SNF-REPORT No. 35/2001

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BERGEN, JULY 2002

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Abstract

An incumbent policy-maker can influence his successors' actions if current policies alter a state variabel that determines the opportunity set of the successor. Existing literature suggests that public debt is an important variabel in this context. This note introduces an alternative mechanism based on the well-known habit formation hyphotesis, which has been utilized in the literatures on consumption and asset pricing. Invoking habit formation in the voters' preferences for various public goods, we obtain a direct and intuitive link between the current government's choices regarding the composition of public spending and the succesors choices in later periods. The relevant state variables in our set-up are simply the habit levels. Given specific assumptions about the dynamic formation of these habit levels, it turns out that the incumbent government may use the habit formation mechanism strategically.

1. Introduction

An incumbent policy maker can influence his successors actions if current policies alter a state variabel, which in turn determines the opportunity set of the successor. Existing literature has focused on public debt as a potentially important state variabel in this context. This paper introduces habit formation in a model due to Tabellini and Alesina (1990). This creates an additional link between current and future policies. Thus, the incumbent's policies influence the habit levels for various types of goods, and these habit levels enter the utility function of the successor. Our model implies a direct and intuitive link between the current government's choices regarding the composition of public spending and the successor's choices in later periods.

Identifying relevant state variables, an important issue is whether a forward-looking incumbent can use these variables strategically. To what extent the current government can use the existence of habit formation strategically depends on the actual specification of the habit formation process. If habit formation is *external* in a sense that will be explained below, the scope for strategic considerations is significant. This implies that a probability for defeat in the next election alters the optimal political choices of the incumbent – compared to the case of a guaranteed re-election.

This paper adds to the fairly small literature on strategic debt accumulation, see the seminal contributions of Persson and Svensson (1989), Tabellini and Alesina (1990) and Alesina and Tabellini (1990). While Persson and Svensson assume that the incumbent and the potential successor disagree about the level of government spending, the latter two papers consider disagreement about the composition of government spending. All three papers rely on the failure of ricardian equivalence. This follows from an ad-hoc assumption in the paper of Tabellini and Alesina and from an explicit modelling of tax distortions in the two other papers. It turns out that the current government in all cases faces a trade-off between an influence on future spending and smooth utility over time (Persson and Tabellini, 1990). Thus, on one hand a higher public debt reduces the potential successor's spending on less useful purposes tomorrow and permits higher useful spending today. On the other hand a higher public debt leads to a sharper reduction in realized utility in the future because tomorrow's spending cuts are not only related to less useful purposes – but also to the useful ones. In the papers of Tabellini and Alesina (1990) and Alesina and Tabellini

(1990) this results in a deficit bias and a "too high" public debt regardless of the incumbent's preferences. In the paper of Persson and Svensson (1989), a deficit bias appears if the incumbent is conservative (i.e. if he wants less public spending than the potential successor) and a surplus bias appears in the opposite case.

While the cited conclusions as well as the approach taken in the strategic debt literature is very appealing, it seems fair to claim that the results are not very robust. The theoretical analyses rely on some rather restrictive assumptions about either the utility function or a given zero probability for re-election in the model of Persson and Svensson (1989). It is, for example, easy to verify that a standard logaritmic specification of the utility function in the paper of Tabellini and Alesina implies that the deficit bias vanishes completely, see Romer (2000: p. 560). Moreover, the empirical support of the strategic debt predictions is not overwhelming. We note, however, that a recent study by Pettersson-Lidbom (2001), which utilizes data from Swedish local governments, provides empirical support for the predictions made by Persson and Svensson (1989). Other empirical studies do not find evidence in support of strategic debt behavior according to Pettersson-Lidbom.

Our analysis assumes that preferences are characterized by habit formation. Such a specification is wellknown in studies of consumption (see Deaton, 1992, for a survey) and has more recently proved to be successful in stochastic consumption-based analyses of asset-prices and the equity premium puzzle, see for example Campbell and Cochrane (1999). Generally, 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 the consumption habit level) than on the level itself. As highlighted by Campbell and Cochrane (p. 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 (representative) individuals' private consumption. We are not aware of any study of strategic government behavior, which considers preferences displaying habit formation. We will argue, however, that the assumption of habit formation is not only relevant for individuals' utility of private consumption – but equally important for any voter's preferences for various types of public goods.

