ISSN 1503-299X

WORKING PAPER SERIES

No. 7/2007

HABIT FORMATION, STRATEGIC EXTREMISM AND DEBT POLICY

Egil Matsen
Øystein Thøgersen

Department of Economics

Norwegian University of Science and Technology
N-7491 Trondheim, Norway
www.svt.ntnu.no/iso/wp/wp.htm

11.12.2007

Habit formation, strategic extremism and debt policy*

Egil Matsen
Dept. of Economics, Norwegian University of Science and Technology, NTNU-Dragvoll, and Central Bank of Norway, N-7491 Trondheim, Norway. Email: egil.matsen@svt.ntnu.no

Øystein Thøgersen
Dept. of Economics, Norwegian School of Economics and Business Administration, and CESifo, Helleveien 30, N-5045 Bergen, Norway. Email: oystein.thogersen@nhh.no

Abstract

We suggest a probabilistic voting model where voters' preferences for alternative public goods display habit formation. Current policies determine habit levels and in turn the future preferences of the voters. This allows the incumbent to act strategically in order to influence the probability of re-election. Comparing to a benchmark case of a certain re-election, we demonstrate that the incumbent's optimal policy features both a more polarized allocation between the alternative public goods and a debt bias.

JEL Classification: D72, D78, H62

Keywords: Budget deficits, voting, extremism, habit formation

---

* We appreciate valuable comments from Rune Jansen Hagen, Erling Holmøy and Ragnar Torvik. We are also grateful to seminar participants in Bergen, Garmisch and Zurich for remarks and valuable discussion. Financial support from the Research Council of Norway is gratefully acknowledged.

1. Introduction

A hundred days into George W. Bush's presidency, *The Economist* entitled its cover story "That shocking conservative". The story was about the common perception among political commentators and pundits of a president pushing a much more conservative agenda, on e.g. tax cuts, than his campaign platform had suggested.[1] Glaeser et al. (2005) provide more systematic evidence showing that politicians sometimes implement policies that are more extreme than their political platforms. They report that Democrats and Republicans in the US on the one hand have very similar, moderate platforms on tax policy. On the other hand evidence reveals rather big differences in mean tax rates between Democratic and Republican administrations.

Why would an elected politician want to pursue more extreme policies than his party platform suggests? One possibility is that party leaders have extreme preferences (Alesina, 1988) which in turn can lead to implementation of more extreme policies than indicated by the electoral platforms (Glaeser et al., 2005). While politicians' ideological preferences are important, we would still expect that the desire for re-election would moderate policies that seem extreme relative to voters' preferences.

This paper demonstrates that extreme policies in terms of a more polarized resource allocation may occur not because the incumbent has extreme preferences, but because it makes the incumbent's *desired future policy* appeal to a larger group of voters. More specifically, we suggest that voters' preferences are characterized by reference levels that are affected by current policies, and politicians can use this link strategically to influence the probability of re-election.

We consider a political framework where potential partisan governments disagree with respect to the composition of public spending as in Alesina and Tabellini (1990) (henceforth "AT") and Tabellini and Alesina (1990) (henceforth "TA"). Crucially, we suggest that voters' utility of a given level of spending on each public good depends not just on the current supply, but also on how that level compares to what they are used to, i.e. their habit level. Comparing to a benchmark case of a certain re-election, this gives the incumbent incentives to implement more polarized allocations. By supplying more today of his most preferred public good, the incumbent can push up voters' habit levels and correspondingly their future marginal utility of this good. This will increase the probability of re-election.

The assumption that preferences are characterized by reference dependence in the form of habit formation has been explored in many branches of economics recently. (Though, to our knowledge, this paper represents the first attempt in the field of political economy.) It is most common in studies of consumption; see Deaton (1992) for a survey.[2] It has more recently proved to be

[1] See *The Economist*, 28 April 2001, North America edition. Fiorina (1999) offers a more detailed discussion of how and why US politics has changed from being centrist during the 1950s and 60s to being increasingly polarized during the later decades.

[2] The general idea of habit formation in consumption seems to be formulated by James Duesenberry, see for example Duesenberry (1949). Other early contributions include Ryder and Heal (1973) and Easterlin (1974).

successful in stochastic, consumption-based analyses of asset prices, see for example Campbell and Cochrane (1999), and also in studies of growth (Carroll et al., 2000) and stabilization policy (Ljungqvist and Uhlig, 2000). Habit formation implies that the satisfaction an individual realizes from a given consumption level tends to depend more on the *change* in consumption (i.e. the deviation between actual consumption and a historically determined habit level) than on the level itself. This is in accordance with psychological research that suggests that individuals' satisfaction is determined by actual outcome relative to some reference level, see Fredrick and Loewenstein (1999) and Rabin (1998, 2002). As highlighted by Campbell and Cochrane (1999: 208): "Habit formation captures a fundamental feature of psychology: Repetition of a stimulus diminishes the perception of the stimulus and responses to it".

