Informative Campaign Promises.*

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March 26, 2009

Abstract

This paper investigates the consequences of campaign talk for elections and public policy. We build a model with successive elections in which candidates for office give campaign promises without a commitment fulfill them. We find that a candidate's promises signal her policy intentions, but they also generate inefficiencies in public policy following the election (these inefficiencies are attenuated when incumbents are nominated for re-election). We find, furthermore, that limits to individual political careers (either natural aging or institutionally imposed term-limits) devalue campaign talk. However, it remains influential if we interpret our game as electoral competition by political parties rather than individual candidates.

Key words: campaign promises, electoral accountability, redistributive politics, nomination for re-election, term limits, political parties.
JEL codes: D72, D82.

*I am grateful to Francis Bloch, Oliver Board, Stephen Coate, Stefan Krasa, John Morgan, Michael Peters, Julia Shvets, Jean Tirole, and especially to Nicolas Marceau for helpful comments. My work has benefited from attention of seminar participants at New Economic School, Université de Montréal, Université du Québec à Montréal, Simon Fraser University, University of Victoria, University of Pittsburgh and participants of Annual Meetings of American Political Science Association, Canadian Economic Theory Conference, Annual Meetings of Canadian Economic Association, and Third World Congress of the game Theory Society. Financial support from CIRPÉE is gratefully acknowledged.

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1 Introduction

In electoral campaigns, candidates competing for office give promises to voters. Political science literature agrees that most of these promises are delivered.[1] How can we explain this, given that incumbents face no legal restraints preventing them from breaking their word to the voters? More importantly, what are the consequences of campaign talk for elections and public policy?

To address these issues, we build a model with successive elections in which candidates for office give campaign promises without any commitment to keeping them. Yet, a candidate's campaign promises signal her ideology and policy intentions. The reason is that the voters pay attention to campaign talk.[2] When a voter interprets (un)favorable campaign promises as a signal of (in)congruence, electoral competition encourages a candidate to give favorable promises to a minimal majority of voters. If their votes bring her in office, she needs to raise them again - this time for re-election, which requires delivering favorable policies as promised. Because a candidate would like to facilitate re-election (if she wins office in the first place), she gives promises that she would like to fulfill the most.

While campaign promises inform voters about candidates' political preferences, they may generate inefficiencies in public policy following the election. The reason is that the future incumbent assembles a minimal majority of voters on her side during the electoral campaign, when she is still uncertain

[1] Lederman and Pomper (1980), Krukones (1984), and Fishel (1985) all find that US presidents keep most of their promises to the voters; Royed and Borrelli (1997) find delivery of most social welfare policy pledges by two major US parties; Budge, Robertson and Hearl (1987), and Petry (1995) find a high rate of campaign promise fulfillment in UK and in Canada.

[2] According to polls by Princeton Survey Research Associates International, campaign promises receive high attention from the voters: during 2008 campaign, 80% of Americans said that they follow campaign news either very- or fairly closly (the avegare figure for the last five presidential elections since 1992 is 70%).

about the cost of a particular public policy prevailing after the election. Once in office, however, she has to pander her policy to the voters on her side if she wants to keep her job, no matter how costly it turns out to be: if the voters would forget her promises, she could potentially find a less costly way to deliver favorable policies to a majority of them and thus raise enough votes for re-election.

Illustrative example The respondents of May 2008 telephone poll conducted by Princeton Survey Research Associates International, indicated that their top-three priority issues in public policy are: economy, education, and healthcare.[3] The winner of the following US Presidential election, Senator Obama, has promised on these issues, among other things: (i) restoration of tax fairness; (ii) increase of teacher compensation and a tax credit to cover most of tuition at public colleges and universities; (iii) affordable, accessible health coverage for every American by the end of the first term in office. Promises by his unsuccessful competitor, Senator McCain included: (i) decrease of corporate taxes and balancing the budget by the end of the first term in office; (ii) increase of education quality, however, not through higher public spending; and (iii) an access to affordable health coverage of their choice for every American (notably, McCain and Obama went negative on each other's plans on healthcare issue).[4] Let us illustrate our insights with an example incorporating these campaign promises.

Model outline. Imagine a democracy in which citizens are differentiated in three types marked with colors (blue, purple and red), by their preferences

[3]Economy was indicated as being "very important" by 88 percent of respondents (a nationwide sample of 1,505 adults, 18 years of age or older). Either issue: education and healthcare was indicated as being "very important" by 78 percent of respondents.

[4]Electoral platforms by US presidential candidates are available at http://www.presidency.ucsb.edu/platforms.php.

over public policy. Net policy benefit to citizens of one color generates net loss to citizens of the other colors: blue citizens would like to increase teacher compensation and decrease college tuitions; purple citizens would like to receive health coverage at a low price; red citizens would like to decrease corporate taxes (the common budget does not need to be balanced, but running a deficit is costly to anybody). Blue and purple citizens agree to increase corporate taxes to finance their goals (against red citizens' interests); however, they disagree about allocation of tax revenues. Red and purple citizens agree upon no increase in public spending on education (against blue citizens' interests), but they disagree about the level of public spending on healthcare. Blue and red citizens agree on no increase in public spending on healthcare (against purple citizens' interests), but they disagree about the level of public spending on education.

The social cost of a given public policy (the level of spending on education, healthcare, and the tax rate) is uncertain. Only an infinitely small mass of citizens knows the prevailing social cost of a given public policy, and can therefore evaluate the relative efficiency of different policies. These citizens are potential candidates for political office.[5] The politician in office is elected by a simple majority vote in a two-candidate contest: a candidate's color (blue, purple, or red) is her private information.

For expository purpose, consider two successive elections (our insights remain robust with an infinite number of elections). Before the first (open-

[5] Maskin and Tirole (2004) emphasize that a good reason for political agency or delegation of public decisions to political representatives is that "they are more likely than the average citizen to have the experience, judgment, and information to decide wisely". In their model, politicians know relative efficiency of different public policies (unlike the average citizen), and they pursue two-fold objectives: satisfying their political preferences and receiving perks from office. For notational simplicity, in our model a candidate for office or a politician is simply a better-informed citizen: she has some political preferences, but she receives no direct benefits from being in office (our insights would not change if we assume perks from office).

seat) election the candidates simultaneously give campaign promises, without commitment to keeping them. For concreteness,[6] suppose they can give any of the following promises (as many as they wish): "I will increase public spending on education (so as to increase teacher compensation and decrease college tuitions); I will increase public spending on healthcare (so as to provide health insurance at a low price); I will keep taxes low". Each citizen compares candidates' campaign promises and votes for one of them. The candidate who collects the most votes wins office (if the vote results in a tie, the winner is chosen by flip of a fair coin). She learns the prevailing cost of different public policies and decides upon the tax rate and public spending on education and healthcare. Then, she runs for re-election against a challenger.[7] A citizen is entirely uncertain about the challenger's color; but he holds two signals about the incumbent's color: he knows whether or not he has received a favorable policy, and he also remembers the incumbent's campaign promises before taking office.

Informative campaign talk. Because of electoral competition, a candidate gives favorable promises to citizens of two colors: her own color and one other color. As a result, the first election is a tie. Without loss of generality, assume that one of the candidates is blue. She promises to increase public spending on both education and healthcare, and she wins office in a tie-close race. A red citizen votes against her re-election ("being red, she would have promised to keep taxes low"); a blue or a purple citizen votes for re-election

[6] In the model, we do not specify a form of campaign promises, because we are interested in their political consequences, and not in their verbal contents. Indeed, candidates for office pander their campaigns to citizen beliefs, hence, a variety of promises can be sustained in equilibrium, giving the same effects on elections and public policy.

[7] In the game with two elections, it is irrelevant whether the incumbent and the challenger promise anything to the voters or not: either way, the winner of their race picks her most preferred policy. When we consider the game with an infinite number of elections, we assume that campaign promises are given in every election.

if and only if he receives a favorable policy ("if the incumbent is blue/purple, she is eager to increase public spending on education/healthcare"). Hence, the incumbent stays in office if and only if she increases public spending both on education and on healthcare, as promised. Naturally, she increases public spending on education (recall that she is blue). She also increases public spending on healthcare (so as to stay in office), unless it turns out that from a blue citizen perspective it is too costly as compared with the expected benefit of keeping political control. In most states, she keeps her campaign promises.

Negative consequences from campaign talk. While campaign promises increase voter information about a candidate's color and her behavior in office, they may also increase the cost of public policy following the election. Continue to assume that the incumbent is blue, and before taking office she has promised to increase public spending on both education and healthcare. If the voters would forget her promises, she could increase public spending on education, and then decide whether or not she wants to pander to re-election in either of the following ways: through increasing public spending on healthcare or through keeping taxes low, whichever is less costly. Unfortunately, the voters remember that the incumbent is not red ("otherwise, why she has not promised to keep taxes low?"), and so the only way for the incumbent to stay in office is to keep her campaign promises, no matter how costly.

