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Spending cuts or tax increases? The composition of fiscal adjustments as a signal

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Abstract

This paper shows that the composition of fiscal adjustments, spending cuts versus tax increases, serves as a signal of the government's degree of collusion with special interests. The politico-economic model of fiscal policies, combining retrospective voting with common-agency-type lobbying, presents undominated separating equilibria and intuitive pooling ones, in both of which fiscal adjustments with sufficiently large spending cuts lead to incumbent reappointment whereas those with only tax increases lead to incumbent defeat. These findings are consistent with the recent empirical evidence of voters behaving as fiscal conservatives. The efficiency-enhancing aspects of the signaling mechanism and the effects of imposing a deficit limit are also analyzed.

JEL classification: D72; E62; H30

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1. Introduction

This paper attempts to explain the public choice of the composition of fiscal adjustments, spending cuts versus tax increases, from a signaling point of view. In

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the literature of recent political economics, while the determination of budget deficits has been analyzed intensively, there is no equilibrium theory, at least to my knowledge, that addresses the issue.[1] Within a politico-economic model that combines retrospective voting with common-agency-type lobbying, this paper will reveal the role of the composition of fiscal adjustments as a signal of the government's hidden degree of collusion with special interests.

A key motivation and inspiration for this research is the range of recent empirical studies on voters' responses to preelectoral fiscal policy manipulation. Although numerous empirical studies tested for systematic business or fiscal fluctuations coinciding with election periods in major developed countries, they found mixed results at best.[2] In sharp contrast to such political budget cycle literature, Peltzman (1992), Besley and Case (1995a, b), Alesina et al. (1998), and Brender (2003), among others, present evidence of voters behaving as "fiscal conservatives," who often tend to remove deficit-producing incumbents from office.[3] These studies found that spending cuts are politically beneficial, while the results for tax increases are somewhat mixed. For instance, Peltzman (1992) examined the data on U.S. Presidential and gubernatorial elections and found that a spending increase, not a tax increase, statistically significantly decreases the incumbent party's vote share. Alesina et al. (1998) analyzed recent fiscal data from 19 OECD countries and pointed out that in a period of fiscal adjustment, governments relying on spending cuts may survive longer or enjoy greater popularity than those relying on tax increases. Besley and Case (1995a) found, using data on U.S. gubernatorial elections, that incumbents hold spending low in their first term in office but expand it significantly in the lame-duck term. Besley and Case (1995b) also revealed, using the same data set, that an increase in a state's own taxes produces a higher probability of incumbent defeat. Brender (2003) examined the data on Israeli local elections to find that the excess wages paid in public entities had a significant negative effect on the mayors' reelection probability.

Fiscal adjustment in Japan during the 1980s, mostly implemented under the Nakasone cabinet (1982–1987), is also an interesting episode in line with the above empirical studies as well as the present analysis. Partly because of recessions after the oil crises, the central government, in 1982, was suffering from an unprecedented huge budget deficit when Prime Minister Yasuhiro Nakasone took office. He embarked on a policy of fiscal consolidation, following the proposals that the Provisional Commission on Administrative Reform (*Rincho*) recommended under a slogan of "fiscal reconstruction without tax increases." Expenditure management through setting ceilings on budget requests resulted in spending cuts, particularly in areas such as agriculture, health care, and public works, the areas where Japan's most powerful interest groups press for expenditures often criticized as wasteful by the

[1] See Persson and Tabellini (2000) for the recent developments in political economics.

[2] For surveys on empirical as well as theoretical literature, see Alesina (1988) and Drazen (2001) among others. The recent empirical studies, including Gonzalez (2002), Shi and Svensson (2002), and Brender and Drazen (2004), point out that political business or budget cycles are more likely to be observed in countries where democracies and/or budget transparency are not well established.

[3] See also Niskanen (1975), Landon and Ryan (1997), and Lowry et al. (1998).

media. Privatization of the national railway company, whose continual deficits placed a big fiscal burden on the government, was also carried out. Thanks to these expenditure restraint initiatives, the government decreased its deficit drastically with no new taxes introduced and finally succeeded in eliminating a new issue of deficit-financing bonds in the FY 1990 budget.[4] Those achievements boosted the popularity of Mr. Nakasone, coupled with his presence as a global political figure (such as his close relationship with U.S. President Ronald Reagan). Indeed, exceptionally, he was allowed by the ruling Liberal Democratic Party to be reelected twice as prime minister, holding the office for longer than anyone else over the last three decades.

Recent developments in common-agency lobbying models (for e.g. Bernheim and Whinston (1986), Grossman and Helpman (1994), Grossman and Helpman (1996a), and Dixit et al. (1997), among others) also motivate the research. In those models, inefficient policy outcomes occur when only some sections of society are organized to participate in lobbying. In the context of the political economy of fiscal policies, the inability of unorganized citizens to lobby is the reason why government makes socially wasteful outlays and accumulates deficits in favor of special interests. In other words, those models treat unorganized citizens as a silent majority with no means of affecting political decision-making.

Despite being unable to lobby collectively, they do have a means of disciplining the government, namely voting. If they could identify the degrees of collusion between politicians and special interests, they would be voting to replace more-collusive incumbents with less-collusive ones. Realistically, however, they seem not to have such information, and electoral control is undermined even though they are the majority of voters. If this is the case, the theoretical implication of common-agency lobbying models will not lose power.

Yet, even in a circumstance of asymmetric information, fiscal policies may signal the degrees of collusion. Though being unaware of which candidate is more collusive, uninformed voters can vote retrospectively, based on the past fiscal performance of the government. If loose fiscal policies were implemented, for example, voters might cast ballots against the incumbent in the next election, inferring that he is more collusive with special interests than other candidates.[5] With the majority of voters behaving in such a way, incumbents may risk future political rents stemming from reappointment when choosing policy in favor of special interests today.

This argument suggests that unorganized citizen-voters can influence the government's fiscal decision in a similar way to lobbying. Just as special interests promise to pay political contributions to policymakers for implementing fiscal policies in their favor, unorganized citizen-voters reward them with reelection rent for implementing fiscal policies that convincingly reveal themselves as less-collusive politicians. By means of retrospective voting, unorganized general citizens no longer remain a silent majority but may implicitly act as another lobby.

[4]Admittedly, cyclical increases in tax revenues and several accounting tricks also explain a large part of the achievement. For details as well as the myth and reality of "fiscal adjustment without tax increases," see OECD (1989), Noguchi (1991), and Suzuki (2000, Chapter 7).

[5]In this paper we will use "he" as the pronoun for a politician.

Combined with uninformed voters' retrospective voting, the common-agency lobbying models may produce novel theoretical predictions on the outcome of special-interest politics. The government will make fiscal decisions to build a good reputation among uninformed voters for reelection as well as to please special interests for political contributions. It may then engage in fiscal adjustments, changing fiscal policies from those that special interests want toward what the general public needs.

The information about the degrees of collusion between policymakers and special interests is conveyed through not only the size but also the composition of fiscal adjustments, spending cuts versus tax increases. The reason is that different degrees of collusion result in different political costs of fiscal adjustments, depending on the composition. For those more collusive with special interests, the cost of cutting socially wasteful outlays is higher, relative to that of increasing taxes, since they care more about the well-being of special interests. This implies that tax-based fiscal adjustments are likely to produce beliefs among uninformed voters that incumbents are more collusive with special interests. Conversely, to establish a reputation of being less collusive, they have to carry out fiscal adjustments based primarily on spending cuts. This scenario seems consistent with the recent empirical results cited above and also with the history of fiscal adjustment in Japan during the 1980s.

This paper will formalize the signaling mechanism and investigate the disciplinary power of retrospective voting. It constructs a four-stage game of political competition among three actors: special interests, politicians, and unorganized citizen-voters. Politicians are potentially of two types: more and less collusive with special interests. The type is known only to special interests who engage in lobbying, while unorganized citizens cannot lobby but are the majority of voters.

The game proceeds as follows. In the first stage, nature chooses the type of incumbent politician. In the second stage, special interests offer a menu of political contributions to the incumbent, knowing his type. In the third stage, he chooses a fiscal policy, and in the fourth stage, an election is held, where two candidates, the incumbent and a challenger, run for the next term of office. Unorganized citizen-voters want to appoint only a less-collusive politician. Because of asymmetric information, however, they have to decide which candidate to elect using only the information of the incumbent's past fiscal policy. Employing the concept of perfect Bayesian equilibrium and applying domination-based refinement, the analysis focuses on the undominated separating equilibria as well as the intuitive pooling ones of the game.

The results are as follows. In undominated separating equilibria, a unique policy outcome is realized. A less-collusive incumbent implements fiscal adjustments and is reelected with certainty, while a more-collusive one carries out a pro-lobby fiscal policy, financing socially wasteful outlays with a deficit, and is ousted with certainty. The composition of the equilibrium fiscal adjustment varies with the size of reelection rewards. It is based only on spending cuts in the case of small reelection rewards and tends to rely more on tax increases as they are larger. An incumbent cannot survive in power after implementing fiscal adjustments with only tax increases. Social welfare is also enhanced in the equilibria, compared with the level

realized in the absence of retrospective voting. The signaling mechanism not only enables voters to oust a more-collusive incumbent but also induces a less-collusive one to cut wasteful spending. The larger the reelection rewards, the more the wasteful spending that is eliminated. With sufficiently large reelection rewards, government spending is adjusted to the level that maximizes the social surplus.

The game also has pooling equilibria that survive the intuitive criterion. The intuitive pooling equilibria generally produce multiple policy outcomes for given reelection rewards, with both types of incumbent reelected with certainty. For instance, there always exists an intuitive pooling equilibrium in which both types of incumbent engage in fiscal adjustment in the same way as a less-collusive incumbent does in the undominated separating equilibria. However, there also exists one in which both types choose the pro-lobby fiscal policy that a less-collusive incumbent would implement in the absence of retrospective voting. In the latter pooling outcome, a more-collusive incumbent is induced to cut wasteful spending but is allowed to survive longer in power, as compared with the separating equilibria. The possibility of pooling equilibria may undermine the power of retrospective voting to discipline self-interested politicians.

Focusing on the undominated separating equilibria, this paper will also explore the desirability of a deficit limit. Tabellini and Alesina (1990) argued for such a budget rule using the framework of strategic deficit creation, where incumbents strategically accumulate public debt to constrain the policy choices of their successors.[6] In the model of this paper, running deficits binds no future policies at all, because of the assumed availability of lump-sum taxes. Yet a deficit limit is shown to promote reduction in wasteful spending, because it induces special interests to pay less to policymakers for spending expansion and thereby increases their incentives for reelection.

