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Germany's New Lagged Balanced Budget Rule: A Political Economy Analysis

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Many policy reforms are introduced only gradually or with a significant lag between the time of legislative passing and its actual implementation. This is also the case for a new constitutional rule in Germany which requires the federal and state governments to run (almost, cyclically adjusted) balanced budgets from 2016 and 2020 respectively. In this context I analyze within a simple political economy model, where politicians are less patient than citizens, the costs and benefits of a lagged balanced budget rule, both when the rule is credible and when it is not. I show that i) a credible lagged balanced budget rule makes the first best much less likely than the immediate introduction of such a rule, but not impossible, and more likely than without any rule; ii) when the balanced budget rule is not credible and subject to revision by either voters or politicians at the time of effectiveness the first best becomes impossible to reach in an important benchmark case. Somewhat surprisingly, this result holds regardless of who controls the reversal decision.

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1 Introduction

Many policy reforms are introduced only gradually or with a significant lag between the time of legislative passing and its actual implementation. For example, the increase of the retirement age in Germany from 65 to 67 takes place gradually over a period of almost twenty years from 2012 to 2030. Given the dramatic ageing of society in Germany, as in many other societies, and its repercussion for public finances one important reason for the timing of the reform is likely to be one of political opportunism, as the costs of adjustment are passed on to future policymakers, who may differ from today's ones, and possibly to future generations or individuals who are not as politically active today (likes the younger ones). The lag in time when reforms become effective may thus be considered an important part of the reform itself, making it perhaps viable in the first place.[1]

Lagged implementation of much earlier decided reforms bears a cost to society, however, as the reform benefits may materialize only in the (distant) future. This may be considered politically acceptable or negligible from of welfare perspective if one takes a very long run perspective. While true this view ignores the decisions and actions prior to the implementation of the reform, which themselves may affect the long run benefits and the credibility of the reform, a point well known from the classic literature on time-inconsistency as in Kyland and Prescott (1977). In this paper I study the economic and political effects of a particular reform, namely a balanced budget rule (BBR) to control government debt, whose introduction is lagged. The particular motivation for this lagged reform is a recent constitutional change in Germany's debt policy becoming effective only in years to come, as described in more detail below. I focus in particular on the incentives of voters and politicians prior to the time of the balanced budget rule becoming effective. In doing so I am interested in answering the following questions: 1) What are the costs and benefits of a lagged balanced budget rule relative to no reform and an immediate reform, assuming that the balanced budget rule is credible? 2) If the reform is not credible once the stage of implementation is reached, how do actions prior to that stage affect the likelihood of a policy reversal? 3) If the reform is not credible, does it matter who controls the decision on continuation or reversal of the balanced

[1] Buchanan (1991) goes further and argues that "lagged implementation is an important element in any strategy for constitutional change, and for reasons that are over and beyond the familiar facilitation of agreement among individuals and groups whose identified interests may conflict" (p. 11), as individuals are in a better situation to evaluate alternative constitutional choices when the introduction is lagged.

budget rule (citizens vs. politicians)?

The dramatic increase in government debt in many countries due to the financial and economic crises and as a result of an ageing society make the control of government debt an important policy issue in general. The specific motivation for the study of a lagged balanced budget rule is a new constitutional provision regarding government debt in Germany which was introduced in 2009, and which is discussed by Heinemann (2010). Under this new rule Germany's federal government is allowed to run a (cyclically adjusted) budget deficit of no more than 0.35% of GDP starting in 2016 (and leaving exceptions only for major natural catastrophes and emergency situations). The small tolerance of a budget deficit is close to being a policy of zero new debt. For German states (Länder) the new rule is even tougher and requires them to run a zero (cyclically adjusted) budget deficit starting in 2020. The new rules are certainly demanding in view of the current federal and state governments debt levels. For this reason and because of the long lag between constitutional reform and the effectiveness of the new rule the credibility of the balanced budget rule may be questioned.

The theoretical analysis in this paper introduces a simple political economy model of government debt, in which homogenous voters are governed by politicians who are unpatient from the viewpoint of citizens. The political agency model builds on the retrospective voting model used by Persson and Tabellini (2000) to study fiscal policy. I assume that voters have log utility over public good spending per period, which in conjunction with a zero interest rate and no discounting implies that equal public good provision across time is optimal from their perspective. A balanced budget rule that were implemented immediately would therefore generate the citizens' first best. In line with the German situation, however, I assume that the balanced budget rule is scheduled for becoming effective only later (in period 2). This is a first potential source of inefficiency. A second source of inefficiency comes from the conflict of interest between voters and the incumbent politician. The latter discounts future benefits, perhaps because there is an exogenous robability of not being in office in the future (other than the explicit reelection calculus considered by voters). I assume that a politician has linear preferences in public good spending, so that in the presence of discounting a politician wants to spend government revenues today rather than tomorrow. This captures the tendency of excessive debts in absence of any constitutional constraint. What keeps the politician partially in check are the benefits from holding office upon reelection. Still, voters

must tolerate some debt in order for politicians to seek reelection, as a politician who does not seek reelection would generate are far worse outcome for voters. The implied reelection constraint is at the center of the theoretical analysis.