Inefficiencies from campaign talk and endorsement for re-election. Nomination for re-election may attenuate inefficiencies from her campaign talk. Suppose that nomination is decided by the politicians' majority vote. Given the incumbent's campaign promises (increase public spending on both education and healthcare), only a minimal majority of politicians (blue and purple) believe that she may be their color. Therefore, nomination for re-election signals that the incumbent's behavior in office has preserved this ambiguity (and so blue and purple citizens should vote for re-election); while nomination failure signals that the incumbent's policy reveals her type (and so blue/purple citizens should vote for re-election if and only if the incumbent increases public spending on education/healthcare). Recall that the politicians know the cost of the incumbent's policy. As long as the incumbent treats blue and purple citizens in the same way when the cost of policies favorable to them are the same, the politicians draw no inferences about her color, even if she delivers none of her promises or she delivers them only partially ("the incumbent has not increased public spending on healthcare because it was too costly from joint perspective of blue and purple citizens"). Therefore, the incumbent can fulfill campaign promises depending associated cost, win nomination, and stay in office.

Term limits and political partisanship. In reality, individual political careers are limited by either natural aging, or by institutionally-imposed term limits. These limits devalue campaign promises. For example, consider an incumbent/challenger election, and suppose that term limits allow for at most one re-election. If the challenger gives favorable campaign promises to a minimal majority of voters (say, red and purple), then some voters on the incumbent's side (purple) receive favorable promises from the challenger. From their perspective, the challenger is a better candidate: she is likely to keep her promises under re-election pressures, while the incumbent will certainly pick her most preferred policy which may or may not be in their favor. So, they go on the challenger's side, bringing her electoral margin over the incumbent. Hence, the incumbent has no chance to stay in office, and so no reason to keep her campaign promises in her first term. However, our insights regarding informative campaign promises and their political consequences go through if we interpret our game as electoral competition by political parties rather than by individual candidates: a political party faces no term limits, and it has the organizational means to discipline its members, so as to preserve ambiguity about ideology by its "representative" candidate and attract wide spectrum of voters.

Roadmap The paper is organized as follows. The next section reviews related literature. Section 3 formalizes the basic model with two elections. Section 4 gives full description of its symmetric pure strategy Perfect Bayesian Equilibria. Section 5 extends the model to a game with infinite number of elections. Section 6 concludes. Technical proofs are collected in the Appendix.

2 Related literature

While the literature agrees that re-election pressures encourage politicians to keep their campaign promises, it takes different approaches to this insight.

In Austen-Smith and Banks (1989), the candidates for office describe their performance goals. If in office, they exert efforts to achieve these goals, because the voters decide upon re-election depending on the achievement. The re-election rule is an implicit contract: the voters are indifferent about re-election, because the candidates do not differ in personal characteristics.

In Harrington (1993) the voters and the candidates for office would all like to pick the efficient public policy. They have heterogenous prior beliefs regarding effectiveness of different policies. A voter updates his priors upon receiving new information, while a candidate never changes her priors or *ideology*: her priors are her private information. There are two successive majority vote elections. Before the first election, the candidates promise to follow some ideology if in office: any they wish to tell. They have no commitment to keep their promises. Naturally, they pander to voter priors.

However, when no type of priors is prevailing, they do not mind promising to follow their true ideologies. Whether promised or not, the winner of the first election follows her ideology, and the voters update their beliefs about its "correctness" depending on their payoffs. They vote for re-election if and only if the incumbent's ideology is likely to be correct (she will never change her mind).

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 approach to modeling campaign promises is yet different: it presents the possibility of investigating the political consequences of campaign talk. We follow Maskin and Tirole (2001, 2004)[8] in that the voters have different political preferences, and they vote for candidates who are the most likely to share them. The incumbent's behavior in office is a (costly) signal of her preferences, guiding voting decisions during the incumbent/challenger election. We introduce nonbinding campaign promises into the play. The incumbent's promises given prior to taking office is an additional (costless) signal of her political preferences (because of electoral competition, the costly- and the costless signals are coherent).

3 Basic model

Consider a game with two elections for political office:[9] the timing of events is summarized at the end of this section.

[8] More precisely, we build on section entitled "Tyranny of the minorities: pork-barrel pandering" in 2001 working paper version that is not included in 2004 published paper.

[9] Section 5 considers an extension with an infinite number of elections.

Citizen preferences The citizens have differentiated policy preferences. There are three types of preferences.[10] Each type is equally represented. A citizen's type is denoted by $\theta \in \{1, 2, 3\}$, and is his private information.

In any given period, a citizen either receives favorable policy (call it, abusing the political science terminology, *pork*) or not. Public policy space $\mathcal{P}$ is a set of three-dimensional vectors with either 1 (pork to type θ citizens) or 0 (no pork to type θ citizens) on each dimension θ. Pork to type θ citizens delivers them benefit b, and it imposes cost $\frac{1+x_\theta \Delta}{2}$ on either type $\widetilde{\theta} \neq \theta$ citizens.[11] This cost is high ($x_\theta = 1$) or low ($x_\theta = 0$), with equal probability. The costs of pork to different types are independent. Vector $x = (x_1, x_2, x_3)$, called the *state* (of Nature), is drawn anew in each period, without correlation. Period-specific public policy takes this vector as an input and it returns vector $p(x) = (p_1(x), p_2(x), p_3(x))$ in set $\mathcal{P}$ as an output, generating payoff

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

to type θ citizens.

Efficient policy The following set of inequalities

$$1 < b < 1 + \Delta \tag{2}$$

guarantees that pork to type θ citizens is efficient if and only if its cost is low. That is, the pork-barrel policy is efficient if and only if $p_\theta(x) = 1 - x_\theta$. Hence, there are two types of inefficiencies: one is to give pork to type θ citizens

[10] It is straightforward to extend the model to any number of types.

[11] For notational convenience, here and everywhere below until Section 5, we omit period indicator for period-specific variables, like x_θ.

when its cost is high ($p_\theta(x) = 1$ when $x_\theta = 1$), call this *overspending*; the other is not to give pork type θ citizens when its cost is low ($p_\theta(x) = 0$ when $x_\theta = 0$), call this *underspending*. The relative welfare cost of overspending as compared underspending is measured by parameter Δ.

Political system The distribution of state x is public information. A citizen is either a politician (she) or a voter (he): the politicians learn realization of state x, unlike the voters. The politicians have no electoral weight. They are potential candidates for office. Each type is equally represented among them. This knowledge is common, while a politician's type is her private information.

Two politicians running for office in the first election are drawn at random. We index them with letter k, taking value I if candidate k wins the incumbency, and value $-I$ otherwise. Variable θ^k denotes type by candidate k. The candidates simultaneously give public *campaign promises*. That is, a candidate describes her policy intentions in state x. Campaign promises or messages by candidate k are represented by a vector-valued function $m^k(x) = (m_1^k(x), m_2^k(x), m_3^k(x))$ that takes state x as an input and returns a vector from set $\mathcal{P}$ as an output.[12] A candidate is entirely free to break her campaign promises if she is in office.

Depending on campaign promises, a citizen decides whom she votes for (there is no abstention), and the candidate who collects the most votes wins office: tie-breaking assumptions are summarized at the end of the section. She learns prevailing state x, picks any policy she likes in set $\mathcal{P}$, and then she runs for re-election against a politician who is drawn at random - the challenger.[13] A voter recalls her campaign promises given before taking office,

[12] Rigorously speaking, campaign promises by candidate k depend on two arguments: x and θ^k. For notational convenience, we omit variable θ^k as an argument.

[13] In the incumbent/challenger election, the candidates do not give campaign promises

and he sees whether or not he has received pork[14] (the politicians, however, have full information about the incumbent's policy).

Timing of the game

Date 1.

The open-seat election.

a. Nature draws two candidates for office, and they give public campaign promises.

b. A citizen updates his beliefs about a candidate's type and pork-barrel policy if she is in office, and he votes for one of the candidates.

Policy-making stage.

c. Nature draws state x, and the politicians learn it.

d. The incumbent picks any public policy she likes, and the citizens update their beliefs about her type: a politicians has full information about her policy, while a voter only knows whether or not he has received pork.

Date 2.

The incumbent/challenger election.

a. Nature draws the challenger.

b. A citizen votes either for the incumbent or for the challenger.

Policy-making stage.

c. Nature draws state x, and the politicians learn it.

d. The politician in office picks public policy.

because the winner has no incentives to keep them anyway.

[14] We assume that a voter knows only his type-specific component of the incumbent's policy in order to reduce his strategy space in the second election. At the end of the next section we describe a situation in which the politicians signal their information about the incumbent's policy to the voters.

Tie-breaking assumptions[15]

(T1) *When a candidate is indifferent between two campaign strategies, she randomizes between them with probability* $\frac{1}{2}$.

(T2) *Being indifferent between the candidates for office, a citizen votes for each of them with probability* $\frac{1}{2}$.

(T3) *When election is a tie, each candidate wins it with probability* $\frac{1}{2}$.