How the model of this paper differs from those in the related literature should be clarified. The earlier literature on retrospective voting, such as Barro (1973), Ferejohn (1986), Austin-Smith and Banks (1989), and Reed (1994), assumes voters' collective precommitment to a voting strategy contingent on the government's policy decision. Such precommitment is precluded here, as in Rogoff (1990), Harrington (1993), Coate and Morris (1995), and Dhami (2003). Regarding fiscal policies, the availability of lump-sum taxes is assumed here to analyze the signaling effects in isolation from those related to intertemporal tax smoothing (Barro, 1979; Cukierman and Meltzer, 1989) and strategic deficit creation (Alesina and Tabellini, 1990; Persson and Svensson, 1989; Tabellini and Alesina, 1990; Aghion and Bolton, 1990).

Rogoff (1990) is the seminal paper that analyzed a signaling model of fiscal policy, focusing on the hidden competence of policymakers, though he does not address special-interest politics or budget deficits. Assuming that a more competent politician can cut spending at a smaller cost, we may construct a Rogoff-type politico-economic model that generates spending-based fiscal adjustment as a

[6]Peletier et al. (1999), however, show that a balanced-budget rule may not be desirable if public investment affecting future tax revenues is taken into account.

signaling equilibrium outcome. However, unlike the model of this paper, it will fail to explain fiscal adjustments composed of both spending cuts and tax increases. Also, in this kind of model, every pooling equilibrium is ruled out by the intuitive criterion.

Grossman and Helpman (1996b) combined electoral competition with lobbying in a different manner from this paper, to give a rigorous justification for the reduced-form government objective assumed in their common-agency lobbying models. They incorporated lobbies' campaign contributions into a spatial model of two-party electoral competition, assuming that the parties can spend that money to attract additional votes. Following this foundation, it is no longer valid to claim that the common-agency lobbying models treat unorganized citizens as a silent majority. Nonetheless, the model of this paper differs from theirs in two important respects. First, it introduces asymmetric information about the type of incumbent and examines the effect of retrospective voting on political outcome, precluding his precommitment to any policy platform in advance of election. Second, while neglecting the effect of political contributions on his chance of reappointment, the model instead takes account of their effect on his incentive for reappointment and also deals with the effect of the voters' beliefs on electoral outcomes explicitly.

The rest of this paper is organized as follows. The next section presents the model consisting of two periods. For expositional convenience, we will concentrate on the game in period 1, taking the period 2 equilibrium payoffs as given. The derivation of the equilibrium in the period 2 game, as well as its formal description, is left to Appendix A. Section 3 characterizes the fiscal policies realized in the perfect Bayesian equilibria. Section 4 focuses on the unique policy outcome realized in the undominated separating equilibria, and Section 5 analyzes the multiple policy outcomes realized in the intuitive pooling equilibria. Section 6 examines the effects of introducing a deficit limit. Section 7 concludes the paper. The proofs of propositions are collected in Appendix B.

2. The model

Consider a two-period model of political economy of fiscal policy. Citizens in period 1 consist of special interests, who are collectively organized as a lobby, and unorganized citizen-voters. The population of special interests is normalized to unity while that of unorganized citizen-voters is equal to $n>1$. In period 1, a politician in office implements a fiscal policy $(g,\tau)\in\Re^2_+$, where g and τ, respectively, represent government spending and a lump-sum tax per capita. Both are measured in terms of a numeraire. Every citizen as well as the government can save and borrow in period 1 at a fixed interest rate, which we assume is equal to zero for simplicity. A budget deficit, $(1+n)(g-\tau)$, is financed by lump-sum taxes in period 2. Elections are held at the end of period 1, where the incumbent and a new challenger run for office in period 2. Since $n>1$, unorganized citizens constitute the majority of voters, and their homogeneity allows us to assume that only they cast ballots. Special interests instead lobby by offering a political contribution to the incumbent. At the beginning of

period 2, new citizens, whose population is $m>0$, enter the society and bear part of the taxes for debt repayment.[7]

2.1. Payoffs from period 1 fiscal policy

We will first state the per capita payoffs that the main actors of the model enjoy from period 1 fiscal policy.

Unorganized citizens receive a benefit, $v(g)$ ($v'(g)>0$ and $v''(g)<0$), from government spending and pay a lump-sum tax, τ, in period 1. They also bear the burden of debt repayment in period 2, the present value of which amounts to $(1+n)(g-\tau)/(1+n+m)$ per capita. Assuming a constant marginal utility for private consumption, we will denote each unorganized citizen's payoff from period 1 fiscal policy by

$$w_u = v(g) - \phi_g g - \phi_\tau \tau,$$

where $\phi_g = (1+n)/(1+n+m)$ and $\phi_\tau = m/(1+n+m)$.

Special interests, on the other hand, receive a benefit, $\pi(g)$ ($\pi'(g)>0$ and $\pi''(g)<0$), and pay as much tax in periods 1 and 2 as the unorganized. If we let $c\geqslant 0$ be a political contribution that they pay to the period 1 incumbent collectively as a lobby, their per capita payoff is written as

$$w_o = \pi(g) - \phi_g g - \phi_\tau \tau - c.$$

With respect to these payoff functions, we assume that special interests enjoy spending expansion more than unorganized citizens:

Assumption 1. $\pi'(g)>v'(g)$ for all $g>0$.

We should also note that because $\phi_g + \phi_\tau = 1$ with $0<\phi_g<1$, citizens living in period 1 pay only a part of the cost of government spending when the government runs deficits.

The benefits are also assumed to last for only one period. Thus the newcomers in period 2 pay the taxes for debt repayment without enjoying benefits. Their per capita payoff from period 1 fiscal policy is accordingly written as

$$w_2 = -\phi_g(g-\tau).$$

The payoff to the office-holding politician from period 1 fiscal policy consists of two components: the aggregate economic welfare he produces and the political contribution he receives. The former is defined in a utilitarian fashion as $nw_u + w_o + mw_2 = nv(g) + \pi(g) - (1+n)g - c$, while the latter is equal to c. Following Grossman and Helpman (1994), we will define his payoff as a weighted

[7] As in Rogoff (1990), the analysis does not consider political parties, in order to focus on the role of informational asymmetry about the degree of collusion in determining the composition of fiscal adjustments. As suggested by Tavares (2004), incorporating partisan factors is an important direction of extension, for which the model developed by Dhami (2003) will be a useful reference.

sum of these two. With weight $1+\theta$ placed on the latter, it is equal to

$$S(g)+\theta c,$$

where $S(g)$ denotes the social surplus, defined by $S(g)=nv(g)+\pi(g)-(1+n)g$. As a regularity condition, it satisfies

Assumption 2. $\lim_{g\to 0}S(g)=\lim_{g\to+\infty}S(g)=-\infty$.

There are potentially two types of politician with $\theta\in\{\theta_H,\theta_L\}$ $(\theta_H>\theta_L>0)$.[8] A politician endowed with θ_i is called a type-i politician or type i for short. Type H is more collusive with special interests because of his stronger preference for political contributions. The prior probability of the incumbent's being type-L is denoted by $p\in(0,1)$.

Information about a politician's type is asymmetric between special interests and unorganized citizen-voters. Special interests are fully informed while unorganized citizens are uninformed, only knowing the probability distribution.

The assumption of lump-sum taxes should be remarked on. It allows us to focus on the signaling effect of fiscal adjustments in isolation from the intertemporal tax smoothing effect and the strategic deficit creation effect prevailing with distortionary taxes.[9] Furthermore, the uniformity of per capita lump-sum taxes across all citizens, coupled with Assumption 1, ensures that an incumbent can favor special interests only with wasteful spending. This feature of the model is in line with Tullock's (1997) argument of *disguised transfers* to special interests. While redistribution to the poor generally takes the form of cash or in-kind transfers, those to special interests are typically much less direct. The average transfer is disguised as something else, such as public investments, government purchases, price subsidies, etc.[10]

2.2. Lobbying

Collectively as a lobby, special interests offer a menu of political contributions to the incumbent in advance of policy choice. Let $c=c_i(g,\tau)$ be the one offered to a type-i incumbent; they promise a contribution $c_i(g,\tau)\geqslant 0$ on condition of implementing a fiscal policy (g,τ). Importantly, we will assume that they can perfectly conceal from the eyes of unorganized citizens any political contribution they pay as well as any menu they offer.[11]

[8] If $\theta<0$, politicians do not accept any political contributions.

[9] With tax distortions introduced in the model, an incumbent may accumulate deficits to prevent his successor from increasing wasteful spending by raising the marginal cost of taxation in the future. Such strategic deficit creation, however, seems to have obtained little empirical relevance in the literature.

[10] Disguised transfer itself may be a problem of asymmetric information. See Coate and Morris (1995). In the model of this paper, as it turns out later, allowing differentiation of taxes between special interests and unorganized citizens does not alter the results (see footnote 14).

[11] The recent articles such as Prat (2002) and Coate (2004) assume, by contrast, that voters correctly observe how much campaign money a politician receives from interest groups. They show that it signals a politician's hidden type and explore the welfare implications of restricting campaign advertising.

2.3. Voting

Two candidates, the incumbent and a new challenger, run for period 2 office in the election held at the end of period 1. The probability of the challenger's being type-L is exogenously fixed and denoted by $q \in (0,1)$. Unorganized citizens vote after observing a fiscal policy in period 1. They want to appoint only a type-L politician because type H will spend more excessively, as explained in the next subsection. Because of asymmetric information, however, the best they can do is to vote retrospectively, updating their beliefs about the incumbent's type with information about the fiscal policy implemented in period 1.

Let $p(g,\tau)$ be the posterior probability of the incumbent's being type-L given his policy choice, (g,τ). The beliefs are constructed following Bayes' rule. Voters reelect the incumbent if $p(g,\tau)>q$, while appointing the challenger if $p(g,\tau)<q$. When $p(g,\tau)=q$, they are indifferent between the two. Thus, voting behavior is represented by a system of reelection probabilities,

$$\mu(g,\tau)=\begin{cases}1 & \text{if } p(g,\tau)>q,\\ \mu\in[0,1] & \text{if } p(g,\tau)=q,\\ 0 & \text{otherwise,}\end{cases} \tag{1}$$

under which the incumbent is reelected with probability $\mu(g,\tau)$ if he implements (g,τ).

2.4. Equilibrium payoffs in period 2

The game in period 2 basically repeats that in period 1, except for three points: (i) the total population increases, (ii) the government cannot finance spending by deficits, and (iii) no election is being held. We will state some properties of the equilibrium outcome and payoffs in period 2 that are necessary to analyze policy determination in period 1. Their derivation as well as the formal description of the period 2 game is left to Appendix A.

In period 2, because no election is being held, the government engages in socially wasteful spending to please the lobby, choosing more excessive spending when a type-H politician takes office. Note that each type's equilibrium spending level is independent of fiscal policies implemented in period 1, because of the availability of lump-sum taxes.

