Political Budget Cycles Without Deficits: How to Play Favorites*

Allan Drazen†   Marcela Eslava‡

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(Preliminary – Not for Quotation)

Abstract

We present a model of Political Budget Cycles in which incumbents influence voters without changing overall expenditures or deficits. They do so by targeting government spending to specific groups of voters at the expense of other voters or other expenditures. Voters face a signal extraction problem: high pre-election spending targeted to voters may reflect opportunistic manipulation, but may also a sincere preference of the incumbent for spending that targeterd voters prefer. We show the existence of a political equilibrium in which rational voters support an incumbent who targets them with spending before the election even though they know it may be electorally motivated. In equilibrium voters in the more "swing" groups are targeted at the expense of types of spending not favored by these voters only if they are uncertain about the strengh of electoral motives.

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†Jack and Lisa Yael Professor of Comparative Economics, Tel Aviv University, University of Maryland, NBER, and CEPR. Email: drazen@econ.umd.edu

‡Universidad de Los Andes. Email: meslava@uniandes.edu.co

1 Introduction

Conventional wisdom is that incumbents use economic policy – especially fiscal policy – before elections to influence electoral outcomes. "Election-year economics" often includes increases in expenditures and transfers, as well as tax reductions.

Though a number of recent studies (Shi and Svensson [2002a, 2002b], Persson and Tabellini [2003]) find evidence of the existence of an electoral deficit cycle in a wide cross-section of countries, Brender and Drazen (2004) argue that the empirical findings in larger data sets are due to a subset of countries (termed "new democracies") and their experience in the first few elections after the transition to democracy. In contrast, in "established" democracies, there is no statistically significant political cycle across countries in aggregate central government expenditure or deficits.

The lack of a political deficit cycle at the aggregate level in established democracies raises the following question: Is fiscal manipulation absent or (more likely) does it simply appear in different forms? That is, in established democracies, is election-year fiscal policy often used to influence voters in such a way that the overall government budget deficit is not affected? One way to do this is to change the *composition* of expenditures towards those that are highly valued by voters and away from those that are less valued. For example, voters may value some types of public services more than others; they may view some government expenditures as benefitting citizens as others as mainly benefitting politicians. Politicians differ in their preferences over types of expenditures and voters prefer politicians whose preferences are more towards expenditures that voters prefer.

Analogously, an incumbent may target expenditures, transfers, and tax cuts at specific groups whose voting behavior is seen as especially susceptible to targeted fiscal policy, and finance these policies by expenditure cuts or tax increases on other groups whose vote are much less sensitive to such policy. A significant part of apparently electorally motivated fiscal policy in practice is in fact via policies or legislation targeted to specific groups of voters – geographically concentrated investment projects, expenditures and transfers targeted to very specific groups of voters, or tax cuts benefitting specific groups.

In spite of the widespread use of policies targeted at groups of voters before elections, there are no formal models integrating targeted expenditures into an intertemporal model of the political cycle.[1] Lindbeck and Weibull (1987) and Dixit and Londregan (1996) present formal models of balanced-budget targeting of voter groups based on their characteristics in order to gain votes. However, they

[1] More generally, though special interest politics is seen as especially important in many political economy analyses, it is almost entirely absent in models of macroeconomic policy in general. This project is part of a larger research agenda on integrating special interest groups into the study of macroeconomic policy, for example, in Drazen and Limao (2003).

are static models (or, equivalently, assume that a politician can commit himself to a post-electoral fiscal policy), so that there is no voter inference problem about post-electoral utility based on pre-electoral economic magnitudes. Hence, these models do not really answer the key question of why rational, forward-looking voters who are targeted by the incumbent before the election vote for him in the expectation that their utility will be higher after the election if he is re-elected.

To expand on this last point, a key question in assessing electoral manipulation is: Why should rational voters respond to election-year economics? The sole existing theoretical approach, introduced by introduced by Rogoff and Sibert (1988) and Rogoff (1990), is based on the unobservability of an incumbent's ability or "competence" in providing aggregate expenditures without raising taxes.[2] Voters care about which candidate will give them higher welfare after the election; since more "competent" candidates can provide more public goods, they provide higher welfare and are therefore preferred by voters, all else equal. Competence is correlated over time, so that a more competent candidate can provide a higher level of public goods both before and after an election.[3] Hence, voters rationally prefer a candidate who provides higher aggregate expenditures before an election, since this is a signal of higher competence.

In many of its versions, the Rogoff competence approach implies increases in total government expenditures in an election year (or in the government budget deficit in the Shi-Svensson version), a prediction that is inconsistent with the finding of Brender and Drazen (2004) that there is no statistically significant aggregate deficit or expenditure cycle in established democracies. It is also inconsistent with the view that voters are "fiscal conservatives" who punish (rather than reward) high spending or deficits at the polls, a finding confirmed by Peltzman (1992) for the U.S. and Brender (2003) for Israel. Similarly, Alesina, Perotti, and Tavares (1998) argue that in the OECD there is no evidence of a systematic electoral penalty or fall in popularity for governments that enact policies of significant fiscal restraint.

A rational voter may indeed be averse to deficits, but may favor incumbents who spend more on the public goods and services the voter cares most about (if he does so without running a deficit). Given these voter preferences of voters, an incumbent's optimal strategy prior to an election involves shifting spending from items with smaller political impact towards those that voters value most. The motivation to manipulate fiscal policy is to attract groups of voters that value specific types of public

[2] Other rational voter models include Persson and Tabellini (1990), González (2001), Stein and Streb (2003), and Shi and Svensson (2002a). All of these models depend on some version of the Rogoff approach, that is, the effect of pre-electoral fiscal expansion on expected aggregate activity or welfare after the election.

[3] A key innovation of Shi and Svensson (2002a) is that the policymaker chooses fiscal policy before he knows his competence level, so that all "types" choose the same level of expansion. That is, the model focusses on moral hazard rather than signaling, as do the other models. An implication is an aggregate deficit cycle.

spending, rather than gaining votes by boosting economic activity.

If manipulation takes the form of targeted expenditures to groups of voters or changes in the composition of spending for a *given* level of total spending, the competence argument does not provide a basis for rational voters responding to fiscal policy in an election year. Rather, a voter who is targeted with expenditures before an election wants to know whether he will be similarly favored after the election.

Why does giving to one group or choosing a type of expenditure before the election makes it credible that the politician will continue to do so after the election? One argument is that politicians who renege on the (implicit) commitment to continue a government program after the election lose the ability to use fiscal policy as a tool to influence voters in future elections.

Another argument is that the politician has *unobserved* preferences over groups or types of expenditure, preferences that have some persistence over time. Hence if a voter believes that the incumbent favors him before the election, he rationally expects to be favored after the election as well. Key to this approach, as in the Rogoff approach, is the inference problem a rational voter must solve under asymmetric information, though over a politician's preferences rather than over his competence. In order to make clear that ours is not a competence argument, we assume that the total amount of spending provided is identical across politicians and is known to voters.[4]

Incumbent preferences over types of expenditures may concern those that voters (as a whole) favor more and those that they favor less, as in Drazen and Eslava (2004). These preferences are unobserved and must be inferred from the actual composition of expenditures. Since politician preferences over types of expenditure display some persistence, voters may find it rational to vote for an incumbent whose election year fiscal policy targets the types of expenditure that voters prefer. Drazen and Eslava (2004) present empirical evidence on compositional effects without deficits in regional political budget cycles in Colombia.[5]

An alternative, studied here, is that a politicians preferences are not over types of expenditures affecting all voters, but over targeted expenditures to different groups of voters. Voters are unsure both of how heavily they are weighted in an incumbent's objective function (relative to other voters

[4] Strömberg (2001) presents a model where politicians differ in their ability to provide different targeted expenditures.

[5] Several papers find evidence of electoral composition effects. Brender (2003) finds that voters in Israel penalize election year deficits, but also that they reward high expenditure in development projects in the year previous to an election. Similarly, Peltzman (1992) result that US voters punish government spending holds for current (as opposed to capital) expenditures, but looses power if investment in roads, an important component of public investment, is included in his policy variable. Kneebone and McKenzie (2001) look for evidence of PBC in fiscal data for Canadian provinces, and find no evidence of a cycle in aggregate spending, but do find a cycle in what they call "visible expenditures", mostly investment expenses such as construction of roads and structures. Very similar findings are reported for Mexico by Gonzàlez (2001), who also find that other categories of spending, such as current transfers, contract prior to elections.

or over non-targeted expenditures) and how "swing" they are, meaning how sensitive their group's voting behavior is to expenditures. That is, voters prefer a candidate who assigns higher value to goods the voter likes most, but have only imperfect information about the politicians' preferences over different voter groups. They therefore need to extract such information about an incumbent's preferences from his fiscal actions. Higher pre-election spending on a good signals high value placed on that good by the politician, Since a politician's preferences change slowly over time, high pre-election provision of the good is positive correlated with its provision after the election. We show the existence of a Perfect Bayesian Equilibrium in which voters rationally respond to election-year expenditures and politicians allocate expenditure across groups on the basis of this behavior. Politicians increase targeted spending before elections, while they contract other types of expenditure to satisfy the no-deficit constraint. To repeat, a key result is that electoral manipulation arises even with fully rational voters.

The strength of the political cycle in our model depends on the distribution of ideological preferences, and the amount of information voters have about the political environment. In particular, we show that targeted spending increases more prior to elections if there is a larger fraction of swing voters. However, voters anticipate this behavior, and are therefore less likely to respond to pre-electoral manipulation of fiscal policy if they know their group is highly likely to be electorally targeted. As a result, there is a natural limit to pre-electoral increases of spending. On the other hand, the incumbent's ability to engage in this form of electoral manipulation is increased by its access to privileged information about the political environment. In particular, politicians have more information than voters about the potential electoral benefits of a given change in fiscal policy, and this increases their ability to obtain political benefits from increases in targeted expenses.