Traditionally, the assumption of habit formation has been related to individuals' private consumption. We will argue, however, that habit formation is equally important for any voter's preferences for most types of public goods. For example, habit formation seems crucial for voters' welfare assessments of the spending levels on essential public goods like schools and education, health services, roads and most types of infrastructure. Solnick and Hemenway (2005) report preliminary evidence in favor of reference dependence in the evaluation of public goods.[3]

Models of political behavior generally assume that voters' policy preferences are exogenous to actual policies.[4] Recent evidence suggests, however, that there may be important feedback effects from economic policy to individual preferences. Alesina and Fuchs-Schündeln (2007) use the German reunification of 1990 as a "natural experiment" to test the relationship between political regime and individual preferences. They strongly conclude that there is a causal link from policies to preferences. Alesina and Fuchs-Schündeln identify the fact that people "get used to" certain policies as one of the reasons for this link. Our model takes this fact seriously in the sense that we model how current policies determine habits and the future preferences of the voters.

We are not the first to analyze how political extremism can appear for strategic (i.e. vote-maximizing) reasons. Glaeser et al. (2005) present a model where strategic extremism occurs because it energizes the incumbent's core constituents more than it energizes the opponent's supporters. Note, however, that they focus on extreme platforms rather than actual policies. Indeed, their model predicts that extremism in policies is due to extreme preferences of candidates, whereas platform extremism occurs for strategic reasons. Our analysis shows that extreme actual policies also can occur for strategic reasons. We share this feature with Glazer et al. (1998). They explore a model where an

[3] Note that Solnick and Hemenway analyze positional concerns as determinants of reference levels, analogous to external habit formation in some other contributions to this literature.

[4] An exception is retrospective voting models where voters punish the incumbent by voting against him if he acted against their interest when in office. In contrast to this backward-looking model, voters are fully forward-looking in our set-up. We also note that models of directional voting (see Rabinowitz and Macdonald, 1989) give the status quo a central role in voting behavior. As in our analysis, this model incorporates a reference point in decision making. Unlike in our model, however, the reference point gives voters incentives to vote strategically; our reference points give politicians incentives to act strategically.

incumbent has incentives to implement extreme policies because it creates a cost to voters of changing powers. Their results hinge critically on the assumptions that there is a fixed cost associated with a policy change and that politicians are (partly) office motivated. This contrast our model where parties are outcome oriented and the election winner can implement preferred policies without any frictions.

Our paper is closely related to the strategic debt literature initiated by Aghion and Bolton (1990), Persson and Svensson (1989), AT (1990) and TA (1990).[5] Building on the models of AT and (particularly) TA, we explore a model where different potential governments disagree about the composition of public goods provision.[6] As extensions, we include probabilistic voting and habit formation in voters' preferences for public goods. It turns out that the extreme resource allocation of the incumbent is accompanied by a strategic debt bias. This debt bias is caused exclusively by the incumbent's attempt to influence the probability of re-election. As explained in more detail below, it complements the strategic debt effects identified by AT and TA.

The next section of this paper presents our model, and briefly discusses the benchmark case where the initial government is certain about re-election. Section 3 considers equilibrium policies when the incumbent acts strategically in the face of uncertainty about re-election. Section 4 offers some final remarks.

2. An intertemporal model with probabilistic voting

Adopting the probabilistic voting approach of Persson and Tabellini (2000, section 13.3), we consider a political environment consisting of two competing political parties ($J = D, R$) with two associated natural constituencies in the form of identically large groups of voters ($j = d, r$). The two parties are outcome oriented and, following AT (1990) and TA (1990), they disagree about the composition of public spending. As TA, we consider a two-period framework. For simplicity, we disregard discounting of utility and assume that the real interest rate is zero.

Parties

Party J is characterized by the period-utility function

(1) $$u_t^J = \alpha^J \log f_t + (1-\alpha^J)\log g_t,$$

where f_t and g_t are the spending levels on the two public goods in period t, $t = 1,2$. The parameter α^J, $0 \le \alpha^J \le 1$, captures the preferences of party J for the composition of the goods. Party R attaches

[5] This strategic debt literature is part of the broader literature on how an incumbent can influence potential successors by altering alternative state variables. For example, Cukierman et al. (1992) apply this idea to taxation while Glazer (1989) considers the choice of public investments in this context.

[6] The alternative approach taken by Persson and Svensson (1989) is to assume that governments disagree about the public spending level vs. private consumption.

a higher weight to the utility of f_t than party *D*, i.e. $\alpha^R > \alpha^D$ and we assume, as Persson and Tabellini, that $\alpha^R = 1 - \alpha^D > \frac{1}{2}$. For concreteness, we assume that the period 1 incumbent is a *R*-government. Because the model is symmetric in every aspect, all results generalize directly to the case of an incumbent *D*-government.

The government in each period is endowed with one unit of output and has access to a perfect global financial market. Thus, the resource constraints are given by

(2a) $f_1 + g_1 = 1 + b$

and

(2b) $f_2 + g_2 = 1 - b$,

where *b* is public debt.

In period 1 the incumbent *R*-government faces an endogenous probability, Π, of not being re-elected for period 2. If re-elected, the *R*-government sets its preferred policy, $f_2 = f_2^R$ and $g_2 = g_2^R$. If replaced, the policy of the succeeding *D*-government must be accepted, $f_2 = f_2^D$ and $g_2 = g_2^D$. Thus, the *R*-incumbent determines optimal policy in terms of f_1, g_1 and, consequently, *b*, by the maximization of

(3) $u_1^R(f_1, g_1) + \Pi\, u_2^R\left(f_2^D, g_2^D\right) + (1 - \Pi) u_2^R\left(f_2^R, g_2^R\right)$,

subject to (1), (2a) and (2b) and given perfect knowledge about i) how Π depends on the chosen policy and ii) how the alternative *D*-government will behave in period 2 if elected. Our modeling of the voters' preferences will imply that Π is a function of both the intra-period split between f_1 and g_1 as well as the intertemporal distribution of resources (*b*).