The equilibrium payoffs to unorganized citizens and special interests depend on which type of politician will be appointed. Let V_i and Π_i, respectively, be those that unorganized citizens and special interests earn in per capita terms with type i in office. Naturally, they satisfy

$$V_L>V_H \tag{2}$$

and

$$\Pi_L<\Pi_H, \tag{3}$$

because type H is more pro-lobby and no election will be held.

The equilibrium payoff to a politician depends on whether he will be in or out of office. If in office, he will earn $\varepsilon + Z_I$, where $\varepsilon \geqslant 0$ is an exogenous 'ego rent' stemming from holding power itself and Z_I is a weighted sum of the endogenously determined social surplus and political contribution. The ego rent is assumed to be the same for every politician in office. Z_I is also independent of his own type, coinciding with the maximum social surplus that is potentially realized in period 2. This is because in the equilibrium every incumbent is left to be indifferent between accepting and rejecting the lobby's offer. If out of office, on the other hand, a politician will earn a payoff equal to the social surplus actually realized, for he gets no ego rent or political contribution. Because the actual social surplus depends on which type of politician takes office, we will let Z_H (Z_L) denote the equilibrium payoff to a politician out of office when a type-H (type-L) politician is in office. Because type H spends more excessively, we have

$$Z_I > Z_L > Z_H. \tag{4}$$

3. Perfect Bayesian equilibria

We will confine attention to the game in period 1 and solve it with the concept of perfect Bayesian equilibrium, taking the period 2 equilibrium payoffs as given. An equilibrium consists of fiscal policies chosen by types H and L, menus of political contributions offered to the respective types, and a system of reelection probabilities. Since there are a huge number of equilibria sustaining the same outcome, we will particularly concentrate on the equilibrium policy outcomes.

3.1. Characterization

Consider first the behavior of the incumbent. At the stage of policy choice in period 1, he expects to earn $Z_I + \varepsilon$ in period 2 if he wins reelection, and $qZ_L + (1-q)Z_H$ otherwise. The former happens with probability $\mu(g,\tau)$ when he chooses a fiscal policy (g,τ) in period 1. Accordingly, taking $c_i(g,\tau)$ and $\mu(g,\tau)$ as given, a type-i incumbent is concerned to maximize

$$S(g) + \theta_i c_i(g,\tau) + \mu(g,\tau)[Z_I + \varepsilon - qZ_L - (1-q)Z_H], \tag{5}$$

where the bracketed term represents the *extra* expected payoff stemming from reelection and is positive because of (4).

According to (5), despite only special interests' lobbying, unorganized citizens' retrospective voting makes the incumbent's payoff contingent on his policy choice just as the lobby's strategic political contribution does. The extra expected payoff from reelection represents a prize with which voters reward the incumbent. In this sense, the structure of the game exhibits a property of the all-participation common-agency lobbying model, with two remarkable differences. First, unlike the lobby, unorganized citizens are not allowed to precommit in advance of policy choice to any compensation schedule, which is embodied in the system of reelection probabilities.

Second, unorganized citizens repay the incumbent, not necessarily for fiscal policies favoring them today, but rather for those convincing them that he is type-L.[12]

Consider next the behavior of the lobby. It offers a menu of political contributions to maximize the payoff to special interests, taking account of the incumbent's type and optimization behavior as well as the system of reelection probabilities.

We will first look for the necessary and sufficient amount of political contributions that the lobby pays for a fiscal policy to be implemented. To do so, let (g^0, τ^0) be the fiscal policy chosen by the incumbent if he receives no political contributions. Substituting $c_i(g, \tau) = 0$ in (5) yields

$$(g^0, \tau^0) \in \arg \max_{(g,\tau)\in\Re^2_+} S(g) + \mu(g, \tau)[Z_I + \varepsilon - qZ_L - (1 - q)Z_H]. \tag{6}$$

Note that (g^0, τ^0) is independent of the incumbent's type, but generally depends on voters' beliefs. If the lobby wants a fiscal policy, say (g, τ), the necessary and sufficient amount to pay is, accordingly, the one to leave the incumbent indifferent between accepting and rejecting the lobby's offer:

$$c = \frac{1}{\theta}[S(g_i^0) - S(g) + (\mu(g^0, \tau^0) - \mu(g, \tau))(Z_I + \varepsilon - qZ_L - (1 - q)Z_H)]. \tag{7}$$

Then, with a type-i politician in office, the lobby's problem is reduced to that of maximizing

$$\pi(g) - \phi_g g - \phi_\tau \tau - c + \mu(g, \tau)[\Pi_i - q\Pi_L - (1 - q)\Pi_H] \tag{8}$$

by g, τ and c, subject to (7). The bracketed term represents the extra expected payoff to special interests stemming from reelection of the incumbent. It is negative (positive) if he is type-L (type-H), according to (3). Note that behind this formulation there exist a huge number of menus of political contributions with which the lobby can induce the incumbent to choose the fiscal policy that maximizes (8).

Now we will characterize the equilibrium outcomes. Let (g_i^*, τ_i^*) be type i's equilibrium fiscal policy and let $\mu^*(g, \tau)$ be the equilibrium system of reelection probabilities. Substituting (7) into (8) and rearranging the terms demonstrates

$$(g_i^*, \tau_i^*) \in \arg \max_{(g,\tau)\in\Re^2_+} S(g) + \theta_i[\pi(g) - \phi_g g - \phi_\tau \tau] + R_i \mu^*(g, \tau), \tag{9}$$

where

$$R_i = Z_I + \varepsilon - qZ_L - (1 - q)Z_H + \theta_i[\Pi_i - q\Pi_L - (1 - q)\Pi_H]. \tag{10}$$

From (7), the equilibrium political contribution for type i is

$$c_i^* = \frac{1}{\theta_i}[S(g^0) - S(g_i^*) + (\mu^*(g^0, \tau^0) - \mu^*(g_i^*, \tau_i^*))(Z_I + \varepsilon - qZ_L - (1 - q)Z_H)]. \tag{11}$$

[12]Another interesting difference is that unorganized citizens can reward the incumbent not with the money out of their own pockets but, at least in part, with the money that special interests pay in period 2 as political contributions.

We will refer to R_i as type i's *reelection reward*, which is a weighted sum of the extra expected payoffs that he and special interests capture from reelection. $R_i > 0$ holds from Lemma 1 in Appendix A. Also, from the definition, an increase in ε raises R_i, whereas the effect of an increase in q is ambiguous since it increases the extra expected payoff to the incumbent but decreases that to special interests.

Comparing (9) with (5) reveals that the lobby's strategic political contribution leads every incumbent to care about the net fiscal benefits to special interests, instead of political contributions he receives. Relative to the social surplus, type i's decision is biased toward the well-being of special interests by the extent of his preference for political contributions, θ_i. At the same time, he is induced to care about reelection as well, according to the amount of his reelection reward, R_i. As it turns out later, these two parameters (though, more precisely, R_i is endogenously determined in the period 2 game) are crucial in determining the equilibrium outcome in period 1 as well as in ensuring the existence of equilibria.

3.2. Special cases

It is useful to consider two special cases before analyzing the equilibrium fiscal policies in detail. First, suppose $\theta_i = R_i = 0$. From (9), as a benevolent politician, every incumbent chooses the socially optimal spending level, g_S, defined by the first-order condition

$$S'(g_S) = 0, \tag{12}$$

while being indifferent about the tax levels.

Second, consider the case of symmetric information, where voters are as informed of the incumbent's type as the lobby. Because of (2), every incumbent faces a fixed reelection probability, one for type L and zero for type H, irrespective of policy decision. Hence he behaves in a pro-lobby fashion. Specifically, from (9), type i chooses

$$(g_i, \tau_i) = \arg \max_{(g,\tau)\in\Re^2_+} W(g, \tau, \theta_i) = \frac{S(g)}{\theta_i} + \pi(g) - \phi_g g - \phi_\tau \tau. \tag{13}$$

We will call (g_i, τ_i) type i's pro-lobby fiscal policy and $W(g, \tau, \theta_i)$ his pro-lobby objective. Clearly, $g_H > g_L > g_S$ for the spending levels, because of the first-order condition

$$S'(g_i) + \theta_i[\pi'(g_i) - \phi_g] = 0, \tag{14}$$

and $\tau_H = \tau_L = 0$ for the taxes.[13] Those pro-lobby policies show an efficiency trade-off caused under symmetric information. On the one hand, it enables voters to reelect only a type-L incumbent, who spends more efficiently in period 2, but on the

[13]The proof is as follows. If we let $g(\theta) = \arg\max_{g\geq 0} W(g, 0, \theta)$, then it satisfies $g_H = g(\theta_H)$, $g_L = g(\theta_L)$, and $g_S = g(0)$, holding the first-order condition, $S'(g(\theta)) + \theta[\pi'(g(\theta)) - \phi_g] = 0$, as well. Because $\phi_g < 1$, Assumption 1 ensures $S'(g) < (1+n)[\pi'(g) - \phi_g]$ for any $g > 0$. Combined with the first-order condition, this implies $\pi'(g(\theta)) > \phi_g$. Then, differentiating the first-order condition yields $g'(\theta) = -[\pi'(g(\theta)) - \phi_g]/[S''(g(\theta)) + \theta\pi''(g(\theta))] > 0$. Hence, $g_H > g_L > g_S$.

other hand, it leads every incumbent to implement debt-financed socially wasteful spending in period 1, with type H making more wasteful outlays, because of a lack of retrospective voting.

4. Separating equilibria

Let us examine the separating equilibria satisfying $(g_H^*, \tau_H^*) \neq (g_L^*, \tau_L^*)$, $\mu^*(g_H^*, \tau_H^*) = 0$, and $\mu^*(g_L^*, \tau_L^*) = 1$. Following Rogoff (1990) and Dhami (2003), we will rule out dominated strategies and focus on the *undominated* separating equilibria.

4.1. Undominated equilibrium outcome

Given $\mu^*(g_H^*, \tau_H^*) = 0$, type H's equilibrium policy should be his pro-lobby one:

$$(g_H^*, \tau_H^*) = (g_H, \tau_H).$$

To obtain type L's, we need voters' out-of-equilibrium beliefs. Define a set of fiscal policies, $\mathscr{P}_L$, as a collection of $(g, \tau) \in \Re_+^2$ such that

$$W(g_H, \tau_H, \theta_H) \geqslant W(g, \tau, \theta_H) + \frac{R_H}{\theta_H} \tag{15}$$

and

$$W(g_L, \tau_L, \theta_L) \leqslant W(g, \tau, \theta_L) + \frac{R_L}{\theta_L}. \tag{16}$$

Every fiscal policy in $\mathscr{P}_L$ is dominated by (g_H, τ_H) for type H but willingly implemented by type L if it guarantees reelection. Accordingly, assuming voters' beliefs to generate

$$\mu^*(g, \tau) = \begin{cases} 1 & \text{if } (g, \tau) \in \mathscr{P}_L, \\ 0 & \text{otherwise,} \end{cases} \tag{17}$$

we obtain type L's equilibrium policy as

$$(g_L^*, \tau_L^*) \in \arg\max W(g, \tau, \theta_L) \quad \text{s.t. } (g, \tau) \in \mathscr{P}_L. \tag{18}$$

In the undominated separating equilibria, type L is led to maximize his pro-lobby objective by choosing a policy out of those that type H will never be motivated to implement.[14]

[14]Although we have assumed uniform per capita lump-sum taxes across all citizens, the characterization of the equilibria in (18) does not hinge on the assumption, because only the taxes on special interests matter in the pro-lobby objectives. Even if the taxes are allowed to differ between unorganized citizens and special interests, only those imposed on special interests potentially play the signaling role.

