Informative Campaign Promises.*

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Abstract

This paper's builds a political agency model in which campaign promises by a candidate for office are nonbinding, yet they signal her political preferences and pork-barrel policy that she intends to implement. As an extension, we show that when the politicians communicate and bargain prior to the play, they divide in a faction with the leading electoral position and its opposition. A candidate's faction membership gives her the incentives to pander to citizens whose political preferences are represented in the faction, and it brings these citizens on her side at the ballot box.

Key words: electoral promises, pork-barrel politics, political parties.
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1 Introduction

In electoral campaigns, candidates competing for office describe public policy which they intend to implement, presumably in order to increase their electoral fortunes. Winners seem to keep their word most of the time. Royed and Borrelli (1997) find that between 1977 and 1992, most of the 287 platform pledges on social welfare policy by two major US parties were fulfilled. Budge, Robertson, and Hearl (1987); and Petry (1995) find campaign promise fulfillment in other democracies. This paper builds a model of electoral competition with nonbinding, yet informative campaign promises.

Model outline We build upon political agency model by Maskin and Tirole (2001, 2004).[1] The citizens are differentiated by *type* of preferences over pork-barrel policy: pork to citizens of one type imposes a cost on the citizens of the other types.[2] For simplicity, there are three types. A citizen's type is his private information.

There are two periods. In a period, the cost of a pork takes either a high or a low value: it is drawn from diffused Bernoulli distribution.[3] A pork is socially efficient if and only if its cost is low. Only an arbitrary small mass of citizens sees period-specific cost of a pork. These citizens are called the politicians; the other citizens are called the voters.[4] All types are equally represented both among the politicians and among the voters.

A period begins with a majority vote election in which two politicians compete for office. The winner picks pork-barrel policy in the period. The first election is an open-seat race. A candidate for office gives public campaign promises: that is, she describes her policy intentions. She is free to break her word if in office. The second election is an incumbent-challenger

[1] More precisely, we build upon the section "Tyranny of the minorities: pork-barrel pandering" in 2001 working paper version that is not included in the published 2004 paper. We consider political representatives who are homogenous in their eagerness for pork-barrel spending, and we let them give campaign promises under uncertainty about cost of a pork.

[2] We follow the political science tradition of using "pork" for favorable public policy.

[3] The distributions from which random parameters are drawn are public information.

[4] Although the politicians also vote, their vote is not influential.

race. A voter's posterior beliefs about the incumbent's type depend on the incumbent's electoral promises, and on whether or not she has given pork to the voter. Voter beliefs about the challenger's type are diffused.[5]

Informative campaign promises We solve the game using the concept of perfect Bayesian equilibrium. We restrict out attention to symmetric pure strategy equilibria. Proposition 1 describes equilibria with informative electoral promises. That is, equilibria in which a candidate's campaign promises signal her type.[6]

Because of electoral competition, a candidate panders campaign promises to a minimal majority of citizens.[7] If their votes bring her in office, she needs to raise them once again if she wants to be re-elected. For that, she has to fulfill her electoral promises.[8] In order to minimize the cost of potential re-election, a candidate gives promises that she would like to fulfill the most. She fulfills them if in office, unless the realized cost of fulfillment lies above the benefit from keeping control over public policy for one more term.

Insight 1 *A candidate's campaign promises signal her type and pork-barrel policy if she is in office.*

This insight is consistent with campaign promises observed to be mostly fulfilled. While some other papers also predict fulfillment of campaign promises rather than take it as an assumption (see Section 2 for the review), our approach is novel in that it allows us to investigate the relationship between campaign promises and porkbarrel politics.

Political factionalization Note that prior to the play politicians of any two types wish to agree that if one of them runs for office, she panders

[5] Nothing changes if the incumbent and the challenger give electoral promises: eitherway, the winner of the second election picks her most preferred policy in the last period.

[6] For the sake of completeness, Section A.1 describes "babbling" equilibria.

[7] Because the candidates pander campaign promises to citizen beliefs, a variety of promises can be sustained in equilibrium. However, in any equilibrium, campaign promises signal the same information to the citizens, and they have the same effects on elections and policies. We are interested in these effects, and not in the contents of electoral pledges.

[8] By abuse of terminology, we say that the incumbent fulfills her campaign promises if and only if both her promises and her policy pander to the same set of citizens.

campaign promises citizens whose types are represented in the agreement. Moreover, these politicians would like to signal membership in the agreement to the voters, so as to make sure that a candidate outside it does not pool with the members using their campaign strategy. In other words, they would like to form a political faction[9] (or a party: because the scope of this paper is limited, we use words "party" and "faction" as synonyms). We extend the model so as to let the politicians bargain over faction membership.

Let the game begin with the following sequence of events. The Nature sequentially draws a politician who collects the other politicians' private messages about their types: these messages may be either true or false. She offers faction membership to a subset of politicians. A receiver of the offer learns the weight of any type among the offer receivers, and either accepts the offer or rejects it. The faction is formed if and only if the receivers accept the offer unilaterally. Bargaining goes until either a faction is formed, or any politician has made an offer once.

A candidate's faction membership and types that are represented in her faction is public information. For simplicity, we assume that if a faction is formed, a factional candidate competes with an independent candidate in either election. Furthermore, we assume that the incumbent can abstain from re-election.[10]

We continue to focus on "the most informative" equilibria. Proposition 2 tells that the first offer maker learns the other politicians' types from their messages, and she unifies her type politicians and a minimal majority of some other type politicians in a political faction.[11] The factional candidate in the

[9] Wikipedia defines political faction as "a grouping of individuals" who "are united in a common goal or set of common goals for the organisation they are a part of, not necessarily shared by all of that organisation's members. They band together as a way of achieving these goals and advancing their agenda and position within the organisation". Initial political factionalization following 1787 debates over the Constitution of new United State and formation of two-major party system through political realignments of the following decades is described, e.g., in Sundquist (1983).

[10] Our insights do not hinge on either of these assumptions.

[11] Proposition 2 describes equilibria with informative campaign promises in which a politician's message during bargaining over political faction membership reveals her type. In the complementary set of equilibria with informative campaign promises, no faction is

first election panders campaign promises to citizens whose types are represented in the faction. She raises their votes and wins office, where she either: (i) fulfills campaign promises, runs for re-election and wins it; or (ii) picks her most preferred policy, in which case she either abstains from re-election if her type politicians are the large majority in the faction; or runs for tie-close electoral race with the challenger otherwise.[12]

Insight 2 *When the politicians communicate, they form a political faction such that a candidate's faction membership gives her the incentives to pander to citizens whose types are represented in the faction, and it brings these citizens on her side at the ballot box.*

Insight 2 may explain both voter and legislator loyalty to political parties. From 1953 to 2004, 88% of respondents of the Biannual poll by American National Election Studies associated themselves with one of the major parties: 83% of Democratic identifiers voted Democratic, and 79% of Republican identifiers voted Republican in Congressional elections. From 1857 to 2000, a majority of Democrats opposed a majority of Republicans in about 60% of roll-call votes. On average, more than 83% of House representatives with the same party affiliation voted in the same way (Gershtenson, 2006).

While the benefits from political partisanship have already been emphasized in the literature (see Section 2), a new feature of our approach is that it allows to investigate how party ideological composition and pork-barrel policy by its member in office depend on electoral structure.

Roadmap The paper is organized as follows. Section 2 reviews related literature. Section 3 formalizes the basic model. Section 4 describes democratic outcomes with informative electoral promises. Section 5 models political factionalization. Section 6 investigates its consequences. Section 7 concludes.

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formed. Hence, the elections and public policy are described by Proposition 1.

[12] If the second election is an open-seat race, the winner is the factional candidate.

2 Related literature

Informative campaign promises While a sizable literate assumes that electoral promises are binding, some papers predict that they are fulfilled without making this assumption.

In Austen-Smith and Banks (1989) the incumbent's performance depends on her effort. The candidates for office describe their performance goals. The voters see the incumbent's fulfillment of her goal, and use a rule to decide on whether to re-elect her or not. There is no adverse selection, unlike in our model.

In an infinite-horizon model by Aragones, Palfrey, and Postlewaite (2006) politicians keep their campaign promises in order to build their reputation with voters who play trigger strategies. Our model has a finite horizon: the mechanism of electoral accountability is different.

In Callander and Wilkie (2007) the candidates for office differ both in their ideology and in the cost of lying in electoral campaigns. Campaign talk by a candidate with low cost of lying is affected by her rivals' being potentially more honest. In our model the candidates are not differentiated in honesty.