I derive several insights, for which only three model parameters are important: per period tax revenues R, the exogenous benefit of holding political office r, and the politician's discount factor δ. First, the lagged implementation of the balanced budget rule has significant costs and benefits. I measure the effectiveness of the balanced budget rule by the range of the politician's discount factor under which the first best can be implemented. With an immediate balanced budget rule the first best is implemented and the politician's discount factor does not matter, as the debt choice is removed from the political agenda. With the delay in the introduction of the balanced budget rule the range of discount factors consistent with the first best shrinks considerably, assuming that the balanced budget rule is credible. As a benchmark I consider the situation where tax revenues R are large relative to the politician's benefits of holding office r (so that $R/(R+r)$ converges to 1). In that case the first best is implemented for the politician's discount factor above approximately 0.62. Hence there is a significant cost of a lagged balanced budget rule. Yet if a (credible) balanced budget rule were not introduced at all the range of discount factors compatible with the first best becomes much smaller. In the limit of the benchmark case the interval shrinks to zero, that is, the first best is not implementable. In this sense, the lagged balanced budget rule generates a substantial benefit.

Second, the preceeding argument rested on the assumption that the balanced budget rule, even when implemented only with a delay, is credible. When this is not the case, implementing the first best becomes even more difficult. The reason for the lower range of discount factors compatible with the first best has to do with out of equilibrium behavior. With a credible balanced budget rule, a politician's alternative to seeking reelection is to spend as much as possible today (and not being in office next period), but the benefit of such a strategy is limited by borrowing constraints. The future balanced budget rule limits first period borrowing to second period tax revenues. By contrast, without credible rules a politician in the first period can afford higher spending through borrowing tax revenues from second and third (all future) periods. This forces voters to tolerate more debt today even when the politicians seeks reelection. In fact, the range of discount factors consistent

with the first best is the same as when no balanced budget rule is in place. Hence, in the limiting case where tax revenues are large relative to benefits of holding political office the first best becomes out of reach.

What is somewhat surprising is that the above result does not rely on the identity of who decides on the continuation of the balanced budget rule (voters of politicans)[2]. Even when voters decide on the continuation the first best is not reachable in the limiting case. While the preferences over continuation of the balanced budget rule differ between politicians and voters in general, these differences are immaterial when it comes to implementing the first best. The reason is that the political agency problem in the first period, and thus prior to the possible introduction of the balanced budget rule, causes a binding constraint regardless of who decides on the continuation of the reform.

The paper is related to the now classic literature on the political economy of the budget deficit. Alesina and Tabellini (1990) explain why a balanced budget is desirable ex ante from the voters' perspective, but not a political equilibrium outcome due to diverging interests among voters. Persson and Svensson (1989) show why a conservative politician, who tends to like little spending, may run a larger budget deficit when his successor may come from a different party than when he continues to be in office, thereby focusing on the conflict of interest among different governments. By contrast, I focus here on the political agency conflict between voters on the one hand and the incumbent politican on the other hand, which plays out repeatedly over time.

The plan of the paper is as follows. In section 2 I introduce the general model setup and characterize the equilibrium partially. Section 3 is devoted to the analysis of a credible balanced budget rule, while section focuses on the situation where the budget rule is not credible. In both of these sections the analysis is concerned with the possibility of reaching the first best. In section 5 expand the analysis and consider second best analysis. Section 6 concludes.

[2]Both scenarios may have some merit. In the case of Germany, the balanced budget rule is anchored in the consitution, which can be changed with a two thirds majority in two houses. Formally, this is a decision by politicians, but it is clear that the requirement is higher than a normal majority decision. In addition, challenges in the constitutional court may occur if the balanced budget rule were discontinued in 2016/20.

2 The Model

Consider a small open economy which is populated by a representative voter/citizen (also referred to voters) and politicians. There are three periods, $t = 1, 2, 3$, where period 1 represents the time before a balanced budget rule may become effective (which happens in period 2). Voter lifetime utility is

$$u(g_1, g_2, g_3) = \ln g_1 + \ln g_2 + \ln g_3, \tag{1}$$

where g_t is public good spending in period t (for simplicity income and tax revenue are held constant throughout, so that the only focus is on the timing of government spending). Each period tax revenue is exogenously given at level R. Debt can be taken on in periods 1 and 2 and must be repaid in the next period. The interest rate is normalized to zero. Hence government budget constraints are

$$\begin{aligned} g_1 &= R - D_0 + D_1 \\ g_2 &= R - D_1 + D_2, \\ g_3 &= R - D_2, \end{aligned} \tag{2}$$

where $D_0 = 0$ by assumption. The borrowing and government saving is done in the international credit market. It is easy to see that the first best from the voter perspective is to have no debt, $D_1 = D_2 = 0$, and hence equal public good spending across time, $g_1 = g_2 = g_3 = R$. A balanced budget rule (BBR) in period t, which is defined as $g_t = R - D_{t-1}$, implements the first best when implemented at beginning of period 1, as $D_1 = D_2 = 0$. The first best may not be implementable, however, as politicians who make debt choices have diverging preferences. In addition the balanced budget rule may start only in period 2.