4.2. Equilibrium fiscal adjustments

4.2.1. Diagrammatic exposition

We will first illustrate the equilibrium outcomes diagrammatically, assuming that R_H and R_L are given such that $\mathscr{P}_L \neq \emptyset$ (the condition for which is shown later). In Fig. 1, type i's pro-lobby objective exhibits contours with a bliss point O_i, which corresponds to his pro-lobby fiscal policy, (g_i, τ_i). Contours labeled with I_H and I_L, respectively, represent those of (g, τ) holding the incentive constraints, (15) and (16), with equality. Provided that choosing (g_i, τ_i) entails no possibility of reelection, type i willingly chooses any fiscal policy in the area below I_i instead, in so far as it ensures reelection. The shaded area thus corresponds to the set $\mathscr{P}_L$. In the undominated separating equilibria, type H implements O_H and, following (18), type L implements E, where one of his contours is tangential to I_H.

Comparing E with O_L reveals that type L engages in fiscal adjustments with a unique pattern of scale and composition; spending is cut by $g_L - g_S$ and taxes are increased by $\underline{\tau}$. Interestingly, the spending level is adjusted to the socially optimal one, g_S, the reason for which is explained later.

Contour I_H shifts downward as type H faces a smaller reelection reward. Then, type L's choice may be a corner solution like D in the figure, where the equilibrium fiscal adjustment is based only on a spending cut of $g_L - \underline{g}$. Since $g_S < \underline{g} < g_L$, the efficiency of government spending is improved as well, relative to his pro-lobby fiscal policy.

The solid line represents the locus of type L's fiscal policies realized in the undominated separating equilibria as type H's reelection reward varies. It shows that (1) when the reward is small, type L implements only spending cuts, (2) when it is large, he implements both spending cuts and tax increases, eliminating all wasteful spending, and (3) as it is larger, the composition of fiscal adjustments relies more on tax increases.

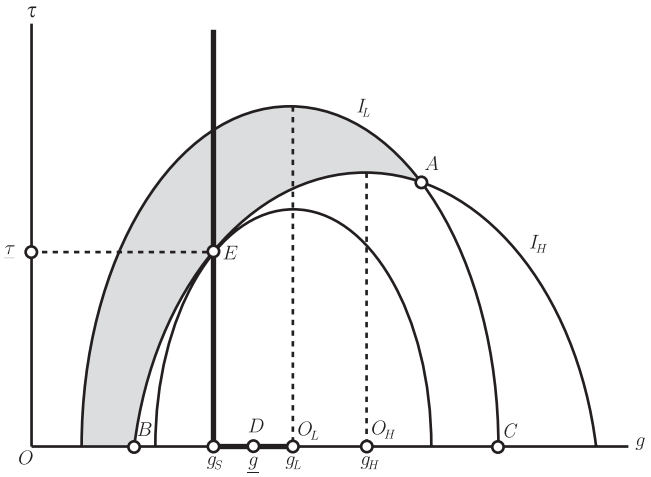

Fig. 1.

4.2.2. Formal description

We will next solve (18) formally. Obviously, $(g_L^*, \tau_L^*) = (g_L, \tau_L)$ if $(g_L, \tau_L) \in \mathscr{P}_L$. Otherwise, the incentive constraint for type H, (15), becomes binding. For convenience, we will take two steps; first consider the optimization problem taking only (15) into account for characterization of the solution, and then check whether (16) is met for revealing the existence condition.

Proposition 1. *Given R_H and R_L, a separating equilibrium is undominated if and only if its policy outcome is $(g_H^*, \tau_H^*) = (g_H, \tau_H)$ and $(g_L^*, \tau_L^*) = (g^*(R_H), \tau^*(R_H))$, where*

$$(g^*(R_H), \tau^*(R_H)) = \begin{cases} (g_L, 0) & \text{if } R_H \leqslant \underline{R}, \\ (\underline{g}(R_H), 0) & \text{if } \underline{R} < R_H < \overline{R}, \\ (g_S, \underline{\tau}(R_H)) & \text{otherwise}, \end{cases} \tag{19}$$

with $\underline{R} = \theta_H[W(g_H, \tau_H, \theta_H) - W(g_L, \tau_L, \theta_H)]$, $\overline{R} = \theta_H[W(g_H, \tau_H, \theta_H) - W(g_S, 0, \theta_H)]$,

$$\underline{g}(R_H) = \min g \quad s.t.\ W(g, 0, \theta_H) + \frac{R_H}{\theta_H} = W(g_H, \tau_H, \theta_H),$$

and

$$\underline{\tau}(R_H) = \frac{1}{\phi_\tau}\left[W(g_S, 0, \theta_H) + \frac{R_H}{\theta_H} - W(g_H, \tau_H, \theta_H)\right].$$

Proof. See Appendix B. □

The new notations are as follows. (i) $\overline{R}$ and $\underline{R}$ are type H's reelection rewards that hold (15) with equality, respectively, for $(g, \tau) = (g_S, 0)$ and (g_L, τ_L). $\overline{R} > \underline{R} > 0$ since $g_S < g_L < g_H$ and $\tau_H = \tau_L = 0$. They imply that if $R_H > \underline{R}$ ($R_H > \overline{R}$), type H strictly prefers (g_L, τ_L) ($(g_S, 0)$) rather than (g_H, τ_H), provided that the former guarantees reelection and the latter entails no chance of it. (ii) $\underline{g}(R_H)$ denotes a debt-financed minimum spending level that leaves type H indifferent between choosing $(\underline{g}(R_H), 0)$ with guaranteed reelection and (g_H, τ_H) with no chance of reelection. With Assumptions 1 and 2, it is strictly decreasing in R_H, and converges to 0 and g_H,respectively, as R_H tends to $+\infty$ and 0. Furthermore, $\underline{g}(\underline{R}) = g_L$ and $\underline{g}(\overline{R}) = g_S$. (iii) $\underline{\tau}(R_H)$ denotes a minimum tax level leaving type H indifferent between choosing $(g_S, \underline{\tau}(R_H))$ with guaranteed reelection and (g_H, τ_H) with no chance of reelection. It is strictly increasing in R_H, and $\underline{\tau}(R_H) \geqslant 0$ if and only if $R_H \geqslant \overline{R}$.

According to Proposition 1, the size of type H's reelection reward is crucial to the pattern of fiscal adjustments by type L. If $R_H \leqslant \underline{R}$, type L wins reelection with his pro-lobby policy. Otherwise, he has to engage in fiscal adjustments for reputation building. The scale increases as R_H is larger. The composition is based only on spending cuts until R_H hits the upper threshold $\overline{R}$ and begins to involve tax increases as well if R_H exceeds the threshold. In the latter case, more tax-based adjustments are implemented as R_H is larger, with spending kept at the socially optimal level. Adjustments with only tax increases generate no chance of reelection.

The positive implication of Proposition 1 is consistent with the recent empirical studies cited in the Introduction; fiscal adjustment without sufficient spending cuts is

likely to produce incumbent defeat. As its normative implication, the signaling mechanism enhances the efficiency of government spending, inducing less-collusive incumbents to reduce wasteful expenditures as well as enabling uninformed voters to reelect only such politicians.

4.2.3. Interpretation

A key to the changing patterns of fiscal adjustments observed above lies in the political costs of fiscal adjustments differing between the types of incumbent. Consider type i's pro-lobby objective and define his political cost of spending cuts as the marginal rate of substitution for tax increases,

$$-\frac{W_g(g,\tau,\theta_i)}{W_\tau(g,\tau,\theta_i)}=\frac{1}{\phi_\tau}\left(\frac{S'(g)}{\theta_i}+\pi'(g)-\phi_g\right),$$

where $W_z=\partial W/\partial z$ for $z=g,\tau$. Given the chance of reelection, an incumbent with a higher political cost of spending cuts is more inclined to use tax increases, rather than spending cuts, for an additional deficit reduction.

Observe that type L has a lower political cost of spending cuts than type H, or in other words, he has a *comparative advantage* in spending cuts, if and only if $g>g_S$.[15] The reason is that, relative to political contributions, type L places a higher value on an improvement in the social surplus than type H. Conversely, because type H cares more about the well-being of special interests, he tends to increase taxes, rather than cutting wasteful spending, for fiscal adjustment. This is why incumbents cannot build their reputation without a sufficient reduction of wasteful outlays. The switch in type L's comparative advantage at $g=g_S$ also explains the involvement of tax increases in his equilibrium fiscal adjustments.

4.2.4. Existence

We now turn to the existence issue. There exist undominated separating equilibria if and only if type L's fiscal policy described in Proposition 1 satisfies his own incentive constraint (16).

Proposition 2. *Given R_H and R_L, undominated separating equilibria exist if and only if*

$$\frac{R_L}{\theta_L}\geqslant\frac{R_H}{\theta_H}-\frac{\underline{R}}{\theta_H}-\left(\frac{1}{\theta_L}-\frac{1}{\theta_H}\right)[S(g^*(R_H))-S(g_L)]. \tag{20}$$

Proof. See Appendix B. □

The condition is illustrated in Fig. 2. R_i/θ_i is a measure of type i's willingness to sacrifice the well-being of special interests for more probable reelection. The upward-sloping schedule depicts the locus of R_H/θ_H and R_L/θ_L holding (20) with equality, and undominated separating equilibria exist if and only if R_H/θ_H and R_L/θ_L are given on or above the schedule.

[15]Note that $S'(g)<0$ and $\theta_H>\theta_L>0$.

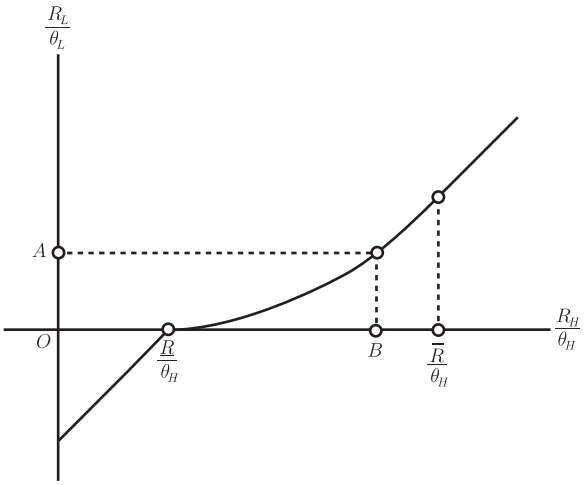

Fig. 2.