The plan of the paper is as follows. In the next section we present a model of politicians who have preferences over groups in the electorate. In section **??** we add a good valued only by politicians ("office rents") to show that electoral fiscal manipulation might entail some one groups being targeted at the expense of others, or all voter groups being targeted at the expense of office rents that politicians value. Because of the difficulty of analytically finding an equilibrium in the models of sections 2 and **??**, in section 4 we present an example which illustrate the political equilibrium. Conclusions are presented in section 5.

2 A Model of Politicians Who Have Preferences over Voters

We consider a simple model where the driving force of the political cycle is expenditures targeted to special interest groups to gain votes. The key innovation in the model relative to earlier models of the political cycle is the central role of unobserved preferences of politicians over different constituencies, and the inference problem this unobservability implies.

There are elections between an incumbent and a challenger, where incumbents use changes in the composition of expenditures to attract votes. Specifically, there is an election at the end of every other period t, $t+2$, *etc.* Voters value targeted transfers or expenditures, but dislike deficits. The incumbent has the ability to choose fiscal policy, and takes voter preferences into account in designing policy meant to increase his electoral prospects. We focus on the targeting of expenditures, and simply assume that the aversion of voters to deficits imposes a tight fiscal constraint: incumbents can neither raise taxes, nor incur in deficits. In short, the sum of all expenditures must always equal the fixed level of taxes. Of course, a voter could be targeted with both low taxes and high expenditures to gain his votes but, to simplify this exposition, it is assumed that only expenditures are used to target individual voters before elections.

2.1 The Government Budget

Total expenditures equal total tax revenues, which are assumed fixed and set equal to unity. Hence, the choice of fiscal policy is the choice of composition of the government budget, which comprises expenditures that can be targeted to specific groups of voters, and other types of expenditure. For simplicity, in this section, we assume that there are no expenditures other than targeted expenditures, which may go to either of two groups of voters, h_1 and h_2, each of whom values expenditures targeted to his type, denoted g^1 and g^2. Everyone in group h receives the same per-capita level of the expenditure. In section **??** we consider the implications of politicians also spending on goods that they alone value, that is, "office rents".

Each period, the government faces the budget constraint:

$$\sum_{h=1}^{2} g_s^h = 1 \qquad s = t, t+1, \ldots \tag{1}$$

2.2 Voters

Utility of an individual depends on two aspects of government policy. First, there is the consumption of the government supplied good $g_s \geq 0$ which provides utility directly. We abstract here from other types of consumption, which are affected by tax policy, since we are imposing fixed taxes. Second, an individual j also cares about the distance between his most desired position π^j over other policies (which is immutable) and the position π^P of the politician P (the incumbent or the challenger). There are two parties L and R, with $\pi^L < \pi^R$, where we take π^L and π^R as given and assume no competition over ideology. Without loss of generality, we assume that party L is the incumbent.

Within each group h_1 and h_2, voters differ in their preferences over ideology. That is, within each group there is a non-degenerate distribution of preferences over ideology which may change between elections. What we need for our results is that voters do not have complete information about the distribution. For simplicity, we assume that the preference distribution is uncorrelated over elections, so that past electoral policy gives voters no information about the current distribution. We denote the density function of voters in group h in the current election cycle as $f_h(\pi)$, where we suppress the time subscript. We assume there is asymmetric information about how effective is fiscal policy to raise votes. In particular, we assume that the incumbent knows $f_{h_1}(\pi)$ and $f_{h_2}(\pi)$, while voters only have imperfect information about them, to be specified more precisely below.

Single period utility of individual j in group h in period s if politician $P \in \{L, R\}$ is in power may be written

$$U_s^{h,j}(P) = \ln g_s^h(P) - \left(\pi^j - \pi^P\right)^2 \tag{2}$$

where $g_s^h(P)$ is expenditure given by policymaker P to a member of group h. A voter j is thus characterized by π^j. (To help in following the exposition, note that $\ln g_s^h(P)$ does not depend on j. Hence in discussing the central problem of inferring g_{t+1} from g_t, we may ignore the index j.)

An individual's only choice is whether to vote for the incumbent or the challenger, and only in an election period. Consider the election cycle t and $t+1$. (The assumptions we make below about the time series properties of politician's preferences imply that we can consider the individual's problem over each election cycle independently.) A forward-looking voter j in group h prefers the incumbent L over the challenger R if

$$E_t\left[\ln g_{t+1}^h(L) \mid g_t^h\right] - (\pi^j - \pi^L)^2 > E_t \ln g_{t+1}^h(R) - (\pi^j - \pi^R)^2 \tag{3}$$

Note that, given (1), observing the g_t the other group receives provides no additional information.

The indifferent voter in group h who receives g_t^h from the incumbent may therefore be represented by the position $\widetilde{\pi}^h(g_t^h)$, defined by

$$\widetilde{\pi}^h(g_t^h) = \frac{\pi^L + \pi^R}{2} + \frac{E_t\left[\ln g_{t+1}^h(L) \mid g_t^h\right] - E_t \ln g_{t+1}^h(R)}{2(\pi^R - \pi^L)} \tag{4}$$

The dependence of the position of the indifferent voter on g_t^h follows from its effect on the utility voters expect to receive if the incumbent is re-elected. Within group h, all individuals characterized by $\pi^j < \widetilde{\pi}^h(g_t^h)$ vote for the incumbent L party, while those with $\pi^j > \widetilde{\pi}^h(g_t^h)$ vote for the R party.

We can then express the fraction of group h voters who vote for the incumbent as a function of the pre-election expenditure observed by voters. Denoting this fraction as $\phi_h(g_t^h)$ and the lower bound of π^j as $\underline{\pi}$, we obtain:

$$\phi_h(g_t^h) = \int_{\underline{\pi}}^{\widetilde{\pi}^h(g_t^h)} f_h(\pi)d\pi = F_h\left(\widetilde{\pi}^h(g_t^h)\right) \tag{5}$$

where $F_h(\cdot)$ is the cumulative distribution associated with the density $f_h(\cdot)$. Voting patterns $\phi_h(\cdot)$ depend on g_t^h due to the dependence of $\widetilde{\pi}^h(\cdot)$ on g_t^h via $E_t\left(\ln g_{t+1}^h \mid g_t^h\right)$, that is, due to the expectation of post-electoral utility conditional on observed g_t^h. Since the politician's choice of g_t^h is used to form expectations of ω^h and $\ln g_{t+1}^h$, the equilibrium expectation of period $t+1$ utility will depend on the politician's optimal behavior, for which we solve in the next section.

Differentiating (5) with respect to g_t^h, one obtains

$$\phi_h'(g_t^h) = f_h\left(\widetilde{\pi}^h(g_t^h)\right)\frac{\partial \widetilde{\pi}^h(g_t^h)}{\partial g_t^h} \tag{6a}$$

$$= f_h\left(\widetilde{\pi}^h(g_t^h)\right)\cdot\left[\frac{\partial E_t\left(\ln g_{t+1}^h(L) \mid g_t^h\right)}{\partial g_t^h}\frac{1}{2\left(\pi^R - \pi^L\right)}\right] \tag{6b}$$

where we have used equations (4) and (19). Note that groups differ in the level of spending that they receive, and, as a result, in the ideological position of the indifferent voter in group h, $\widetilde{\pi}^h(g_t^h)$. We assume that the $f_h(\cdot)$ have no mass points, so that a marginal increase in $\widetilde{\pi}^h(g_t^h)$ cannot induce a discontinuous jump in the number of voters supporting the incumbent. As indicated, voter groups do not know the distribution of ideological positions in their group, and hence how large is the fraction of voters in their group who are close to indifferent between the two candidates. That is, they do not know how many "swing" voters their group has.

$\phi_h'(g_t^h)$ measures the electoral benefit to the politician from targeting an additional dollar to voters in group h. The size of this benefit depends first on how much that additional dollar expands the range of ideological positions for which voters prefer the incumbent, characterized by the position of the indifferent voter $\widetilde{\pi}^h(g_t^h)$. If the utility voters expect under the incumbent in $t+1$ increases, $\widetilde{\pi}^h(g_t^h)$ increases (that is, moves closer to π^R) and the range of supporters for the incumbent expands. For a given change in expected utility, the increase of $\widetilde{\pi}^h(g_t^h)$ is smaller the farther apart π^R and π^L are, as the cost to voters from having their least preferred ideological position in power becomes larger. Second, $\phi_h'(g_t^h)$ depends on the mass of h voters at point $\widetilde{\pi}^h(g_t^h)$, namely $f_h\left(\widetilde{\pi}^h(g_t^h)\right)$,which determines how many additional votes the incumbent obtains from increasing $\widetilde{\pi}^h(g_t^h)$.