A politician's utility in any period v_t is government spending in that period plus any fixed benefit r when reelected. A politician has zero utility when not in office. Politicians have a preference for spending today rather than tomorrow, and discount future utility at rate $\delta \in (0, 1]$. While in the analysis below the reelection process is explicitly considered, there might be other exogenous reasons why politicians are less patient than voters. For example, the discount factor could be interpreted as the probability that the politician's party removes the politician from its party or a scandal involving the candidate himself forcing him or her

to step down after reelection. A politician has lifetime utility

$$v = \sum_{t=1}^{3} \delta^{t-1}(g_t + r_t), \tag{3}$$

where $r_t = r$ if in office in period t and $r_t = 0$ otherwise. The politician in period 1 is the incumbent and hence we can ignore r_1 in the following. When a politician is not reelected, another otherwise identical politician is randomly selected from the set of politicians.

The game's timing of event is as follows. There are three periods, as mentioned before. Within periods actions are taken by politicians and voters:

In period 1, i) voters set their reservation utility $\overline{u}_1 = \ln(R + D_1)$, which is the maximum (!) utility for period 1 that voters are willing to tolerate in order to reelect the incumbent politician; ii) then the incumbent politician chooses D_1, and iii) voters decide on reelection of politician based on i) and ii).

At the beginning of period 2, the balanced budget rule kicks in (credible rules) or its continuation is decided upon (noncredible rules). Then the steps i) to iii) from period 1 are repeated, with D_2 replacing D_1.

In period 3 no further action is taken, as only the public good is provided based on the debt decision in period 2.

Notice that there is a one to one correspondence between reservation utility and debt choice, which will be exploited frequently below.

2.1 Solving the Model: Periods 2 and 3

The game is solved by backward induction. I consider first the case with a balanced budget rule (BBR) which becomes effective in period 2. In period 3 there is no choice to be made, $g_3 = R$ and in period 2 $g_2 = R - D_1$. There is nothing what voters can do about influencing politician behaviour by setting reservation utility in period 2, as debt $D_2 = 0$ by assumption. I therefore assume that the politician is reelected. Note that nonnegative public good provision in period 2 requires $D_1 \leq R$.

Interim utility for voters, when viewed from the beginning of period 2, equals $u_{23} = \ln(R - D_1) + \ln R$, whereas the politician gets $v_{23} = R - D_1 + \delta(R + r) = (1 + \delta)R - D_1 + \delta r$.

Next comes the analysis of the case when no balanced budget rule is in place at the beginning of period 2. Consider a politician forgoing reelection. His interim utility in period 2 is $v_{23} = R - D_1 + D_2$ subject to $g_3 = R - D_2 \geq 0$ or $D_2 \leq R$ (and $g_2 \geq 0$). Because of discounting the optimal choice for the politician is $D_2 = R$, giving the politician utility $v_{23} = 2R - D_1$. In this case the voter obtains utility equal to minus infinity as $g_3 = 0$ (while $g_2 > 0$).

In order to avoid this outcome the politician must be given under reelection at least as much as under no reelection, that is $2R - D_1$. With reelection the politician gets $v_{23} = (1 + \delta)R - D_1 + (1 - \delta)D_2 + \delta r$. Debt in period 2 must be at least equal to the value coming from indifference between reelection and no reelection, that is, $2R - D_1 \leq (1 + \delta)R - D_1 + (1 - \delta)D_2 + \delta r$, or

$$D_2 \geq D_2^{pol} = R - \delta r/(1 - \delta), \tag{4}$$

where *pol* refers to politician. Condition (4) is the reelection incentive constraint. D_2^{pol} is postive if and only if $\delta < R/(R + r)$, and holds if the rent to holding office is small relative to overall tax revenue. If D_2^{pol} were chosen, $g_3^{pol} = \delta r/(1-\delta) > 0$ and $g_2^{pol} = 2R - D_1 - \delta r/(1-\delta)$. The latter requires a restriction on first period debt, $D_1 \leq 2R_1 - \delta r/(1-\delta)$, in order to have nonegative public good provision in period 2.