In Harrington (1993) a candidate for office is characterized by *steadfast* beliefs in efficiency of a given public policy. The candidates describe their policy intentions to the voters who hold heterogenous priors regarding effectiveness of different policies. The voters form posteriors about "correctness" of the incumbent's beliefs depending on her campaign message and on the payoff generated by her policy: the more likely are the incumbent's beliefs to be correct, the higher her re-election fortunes. When uncertainty about electoral weight by voters with a given type of priors is sufficiently high, a candidate truthfully describes her policy intentions. Otherwise, campaigning is uninformative. In our model allocation of electoral weight among different types of voters is diffused. We focus on how pork-barrel policy depends on campaigning, taking dispersion in cost of a pork as the main parameter.

Commitment and signalling benefits from party membership A growing body of papers views political parties as organizations that enhance electoral fortunes by their members.

In Snyder and Ting (2002), Ashworth and Bueno de Mesquita (2006), and Castanheira and Crutzen (2006) a candidate's party affiliation is a costly public signal of her ideology in a unidimensional spectrum. In Snyder and Ting, the voters have preferences over ideology by an office holder. Parties are unitary players that locate their platforms so as to maximize the votes raised by their candidates for office. A candidate can join a party at a cost which is increasing in the distance between her ideology and the party's platform.[13] Party membership signals ideology, because a party attracts the members whose ideologies lie sufficiently close to its platform. In our model party membership is costless, yet it signals political preferences.

Other papers emphasize that partisanship by a candidate for office increases her commitment abilities. The reason given in Alesina and Spear (1988) is that a party has an infinite horizon, unlike its members. The reason given in Levy (2004) and in Morelli (2004) is intra-party ideological heterogeneity: in Levy, a candidate can commit to a policy that lies in Pareto set by her party members; in Morelli (2004), she can commit to a diverse set of policies that internalize ideologies represented by the party. Our paper models the formation of an ideologically heterogenous party and shows that its candidate has the incentives to pander to citizens whose ideologies are represented in her party.

3 Basic model

Consider a two-period model of representative democracy[14] in which the citizens are differentiated by *type* of preferences over public policy. A citizen's type θ is his private information. There are three types $\theta \in \{1, 2, 3\}$.[15] In a

[13] In Ashworth and Bueno de Mesquita, a party sets the cost of its membership. In Castanheira and Crutzen, it indicates a set of tolerated policies around some point in ideological spectrum.

[14] Timing of the game is summarized at the end of this section.

[15] It is straightforward to extend the model to an arbitrary number of types. Also, we believe that our insights remain robust if the model is extended to more than two periods.

period, type θ citizens either receive *pork* or not. It is indicated by variable[16]

$$p_\theta = \begin{cases} 1, \text{ if type } \theta \text{ citizens receive pork;} \\ 0, \text{ otherwise.} \end{cases}$$

Set $\mathcal{P} = \{(p_1, p_2, p_3) \mid p_\theta \in \{0,1\}\}$ is pork-barrel policy space. Pork to type θ citizens delivers them benefit b. It imposes cost $\frac{1+x_\theta \Delta}{2}$ on either type $\widetilde{\theta} \neq \theta$ citizens, where variable x_θ is drawn from distribution

$$x_\theta = \begin{cases} 1, \text{ with probability } \frac{1}{2}; \\ 0, \text{ with probability } \frac{1}{2}. \end{cases} \tag{1}$$

The draw is independent between the periods and among the types. We denote with

$$V_\theta(p) = p_\theta b - \frac{1}{2} \sum_{\widetilde{\theta} \neq \theta} p_{\widetilde{\theta}} \left(1 + x_{\widetilde{\theta}} \Delta\right) \tag{2}$$

type θ citizen payoff from pork-barrel policy $p = (p_1, p_2, p_3) \in \mathcal{P}$.[17] The set of inequalities

$$1 < b < 1 + \Delta \tag{3}$$

guarantees that pork to type θ citizens is efficient if and only if $x_\theta = 0$. Hence, parameter Δ measures the cost of inefficient pork-barrel policy.

A citizen is either a politician or a voter, depending on his information about period-specific cost of a pork. Indeed, any citizen knows that period-specific cost of a pork is drawn from distribution (1). However, only the politicians learn period-specific *state* $x = (x_1, x_2, x_3)$ after its realization. The mass of the politicians is arbitrary small. Any type is equally represented both among the politicians and among the voters: this information is public.

At the beginning of either period there is an election, in which two politicians compete for office by a simple majority-vote without abstention. The

[16] For notational convenience, here and everywhere below we omit a period indicator for period-specific variables, like p_θ.

[17] Note that two different type citizens would like to deliver no pork to each other. However, they both wish that no pork is given to yet different type citizens. As an illustration, imagine that the citizens hold the following preferences regarding the allocation/size of the state budget: citizens of one type would like to increase worker compensation; the second type citizens would like to increase family assistance; and the third type citizens would like to decrease public spending (they benefit from low income tax rate).

winner picks pork-barrel policy in the period.

Notation *We index a candidate for office in the first election with letter $k \in \{I, -I\}$: index I refers to the first-period incumbent, called by abuse of terminology "the incumbent"; index $-I$ refers to her rival. Variable θ^k denotes type by candidate k.*

The candidates for office in the first election are drawn at random. They simultaneously give public campaign promises. That is, candidate k describes policy $p^k(x, \theta^k) = (p_1^k(x, \theta^k), p_2^k(x, \theta^k), p_3^k(x, \theta^k))$ from set $\mathcal{P}$, which she intends to pick in state x if in office: she is free to break her word. Depending on campaign promises, the citizens update their beliefs about a candidate's type and pork-barrel policy if she wins the first election.

Definition 1 (electoral base) *Type θ citizen is in electoral base by candidate k if and only if* $\Pr\left(\theta^k = \theta \mid p^k(x, \theta^k),\ p^{-k}(x, \theta^{-k})\right) > 0$.

$$\mathcal{B}^k(\theta^k) = \left\{\theta \mid \Pr\left(\theta^k = \theta \mid p^k(x, \theta^k),\ p^{-k}(x, \theta^{-k})\right) > 0\right\} \tag{4}$$

is the set of types in electoral base by candidate k.

The incumbent picks policy $p(x, \theta^I) = (p_1(x, \theta^I), p_2(x, \theta^I), p_3(x, \theta^I))$ from set $\mathcal{P}$.[18] A politician observes vector $p(x, \theta^I)$. A voter sees only his type-specific component of the vector, that is, type θ voter sees $p_\theta(x, \theta^I)$.[19] The citizens update their beliefs about the incumbent's type. In the second election, the incumbent competes with the challenger who is drawn at random.

Timing of the game

Date 0.

The Nature draws the candidates for office. The candidates give campaign promises. The citizens update their beliefs about a candidate's type and pork-barrel policy if she is in office.

Date 1. The first election.

[18] The first-period policy is a function of three arguments: x, θ^I, and $p^I(x, \theta^I)$. For notational convenience, we write it as a function of x and θ^I.

[19] Section 6 describes situation in which the politicians signal their preferences between the incumbent and the challenger to the voters.

a. The Nature draws the first-period state. The politicians learn the state.

b. The incumbent picks pork-barrel policy. A politician learns it. A voter learns only whether or not he has received pork.[20] The citizens update their beliefs about the incumbent's type.

c. The Nature draws the challenger.

Date 2. The second election.

a. The Nature draws the second-period state.

b. The politician in office learns the state and picks pork-barrel policy.

Tie-breaking assumptions

(T1) *When a candidate would like to play either of two campaign advertising strategies, she randomizes between the strategies with probability* $\frac{1}{2}$.

(T2) *Being indifferent between the candidates, a citizen votes at random.*

(T3) *When the vote results in a tie, the election's outcome is random.*

(T4) *An office-holder receives arbitrary small perks from office.*[21]

4 Informative campaign promises

We solve the game using the concept of perfect Bayesian equilibrium. We focus on symmetric equilibria in which the players use pure strategies, unless specified otherwise by a tie-breaking assumption. "Babbling" equilibria in which a candidate's campaign promises do not depend on her type are described in Section A.1. This section describes the complementary set of equilibria. For concreteness, it focuses on equilibria in which candidate k promises at least as high expected payoff to type θ^k citizens as to anybody else, hence,

$$\Pr\left(\theta^k = \theta \mid EV_\theta\left(p^k(x,\theta^k)\right) < \max_{\widetilde{\theta}\neq\theta}\left\{EV_{\widetilde{\theta}}\left(p^k(x,\theta^k)\right)\right\}\right) = 0, \qquad (5)$$

where the expectations are taken at date 1. By abuse of terminology,[22]

[20] This assumption is made for simplicity and it is not key for the insights.

[21] Hence, when the cost of pandering to re-election is equal to the benefit from staying in office, the incumbent panders to re-election.

[22] Recall footnote 7.