2.3 The Incumbent's Problem

Politicians do not weight the utility of all voters equally, where their preference over different groups may be represented by the weight they put on a group's non-ideological utility $\ln g_t^h$.[6] A politician P's single period utility in period s if the policy in place is π^A may be written

$$U_s^P = Z_s^P\left(\mathbf{g}_s\right) - \left(\pi^P - \pi^A\right)^2 \tag{7}$$

where $\mathbf{g}_s$ is the vector $\left(g_s^1, g_s^2\right)$ and $Z_s^P\left(\cdot\right)$ represents his preferences over the two groups of voters at time s

$$Z_s^P\left(\mathbf{g}_s\right) = \sum_{h=1}^{2} \omega_{P,s}^h \ln g_s^h \tag{8}$$

For simplicity, we assume that $\omega_{P,s}^2 = 1 - \omega_{P,s}^1$,where $\omega_{P,s}^1$ is drawn from an i.i.d. distribution at the beginning of every election period for two periods. (That is, $\omega_{P,t+1}^1 = \omega_{P,t}^1$ if t is an election period, but $\omega_{P,t}^1$ and $\omega_{P,t+2}^1$ are uncorrelated.) What is crucial is that there is some correlation between $\omega_{P,t}^h$ between an election period and the post-election period, so that forward-looking voters care about $\omega_{P,t}^h$ when voting at the end of period t.[7] The distribution, which is the same for both incumbent and challenger, is defined over $\left(\omega^l, \omega^u\right)$, where $0 \leq \omega^l < \omega^u \leq 1$ and has a mean of $\overline{\omega}$.

A politician L who was elected in t has an objective function Ω_{t+1}^{IN} in the following non-election year $t+1$ (when he is *in* office and not facing an election in $t+1$) for the vector of targeted expenditure

[6] Bonomo and Terra (2003) consider politicians who have preferences over sectors, but where these preferences are known.

[7] Post-electoral ω_P^h must be correlated with the pre-electoral ω_P^h, so that pre-electoral policy contains information about what post-electoral policy will be. No correlation in $\omega_{P,s}^h$ *across* electoral cycles greatly simplifies the voters' inference problem, since observed policy in previous elections provides no information about current $\omega_{P,s}^h$. Assuming $\omega_{P,s}^h$ follows an MA(1) process has these implications, as does our assumption in the text. We chose the latter over the former assumption as it greatly simplifies the comparison of pre- and post-electoralfiscal policy while maintaining the necessary serial correlation structure.

$\mathbf{g}_{t+1}^{L}$ of

$$\Omega_{t+1}^{IN}(\mathbf{g}_{t+1}^{L}, L) = Z_{t+1}^{L}\left(\mathbf{g}_{t+1}^{L}\right) + \beta E_{t+1}^{L}\left(\Omega_{t+2}^{ELE}(\cdot, L)\right) \tag{9}$$

where β is the discount factor, $E_{t+1}^{L}\left(\Omega_{t+2}^{ELE}\right)$ is L's expectation as of period $t+1$ of the present discounted value of utility from $t+2$ (an election period) onward. The assumptions that the government's budget is balanced each period and that $\omega_{L,t}^{h}$ has a two-period life mean that actions at $t+1$ have no effect on Ω_{t+2}^{E}.

The incumbent's objective Ω_{t}^{ELE} in the previous election year t can then be written

$$\Omega_{t}^{ELE}\left(\mathbf{g}_{t}^{L}, L\right) = Z_{t}^{L}\left(\mathbf{g}_{t}^{L}\right) + \beta\left(\rho\left(N^{L}\right) E_{t}^{L}\Omega_{t+1}^{IN}\left(\mathbf{g}_{t+1}^{L}, L\right) + \left(1-\rho\left(N^{L}\right)\right) E_{t}^{L}\Omega_{t+1}^{OUT}\right) \tag{10}$$

where ρ, the probability of re-election, is a function of the fraction of votes N_{t}^{L} the left-wing incumbent receives and where Ω_{t+1}^{OUT} is the present discounted utility the period-t incumbent assigns to being out of office in $t+1$. The difference $E_{t}\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right)$ is the value of re-election at t which may be written

$$E_{t}\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right) = (1+\beta)\left(\pi^{L} - \pi^{R}\right)^{2} + E_{t}\left(Z_{t+1}^{L}\left(\mathbf{g}_{t+1}^{L}\right) - Z_{t+1}^{L}\left(\mathbf{g}_{t+1}^{R}\right)\right) + \beta^{2}E_{t}\Pi_{t+3} \tag{11}$$

where $E_{t}\Pi_{t+3}$ is the expected gain from the *possibility* of re-election in $t+2$ and later due to election at t. The first term in (11) is the gain to the incumbent in periods $t+1$ and $t+2$ of having policy reflect his preferred ideology rather than that of his opponent. The second term is the value of having his preferred fiscal policy in period $t+1$ rather than that of his opponent. The assumptions on the stochastic nature of ω_{t}^{h} imply that as of t there is an expected difference in a politician's preferences over voters only at $t+1$. As of t the incumbent's expected preferences for dates $t+2$ and later are identical to those of a representative candidate.

The last term reflects the effect of re-election at t on the probability of re-election at the end of $t+2$ and later. If, for example, the probability of re-election at $t+2$ is independent of the election outcome at t, then $E_{t}\Pi_{t+3} = 0$. Conversely, if a party's re-election at t increases the probability of its re-election at $t+2$ and later, then $E_{t}\Pi_{t+3} > 0$, where the value of the higher probability of re-election at $t+2$ and later stems (in the absence of "office rents") solely from the ability to enact one's preferred ideological policies.[8] The larger the positive effect of electoral victory at t on the

[8] To take a simple example, if L's re-election at t increases its expected probability of re-election at $t+2$ (and hence its probability of being in office at $t+3$ and $t+4$) from ρ_{L} to $\hat{\rho}_{L} > \rho_{L}$, but has no effect on later proababilities, we would have

$$E_{t}^{L}\Pi_{t+3} = (1+\beta)\left(\hat{\rho}_{L} - \rho_{L}\right)\left(\pi^{L} - \pi^{R}\right)$$

probability of later election (where this effect could be negative), the larger is $E_t\Pi_{t+3}$. Rents would add an important component to the value of re-election at t and all future dates, as in section **??** below.

Equation (10) may be written

$$\Omega_t^{ELE}\left(\mathbf{g}_t^L, L\right) = Z_t^L\left(\mathbf{g}_t^L\right) + \beta\rho\left(N^L\right)E_t^L\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right) + \beta E_t^L\Omega_{t+1}^{OUT} \tag{12}$$

For tractability, we consider $\rho(N^L)$ as a continuous increasing function. The continuity of $\rho(N^L)$ is clearly inexact in a setting where elections are decided by some majority voting rule, but it simply implies that candidates try to maximize the number of votes they receive. This is not a crucial force behind our results about how electoral transfers are allocated across groups of voters.

Notice that the fraction of votes N^L received by the incumbent is given by (we have assumed both groups are of size 1):

$$N^L = \sum_{h=1}^{2}\phi_h(g_t^h)$$

We solve the politician's problem backwards over a "representative " electoral cycle t and $t+1$. For ease of exposition we drop the time subscript on $\omega_{L,s}^h$, that is, $\omega_{L,t}^h = \omega_{L,t+1}^h = \omega_L^h$. If the incumbent is re-elected for the post-election period, he chooses g_{t+1}^h for group h to maximize (9) subject to the budget constraint (1), yielding a first-order condition:

$$\frac{\omega_L^1}{g_{t+1}^1} = \frac{\omega_L^2}{g_{t+1}^2} \tag{13}$$

or, using $\omega_L^2 = 1 - \omega_L^1$ and $g_{t+1}^2 = 1 -\ g_{t+1}^1$ from (1),

$$g_{t+1}^h = \omega_L^h \qquad h = 1, 2 \tag{14}$$

so that the expected utility from re-electing the incumbent is increasing in ω_L^h.

In the extreme, in a citizen-candidate model where the probability of the incumbent I being a candidate in the future if she loses at t is zero, this expression would be

$$E_t\Pi_{t+3} = E_t\left[(1+\beta)\sum_{s=1}^{\infty}\beta^{2(s-1)}\left(\rho_{t+2s}\right)^s\left(\pi^L - \pi^{P_{t+2s}}\right)^2\right]$$

where $\pi^{P_{t+2s}}$ is the ideology of the candidate elected at time $t+2s$ $(s = 1, \ldots)$ and ρ_{t+2s} is the probability that the current incumbent stands for election and wins at time $t+2s$.

The expected value of re-election to the L incumbent, $E_t^L\left(\Omega_{t+1}^{IN}-\Omega_{t+1}^{OUT}\right)$, will be a function of his actual choices for g_{t+1}^h, so that the incumbent treats it as given in choosing g_t^h. For the election period, the incumbent's optimal choice is given by maximizing (12), leading to a first-order condition at t (remember $\phi_h(g_t^h)$ is the share of group h's votes that goes to the incumbent):

$$\frac{\omega_L^1}{g_t^1}+\beta\rho'(\cdot)\,\phi_1'\left(g_t^1\right)E_t^L\left(\Omega_{t+1}^{IN}-\Omega_{t+1}^{OUT}\right)=\frac{\omega_L^2}{g_t^2}+\beta\rho'(\cdot)\,\phi_2'\left(g_t^2\right)E_t^L\left(\Omega_{t+1}^{IN}-\Omega_{t+1}^{OUT}\right) \tag{15}$$

The left-hand side of (15) represents the benefit from a marginal increase in g_t^1. As in the post-election period, this benefit includes the utility gain this change induces for group 1 voters, the first term on the left-hand side. However, prior to an election the politician potentially derives an additional benefit from targeting group 1, namely obtaining more votes from them. The right-hand side represents the same benefit from a marginal increase in g_t^2.