I now move to the analysis of the setting of the reservation utility by voters. Given D_1 the (unconstrained from politician's reelection incentives) optimal debt from the voters perspective is the solution to the problem $\max_{D_2} \ln(R - D_1 + D_2) + \ln(R - D_2)$, which is

$$D_2^{vot}(D_1) = \frac{D_1}{2}, \tag{5}$$

where *vot* refers to voters. Note that (5) is rising in D_1, that is, the higher first period debt, the higher will be the voters' desired second period debt level. If second period debt is chosen according to (5), public good provision equals $g_3^{vot} = (2R - D_1)/2 = g_2^{vot}$, which are nonnegative if $D_1 \leq 2R$.

There are two candidates for D_2: the level necessary for a politican to seek reelection, D_2^{pol}, and the one preferred by the voter, D_2^{vot}. Since interim voter utility is strictly concave

in second period debt, voters set the reservation utility such that $D_2 = \max\{D_2^{vot}, D_2^{pol}\} = \max\{D_1/2, R - \delta r/(1-\delta)\}$. The *reelection constraint is said to be binding* if $D_2^{vot} < D_2^{pol}$, in which case voters must accept a higher debt level than they prefer otherwise in order to give the politician the proper incentives to seek reelection.

Let $\widehat{D}_1$ be the level of first period debt such that the two second period debt levels are the same, i.e., $D_2^{pol} = D_2^{vot}(\widehat{D}_1)$:

$$\widehat{D}_1 = 2\left(R - \frac{\delta r}{1-\delta}\right). \tag{6}$$

Note that $\widehat{D}_1$ is consistent with g_2^{pol} and $g_2^{vot} = g_3^{vot} > 0$ (g_3^{pol} is positive in any case). From here follows that the politician is better off by going for reelection and choosing D_2 according to the maximum of $\{D_2^{vot}, D_2^{pol}\}$, which gives the politician $v_{23} = (1+\delta)R - D_1 + (1-\delta)\max\{D_2^{vot}, D_2^{pol}\} + \delta r$ and voters $u_{23} = \ln(R - D_1 + \max\{D_2^{vot}, D_2^{pol}\}) + \ln(R - \max\{D_2^{vot}, D_2^{pol}\})$. From the debt choice follows the corresponding reservation utility by inserting D_2 into $\overline{u_2} = R - D_1 + D_2$.

Lemma 1 *(Period 2 and 3 equilibrium under no balanced budget rule).* Assume that first period debt D_1 is given and no balanced budget rule was chosen at the beginning of period 2.

a) When $D_1 < \widehat{D}_1$, the reelection constraint in period 2 is binding ($D_2^{vot} < D_2^{pol} = D_2 = R - \delta r/(1-\delta)$) and public good levels are $g_2 = g_2^{pol} = 2R - D_1 - \delta r/(1-\delta) > 0$ and $g_3 = g_3^{pol} = \delta r/(1-\delta) > 0$.

b) When $D_1 \geq \widehat{D}_1$, the reelection constraint in period 2 is not binding ($D_2^{vot} \geq D_2^{pol}$) and $g_2 = g_3 = (2R - D_1)/2$.

Note that the requirement for nonnegative public goods is fulfilled under b) when $D_1 \leq 2R$. In case a) the requirement is always fulfilled.

3 Credible Rules

In this section I assume that the balanced budget rule to be started in period 2 is exogenously given prior to period 1, which means that the budget rule is credible by assumption. I consider two cases: first where a balanced budget rule is credibly enforced, and then where no such rule is imposed.

Consider first the situation where a balanced budget rule was implemented for period 2. I can directly go to the analysis of period 1. When the politician does not go for reelection, the politician's utility is $v = R + D_1$, which is increasing in D_1. When the BBR is credibly enforced, the politician can at most choose a first period public debt level that leaves nonnegative public goods in subsequent periods, hence $D_1 \leq R$, as no one is willing to hold debt in excess of R. The no reelection strategy thus gives the politician $v = 2R$. Alternatively, seeking reelection gives the politician $v = R + D_1 + \delta(R - D_1 + r) + \delta^2(R + r)$. There is no further choice in period 2, so utility for the politician is fixed once reelected in period 1. To keep the politician interested in reelection first period public debt must satisfy

$$D_1 \geq D_{1,B}^{pol} = \frac{R(1 - \delta - \delta^2) - \delta r(1 + \delta)}{1 - \delta}, \tag{7}$$

where subscript B stands for balanced budget rule.

Voters may want more or less debt than (7) in period 1? Given that a balanced budget is followed subsequently the voters' (politically unconstrained) optimal debt in period 1 is zero, as this implements the first best. The actual choice of first period debt is then

$$D_1 = \max\{D_{1,B}^{pol}, 0\}. \tag{8}$$

Setting the right hand side of (7) equal to zero and solving in terms of δ gives the critical discount factor at which the reelection constraint becomes binding. The following result is then immediate:

Proposition 1. The first best is implemented under a credible balanced budget rule effective in period 2 if and only if the politician's discount factor satisfies

$$\delta \geq \delta^* := -0.5 + \sqrt{0.25 + R(R + r)^{-1}} \geq 0. \tag{9}$$

An interesting special case is obtained when the tax revenue R is large relative to the rent of holing office r, so that $R/(R+r)$ converges toward 1. For this situation δ^* equals approximately 0.62. While the first best can be secured even when politicians discount future benefits more than voters, the balanced budget rule introduced in period 2 reduces efficiency substantially.