Analyzing how the incumbent will utilize the link between policy-choices and Π, we will compare the outcome with a benchmark case of a certain re-election for the *R*-government, i.e. $\Pi = 0$. It follows from (1), (2a), (2b) and (3), that our benchmark is given by

(4) $f_t = \alpha^R$, $g_t = (1 - \alpha^R)$ and $b = 0$, for $t = 1,2$.

Voters

The utility of voter *i* in group *j* is given by

(5) $u_1^j + u_2^j + (\sigma^{ij} + \delta) K^D$,

where u_t^j is the period *t* utility of the provided package of public spending.[7] The dummy variable K^D is one in the case of party *D* holding office in period 2 and zero in the case of party *R*. Moreover, σ^{ij} is an idiosyncratic bias in group *j* for party *D*, reflecting non-economic ideological factors, and δ

[7] Following TA (1990), we abstract from private consumption decisions.

is an aggregate popularity shock. The distributions of σ^{ij} and δ are uniform with zero means and densities that are similar across the parties and equal to respectively ϕ and ψ.

The period-utility functions of the voters in group *j* are given by

(6) $u_t^j = \alpha^j \log F_t + (1-\alpha^j)\log G_t \quad (t = 1, 2),$

where F_t and G_t are the *surplus* spending levels on the two public goods, reflecting our specification of habit formation in the voters' preferences for public goods. We have that

(7a) $F_t = f_t - \gamma f_{t-1},$

and

(7b) $G_t = g_t - \gamma g_{t-1},$

where γ, $0 \le \gamma < 1$, indicates the strength of the habit formation mechanism (and $\gamma = 0$ implies additive separable preferences). The magnitudes of f_0 and g_0 are given by history. We assume that the relevant values of γ ensure $F_t > 0$ and $G_t > 0$.

Capturing that group *j* is the natural constituency of party *J*, we assume that $\alpha^R = \alpha^r$ and $\alpha^D = \alpha^d$. Still, the existence of ideological concerns and popularity shocks, as introduced in (5), and habit formation may all imply that segments of the voters may take voting decisions that are not in accordance with their constituency.

A crucial feature of the model is the fact that voters' preferences are characterized by habit formation, while this is not the case for the preferences of the parties. This reflects two priorities. First, we wish in particular to highlight that voters' preferences are endogenously determined by policies. This is modeled by a mechanism that is more transparent if the parties' preferences do no change in response to the implemented policies. Second, studies of party manifestos suggest that political parties' policy preferences are relatively stable over time. Using post WWII time series data for 25 democracies, Budge and Klingemann (2001) report that - while there are some changes in party positions over time - estimated party preferences within individual countries do generally not leapfrog or overlap. Hence, it seems reasonable to assume that political parties to a large extent represent basic ideas, and implied views about resource allocation, that remain more stable over time than the preferences of large segments of the voters.

3. The political equilibrium

The timing of the political decisions is as follows: In period 1 the *R*-incumbent sets its preferred policy in terms of f_1, g_1 and *b*. There is no room for policy commitment. An election is held at the start of

period 2. The winning party then sets period 2 policy in terms of f_2 and g_2. As usual, we solve the model backwards.

Post election policy

Assume that party *J* wins the election. The chosen period 2 policy is then determined by the maximization of u_2^J, see (1), subject to (2b) when *b* is inherited from period 1. This yields

(8a) $f_2^J(b) = \alpha^J(1-b)$

and

(8b) $g_2^J(b) = (1-\alpha^J)(1-b)$.

Utilizing the period 1 budget constraint, (2a), it follows from (7a), (7b), (8a) and (8b) that the realized period 2 surplus spending levels, $F_2 = F_2^J$ and $G_2 = G_2^J$, can be written as (reaction-) functions of f_1 and g_1:

(9a) $F_2^J(f_1, g_1) = \alpha^J(2 - f_1 - g_1) - \gamma f_1$,

(9b) $G_2^J(f_1, g_1) = (1-\alpha^J)(2 - f_1 - g_1) - \gamma g_1$.

An increase in the period 1 spending on one of the goods, say f_1, has two distinct effects on the period 2 surplus spending levels. The direct "habit effect" lowers the period 2 surplus spending on the same good through a higher habit level, i.e. the effect of f_1 on the last term on the RHS of (9a). In addition, there is a "debt effect" that lowers both surplus spending levels, i.e. the first term on the RHS of both (9a) and (9b).

Voting decisions

Turning to voting decisions, we define $\bar{u}_2^j$ as the difference in period 2 utility for group *j* if party *D* rather than party *R* wins the election. It follows from (6) that

(10) $\bar{u}_2^j = \alpha^j\left(\log F_2^D - \log F_2^R\right) + (1-\alpha^j)\left(\log G_2^D - \log G_2^R\right)$.