Simply, (20) is met if $R_L/\theta_L - R_H/\theta_H \geqslant 0$. Using (10), on the other hand, we have

$$\frac{R_L}{\theta_L} - \frac{R_H}{\theta_H} = \left(\frac{1}{\theta_L} - \frac{1}{\theta_H}\right)[Z_I + \varepsilon - qZ_L - (1-q)Z_H] - (\Pi_H - \Pi_L). \tag{21}$$

Thus, an increase in ε as well as a decrease in q makes type L more willing to sacrifice the well-being of special interests for reelection, relative to type H. From Lemma 1 in Appendix A, we also have $R_L/\theta_L - R_H/\theta_H \geqslant 0$ if $\varepsilon = q = 0$. Accordingly, undominated separating equilibria exist either with a sufficiently large ego rent or with a sufficiently rare chance of a type-L challenger's running for period 2 office.

4.3. Equilibrium political contributions

The signaling mechanism also affects political contributions. From (11),

$$c_H^* = \frac{1}{\theta_H}[S(g^0) - S(g_H^*) + \mu^*(g^0, \tau^0)(Z_I + \varepsilon - qZ_L - (1-q)Z_H)] \tag{22}$$

and

$$c_L^* = \frac{1}{\theta_L}[S(g^0) - S(g_L^*) + (\mu^*(g^0, \tau^0) - 1)(Z_I + \varepsilon - qZ_L - (1-q)Z_H)]. \tag{23}$$

These expressions show that voters' beliefs affect the equilibrium political contributions through the incumbent's outside option, (g^0, τ^0), and the reelection probability it produces.

Suppose that $\mu^*(g_S, \hat{\tau}) = 1$ for some $\hat{\tau} \geqslant 0$. According to Proposition 1, this property holds on the equilibrium path if $R_H \geqslant \overline{R}$, and even otherwise, the voters'

out-of-equilibrium beliefs may validate it.[16] Following (6), then, we can set $(g^0, \tau^0) = (g_S, \hat{\tau})$, with which (22) and (23) are reduced to $c_H^* = [S(g_S) + R_H - S(g_H^*)]/\theta_H$ and $c_L^* = [S(g_S) - S(g_L^*)]/\theta_L$. Combining these with (19) yields an interesting observation: as R_H is larger, type H receives more from special interests in return for keeping the pro-lobby policy, whereas type L behaves more like a benevolent politician, cutting wasteful outlays more and receiving less from special interests.

5. Pooling equilibria

Consider next the *pooling* equilibria in which both types implement the same policy (g_P^*, τ_P^*).[17] The voters cast ballots, only knowing that the incumbent is type-L with probability p while the challenger is with q. No pooling equilibrium exists if $p < q$, since any unrevealing policy leads to sure incumbent defeat. Hence we will assume $p \geqslant q$ in what follows.

To obtain the entire set of pooling outcomes, consider an equilibrium system of reelection probabilities,

$$\mu^*(g,\tau) = \begin{cases} \mu_P^* & \text{if } (g,\tau) = (g_P^*, \tau_P^*), \\ 0 & \text{otherwise,} \end{cases} \tag{24}$$

where $\mu_P^* = 1$ if $p > q$, while $\mu_P^* \in (0, 1]$ if $p = q$. Then, from (9) and (24), (g_P^*, τ_P^*) is realized in a pooling equilibrium if and only if it belongs to a set of $(g, \tau) \in \Re_+^2$ such that

$$W(g_H, \tau_H, \theta_H) \leqslant W(g, \tau, \theta_H) + \mu_P^* \frac{R_H}{\theta_H} \tag{25}$$

and

$$W(g_L, \tau_L, \theta_L) \leqslant W(g, \tau, \theta_L) + \mu_P^* \frac{R_L}{\theta_L}. \tag{26}$$

These conditions reveal that the presence of sufficiently large reelection rewards guarantees the existence of pooling equilibria, generally with multiple policy outcomes. To illustrate them in Fig. 1, suppose that $\mu_P^* = 1$ and contours I_H and I_L are, respectively, those of (g, τ) holding (25) and (26) with equality. Then, every policy in area ABC can be an equilibrium outcome. Ruling out dominated strategies does not help to refine the equilibria at all.

We will employ Cho and Kreps's (1987) intuitive criterion.[18] A pooling equilibrium survives (and is then called *intuitive*) if and only if (g_P^*, τ_P^*) has no

[16] We may choose $\hat{\tau}$ large enough to ensure $(g_S, \hat{\tau}) \notin \mathscr{P}_L$. Then, $(g_S, \hat{\tau})$ is dominated by (g_i, τ_i) for type i, and any posterior belief is allowed.

[17] There also exist hybrid equilibria with type H randomizing his fiscal policies, which we do not consider here.

[18] Any undominated separating equilibrium survives the intuitive criterion.

out-of-equilibrium fiscal policy (g,τ) such that[19]

$$W(g_P^*,\tau_P^*,\theta_H) > W(g,\tau,\theta_H) + (1-\mu_P^*)\frac{R_H}{\theta_H} \tag{27}$$

and

$$W(g_P^*,\tau_P^*,\theta_L) \leqslant W(g,\tau,\theta_L) + (1-\mu_P^*)\frac{R_L}{\theta_L}. \tag{28}$$

Confine attention to the equilibria with $\mu_P^* = 1$ for a while. The above requirement then implies that an intuitive pooling equilibrium satisfies the following recursive property:

$$(g_P^*,\tau_P^*) \in \arg\max_{(g,\tau)\in\Re_+^2} W(g,\tau,\theta_L) \quad \text{s.t. } W(g_P^*,\tau_P^*,\theta_H) \geqslant W(g,\tau,\theta_H). \tag{29}$$

Type L's pro-lobby objective attains a constrained maximum in an intuitive pooling equilibrium, as it does in the undominated separating equilibria.

The multiplicity of equilibrium policy outcomes remains, however, technically because the pro-lobby objectives are not single-crossing as observed in Fig. 1. Yet we can characterize them as follows, making use of the expression in (19).

Proposition 3. *Suppose $p \geqslant q$. Given R_H and R_L, then*, (i) *a pooling equilibrium with $\mu_P^* = 1$ is intuitive if and only if its policy outcome satisfies*

$$(g_P^*,\tau_P^*) \in \{(g^*(x),\tau^*(x)) | \underline{R} \leqslant x \leqslant \min[R_P, R_H]\},$$

where R_P is uniquely defined by

$$\frac{R_L}{\theta_L} = \frac{R_P}{\theta_H} - \frac{\underline{R}}{\theta_H} - \left(\frac{1}{\theta_L} - \frac{1}{\theta_H}\right)[S(g^*(R_P)) - S(g_L)],$$

and (ii) *intuitive pooling equilibria exist if and only if $R_H \geqslant \underline{R}$.*

Proof. see Appendix B.

For illustration in Fig. 1, suppose again that $\mu_P^* = 1$ and contours I_H and I_L hold (25) and (26) with equality, respectively. Then, according to the above proposition, any fiscal policy on the segment of the solid locus below I_H is realized in an intuitive pooling equilibrium. This is in sharp contrast to the undominated separating equilibria, in which type L implements E and type H chooses O_H as the unique policy outcome, given the same amounts of reelection rewards.[20]

The intuitive pooling equilibria exist even when no undominated separating equilibria exist. Suppose $\mathscr{P}_L = \emptyset$, in which case type L's reelection reward is so small, relative to type H's, that I_L is located entirely below I_H in Fig. 1. Then, any policy on

[19] These conditions state that even if choosing (g,τ) guarantees reelection, only type L will carry it out instead of (g_P^*,τ_P^*). The voters' plausible beliefs will then establish $\mu^*(g,\tau) = 1$. If such a policy exists, (g_P^*,τ_P^*) cannot be an equilibrium outcome because of type L's deviation.

[20] The equilibrium political contributions for both types follow a formula similar to (23). However, because of the multiplicity, there is no one-to-one relation between political contributions and reelection rents as observed before.

the segment of the solid locus below I_L is realized in an intuitive pooling equilibrium. This corresponds to the case of $R_P < R_H$ in Proposition 3, occurring when R_H/θ_H and R_L/θ_L are given in the area strictly below the schedule in Fig. 2. (If R_L/θ_L is given at A, for example, R_P/θ_H is determined at B.) Also, irrespective of whether $\mu_P^* = 1$ or not, no pooling equilibria exist if $R_H < \underline{R}$, since (g_H, τ_H) dominates (g_L, τ_L) for type H.

From the point of efficiency, the disciplinary power of retrospective voting may be weaker when pooling occurs. The intuitive pooling equilibria hold an advantage in inducing type H to cut wasteful spending in period 1, as compared with the undominated separating ones. However, they also cause a loss in period 2, letting him survive in power to increase wasteful outlays. More important, they may induce type L to cut wasteful outlays less in period 1. In the least efficient equilibrium, $(g_P^*, \tau_P^*) = (g_L, \tau_L)$ occurs.

In the intuitive pooling equilibria with $\mu_P^* < 1$, which may arise only if $p = q$, the range of the equilibrium policy outcomes expands. This is because the intuitive criterion does not require them to attain the constrained maximum of type L's pro-lobby objective, as we can see from (27) and (28). Spending levels smaller than g_S, as well as those larger than g_L, can be realized depending on the size of reelection rewards. Yet such equilibria do not exist if $R_L/\theta_L > R_H/\theta_H$, since (27) and (28) hold for $g = g_P^*$ and $\tau = \tau_P^* + (1 - \mu_P^*)R_L/(\phi_\tau \theta_L)$. Therefore, from Lemma 1 in Appendix A, $\mu_P^* = 1$ if either ε is sufficiently large or q (as well as p) is sufficiently small.

6. Deficit limits

We will examine the effects of a deficit limit on the equilibrium spending levels, confining attention to the undominated separating equilibria. Tabellini and Alesina (1990) argued that it improves the efficiency of government spending since it prevents policymakers from strategically accumulating budget deficits to constrain unfavorable policy administration by their successors. In our model, such a commitment effect is removed by the assumption of lump-sum taxes, yet a deficit limit enhances efficiency for two reasons; one is that it reduces political pressure from special interests for spending expansion, and the other is that it reinforces type H's incentive to mimic type L.