We may express the relation between g_t^h and ω_L^h more compactly as follows. Use $1-\omega_L^1=\omega_L^2$ to write (15) for choice of g_t^1 as

$$\omega_L^1=g_t^1+\beta\rho'(\cdot)\,E_t^L\left(\Omega_{t+1}^{IN}-\Omega_{t+1}^{OUT}\right)g_t^1g_t^2\left(\phi_2'\left(g_t^2\right)-\phi_1'\left(g_t^1\right)\right) \tag{16}$$

or

$$g_t^1=\omega_L^1+A\left(g_t^1,g_t^2\right)\left[\phi_1'\left(g_t^1\right)-\phi_2'\left(g_t^2\right)\right] \tag{17}$$

where $A\left(g_t^1,g_t^2\right)\equiv\beta\rho'(\cdot)\,E_t^L\left(\Omega_{t+1}^{IN}-\Omega_{t+1}^{OUT}\right)g_t^1g_t^2$ and where $\phi_1'\left(g_t^1\right)-\phi_2'\left(g_t^2\right)$ is the vote gain to the incumbent from transferring a dollar of expenditures from group 2 to group 1. (Using $g_t^1+g_t^2=1$, this could be expressed as a function solely of g_t^1.) This vote gain from a change in expenditure composition is known to the incumbent politician, but not to the voters. The relation takes the same form for group 2, namely

$$g_t^2=\omega_L^2+A\left(g_t^1,g_t^2\right)\left[\phi_2'\left(g_t^2\right)-\phi_1'\left(g_t^1\right)\right] \tag{18}$$

The first important result is that targeted spending increases the share of votes that goes to the incumbent, despite the fact that voters recognize the electoral incentives faced by the incumbent.

Proposition 1 *In a political equilibrium under asymmetric information, $\phi_h'\left(g_t^h\right)>0$ for each h.*

Proof. Suppose $\phi_h'\left(g_t^h\right)\leq 0$. The incumbent would then get more votes by *reducing*, or at least not increasing, targeted spending to group h. Larger g_t^h in this case cannot be driven by electoral motives, but by ω_I^h being high. Increases in g_t^h then lead voters in h to perceive higher ω_I^h and expect higher post-election utility. As a result, more group h voters want to vote for the incumbent, that is, $\phi_h'\left(g_t^h\right) > 0$. This contradicts the initial assumption. ■

To close the model we now relate optimal politician behavior in choosing g_t^h as a function of $\phi_h'\left(g_t^h\right)$ as summarized in (15) with optimal voter behavior yielding the $\phi_h'\left(g_t^h\right)$ for the g_t^h received as summarized in (6b).

2.4 Voters' Expectations and the Political Equilibrium

The previous section characterized the allocation of pre-electoral targeted government spending across groups as a function of the additional share of votes an incumbent receives as a result of such spending. The marginal electoral effect of targeted spending is represented by $\phi_h'\left(g_t^h\right)$. Since $\phi_h'(g_t^h)$ depends on an incumbent's decision rule as derived in the previous subsection, as it depends on $\frac{\partial E\left[\ln g_{t+1}^h | g_t^h\right]}{\partial g_t^h}$, we must now use these results to close the model and derive the political-economic equilibrium under rational expectations.

The basic logic behind voters' beliefs is that they formulate expectations about their future well-being under each candidate optimally using all information available to them. In particular, voters in any group h can solve the politician's problem for each possible value of ω_I^h, and know precisely how their future utility under the incumbent relates to ω_I^h. Asymmetric information about ω_I^h and $f_h(\pi)$ however implies that they cannot perfectly observe $\phi_h'\left(g_t^h\right)$.

To define an equilibrium, let us define

$$\Psi\left(g_t^h\right) \equiv E_t\left[\ln g_{t+1}^h\left(L\right) \mid g_t^h\right] \tag{19}$$

which is expected period $t+1$ utility under asymmetric information if incumbent L is re-elected as a function of observed g_t^h, given the voter's information about $f_h(\pi)$ and ω. The beliefs of a voter in group 1 for example about his post-electoral utility under the incumbent L are thus formed according to

$$E_t\left[\ln g_{t+1}^1\left(L\right) \mid g_t^1\right] = E_t \ln\left(g_t^1 - A\left(g_t^1, 1-g_t^1\right)\left[\phi_1'\left(g_t^1\right) - \phi_2'\left(1-g_t^1\right)\right]\right) \tag{20}$$

where (6b) implies

$$\phi_h'(g_t^h) = \frac{f_h\left(\widetilde{\pi}^h(g_t^h)\right)}{2\left(\pi^R - \pi^L\right)}\Psi'\left(g_t^h\right) \tag{21a}$$

By substituting $\phi_h'(g_t^h)$ into equation (20) and using the definition of $\Psi\left(g_t^h\right)$, we can then write (20) as a first order, non-linear, differential equation in the function $\Psi(\cdot)$, namely

$$\Psi\left(g_t^1\right) = E_t \ln\left[g_t^1 - \frac{A\left(g_t^1, 1-g_t^1\right)}{2\left(\pi^R - \pi^L\right)}\left(f_1\left(\widetilde{\pi}^1(g_t^1)\right)\Psi'\left(g_t^1\right) - f_1\left(\widetilde{\pi}^1(1-g_t^1)\right)\Psi'\left(1-g_t^1\right)\right)\right] \tag{22}$$

A function $\Psi(\cdot)$ that solves this equation would constitute a rational political equilibrium, where voters are choosing how to vote on the basis of their expected utility which incorporates optimal government behavior in choosing targeted expenditures in response to voter behavior based on correct expectations. This equation captures voters' beliefs affect electoral outcomes, and therefore the choice of policy, and policy in turn affects their beliefs. That is,

DEFINITION: *In a rational political equilibrium under asymmetric information, voters are choosing how to vote optimally according to* (3) *given their beliefs, the incumbent chooses* g_t^1 *and* g_t^2 *optimally according to* (17) *and* (18) *given voters' beliefs, and voters' beliefs are based on the the politician's behavior and the known distributions of* π *and* ω. *A rational political equilibrium for given probability density functions* $f_1(\cdot)$ *and* $f_2(\cdot)$ *may be represented by a function* $\Psi\left(g_t^h\right)$ *such that if voters vote according to the beliefs underlying* $\Psi\left(g_t^h\right)$ *and the incumbent chooses* g_t^1 *and* g_t^2 *according to* (17) *and* (18), *the incumbent's policy choice of* g_t^h *will ratify these beliefs, that is,* $\Psi\left(g_t^h\right)$.

2.5 Characteristics of the rational political equilibrium

Because (22) is a differential equation in the function $\Psi(\cdot)$, we cannot solve it analytically. (We provide a numerical solution in section 4 below for the case including rents to holding office. We can however characterize some important results. We begin with the reference case of no asymmetric information about the voter densities.

Proposition 2 *In a rational political equilibrium with full information by voters about their* $f_h(\pi)$, *there is no political cycle in the* g_t^h.

Proof:

Suppose not, that is, suppose that $\phi_1'\left(g_t^1\right)$ and $\phi_2'\left(g_t^2\right)$ are positive. Without loss of generality, suppose that $\phi_1'\left(g_{t+1}^1\right) > \phi_2'\left(g_{t+1}^2\right)$, so that $g_t^1 > \omega_L^1$ and $g_t^2 < \omega_L^2$ according to (17) and (18). Since the $f_h(\pi)$ are known, then the true values of $\phi_1'\left(g_t^1\right)$ and $\phi_2'\left(g_t^2\right)$ are known from (21a) (since the voter must know the value of his own expectation $E_t\left[\ln g_{t+1}^h(L) \mid g_t^h\right]$). Individuals can therefore "extract" ω_L^h from the known behavioral rules (17) and (18). That is, different values of the $\phi_h'\left(g_t^1\right)$ will imply different values of the g_t^h for the same underlying ω_L^h, but the voter will always be able to infer the true ω_L^h and hence $\ln g_{t+1}^h(L) = \ln \omega_L^h$ for any observed g_t^h. Therefore, $E_t\left[\ln g_{t+1}^h(L)\right]$ in (6b) does not depend directly on g_t^h **given** the voter's knowledge of ω_L^h, so that Therefore, $\frac{\partial E_t\left(\ln g_{t+1}^h(L)|g_t^h\right)}{\partial g_t^h} = 0$ in (6b). Therefore, $\phi_h'\left(g_t^h\right) = 0$ for both groups 1 and 2. Hence, there is no political cycle. ■

Intuitively, by knowing the density function $f_h(\pi)$ and the politician's decision rules (17) and (18), a voter can perfectly infer $\omega_L^h = g_{t+1}^h(L)$. Any manipulation, that is, choice of $g_t^h \neq \omega_L^h$ (and its implications for what $\phi_1'\left(g_t^1\right)$ and $\phi_2'\left(g_t^2\right)$ must be to make this consistent with the choice of g_t^h given the underlying ω_L^h) will not change the voters inference of ω_L^h from (17) and (18) and hence his expectation of post-electoral utility under the incumbent L versus the challenger R. Voting must therefore be independent of g_t^h. Hence, under full information by voters about voting patterns, electoral targeting will be ineffective and not used. Since this information can be used by voters to separate the electoral motive from the "favorites" motive, they will not be swayed by election-year economics.

In contrast, as shown in Proposition 1, under asymmetric information $\phi_h'\left(g_t^h\right)$ is strictly positive. If follows from (15) that the more electorally valuable group will be targeted in the election year. That is,

Proposition 3 *The group with the higher value of $\phi_h'(\cdot)$ evaluated at the post-electoral g_{t+1}^h receives higher targeted expenditures in an election period t relative to the subsequent non-election period $t+1$, while the other group receives lower targeted expenditures in t relative to $t+1$.*

Proof: Suppose, without loss of generality, $\phi_1'\left(g_{t+1}^1\right) > \phi_2'\left(g_{t+1}^2\right)$. Then $g_t^1 = g_{t+1}^1 \left(= \omega_L^1\right)$ and $g_t^2 = g_{t+1}^2 \left(= \omega_L^2\right)$ cannot solve (17) and (18). Proposition 1 then implies that $g_t^1 > g_{t+1}^1$ and $g_t^2 < g_{t+1}^1$. ■

Intuitively, if one group is more electorally valuable when their voting behavior is evaluated at the non-electorally motivated level of government expenditures, then in an election period fiscal policy will be targeted to get their votes.