Being perfectly informed about the intensions of the alternative governments, voter *i* from group *j* will choose to vote for party *D* if $\sigma^{ij} > -\left(\bar{u}_2^j + \delta\right)$, see (5). Normalizing the size of each of the two groups to $\frac{1}{2}$, it follows (as seen by the illustration in Figure 1) that the number of voters for party *D* is

(11) $N^D = \frac{1}{2}\left(\frac{1}{2} + \left(\bar{u}_2^d + \delta\right)\phi\right) + \frac{1}{2}\left(\frac{1}{2} + \left(\bar{u}_2^r + \delta\right)\phi\right) = \frac{1}{2} + \frac{1}{2}\left(\bar{u}_2^d + \bar{u}_2^r\right)\phi + \delta\phi$.

***** Figure 1 *****

***** Figure 2 *****

We have that $\Pi(f_1, g_1) = \text{Prob}\left(N^D > \frac{1}{2}\right)$. Recalling that the popularity shock, δ, is uniformly distributed with a zero mean and a density equal to ψ, it follows from (11) that

$$(12) \qquad \Pi(f_1, g_1) = \frac{1}{2} + \psi \frac{1}{2}\left(\bar{u}_2^d + \bar{u}_2^r\right),$$

see Figure 2. Consequently, in order to investigate how the period 1 policy influences the probability of re-election, we have to consider the derivatives:

$$(13a) \qquad \frac{d\Pi}{df_1} = \frac{1}{2}\psi\left(\frac{d\bar{u}_2^d}{df_1} + \frac{d\bar{u}_2^r}{df_1}\right),$$

$$(13b) \qquad \frac{d\Pi}{dg_1} = \frac{1}{2}\psi\left(\frac{d\bar{u}_2^d}{dg_1} + \frac{d\bar{u}_2^r}{dg_1}\right).$$

From (9a), (9b), (10) and the assumption that $\alpha^R = 1 - \alpha^D$, we derive

$$(14a) \qquad \frac{d\bar{u}_2^d}{df_1} + \frac{d\bar{u}_2^r}{df_1} = \gamma\left(\frac{1}{F_2^R} - \frac{1}{F_2^D}\right) - \alpha^D\left(\frac{1}{F_2^D} - \frac{1}{G_2^R}\right) - (1-\alpha^D)\left(\frac{1}{G_2^D} - \frac{1}{F_2^R}\right),$$

where the first term on the RHS captures the habit effect as defined above and the two remaining terms capture the debt effect. Using (9a) and (9b), we collect the last two terms and rewrite (14a):

$$(14b) \qquad \frac{d\bar{u}_2^d}{df_1} + \frac{d\bar{u}_2^r}{df_1} = \gamma\left(\frac{1}{F_2^R} - \frac{1}{F_2^D}\right) + \gamma(f_1 - g_1)\left[\frac{1-\alpha^D}{F_2^R G_2^D} - \frac{\alpha^D}{F_2^D G_2^R}\right].$$

Because $\alpha^R > \alpha^D$ and, accordingly, $F_2^R > F_2^D$, the habit effect is negative. This reflects that a higher habit level reduces voters' utility of given levels of f_2^J. Because $f_2^D < f_2^R$, the concavity of the utility function implies that the drop in all voters' utility is larger in the case of a *D*-government than for a *R*-government.

Noting that the term in brackets in the last part of the RHS of (14b) is negative (as shown in the Appendix), we conclude that the debt effect has the opposite sign of $(f_1 - g_1)$. This reflects that a higher debt reduces both f_2^J and g_2^J, which lower voters' surplus spending levels disproportionally, depending on the magnitudes of the habit levels, γf_1 vs. γg_1. If $f_1 > g_1$, the drop in F_2^J is more painful than the drop in G_2^J, implying that all voters' assessment of the political parties are tilted in the favour of the R-government that will ensure the smallest reduction in f_2. Correspondingly, the case of $f_1 < g_1$ implies a debt effect that favors voters' assessment of the *R*-party. Summing up, it follows for $\gamma > 0$ that the expression in (14b) is strictly negative if $f_1 \geq g_1$ and ambiguous if $f_1 < g_1$.

The derivation of how $\bar{u}_2^d + \bar{u}_2^r$ responds to changes in g_1 is analogous. Using (9a), (9b) and (10), we derive

$$(15) \qquad \frac{d\bar{u}_2^d}{dg_1} + \frac{d\bar{u}_2^r}{dg_1} = \gamma\left(\frac{1}{G_2^R} - \frac{1}{G_2^D}\right) + \gamma(f_1 - g_1)\left[\frac{1-\alpha^D}{F_2^R G_2^D} - \frac{\alpha^D}{F_2^D G_2^R}\right].$$

The habit effect of a higher g_1 favors party *D*, i.e. the first term on the RHS is positive, while the debt effect also favors party *D* if $g_1 > f_1$. Provided that $\gamma > 0$, the expression in (16) is therefore strictly positive if $g_1 \geq f_1$ and ambiguous if $g_1 < f_1$.

Returning to the effects on the probability of re-election of changes in respectively f_1 and g_1 (including the induced debt effect), we observe from (13a) and (13b) that they are proportional to the derivatives in (14b) and (15). The effects are also proportional to the magnitude of the density ψ. As illustrated in Figure 2, this simply reflects that a higher ψ implies that a given change in $\bar{u}_2^d + \bar{u}_2^r$ will influence the voting behavior of a larger group of voters. Moreover, it follows from (14b) and (15) that the ability of the incumbent to use current policies to influence Π hinges on the habit formation mechanism, i.e. $\gamma > 0$.[8] If $\gamma = 0$, our model simplifies to a log-utility version of the TA (1990) framework, which features an exogenous probability of re-election.