Definition 2 (informative campaign promises) *campaign promises are informative if and only if citizen beliefs are described by equation (5).*

Because the incumbent picks pork-barrel policy that is the best for type θ^I citizens from two-period perspective, type θ citizen maximizes the probability of event $\theta^I = \theta$ (Lemma A.6): (i) at date 1, a voter votes for the candidate who is the most likely to be congruent with him (Lemma A.7); and (ii) at date 0, a candidate panders her campaign promises to voter beliefs, so as to maximize her electoral fortunes. Competition for office encourages her to promise the same expected payoff to the citizens of two types, and a lower expected payoff to the remaining citizens, so as to frame a minimal majority in her electoral base (Lemma A.8). By symmetry, the outcome of the first election is random.

In the second election, once again, a voter would like to elect a politician who is congruent with him, because the last period office-holder delivers pork only to her type citizens. A voter outside the incumbent's electoral base votes for the challenger, because he recalls the incumbent's electoral promises. A voter in the incumbent's electoral base gratefully votes for re-election if and only if he receives pork, because the incumbent's policy signals her type (Lemma A.9). Hence, the incumbent stays in office if and only if she gives pork to anybody in her electoral base.

On the one hand, the incumbent would like to stay in office, so as to control pork-barrel policy for one more term. On the other hand, however, she would like to give pork only to type θ^I citizens. When they are in her electoral base, the cost of re-election is the lowest. Because the incumbent plays an optimal campaign advertising strategy, her electoral base is type θ^I citizens and some other type citizens. Naturally, the incumbent gives pork to θ^I citizens regardless of its cost, that is,

$$p_{\theta^I}(x, \theta^I) = 1 \text{ for any } x. \tag{6}$$

She gives pork to type $\mathcal{B}^I(\theta^I) \backslash \left\{\theta^I\right\}$ citizens if and only if the associated cost that is paid by type θ^I citizens lies not higher than the expected benefit from re-election, which is equal to[23]

$$R = \frac{2b}{3} + \frac{1}{3} + \frac{\Delta}{6}. \tag{7}$$

When the cost of inefficient pork-barrel pandering Δ lies not higher than threshold $2b - \frac{1}{2}$, type $\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}$ citizens receive pork regardless of its cost, that is,

$$p_{\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}}(x, \theta^I) = 1 \text{ for any } x. \tag{8}$$

Otherwise, they receive pork if and only if it is efficient, that is,[24]

$$p_{\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}}(x, \theta^I) = 1 - x_{\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}}. \tag{9}$$

The citizens outside the incumbent's electoral base never receive pork, because is costly for the incumbent and it does not bring them on her side in the second election, that is,

$$p_{\{1,2,3\}\backslash\mathcal{B}^I(\theta^I)}(x, \theta^I) = 0 \text{ for any } x. \tag{10}$$

Proposition 1 (informative campaign promises) *In equilibrium with informative electoral promises set $\mathcal{B}^k(\theta^k)$ has two elements: θ^k and a random draw from set $\{1, 2, 3\} \setminus \left\{\theta^k\right\}$. Either candidate wins the first election with probability $\frac{1}{2}$. The first-period policy is described by set of equations (6), (10) and: either (8), when $\Delta \leqslant 2b - \frac{1}{2}$; or (9) otherwise. The incumbent is re-elected, unless both $\Delta > 2b - \frac{1}{2}$ and $x_{\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}} = 1$. The second-period office-holder gives pork only to her type citizens.*

Remark 1 *Given sets $B^k(\theta^k)$ and $B^{-k}(\theta^{-k})$, democratic outcomes in equilibrium with informative electoral promises are described by Proposition* 1 *unambiguously.*[25] *This remark applies to Propositions* 2-4*.*

[23]The incumbent's expected second-period payoff is equal to b if she stays in office; and to $\frac{b}{3} - \frac{2}{3}\left(\frac{1}{2} + \frac{\Delta}{4}\right)$ if the challenger wins the second election.

[24]Hence, in region $\Delta > 2b - \frac{1}{2}$, the incumbent internalizes the cost of pork to $\mathcal{B}^I(\theta^I)\backslash\left\{\theta^I\right\}$ type citizens: this is a welfare benefit from political agency.

[25]Recall footnote 7 and note that by assumption (T1) and Lemmas A.8 and A.10, set $B^k(\theta^k)$ has two possible realizations.

Proposition 1 implies that campaign promises are informative, as emphasized by Insight 1 in the Introduction. For example, let us restrict our attention to deterministic campaign promises. Then, a candidate promises pork in any state to her type citizens and to some other type citizens, no pork ever to the remaining citizens, and she keeps her word in most states if in office.

Welfare implication Note that campaign promises limit the incumbent's flexibility in pandering to re-election, which potentially decreases the efficiency of her policy: compare the first-period policy described by Proposition 1 and that described by Lemmas A.3 and A.4 in the Appendix. This negative effect should be attenuated by electoral sorting benefit if the model is extended so that the candidates are vertically differentiated in quality.

5 Political factionalization

This section shows that when the politicians communicate, they form a faction that influences elections and pork-barrel policy. Let the game begin with the following sequence of events:

$0.a$. The Nature randomly draws a politician called political *leader*.

$0.b$. A politician sends private message $m(\theta)$ to the leader: this message is either the politician's true type θ or some other type.

$0.c$. The leader offers faction membership to a subset of politicians (in particular, she can offer membership to nobody).

$0.d$. A receiver of the offer learns share s_θ of type θ politicians among the offer receivers, and she either accepts the offer or rejects it. The faction is formed if and only if the offer is accepted by any receiver. If it is formed, or else if any politician has been a leader once, the game continues with the sequence of events that are described in Section 3. Otherwise, it goes back to date $0.a$.

A candidate's faction membership and types that are represented in her faction are public information. For simplicity, we assume that in either election a factional candidate competes with an independent candidate. We assume, furthermore, that the incumbent can abstain from re-election.[26]

Additional tie-breaking assumptions

(T5) *When a political leader would like to make either of two offers, she randomizes between the offers with probability* $\frac{1}{2}$.

(T6) *A politician has an arbitrary weak preference to remain independent.*

We continue to consider equilibria with informative electoral promises. This section describes equilibria in which a politician's date $0.b$ message to a leader reveals the politician's type.[27]

Definition 3 *In equilibrium with informed political leadership*

$$\Pr\left(\theta \mid m(\theta)\right) = 1. \tag{11}$$

Let θ^L denote the first political leader's type. To maximize the probability of event $\theta^I = \theta^L$, she offers faction membership to all type θ^L politicians and a minimal majority of some other type politicians; this offer is accepted by all the receivers, and the faction is formed. Note that at date $0.b$, a politician does not mind revealing her type to the leader, because her beliefs about types by date $0.c$ offer receivers are diffused.

The factional candidate panders her campaign to citizens whose types are represented in her faction, so as not to reveal extra information about her type to that which is conveyed by her membership in the faction. She raises votes by these citizens and wins office, where she either (i) gives pork to all of them, so as to run for re-election and win it; or (ii) she picks her most preferred policy: then, the best for her is to abstain from re-election if her type is θ^L (the large majority in her faction), and runs for a tie-close race with the challenger otherwise.[28] The expected benefit from keeping campaign

[26] Recall footnote 10.

[27] Recall footnote 11.

[28] If the incumbent's type is $\mathcal{B}^I(\theta^I)\backslash\left\{\theta^L\right\}$, her policy reveals it, and she runs for re-election: type $\mathcal{B}^I(\theta^I)\backslash\left\{\theta^L\right\}$ voters vote for her; type $\{1,2,3\}\backslash\mathcal{B}^I(\theta^I)$ voters vote for the challenger; type θ^L cast their votes at random.

promises is equal to[29]

$$r = \frac{b}{2} + \frac{1}{4} + \frac{\Delta}{8}. \tag{12}$$

Therefore, the incumbent fulfills campaign promises in any state if and only if $\Delta \leqslant \frac{4b-2}{3}$; otherwise, her policy is described by equations (6) and (9).

Proposition 2 (political factionalization) *In equilibrium with informative electoral promises and informed political leadership all θ^L type politicians and a minimal majority of some other type politicians unify in political faction. Electoral base by its candidate are the citizens whose types are represented in the faction. She wins the first election by their votes. The first-period policy is described by equations (6), (10) and: either (8) when $\Delta \leqslant \frac{4b-2}{3}$, or (9) when $\Delta > \frac{4b-2}{3}$. The re-election probability is equal to 1, unless both $\Delta > \frac{4b-2}{3}$ and $x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 1$: then, it is equal to 0 if $\theta^I = \theta^L$;[30] and to $\frac{1}{2}$ otherwise. The second-period office-holder gives pork only to her type citizens.*

Insight 2 in the Introduction follows from Proposition 2.

6 Consequences of political factionalization

Political factionalization biases pork-barrel policy towards citizens whose types are represented in the faction. More importantly, it erodes re-election pressures potentially decreasing the efficiency of the incumbent's policy.