As an example of deficit limits, consider a budget rule that prohibits deficits. Type i's pro-lobby fiscal policy is then defined as

$$(g_i^B, \tau_i^B) = \arg\max W(g, \tau, \theta_i) \quad \text{s.t. } \tau \geqslant g \geqslant 0.$$

Clearly, $g_i^B = \tau_i^B$, with g_i^B satisfying the first-order condition,

$$S'(g_i^B) + \theta_i[\pi'(g_i^B) - 1] = 0. \tag{30}$$

Comparing (30), respectively, with (12) and (14), we have $g_i > g_i^B > g_S$. Each type's pro-lobby fiscal policy spends more efficiently under the budget rule, because special

interests lobby less for tax-financed spending expansion. We also have $g_H^B > g_L^B$. Type H is still a bigger spender.[21]

Let (g_i^{B*}, τ_i^{B*}) denote type i's fiscal policy realized in the undominated separating equilibria with deficit creation prohibited. As before, $\mu^*(g_H^{B*}, \tau_H^{B*}) = 0$ and $\mu^*(g_L^{B*}, \tau_L^{B*}) = 1$. Then, for type H, $g_H^{B*} = \tau_H^{B*} = g_H^B$. Because $g_S < g_H^B < g_H$, the budget rule leads him to spend more efficiently. For type L, incorporate the constraint $\tau \geqslant g$ into the maximization problem (18). Ruling out dominated policies demonstrates $(g_L^{B*}, \tau_L^{B*}) \in \arg\max W(g, \tau, \theta_L)$ subject to $\tau \geqslant g$,

$$W(g_H^B, g_H^B, \theta_H) \geqslant W(g, \tau, \theta_H) + \frac{R_H}{\theta_H}, \tag{31}$$

and

$$W(g_L^B, g_L^B, \theta_L) \leqslant W(g, \tau, \theta_L) + \frac{R_L}{\theta_L}. \tag{32}$$

The incentive constraints differ from (15) and (16) only on the left-hand sides.[22] In particular, comparing (31) with (15), $W(g_H^B, g_H^B, \theta_H) < W(g_H, \tau_H, \theta_H)$ implies that the budget rule makes type H more willing to mimic type L, since type H is repaid less than before for choosing the pro-lobby policy. Type L therefore has to implement larger fiscal adjustments to separate himself from type H.

Proposition 4. *Suppose that budget deficits are prohibited. Given R_H and R_L, then,* (i) *a separating equilibrium is undominated if and only if the policy outcome satisfies $(g_H^{B*}, \tau_H^{B*}) = (g_H^B, g_H^B)$ and $(g_L^{B*}, \tau_L^{B*}) = (g^{B*}(R_H), \tau^{B*}(R_H))$, where*

$$(g^{B*}(R_H), \tau^{B*}(R_H)) = \begin{cases} (g_L^B, g_L^B) & \text{if } R_H \leqslant \underline{R}^B, \\ (\underline{g}^B(R_H), \underline{g}^B(R_H)) & \text{if } \underline{R}^B < R_H < \overline{R}^B, \\ (g_S, \underline{\tau}^B(R_H)) & \text{otherwise}, \end{cases}$$

with $\underline{R}^B = \theta_H[W(g_H^B, g_H^B, \theta_H) - W(g_L^B, g_L^B, \theta_H)]$, $\overline{R}^B = \theta_H[W(g_H^B, g_H^B, \theta_H) - W(g_S, g_S, \theta_H)]$,

$$\underline{g}^B(R_H) = \min g \quad s.t.\ W(g, g, \theta_H) + \frac{R_H}{\theta_H} = W(g_H^B, g_H^B, \theta_H),$$

and

$$\underline{\tau}^B(R_H) = \frac{1}{\phi_\tau}\left[W(g_S, 0, \theta_H) + \frac{R_H}{\theta_H} - W(g_H^B, g_H^B, \theta_H)\right].$$

[21] Differentiating (30) shows $\mathrm{d}g_i^B/\mathrm{d}\theta_i > 0$ under Assumption 1.

[22] Because of the availability of lump-sum taxes, reelection rewards do not change.

(ii) $g_L^{B*} \leqslant g_L^*$ *with strict inequality holding if and only if* $R_H < \overline{R}$, *and* (iii) *undominated separating equilibria exists, if and only if*

$$\frac{R_L}{\theta_L} \geqslant \frac{R_H}{\theta_H} - \frac{\underline{R}^B}{\theta_H} - \left(\frac{1}{\theta_L} - \frac{1}{\theta_H}\right)[S(g^{B*}(R_H)) - S(g_L^B)].$$

Proof. See Appendix B.

The new notations have the following implications. $\overline{R}^B$ and $\underline{R}^B$ are the counterparts of $\overline{R}$ and $\underline{R}$, satisfying $\overline{R}^B > \underline{R}^B$ because $g_S < g_L^B < g_H^B$. Similarly, $\underline{g}^B(R_H)$ and $\underline{\tau}^B(R_H)$ are introduced as those of $\underline{g}(R_H)$ and $\underline{\tau}(R_H)$. $\underline{g}^B(R_H)$ is decreasing in R_H, and $\underline{g}^B(R_H) < g_L^B$ if and only if $R_H > \underline{R}^B$. $\underline{\tau}^B(R_H)$ is increasing in R_H, and $\underline{\tau}^B(R_H) > g_S$ if and only if $R_H > \overline{R}^B$.

The first part of Proposition 4 shows the changing pattern of type L's fiscal adjustments. A difference from one observed before is that he balances the budget if $R_H \leqslant \overline{R}^B$ and otherwise runs surpluses. The second part reveals that the budget rule enhances efficiency, inducing type L to cut wasteful outlays more than he does without the rule. Since type H also spends more efficiently as observed above, imposing a deficit limit is socially desirable. The third part establishes the existence condition, which is quite similar to that spelled out in Proposition 2.

A difference between a deficit limit and a balanced-budget rule should also be remarked on. With a balanced-budget rule imposed instead, type L has to cut spending even when $R_H > \overline{R}^B$ for reputation building, in the same fashion as he does when $\underline{R}^B < R_H < \overline{R}^B$. This is because tax increases and spending cuts cannot serve as independent signals under the rule. Since type L is induced to spend less than the socially optimal level if $R_H > \overline{R}^B$, a balanced-budget rule does not necessarily improve efficiency in contrast to a deficit limit.[23]

7. Concluding remarks

In this paper, we have sought to explain the public choice of the composition of fiscal adjustments from a signaling point of view. Fiscal adjustments with sufficiently large spending cuts serve to signal policymakers less collusive with special interests. They can take advantage of their lower political costs for cutting wasteful spending. In the undominated separating equilibria, less-collusive policymakers engage in such adjustments to win reelection, while more-collusive ones choose a pro-lobby fiscal policy and lose office. In the intuitive pooling equilibria, both types of policymaker engage in such adjustments to survive in power, yet multiple equilibrium outcomes generally prevail. In either equilibria, policymakers cannot be reelected by implementing fiscal adjustments with only tax increases.

[23]Regarding the intuitive pooling equilibria, the effect of a deficit limit is ambiguous because of the multiplicity of policy outcomes, which continues to prevail under the budget rule. But we can say that if they always implement type L's pro-lobby fiscal policy as a focal point, then imposing the rule improves efficiency, because $g_S < g_L^B < g_L$.

We have also analyzed the normative aspects of the signaling mechanism. In the undominated separating equilibria, less-collusive policymakers cut wasteful spending more as the reelection rewards become larger. With reelection rewards large enough that they implement both tax increases and spending cuts, the spending level is adjusted to maximize the social surplus. Legal limits on budget deficits enhance the efficiency of government spending by reducing political pressure from special interests for spending expansion as well as by decreasing policymakers' payoffs from keeping cozy relationships with them. In the intuitive pooling equilibria, however, the multiplicity of equilibrium policy outcomes may undermine the disciplinary power of retrospective voting. In the least efficient outcome, both types of policymaker implement the same pro-lobby policy as a less-collusive policymaker would choose in the absence of retrospective voting, and even a more-collusive incumbent survives in power.

A possible extension of the model is to consider the government providing multiple public programs under pressure from special interest groups associated with them. In such an extension, not only cuts in aggregate spending but also changes in its allocation over programs will play a signaling role. Another is to introduce distortionary taxes and synthesize the intertemporal tax smoothing effect and the strategic deficit creation effect in the signaling mechanism. Even with tax distortions, the positive implications of the analysis will be unaffected because cutting wasteful outlays always produces an improvement in social welfare, which type L needs to separate himself from type H. On the other hand, part of the normative messages may be modified especially when the reelection rewards are sufficiently large, since they may induce type L to implement socially excessive spending cuts and tax increases as a signal.

A final remark is concerned about transparency in budgeting and in politics. Transparency in budgeting, in the sense that voters are correctly informed of policymakers' fiscal decisions, is indispensable for the signaling mechanism to work. Nontransparent budget processes will make it easier for policymakers to collude with special interests in secret from voters. On the other hand, transparency in politics, in the sense that voters are well informed of the degrees of collusion between politicians and special interests, is also useful for reducing socially wasteful outlays, since more-collusive policymakers will be less likely to survive in power. Disclosing detailed information on political contributions, for instance, is considered to be one of the ways to make politics more transparent in this sense.

The analysis implies, however, that transparent politics may only ruin the signaling mechanism in a society with transparent budgeting. As argued in the text, if voters know the degrees of collusion, policymakers will lose an incentive to engage in fiscal adjustments for reputation building and instead implement fiscal policies to favor special interests, since the chance of reelection is independent of their performance in office. This view is in contrast to the conventional premise emphasizing the role of transparent politics in establishing an efficient government. However, it is far from reality and perhaps beyond our reach to have both budgeting and politics perfectly transparent in the above meanings. The issue of how the

politico-economic institutions should be designed in such a second-best environment to make the most of the signaling mechanism is left for further research.

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Appendix A. The equilibrium outcome in period 2

Appendix A presents a formulation of the period 2 game yielding the properties of the equilibrium outcome that we have made use of in the text to characterize the perfect Bayesian equilibria. It is basically a repetition of the period 1 game, except that (i) new members enter the society, (ii) no more budget deficits can be produced, and (iii) no more elections are held. Technically, the entry of new members is assumed only for the purpose of motivating special interests to lobby for deficit-financed spending in period 1. Other formulations, such as one with short-lived special interests, will also suffice, without qualitatively changing the results obtained in the text.

The actors in period 2 consist of politicians in and out of office, unorganized citizens, special interests, and newcomers. Merely for simplicity, newcomers are assumed to be identical to unorganized citizens living from period 1. Variables appearing in period 2 as counterparts of those in period 1 are denoted by attaching a hat (^) to the latter.