Equilibrium policy

Using (1), (8a), (8b), (2a) and the condition $\alpha^D = 1 - \alpha^R$, we rewrite the expected utility function of the *R*-incumbent, (3), as

$$(3b) \qquad \alpha^R \log f_1 + (1-\alpha^R)\log g_1 + \log(2 - f_1 - g_1) + A + B\Pi(f_1, g_1).$$

Here *A* and *B* are negative constants (recall that $\alpha^R > \alpha^D$),

$$(16) \qquad A = \alpha^R \log \alpha^R + (1-\alpha^R)\log(1-\alpha^R) < 0,$$

$$(17) \qquad B = (1-2\alpha^R)\left(\log \alpha^R - \log(1-\alpha^R)\right) < 0.$$

Maximization of (3b) with respect to f_1 and g_1 yields the first-order conditions

$$(18a) \qquad \frac{\alpha^R}{f_1} - \frac{1}{2 - f_1 - g_1} + B\frac{d\Pi}{df_1} = 0,$$

$$(18b) \qquad \frac{1-\alpha^R}{g_1} - \frac{1}{2 - f_1 - g_1} + B\frac{d\Pi}{dg_1} = 0.$$

[8] Comparing to the probabilistic voting framework of Persson and Tabellini (2000, section 13.3), we note that the ability of the incumbent to influence the probability of re-election in their model hinges completely on the assumption that the uniform distributions for σ^{iR} and σ^{iD} have different densities. By the assumption of a similar density ψ, this mechanism is deliberately disregarded in our model.

It is useful first to consider the corner case of no habit formation mechanism, i.e. $\gamma = 0$, which implies that $\frac{d\Pi}{df_1} = 0$ and $\frac{d\Pi}{dg_1} = 0$. We then obtain $f_1 = \alpha^R$, $g_1 = (1-\alpha^R)$ and, from (2a), $b = 0$. This is equivalent to the benchmark case of a certain re-election, see (4). The intuition follows from TA (1990). When Π is exogenous and less than one, the incumbent on the one hand benefits from increased debt because it provides more of the most preferred composition of public spending today and, as a consequence of less total future spending, it also "forces" the potential alternative government to set the composition of public spending in period 2 closer to the incumbent's preferences. One the other hand, increased debt harms the incumbent because it implies a less smooth utility profile over time. The degree of concavity in the utility function determines whether a debt or surplus bias is optimal on strategic grounds.[9] It turns out that log utility is the borderline case where the two opposite effects exactly cancel out. In the context of the present paper that assumes log utility at the outset, this is a useful property because it allows us to focus exclusively on the strategic effects of current policies on Π.

From (18a) and (18b), we obtain

$$(19) \qquad \frac{\alpha^R}{f_1} - \frac{1-\alpha^R}{g_1} = B\left(\frac{d\Pi}{dg_1} - \frac{d\Pi}{df_1}\right).$$

Using (13a), (13b), (14b) and (15), it is straightforward to verify that

$$(20) \qquad \left(\frac{d\Pi}{dg_1} - \frac{d\Pi}{df_1}\right) = \frac{1}{2}\psi\gamma\left[\left(\frac{1}{G_2^R} - \frac{1}{G_2^D}\right) - \left(\frac{1}{F_2^R} - \frac{1}{F_2^D}\right)\right] > 0 \text{ for } \gamma > 0.$$

Recalling that the constant *B* is strictly negative, see (17), we conclude from (19) that:

PROPOSITION 1: *When* $\gamma > 0$, *the period 1 R-incumbent sets* f_1 *and* g_1 *such that* $\frac{f_1}{g_1} > \frac{\alpha^R}{1-\alpha^R}$.

Comparing to the benchmark case of a certain re-election (see (4)), or the case with an exogenous re-election probability ($\gamma = 0$), this proposition implies that the incumbent chooses a more polarized allocation between the two public goods in the sense that the magnitude of the gap $f_1 - g_1 > 0$ has increased. Thus, rather than to cater to the middle as predicted by a median voter model, the incumbent's political-strategic reasoning leads him to choose a more extreme intra-period distribution of the two public goods.

In order to consider debt policy, we note that the first-order conditions (18a) and (18b) imply

$$(21) \qquad f_1 + g_1 = 1 + \frac{1}{2}(2 - f_1 - g_1)B\left[f_1\frac{d\Pi}{df_1} + g_1\frac{d\Pi}{dg_1}\right].$$

[9] In the extreme case of completely opposite preferences, $\alpha^R = (1-\alpha^D) = 1$, a debt bias is always optimal when $\Pi < 1$ because the incumbent will regard the alternative government's spending as pure waste.

Because $B < 0$ and $(2 - f_1 - g_1) > 0$, it follows that $f_1 + g_1 > 1$ if the term in brackets on the RHS is strictly negative. As demonstrated in the Appendix, this condition is satisfied when $\gamma > 0$. Thus:

PROPOSITION 2: *Given* $\gamma > 0$, $b > 0$.

Moreover, from Proposition 1 and Proposition 2, we immediately obtain:

PROPOSITION 3: *Given* $\gamma > 0$, *the R-incumbent sets* $f_1 > \alpha^R$.

Consequently, the incumbent's choice of polarization in the sense of an increased gap between f_1 and g_1 involves an increase in the supply of his most preferred good - as compared to the case of a certain re-election.