(T4) *A politician receives arbitrarily small perks from being in office.*

4 Informative campaign promises

> "Flip-flopping is getting a bad rap, because I think it is great. Someone has made a mistake. I mean, someone has, for 20 or 30 years, been in the wrong place with his idea and with his ideology and says, 'You know something? I changed my mind. I am now for this.' As long as he's honest or she's honest, I think that is a wonderful thing. You can change your mind. I have changed my mind on things and there is nothing wrong with it." (California Governor Arnold Schwarzenegger, July 2008 interview to ABC's "This Week").

We solve the game using the concept of perfect Bayesian equilibrium.

Definition 1 (equilibrium concept) *Hereafter, word "equilibrium" refers to a symmetric perfect Bayesian equilibrium of the game in which the players*

[15] In equilibrium, a candidate for office panders campaign promises to citizens of two types: her own type and one other type, no matter which of the remaining two. Assumption (T1) tells that she chooses between these two types by flipping a fair coin. In the open seat election, at least one type of citizens is indifferent between the candidates for office. Assumption (T2) tells that he decides whom to vote for by flipping a fair coin. The open seat election is a tie. Assumption (T3) tells that the winner is chosen by flip of a fair coin. Finally, assumption (T4) tells that when the cost of pandering to re-election is equal to the benefit from staying in office, so that the incumbent is indifferent between pandering to re-election and picking her most preferred policy, she panders to re-election.

use pure strategies, unless specified otherwise by a tie-breaking assumption.

Trivially, the politician in office at date 2 picks her most preferred policy.

Lemma 1 (behavior in office without re-election concerns) *At date 2.d, the politician in office gives pork only to citizens of her type.*

Therefore, in the incumbent/challenger election a voter votes for a candidate who is the most likely to be his type (because we focus on symmetric equilibria, voting is sincere). The challenger is chosen randomly, and so is each type with probability $\frac{1}{3}$. Voter posteriors about the incumbent's type (by abuse of terminology, hereafter we call the politician in office at date 1 the *incumbent*) depend on two signals: the incumbent's campaign promises and delivery of pork. Because delivery of pork signals the incumbent's type, that is,

$$\Pr\left(\theta^I = \theta \mid m^I(x),\ p_\theta(x) = 1\right) \geqslant \Pr\left(\theta^I = \theta \mid m^I(x),\ p_\theta(x) = 0\right), \qquad (3)$$

there are two possibilities.

(i) For a voter it is sufficient to know whether or not he has received pork from the incumbent to decide upon his vote regarding re-election ("it is more important what the incumbent has done in office, not what she has promised to do before taking it"). Formally, inequality

$$\Pr\left(\theta^I = \theta \mid m^I(x),\ p_\theta(x) = 1\right) \geqslant \frac{1}{3} \qquad (4)$$

is met for all $m^I(x)$. It is called a *babbling* equilibrium.

(ii) A voter believes that some campaign promises clearly signal that the incumbent is not his type, so he should vote against re-election even if he receives pork ("being my type, the incumbent would have never run such a campaign"). Formally, inequality (4) is violated for some $m^I(x)$. Call it an equilibrium with *informative campaign promises*.

Hence, we divide equilibria in two complementary sets, depending on how important are the incumbent's campaign promises given prior to taking office for voter posteriors about her type when she runs for re-election.

Babbling equilibria Let us describe babbling equilibria.

Lemma 2 (grateful vote) *In a babbling equilibrium, type θ voters vote for re-election if and only if they receive pork, that is, $p_\theta(x) = 1$.*

Hence, the incumbent needs to deliver pork to at least two types of citizens, in order to win re-election. She delivers pork to her own type citizens anyway:

$$p_{\theta^I}(x) = 1 \text{ for all } x. \tag{5}$$

The remaining issue for her is whether or not to pander to re-election. That is, whether or not to deliver pork to citizens of one other type, naturally, at the lowest possible cost imposed on her and the citizens of her type. Staying in office allows her to pick her most preferred policy at date 2.d: otherwise, she exposed to the most preferred policy by a politician of a random type. Hence, the incumbent panders to re-election if and only if[16]

$$\frac{1 + \Delta \min\limits_{\theta \neq \theta^I} x_\theta}{2} \leqslant \frac{2b}{3} + \frac{1}{3} + \frac{\Delta}{6}. \tag{6}$$

When overspending is not too costly ($\Delta \leqslant 2b - \frac{1}{2}$), the incumbent panders to re-election in all states (inequality (6) is met for any x); otherwise, she panders to re-election if and only if no overspending is involved, that is, $\min\limits_{\theta \neq \theta^I} x_\theta = 0$: these insights are summarized in columns two and four of table

[16] By tie-breaking assumption (T4), inequality (6) is not strict.

1 in the appendix.

Lemma 3 (public policy in a babbling equilibrium) *In a babbling equilibrium, date 1.d policy is described by equation (5), and:*

$$p_{\overline{\theta}^I}(x) = 0,\ p_{\{1,2,3\}\setminus\left\{\overline{\theta}^I\right\}}(x) = 1 \text{ for all } x, \tag{7}$$

when $\Delta \leqslant 2b - \frac{1}{2}$*; or*

$$p_{\overline{\theta}^I}(x) = 0, \text{ for all } x,\ p_{\{1,2,3\}\setminus\left\{\overline{\theta}^I\right\}}(x) = 1 \text{ if and only if } x_{\{1,2,3\}\setminus\left\{\overline{\theta}^I,\theta^I\right\}} = 0, \tag{8}$$

when $\Delta > 2b - \frac{1}{2}$*, where* $\overline{\theta}^I$ *is a random draw from* $\arg\max_{\theta \neq \theta^I} x_\theta$*.*

It remains to describe the open-seat election. A candidate's campaign promises are consistent with voter beliefs if and only if they do not depend on her type. Given such promises, a citizen is indifferent between the candidates. By assumption (T2), he votes for each candidate with probability $\frac{1}{2}$. As a result, the election is a tie. By assumption (T3), either candidate has equal chance of winning it.

Lemma 4 *In a babbling equilibrium, vector* $m^k(x)$ *does not depend on* θ^k*. In the open-seat election a citizen votes for each candidate with probability* $\frac{1}{2}$*, and each candidate wins office with probability* $\frac{1}{2}$*.*

Proposition 1 *Babbling equilibria are described by Lemmas* 1-4*.*

Hence, in a babbling equilibrium a candidate's campaign promises do not depend on her type. Therefore, a citizen is indifferent between the candidates for office in the open-seat election, and so the winner is chosen by flip of a fair coin. She gives pork to her own type citizens, and, most of the time,[17] to citizens of one other type, so as to win their votes for re-election (between the

[17] Unless both $\Delta > 2b - \frac{1}{2}$ and $x_\theta = 1$, for either $\theta \neq \theta^I$.

remaining two types, she picks the one with the lowest cost of type-specific pork). The winner of the incumbent/challenger election (most likely, the incumbent) gives pork only to her own type citizens.

Equilibria with informative campaign promises Let us now describe equilibria with informative campaign promises, in which, recall, some campaign promises may clearly signal that the incumbent is not type θ, so type θ voters vote against re-election even if they receive pork. Of course, a variety of campaign promises may generate such a signal, depending on which promises the citizens interpret as being such a signal. We, therefore, abstract from verbal contents of campaign promises and focus on their political consequences. For this purpose, we introduce the following concept.

Definition 2 (electoral base) *Electoral base by candidate k is set*[18]

$$\mathcal{B}^k = \left\{ \theta \mid \Pr\left(\theta^k = \theta \mid k = I, m^k(x),\ p_\theta(x) = 1\right) \geqslant \frac{1}{3} \right\}. \tag{9}$$

That is, a voter whose type is in the incumbent's electoral base votes for re-election if he receives pork, but not otherwise; while a voter whose type is outside the incumbent's electoral base votes for the challenger no matter whether he receives pork or not.

Lemma 5 (vote upon re-election) *Type θ voters vote for re-election if and only if both $\theta \in \mathcal{B}^I$ and $p_\theta(x) = 1$.*

Hence the incumbent's behavior in office should depend on her electoral base. We proceed as follows: first, we describe the open-seat election when the incumbent forms her electoral base, then we describe her policy.

[18] Being rigorous, we should have written that a candidate's electoral base depends on her type. We do not do it for notational convenience.

Lemma 6 (citizen objectives in the open-seat election) *In the open-seat election, type θ citizen maximizes the probability of event $\theta^I = \theta$.*

The reason is that the election's winner plays in the interests of her own type citizens from two-period perspective. Therefore, a citizen votes for the candidate who is the most likely to be his type, and the candidates give campaign promises so as to maximize their electoral fortunes. Competition for office encourages a candidate to pander campaign promises to a minimal majority of citizens. Hence, there are two types in a candidate's electoral base. One of these types is her own type: is she wins office, she is re-elected if and only if she delivers pork to citizens of both types in her electoral base, which is the least costly when her own type is in the base.

Lemma 7 (the open-seat election) *In equilibrium with informative campaign promises, set $\mathcal{B}^k$ has two elements: θ^k and a random draw from set $\{1,2,3\} \setminus \{\theta^k\}$; citizen posteriors are:*

$$\Pr\left(\theta^k = \theta \in \mathcal{B}^k\right) = \frac{1}{2}, \Pr\left(\theta^k = \{1,2,3\} \setminus \mathcal{B}^k\right) = 0;$$

type θ citizens vote for: candidate k, when $\theta \in \mathcal{B}^k \backslash \mathcal{B}^{-k}$; candidate $-k$, when $\theta \in \mathcal{B}^{-k} \backslash \mathcal{B}^k$; each candidate with probability $\frac{1}{2}$, otherwise.

