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# POLITICAL UNCERTAINTY, PUBLIC EXPENDITURE AND GROWTH

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## Abstract

We focus on the link between political instability due to uncertain electoral outcomes and economic growth, through the impact on a government's decisions on how to allocate government expenditure between public consumption and investment. Using an endogenous growth model with partisan electoral effects, we demonstrate that political uncertainty will generate a steady-state equilibrium growth rate which is inefficient and too low. We also use a newly-constructed political data set to estimate panel regressions for several OECD economies over a period 1960-95. Our empirical evidence on the effects of political variables on tax and spending decisions supports our theoretical results.

Keywords: Endogenous growth, public consumption and investment, political uncertainty, panel regressions, OECD countries

JEL Classification: O41, H50, E61

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## 1. Introduction

There are a number of channels through which political instability can affect economic growth. One obvious channel is the impact which greater social unrest and political upheaval and revolution can have on incentives to invest. It is quite apparent that the lack of protection for property rights may harm prospects for private investment[1], and may reduce foreign direct investment in a country[2]. Similarly, in countries where rulers are weak and run the danger of being overthrown, policymakers might have an incentive to allow key groups to engage in rent-seeking activities, which may again harm economic growth[3]. There seems to be considerable empirical evidence that major political upheaval (as opposed to routine changes of governments that follow elections) and coups d'état can adversely affect economic growth (see Alesina *et al.*, 1996, Barro, 1996, and Easterly and Rebelo, 1993).

In modern democracies, where government changes are generally peaceful and follow constitutional norms, political instability may still have an impact on economic growth. The main mechanism at work in these models is through the impact of political instability on *government myopia*. This myopia occurs when forward-looking governments are not interested in carrying out long-term economic policies[4] because of uncertain re-election prospects. For instance, Svensson (1993) emphasises how governments may be less inclined to make improvements to the legal system. Calvo and Drazen (1997) show how policy uncertainty can distort the future path of investment

[1] For theoretical models in which the lack of enforcement of property rights affects growth, see Tornell and Velasco (1992) and Benhabib and Rustichini (1996). For a survey, see Persson and Tabellini (1998).
[2] See Rodrik (1991).
[3] See Murphy *et al.* (1991).
[4] The notion of policy myopia is quite common in political economy models. For alternative models of fiscal policy in which the incumbent has an incentive not to act in the social interest see Alesina and Tabellini (1990) and Milesi-Ferretti and Spolaore (1994). Peletier *et al.* (2000) shows that binding rules on deficits can reduce public investment to inefficient levels.

decisions. Devereux and Wen (1999) suggest that political instability encourages governments to run down the economy's asset base, with the result that future governments are more likely to raise capital taxation, and this depresses private investment. Persson and Tabellini (1998) build a 2-period model in which capital taxation is used to finance public investment, which drives economic growth and enhances the future tax base. In their model, public investment is valued less by an incumbent government if re-election is uncertain, because less of the economy's future tax revenues will be spent on the incumbent's preferred public goods. Hence political instability (a greater uncertainty of re-election for the incumbent) reduces public investment because it increases policy myopia.

Empirically, there seems to be some evidence in favour of a negative link between minor political instability (the frequency of changes in a government's political complexion) and economic growth (see Alesina *et al*., 1996, Perotti, 1996). However, this existing empirical evidence makes use of quite limited measures of political instability, and does not always focus on industrial democracies.

In this paper, we focus on the link between the political instability (due to uncertainty in electoral outcomes) and economic growth through the impact on a government's decisions on how to allocate government expenditure between public consumption and public investment. The value added of our contribution is the following. First, unlike existing two-period models of the impact of political uncertainty on growth (see Persson and Tabellini, 1998) we propose an infinite horizon model, and examine the dynamic interaction of an endogenous growth model with electoral turn-over. In existing models myopia generally arises because incumbent governments may not have access to the future benefits from current taxation and spending decisions which will accrue to their political constituency. In our model, government myopia

arises because of office motivation, so that an incumbent government will perceive a more limited political benefit from decisions taken now which only impact with a lag on consumer utility. Thus political uncertainty leads to a shift of government budgets from capital spending to current consumption. Thus, our focus is rather different from that of other authors, who have tended to concentrate on inequality, the enforcement of property rights, and public expenditures on different types of public goods. Our view is that the relationship between public investment and consumption is an important one in understanding the consequences for growth.