To emphasize this effect we extend the game so as to increase voter information in the second election: between date 1.c and date 2 a politician

[29] When the incumbent picks her most preferred policy, the winner of the second election has type θ^I with probability $\frac{2}{3}$: if $\theta^I = \theta^L$, the second election is an open-seat race whose winner is in the incumbent's faction, hence, her type is θ^L with probability $\frac{2}{3}$. If $\theta^I = \mathcal{B}^I(\theta^I)\setminus\left\{\theta^L\right\}$, the incumbent wins re-electionion with probability $\frac{1}{2}$, and with probability $\frac{1}{2}$ she looses to the challenger whose type is θ^I with probability almost $\frac{1}{3}$.

[30] The incumbent abstains from re-election to guarantee that the second election's winner is in her faction.

votes either "for" or "against" the incumbent's *nomination* for re-election. The nomination rule is a simple majority. Nomination indicator

$$\eta = \begin{cases} 1, \text{ if the incumbent is nominated for re-election;} \\ 0, \text{ otherwise} \end{cases}$$

is public information.

We compare the most informative and the most efficient equilibria in two games: with- and without political factionalization. Let us first give considerations that are common to either game.

1. In our model, an equilibrium's efficiency is measured by the efficiency of the first-period policy in this equilibrium. Because the citizens outside the incumbent's electoral base never receive pork, the first-period policy cannot be more efficient than the one that lies on Pareto frontier by citizens in the incumbent's electoral base. Lemma A.12 shows that this benchmark is described by equation (10), and either set of equations:

$$p_\theta(x, \theta^I) = 1 \text{ for any } x, \tag{13}$$

when $\Delta < 2b - 1$; or

$$p_\theta(x, \theta^I) = 1 \text{ if and only if } x_\theta = 0 \tag{14}$$

when $\Delta \geqslant 2b - 1$, where θ takes values in set $B^I(\theta^I)$.

2. Equilibria with informative electoral promises can be divided in two sets: (i) those in which nomination for re-election is uninformative, that is, a politician's nomination strategy does not depend on her preference between the incumbent and the challenger; and (ii) the complementary set. Democratic outcomes in equilibrium from the set (i) are already described by Propositions 1 and 2. It remains to describe equilibria in set (ii).[31]

For concreteness,[32] let a politician vote for the incumbent's nomination if and only if she is for re-election, that is, if and only if

$$\Pr\left(\theta^I = \theta \mid p(x, \theta^I),\ p^I(x, \theta^I), x\right) > \frac{1}{3}. \tag{15}$$

[31] We will see that the most efficient equilibria lie in the set (ii).

[32] In mirror image equilibria a politician votes for the incumbent's nomination if and only if she is against re-election.

Because nomination rule is a simple majority, and only a minimal majority of politicians are in the incumbent's electoral base, nomination for re-election signals that all of them stayed on the incumbent's board. Instead, nomination failure signals that the incumbent's policy has revealed her type to the politicians. Hence, a voter in the incumbent's electoral base votes for re-election, unless both he receives no pork and the incumbent is not nominated (Lemma A.14). Eventually, he votes in the same way as a politician of his type.[33]

The most efficient equilibrium without political factionalization Consider the game without political factionalization. The expected benefit from re-election is described by equation (7). In region $\Delta \geqslant 2b+1$, it is sufficiently high to induce the incumbent to pick policy

$$p_{\mathcal{B}^I(\theta^I)\setminus\left\{\theta^I\right\}}(x,\theta^I)=1,\ p_{\theta^I}(x,\theta^I)=p_{\{1,2,3\}\setminus\left\{\mathcal{B}^I(\theta^I)\right\}}(x,\theta^I)=0 \tag{16}$$

in state $x_{\theta^I}=1$, $x_{\mathcal{B}^I(\theta^I)\setminus\left\{\theta^I\right\}}=0$. Therefore, the first-period policy in the most efficient equilibrium with informative electoral promises is described by equations (10) and (14). When $\Delta<2b+1$, re-election pressures are too weak to encourage the incumbent giving pork to $\mathcal{B}^I(\theta^I)\setminus\left\{\theta^I\right\}$ type citizens and not ever to θ^I type citizens. Therefore, the incumbent's policy in the most efficient equilibrium with informative electoral promises is egalitarian with respect to citizens in her electoral base: (i) in region $2b-\frac{1}{2}<\Delta<2b+1$, they all receive pork if and only if it is efficient, that is,

$$p_\theta(x,\theta^I)=1 \text{ if and only if } x_\theta=0 \text{ for either } \theta\in\mathcal{B}^I(\theta^I); \tag{17}$$

(ii) in region $2b-1<\Delta\leqslant 2b-\frac{1}{2}$ they all receive pork, unless it is efficient to give no pork to any of them, that is,

$$p_\theta(x,\theta^I)=0 \text{ if and only if } x_\theta=1 \text{ for any } \theta \text{ in set } \mathcal{B}^I(\theta^I); \tag{18}$$

(iii) in region $\Delta\leqslant 2b-1$ they all receive pork in any state (recall Lemma A.12 and Proposition 1).

[33] Because nomination is influential, a politician does not deviate from nomination strategy described by inequality (15).

Proposition 3 *In the game without political factionalization the first-period policy in the most efficient equilibrium with informative electoral promises is described by equation (10) and one of the following equations: (14) when* $\Delta \geqslant 2b+1$; *(17) when* $2b-\frac{1}{2} < \Delta < 2b+1$; *(18) when* $2b-1 < \Delta \leqslant 2b-\frac{1}{2}$; *(13) when* $\Delta \leqslant 2b-1$. *The incumbent is re-elected. In the second period, only type* θ^I *citizens receive pork in any state.*

Comparison of Propositions 1 and 3 shows that nomination for re-election increases the efficiency of the incumbent's policy the more, the higher the cost of inefficient pork-barrel pandering.

The most efficient equilibrium with political factionalization Let us now describe the most efficient equilibrium with informative electoral promises and informed political leadership in the game with political factionalization. A political faction is such as described by Proposition 2. It decreases the incumbent's expected benefit from keeping campaign promises from the one given by equation (7) to that given by equation (12). Proceeding similarly to the previous subsection we find that

Proposition 4 *in the game with political factionalization the first-period policy in the most efficient equilibrium with informative electoral promises is described by set of equations (10) and: (14) when* $\Delta \geqslant 4b+2$; *(17) when* $4b-2 \leqslant \Delta < 4b+2$, *(6) and (9) when* $\frac{4b-2}{3} < \Delta < 4b-2$; *(13) when* $\Delta \leqslant \frac{4b-2}{3}$. *The re-election probability is equal to* 1, *unless both* $\frac{4b-2}{3} \leqslant \Delta < 4b-2$ *and* $x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 1$*: then, it is equal to* 0 *if* $\theta^I = \theta^L$*; and to* $\frac{1}{2}$ *otherwise. The second-period office-holder gives pork only to her type citizens.*

Welfare implication Political factionalization dilutes re-election pressures, which potentially decreases efficiency of the incumbent's policy: compare the first-period policy described by Proposition 3 and that described by Proposition 4. This certainly does not imply that political parties have negative welfare consequences. In general, welfare effect of weaker re-election pressures is ambiguous (Maskin and Tirole, 2004). Moreover, party organizations potentially improve democratic process (Caillaud and Tirole, 2002; Castanheira, Crutzen, and Sahuguet, 2005).[34]

7 Conclusion

This paper builds a political agency model with nonbinding campaign promises. It describes how pork-barrel policy depends on campaigning. The main insight is that a candidate's campaign promises signal pork-barrel policy that she intends to implement. This insight is consistent with campaign promises found to be fulfilled most of the time.

Furthermore, we show that when political representatives communicate, they form a political faction (or party). Looking at consequences for elections and policies, we find that a candidate's faction membership both gives her the incentives to pander campaign promises (hence, pork-barrel policy if in office) to citizens whose political preferences are represented in the faction, and it brings these citizens on her board in elections. This gives a possible explanation for voter- and legislator loyalty to political parties.

We hope that future research will analyse our approach to give a better picture of the relationship between electoral strategies and public policy.

References

[1] Alesina A. and S. Spear (1988), "An Overlapping Generations Model of Electoral Competition," *Journal of Public Economics*, 37:359-379.

[2] Aragonès E., Palfrey T. R., and A. Postlewaite (2006), "Political Reputations and electoral promises," forthcoming: *Journal of European Economic Association*.

[34] Caillaud and Tirole emphasize that parties are organized so as to: (i) on the one hand, encourage the candidates to exert effort in platform design; (ii) on the other hand, discourage them from challenging high quality platforms by their party members.

[3] Ashworth S. and E. Bueno de Mesquita (2006), "Informative Party Labels with Institutional and Electoral Variation," forthcoming: *Journal of Theoretical Politics*.

[4] Austen-Smith D. and J. Banks (1989) "Electoral Accountability and Incumbency," in *Models of Strategic Choice in Politics*, Peter Ordeshook (eds.), Ann Arbor: University of Michigan Press.