Hence, there are two types in the incumbent's electoral base: her own type and one other type. Obviously, the incumbent gives pork to her own type citizens, that is, equation (5) continues to hold, and no pork to the citizens whose type is outside her electoral base (they won't vote for her re-election anyway):

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

She gives pork to the citizens whose type is in her electoral base, but it is not her own type if and only if the associated cost is no higher than the expected benefit from re-election, that is,

$$\frac{1+\Delta x_{\mathcal{B}^I\setminus\{\theta^I\}}}{2} \leqslant \frac{2b}{3}+\frac{1}{3}+\frac{\Delta}{6}. \tag{11}$$

When the cost of overspending is relatively low ($\Delta \leqslant 2b-\frac{1}{2}$), the incumbent panders to re-election in all states:

$$p_{\mathcal{B}^I\setminus\{\theta^I\}}(x) = 1 \text{ for all } x; \tag{12}$$

otherwise, she panders to re-election if and only if no overspending is involved:

$$p_{\mathcal{B}^I\setminus\{\theta^I\}}(x) = 1 - x_{\mathcal{B}^I\setminus\{\theta^I\}}, \tag{13}$$

as summarized by columns three and five of table 1 in the appendix.

Lemma 8 (pork-barrel policy with informative campaign promises) *In equilibrium with informative campaign promises, date 1.d policy is described by the following set of equations: (5), (10), and either (12), when* $\Delta \leqslant 2b-\frac{1}{2}$*; or (13), when* $\Delta > 2b-\frac{1}{2}$.

Proposition 2 *Equilibria with informative campaign promises are described by Lemmas* 1*,* 5*,* 7 *and* 8*.*

Hence, in equilibrium with informative campaign promises, a candidate gives favorable promises to citizens of two types: her own type and one other type. The open-seat election is a tie. Its winner never delivers pork to citizens whom she has given favorable promises; she gives pork to her own type citizens (as promised); and, in most states, to the other citizens brought on her side by favorable campaign promises. The winner of the incumbent/challenger election gives pork only to citizens of her own type.

Propositions 1 and 2 imply the following insights.

Corollary 1 (informative campaign promises) *Fulfillment of campaign promises can be rationalized by voter beliefs in their verbal contents.*

Indeed, in one of equilibria with informative campaign promises, a candidate for office promises pork in all states to citizens of two types: her own type and one other type, no pork ever to the other citizens, and she keeps her word in most states, if in office.

Corollary 2 (inefficiencies from campaign talk) *Campaign promises may generate inefficiencies in public policy following the election.*

This happens when $x_{\mathcal{B}^I \setminus \{\theta^I\}} = 1$ and $x_{\{1,2,3\} \setminus \mathcal{B}^I} = 0$ (see the second row from the bottom of table 1 in the appendix). In equilibrium with informative campaign promises type $\{1, 2, 3\} \setminus B^I$ citizens receive no pork (this is an underspending); moreover, when $\Delta < 2b - \frac{1}{2}$, type B^I citizens receive pork (this is an overspending). These inefficiencies, however, do not arise in babbling equilibria. The reason is that in a babbling equilibrium the incumbent is free to choose her pandering strategy when she is in office; whereas in an equilibrium with informative campaign promises she has to choose her pandering strategy before taking office, when she is still uncertain about the cost of a pork.

Nomination and inefficiencies from campaign talk Nomination for re-election may attenuate inefficiencies from campaign talk. Consider the following extension. Suppose that after the incumbent picks her policy and before she runs for re-election, the politicians nominate her by a simple majority vote.[19] Nomination indicator η takes value 1 if the incumbent is nominated for re-election, value 0 otherwise; and is public information.

Let us describe public policy in the most efficient equilibria with infor-

[19] Nomination rule has to require the votes by both types of politicians in the incumbent's electoral base.

mative campaign promises. There are two types in the incumbent's electoral base: her own type and one other type (Lemma 7 continues to hold). The incumbent either picks her most preferred policy, thereby revealing her type to the voters, or she panders to re-election by preserving ambiguity about her type between the two in her electoral base. Hence, during nomination, a politician either knows the incumbent's type or she believes that the incumbent is each type in her electoral base with probability $\frac{1}{2}$. The politicians' posteriors $\Pr\left(\theta^I = \theta \mid m^I(x),\ p(x),\ x\right)$ about the incumbent's type take one of the following values: 0, $\frac{1}{2}$, or 1. Nomination strategy takes these posteriors as an input, and returns vote "for" or "against" nomination as an output. Overall, there are eight (pure) nomination strategies.

Definition 3 (informative nomination strategy) *Nomination strategy is informative if realization of η depends on posteriors* $\Pr\left(\theta^I = \theta \mid m^I(x),\ p(x),\ x\right)$. *Otherwise, it is uninformative.*

Four nomination strategies are uninformative: always vote for nomination; vote for nomination if and only if the incumbent is clearly congruent; and the mirror images of these two strategies. When nomination is uninformative, the voters ignore it when they vote upon re-election[20] (their vote is described by Lemma 5), and given that nomination is not influential, the politicians are indifferent among nomination strategies, so they do not mind to play an uninformative strategy. Hence, the game has equilibria with informative campaign promises and uninformative nomination. Public policy in these equilibria is described by Lemma 8.

The other four nomination strategies are informative: (i) vote for nomination if and only if the incumbent is congruent with probability either 1 or at least $\frac{1}{2}$; (ii) vote for nomination if and only if the incumbent is congruent

[20] By Bayes and full probability rules, the voters do not update their beliefs about the incumbent's type when η takes the value that is not realized.

with probability $\frac{1}{2}$, and the mirror images of these two strategies. For concreteness, let us focus on strategies (i) and (ii), so that nomination does not decrease re-election fortunes.

Definition 4 (informative nomination) *By abuse of terminology, we say, hereafter, that nomination is informative if and only if type θ politician votes for nomination unless* $\Pr\left(\theta^I = \theta \mid m^I(x),\ p(x),\ x\right) < \frac{1}{2}$.

Informative nomination for re-election signals that the incumbent has preserved ambiguity about her type between two types in her electoral base, that is,

$$\Pr\left(\theta^I = \theta \mid m^I(x),\ p(x), x\right) = \frac{1}{2} \text{ for both } \theta \text{ in set } B^I.$$

Nomination failure instead signals that the incumbent's policy reveals her type. Hence, a voter in the incumbent's electoral base votes for re-election, unless he both receives no pork and the incumbent is not nominated (eventually, in the same way as a politician of his type).

Lemma 9 (vote upon re-election with informative nomination) *In equilibria with informative campaign promises and informative nomination, type θ voters vote for re-election if and only if both θ lies in set B^I and* $\max\{p_\theta(x), \eta\} = 1$.

The vote described by Lemma 9 is consistent with either nomination strategy (i) or (ii). That is, there are equilibria with such a vote and nomination. In the most efficient among these equilibria, the incumbent maximizes joint payoff by citizens whose types are in her electoral base, subject to her own type remaining ambiguous. That is, subject to the condition that a politician of either type in her electoral base would pick the same policy if her re-election is at stake. The more is overspending costly, the stronger the re-election pressures, hence the more efficient policy can be sustained. When $\Delta \geqslant 2b + 1$, re-election pressures are strong enough to sustain the policy on

Pareto frontier by citizens whose types are in the incumbent's electoral base. Otherwise, the incumbent at best picks a policy which is egalitarian with respect to citizens in her electoral base: the lower Δ, more pork is distributed.

Lemma 10 (public policy with informative nomination) *In the most efficient equilibrium with informative campaign promises and informative nomination, date 1.d policy is described by equation (10) and one of the following set of equations:*

$$p_\theta(x) = 1 \text{ if and only if } x_\theta = 0, \text{ when } \Delta \geqslant 2b + 1; \tag{14}$$

$$p_\theta(x) = 1 \text{ if and only if } x_\theta = 0 \text{ for both } \theta \text{ in set } B^I, \text{ when } 2b-\frac{1}{2} < \Delta < 2b+1; \tag{15}$$

$$p_\theta(x) = 0 \text{ if and only if } x_\theta = 1 \text{ for both } \theta \text{ in set } B^I, \text{ when } 2b-1 < \Delta \leqslant 2b-\frac{1}{2}; \tag{16}$$

(5) and (12), when $\Delta \leqslant 2b - 1$.

Public policy described by Lemma 10 is more efficient than that described by Lemma 8 when $\Delta > 2b - 1$, otherwise, they are equally efficient.

Proposition 3 (the most policy with nomination) *Nomination for re-election extends the limits of efficiency of public policy in equilibrium with informative campaign promises when* $\Delta > 2b - 1$. *Otherwise, it does not alter these limits.*

Hence, when the cost of overspending is sufficiently high, nomination for re-election increases the efficiency of public policy.