Second, unlike other attempts to model political uncertainty, we take into account of the preferences of consumers and how these affect the political equilibrium. We are therefore able to compare the stochastic steady-state growth equilibrium under political uncertainty with that which would prevail in the presence of an optimal social planner. This allows us to consider the welfare implications of political uncertainty.

Third, we use a newly-constructed data-set on measures of political uncertainty to provide empirical support for our theoretical model. Using data on a panel of 13 European economies, we find considerable support for our hypothesis that political uncertainty affects public investment decisions. The rest of this paper is structured as follows. In Section 2 we outline our theoretical model and its main results. In Section 3, we outline our empirical evidence. Section 4 concludes.

## 2. A Theoretical Model.

We develop an endogenous growth model in which government spending is a major determinant of growth. We assume a partisan-type political economy set-up in which two political parties alternate in power. The party in power implements taxation policies and allocates government expenditures between consumption, which directly increases

the current utility of consumers, and investment, which encourages future growth and impacts on consumers' utility in the future. Consumers are assumed to differ in their rate of time preference, with some benefiting more than others from future consumption.[5] Each party's political platform is given by the rate of time preference at which future benefits are capitalised. Consumers will therefore vote for the party that most closely represents their views, and an element of political uncertainty is introduced by assuming random voter turnout.[6]

Before outlining our model in detail, we summarise the key results that emerge. First, the presence of political uncertainty creates policy myopia. The two political parties always adopt policies which give rise to lower growth and a higher fraction of revenues spent on public consumption compared with consumers who share their rate of time preference. Second, a higher degree of political uncertainty has both negative and positive effects on the growth rate (via the tax policies chosen by the political parties). However, the net effect of increased political uncertainty is that it discourages growth and increases the share of government consumption. Third, the resulting equilibrium is generally inefficient, and makes the economy grow too slowly.

### *2.1 The Production and Government Sectors*

We assume a continuous-time model, in which the final output sector is perfectly competitive and there is no private capital[7]. The aggregate production function is:

[5] In a richer model one might want to explain the source of these differences in consumers' rate of time preference. These might arise because of the presence or absence of intergenerational links. Our conclusions, based on infinitely-lived consumers would still hold in a model with overlapping generations as long as there was some political uncertainty.

[6] This can be justified in terms of shifts in the composition and preference distribution of the electorate (see Alesina and Rosenthal, 1995).

[7] This assumption is not particularly restrictive and can be found in many endogenous growth models. It is assumed here because it makes the model analytically tractable, given that consumers have different rates of time preference.

$$Y_t = (A_t L)^a G_t^{1-a} \tag{1}$$

where $Y_t$ is final output (a numeraire), $L$ is the working population (which is normalised to one). Productivity is augmented through the flow of public investment, $G_t$ and the variable $A_t$, which captures a learning-by-doing effect. We assume that $A_t$ is proportional to the accumulation of output production per worker:

$$A_t = b\int_{-\infty}^{t} Y_s ds \tag{2}$$

where $b>0$ measures the degree of the learning-by-doing effect. From (2), increases in current output raise future productivity, so the flow public expenditure $G$ in (1) can be interpreted as a form of investment. Using (1) and (2), we have:

$$\frac{\dot{A}_t}{A_t} = \frac{bY_t}{A_t} = bx_t^{1-a} \tag{3}$$

where $x_t = G_t / A_t$.

The government taxes final output at a rate $0 < t < 1$, hence the first order condition of the profit maximisation of a competitive firm is

$$w_t = (1-t)a A_t x_t^{1-a} \tag{4}$$

where, $w$ is the wage rate. The government allocates a fraction $0 < q < 1$ of tax revenue to public investment $G_t$, and the remainder is used for public consumption, $Z_t$. Hence, government investment is rewritten as

$$G_t = qtY_t \quad \Rightarrow \quad qt = x_t^a \tag{5}$$

using (1), and public consumption is given by

$$Z_t = (1-q)tY_t = (1-q)t A_t \left(tq\right)^{(1-a)/a} \tag{6}$$

$Z_t$ is increasing in $t$ simply because a higher tax revenue means more expenditure. But it is non-monotonically related to $q$ due to the presence of $q^{(1-a)/a}$ which captures the

positive impact of government investment on output. As we shall see below, the policy parameters $t$ and $q$ will be determined endogenously by the political parties.