[5] Budge I., Robertson D. and D. Hearl (1987), *Ideology, Strategy and Party Change: Spatial Analysis of Post-war Election Programs in 19 Democracies*, Cambridge University Press.

[6] Caillaud B. and J. Tirole (2002), "Parties As Political Intermediaries," *The Quarterly Journal of Economics*, 117(4):1453-1489.

[7] Callander, S. and S. Wilkie (2007), "Lies, damned lies, and political campaigns," *Games and Economic Behavior*, 60:262-286.

[8] Castanheira M. and B. Crutzen (2006), "Districts, Party Discipline, and Polarization" *mimeo*, ECARES.

[9] Castanheira M., Crutzen B. and N. Sahuguet (2005), "Party Governance and Political Competition with an Application to the American Direct Primacy," *CEPR Discussion Paper* No. 4890.

[10] Gershtenson J. (2006), "Election Cycles and Partisanship in the U.S. House of Representatives, 1857-2000," *Politics and Policy*, 34(4):690-705.

[11] Harrington, J. E. (1993), "The Impact of Reelection Pressures on the Fulfillment of Campaign Promises," *Games and Economic Behavior*, 5:71-97.

[12] Levy, G. (2004) "A model of political parties," *Journal of Economic Theory*, 115(2):250-277.

[13] Maskin E. and J. Tirole (2001), "The Politician and The Judge: Accountability in Government," *mimeo, IDEI.*

[14] Maskin E. and J. Tirole (2004), "The Politician and The Judge: Accountability in Government," *The American Economic Review*,

94(4):1034-1054.

[15] Morelli M. (2004), "Party Formation and Policy Outcomes under Different Electoral Systems," *Review of Economic Studies*, 71:829-853.

[16] Petry F. (1995), "The Party Agenda Model: Election Programmes and Government Spending in Canada", *Canadian Journal of Political Science*, 28(1):51-84.

[17] Royed T. J. and S. A. Borrelli (1997), "Political Parties and Public Policies: Social Welfare Policy from Carter to Bush," *Polity,* 29(4):539-563.

[18] Snyder, J. M. and M. Ting (2002), "An Informational Rationale for Political Parties," *American Journal of Political Science* 46(1):90-110.

[19] Sundquist J. L. (1983), *Dynamics of the Party System: Alignment and Realignment of Political Parties in the United States*, Brookings Institution, Washington, DC.

A Appendix

A.1 "Babbling" equilibria

Equation (2) implies

$$\Pr\left(\theta^I = \theta \mid p^I(x,\theta^I),\ p_\theta(x,\theta^I) = 1\right) \geqslant \Pr\left(\theta^I = \theta \mid p^I(x,\theta^I),\ p_\theta(x,\theta^I) = 0\right). \tag{19}$$

There are two possibilities: either inequality

$$\Pr\left(\theta^I = \theta \mid p^I(x,\theta^I),\ p_\theta(x,\theta^I) = 1\right) \geqslant \frac{1}{3} \tag{20}$$

is met for any $p^I(x,\theta^I)$, or it is violated for some $p^I(x,\theta^I)$. This section describes equilibria in which inequality (20) is met for any $p^I(x,\theta^I)$.

Lemma A.1 (pork-barrel policy without re-election concerns) *The last period office-holder gives pork only to her type citizens.*

Proof. Recall equation (2). ■

Lemma A.2 (grateful vote) *Type θ citizens vote for re-election if and only if $p_\theta(x, \theta^I) = 1$.*

Proof. By Lemma A.1, at date 2 type θ citizens vote for the candidate whose type is the most likely to be θ: by symmetry, the citizens of the same type vote in the same way. By inequalities (20) and (19), either (i) the vote is described by Lemma A.2, or (ii) it does not depend on $p(x, \theta^I)$. However, if the vote does not depend on $p(x, \theta^I)$, the incumbent delivers pork only to type θ^I citizens. As the incumbent's policy reveals her type, vote (ii) is not rational. Hence, in equilibrium the vote is such as described by Lemma A.2.

■

By Lemma A.2 and equation (2),

Lemma A.3 (favoritism) $p_{\theta^I}(x, \theta^I) = 1$ *for any* x.

Lemma A.4 (pandering to re-election) *When* $\Delta \leqslant 2b - \frac{1}{2}$ *or else when* $\min_{\theta \neq \theta^I} x_\theta = 0$, $p_{\widehat{\theta}}(x, \theta^I) = 1$ *and* $p_{\{1,2,3\} \setminus \{\widehat{\theta}, \theta^I\}}(x, \theta^I) = 0$, *where* $\widehat{\theta}$ *is a random draw from* $\arg\min_{\theta \neq \theta^I} x_\theta$. *Otherwise,* $p_\theta(x, \theta^I) = 0$ *for either* $\theta \neq \theta^I$.

Proof. By Lemma A.2, the incumbent stays in office if and only if

$$\left| \left\{ \theta \mid p_\theta(x, \theta^I) = 1 \right\} \right| = 2.$$

By Lemma A.3, the cost of re-election is equal to $\frac{1}{2}\left(1 + \Delta \min_{\theta \neq \theta^I} x_\theta\right)$. The incumbent panders to re-election if and only if[35]

$$\frac{1}{2}\left(1 + \Delta \min_{\theta \neq \theta^I} x_\theta\right) \leqslant R, \tag{21}$$

where R is given by equation (7). In region $\Delta \leqslant 2b - \frac{1}{2}$, $\frac{1+\Delta}{2} \leqslant R$. Hence, inequality (21) is fulfilled in any state x. Instead, in region $\Delta > 2b - \frac{1}{2}$, $\frac{1}{2} \leqslant R < \frac{1+\Delta}{2}$. Hence, inequality (21) is met if and only if $\min_{\theta \neq \theta^I} x_\theta = 0$. ■

[35] Inequality (21) is not strict due to tie-breaking assumption (T4).

Lemma A.5 (diffuse promises and uninformed vote) *vector $p^k(x,\theta^k)$ does not depend on θ^k. At date 1 a citizen votes at random.*

Proof. By Lemmas A.1, A.3 and A.4, a citizen is indifferent between the candidates for office at date 1. Hence, he votes at random: recall assumption (T2). As the vote does not depend on $p^k(x,\theta^k)$, candidate k is indifferent among campaign strategies. However, we want inequality (20) to be met for any $p^I(x,\theta^I)$. It is true if and only if $p^k(x,\theta^k)$ does not depend on θ^k. ■

A.2 Proof of proposition 1

Lemma A.6 (date 1 objectives) $\arg\max_{\theta^I} E\left(V_\theta\left(p(x,\theta^I)\right) \mid \theta^I\right) = \theta$.[36]

Proof. Let

$$\bar{c} = \frac{1}{2} + \frac{\Delta}{4} \tag{22}$$

denote an average cost paid by one type of citizens for pork to some pther type of citizens.

The incumbent always can give pork only to type θ^I citizens. This policy generates payoff b to type θ citizens and payoff at most $-\frac{1}{2}$ to either type $\theta \neq \theta^I$ citizens in the first period. Because the probability of event that the challenger's type is θ^I is equal to $\frac{1}{3}$, the expected second-period payoff by type θ^I citizens lies at least as high as threshold $\frac{1}{3}b - \frac{2}{3}\bar{c}$, while that by either type $\theta \neq \theta^I$ citizens lies at most as high as this threshold. By revealed preference argument,

$$EV_{\theta^I}\left(p(x,\theta^I)\right) \geqslant b + \frac{1}{3}b - \frac{2}{3}\bar{c}; \tag{23}$$

$$EV_{\theta\neq\theta^I}\left(p(x,\theta^I)\right) \leqslant -\frac{1}{2} + \frac{1}{3}b - \frac{2}{3}\bar{c}. \tag{24}$$

The right-hand-side of equation (24) lies below that of equation (23). ■

Lemma A.7 (date 1 vote) *At date 1 type θ citizens vote for: (i) candidate k, either when $\theta \in \mathcal{B}^k(\theta^k) \backslash \mathcal{B}^{-k}(\theta^{-k})$, or else when both $\theta \in \mathcal{B}^k(\theta^k) \cap \mathcal{B}^{-k}(\theta^{-k})$*

[36] Here and everywhere below the expectations are taken at date 1.

and $\left|\mathcal{B}^k(\theta^k)\right| < \left|\mathcal{B}^{-k}(\theta^{-k})\right|$; *(ii) either candidate with probability* $\frac{1}{2}$*, when both* $\theta \in \mathcal{B}^k(\theta^k) \cap \mathcal{B}^{-k}(\theta^{-k})$ *and* $\left|\mathcal{B}^k(\theta^k)\right| = \left|\mathcal{B}^{-k}(\theta^{-k})\right|$; *(iii) candidate* $-k$ *otherwise.*[37]

Proof. Follows from Lemma A.6, equations (4)-(5), and assumption (T2). ■

Lemma A.8 (cardinality of a candidate's electoral base) $\left|\mathcal{B}^k(\theta^k)\right| = 2$.