5 Game with infinite number of elections

This section shows that Corollaries 1 and 2 remain robust when we extend basic model to a game with an infinite number of elections. Suppose that the game starts with events of the first periods in the basic game, and it continues with repeated play of the following events.

Events at date $t > 1$.

Electoral stage.

a. Nature draws a politician to challenge the previous-period incumbent. If she may loose the election to the previous-period incumbent, they compete for office. Otherwise, the incumbent abstains from electoral competition and Nature draws one more politician to run for office: the game restarts. The candidates running for office simultaneously give campaign promises.

b. A citizen updates his beliefs about a candidate's type, and he votes for one of the candidates.

Policy-making stage.

c. Nature draws a period-specific state from the same distribution as in the basic game, and the politicians learn the state.

d. The winner of the election picks public policy, type θ voters learn whether or not she gave them pork, and they update their beliefs about her type.

The players discount the future at rate δ. They do not forget any information.

Notations. The state prevailing in period t is denoted with x_t; x_t^θ is its component on dimension θ. The candidates running for office in election t are indexed with k_t, taking value I_t if candidate k_t wins the election, and value $-I_t$ otherwise. Type by candidate k_t is denoted with θ^{k_t}. Her campaign promises are represented by vector-valued function $m^{k_t}(x_t)$ in set $\mathcal{P}$. Vector-valued function $p(x_t)$ in set $\mathcal{P}$ is public policy by the winner of election t; $p_\theta(x_t)$ is its component on dimension θ.

Definition 5 (history of the game) *Set*

$$H_t^\theta = \left\{m^{k_\tau}(x_\tau),\ p_\theta(x_\tau) \mid \tau < t\right\}$$

is history recorded by type θ voters before date $t > 1$, $H_1^\theta = \{\varnothing\}$.

Let us describe stationary equilibria of the extended game. As in the basic model, we divide them in two complementary sets: (i) stationary *babbling* equilibria in which

$$\Pr\left(\theta^{I_t} = \theta \mid H_t^\theta\right) \geqslant \frac{1}{3} \text{ when } p_\theta(x_\tau) = 1 \tag{17}$$

in every period τ since incumbent I_t is in office, regardless of her campaign promises $m^{I_t}(x_\tau)$; and (ii) stationary equilibria with *informative campaign promises* in which it is not true.

Equilibria with informative campaign promises It is straightforward to generalize the concept of a candidate's electoral base.

Definition 6 (a candidate's electoral base in election t) *Electoral base by candidate k_t is set*

$$\mathcal{B}^{k_t} = \left\{\theta \mid \Pr\left(\theta^{k_t} = \theta \mid H_{t-1}^\theta, m^{k_t}(x_t), k_t = I_t, p_\theta(x_t) = 1\right) \geqslant \frac{1}{3}\right\}. \tag{18}$$

In a stationary equilibrium with informative campaign promises, there are two types in incumbent I_t's electoral base: her own type θ^{I_t} and one other type (as in game with two elections). Citizens of these types vote for re-election if and only if they receive pork. Hence, incumbent I_t has three undominated strategies at date $t.d$:

(i) pander to re-election in all states, that is,

$$p_\theta(x_t) = 1 \text{ if and only if } \theta \in \mathcal{B}^{I_t} \text{ for all } x_t; \tag{19}$$

(ii) pander to re-election depending on associated cost, that is,

$$p_{\theta^{I_t}}(x_t) = 1,\, p_{B^{I_t}\backslash\theta^{I_t}}(x_t) = 1 - x_t^{B^{I_t}\backslash\theta^{I_t}},\, p_{\{1,2,3\}\backslash B^{I_t}}(x_t) = 0; \tag{20}$$

(iii) pick the most preferred policy in all states, that is,

$$p_{\theta^{I_t}}(x_t) = 1,\ p_\theta(x_t) = 1 \text{ for both } \theta \neq \theta^{I_t} \text{ for all } x_t. \tag{21}$$

The winner of the first election keeps pandering to re-election in all states (that is, she plays strategy (i)) if and only if this strategy-specific expected discounted benefit from re-election (computed recursively) is no lower than the immediate cost of pork-barrel pandering to re-election, no matter how high:

$$\frac{1+\Delta}{2} \leqslant \frac{\delta(4b+2+\Delta)}{12\,(1-\delta)}, \tag{22}$$

or, equivalently, the discount factor lies sufficiently high, so that keeping control over future payoffs is sufficiently important:

$$\delta \geqslant \frac{6(1+\Delta)}{7(1+\Delta)+4b+1}. \tag{23}$$

Strategy (ii) may also be played in equilibrium. This happens when the expected discounted benefit from re-election may lie either below- or above the associated cost of pandering, depending on realization of the cost:

$$\frac{1}{2} \leqslant \frac{\delta\,(3b+2+\Delta)}{3(2-\delta)} < \frac{1+\Delta}{2}, \tag{24}$$

because keeping control over the future public policy is moderately important:[21]

$$\frac{2}{\Delta+3b+3} \leqslant \delta < \frac{2(1+\Delta)}{2\Delta+3b+3}. \tag{25}$$

Strategy (iii) cannot be played in a stationary equilibrium with informative campaign promises, because when an office-holder picks her most preferred policy in all states, a citizen should forget about her campaign promises and vote for her re-election if and only if he receives pork.

[21] The lower limit of interval described by inequality (25) lies below that described by inequality (23); however, the intervals may overlap.

Proposition 4 (stationary equilibria with informative promises) *The game with an infinite number of elections has stationary equilibria with informative campaign promises if and only if the discount factor* δ *lies no lower than threshold* $\frac{2}{\Delta+3b+3}$. *In these equilibria, public policy at date t.d is described by equations: (i) (20), when* δ *lies in the interval described by set of inequalities (25); (ii) (19), when* δ *lies in the interval described by inequality (23).*

In words, when keeping control over the future payoffs is sufficiently important, the winner of the first election keeps winning re-elections by giving pork to the citizens of her own type and one other type, brought on her side through favorable promises during her first campaign. When the future payoffs are less important, an office holder shows such behavior as long as the cost of pork to incongruent citizens "seduced" by her promises remains low: once it becomes high, she gives pork only to congruent citizens revealing thereby her type and her career in office is over.

Relationship to the basic model. Because campaign promises are perceived as being informative, the citizens who receive favorable promises are likely to receive favorable policies (recall Corollary 1). However, less likely case is, the higher the cost of overspending (the higher parameter Δ, the smaller the "upper" interval of the discount factor (23) where strategy (i) is supported in equilibrium, and the larger "intermediate" interval (25) where strategy (ii) is supported in equilibrium): likewise, in the basic game, campaign promises are "fulfilled" either entirely, when the cost of overspending lies sufficiently low; or at least partially, otherwise (recall Lemma 8).

Babbling equilibria In a stationary babbling equilibrium, electoral base of incumbent I_t is made upon types of citizens to whom she has always delivered pork since she is in office (during the first term, her electoral base is uniform). Because she is re-elected if and only if she delivers pork to citizens of at least two types in her electoral base, she has four undominated strategies at date $t.d$:

(I.a) give pork to citizens of her own type and one other type (with the lowest cost of type-specific pork), as it is described by set of equations (5) and (7) indexed with $t = 1$; and keep giving pork to these citizens in all states, as it is described by set of equations (19);

(I.b) preserve full ambiguity about own type by giving pork to anybody, as long as the cost of pork to either type of incongruent citizens remains low, that is,

$$p_\theta(x_t) = 1 \text{ for all } \theta \text{ in all periods } t < \tau, \text{ where} \tag{26}$$

$$\tau = \min\left\{t \mid x_t^\theta = 1 \text{ for some } \theta\right\}; \tag{27}$$

afterwards, switch to strategy (I.a).

(II) give pork to citizens of her own type, and give pork to citizens of one other type, as long as its cost remains low, that is,

$$p_{\theta^{I_t}}(x_t) = 1,\ p_{\overline{\theta}^{I_t}}(x_t) = 0,\ p_{\{1,2,3\}\backslash\left\{\theta^{I_t},\overline{\theta}^{I_t}\right\}}(x_t) = 1 - x_t^{\{1,2,3\}\backslash\left\{\theta^{I_t},\overline{\theta}^{I_t}\right\}}, \tag{28}$$

where $\overline{\theta}^{I_t}$ is a random draw from $\arg\max_{\theta\in B^{I_t}\backslash\theta^{I_t}} x_1^\theta$.

(III) pick the most-preferred policy, described by set of equations (21).