Propositions 1 and 2 imply that the incumbent chooses to "pay" for the increased re-election probability by deviating from both his intra- and intertemporal first-best allocation of resources. We note that he could have increased the re-election probability by deviating only along the intra-period dimension. It turns out, however, that the cost to the incumbent of a given increase in Π is minimized when the distortion incurred due to polarization is smoothed with an intertemporal distortion caused by debt. Thus, debt allows the *R*-incumbent to increase the gap between f_1 and g_1 by means of a jump in f_1 (i.e. proposition 3) which is not fully compensated by a similar drop in g_1.

Our analysis can be summarized by Figure 3.[10] In this figure, the intra-period indifference curves of the *R*-incumbent are denoted I, II, III and IV. The period 2 expansion path of the potential *D*-successor is given by EP^D, while the expansion path of the R-government in the case of $\gamma = 0$ (i. e. when Π is exogenous) is given by $EP^R\big|_{\gamma=0}$. The benchmark solution of a certain re-election for the R-incumbent is given by point B^R on the $b = 0$ budget line (in both periods). As explained above, the R-incumbent would also choose point B^R in period 1 when Π is exogenous and satisfies $0 < \Pi < 1$. Then the period 2 allocations would be either in point B^R if R wins the election or in point B^D if D wins.

Given that the R-incumbent can influence Π, the optimal period 1 allocation is given by R_1. Comparing to B^R, the R-incumbent chooses $b > 0$, a larger gap between f_1 and g_1 and finally $f_1 > \alpha^R$. The R-incumbent now incurs costs in terms of both an inefficient intra-period allocation of resources in period 1 and an inefficient intertemporal resource allocation. These costs are worthwhile, however, because they are dominated by the increase in expected period 2 utility caused by a higher probability for the R_2 allocation in period 2 rather than the D_2 allocation.

[10] Figure 3 is inspired by Figure 1 in TA (1990: p. 44).

***** Figure 3 *****

4. Final remarks

This paper has put forward a probabilistic voting model where habit formation in the voters' preferences for alternative public goods implies a link from current policies in terms of decisions on the composition of public goods and debt to the probability for re-election. A forward-looking and output oriented incumbent that faces a probability of being replaced by an alternative government with different preferences for the composition of public goods, will act strategically and utilize this link in order to increase the probability of re-election. Comparing to either the benchmark case of a certain re-election or the case of an exogenous probability of re-election (due to $\gamma = 0$), we have shown that the incumbent chooses a larger initial period budget share for his most preferred public goods. This pushes up all voters' habit levels for this good. As a consequence, all voters' assessment of the incumbent's preferred future policy will be more favorable, leading in turn to a higher probability of re-election. Moreover, we have also demonstrated that the increased polarization in the resource allocation in the initial period is accompanied by a deficit bias.

Our predictions call for a search for empirical evidence. As mentioned in the introduction, Glaeser et al. (2005) report some striking observations of seemingly surprisingly polarized policies in the US. These observations refer to tax policies, however, and not to the composition of public goods. Moreover, there are plenty of observations of sustained public deficits in many major OECD economies (see for example OECD, 2006) but as surveyed by Persson and Tabellini (2000, section 13.3.4) it has still proved hard to provide robust empirical evidence for suggested strategic motives.[11]

With respect to AT (1990) and TA (1990), their prediction of an inverse relationship between the magnitude of the (exogenous) probability of re-election and the size of the deficit has been rejected by existing empirical studies. Our findings suggest a quite different relationship, however, i.e. a deficit and a polarized resource allocation are means used by the incumbent to increase the probability of re-election. Thus, we believe that careful empirical analyses of potential co-movements between these three variables are warranted. As a motivation for such an effort in the future, we note that our finding seems to be in the spirit of the theory of political business cycles and loosely consistent with the stylized fact (as presented by Persson and Tabellini, 2000, p: 393) that budget deficits tend to be larger during election years.

[11] One exception is a study by Petterson (2001). Using data for Swedish municipalities, he finds strong support for the strategic budget motive suggested by Persson and Svensson (1989).

Appendix

Last term on the RHS of (14b)

In order to determine the sign of the term in brackets on the RHS of (14b), we note that:

$$\text{(A-1)} \quad \left[\frac{1-\alpha^D}{F_2^R G_2^D} - \frac{\alpha^D}{F_2^D G_2^R}\right] = \frac{(1-\alpha^D)F_2^D G_2^R - \alpha^D F_2^R G_2^D}{F_2^D G_2^R F_2^R G_2^D}.$$

Substituting from (9a) and (9b) and using that $\alpha^R = 1-\alpha^D$, we rewrite the numerator as

$$\text{(A-2)} \quad \begin{array}{l}\left(\alpha^D(1-\alpha^D)(2-f_1-g_1)-(1-\alpha^D)\gamma f_1\right)\left(\alpha^D(2-f_1-g_1)-\gamma g_1\right) \\ -\left(\alpha^D(1-\alpha^D)(2-f_1-g_1)-\alpha^D\gamma f_1\right)\left((1-\alpha^D)(2-f_1-g_1)-\gamma g_1\right).\end{array}$$

Because $\alpha^D < \frac{1}{2}$ and $2-f_1-g_1>0$, the numerator must be strictly negative, implying that the terms in brackets on the RHS of (14b) must be strictly negative as well.