The next section takes a closer look at two different habit-formation concepts and discusses the intra-period problem of the government. We demonstrate that the

existence of habit formation implies an intuitive and direct link between past and present policy decisions on the composition of public spending. Section 3 extends the analysis to an intertemporal setting and discusses how the incumbent government, which faces a positive probability for defeat in the next election, can utilize the existence of habit formation strategically. We offer some final remarks in section 4.

2. Habit formation in the Tabellini-Alesina set-up

As a point of departure we consider the intra-period problem of the government in office in a given period t. Following Tabellini and Alesina (1990) and Alesina and Tabellini (1990) the government has preferences for spending on two public goods. The spending levels are denoted by G_t and F_t respectively. In the same way as Tabellini and Alesina we disregard an explicit modelling of the trade-off between public and private spending. Initially we simply assume that intertemporal considerations (which we return to below) imply that total public spending in period t should amount to W_t, i.e. the period t public budget constraint is simply

(1) $G_t + F_t = W_t$.

Habit formation implies that preferences are related to the *surplus consumption levels*, which are related to the deviation between the actual consumption levels and the habit levels. We define the surplus consumption levels as

(2a) $g_t = G_t - \gamma \overline{G}_t$,

(2b) $f_t = F_t - \gamma \overline{F}_t$,

where $\overline{G}_t$ and $\overline{F}_t$ denote the habit levels and the parameter γ ($0 \leq \gamma \leq 1$) determines the strenght of the habit formation process. Individual i's preferences for public goods in period t is described by the utility function

(3) $U_t^i = \alpha^i u(g_t) + (1 - \alpha^i) u(f_t)$,

where $u' > 0$, $u'' < 0$ and α^i is the weight on g_t relative to f_t, $0 \leq \alpha^i \leq 1$. Clearly, different individuals are characterized by different values of α^i and the political process translates the voters' distributions of α^i-values into the government's value.

We observe from (2a), (2b) and (3) that the special case of $\gamma = 0$ implies additive separability.

As discussed in more detail by Tabellini and Alesina (1990), we assume that the government's preferences are characterized by the median voter's α-value in period t – which we denote α_t^{med}. While we assume that each individual is characterized by a fixed α-value, the value of α_t^{med} is stochastic ex-ante due to random participation in the political process. This is elaborated by Tabellini and Alesina (see also Romer, 2001, section 11.6).

The maximization of (3) subject to (1), (2a), (2b) and given values of $W_t, \overline{G}_t$ and $\overline{F}_t$ can be written as an unconstrained maximization problem in one choice variabel, G_t. Consequently, the government in period t maximezes

(3') $U_t^{med} = \alpha^{med} u\left(G_t - \gamma \overline{G}_t\right) + (1 - \alpha^{med}) u\left(W_t - G_t - \gamma \overline{F}_t\right).$

It follows that the median-voter theorem applies since preferences over G_t are single-peaked (because $u' > 0$ and $u'' < 0$). Moreover, it also follows that the government in period t determines the composition between the public goods according to the first-order condition

(4) $\dfrac{u'(g_t)}{u'(f_t)} = \dfrac{1 - \alpha_t^{med}}{\alpha_t^{med}}.$

Obviously, α_t^{med} is positively related to g_t and inversely related to f_t. It is also straightforward to verify that an increase in total spending, W_t, leads to increases in both g_t and f_t (and in their counterparts in natural units, G_t and F_t). We may easily imagine that W_t is (partly) determined by previous governments' debt policy – and that is in effect the link between past and present policies, which are highlighted in the strategic debt literature.

Habit formation introduces a direct link between past and present policies. It follows from (4), (2a) and (2b) that the partial effects of an exogenous increase in one of the habit-levels, say $\overline{G}_t$, leads on one hand to reductions in both g_t and f_t – but on the other hand to asymmetric effects on the natural levels, i.e. $\partial G_t / \partial \overline{G}_t > 0$ and $\partial F_t / \partial \overline{G}_t < 0$ provided that $\gamma > 0$. Analogously, we have $\partial F_t / \partial \overline{F}_t > 0$ and $\partial G_t / \partial \overline{F}_t < 0$ as long as $\gamma > 0$.