Similarly to the previous subsection, for each of these four strategies we find an interval of the discount factor where this strategy is played in equilibrium:[22] We find the following intervals:

$$\delta \geqslant \frac{\sqrt{384b(1+\Delta)+321\Delta^2+648\Delta+336}-9\Delta-12}{2\left(8b+5\Delta+4\right)} \text{ for strategy (I.a);} \tag{29}$$

$$\delta \geqslant \max\left\{\frac{8}{2b+\Delta+9}, \frac{4(1+\Delta)}{2b+5\Delta+5}\right\} \text{ for strategy (I.b);} \tag{30}$$

$$\frac{\sqrt{3}\sqrt{129b+3\Delta^2+76\Delta+140}+3\Delta-6}{24b+11\Delta+16} \leqslant \delta < \tag{31}$$

$$< \frac{\sqrt{576b(1+\Delta)+3(10+7\Delta)(14+13\Delta)}-6-3\Delta}{24b+11\Delta+16} \text{ for strategy (II);}$$

$$\delta < \frac{3}{4b+5+\Delta} \text{ for strategy (III).} \tag{32}$$

Proposition 5 (stationary babbling equilibria) *Date t.d public policy in a stationary babbling equilibrium is described by equations: (i) (5) and (7) in period* 1 *and (19) in any period* $t > 1$*, if and only if inequality (29) is met; (ii) (28), if and only if set of inequalities (31) is met; (iii) (21), if and only if inequality (32) is met; (iv) (26) in any period* $t \leqslant \tau$*, where* τ *is defined by equation (27), (5) and (7) indexed with time indicator* τ*, and (22) in any period after* τ*, if and only if set of inequalities (30) is met.*

In words, when keeping control over the future public policy is very important, the winner of the first election keeps pandering to re-election: at first she may keep perfect ambiguity about her type by delivering pork to anybody, but eventually she starts giving pork to the citizens of two types: her own type and one other type. When the future payoffs are moderately important, an office-holder panders to re-election until the cost of pandering remains low; once it is high, she picks her most preferred policy and

[22] The limits of the intervals that we find look a bit “messy”: they solve quadratic equations on parameter δ. The reason is that continuation of the game following re-election differs from that following election of a new incumbent.

abandons office. When keeping control over the future policies is weakly important, there is no pandering to re-election: the politician in office always picks her most-preferred policy.

Relationship to the basic model. Comparison of Propositions 3 and 4, shows that public policy following election of a new incumbent in a babbling equilibrium is more efficient than that in an equilibrium with informative campaign promises: likewise, campaign promises create inefficiencies in the first period of the basic game (recall Corollary 2).

Term limits and party membership Limits to career in office devalue campaign promises. For example, suppose that term limits allow for at most one re-election. If campaign promises are informative, they should allow a challenger to establish parity with the incumbent in terms of voter information about their types. Term limits, moreover, give the challenger the electoral advantage by eroding the incumbent's commitment abilities. Then, however, the incumbent has no chance for re-election, hence, no incentives to keep her campaign promises.[23]

Proposition 6 (term limits and campaign promises) *A game with term limits has no stationary equilibrium with informative campaign promises.*

In reality, individual political representatives have careers that are limited either by natural aging or by institutionally imposed term limits. Why do

[23]Being rigorous, we would describe babbling equilibria of the game with term limits. However, this straightforward exercise is not very insightful. Note only that there are equilibria with re-election, because for citizens who receive pork as signal of congruence from the incumbent she is a better candidate than a challenger of entirely unknown type (even if the challenger is going to pander to a majority whereas the incumbent will pick her most preferred policy). For example, when δ is sufficiently close to one, there is an equilibrium in which incumbent panders to re-election in any state during her first term in office, and she picks her most preferred policy in the last term.

they tend to keep their campaign promises? A possible answer is that they are affiliated to political parties: in US history, an average share of independent politicians among the House representatives was only 0.003. Parties are freed from term limits faced by their members, and they discipline their members, for example through committee assignments, or else through providing benefits to retiring party members. Our insights regarding informativeness of campaign promises and their political consequences remain robust if we interpret our game as electoral competition by political parties rather than by individual candidates.

6 Conclusion

In this paper, we have built a model of nonbinding campaign promises to investigate their impact on elections and public policy. We found that high rate of delivery on campaign promises can be rationalized with voter beliefs in their verbal contents. While campaign promises increase voter information about political intentions by candidates for office, they may also generate inefficiencies in public policy following the election. We show that nomination for re-election attenuates these inefficiencies through increasing voter information. Finally, we find that limits to individual political careers devalue campaign talk. This may explain why individual politicians affiliate themselves with long-living organizations: political parties. Indeed, taking limits to political careers into the account, we should interpret our model as a game between political parties, rather than by individual candidates. Indeed, the literature oftentimes assumes that party discipline is perfect, and models political parties as independent players. We hope, however, that the future research will go beyond this approach, and accommodate endogenous formation of political parties into our model of campaign promises.[24]

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[24] For example, political parties may be formed during pre-play communication and bargaining. For example, one politician can collect information about types by the other politicians and then make informed offer of party membership to some of them: as long as the politicians (rationally) believe that she is going to form a party that will benefit a majority of them, they do not hesitate to tell her the truth about their types.

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A Appendix

A.1 Proof of proposition 1

Lemma 1 follows from equation (1).

Proof of Lemma 2 By Lemma 1, in the second election θ-type citizens vote for the candidate whose type is the most likely to be θ (by symmetry, the same type citizens vote in the same way). By inequalities (4) and (3), either (i) the vote is such as described by Lemma 2, or (ii) it does not depend on $p(x)$. However, if the vote does not depend on $p(x)$, the incumbent delivers pork only to θ^I-type citizens. Because this policy reveals the incumbent's type, it is not rational to ignore information on $p(x)$ while taking the voting decision. Hence, in equilibrium the vote is such as described by Lemma 2.

Proof of Lemma 3 Let

$$\overline{c} = \frac{1}{2} + \frac{\Delta}{4} \tag{33}$$

denote an average cost paid by citizens of one type for pork to citizens of some other type. The incumbent's expected second-period payoff is equal to b if she stays in office; and to $\frac{1}{3}b - \frac{2}{3}\overline{c}$ otherwise. Hence, the expected benefit from re-election is equal to

$$R = \frac{2}{3}\left(b + \overline{c}\right) = \frac{2b}{3} + \frac{1}{3} + \frac{\Delta}{6}. \tag{34}$$

The incumbent panders to re-election if and only if inequality (6) is fulfilled. In the region where $\Delta \leqslant 2b - \frac{1}{2}$, inequality (6) is fulfilled for all x. In the region where $\Delta > 2b - \frac{1}{2}$, inequality (6) is met if and only if $\min\limits_{\theta \neq \theta^I} x_\theta = 0$.

Proof of Lemma 4 Because inequality (4) is met for all $m^I(x)$, vector $m^k(x)$ does not depend on θ^k. By Lemmas 1 and 3, a citizen is indifferent between the candidates for office in the first election. By assumption (T2), he votes at random, regardless of $m^k(x)$. Therefore, a candidate is indifferent among campaign strategies. In particular, she does not mind giving promises that do not signal her type.

A.2 Proof of proposition 2

Proof of Lemma 5 By Lemma 1, in the second election θ-type citizens vote for the candidate whose type is the most likely to be type θ. The challenger is any type with probability $\frac{1}{3}$. By definition 2, θ-type voters vote for the challenger when $\theta \notin \mathcal{B}^I$. Otherwise, they vote for the incumbent if and only if $p_\theta(x) = 1$ (see the proof of Lemma 2).

Proof of Lemma 6 Let us show that

$$\arg\max_{\theta^I} E_{date\ 1.a}\left(V_\theta\left(p(x)\right) \mid \theta^I\right) = \theta.$$

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

$$E_{date\ 1.a}V_{\theta^I}\left(p(x)\right) \geqslant b + \frac{1}{3}b - \frac{2}{3}\overline{c}; \tag{35}$$

$$E_{date\ 1.a}V_{\theta \neq \theta^I}\left(p(x)\right) \leqslant -\frac{1}{2} + \frac{1}{3}b - \frac{2}{3}\overline{c}. \tag{36}$$

The right-hand-side of equation (36) lies below that of equation (35).

Proof of Lemma 8 Recall Lemma 6. The following campaign strategy

$$m^k(x) \in \arg\min_{\widetilde{m}^k(x)} \Pr\left(\theta^k = \overline{\theta}^k \mid \widetilde{m}^k(x),\ m^{-k}(x)\right) \text{ for some } \overline{\theta}^k \tag{37}$$

$$\Pr\left(\theta^k = \theta \mid m^k(x),\ m^{-k}(x)\right) = \frac{1 - \Pr\left(\theta^k = \overline{\theta}^k \mid m^k(x),\ m^{-k}(x)\right)}{2} \text{ for either } \theta \neq \overline{\theta}^k. \tag{38}$$

is dominant: when one candidate plays it, the other candidate looses the election if she plays some other campaign strategy; when one candidate plays campaign strategy other than that described by set of equations (37)-(38), the other candidate wins office with probability 1 if she plays the strategy described by the above set of equations. Hence, in equilibrium the candidates play strategy described by set of equations (37)-(38). By symmetry, and because inequality (4) is violated for some $m^I(x)$,

$$\Pr\left(\theta^k = \overline{\theta}^k \mid m^k(x),\ m^{-k}(x)\right) < \frac{1}{3}.$$

By definition 2, $\left|\mathcal{B}^k\right| = 2$.[25]