Proof. During the electoral campaign, candidate k pursues lexicographic objectives. It is the most important for her to win the first election (Lemma A.6). Her secondary objective is to maximize $\left|\mathcal{B}^k(\theta^k)\right|$ so as to minimize the cost of re-election if in office. The reminder of the proof is divided in four steps.

Step 1 proves that it is always feasible for candidate k to have $\left|\mathcal{B}^k(\theta^k)\right| = 2$. It suffices to promise the same expected payoff to citizens of two types: θ and $\widetilde{\theta}$, and a lower payoff to type $\{1,2,3\} \setminus \left\{\theta, \widetilde{\theta}\right\}$ citizens. By equations (4)-(5),

$$\Pr\left(\theta^k = \theta \mid EV_\theta\left(p^k(x,\theta^k)\right) = EV_{\widetilde{\theta}}\left(p^k(x,\theta^k)\right) > EV_{\{1,2,3\}\setminus\left\{\theta,\widetilde{\theta}\right\}}\left(p^k(x,\theta^k)\right)\right) =$$

$$= \Pr\left(\theta^k = \widetilde{\theta} \mid EV_\theta\left(p^k(x,\theta^k)\right) = EV_{\widetilde{\theta}}\left(p^k(x,\theta^k)\right) > EV_{\{1,2,3\}\setminus\left\{\theta,\widetilde{\theta}\right\}}\left(p^k(x,\theta^k)\right)\right) = \frac{1}{2}.$$

Step 2 proves that in equilibrium, $\left|\mathcal{B}^k(\theta^k)\right| \neq 1$.

Suppose that $\left|\mathcal{B}^k(\theta^k)\right| = 1$. The best for candidate $-k$ is to promise the same expected payoff to anybody, so that no information about her type is revealed, $\mathcal{B}^{-k}(\theta^{-k}) = \{1,2,3\}$, and she is in office. The best response by candidate k is to change her campaigning strategy to such that $\left|\mathcal{B}^k(\theta^k)\right| = 2$ in order to win the election: by step 1 this is feasible.

Step 3 proves that in equilibrium, $\left|\mathcal{B}^k(\theta^k)\right| \neq 3$.

Suppose that $\mathcal{B}^k(\theta^k) = \{1,2,3\}$. The best for candidate $-k$ is to give such promises that $\left|\mathcal{B}^{-k}(\theta^{-k})\right| = 2$, so as to win the election. The best response by candidate k to change her campaigning strategy to such that $\left|\mathcal{B}^k(\theta^k)\right| = 2$, so as to increase her electoral fortunes up to $\frac{1}{2}$.

---

[37] We use standard notation $\left|\mathcal{B}^k(\theta^k)\right|$ for cardinality of set $\mathcal{B}^k(\theta^k)$.

Step 4 proves that in equilibrium, $\left|\mathcal{B}^k(\theta^k)\right| = 2$.

Suppose that $\left|\mathcal{B}^k(\theta^k)\right| = 2$. It is the best for candidate $-k$ to give such promises that $\left|\mathcal{B}^{-k}(\theta^{-k})\right| = 2$, so as to win the election with probability $\frac{1}{2}$: no other campaign strategy gives her a chance to be elected (recall steps 2 and 3). Trivially, it is the best for candidate k to keep giving such promises that $\left|\mathcal{B}^k(\theta^k)\right| = 2$. ■

Lemma A.9 (date 2 vote) *Type θ voters vote for re-election if and only if both $\theta \in \mathcal{B}^I(\theta^I)$ and $p_\theta(x, \theta^I) = 1$.*

Proof. Trivially, Lemma A.1 continues to hold. Therefore, at date 2, type θ voters would like to elect the candidate whose type is the most likely to be θ. The challenger is any type with probability $\frac{1}{3}$. When $\theta \notin \mathcal{B}^I(\theta^I)$, type θ voters vote for the challenger, because by equation (5),

$$\Pr\left(\theta^I = \theta \mid p^I(x, \theta^I),\ p_\theta(x, \theta^I)\right) = 0 \text{ for either } p_\theta(x, \theta^I).$$

When $\theta \in \mathcal{B}^I(\theta^I)$, type θ voters vote for the incumbent if and only if $p_\theta(x, \theta^I) = 1$ (see the proof of Lemma A.2). ■

Lemma A.10 (informative campaign promises) $\theta^k \in \mathcal{B}^k(\theta^k)$.

Proof. By Lemma A.9, the incumbent is re-elected if and only if

$$\left|\left\{\theta \in \mathcal{B}^I(\theta^I) \mid p_\theta(x, \theta^I) = 1\right\}\right| = 2. \tag{25}$$

By Lemma A.8, the cost of pork-barrel pandering to re-election is equal to $\sum\limits_{\theta \in \mathcal{B}^I(\theta^I) \setminus \left\{\theta^I\right\}} \frac{1+\Delta x_\theta}{2}$. Because candidate k would like to minimize this cost if in office, vector $p^k(x, \theta^k)$ is such that $\theta^k \in \mathcal{B}^k(\theta^k)$. ■

Lemma A.11 (the incumbent's policy) *The first-period policy is such as described by Proposition* 1.

Proof. By Lemmas A.8, A.10, and assumption (T1), set $\mathcal{B}^I(\theta^I)$ has two elements: θ^I and a random draw from set $\{1, 2, 3\} \setminus \left\{\theta^I\right\}$. Equation (6) is trivial. Equation (10) is met because the vote by type $\{1, 2, 3\} \setminus \mathcal{B}^I(\theta^I)$ voters does not depend on $p_{\{1,2,3\} \setminus \mathcal{B}^I(\theta^I)}(x, \theta^I)$, and $\frac{\partial V_{\theta^I}\left(p(x, \theta^I)\right)}{\partial p_{\{1,2,3\} \setminus \mathcal{B}^I(\theta^I)}(x)} < 0$.

It remains to prove equations (8) and (9). The incumbent stays in office if and only if equation (25) is met. By Lemmas A.8 and A.10, $p_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}}(x,\theta^I) = 1$ if and only if

$$\frac{1+\Delta x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}}}{2} \leqslant R, \tag{26}$$

where R is given by equation (7). In region $\Delta \leqslant 2b-\frac{1}{2}$, inequality (26) is met in any state x. In region $\Delta > 2b-\frac{1}{2}$, it is met if and only if $x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 0$.
■

It is straightforward to see that there is a consistency among the strategies described by Lemma A.1 and Lemmas A.7 - A.11.

A.3 Proof of proposition 2

Step 1 describes an "informed" leader's stationary offer that is unilaterally accepted.[38] We denote this offer with triplet $s = (s_{\theta^l}, s_{\widehat{\theta}}, s_{\{1,2,3\}\setminus\{\theta^l,\widehat{\theta}\}})$, where θ^l is the leader's type and $\widehat{\theta} = \underset{\theta\neq\theta^l}{\arg\max} s_\theta$.

Let P_θ be the probability of event $\theta^I = \theta$ when: strategy s is played, campaign advertising is optimal, and the vote is rational. Trivially,

$$\sum_\theta P_\theta = 1. \tag{27}$$

By Lemma A.6, type θ politician maximizes probability P_θ. Because the leader can make offer to nobody,

$$P_{\theta^l} > \frac{1}{3}P_{\theta^l} + \sum_{\theta\neq\theta^l}\frac{1}{3}P_\theta: \tag{28}$$

the right-hand-side of inequality (28) is the leader's expected payoff if the game goes back to date $0.a$. The offer is accepted by any receiver if and only if,

$$P_\theta > \frac{1}{3}P_{\theta^l} + \sum_{\theta\neq\theta^l}\frac{1}{3}P_\theta \text{ for either } \theta\neq\theta^l \text{ such that } s_\theta > 0: \tag{29}$$

The right-hand-side of inequality in set (29) is type θ politician's expected payoff if she rejects the offer (hence, no faction is formed), and the game

[38] Recall that an offer is meaningful if and only if it is accepted by any receiver.

goes back to date $0.a$. Inequality (28) and inequalities (29) are strict by tie-breaking assumption (T6).

(a) First of all, note that there are such offers s that inequalities (28) and (29) are met: for example, $s_{\theta^l} = s_{\widehat{\theta}} = \frac{1}{2}$; $s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} = 0$.

(b) Let us prove by contradiction that

$$s_{\theta^l} > 0. \tag{30}$$

Suppose that $s_{\theta^l} = 0$. Point (a) implies that $s_\theta > 0$ for some θ. Hence, $s_{\widehat{\theta}} > 0$. However, neither (i) $s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} = 0$ nor (ii) $s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} > 0$ is possible.