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It is useful to consider the case of logaritmic utility, which we will refer to below. In this case the utility function could be interpreted as a Stone-Geary utility function, which leads to a linear expenditure system. Thus, we obtain the following demand functions from (4):

(5a) $G_t = \gamma \overline{G}_t + \alpha_t^{med}(W_t - \gamma \overline{G}_t - \gamma \overline{F}_t)$,

(5b) $F_t = \gamma \overline{F}_t + (1 - \alpha_t^{med})(W_t - \gamma \overline{G}_t - \gamma \overline{F}_t)$.

We observe that $\partial G_t / \partial \overline{G}_t = \gamma(1 - \alpha_t^{med})$, $\partial F_t / \partial \overline{G}_t = -\gamma(1 - \alpha_t^{med})$, $\partial F_t / \partial \overline{F}_t = \gamma \alpha_t^{med}$, $\partial G_t / \partial \overline{F}_t = -\gamma \alpha_t^{med}$, $\partial G_t / \partial W_t = \alpha_t^{med}$ and $\partial F_t / \partial W_t = (1 - \alpha_t^{med})$. It follows immediately from (5a) and (5b) that

(6a) $g_t = \alpha_t^{med}(W_t - \gamma \overline{G}_t - \gamma \overline{F}_t)$,

(6b) $f_t = (1 - \alpha_t^{med})(W_t - \gamma \overline{G}_t - \gamma \overline{F}_t)$.

Thus, both g_t and f_t change proportionally to a change in $(W_t - \gamma \overline{G}_t - \gamma \overline{F}_t)$ when the utility function is logarithmic.

Below we will focus on two different specification of the habit formation process, which essentially corresponds to the distinction between *external* and *internal* habit formation made by Campbell and Cochrane (1999). Refering to a traditional one-consumption-good intertemporal framework, internal habit formation refers to the case where an individual's habit level is determined by his own historical consumption pattern. Generally, this means that the habit consumption level in a given period is given by some sort of a weighted moving average of past consumption. In its simplest form, internal habit formation implies that the habit level in period t is equal to the actual consumption level in the previous period.

On the other hand, external habit formation refers to the case where an individual's habit level is determined by the history of aggregate consumption. As highlighted by Campbell and Cochrane, there is an important distinction between the two habit level concepts when it comes to the calculation of the marginal utility of current actual consumption. In the case of internal habit formation marginal utility will (also) depend on terms capturing how an increase in actual consumption today raises *future* habits. These terms are eliminated under external habit formation.

In our public goods context, the above definition of internal habit formation applies immediately. Assuming for simplicity that the habit levels in a given period are determined solely by the spending level in the previous period, we have

(7) $\quad \overline{G}_t^{internal} = G_{t-1} , \overline{F}_t^{internal} = F_{t-1}.$

The definition of external habit formation is slightly more difficult to translate to our public spending and political economy setting. In the following external habit formation is specified in order to capture the general idea that i) a potential new government's habit levels in a given period $t+1$ depend on the incumbent's actual spending levels in period t – and ii) if the incumbent remains in office in period t+1, the habit levels remain constant. Formally this means that

(8) $\quad \overline{G}_t^{external} = \begin{cases} \overline{G}_{t-1} & \text{if } \alpha_t^{med} = \alpha_{t-1}^{med} \\ G_{t-1} & \text{if } \alpha_t^{med} \neq \alpha_{t-1}^{med} \end{cases}, \quad \overline{F}_t^{external} = \begin{cases} \overline{F}_{t-1} & \text{if } \alpha_t^{med} = \alpha_{t-1}^{med} \\ F_{t-1} & \text{if } \alpha_t^{med} \neq \alpha_{t-1}^{med} \end{cases}.$

Below we will focus on external habit formation. The implication seems intuitive. If the present government chooses to give priority to much spending on a particularly preferred public good, this alters the habit levels of the voters in a way which influences the spending priorities of the next government. The next government will also choose to spend much on this public good – even if this new government does not share the strong preferences for this particular good at the outset.