Because $\left|\mathcal{B}^I\right| = 2$, and by Lemma 5, the cost of re-election is equal to $\frac{1+\Delta x_{\mathcal{B}^I \setminus \{\theta^I\}}}{2}$ when $\theta^I \in \mathcal{B}^I$, and to $1 + \frac{\Delta}{2}\sum\limits_{\theta \neq \theta^I} x_\theta$ otherwise. Trivially, it is the lowest when $\theta^I \in \mathcal{B}^I$. Therefore, $\theta^k \in \mathcal{B}^k$. Hence, $\{1,2,3\} \setminus \mathcal{B}^k \neq \theta^k$. Therefore,

$$\Pr\left(\theta^k = \{1,2,3\} \setminus \mathcal{B}^k\right) = 0.$$

By equation (38),

$$\Pr\left(\theta^k = \theta \in \mathcal{B}^k\right) = \frac{1}{2}.$$

Proof of Lemma 8 By Lemmas 5 and 6, the incumbent is re-elected if and only if $p_\theta(x) = 1$ for either θ in set $\mathcal{B}^k$. Equation (5) is trivial. Equation (10) is met because type $\{1,2,3\} \setminus \mathcal{B}^I$ voters vote for the challenger, regardless of $p_{\{1,2,3\} \setminus \mathcal{B}^I}(x)$, and $\frac{\partial V_{\theta^I}(p(x))}{\partial p_{\{1,2,3\} \setminus \mathcal{B}^I}(x)} < 0$. Equations (12) and (13) follow from inequality (11). In the region where $\Delta \leqslant 2b - \frac{1}{2}$, inequality (11) for all states x. In the region where $\Delta > 2b - \frac{1}{2}$, it is met if and only if $x_{\mathcal{B}^I \setminus \{\theta^I\}} = 0$.

A.3 Table 1: public policy

The following table illustrates distribution of pork to types 2 and 3 citizens by the incumbent of type 1 with electoral base $B^I = \{1,2\}$.[26]

Region:	$\Delta \leqslant 2b - \frac{1}{2}$		$\Delta > 2b - \frac{1}{2}$	
Equilibrium:	Babbling	Informative	Babbling	Informative
$x_2 = 0,\ x_3 = 0$	$p_2 + p_3 = 1$	$p_2 = 1,\ p_3 = 0$	$p_2 + p_3 = 1$	$p_2 = 1,\ p_3 = 0$
$x_2 = 0,\ x_3 = 1$	$p_2 = 1,\ p_3 = 0$	$p_2 = 1,\ p_3 = 0$	$p_2 = 1,\ p_3 = 0$	$p_2 = 1,\ p_3 = 0$
$x_2 = 1,\ x_3 = 0$	$p_2 = 0,\ p_3 = 1$	$p_2 = 1,\ p_3 = 0$	$p_2 = 0,\ p_3 = 1$	$p_2 = 0,\ p_3 = 0$
$x_2 = 1,\ x_3 = 1$	$p_2 + p_3 = 1$	$p_2 = 1,\ p_3 = 0$	$p_2 = 0,\ p_3 = 0$	$p_2 = 0,\ p_3 = 0$

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

[26] Notation p_θ stands for $p_\theta(x)$.

A.4 Proof of proposition 3

Let us prove Lemma 10 (the rest of the proof is in the main text). Let us show that the policy described by Lemma 10 is

$$p(x) = \underset{\widetilde{p}(x)\in\widetilde{\mathcal{P}}}{\arg\max}\left\{\sum_{\theta\in\mathcal{B}^I} V_\theta(\widetilde{p}(x))\right\}, \text{ where} \tag{39}$$

$$\widetilde{\mathcal{P}} = \left\{\widetilde{p}(x) \mid V_\theta(\widetilde{p}(x)) + R \geqslant b \text{ for both } \theta \text{ in set } B^I\right\}. \tag{40}$$

Step 1 Note that $\underset{\widetilde{p}(x)\in\mathcal{P}}{\arg\max}\left\{\sum_{\theta\in\mathcal{B}^I} V_\theta(\widetilde{p}(x))\right\}$ is described by equation (10) and either (i) set of equations (5) and (12), in the region where $\Delta \leqslant 2b-1$; or (ii) set of equations (14), in the region where $\Delta > 2b-1$.

By Proposition 2, in the region where $\Delta \leqslant 2b-1$, vector $p(x)$ given by equation (39) is described by set of equations (10), (5) and (12). It remains to show that in the region where $\Delta > 2b-1$ it is described by Lemma 10.

Step 2 Consider the region where $\Delta > 2b-1$. When $x_{\theta^I} = x_{\mathcal{B}^I\setminus\{\theta^I\}}$, vector $p(x)$ described by set of equations (10) and (14) lies in set $\widetilde{\mathcal{P}}$. Indeed, when $x_{\theta^I} = x_{\mathcal{B}^I\setminus\{\theta^I\}} = 0$,

$$R + V_\theta(p(x)) = R + b - \frac{1}{2} > b \text{ for both } \theta \text{ in set } \mathcal{B}^I; \tag{41}$$

when $x_{\theta^I} = x_{\mathcal{B}^I\setminus\{\theta^I\}} = 1$,

$$R + V_\theta(p(x)) = R > b \text{ for both } \theta \text{ in set } \mathcal{B}^I. \tag{42}$$

Hence, in the states when $x_{\theta^I} = x_{\mathcal{B}^I\setminus\{\theta^I\}}$, vector $p(x)$ given by equation (39) is described by set of equations (10) and (14).

Step 3 Recall that we focus on pure strategies. Therefore, when $x_{\theta^I} \neq x_{\mathcal{B}^I\setminus\{\theta^I\}}$, there are three possibilities: vector $p(x)$ given by equation (39) is described by equations (10) and (14); or (10) and (15); or else (10) and (16).[27] For each of these three sets of equations, we find a region of parameter Δ where policy $p(x)$ that it describes lies in set $\widetilde{\mathcal{P}}$.

A. When $p(x)$ is described by set of equations (10) and (14),

$$\min_{\theta \in \mathcal{B}^I, x} R + V_\theta(p(x)) = R - \frac{1}{2} \tag{43}$$

(the incumbent is the most eager to deviate her most preferred policy when $x_{\theta^I} = 1$ and $x_{\mathcal{B}^I \setminus \{\theta^I\}} = 0$). The right-hand-side of equation (43) is no lower than threshold b if and only if $\Delta \geqslant 2b + 1$. Hence, vector $p(x)$ described by equations (10) and (14) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \geqslant 2b + 1$.

B. When $p(x)$ is described by equations (10) and (15),

$$\min_{\theta \in \mathcal{B}^I, x} \{R + V_\theta(p(x))\} = R \tag{44}$$

(the incumbent is the most eager to deviate her most preferred policy when $x_{\theta^I} = 1$). The right-hand-side of equation (44) is no lower than threshold b if and only if $\Delta \geqslant 2b - 2$. Hence, vector $p(x)$ described by equations (10) and (14) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \geqslant 2b - 2$.

C. When $p(x)$ is described by equations (10) and (16),

$$\min_{\theta \in \mathcal{B}^I, x} \{R + V_\theta(p(x))\} = R + b - \frac{1 + \Delta}{2} \tag{45}$$

(the incumbent is the most eager to deviate to her most preferred policy when $x_{\mathcal{B}^I \setminus \{\theta^I\}} = 1$). The right-hand-side of equation (45) is no lower than threshold b if and only if $\Delta \leqslant 2b - \frac{1}{2}$. Hence, vector $p(x)$ described by equations (10) and (16) lies in set $\widetilde{\mathcal{P}}$ if and only if $\Delta \leqslant 2b - \frac{1}{2}$.

Step 4 By steps 1 and 3.A, in the region where $\Delta \geqslant 2b + 1$, vector $p(x)$

[27] It will become clear that $p(x)$ cannot be described by equation (10) and the mirror image of equations (14), because at least one of three policies above lies in set $\widetilde{\mathcal{P}}$, and each of them is more efficient.

given by equation (39) is described by set of equations (10) and (14). By step 3.A-C, in the region where $2b - \frac{1}{2} < \Delta < 2b + 1$, $p(x)$ given by equation (39) is described by equations (10) and (15): set $\widetilde{\mathcal{P}}$ has no other elements in this region. When $2b - 1 < \Delta \leqslant 2b - \frac{1}{2}$, vector $p(x)$ given by equation (39) is described by equations (10) and (16): in this region both policy described by equations (10) and (16), and policy described by equations (10) and (15) lie in set $\widetilde{\mathcal{P}}$ (see step 3.B and C). However, the former one is more efficient:

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

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

Step 5 Posteriors

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

and vector $p(x)$ described by equation (39) are mutually consistent.

A.5 Proof of proposition 4

Let V_θ^{t+1} be the expected discounted payoff by θ-type citizens as of date $t+1$.

$$\text{Let } V_\theta\left(\widehat{\theta}\right) = E_{t.d}\left(V_\theta^{t+1} \mid \theta^{I_{t+1}} = \widehat{\theta}\right).$$

In these terms, the expected discounted benefit from re-election by incumbent I_t is equal to

$$R(p(x_t)) = \frac{2\delta}{3}\left(V_{\theta^{I_t}}\left(\theta^{I_t}\right) - V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right)\right), \tag{46}$$

where $\overline{\theta}^{I_t} \neq \theta^{I_t}$, and $p(x_t)$ is a stationary equilibrium policy.