(i) Suppose that $s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} = 0$. Because the voters hold rational beliefs about strategy s, the independent candidate builds electoral base $\{1,2,3\} \setminus \left\{\widehat{\theta}\right\}$ and wins the first election. Hence, $P_{\widehat{\theta}} = 0$ and inequality (29) is not met for $\theta = \widehat{\theta}$.

(ii) Suppose that $s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} > 0$. Adding up inequalities (29) for $\theta \neq \theta^l$ implies

$$2P_{\theta^l} < \sum_{\theta \neq \theta^l} P_\theta. \tag{31}$$

At the same time, inequality (28) implies

$$2P_{\theta^l} > \sum_{\theta \neq \theta^l} P_\theta. \tag{32}$$

(c) Let us prove by contradiction that

$$\min_{\theta \neq \theta^l} s_\theta = 0. \tag{33}$$

Suppose that $s_\theta > 0$ for either $\theta \neq \theta^l$. Adding P_{θ^l} to either side of inequality (31) we find

$$\sum_\theta P_\theta > 3P_{\theta^l}. \tag{34}$$

The left-hand-side of inequality (34) is equal to 1. Hence, $P_{\theta^l} < \frac{1}{3}$ and $\sum_{\theta \neq \theta^l} P_\theta > \frac{2}{3}$. This, however, contradicts to inequality (32).

(d) Let us prove by contradiction that

$$\max_{\theta \neq \theta^l} s_\theta > 0. \tag{35}$$

Suppose that $s_\theta = 0$ for either $\theta \neq \theta^l$. Then, the independent candidate builds electoral base $\{1,2,3\} \setminus \left\{\widehat{\theta}\right\}$ and wins the first election. Hence, $P_{\theta^l} = 0$ and inequality (28) is not met.

(e) Let us show that

$$s_{\theta^l} = 1 \text{ and } s_{\widehat{\theta}} = \frac{1}{2} + \varepsilon, \text{ where} \tag{36}$$

ε is an arbitrary small value and $\widehat{\theta}$ is a random draw from set $\{1,2,3\} \setminus \{\theta^l\}$. Points (c) and (d) imply:

$$s_{\widehat{\theta}} > 0,\ s_{\{1,2,3\} \setminus \{\theta^l,\ \widehat{\theta}\}} = 0. \tag{37}$$

By equation (27) and inequality (29) written for $\theta = \widehat{\theta}$

$$P_{\widehat{\theta}} > \frac{1}{3}. \tag{38}$$

Because a candidate's type is her private information, any faction member has the same electoral fortunes if she is drawn to run for office. Because the draw is random, probability P_θ is increasing in s_θ for either θ from set $\left\{\theta^l, \widehat{\theta}\right\}$. Hence, the leader maximizes s_{θ^l}. Inequality (38) tells that she is constrained by inequality[39]

$$s_{\widehat{\theta}} > \frac{1}{2} s_{\theta^l}. \tag{39}$$

Hence, *"informed" leader's stationary offer is described by set of equations (36).*[40]

Step 2 shows that when leader beliefs are described by equation (11), and a politician anticipates date $0.c$ offer to be such as described in step 1, she sends a message revealing her type at date $0.b$. Indeed, type θ politician has

[39] Trivially, factional candidate wins the first election with probability at most 1.

[40] $\widehat{\theta}$ is defined by assumption (T5).

no reason to deviate from informative strategy $m(\theta)$, because the probability of the event that θ is in set $\left\{\theta^{l},\, \widehat{\theta}\right\}$ is equal to $\frac{2}{3}$ regardless of $m(\theta)$.
Steps 1 and 2 imply that *the leader who is drawn the first forms political faction whose composition is described by set of equations (36).*

Step 3 describes electoral promises and pork-barrel policy. By Lemma A.10, electoral base by the factional candidate for office is $\left\{\theta^{L},\, \widehat{\theta}\right\}$. Set of equations (36) tells that she wins the first election by raising the votes of type θ^{L}- and type $\widehat{\theta}$ citizens.

If at date $1.b$ she gives pork to anybody in her electoral base, she runs for re-election and wins it. Suppose that she picks her most preferred policy. If she runs for re-election, she looses the race to the challenger with probability that is equal either to 1 if $\theta^{I} = \theta^{L}$; or $\frac{1}{2}$ if $\theta^{I} = \widehat{\theta}$. If she abstains from re-election, the second election is an open-seat whose winner is a member of her faction. Hence, she runs for re-election if and only if her type is $\widehat{\theta}$.

The expected benefit from campaign promise fulfillment is given by equation (12).[41] The first-period policy is such as described by the proposition, because[42]

$$\frac{1+\Delta}{2} \leqslant r \text{ if and only if } \Delta \leqslant \frac{4b-2}{3}.$$

A.4 Proof of proposition 3

Lemmas A.1, A.6, A.7(i), A.8 and A.10 continue to hold.

Lemma A.12 (the most efficient policy benchmark) *In region $\Delta < 2b-1$, the first-period policy is at most as efficient as that described by equations (10) and (13). In region $\Delta \geqslant 2b-1$, the first-period policy is at most as efficient as that described by equations (10) and (14).*

Proof. In our model an equilibrium's efficiency is measured by efficiency of the first period policy in this equilibrium (recall Lemma A.1). Equation (10) is met in any equilibrium with informative electoral promises. Hence,

$$\sum_{\theta \in \{1,2,3\}} V_{\theta}(p(x,\theta^{I})) = \sum_{\theta \in \mathcal{B}^{I}(\theta^{I})} V_{\theta}(p(x,\theta^{I})). \tag{40}$$

[41] Recall footnote 29.
[42] Recall footnote 38.

The right-hand-side of equation (40) is maximized by vector $p(x, \theta^I)$ that is described by the Lemma. ■

By Lemma A.12 and Proposition 1,

Lemma A.13 *in region* $\Delta < 2b - 1$, *pork-barrel policy in the most efficient equilibrium with informative electoral promises is described by equations (10) and (13).*

Let us consider region $\Delta \geqslant 2b - 1$.

Lemma A.14 (persuasive nomination) *Type* θ *voters vote for the incumbent if and only if both* $\theta \in \mathcal{B}^I(\theta^I)$ *and* $\max\left\{p_\theta(x, \theta^I), \eta\right\} = 1$.

Proof. By Lemmas A.8, A.10, and assumption (T1), set $\mathcal{B}^I(\theta^I)$ has two elements: θ^I and a random draw from set $\{1, 2, 3\} \setminus \left\{\theta^I\right\}$.

Step 1. Type $\{1, 2, 3\} \setminus \mathcal{B}^I(\theta^I)$ voters vote for the challenger, because by equation (4), $\Pr\left(\theta^I = \{1, 2, 3\} \setminus \mathcal{B}^I(\theta^I) \mid p^I(x, \theta^I),\ p(x, \theta^I), x\right) = 0$.

Step 2. When $\eta = 1$, the voters of either type in set $\mathcal{B}^I(\theta^I)$ vote for the incumbent: recall Lemma A.8 and the fact that a politician in the incumbent's electoral base votes for re-election if and only if inequality (15) is met.

Step 3. When $\eta = 0$, $\Pr\left(\theta^I = \theta \mid p(x, \theta^I)\right) = 0$ for some θ in $\mathcal{B}^I(\theta^I)$. Hence,[43]

$$\Pr\left(\theta^I = \theta \mid \eta = 0,\ \theta \in \mathcal{B}^I(\theta^I),\ p_\theta(x, \theta^I) = 0\right) = 0,$$
$$\Pr\left(\theta^I = \theta \mid \eta = 0,\ \theta \in \mathcal{B}^I(\theta^I),\ p_\theta(x, \theta^I) = 1\right) = 1.$$

■

By Lemma A.14, the incumbent stays in office if and only if inequality (15) is met for either $\theta \in B^I(\theta^I)$. Note that a politician is eager to play nomination strategy that is described by inequality (15).

Lemma A.15 *Let*

$$\widetilde{\mathcal{P}} = \left\{\widetilde{p}(x, \theta^I) \mid V_\theta(\widetilde{p}(x, \theta^I)) + R \geqslant b \text{ for either } \theta \in \mathcal{B}^I(\theta^I)\right\}. \quad (41)$$

In the most efficient equilibrium with informative electoral promises

$$p(x, \theta^I) = \underset{\widetilde{p}(x, \theta^I) \in \widetilde{\mathcal{P}}}{\arg\max} V_{\theta^I}(\widetilde{p}(x, \theta^I)) \quad (42)$$

[43] Recall proof of Lemma A.2.

if set $\widetilde{\mathcal{P}}$ is not empty; otherwise,

$$\text{in any state } x,\ p_{\theta^I}(x,\theta^I) = 1 \text{ and } p_\theta(x,\theta^I) = 0 \text{ for either } \theta \neq \theta^I. \tag{43}$$

Proof. If $V_\theta(p(x,\theta^I)) + R < b$ for some $\theta \in \mathcal{B}^I(\theta^I)$,

$$\Pr\left(\theta^I = \theta \mid p^I(x,\theta^I), p(x,\theta^I), x\right) = 0.$$

Step 1. If $\widetilde{\mathcal{P}} = \{\varnothing\}$, the incumbent cannot be re-elected, by inequality (15) and Lemma A.14. Hence, vector $p(x,\theta^I)$ is described by set of equations (43).