The model proceeds as follows. A politician in office chooses a spending level, $\hat{g}$, financing it entirely by lump-sum taxes. Special interests and unorganized citizens earn per capita payoffs, $\hat{\pi}(\hat{g}) - \hat{g} - \hat{c}$ and $\hat{v}(\hat{g}) - \hat{g}$, respectively. The taxes imposed in period 2 for debt repayment have been already taken into account in the period-1 payoff functions as the discounted tax burdens. The benefits satisfy $\hat{\pi}'(\hat{g}) > \hat{v}'(\hat{g}) > 0$ for $\hat{g} > 0$ as well as $\hat{\pi}''(\hat{g}), \hat{v}''(\hat{g}) < 0$, similarly to Assumption 1. The social surplus augmented with the increased population of unorganized citizens is given by $\hat{S}(\hat{g}) = (n+m)\hat{v}(\hat{g}) + \hat{\pi}(\hat{g}) - (1+n+m)\hat{g}$.

When in office, a type-i politician enjoys a payoff, $\varepsilon + \hat{S}(\hat{g}) + \theta_i \hat{c}$, where $\varepsilon \geqslant 0$ represents an exogenously fixed ego rent. Irrespective of his type, he would choose in the absence of any political contributions the socially optimal spending level, $\hat{g}_S$, defined by $\hat{S}'(\hat{g}_S) = 0$. As in period 1, special interests strategically offer a menu of political contributions, knowing the type of incumbent. If he is type-i, he willingly implements $\hat{g}$ in return for a political contribution, $[\hat{S}(\hat{g}_S) - \hat{S}(\hat{g})]/\theta_i$. Substituting this into the payoff function of special interests, we find that a type-i incumbent is

induced in period 2 to maximize his pro-lobby objective,

$$\hat{W}(g,\theta_i)=\hat{S}(\hat{g})/\theta_i+\hat{\pi}(\hat{g})-\hat{g}.$$

Let $\hat{g}_i$ be the spending level chosen by a type-i incumbent. From the first-order condition

$$\hat{S}'(\hat{g}_i)+\theta_i[\hat{\pi}'(\hat{g}_i)-1]=0, \tag{A.1}$$

we have

$$\hat{g}_H>\hat{g}_L>\hat{g}_S, \tag{A.2}$$

since the assumption of $\hat{\pi}'(\hat{g})>\hat{v}'(\hat{g})$ for $\hat{g}>0$ implies $\hat{\pi}'(\hat{g}_i)>1$ and hence $\mathrm{d}\hat{g}_i/\mathrm{d}\theta_i>0$. Type H spends more excessively than type L in period 2.

Consider the equilibrium payoffs to politicians. When in office, a type-i politician implements $\hat{g}_i$ in exchange for a political contribution, $\hat{c}_i=[\hat{S}(\hat{g}_S)-\hat{S}(\hat{g}_i)]/\theta_i$. Thus, his equilibrium payoff is equal to $\varepsilon+Z_I$, where

$$Z_I=\hat{S}(\hat{g}_S).$$

Every incumbent earns the same equilibrium payoff regardless of his type. The payoff to a politician out of office, on the other hand, depends on the type of incumbent. If the incumbent is type-i, it is written as

$$Z_i=\hat{S}(\hat{g}_i),$$

because he earns no ego rents or political contributions. Then, $Z_I>Z_L>Z_H$ follows from (A.2).

The equilibrium payoffs to unorganized citizens and to special interests also depend on the type of incumbent. If he is type-i, unorganized citizens earn

$$V_i=\hat{v}(\hat{g}_i)-\hat{g}_i.$$

Notice that from (A.1), $\hat{v}'(\hat{g}_i)<1$ must hold under the assumption of $\hat{\pi}'(\hat{g})>\hat{v}'(\hat{g})$ for $\hat{g}>0$. Then, $V_L>V_H$ follows from (A.2). Similarly, with type i in office, special interests earn

$$\Pi_i=\hat{\pi}(\hat{g}_i)-\hat{g}_i+\frac{\hat{S}(\hat{g}_i)-\hat{S}(\hat{g}_S)}{\theta_i}.$$

Since $\hat{S}(\hat{g}_i)<\hat{S}(\hat{g}_S)$ from (A.2), $\Pi_H>\Pi_L$ follows straightforwardly from the envelope theorem.

Finally, we will consider the reelection rewards. Substituting those equilibrium payoffs into (10) and rearranging the terms yields

$$\frac{R_L}{\theta_L}=(1-q)[\hat{W}(\hat{g}_L,\theta_L)-\hat{W}(\hat{g}_H,\theta_L)]+(1-q)\frac{\hat{S}(\hat{g}_S)-\hat{S}(\hat{g}_H)}{\theta_H}$$
$$+q\frac{\hat{S}(\hat{g}_S)-\hat{S}(\hat{g}_L)}{\theta_L}+\frac{\varepsilon}{\theta_L}$$

and

$$\frac{R_H}{\theta_H} = q[\hat{W}(\hat{g}_H, \theta_H) - \hat{W}(\hat{g}_L, \theta_H)] + (1-q)\frac{\hat{S}(\hat{g}_S) - \hat{S}(\hat{g}_H)}{\theta_H} + q\frac{\hat{S}(\hat{g}_S) - \hat{S}(\hat{g}_L)}{\theta_L} + \frac{\varepsilon}{\theta_H}.$$

Lemma 1. (i) *R_i is positive and increasing in ε for $i = H, L$.* (ii) *$R_L/\theta_L - R_H/\theta_H$ is positive if $\varepsilon = q = 0$, increasing in ε, and decreasing in q.*

Proof. Both statements are straightforward if we notice that $\hat{W}(\hat{g}_i, \theta_i) \geqslant \hat{W}(\hat{g}, \theta_i)$ for any $\hat{g}$, $\hat{S}(\hat{g}_H) < \hat{S}(\hat{g}_L) < \hat{S}(\hat{g}_S)$, and $\theta_H > \theta_L > 0$. □

Appendix B. Proofs of propositions

Appendix B collects the proofs of propositions. We will start with the following lemma.

Lemma 2. *Suppose that $\underline{g} < \overline{g}$. Then,* (i) *$W(\underline{g}, 0, \theta_H) = W(\overline{g}, 0, \theta_H)$ implies $W(\underline{g}, 0, \theta_L) > W(\overline{g}, 0, \theta_L)$, and* (ii) *$W(\underline{g}, \underline{g}, \theta_H) = W(\overline{g}, \overline{g}, \theta_H)$ implies $W(\underline{g}, \underline{g}, \theta_L) > W(\overline{g}, \overline{g}, \theta_L)$.*

Proof. (i) From Assumption 1 and the definitions of $S(g)$ and ϕ_g, $S'(g) = nv'(g) + \pi'(g) - (1+n) < (1+n)[\pi'(g) - \phi_g]$, which yields $S(\overline{g}) - S(\underline{g}) < (1+n)[(\pi(\overline{g}) - \phi_g \overline{g}) - (\pi(\underline{g}) - \phi_g \underline{g})]$. Then, if $W(\underline{g}, 0, \theta_H) = W(\overline{g}, 0, \theta_H)$, $S(\underline{g}) > S(\overline{g})$ since otherwise $W(\underline{g}, 0, \theta_H) < W(\overline{g}, 0, \theta_H)$. $W(\underline{g}, 0, \theta_L) - W(\overline{g}, 0, \theta_L) = (1 - \theta_L/\theta_H)[S(\underline{g}) - S(\overline{g})]$ must also hold. Hence $W(\underline{g}, 0, \theta_L) > W(\overline{g}, 0, \theta_L)$. (ii) Similarly, under Assumption 1, $S(\overline{g}) - S(\underline{g}) < (1+n)[(\pi(\overline{g}) - \overline{g}) - (\pi(\underline{g}) - \underline{g})]$. Then, $W(\underline{g}, \underline{g}, \theta_H) = W(\overline{g}, \overline{g}, \theta_H)$ implies $S(\underline{g}) > S(\overline{g})$, and hence $W(\underline{g}, \underline{g}, \theta_L) > W(\overline{g}, \overline{g}, \theta_L)$. □

Proof of Proposition 1. Taking account only of (15), define the Lagrangian as

$$\mathscr{L} = W(g, \tau, \theta_L) + \lambda[W(g_H, 0, \theta_H) - W(g, \tau, \theta_H) - R_H],$$

where $\lambda \geqslant 0$. Then, the first-order conditions are

$$(1-\lambda)S'(g_L^*) + (\theta_L - \lambda\theta_H)[\pi'(g_L^*) - \phi_g g_L^*] = 0, \tag{B.1}$$

$$\tau_L^*(\lambda\theta_H - \theta_L) = 0, \tag{B.2}$$

and

$$\lambda[W(g_L^*, \tau_L^*, \theta_H) + R_H - W(g_H, 0, \theta_H)] = 0, \tag{B.3}$$

while the second-order condition is

$$(1-\lambda)S''(g_L^*) + (\theta_L - \theta_H\lambda)\pi''(g_L^*) \leqslant 0. \tag{B.4}$$

From (B.2) $\tau_L^* = 0$ or $\lambda = \theta_L/\theta_H$, while from (B.4) $\lambda < 1$. Provided that $W(g_L^*, \tau_L^*, \theta_H) + R_H < W(g_H, 0, \theta_H)$, then $\lambda = 0$ from (B.3), and hence $(g_L^*, \tau_L^*) = (g_L, 0)$ from (B.1) and (B.2). Notice that $W(g_L, 0, \theta_H) + R_H < W(g_H, 0, \theta_H)$ is equivalent to $R_H < \underline{R}$. If $\tau_L^* > 0$ and $W(g_L^*, \tau_L^*, \theta_H) + R_H = W(g_H, 0, \theta_H)$, on the

other hand, $g_L^* = g_S$ from (B.1) and (B.2). This case occurs if and only if $R_H > \overline{R}$ and $\tau_L^* = \underline{\tau}(R_H)$ by definition. If $\tau_L^* = 0$ and $W(g_L^*, 0, \theta_H) + R_H = W(g_H, 0, \theta_H)$, a corner solution occurs, and $g_L^* = \underline{g}(R_H)$ follows from Lemma 2. □

Proof of proposition 2. Subtracting (16) from (15) on each side yields

$$W(g_H, \tau_H, \theta_H) - W(g_L, \tau_L, \theta_L) - [W(g_L^*, \tau_L^*, \theta_H) - W(g_L^*, \tau_L^*, \theta_L)] + \frac{R_L}{\theta_L} - \frac{R_H}{\theta_H} \geqslant 0.$$

Substituting $W(g_H, \tau_H, \theta_H) = W(g_L, \tau_L, \theta_H) + \underline{R}/\theta_H$ into this and rearranging the terms, we obtain (20). Conversely, suppose that (20) holds. If $R_H \leqslant \underline{R}$, then, $(g_L^*, \tau_L^*) = (g_L, 0)$ from Proposition 1, and (16) is obviously met. If $R_H > \underline{R}$, $(g^*(R_H), \tau^*(R_H))$ satisfies (15) with equality. Combining (15) with (20) yields (16) straightforwardly. □