Consider next the case where there are no restrictions on debt in period 2. When the politician does not seek reelection in period 1, first period public debt is now constrained by $2R$, as shown in Lemma 1, in order to have nonnegative public goods supplies in period 2 and 3. No reelection thus gives the politician $3R$ which is more than under the balanced budget rule, where the no reelection strategy gives only $2R$. Alternatively, seeking reelection the politician obtains $v = R + D_1 + \delta(R - D_1/2 + r) + \delta^2(R - D_1/2 + r)$. Setting the two expressions equal, the incentive constraint for reelection in period 1 is that D_1 fulfills

$$D_1 \geq D_{1,N}^{pol} = 2\left(R - \frac{\delta r(1+\delta)}{2-\delta-\delta^2}\right). \tag{10}$$

Voters may want more or less than this debt level. To find out differentiate voter utility with respect to D_1, and take into account Lemma 1. The first order condition is

$$\frac{du}{dD_1} = \frac{1}{R+D_1} - \begin{cases} \frac{1}{2R-D_1-\frac{\delta r}{1-\delta}} & \text{if} \quad D_1 < \widehat{D}_1 \\ \frac{2}{2R-D_1} & \text{if} \quad D_1 \geq \widehat{D}_1 \end{cases} \tag{11}$$

It is straightforward to show that the derivative - when evaluated at $D_1 = \widehat{D}_1$ - is increasing in first period debt if $\delta > R/(R+r)$, and decreasing when the reverse holds. When δ is sufficiently large for (11) to be positive at $\widehat{D}_1$, the first order condition gives an (politically unconstrained) optimal first period debt level of $D_1^{vot} = 0$, while for small δ first period debt D_1 is $D_1^{vot} = 0.5(R - \delta r/(1-\delta))$. Note that the letter is positive whenever $\delta < R/(R+r)$. This gives

Proposition 2. When no balanced budget rule for period 2 is imposed, the first best is implemented if and only if

$$\delta \geq \delta^{**} := -0.5 + \sqrt{0.25 + 2R(R+r)^{-1}} \geq 0. \tag{12}$$

Proof: First period public debt is $D_1 = \max\{D_{1,N}^{pol}, D_1^{vot}\}$. The first best requires $D_1 = D_2 = 0$. For $\delta < R/(R+r)$, first period debt is positive, as $D_1^{vot} > 0$, and hence the

first best cannot be achieved. When $\delta \geq R/(R+r)$, the first best is implemented when $D_{1,N}^{pol} \leq D_1^{vot} = 0$ and $D_2^{pol} \leq 0 = D_2^{vot}$. The last inequality condition holds because the reelection constraint in period 2 is not binding by the assumption on δ and the optimal second period public debt from the voter perspective is $D_2 = D_1/2$, which is zero when first period debt is zero. Hence, all conditions for the first best are fulfilled when $D_{1,N}^{pol} \leq 0$, which is equivalent to condition (12).

Proposition 3. A credible balanced budget rule starting at the beginning of period 2 implements the first best for a larger range of politician's discount factors than if no such rule is imposed.

The proof follows by comparing δ^* and δ^{**}.

The difference between the two situations comes from out of equilibrium behavior. With a balanced budget rule firmly in place, the option of foregoing reelection is less attractive for a politician than when a bigger deficit could be run under no such rule. Note that in the limiting case of a small rent of holding office relative to tax revenues, δ^{**} converges to 1, thus making the first best impossible to implement under the absence of a balanced budget rule.

4 Noncredible Rules

In contrast to section 3 I assume now that a balanced budget rule is set as default for the beginning of period 2, but the continuation of that rule is subject to choice at the beginning of period 2. There is thus an additional decision and I analyze both the case where the politician decides and the case where the voters choose.

4.1 Continuation of the Balanced Budget Rule - Period 2 Analysis

From the *politician*'s perspective the continuation of the BBR is better if and only if

$$v_{23}^B = (1+\delta)R - D_1 + \delta r \geq (1+\delta)R - D_1 + (1-\delta)\max\{D_2^{vot}, D_2^{pol}\} + \delta r = v_{23}^N, \quad (13)$$

which is equivalent of saying that $D_2 = \max\{D_2^{vot}, D_2^{pol}\} \leq 0$. Note that this is impossible if either $D_1 \geq 0$, as then $D_2^{vot} \geq 0$ (see (5)), or $D_2^{pol} \geq 0$ which holds when $\delta \leq R/(R+r)$ (see (4)).