Step 2. Let $\widetilde{\mathcal{P}} \neq \{\varnothing\}$. Politician posteriors

$$\Pr\left(\theta^I = \theta \mid p(x,\theta^I) \in \widetilde{\mathcal{P}},\ \theta \in \mathcal{B}^I(\theta^I)\ \right) = \Pr\left(\theta^I = \theta \mid \theta \in \mathcal{B}^I(\theta^I)\right) = \frac{1}{2},$$

and strategy described by equation (42) are mutually consistent.

Pooling equilibrium described in step 2 is more efficient than separating equilibrium described in step 1:

$$\frac{b}{2} - \frac{1}{2} - \frac{\Delta}{4} < 0 \text{ for any } \Delta \geqslant 2b - 1. \tag{44}$$

■

Lemma A.16 *When $x_{\theta^I} = x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}}$, the first-period policy in the most efficient equilibrium with informative electoral promises is described by equations (10) and (14).*

Proof. Let vector $p(x,\theta^I)$ be described by equations (10) and (14). When $x_{\theta^I} = x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 0$,

$$R + V_\theta(p(x,\theta^I)) = R + b - \frac{1}{2} > b \text{ for either } \theta \in \mathcal{B}^I(\theta^I). \tag{45}$$

When $x_{\theta^I} = x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 1$,[44]

$$R + V_\theta(p(x,\theta^I)) = R > b \text{ for either } \theta \in \mathcal{B}^I(\theta^I). \tag{46}$$

[44] Recall that we consider region $\Delta \geqslant 2b - 1$, where set of inequalities (46) is met.

By set of inequalities (45) and (46), $p(x, \theta^I) \in \widetilde{\mathcal{P}}$. By Lemmas A.12 and A.15, $p(x, \theta^I)$ is the first-period policy in the most efficient equilibrium with informative electoral promises. ■

Lemma A.17 *When $x_{\theta^I} \neq x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}}$, the first-period policy in the most efficient equilibrium with informative electoral promises is described by equation (10) and one of the following equations: (14) in region $\Delta \geqslant 2b+1$; (17) in region $2b - \frac{1}{2} < \Delta < 2b+1$; and (18) in region $2b - 1 < \Delta \leqslant 2b - \frac{1}{2}$.*

Proof. Recall, that we look at pure strategies. By Lemma A.6, either (i) the first-period policy in the most efficient equilibrium is described by set of equations (43), or (ii) it lies in the set of policies described by Lemma A.17: it will become clear that the mirror image of pork-barrel policy described by equations (10) and (14) lies out of the most efficient equilibrium with informative electoral promises. For each pork-barrel policy described by Lemma A.17, we find the region of parameter Δ in which it lies in set $\widetilde{\mathcal{P}}$.

Step 1 shows that pork-barrel policy $p(x, \theta^I)$ described by equations (10) and (14) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \geqslant 2b+1$. Indeed, the incumbent is the most eager to deviate from this policy to that described by set of equations (43) when $x_{\theta^I} = 1$ and $x_{\mathcal{B}^I(\theta^I)\setminus\{\theta^I\}} = 0$. Hence,

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} R + V_\theta(p(x, \theta^I)) = R - \frac{1}{2}. \tag{47}$$

The right-hand-side of equation (47) lies at least as high as threshold b if and only if $\Delta \geqslant 2b+1$.

Step 2 shows that pork-barrel policy $p(x, \theta^I)$ described by equations (10) and (17) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \geqslant 2b - 2$. Indeed, the incumbent is the most eager to deviate from this policy to that described by set of equations (43) when $x_{\theta^I} = 1$. Hence,

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} \left\{ R + V_\theta(p(x, \theta^I)) \right\} = R. \tag{48}$$

The right-hand-side of equation (48) lies at least as high as threshold b if and only if $\Delta \geqslant 2b - 2$.

Step 3 shows that pork-barrel policy $p(x, \theta^I)$ described by equations (10) and (18) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \leqslant 2b - \frac{1}{2}$. Indeed, the incumbent is the most eager to deviate from this policy to that described by set of equations (43) when $x_{\mathcal{B}^I(\theta^I) \setminus \{\theta^I\}} = 1$. Hence,

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} \left\{ R + V_\theta(p(x, \theta^I)) \right\} = R + b - \frac{1+\Delta}{2}. \tag{49}$$

The right-hand-side of equation (49) lies at least as high as threshold b if and only if $\Delta \leqslant 2b - \frac{1}{2}$.

Step 4 By steps 1-3 and Lemma A.15, the first-period policy that is the mirror image of that described by equations (10) and (14) lies out of the most efficient equilibrium with informative electoral promises. Indeed, it is less efficient than any policy described in steps 1-3, and for any Δ at least one policy described in steps 1-3 lies in set $\widetilde{\mathcal{P}}$.

Step 5. By step 1, and Lemmas A.12 and A.15: when $\Delta \geqslant 2b + 1$, the first-period policy in the most efficient equilibrium with informative electoral promises is described by equations (10) and (14).

Step 6. By steps 1-3 when $2b - \frac{1}{2} < \Delta < 2b + 1$, set $\widetilde{\mathcal{P}}$ has one element: it is described by equations (10) and (17). By Lemma A.15, this element is the first-period policy in the most efficient equilibrium with informative electoral promises.

Step 7. By steps 1-3 when $2b - 1 < \Delta \leqslant 2b - \frac{1}{2}$, there are two elements in set $\widetilde{\mathcal{P}}$. The one that is described by equations (10) and (18) is the most efficient. Indeed,

$$\frac{1}{4}\left(b - \frac{1}{2}\right) + \left(b - \frac{1+\Delta}{2}\right) > 0 \text{ if and only if } \Delta \geqslant 4b - 2;$$

by assumption (3), $4b - 2 > 2b - \frac{1}{2}$. ■

A.5 Proof of proposition 4

The proof is similar to that of proposition 3. Political faction is such as described by Proposition 2. Therefore, the expected benefit from keeping campaign promises is described by equation (7) if $\theta^I = \theta^L$; and by equation (12) otherwise. Let

$$\widetilde{\mathcal{P}}^c = \left\{ \widetilde{p}(x, \theta^I) \mid V_\theta(\widetilde{p}(x, \theta^I)) + r \geqslant b \text{ for either } \theta \in \mathcal{B}^I(\theta^I) \right\}. \tag{50}$$

In the most efficient equilibrium with informative electoral promises $p(x, \theta^I) = \arg\max_{\widetilde{p}(x,\theta^I) \in \widetilde{\mathcal{P}}^c} V_{\theta^I}(\widetilde{p}(x, \theta^I))$, if set $\widetilde{\mathcal{P}}^c$ is not empty; otherwise,

$$\text{in any state } x,\ p_{\theta^I}(x, \theta^I) = 1 \text{ and } p_\theta(x, \theta^I) = 0 \text{ for either } \theta \neq \theta^I: \tag{51}$$

see the proof of Lemma A.15 and recall that the expected benefit from re-election is given either by equation (12) or by equation (7).

In region $\Delta \geqslant 4b + 2$, the first-period policy in the most efficient equilibrium with informative electoral promises is described by equations (10) and (14):

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} \left\{ r + V_\theta(p(x, \theta^I)) \right\} = r - \frac{1}{2} \geqslant b \text{ if and only if } \Delta \geqslant 4b + 2.$$

In region $4b - 2 \leqslant \Delta < 4b + 2$, it is described by equations (10) and (17):

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} \left\{ r + V_\theta(p(x, \theta^I)) \right\} = r \geqslant b \text{ if and only if } \Delta \geqslant 4b - 2.$$

Pork-barrel policy described by equations (10) and (18) lies out of the most efficient equilibrium with informative electoral promises. Indeed,

$$\min_{\theta \in \mathcal{B}^I(\theta^I), x} \left\{ r + V_\theta(p(x, \theta^I)) \right\} = r + b - \frac{1 + \Delta}{2} \geqslant b \text{ if and only if } \Delta \leqslant \frac{4b - 2}{3}.$$

However, when $\Delta \leqslant \frac{4b-2}{3}$, the first period policy in the most efficient equilibrium is described by equations (10) and (13). By Lemma A.12 and Proposition 2, $\frac{4b-2}{3} < 2b - 1$.