1. When vector $p(x_t)$ is described by set of equations (19),

$$V_{\theta^{I_t}}\left(\theta^{I_t}\right) = \frac{b - \overline{c}}{1 - \delta},\ V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right) = \frac{1}{1 - \delta}\left(\frac{1}{2}b - \frac{3}{2}\overline{c}\right), \text{ and so}$$

$$R(p_t(x_t)) = \frac{\delta\,(b+\bar{c})}{3\,(1-\delta)} = \frac{\delta(4b+2+\Delta)}{12\,(1-\delta)}. \tag{47}$$

Hence, the incumbent does not deviate from policy $p(x_t)$ described by set of equations (19) if and only if inequality (22) is met. It is equivalent to inequality (23).

2. When vector $p(x_t)$ is described by set of equations (20),

$$V_{\theta^{I_t}}\left(\theta^{I_t}\right) = b - \frac{1}{4} + \frac{\delta}{2}\left(V_{\theta^{I_t}}\left(\theta^{I_t}\right) + \frac{V_{\theta^{I_t}}\left(\theta^{I_t}\right)}{3} + \frac{2V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right)}{3}\right),$$

$$V_{\theta^{I_{t-1}}}\left(\overline{\theta}^{I_t}\right) = -\bar{c} + \frac{b}{4} - \frac{1}{4} + \frac{\delta}{2}\left(V_{\theta^{I_{t-1}}}\left(\overline{\theta}^{I_t}\right) + \frac{V_{\theta^{I_t}}\left(\theta^{I_t}\right)}{3} + \frac{2V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right)}{3}\right)$$

Hence, $V_{\theta^{I_t}}\left(\theta^{I_{t1}}\right) - V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right) = \frac{3b}{4} + \bar{c} + \frac{\delta}{2}\left(V_{\theta^{I_t}}\left(\theta^{I_t}\right) - V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right)\right)$, from where

$$V_{\theta^{I_t}}\left(\theta^{I_t}\right) - V_{\theta^{I_t}}\left(\overline{\theta}^{I_t}\right) = \frac{3b+2+\Delta}{2(2-\delta)}, \text{ and } R(p(x_t)) = \frac{\delta\,(3b+2+\Delta)}{3(2-\delta)}. \tag{48}$$

Hence, the incumbent does not deviate from strategy $p(x_t)$ described by set of equations (20) if and only if set of inequalities (24) is met. It is equivalent to set of inequalities (25).

A.6 Proof of proposition 5

Let us denote with

$$\widetilde{V}_\theta\left(\widehat{\theta}\right) = E_{t-1.d}\left(V_\theta^t \mid \theta^{I_t} = \widehat{\theta},\, \mathcal{B}^{I_t} = \{1,2,3\}\right)$$

the expected discounted payoff by θ-type citizens following an open-seat election won by the $\widehat{\theta}$-type politician. In these terms, the expected discounted benefit from re-election is equal to

$$\widetilde{R}(p(x_t)) = \delta\left(V_{\theta^{I_{t-1}}}\left(\theta^{I_{t-1}}\right) - \frac{1}{3}\widetilde{V}_{\theta^{I_{t-1}}}\left(\theta^{I_{t-1}}\right) - \frac{2}{3}\widetilde{V}_{\theta^{I_{t-1}}}\left(\overline{\theta}^{I_{t-1}}\right)\right), \tag{49}$$

were, recall, $\overline{\theta}^{I_{t-1}}$ is an element from set $\{1,2,3\}\setminus I_{t-1}$. When $p(x_t)$ is described by set of equations (5) and (7) following an open-seat election, and (19) following re-election,

$$\widetilde{R}(p_t(x_t)) = -\frac{\delta\Delta}{8} + \frac{\delta^2\,(b+\overline{c})}{3\,(1-\delta)}.$$

The incumbent does not deviate from strategy I.a if and only if

$$\frac{1+\Delta}{2} \leqslant \frac{\delta^2(4b+2+\Delta)}{12(1-\delta)} - \frac{\delta\Delta}{8}, \tag{50}$$

which is equivalent to inequality (29).

When $p(x_t)$ is described by set of equations (28),

$$\widetilde{R}(p_t(x_t)) = -\frac{\delta\Delta}{8} + \frac{\delta^2\,(3b+2+\Delta)}{3(2-\delta)}.$$

The incumbent does not deviate from strategy II if and only if

$$\frac{1}{2} \leqslant \frac{\delta^2(3b+2+\Delta)}{3(2-\delta)} - \frac{\delta\Delta}{8} < \frac{1+\Delta}{2}, \tag{51}$$

which is equivalent to set of inequalities (31).

When $p(x_t)$ is described by set of equations (21),

$$\widetilde{R}(p_t(x_t)) = \frac{2\delta\,(b+\overline{c})}{3\,(1-\delta)}.$$

The incumbent does not deviate from strategy III if and only if

$$\frac{1}{2} > \frac{\delta\,(4b+2+\Delta)}{6\,(1-\delta)}, \tag{52}$$

which is equivalent to inequality (32).

When $p(x_t)$ is described by set of equations (26) in any period $t \leqslant \tau$, where τ is defined by equation (27), (5) and (7) indexed with time indicator in period τ, and (22) in any period after τ,

$$\widetilde{R}(p_t(x_t)) = \frac{\delta\,(2b+1+\Delta)}{8\,(1-\delta)}.$$

The incumbent does not deviate from strategy I.b if and only if

$$\max\left\{1, \frac{1+\Delta}{2}\right\} \leqslant \frac{\delta(2b+1+\Delta)}{8(1-\delta)},$$

which is equivalent to set of inequalities (30).

A.7 Proof of proposition 6

Suppose that the game with term limits has an equilibrium with informative campaign promises. When the incumbent is in office for the first term, she either panders to re-election in all states, as described by set of equations (19), or she panders to re-election if and only if no overspending is involved, as it is described by set of equations (20): recall, that in equilibrium with informative campaign promises there is pandering to re-election, at least in some states (see the proof of Proposition 4).

Let us show that there is no stationary equilibrium with informative campaign promises in which the incumbent panders to re-election in all states. The incumbent would like to pander to re-election in all states if and only if

$$-\frac{1+\Delta}{2} + \delta b + \delta^2 V \geqslant \delta V, \tag{53}$$

where V denotes pre-play citizen expected discounted payoff. As in the basic game, there are two types in her electoral base. During incumbent/challenger election, the challenger also frames her electoral base with two types - she can do so because campaign promises are informative. Hence, there is at least one type in the intersection of the candidates' electoral bases. The voters of this type prefer the incumbent to the challenger if and only if

$$\frac{4b-2-\Delta}{8}+\delta V \geqslant \frac{4b-2-\Delta}{4}+\frac{\delta\left(4b-2-\Delta\right)}{8}+\delta^2 V. \tag{54}$$

However, inequalities (53) and (54) contradict each other (if they both are met, we should have

$$\frac{(1+\delta)}{2}\left(b-\frac{1}{2}-\frac{\Delta}{4}\right)<\delta V\left(1-\delta\right)\leqslant \delta b-\frac{1+\Delta}{2},$$

but the lower limit of this set of inequalities lies above its upper limit).

Let us now show that there is no stationary equilibrium with informative campaign promises in which an incumbent panders to re-election if and only if no overspending is involved. She would like to pander to re-election contingent on no overspending being involved if and only if

$$\delta b-\frac{1+\Delta}{2}<\delta\widetilde{V}\left(1-\delta\right)\leqslant \delta b-\frac{1}{2}, \tag{55}$$

where $\widetilde{V}$ denotes pre-play citizen expected discounted payoff. The voters in the overlap of her and the challenger's electoral bases vote for re-election if and only if

$$\delta\widetilde{V}\left(1-\delta\right)\geqslant\frac{1}{2}\left(b-\frac{1}{2}+\delta\left(b-\frac{1}{2}-\frac{\Delta}{4}\right)\right). \tag{56}$$

The expected pre-play citizen payoff $\widetilde{V}$ is implicitly given by equation:

$$\widetilde{V}=\frac{b-1}{2}+\frac{\delta}{6}\left(b-1-\frac{\Delta}{2}\right)-\frac{\Delta}{6}+\frac{\delta\widetilde{V}}{2}+\frac{\delta^2\widetilde{V}}{2},\text{ or, explicitly,}$$

$$\widetilde{V}=\frac{6b-6+2\Delta+\delta\left(2b-2-2\Delta\right)}{6\left(1-\delta\right)\left(2+\delta\right)}.$$

It is straightforward that inequality (56) is equivalent to inequality

$$\delta\left(-3b-\frac{3}{2}-\frac{\Delta}{2}\right)+\delta^2\left(-b-\frac{\Delta}{4}-\frac{1}{2}\right)-6\left(b-\frac{1}{2}\right)\geqslant 0,$$

which is never met, because parameters δ and Δ are positive, and $b>\frac{1}{2}$.