Characterizing who gets targeted under asymmetric information in terms of fundamentals about voter densities, the $f_h(\tilde{\pi}^h\left(g_t^h\right))$, is much harder. To see why, note that two factors determine a group's electoral value: the density $f_h(\cdot)$ of ideologically indifferent or "swing" voters; and, given $f_h(\cdot)$, the effect of g_t^h on expected utility in $t+1$. A group can be more electorally valuable even if they have fewer "swing" voters if g_t^h is particularly effective in raising voters' expected utility. That is, if one considers the density of swing voters at the non-electorally-motivated (that is, $t+1$) level of expenditures, it is clear from (21a) that $f_1(\tilde{\pi}^1\left(g_{t+1}^1\right)) > f_2(\tilde{\pi}^2\left(g_{t+1}^2\right))$ does not necessarily imply

$\phi_1'\left(g_{t+1}^1\right) > \phi_2'\left(g_{t+1}^2\right)$ since $\Psi'\left(g_t^h\right)$ is not a constant. Even if $\Psi\left(g_t^h\right) \equiv E_t\left[\ln g_{t+1}^h(L) \mid g_t^h\right]$ were strictly concave, $\phi_1'\left(g_{t+1}^1\right)$ could be less than $\phi_2'\left(g_{t+1}^2\right)$ even though $f_1(\tilde{\pi}^1\left(g_{t+1}^1\right)) > f_2(\tilde{\pi}^2\left(g_{t+1}^2\right))$ if g_{t+1}^2 were sufficiently less than g_{t+1}^1. In more intuitive terms, a group that in a non-election period receives particularly low targeted spending is attractive for electoral targeting since, given concavity of utility function, the impact on its expected utility from a small increase in perceived ω is very high. Moreover, since $\Psi\left(g_t^h\right)$ represents an inference problem over unobserved variables, concavity of the utility function does not guarantee concavity of $\Psi\left(g_t^h\right)$ without restricting the distributions of voter ideology π and incumbent preferences ω.

In order to highlight the effect of targeted expenditures on voting, it was assumed in the model that there is no competition over ideology in an election. However, ideology affects the size of targeted expenditure in an election period. Greater ideological differences between the two candidates have a number of effects on the use of targeted expenditure policy, which may be summarized by (21a), reproduced here:

$$\phi_h'(g_t^h) = \frac{f_h\left(\widetilde{\pi}^h(g_t^h)\right)}{2\left(\pi^R - \pi^L\right)}\Psi'\left(g_t^h\right)$$

Consider a mean-preserving increase in the difference between π^R and π^L. Given the voter density $f_h(\cdot)$ and expectation function $\Psi\left(g_t^h\right)$, the larger is the ideological spread between the two parties, that is, the greater is $\pi^R - \pi^L$, the smaller will be the effect of targeted expenditures. The reason is that the greater is $\pi^R - \pi^L$, the smaller is the effect of targeted expenditure on $\widetilde{\pi}^h(g_t^h)$ (that is $\widetilde{\pi}^h(g_t^h)$ moves closer to the midpoint $\frac{\pi^L+\pi^R}{2}$ in (4)), since the larger is the cost of voters of not having actual policy be their preferred option between π^R and π^L. That is, the greater is the difference between the two party's ideological positions, the more voting is influenced by ideology and the less by targeted transfers. This "first-order" effect is as one would expect intuitively. Conversely, in close ideological elections, targeted expenditures would play a large role.

However, since a change in π^R and π^L affects the position of the indifferent voter $\widetilde{\pi}^h(g_t^h)$ in (4), there will in general be effects on $\phi_h'(g_t^h)$ via $f_h(\cdot)$ and $\Psi\left(g_t^h\right)$. As above, the net effect will depend on the distribution of ideology.

3 Rents to Holding Office

We now add a value of holding office, which we call "rents" (over and above the value to the politician of enacting his own preferred ideology). Specifically, a part of government expenditure may be spent on a good K that is valued only by the politician ("*desks*"). The key effect of this change is the possibility that targeted expenditures to all groups rise in an election year, at the expense of K. This result does not depend on voters assigning no value to K, only that there are some types of expenditure that voters value less than others, and these may be cut in an election year. The characterization of K as total waste in the eyes of voters is simply an extreme way to capture those differences in the value assigned by voters to different goods and services provided by the government.

The government's budget constraint now becomes

$$T = \sum_{h=1}^{2} g_s^h + K_s \qquad s = t, t+1, \ldots \tag{24}$$

The voter's problem is as described in section 2.2, except that here we assume that voters in each group observe only their own g_t^h, but not that of the other group. The politician's objective function is obviously different. The incumbent L's objective in a non-election year $t+1$ parallels (9) but with the addition of rents

$$\Omega_{t+1}^O(\mathbf{g}_{t+1}^L, L) = Z_{t+1}^L\left(\mathbf{g}_{t+1}^L\right) + \chi(K_{t+1}) + \beta E_{t+1}^L\left(\Omega_{t+2}^E(\cdot, L)\right) \tag{25}$$

where rents χ are an increasing, weakly concave function of K.[9] Note that K (and hence χ) will change both over the cycle (and possibly between cycles) since the vector of targeted expenditures $\mathbf{g}$ will change. The incumbent's objective in the election year t can then be written

$$\Omega_t^E\left(\mathbf{g}_t^L, L\right) = Z_t^L\left(\mathbf{g}_t^L\right) + \chi(K_t) + \beta\left(\rho\left(N^L\right) E_t^L \Omega_{t+1}^{IN}\left(\mathbf{g}_{t+1}^L, L\right) + \left(1 - \rho\left(N^L\right)\right) E_t^L \Omega_{t+1}^{OUT}\right) \tag{26}$$

The difference $E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right)$ is

$$(1+\beta)\left(\pi^L - \pi^R\right)^2 + E_t^L\left(Z_{t+1}^L\left(\mathbf{g}_{t+1}^L\right) - Z_{t+1}^L\left(\mathbf{g}_{t+1}^R\right)\right) + (1+\beta) E_t^L \chi(K_{t+1}) + \beta^2 E_t^L \Pi_{t+3} \tag{27}$$

but where the value in $E_t\Pi_{t+3}$ to being in office after $t+2$ includes the expected present discounted value of future office rents in addition to ideology. Equation (27) represents four components in this model which make re-election valuable, three of which were present in (11): the ability to implement one's preferred ideology; the ability to target expenditures to preferred groups; the rents from office; and the possibility that re-election at t gives to win future re-election and hence gain future advantage of being in office.

[9] Although politicians could differ in the value they place on rents relative to voters, we assume that all politicians assign the same value to such expenditures. Drazen and Eslava (2004) consider politicians who differ in the weight they put on voters relative to "rents", where this weight is unobserved and all voters are homogeneous.

With rents from holding office, the first-order condition in a non-election year for each group h (found by maximizing (25) subject to (24)) yields a first-order condition equating the marginal value of targeted expenditures to the marginal value of rents (where once again we consider g_t^h and g_t^h over a single election cycle, so we suppress the time subscripts on $\omega_{L,t}^h$):

$$\frac{\omega_L^h}{g_{t+1}^h} = \chi'(K_{t+1}) \qquad h = 1, 2 \tag{28}$$

These first-order conditions for the two groups yields (13). Similarly, for an election year, one derives a first-order condition equating the value of targeted expenditures to the value of office rents:

$$\frac{\omega_L^h}{g_t^h} + \beta\rho'(\cdot)\,\phi_h'\left(g_t^h\right) E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right) = \chi'(K_t) \tag{29}$$

for $h = h_1, h_2$.

The left hand side of (29) represents the benefit from a marginal increase in g_t^h. As in the post-election period, this benefit includes the utility gain this change induces for group h voters. However, prior to an election the politician potentially derives an additional benefit from targeting group h, namely obtaining more votes from this group's voters.

Since (29) holds for both groups, optimal choices of g_t^1 and g_t^2 therefore also satisfy:

$$\frac{\omega_L^1}{g_t^1} - \frac{\omega_L^2}{g_t^2} = \beta\rho'(\cdot)\,E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right)\cdot\left[\phi_2'\left(g_t^2\right) - \phi_1'\left(g_t^1\right)\right] \tag{30}$$

With respect to the post-electoral allocation of expenditures there is a pre-electoral shift of government resources away from "desks" and into targeted spending. In other words, $K_t < K_{t+1}$. To see that this is the case, combine $\phi_h'\left(g_t^h\right) > 0$ with the fact that K_{t+1} satisfies the post-election first-order condition (28). Given these two elements, if the incumbent chose $K_t = K_{t+1}$ the pre-election marginal benefit of targeted spending would exceed that of *desks*. Since $\chi(K)$ is (weakly) concave, satisfying the pre-election first-order condition (29) requires lower non-targeted expenditure before the election. The pre-electoral shift of resources toward targeted spending holds for any realization of ω_I^1 and ω_I^2, so that all types of politicians have incentives to change the composition of expenditures prior to an election.

An interesting question to address in this framework is: how do electoral motives change the allocation of resources across groups in the pre-election period, compared to non-election periods. That is, how do g_t^1 and g_t^2 compare to g_{t+1}^1 and g_{t+1}^2? We will provide here an intuitive discussion of how these resources are allocated.