Proof of Proposition 3. (i) Consider an intuitive pooling equilibrium with $\mu_P^* = 1$. Then, the conditions of (25), (26), and (29) reveal that (g_P^*, τ_P^*) is its policy outcome if and only if there exists $x \in [0, R_H]$ such that

$$W(g_P^*, \tau_P^*, \theta_H) + \frac{x}{\theta_H} = W(g_H, \tau_H, \theta_H), \tag{B.5}$$

$$(g_P^*, \tau_P^*) = \arg \max_{(g,\tau) \in \Re_+^2} W(g, \tau, \theta_L) \quad \text{s.t. } W(g, \tau, \theta_H) + x/\theta_H \leqslant W(g_H, \tau_H, \theta_H), \tag{B.6}$$

and

$$W(g_P^*, \tau_P^*, \theta_L) + \frac{R_L}{\theta_L} \geqslant W(g_L, \tau_L, \theta_L). \tag{B.7}$$

When x is replaced for R_H, (B.6) shows the same maximization problem as we have solved in the proof of Proposition 1. Thus, (B.5) and (B.6) are met if and only if $(g_P^*, \tau_P^*) = (g^*(x), \tau^*(x))$ and $x \geqslant \underline{R}$. With respect to (B.7), substituting $(g^*(x), \tau^*(x))$ into (g_P^*, τ_P^*) and invoking the definition of $\underline{R}$ as well as (B.5), we can rewrite it into

$$\frac{R_L}{\theta_L} \geqslant \frac{x - \underline{R}}{\theta_H} - \left(\frac{1}{\theta_L} - \frac{1}{\theta_H}\right)[S(g^*(x)) - S(g_L)]. \tag{B.8}$$

According to Proposition 2(ii), the right-hand side is increasing in x. Hence R_P is unique and (B.8) holds if and only if $R_P \geqslant x$.

(ii) Suppose $R_H < \underline{R}$. From (25), $(g_P^*, \tau_P^*) \neq (g_L, \tau_L)$, because $W(g_H, \tau_H, \theta_H) > W(g_L, \tau_L, \theta_H) + R_H/\theta_H$. Then, $(g, \tau) = (g_L, \tau_L)$ establishes (27) and (28) for any $\mu_P^* \in [0, 1]$. Suppose next $R_H \geqslant \underline{R}$. From (B.8), $R_P \geqslant \underline{R}$ whenever $R_L > 0$. Then, from the above proposition, the existence of an intuitive pooling equilibrium with $\mu_P^* = 1$ is assured. □

Proof of Proposition 4. (i) Because of separating equilibria, $(g_H^{B*}, \tau_H^{B*}) = (g_H^B, \tau_H^B)$ is obvious. Given this, the removal of dominated strategies requires

$$(g_L^{B*}, \tau_L^{B*}) = \arg \max_{(g,\tau)\in\Re_+^2} W(g, \tau, \theta_L) \quad \text{s.t. } \tau \geqslant g, \text{ (31), and (32).}$$

Consider this problem, disregarding (32) for a while. Then, $(g_L^{B*}, \tau_L^{B*}) = (g_L^B, g_L^B)$ if $R_H \leqslant \underline{R}^B$, since (31) is not binding. Recalling the proof of Proposition 1, $(g_L^{B*}, \tau_L^{B*}) = (g_S, \underline{\tau}^B(R_H))$ if $R_H \geqslant \overline{R}^B$, since the budget rule is not binding. If $\overline{R}^B > R_H > \underline{R}^B$, (31) is binding, and hence $g_L^{B*} = \underline{g}^B(R_H)$ from Lemma 2(ii).

(ii) We will first show that $\underline{g}(R_H) > \underline{g}^B(R_H)$ for any R_H. From the definitions of $\underline{g}^B(R_H)$ and g_H,

$$W(\underline{g}^B(R_H), 0, \theta_H) + \phi_\tau(g_H^B - \underline{g}^B(R_H)) + R_H/\theta_H = W(g_H^B, 0, \theta_H) < W(g_H, 0, \theta_H).$$

Hence $W(\underline{g}^B(R_H), 0, \theta_H) < W(\underline{g}(R_H), 0, \theta_H)$, because $W(g_H, 0, \theta_H) = W(\underline{g}(R_H), 0, \theta_H) + R_H/\theta_H$ and $g_H^B > \underline{g}^B(R_H)$. Then, $\underline{g}^B(R_H) < \underline{g}(R_H)$ follows since $W(g, 0, \theta)$ is increasing in g if $0 \leqslant g \leqslant g_H$. Now compare the equilibrium fiscal policies. If $R_H \leqslant \underline{R}$, then $g_L^* = g_L > g_L^B \geqslant g_L^{B*}$. If $\overline{R} > R_H > \underline{R}$, then $g_L^* = \underline{g}(R_H) > g_S$ and $g_L^{B*} = \min\{g_L^B, \max\{\underline{g}^B(R_H), g_S\}\}$. Since $\underline{g}(R_H) > \underline{g}^B(R_H)$, we have $g_L^* > g_L^{B*}$.

(iii) The proof is almost the same as that of Proposition 2 and hence omitted. □

References

Aghion, P., Bolton, P., 1990. Government domestic debt and the risk of default: a politico-economic model of the strategic role of debt. In: Dornbusch, R., Draghi, M. (Eds.), Public Debt Management: Theory and History. Cambridge University Press, Cambridge, pp. 315–345.

Alesina, A., 1988. Macroeconomics and Politics. NBER Macroeconomic Annual 1988, MIT Press, Cambridge, MA, pp.13–52.

Alesina, A., Tabellini, G., 1990. A political theory of fiscal deficits and government debt in a democracy. Review of Economic Studies 57, 403–414.

Alesina, A., Perotti, R., Tavares, J., 1998. The political economy of fiscal adjustments. Brooking Papers on Economic Activity 1, 197–266.

Austin-Smith, D., Banks, J., 1989. Electoral accountability and incumbency. In: Ordeshook, P.C. (Ed.), Models of Strategic Choice in Politics. University of Michigan Press, Ann Arbor.

Barro, R., 1973. The control of politicians: an economic model. Public Choice 14, 19–42.

Barro, R., 1979. On the determination of public debt. Journal of Political Economy 87, 947–971.

Bernheim, B.D., Whinston, M.D., 1986. Menu auctions, resource allocation, and economic influence. Quarterly Journal of Economics 101, 1095–1117.

Besley, T., Case, A., 1995a. Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits. Quarterly Journal of Economics 110, 769–798.

Besley, T., Case, A., 1995b. Incumbent behavior: vote-seeking, tax-setting, and yardstick competition. American Economic Review 85, 25–45.

Brender, A., 2003. The effect of fiscal performance on local government election results in Israel: 1989–1998. Journal of Public Economics 87, 2187–2205.

Brender, A., Drazen, A., 2004. Political budget cycles in new versus established democracies, working paper. Tel Aviv University.

Coate, S., 2004. Pareto-improving campaign finance policy. American Economic Review 94, 628–655.

Coate, S., Morris, S., 1995. On the form of transfers to special interests. Journal of Political Economy 103, 1210–1235.
Cho, I.-K., Kreps, D., 1987. Signaling games and stable equilibria. Quarterly Journal of Economics 102, 179–221.
Cukierman, A., Meltzer, A., 1989. A political theory of government debt and deficits in a neo-Ricardian framework. American Economic Review 79, 713–731.
Dhami, S., 2003. The political economy of redistribution under asymmetric information. Journal of Public Economics 87, 2069–2103.
Dixit, A.K., Grossman, G.M., Helpman, E., 1997. Common agency and coordination: general theory and application to government policy making. Journal of Political Economy 105, 752–769.
Drazen, A., 2001. The political business cycle after 25 years. In: NBER Macroeconomic Annual 2000. MIT Press, Cambridge, MA, pp. 75–117.
Ferejohn, J., 1986. Incumbent performance and electoral control. Public Choice 50, 5–26.
Gonzalez, M.A., 2002. On elections, democracy, and macroeconomic policy cycles, working paper, Department of Economics, Princeton University.
Grossman, G.M., Helpman, E., 1994. Protections for sale. American Economic Review 84, 833–850.
Grossman, G.M., Helpman, E., 1996a. Intergenerational redistribution with short-lived government. Economic Journal 108, 1299–1329.
Grossman, G.M., Helpman, E., 1996b. Electoral competition and special interest politics. Review of Economic Studies 63, 265–286.
Harrington Jr., J.E., 1993. Economic policy, economic performance, and elections. American Economic Review 83, 27–42.
Landon, S., Ryan, D.L., 1997. The political costs of taxes and government spending. Canadian Journal of Economics 30, 85–111.
Lowry, R.C., Alt, J.E., Ferree, K.E., 1998. Fiscal policy outcomes and electoral accountability in American states. American Political Science Review 92, 759–774.
Niskanen, W.A., 1975. Bureaucrats and politicians. Journal of Law and Economics 18, 617–644.
Noguchi, Y., 1991. Budget policymaking in Japan. In: Kernell (Ed.), Parallel Politics : Economic Policymaking in Japan and the United Stages. Brookings Institution, Washington, pp. 119–141.
OECD, 1989. OECD Economic Surveys: Japan 1988/89. Organization for Economic Co-operation and Organization, Paris.
Peletier, B.D., Dur, R.A.J., Swank, O.H., 1999. Voting on the budget deficit: comment. American Economic Review 89, 1377–1381.
Peltzman, S., 1992. Voters as fiscal conservatives. Quarterly Journal of Economics 107, 327–361.
Persson, T., Svensson, L., 1989. Why a stubborn conservative would run a deficit: policy with time-inconsistent preferences. Quarterly Journal of Economics 65, 325–346.
Persson, T., Tabellini, G., 2000. Political Economics: Explaining Economic Policy. MIT Press, Cambridge, MA.
Prat, A., 2002. Campaign spending with office-seeking politicians, rational voters, and multiple lobbies. Journal of Economic Theory 103, 162–189.
Reed, W.R., 1994. A retrospective voting model with heterogeneous politicians. Economics and Politics 6, 39–58.
Rogoff, K., 1990. Equilibrium political budget cycles. American Economic Review 80, 21–36.
Shi, M., Svensson, J., 2002. Political budget cycles in developed and developing countries, working paper.
Suzuki, T., 2000. Japan's Budget Politics: Balancing Domestic and International Interests. Lynne Rinner Publications, London.
Tabellini, G., Alesina, A., 1990. Voting on the budget deficit. American Economic Review 80, 37–49.
Tavares, J., 2004. Does right or left matter? Cabinet, credibility and fiscal adjustments. Journal of Public Economics 88, 2447–2468.
Tullock, G., 1997. Economics of Income Redistribution, second ed. Kluwer Academic Publishers, Dordrecht.