Lemma 2 *(Politician's choice on continuation).* Given D_1, a politician prefers the continuation of the balanced budget rule at the beginning of period 2 if and only if $D_1 \leq 0$ *and* $\delta \geq R/(R+r)$. In this case $D_2 = \max\{D_2^{vot}, D_2^{pol}\} \leq 0$.

A direct implication of Lemma 2 is that the politician prefers no balanced budget rule if either $D_1 > 0$ *or* $\delta < R/(R+r)$. In words, the politician prefers BBR if he values the future benefits of holding office very strongly, and no debt was inherited from period 1.

What if *voters* were to decide on the continuation? Voter utility under BBR is

$$u_{23}^B = \ln(R - D_1) + \ln R, \tag{14}$$

while under no such rule it is

$$\begin{aligned} u_{23}^N &= \ln(R - D_1 + D_2) + \ln(R - D_2) \\ &= (R - D_1 + \max\{D_2^{vot}, D_2^{pol}\}) + \ln(R - \max\{D_2^{vot}, D_2^{pol}\}). \end{aligned} \tag{15}$$

Utilities are equal, given D_1, if $D_2 = 0$. It is obvious that whenever second period debt D_2 is equal to $D_2^{vot}(D_1)$, then by definition not keeping a balanced budget rule is weakly better. Notice as well that u_{23}^N is strictly concave in D_2 and approaches minus infinity if D_2 approaches R, as then public good provision in period 3 approaches 0.

There are two solutions to the equality of (14) and (15), namely $D_2 = 0$ and $D_2 = D_1$. Strict concavity and the fact that u_{23}^N is approaching minus infinity at $D_2 = R$, imply that no balanced budget rule is preferred by voters for $D_2 \in \{D_1, 0\}$ when $D_1 < 0$ and for $D_2 \in \{0, D_1\}$ when $D_1 \geq 0$. Outside the respective interval BBR is preferred.

Lemma 3 *(Voter's choice on continuation).* At the beginning of period 2 the voters' choice to continue or abandon the balanced budget rule is as follows:

a) When $D_1 < 0$, the voters prefer the balanced budget rule if and only if $\delta \leq R/(R+r))$, which implies $D_2^{pol} \geq 0$.

b) When $D_1 = 0$, the voters (weakly) prefer the balanced budget rule.

c) When $D_1 > 0$, the voters prefer the balanced budget rule if and only if $\delta \leq (R - D_1)/(R - D_1 + r))$, and implies $D_2^{pol} \geq D_1$.

Lemma 3c follows from the observation that the condition on δ is equivalent to $R - \delta r/(1-\delta) \geq D_1$, so that $D_2^{pol} = R - \delta r/(1-\delta) \geq D_1$ implies a preference for the balanced budget rule. Case b is the leading candidate for an implementation of the first best.

A comparison of Lemmas 2 and 3 shows that $D_1 \leq 0$ is a necessary condition for a politician to prefer BBR. In that case, however, politician and voter differ as to the additional condition for BBR to be optimal. While the politician need a high discount factor, the voter does only when the discount factor is low.

Note also that the threshold discount factor for voters to prefer BBR is lower when $D_1 > 0$ than with $D_1 < 0$.

4.2 Period 1 Analysis

Now comes the analysis of period 1 and the choice of first period debt D_1. Here the analysis depends on who decides on the continuation of the balanced budget rule.

Assume first that the politician makes that decision. If the politician forgoes reelection in period 1 his utility is $v = R + D_1$, which is increasing in D_1. From Lemma 2, the politician prefers no BBR if $D_1 > 0$. Hence in maximizing $v = R + D_1$ the restriction on D_1 comes from the constraint that public goods must be nonnegative, which given Lemma 1 is easier the higher is D_1. Hence the optimal choice by politician forgoing reelection is $D_1 = 2R$ and his total utility is then $v = 3R$. This outcome is not desirable by voters, as no public goods are provided in periods 2 and 3 (Lemma 1b). The high debt level D_1 implies that abandoning the BBR is forced in period 2.

Next consider that the politician seeks reelection.

Case 1. Assume that upon reelection in period 1 the balanced budget rule is optimal from the viewpoint of the politician in period 2, given D_1. This requires $D_1 < 0$ and a sufficiently high δ (Lemma 2). In that case, the politician obtains when reelected in period 1 $v = R + D_1 + \delta(R - D_1 + r) + \delta^2(R + r) = R(1 + \delta + \delta^2) + D_1(1 - \delta) + \delta r(1 + \delta)$, and assuming he is reelected also subsequently. Setting this equal to $3R$ (no reelection), the restriction on first period debt is that D_1 must fulfill

$$D_1 \geq D_{1,B}^{pol} = \frac{R(2 - \delta - \delta^2) - \delta r(1 + \delta)}{1 - \delta}, \tag{16}$$

