, σG, πOx, σO]];
 Show[
  gSC,
  Graphics[{PointSize[0.025], RGBColor[1, 0, 0], Point[nSC[[ιG]]]}],
  Graphics[{PointSize[0.025], RGBColor[0, 0, 1], Point[nSC[[ιO]]]}]
 ];
 Show[
  gP,
  Graphics[{PointSize[0.025], RGBColor[1, 0, 0], Point[nP[[ιG]]]}],
  Graphics[{PointSize[0.025], RGBColor[0, 0, 1], Point[nP[[ιO]]]}]
 ]]
```

References

Bortolotti, Bernardo and Paolo Pinotti, "Delayed Privatization," *Public Choice*, forth.

Budge, I., "Issues, dimensions, and agenda change in postwar democracies: Long-term trends in party election programs and newspaper reports in twenty-three democracies," in W.H. Riker, ed., *Agenda Formation*, Ann Arbor: University of Michigan Press, 1993, pp. 41–80.

_ , H-D. Klingemann, A. Volkens, J. Bara, and E. Tanenbaum, *Mapping policy preferences: Estimates for parties, electors, and governments 1945–1998*, Oxford and New York: Oxford University Press, 2001.

Colomer, J.M. and R. Puglisi, "Cleavages, issues, and parties: A critical overview of the literature," *European Political Science*, 2005, *4*, 502–520.

Grofman, Bernard, "Downs and two-party convergence," *Annual Review of Political Science*, 2004, *7*, 25–46.

Klingemann, H.D., A. Volkens, J. Bara, and I. Budge, *Mapping policy preferences II: Estimates for parties, electors and governments in Central and Eastern Europe, European Union and OECD 1990-2003*, Oxford and New York: Oxford University Press, 2006.

Petrocik, J.R., "Issue ownership in presidential elections, with a 1980 case study," *American Journal of Political Science*, 1996, *40* (3), 825–850.

_ , W.L. Benoit, and G. Hansen, "Issue ownership and presidential campaigning, 1952-2000," *Political Science Quarterly*, 2002, *118* (4), 599–626.

Riker, W.H., ed., *Agenda Formation*, Ann Arbor: University of Michigan Press, 1993.

Roemer, J.E., *Political Competition. Theory and Applications*, Cambridge, Mass.: Harvard University Press, 2001.

Stokes, D.E., "Spatial models of party competition," *American Political Science Review*, 1963, *57* (2), 368–377.