3. Strategic behavior in an intertemporal setting

So far we have shown that habit formation in the voters' preferences for spending on various public goods implies a direct link between the current government's spending decisions and the succeeding government's decisions. An interesting question is then to what extent this link can be utilized strategically by the incumbant government. In order to investigate this issue we analyse a simple two-period intertemporal version of our model. We assume logaritmic utility. There are two types of voters characterized by respectively α_1^{med} and α_2^{med}, $\alpha_1^{med} \neq \alpha_2^{med}$. In the initial period 1 the elected government is characterized by α_1^{med}. The incumbent faces an exogenous probability π, $0 \leq \pi \leq 1$, for re-election in period 2. If a new government is elected in period 2, it will be characterized by α_2^{med}.

Following Tabellini and Alesina (1990) the budget constraints are given by:

(9) $\quad G_1 + F_1 = W_1 = T + D$,

(10) $\quad G_2 + F_2 = W_2 = T - D$.

Here T is the exogenous tax income, which is constant over time, and D is the borrowing of the initial government. For simplicity the public debt in the beginning of period 1 is zero. Using (9) and (10) and noting that the government in period 2 will be characterized by demand functions of the type given by equations (6a) and (6b), it follows that the optimization problem of the government in period 1 is to choose G_1 and F_1 in order to maximize:

(11)

$$\alpha_1^{med} \ln\left(G_1 - \gamma G^0\right) + (1 - \alpha_1^{med}) \ln\left(F_1 - \gamma F^0\right) +$$

$$\pi\left\{\alpha_1^{med} \ln\left(\alpha_1^{med}(T - D - \gamma G^0 - \gamma F^0)\right) + (1 - \alpha_1^{med}) \ln\left((1 - \alpha_1^{med})(T - D - \gamma G^0 - \gamma F^0)\right)\right\} +$$

$$(1 - \pi)\left\{\alpha_1^{med} \ln\left(\alpha_2^{med}(T - D - \gamma G_1 - \gamma F_1)\right) + (1 - \alpha_1^{med}) \ln\left((1 - \alpha_2^{med})(T - D - \gamma G_1 - \gamma F_1)\right)\right\}.$$

Here G^0 and F^0 are exogenously given initial habit levels, $D = G_1 + F_1 - T$ and we rely on the external habit formation definition discussed above.

In the following, we consider two different cases. First, we assume that the government in period 1 will be re-elected with probability $\pi = 1$. Then, we look at the opposite case charaterized by $\pi = 0$, i.e. the government in period 1 knows that it will be succeeded by the alternative government in period 2. The question is then whether or not the initial government will act strategically and alter its behavior when it knows that it will be succeeded by the alternative government. At the outset we know from Tabellini and Alesina (1990) and Romer (2000) that the special case of $\gamma = 0$ (i.e. no habit formation, see (2a) and (2b) above) implies that the initial government will not alter its behavior when $\pi < 1$. Thus, if it turns out that the initial government acts strategically and alters its behavior, it will be due to the habit formation mechanism.

Case 1 – Re-election guaranteed, $\pi = 1$

The maximization of (11) in the case of $\pi = 1$ yields the first-order conditions:

(12a) $\alpha_1^{med} \dfrac{1}{g_1} - \alpha_1^{med} \dfrac{1}{g_2} \alpha_1^{med} - (1 - \alpha_1^{med}) \dfrac{1}{f_2}(1 - \alpha_1^{med}) = 0,$

(12b) $(1 - \alpha_1^{med}) \dfrac{1}{f_1} - \alpha_1^{med} \dfrac{1}{g_2} \alpha_1^{med} - (1 - \alpha_1^{med}) \dfrac{1}{f_2}(1 - \alpha_1^{med}) = 0.$

We immediately observe from (12a) and (12b) that

$$(13) \quad \frac{\alpha_1^{med}}{(1-\alpha_1^{med})} = \frac{g_1}{f_1} .$$

Thus, the surplus consumption levels are characterized by constant budget shares in the first period in the same way as in the second.