where the subscript B stands for continuation of the balanced budget rule. The term (16) is negative if $R < \delta r(1 + \delta)/(2 - \delta - \delta^2)$ or $\delta \geq \delta^{**} = -0.5 + \sqrt{0.25 + 2R(R + r)^{-1}}$. This threshold is the same level of the discount factor as given in Prop. 2 under the absence of a balanced budget rule. Note the difference to the case with credible rules, where under BBR the first period debt was restricted to be no more than R when the politician forgoes reelection. Here a politician who does not seek reelection can force the abandoning of BBR in period 2. In addition, a necessary condition for BBR to be optimal from the politician's perspective is $\delta > R/(R + r)$. It is easy to prove that the requirement that $D_{1,B}^{pol} \leq 0$, the reelection constraint, is the tighter condition.

Which first period debt level is chosen (subject to continuing with BBR) depends on voter preferences. Unconstrained optimal first period debt from the voter perspective is

$$D_1^{vot} = 0 \tag{17}$$

when BBR is continued, as this would implement the first best. (17) is greater than $D_{1,B}^{pol}$, which is negative by assumption of Case 1.

Lemma 4. Suppose $\delta \geq \delta^{**} = -0.5 + \sqrt{0.25 + 2R(R + r)^{-1}}$ (that is $D_{1,B}^{pol} \leq 0$). Then there exists a first-period debt level $D_1 = 0$ such that the politician is better off seeking reelection and choosing zero debt in the first period than forgoing reelection, and teh balanced budget rule is optimally chosen by the politician at beginning of period 2. In this case, the voter's first best is implemented.

Under the condition of Lemma 4 the first best is implemented and voters cannot do better by choosing a different reservation utility in period 1 (which induced the politician to abandon the balanced budget rule).

Case 2. With reelection in period 1 and a first period debt that induces the politician to abandon the balanced budget rule at the beginning of period 2 (which happens for sure if $\delta \leq R/(R+r)$, as shown in Lemma 2), and subsequent reelection in period 2, the politician obtains $v = R(1+\delta+\delta^2) + (1-\delta)(D_1 + \delta D_2) + \delta r(1+\delta)$. Setting this equal to $3R$ (no reelection), I obtain a condition on debt levels in periods 1 and 2 that must hold, and hence implicitly on the incentive constraint in period 1:

$$D_1 + \delta D_2 = \frac{R(2-\delta-\delta^2) - \delta r(1+\delta)}{1-\delta}. \tag{18}$$

It is straightforward to show that there exists no first period debt level $D_1 \leq \widehat{D}_1$, so that $D_2 = D_2^{pol}$, which solves (18). For $D_1 > \widehat{D}_1$, so that $D_2 = D_2^{vot} = D_1/2$, the solution to (18) is

$$D_{1,N}^{pol} = \frac{2[R(2-\delta-\delta^2) - \delta r(1+\delta)]}{(2+\delta)(1-\delta)} = 2R - \frac{2\delta r(1+\delta)]}{(2+\delta)(1-\delta)}, \tag{19}$$

where subcript N refers to no BBR. Note that public goods are nonnegative (Lemma 1b). Furthermore, the assumption of no BBR as the choice of the politician at beginning of period 2 is correct if $D_{1,N}^{pol} > 0$ were the first period debt choice.

The next question is whether voters want more debt than (19), that is, whether the reelection constraint is binding or not. The derivative of voter utility u with respect to D_1, and evaluated at $D_{1,N}^{pol}$, is positive (negative) if $D_{1,N}^{pol} < (>)0$. Hence first period debt $D_1 = \max\{D_1^{vot}, D_{1,N}^{pol}\}$.

To study the equilibrium level of first period debt consider the following properties of (19): i) $D_{1,N}^{pol}$ is decreasing in δ, ii) $D_{1,N}^{pol} > 0$ for $\delta = 0$, and iii) $D_{1,N}^{pol} < 0$ for $\delta \to 1$. Therefore there exists a critical discount factor, which is the solution to setting $D_{1,N}^{pol} = 0$, such that for δ less than this critical value the equilibrium debt is $D_1 = D_{1,N}^{pol} > 0$, while for higher discount factors the voters' optimal debt choice. The latter is the solution to the voters' first order condition, and is given by zero first period public debt (see (17)). In all cases first period debt is nonnegative which is consistent with a preference for abandoning BBR). The solution to $D_{1,N}^{pol} = 0$ is δ^{**}, as above.

Proposition 4. Assume that the *politician* decides at the beginning of period 2 whether the balanced budget rule is abandoned or not.

a) If $\delta \geq \delta^{**} = -0.5 + \sqrt{0.25 + 2R(R+r)^{-1}}$, then the balanced budget rule is part of the equilibrium and the first best is implemented, all debt levels are zero, and the politician is reelected in periods 1 and 2.

b) If $\delta < \delta^{**}$, the balanced budget rule is abandoned in period 2, $D_1 = D_{1,N}^{pol} > 0$, and public good levels are $g_1 = 3R - 2\delta(1+\delta)^2 r/(2-\delta-\delta^2), g_2 = g_3 = 2\delta(1+\delta)^2 r/(2-\delta-\delta^2)$.