Proof of Proposition 2

Proposition 2 hinges on the condition that the term in brackets on RHS of (21) is strictly negative,

$$\text{(A-2)} \quad \left[f_1\frac{d\Pi}{df_1} + g_1\frac{d\Pi}{dg_1}\right] < 0.$$

Substituting from (13a), (13b), (14a) and (14b), and collecting terms, this condition can be written as

$$\text{(A-3)} \quad \frac{1}{2}\psi\left[\gamma(f_1-g_1)\left(\frac{1-\alpha^D}{G_2^D F_2^R} - \frac{\alpha^D}{F_2^D G_2^R}\right)(f_1+g_1) + \gamma f_1\left(\frac{1}{F_2^R}-\frac{1}{F_2^D}\right) + \gamma g_1\left(\frac{1}{G_2^R}-\frac{1}{G_2^D}\right)\right] < 0.$$

By Proposition 1 we have that $f_1 > g_1$. Using that the first part of this Appendix proves that the expression in (A-1) is strictly negative, it follows that a sufficient condition for (A-2) to hold is

$$\text{(A-4)} \quad f_1\left(\frac{1}{F_2^R}-\frac{1}{F_2^D}\right) + g_1\left(\frac{1}{G_2^R}-\frac{1}{G_2^D}\right) \le 0.$$

Taking into account that $f_1 > g_1$, $F_2^R > F_2^D$ and $G_2^D > G_2^R$, (A-4) holds if

$$\text{(A-5)} \quad \left|\frac{1}{F_2^R}-\frac{1}{F_2^D}\right| \ge \left|\frac{1}{G_2^R}-\frac{1}{G_2^D}\right|,$$

which after straightforward manipulations can be written as

$$\text{(A-6)} \quad \frac{\alpha^R(1-b)-\gamma f_1}{\alpha^R(1-b)-\gamma g_1} \le \frac{(1-\alpha^R)(1-b)-\gamma g_1}{(1-\alpha^R)(1-b)-\gamma f_1}.$$

This condition is obviously satisfied because $f_1 > g_1$. This implies that condition (A-2) and in turn Proposition 2 are satisfied as well.

References

Aghion, P. and P. Bolton (1990): "Government domestic debt and the risk of default: A political-economic model of a strategic role of debt", in R. Dornbusch and M. Draghi (eds.), *Public Debt Management. Theory and History*, Cambridge, Cambridge University Press, 315-345.

Alesina, A. (1988): "Credibility and policy convergence in a two-party system with rational voters", *American Economic Review*, 78, 796-805.

Alesina, A. and G. Tabellini (1990): "A positive theory of fiscal deficits and government debt", *Review of Economic Studies*, 57, 403-414.

Alesina, A. and N. Fuchs-Schündeln (2007): "Good bye Lenin (or not?): The effect of communism on people's preferences", *American Economic Review*, forthcoming.

Budge, I. and H-D. Klingemann (2001): "Finally! Comparative over-time mapping of part policy movement", in I. Budge et al. (eds.), *Mapping Policy Preferences: Estimates for Parties, Electors, and Governments 1945-1988*, Oxford, Oxford University Press, 19-50.

Campbell, J.Y. and J.H. Cochrane (1999): "By force of habit: A consumption-based explanation of Aggregate stock market behavior", *Journal of Political Economy*, 107, 205-251.

Carroll, C.D., J. Overland and D.N. Weil (2000): "Saving and growth with habit formation", *American Economic Review*, 90, 341-355.

Cukierman, A., S. Edwards and G. Tabellini (1992): "Seignorage and political instability", *American Economic Review*, 82, 537-555.

Deaton, A. (1992): *Understanding consumption*, Oxford University Press, Oxford.

Duesenberry, J.S. (1949): *Income, saving and the theory of consumer behavior*, Harvard University Press, Cambridge (Mass.).

Easterlin, R.A. (1974): "Does economic growth improve the human lot? Some empirical evidence", in P.A. David and M.W. Reider (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*, New York, Academic Free Press, 89-125.

Fiorina, M.P. (1999): "Whatever happened to the median voter?", manuscript, Stanford University.

Fredrick, S. and G. Loewenstein (1999): "Hedonic adaptation", in D. Kahneman, E. Diener and N. Schwarz (eds.), *Well-Being: The Foundations of Hedonic Psychology*, New York, Russell Sage Foundation, 302-329.

Glaeser, E.L., G.A.M. Ponzetto and J.M. Shapiro (2005): "Strategic extremism: Why democrats and republicans divide on religious values", *Quarterly Journal of Economics*, 120, 1283-1330.

Glazer, A. (1989): "Politics and the choice of durability", *American Economic Review*, 79, 1207-1214.

Glazer, A., M. Gradstein and K.A. Konrad (1998): "The electoral politics of extreme policies", *Economic Journal*, 108, 1677-1685.

Ljungqvist, L. and H. Uhlig (2000): "Tax policy and aggregate demand management under catching up with the Joneses", *American Economic Review*, 90, 356-366.

OECD (2006): Economic Outlook 80, Paris.

Persson, T. and L.E.O. Svensson (1989): "Why a stubborn conservative would run a deficit: Policy with time-inconsistent preferences, *Quarterly Journal of Economics*, 104, 325-345.

Persson, T. and G. Tabellini (2000): *Political Economics - Explaining Economic Policy*, MIT Press, Cambridge, Massachusetts.

Petterson, P. (2001): "An empirical investigation of the strategic use of debt", *Journal of Political Economy*, 109, 570-584, 2001.