Using the condition $\dfrac{1-\alpha_1^{med}}{f_2} = \dfrac{\alpha_1^{med}}{g_2}$ (which follows from the constant budget share property in the second period), (12a) and (12b), we obtain easily

$$(14a) \quad \frac{1}{g_1} = \frac{1}{g_2} ,$$

$$(14b) \quad \frac{1}{f_1} = \frac{1}{f_2} .$$

These conditions imply that $g_1 = g_2$ and $f_1 = f_2$. It follows that $G_1 = G_2 = G$ and $F_1 = F_2 = F$, which in turn implies that $D = 0$. There is no public deficit bias when the incumbent government knows that re-election is guaranteed. We also note that the budget shares of G and F not only depend on α_1^{med} – but also on the corresponding initial habit levels G^0 and F^0.

Case 2 – No possibility for re-election, $\pi = 0$

In the case of $\pi = 0$ maximization of (11) yields the first-order conditions:

$$(15a) \quad \alpha_1^{med}\frac{1}{g_1} - (1+\gamma)\left(\alpha_1^{med}\frac{1}{g_2\big|_{\alpha_2^{med}}}\alpha_2^{med} - (1-\alpha_1^{med})\frac{1}{f_2\big|_{\alpha_2^{med}}}(1-\alpha_2^{med}) \right) = 0 ,$$

$$(15b) \quad (1-\alpha_1^{med})\frac{1}{f_1} - (1+\gamma)\left(\alpha_1^{med}\frac{1}{g_2\big|_{\alpha_2^{med}}}\alpha_2^{med} - (1-\alpha_1^{med})\frac{1}{f_2\big|_{\alpha_2^{med}}}(1-\alpha_2^{med}) \right) = 0 .$$

We observe that (15a) and (15b) imply that condition (13) also holds in the case of $\pi = 0$, i.e. the surplus consumption levels are characterized by constant budget shares.

The intertemporal allocation is altered, however. Using the condition $\dfrac{1-\alpha_1^{med}}{f_2} = \dfrac{\alpha_1^{med}}{g_2}$ in the same way as above, i.e. inserting in (15a) and (15b), we obtain

$$(16a) \quad \frac{\alpha_1^{med}}{g_1} = (1+\gamma)\frac{\alpha_2^{med}}{g_2\big|_{\alpha_2}} ,$$

(16b) $\dfrac{1-\alpha_1^{med}}{f_1} = (1+\gamma)\dfrac{1-\alpha_2^{med}}{f_2\big|_{\alpha_2^{med}}}$.

The simple results that $g_1 = g_2$, $f_1 = f_2$ and $D = 0$ no longer apply. Using one of the conditions (16a) and (16b) and the corresponding budget constraint, i.e. (9) or (10), we obtain after some calculations:

(17) $D = \gamma\left(\dfrac{1}{2}(G^0 + F^0) - \dfrac{1}{1+\gamma}T\right).$

Thus, we can conclude that the incumbent government will utilize the habit formation mechanism strategically and alter its intertemporal debt policy in response to uncertainty about the possibility of re-election. An interesting finding is that there is no unambiguous deficit bias. We observe from (17) that whether strategic considerations lead to a deficit or a surplus in the initial period depends on the magnitudes of respectively the initial habit levels (i.e. $G^0 + F^0$) and the tax revenue (T). The initial habit levels are positively related to D, while T is negatively related to D.

4. Final remarks

This paper suggests that the voters' preferences for various public goods display habit formation. It is shown that the habit formation mechanism lead to a direct link between the current government's decision on the composition of various public goods and its successor's decision. We believe that this link is intuitive and of strong empirical significance. It is easy to imagine the following type of political process: The government at a point of time chooses to give priority to a particularly preferred type of public good. Even if this decision is controversial it is likely to rather quickly influence the habit levels of the majority of the voters. As a consequence the succeeding government is likely to keep the spending level on the public good in question at a high level – even if this new government did not share the initial government's high preferences for this good at the outset. We believe that this type of process is highly plausible and captured by habit formation.

We have also discussed the possibility that the incumbent government may use the habit formation mechanism strategically. Our analysis shows that the

incumbent may indeed use the habit formation mechanism strategically under certain assumptions about the dynamic formation of the voters' habit levels, i.e. if the socalled "external habit formation" definition is valid. An interesting result is that strategic considerations may lead to both public deficits as well as surpluses. This depends on the magnitudes of the initial habit levels. We will argue, however, that more work is neccessary in order to obtain a more satisfactory and generalized modelling of how voters' habit formation for various public goods may be utilized strategically by the policy-makers.

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