The threshold level separating cases a and b in Prop. 4 is the same as the one introduced in section 3 when no balanced budget rule was in place. Hence, lack of credibility leads to the same outcome as far as the implementation of the first best is concerned. Case b is the "more likely" one if it is assumed that tax revenues are large relative to the rent of being in office.

Now assume *voters* decide in period 2 on the continuation of the balanced budget rule. Assume for the moment $D_1 > 0$. Then voters will choose the balanced budget rule if and only if $D_2^{pol} > D_1$, which by Lemma 3 is equivalent to $R - \delta r/(1-\delta) > D_1$ or $\delta \leq (R - D_1)/(R - D_1 + r))$. Because first period debt is positive the latter condition implies $\delta < R/(R+r)$.

A politician's utility when the balanced budget rule is continued, and upon reelection in period 1, is $R(1+\delta+\delta^2) + (1-\delta)D_1 + \delta(1+\delta)r$. If the politician sets $D_1 = 2R$ when forgoing reelection, first period debt D_1 must be at least $D_{1,B}^{pol}$ (as given by (16)). Is this possible? I check whether $D_{1,B}^{pol} < D_2^{pol}$ (necessary for the balanced budget rule to be continued), which is equivalent to $\delta^2 > R/(R+r)$. The latter however violates the condition $\delta < R/(R+r)$, as $\delta < 1$. It is easy to show that the same argument also applies when $D_1 < 0$ assumed initially.

When $D_1 = 0$, however, the voter always (weakly) prefers the balanced budget rule at the beginning of period 2 (Lemma 3). The first best is implementable if $D_{1,B}^{pol} \leq 0$, as $D_1^{vot} = 0$. The first period debt $D_{1,B}^{pol}$ is given by (16).

Proposition 5. Suppose voters decide at the beginning of period 2 about the continuation of the balanced budget rule. When $\delta \geq \delta^{**}$ the balanced budget rule is continued and the first best is implemented.

A comparison of Propositions 4 and 5 shows that the first best can be attained under the

same parameter restrictions regardless of who controls the decision at period 2. This seems surprising given that in general politicians and voters differ in terms of when they want to continue to the balanced budget rule (see Lemmas 2 and 3). The key point, however, is that the first best is a specific policy, which includes zero first period debt. Under $D_1 = 0$ voters always want to continue the balanced budget rule, and the politician as well if his discount factor is sufficiently large. The latter condition is implied by the requirement that the political reelection constraint in the first period is sufficiently weak ($D_1^{pol} \leq 0$) and thus there is no actual difference between voters and politicians deciding on the continuation of the balanced budget rule.

5 Concluding Remarks

In this paper I have analyzed the economic effects of a lagged balanced budget rule when voters and politicians disagree on the timing of government spending. The focus on a political agency problem does not imply that political conflicts among citizens, like in Tabellini and Alesina (1990), or among present and future governments, like in Persson and Svensson (1989), are irrelevant for understanding budget deficits. Rather the emphasis is on the shortsightedness of politicians and thus complements those other analyses of budget deficits. The new contribution of the present paper is to look at a lagged balanced budget rule, which is defined as the delay in the introduction of the new budget rule. It is the combination of the political agency problem with the delay in an otherwise first best rule that give rise to interesting dynamics, as decisions prior to the balanced budget rule become important.

I show that under a credible balanced budget rule the lag has some bite, that is, the first best is not implementable when politicians are not patient enough. Still the lagged rule has some benefit, as without the lagged rule the first best becomes more elusive, and in an important benchmark case impossible to reach. The latter is also true if the balanced budget rule is not credible and either the incumbent politician or the voters decide on its continuation. While politicians and voter differ in general about when to continue the balanced budget rule, the two groups are (almost) in line when first period debt is zero (which is the requirement for the first best). The overriding condition then is in both cases that the political reelection constraint in the first period, and thus prior to the introduction

of the balanced budget rule, is not too tight. Clearly, outside the first best it does matter who controls the continuation and this is a subject for further analysis.

The current setup captures in a nutshell the new German constitutional provisions regarding debt policies at the federal and state level, which will kick in 2016 and 2020 respectively. Given the high levels of debt in Germany and the time until the new rule becomes effective the credibility of the new rules will be challenged. The long period until implementation suggests also that the transition effects are not negligible. As many other countries also struggle with large amounts of debt and non-sustanainable budget deficits new constitutional constraints on debt are likely to be considered there as well. As emphasized in the introduction, political opportunism might lead those countries to delay the introduction of tighter constraints, which has substantial costs and benefits as argued in this paper.

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