Rabin, M. (1998): "Psychology and economics", *Journal of Economic Literature*, 36, 11-46.

Rabin, M. (2002): "A perspective on psychology and economics", *European Economic Review*, 46, 657-685.

Rabinowitz, G. and S.E. Macdonald (1989): "A directional theory of issue voting", *American Political Science Review*, 83, 91-121.

Ryder, H.E. Jr. and G.M. Heal (1973): "Optimal growth with intertemporally dependent preferences", *Review of Economic Studies*, 40, 1-33.

Solnick, S.J. and D. Hemenway (2005): "Are positional concerns stronger in some domains than in others?", *American Economic Review*, 95, 147-151.

Tabellini, G. and A. Alesina (1990): "Voting on the budget deficit", *American Economic Review*, 80, 37-49.

Figure 1: Vote share of party *D* in group *j*, *j* = *d*, *r*

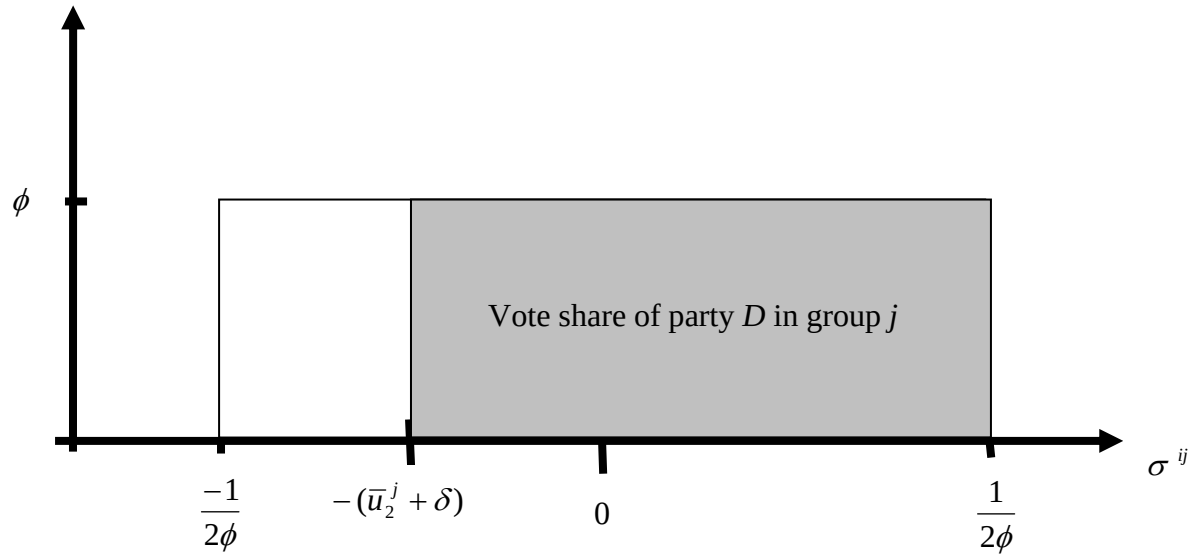

Figure 2: The probability that party D wins the election

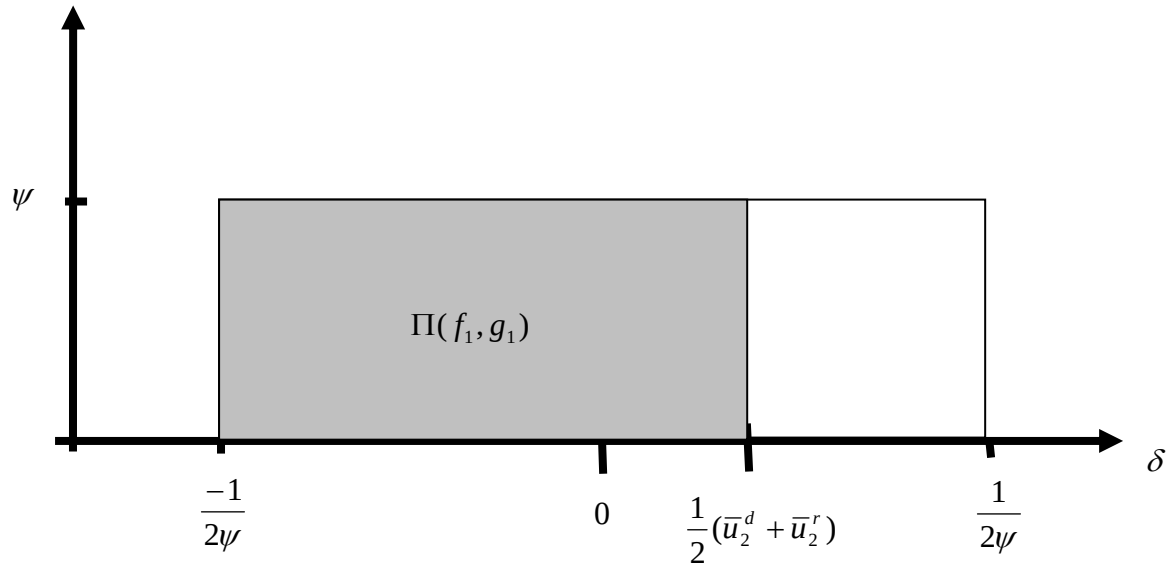

Figure 3: Optimal policies