In $t+1$ there is no electoral motivation for targeted transfers, so g_{t+1}^1 and g_{t+1}^2 serve as the reference point in measuring electoral effects. Without loss of generality, suppose that group 1 is more electorally valuable, that is, $\phi_1'\left(g_{t+1}^1\right) > \phi_2'\left(g_{t+1}^2\right)$. Since K_{t+1}, g_{t+1}^1 and g_{t+1}^2 satisfy the first-order condition (28), and $\phi_h'(g) > 0$, the following relations hold:

$$\frac{\omega_L^h}{g_{t+1}^h} + \beta\rho'(\cdot)\,\phi_h'\left(g_{t+1}^h\right) E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right) > \chi'\left(K_{t+1}\right) \qquad \text{for } h = 1, 2$$

and

$$\frac{\omega_L^1}{g_{t+1}^1} - \frac{\omega_L^2}{g_{t+1}^2} > \beta\rho'(\cdot)\,E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right)\left[\phi_2'\left(g_t^2\right) - \phi_1'\left(g_t^1\right)\right]$$

That is, if the $t+1$ composition of spending was imposed in t, the marginal benefit of expenditures targeted to any group would exceed that of K, and the benefit of directing one more dollar to group h_1 exceeds that of directing it to group h_2. The incumbent then has incentives to take one dollar from non-targeted expenditures K, and put it into g^1, the most valuable form of targeted spending, while keeping g^2 unchanged. This will increase the marginal benefit of desks (non-targeted spending), given the concavity of $\chi(K)$. What happens to g_t^2 and the final effect on K_t depend on the relative distance between $\phi_1'\left(g_{t+1}^1\right)$ and $\phi_2'\left(g_{t+1}^2\right)$.

There are two cases to consider. If $\phi_1'\left(g_{t+1}^1\right)$ and $\phi_2'\left(g_{t+1}^2\right)$ are similar in value, then both g_t^1 and g_t^2 will be higher than the corresponding g_{t+1}^1 and g_{t+1}^2. That is, compared to the post-election period, the equilibrium composition of spending before the election would involve lower K_t and higher targeted spending to *both* groups. Alternatively, if the values of $\phi_1'\left(g_{t+1}^1\right)$ and $\phi_2'\left(g_{t+1}^2\right)$ are not close to one another, then it may be the case that while $g_t^1 > g_{t+1}^1$ unambiguously, targeted spending on group 2 will fall, that is, $g_t^2 < g_{t+1}^2$. That is, in the first case, when the distributions $f_h(\cdot)$ of political characteristics is similar (and post-election spending on the groups is not too dissimilar) it is valuable to pump resources into group 2 as well as group 1. However, when the distance between the two distributions is much larger, rather than reducing desks to finance all electoral transfers to group 1, the politician takes expenditures away from group 2.

In short, if targeting a given group of voters is much more beneficial for electoral purposes than targeting the other, resources will be shifted to the more favorable group not only from desks but also from the other group. However, both groups could actually receive higher expenditure before the election if they are relatively similar in terms of providing electoral benefits.

To summarize, the extent of electoral manipulation of policy is increasing in the share of votes the incumbent can raise by engaging in it: political business cycles are likely to be more intense in more "swing" societies. The main difference in this setting is that it is now clear that we focus on the fraction of voters that are swing "at the post-election levels of spending". Only voters close to the indifferent ideological position are willing to shift their votes facing a marginal change in policy, but that indifferent position is in turn a function of policy. The relevant question is thus whether the mass of voters close to the indifferent position at a given composition of spending is large.

4 An Example

Because of the involved nature of a solution for $\Psi\left(g_t^h\right)$, further characterizing equilibrium outcomes for this general case is difficult. At the same time, observing the form of a specific solution for those outcomes would help our intuition. We therefore resort to a specific example to illustrate the equilibrium.

4.1 Calculating an Equilibrium

Take the following specific assumptions about functional forms: $\chi(K) = \theta K$, where θ is a constant. Suppose also that, for any politician P $(P = I, C)$, ω_P^h follows a uniform distribution with values between $\omega^l = 0.2$ and $\omega^u = 1$. Let $E_t\left(\Omega_{t+1}^{IN} - \Omega_{t+1}^{OUT}\right) = \bar{\Omega}$, a constant. Without loss of generality, we assume that $\pi^R (= -\pi^L) = 0.25$. Let $\rho(N^L)$ be a linear function of the form $\bar{\rho}N^L$. We assume

$$f^h(\pi) = \alpha^h \exp(-|\pi|)$$

where $\alpha^h = \frac{1}{2(1-\exp(-\bar{\pi}^h))}$. This distribution has the nice feature of being concentrated and symmetric around zero (the midpoint between π^I and π^C), and will prove tractable. Here, $\bar{\pi}^h$ and $-\bar{\pi}^h$ are, respectively, the upper and lower bound for π in group h. Figure 1 depicts $f^h(\pi)$ for different values of $\bar{\pi}^h$: the crosses correspond to $\bar{\pi}^h = 0.3$ $(\alpha^h = 1.93)$, the solid line to $\bar{\pi}^h = 0.75$ $(\alpha^h = 0.95)$ and the diamonds to $\bar{\pi}^h = 1$ $(\alpha^h = 0.79)$.

We assume that both voters and incumbent know one of the two groups is characterized by $\alpha^h = \overline{\alpha}$ and the other by $\alpha^h = \underline{\alpha}$. However, only politicians know *which* group corresponds to each value of α, while voters simply assign some probability $p_h^{\overline{\alpha}}$ that group h is the one with $\overline{\alpha}$: $\Pr(\alpha^h = \overline{\alpha}) = p_h^{\overline{\alpha}}$.

From the first-order condition's (28) and (29) the incumbent's optimal choices for g_{t+1}^h and g_t^h are given by:

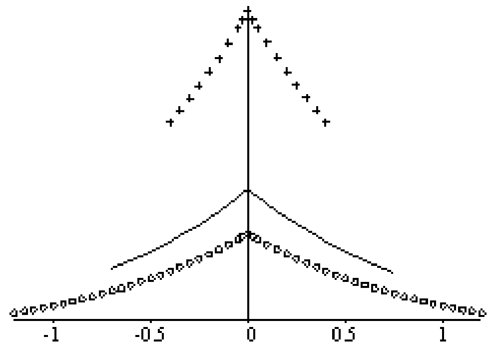

Figure 1: $f_h(\pi)$ for $\bar{\pi}^h = 0.3(\times), 0.75(-), 1(\diamond)$

$$g_{t+1}^h = \frac{\omega_L^h}{\theta} \tag{31}$$

and

$$\frac{\omega_L^h}{g_t^h} + \beta\bar{\rho}\bar{\Omega}\phi_h'\left(g_t^h\right) = \theta \tag{32}$$

The key issue is how to solve for $\phi_h'\left(g_t^h(L)\right)$, where this solution is consistent with voters rationally forming expectations. The first step is to re-write the incumbent's first-order condition (32) to explicitly note that it depends on individuals's expectations. Using $V(g_{t+1}^h) = \ln\left(\frac{\omega_L^h}{\theta}\right)$, our assumptions about f^h, and equation (6a), note that $\phi_h'\left(g_t^h(L)\right)$ can be written as:

$$\phi_h'\left(g_t^h(L)\right) = a^h \exp\left[-\left|E\left(\ln\omega_L^h \mid g_t^h(L)\right) - E\left(\ln\omega_R^h\right)\right|\right] \frac{\partial E\left(\ln\omega_L^h \mid g_t^h(L)\right)}{\partial g_t^h}$$

or, letting $Y(g_t^h) \equiv \exp\left[-\left|E\left(\ln\omega_L^h \mid g_t^h\right) - E\left(\ln\omega_R^h\right)\right|\right]$,

$$\phi_h'\left(g_t^h(L)\right) = \begin{array}{ll} a^h Y'(g_t^h) & \text{if } E\left(\ln\omega_L^h \mid g_t^h\right) \leq E\left(\ln\omega_R^h\right) \\ -a^h Y'(g_t^h) & \text{if } E\left(\ln\omega_L^h \mid g_t^h\right) > E\left(\ln\omega_R^h\right) \end{array} \tag{33}$$

Note that $Y(g_t^h)$ is the component of $\phi_h'\left(g_t^h\right)$ affected by voters's expectations, so our analysis of their beliefs will focus on $Y(g_t^h)$. Also, ex-ante incumbent and challenger are identical, so ω_R^h follows the same unconditional distribution that characterizes ω_L^h. $E\left(\ln\omega_R^h\right)$ is formed according to that unconditional distribution.

Voters infer the relationship between ω_L^h and g_t^h from the first-order condition (32), and use it to form expectations about the future. That relationship is given by

$$\omega_L^h = \begin{array}{ll} g_t^h \left(\theta - \alpha^h \Lambda Y'(g_t^h)\right) & \text{if } E\left(\ln \omega_L^h \mid g_t^h\right) \leq E\left(\ln \omega_R^h\right) \\ g_t^h \left(\theta + \alpha^h \Lambda Y'(g_t^h)\right) & \text{if } E\left(\ln \omega_L^h \mid g_t^h\right) \leq E\left(\ln \omega_R^h\right) \end{array} \tag{34}$$

where $\Lambda = \beta \bar{\rho} \bar{\Omega}$ is the value of one additional vote to the incumbent. It is clear from this expression that one key reason why voters respond to pre-electoral manipulation is their lack of information about α^h, which determines how attractive from the electoral point of view is a given group. If a^h were *known* to voters, they could perfectly infer ω_L^h from their observation of g_t^h, and increases in g_t^h would generate no electoral benefits to the incumbent.

Voters form $E\left(\ln \omega_L^h \mid g_t^h\right)$ by taking logs on both sides of (34), and using $\Pr(\alpha^h = \bar{\alpha}) = p_h^{\bar{\alpha}}$. Writing these expectations in terms of $Y(g_t^h)$, we obtain:

$$Y(g_t^h) = \begin{array}{ll} e^{-E\left(\ln \omega_R^h\right)} g_t^h \theta \left[1 - \overline{\alpha} \frac{\Lambda}{\theta} Y'(g_t^h)\right]^{p_h^{\alpha}} \left[1 - \underline{\alpha} \frac{\Lambda}{\theta} Y'(g_t^h)\right]^{(1-p_h^{\alpha})} & \text{if } g_t^h \leq \bar{g} \\ e^{E\left(\ln \omega_R^h\right)} \left(g_t^h \theta \left[1 + \overline{\alpha} \frac{\Lambda}{\theta} Y'(g_t^h)\right]^{p_h^{\alpha}} \left[1 + \underline{\alpha} \frac{\Lambda}{\theta} Y'(g_t^h)\right]^{(1-p_h^{\alpha})}\right)^{-1} & \text{if } g_t^h > \bar{g} \end{array} \tag{35}$$

where $\bar{g}$ is such that $E\left(\ln \omega_L^h \mid g_t^h\right) \leq E\left(\ln \omega_R^h\right)$ if and only if $g_t \leq \bar{g}$[10]. This is the first order differential equation that characterizes rational voters' beliefs. Note that expression (34) represents the incumbent's optimal choice of g_t^h given voters' expectations, while expression (35) represents voters' rational expectations, given the incumbent's actions. Equilibrium outcomes are therefore represented by a function $Y(g_t^h)$ that solves expression (35), and the choice of g_t^h that satisfies (34) for that $Y(g_t^h)$. Those equilibrium outcomes, which we illustrate below, are summarized in proposition 4.

Proposition 4 *In this example, voters' equilibrium expectations about the future are characterized by*

$$E(\ln \omega_L^h \mid g_t^h) \begin{array}{ll} = \ln(g_t^h \theta c_0) & \text{if } g_t^h < \bar{g} \\ \approx \left(-\theta \left(g_t^h\right)^2 c_3\right) \ln \left[c_1 + c_2 \int \exp\left(\theta \left(g_t^h\right)^2 c_3\right) dg\right] & \text{if } g_t^h > \bar{g} \end{array} \tag{36}$$

where $c_{0,} c_1$, c_2 *and* c_3 *are constants which depend on* $\bar{\alpha}$, $\underline{\alpha}$ *and* $p_h^{\bar{\alpha}}$, *and*

$$\bar{g} = \frac{e^{E(\ln \omega_R^h)}}{\theta c_0}$$

[10] The fact that $E\left(\ln \omega_L^h \mid g_t^h\right)$ is increasing in g_t^h was proved for the general case in previous sections. This example is, in any case, self-contained: we can consider the positive slope of $E\left(\ln \omega_L^h \mid g_t^h\right)$ as a conjecture, which will then prove consistent with the politicians' choices.

Meanwhile, the incumbent's optimal choice for g_t^h is given by

$$\frac{\omega_L^h}{g_t^h} = \begin{cases} \theta - \alpha^h \Lambda \theta e^{-E(\ln \omega_R^h)} c_0 & \text{if } E\left(\ln \omega_L^h \mid g_t^h\right) \leq E\left(\ln \omega_R^h\right) \\ \theta + \alpha^h \Lambda \left(c_1 - 2\theta g_t^h Y(g_t^h) c_3\right) & \text{if } E\left(\ln \omega_L^h \mid g_t^h\right) > E\left(\ln \omega_R^h\right) \end{cases} \tag{37}$$

Proof: We first need to prove that (36) solves the differential equation (35). Note that

$$Y(g_t^h) = e^{-E\left(\ln \omega_R^h\right)} g_t^h \theta c_0$$

satisfies equation (35) for the $E(\ln \omega_L^h \mid g_t^h) < E(\ln \omega_R^h)$ case, if $c_0 = (1 - \overline{\alpha} \Lambda e^{-E(\ln \omega_R^h)} c_0)^{p^\alpha} (1 - \underline{\alpha} \Lambda e^{-E(\ln \omega_R^h)} c_0)^{(1-p^\alpha)}$. Also, $\bar{g}$ is the value of g_t^h that solves $Y(g_t^h) = 1$.

The nonlinear differential equation in the $E(\ln \omega_L^h \mid g_t^h) > E(\ln \omega_R^h)$ branch of (35) is obviously hard to solve, but we assume that voters solve an approximate, linear, form of it. We take a first order Taylor approximation around $Y' = x = -\theta c_0 e^{-E\left(\ln \omega_R^h\right)}$. This ensures that $\lim_{g \to \bar{g}} \frac{\partial E(\ln \omega_L^h | g_t^h)}{\partial g_t^h}$ is equal whether we approach from the left or the right. This yields (letting $\widehat{\alpha} = E(\alpha)$)

$$Y(g_t^h) = \frac{e^{E\left(\ln \omega_R^h\right)}}{g_t^h \theta} \left[K_1 - K_2 \left(Y' - x\right)\right]$$

where $K_1 = \frac{\left(1 + \overline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right)\left(1 + \underline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right) - \Lambda C e^{-E(\ln \omega_R^h)}\left(\widehat{\alpha} - \Lambda C \overline{\alpha} \underline{\alpha} e^{-E(\ln \omega_R^h)}\right)}{C\left(1 + \overline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right)\left(1 + \underline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right)}$ and

$K_2 = \frac{\Lambda\left(\widehat{\alpha} - \Lambda C \overline{\alpha} \underline{\alpha} e^{-E(\ln \omega_R^h)}\right)}{\theta C\left(1 + \overline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right)\left(1 + \underline{\alpha} \Lambda C e^{-E(\ln \omega_R^h)}\right)}$. The solution to this differential equation takes the form:

$$Y(g_t^h) = \exp\left(\frac{-\theta \left(g_t^h\right)^2}{2K_2 e^{-E(\ln \omega_R^h)}}\right) \left[c_1 + \frac{K_1}{K_2} \int \exp\left(\frac{\theta \left(g_t^h\right)^2}{2K_2 e^{-E(\ln \omega_R^h)}}\right) dg_t^h\right] \tag{38}$$

where c_1 is a constant such that $Y(\bar{g}) = 1$. Letting $\frac{K_1}{K_2} = c_2$ and $\frac{1}{2K_2 e^{-E(\ln \omega_R^h)}} = c_3$, this is identical to (36) for $E(\ln \omega_L^h \mid g_t^h) > E(\ln \omega_R^h)$.

Substituting (36) into (34) we obtain (37).■

4.2 Illustration

We can now illustrate this solution[11]. Take the following set of parameters: $\omega \sim U\,[0.2\,,\,1]$, $T = 1$, $\theta = 1.3$, $\alpha^{h_1} = 1.93$ (or $\bar{\pi}^{h_1} = 0.3$), $\alpha^{h_2} = 0.79$ (or $\bar{\pi}^{h_1} = 1$), $p^{\alpha^{h_1} = \bar{\alpha}} = 0.5$, and $\Lambda = 0.1$. The choice

[11]Note that the solution for the upper branch of $E(\ln \omega_I^h \mid g_t^h)$ is an approximation, since it involves linearizing the differential equation around the $E(\ln \omega_I^h \mid g_t^h) = E(\ln \omega_C^h)$ point (see appendix).

of Λ is consistent, for instance, with[12] $\beta = 0.99$, $\rho = 1$ and $\bar{\Omega} = 0.11$, where the latter would be satisfied by combinations of $\omega_L^{h_1}$ and $\omega_L^{h_2}$ such as 0.3 and 0.9 or 0.5 and 0.45. These parameters imply $\bar{g} = 0.53$.

The solution to the problem can be summarized by $\phi'(g_t^h)$, the first order condition (32), and the resulting choice of $g_t^h(L)$ as a function of ω_L^h and α^h. We depict them in the following three figures.

Figure 2 shows $\phi'(g_t^h)$ for the two groups. Keep in mind that $\phi'(g_t^h)$ represents the additional h votes the incumbent can obtain from raising g_t^h one dollar. The top line in that figure corresponds to the group with more swing voters, which in this case is h_1 since it has the larger α^h. The larger effect on votes for the more swing group is consistent with our previous result that electoral incentives to target swing groups are large, compared to more core groups. Note also that $\phi'(g_t^h)$ is positive and (weakly) decreasing everywhere, reflecting the fact that the incumbent can always obtain more h votes by increasing g_t^h, but the electoral gain tends to decrease as g_t^h grows. In other words, the share of group h votes the incumbent obtains, given by $\phi(g_t^h)$, is increasing and (weakly) concave. The increasing slope shows the incentive for electoral increases in targeted spending. The concavity is a consequence of decreasing marginal utility, and less concentration of voters in the tails of the π^h distribution. In fact, note that the decreasing pattern of $\phi'(g_t^h)$ is less pronounced for group h_2 (bottom line), which exhibits a π^h distribution with fatter tails.

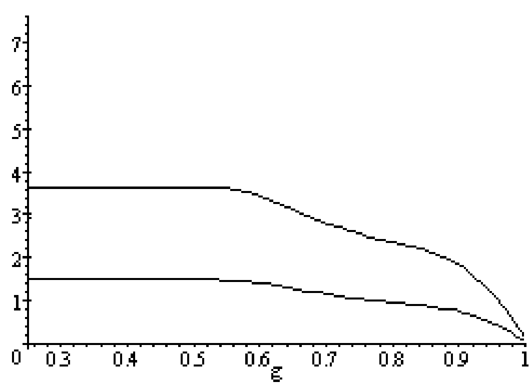

Figure 2: $\phi'(g_t^1)$ and $\phi'(g_t^2)$

The incumbent's choice of g_t^h is characterized by the first-order condition (32), which can be written as

[12] $\beta = 0.99$ corresponds to a discount rate of 0.01, which is consistent with historical records of quartely interest rates.

$$\frac{\omega_L^h}{g_t^h} = \theta - \Lambda\phi_h'\left(g_t^h\right) \tag{39}$$

This representation is useful because this first-order condition then looks very similar the first-order condition for the post-election period. The only difference is the last term of the right hand side. We depict both the pre-election and the post-election first-order conditions in Figure 3. The left hand side, $\frac{\omega_L^h}{g^h}$, is given by the decreasing dotted curves for different values of ω_I^h. From bottom to top, these curves correspond to $\omega_L^h = 0.2$, $\omega_L^h = 0.4$, $\omega_L^h = 0.6$ and $\omega_L^h = 0.8$. Meanwhile, the dashed horizontal line corresponds to the right hand side of the $t+1$ first-order condition (which is given simply by θ). The two solid curves represent the right hand side of the period t first-order condition for the two groups: the bottom one is the case of the more swing group (h_1) which we already noted exhibits the larger ϕ_h' for any g_t^h.

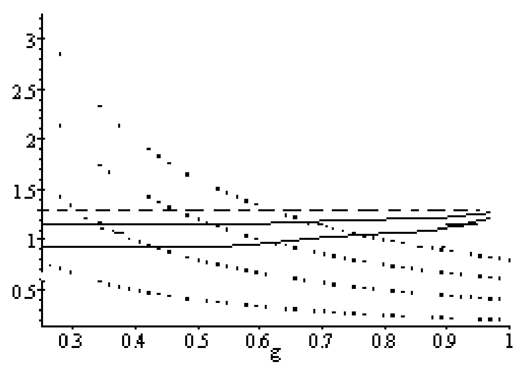

Figure 3: Incumbent's first order conditions

Take, for instance, group h_1. The incumbent's optimal choice of g_t^1 is given by the intersection between the $\theta - \Lambda\phi_1'(g)$ line (bottom solid line) and the $\frac{\omega_L^h}{g^h}$ curve. Meanwhile, his optimal choice of g_{t+1}^1 is at the intersection of the dashed horizontal line and the same (since ω_L^h does not change between t and $t+1$) $\frac{\omega_L^h}{g^h}$ curve. Note that, for any given ω_L^h, both groups receive observe larger targeted expenditures before the election than after it ($g_t^h > g_{t+1}^h$ for both h). In this case, as discussed above, the constant marginal utility of *desks* precludes the possibility that one of the groups receives less targeted spending before the election that it would in $t+1$.

The size of pre-electoral transfers (the difference between g_t^h and g_{t+1}^h). is larger for group 1, characterized by a larger mass of swing voters. The differences between the two groups, however, become smaller for larger values of g_t^h, since at these levels voters already perceive high benefits of choosing the incumbent (note that the two curves grow closer as g increases). The reason is that, given decreasing marginal utility, providing voters with additional expenditures in this region has only small effects in the well-being they expect to enjoy if the incumbent is re-elected. These findings are reflected in Figure 4, which shows the optimal choice of g_t^h as a function of ω_L^h.

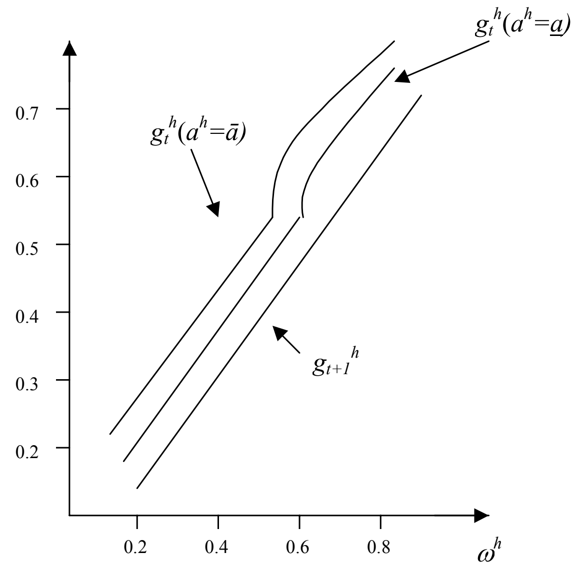

Figure 4: $g_t^h(\omega_L^h)$ and $g_{t+1}^h(\omega_L^h)$

The extent to which pre- and post-electoral policy differ (i.e. the size of the political budget cycle) obviously depends on the specific parameters chosen. For instance, larger values of Λ imply a larger value of re-election, and therefore lead the incumbent to chose larger g_t^h. Small values of θ imply that the post-election level of targeted expenditure is already high (for any candidate) and, given decreasing marginal utility, reduce the potential differences between one and another candidate in terms of provision of targeted goods. This reduces the incentives for electoral increases of g_t^h. Larger ideological gaps between the different candidates reduce the importance voters give to fiscal policy in choosing the candidate, and therefore reduce the incentives for electoral increases of g_t^h. Different choices of α^{h_1} and α^{h_2} will change the electoral benefit the incumbent can obtain from increasing g_t^h, as can be deduced from the figures above. The general patterns of electoral changes for g_t^h, however, are quite robust to the parameters chosen.

5 Conclusions

This paper presents a view of the Political Budget Cycle in which politicians recognize that voters dislike government deficits, and hence use expenditures targeted to voters at the expense of other categories of expenditure or at more politically "useful" voters at the expense of other voters. Hence, pre-electoral manipulation is present, but does not show up in aggregate expenditures or deficits in the government budget. We present a model with perfectly rational, forward-looking voters who use their perception of public goods provision to make inferences about the incumbents' preferences. Election-year economics "works" even though rational voters correctly solve the inference problem of trying to discern the motivation for election-year spending under imperfect information. That is, election-year economics succeeds in gaining the votes of rational voters, even though they know there is some probability that they are being targeted solely to get their votes.

Our view differs from other models of political budget cycles in that voters' care about the preferences of incumbents over different interest groups, rather than his competence. The difference is not merely semantic; in the competence approach a key element is an inability of voters to observe not only the characteristics of the incumbent but also some component of the budget. In our approach, meanwhile, a political budget cycle may emerge even if voters observe all fiscal choices; we shift the attention from the fiscal information voters receive to their fiscal preferences and those of the incumbent.

Our focus on the favoritism of politicians for certain groups is motivated by traditional election-year economics, which gives a key role to special interests in electoral budget manipulation. Although the idea of pork barrel politics is common in political economy, it has not been incorporated in intertemporal models of fiscal policy-making. Furthermore, previous literature does not address the question of why providing such spending would affect the votes of rational, forward-looking, individuals.

References

Alesina, A., R. Perotti and Tavares (1998), "The Political Economy of Fiscal Adjustments," *Brookings Papers on Economic Activity* 1:1998.

Bonomo, M. and C. Terra (2003), "Elections and Exchange Rate Policy Cycles," working paper, Getulio Vargas Foundation.

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. and A. Drazen (2004), "Political Budget Cycles in New versus Established Democracies," NBER working paper 10379. (also available at http://www.tau.ac.il/~drazen)

Dixit, A. and J. Londregan (1996), "The Determinants of Success of Special Interests in Redistributive Politics," *Journal of Politics* 58, 1132-55.

Drazen, A. and M. Eslava (2004), "Political Budget Cycles Without Deficits: Expenditure Composition Effects," working paper.

Drazen, A and N. Limão (2003), "Government Gains from Self-Restraint: A Bargaining Theory of Inefficient Redistribution," working paper. (available at http://www.tau.ac.il/~drazen)

Gonzalez, M.(1999), "Political Budget Cycles and Democracy: A Multi-Country Analysis," working paper, Department of Economics, Princeton University.

Gonzalez, M.(2001), "Do Changes in Democracy affect the Political Budget Cycle? Evidence from Mexico". Forthcoming, *Review of Development Economics*

Kneebone, R. and McKenzie, K. (2001) "Electoral and Partisan Cycles in Fiscal Policy: an Examination of Canadian Provinces," *International Tax and Public Finance* 8, 753-774.

Lindbeck, A. and J. Weibull (1987), "Balanced Budget Redistribution as the Outcome of Political Competition," *Public Choice* 52, 272-97.

Peltzman, S. (1992), "Voters as Fiscal Conservatives," *Quarterly Journal of Economics* 107, 327-261

Persson, T. and G. Tabellini (1990), *Macroeconomic Policy, Credibility, and Politics*, London: Harwood.

________ (2003), *The Economic Effects of Constitutions* Cambridge, MA: MIT Press

Rogoff, K. (1990), "Equilibrium Political Budget Cycles," *American Economic Review* 80, 21-36.

Rogoff, K. and A. Sibert (1988), "Elections and Macroeconomic Policy Cycles," *Review of Economic Studies* 55, 1-16.

Shi, M. and J. Svensson (2002a), "Conditional Political Budget Cycles," CEPR Discussion Paper #3352.

_______ (2002b) "Political Business Cycles in Developed and Developing Countries," working paper.

Stein, E. and J. Streb (2003), "Elections and the Timing of Devaluations," *Journal of International Economics.*

Strömberg, D. (2001), "Mass Media and Public Policy," *European Economic Review* 45, 652-663.