We can now derive the growth equilibrium. The production function implies that the growth rate, $g$ is:

$$g \equiv \frac{\dot{Y}_t}{Y_t} = \frac{\dot{A}_t}{A_t} + (1-a)\frac{\dot{x}_t}{x_t} \tag{7}$$

Note from (5) that $x_t$ is constant as long as $qt$ is fixed. Hence, the growth rate will jump whenever there is a (stochastic) change of government which causes a change in $q$ and $t$. During the period between two successive switches in the fiscal policy parameters, we have:

$$g = b(qt)^{(1-a)/a} \tag{8}$$

using (3), (5) and (7). This is the *economic* equilibrium condition.[8]

### *2.2 Voters Preferences and Behaviour*

Consumers differ in their rate of subjective time preference, $r$. This parameter summarises their political preferences: consumers with a lower $r$ give greater weight to future consumption and therefore tend to support a growth-oriented party. We assume that the distribution of preferences is such that $r \in [\underline{r}, \bar{r}]$ is continuously distributed with the distribution function $F(r)$.

The consumers' intertemporal utility function is given by:

$$U_t = \int_t^{\infty} e^{-r(s-t)} c_s^b Z_s^{1-b} ds \tag{9}$$

[8] Hence, the growth rate is monotonically increasing in the tax rate. As shown in Barro (1990), monotonicity no longer holds in the presence of physical capital accumulation.

where $c_s$ is the consumption of final output and $Z_s$ is the consumption of government services. In the absence of lending and borrowing, consumers will spend their wages in each instant on private consumption, i.e.

$$c_t = w_t = \alpha A_t (1-t)(qt)^{(1-\alpha)/\alpha} \tag{10}$$

where (5) is used. In (10), the term $(1-t)$ represents a distortionary effect of taxation, and $t^{(1-\alpha)/\alpha}$ captures the positive impact of public investment. Note that private consumption for *all* consumers is maximised at $t = 1-\alpha$. However, consumers are interested in future as well as current consumption, hence they generally prefer a higher tax rate than 1-$\alpha$. The more patient the consumers the higher their ideal tax rate.

Political parties differ in their fiscal policies, and consumers will generally vote for the party whose policy yields them the highest utility. Thus, we first characterise each consumer's ideal settings of $t$ and $q$ (and hence $g$). Substituting (6) and (10) into (9), and re-expressing the resulting equation using (8), we obtain

$$U_t(r,t,g) = \frac{A_t\left[\alpha(1-t)\right]^{\beta}\left[t-(g/\beta)^{\alpha/1-\alpha}\right](g/\beta)}{r-g} \tag{11}$$

where $r > g$ is assumed. From (11) we can obtain the first-order conditions[9] which implicitly determine the ideal fiscal policy for each consumer, given his/her value of $r$:

$$\frac{\partial U_t}{\partial t} = 0: \quad t = \beta(g/\beta)^{\alpha/1-\alpha} + (1-\beta) \tag{12}$$

$$\frac{\partial U_t}{\partial g} = 0: \quad \left\{\left[(1-\beta)\frac{\alpha}{1-\alpha}+1\right]\left(\frac{g}{\beta}\right)^{\alpha/(1-\alpha)} - t\right\}(r-g) = g\left[t-\left(\frac{g}{\beta}\right)^{\alpha/(1-\alpha)}\right] \tag{13}$$

These conditions represent the contemporaneous trade-off between private and public consumption, and the intertemporal trade-off between future and current private and public consumption. We can summarise these trade-offs by combining (12) and (13):

$$\underbrace{\frac{g^{a/(1-a)}}{1-a}}_{MC_r} = \underbrace{\frac{a}{1-a}\frac{g^{1/(1-a)}}{r} + b^{a/(1-a)}}_{MB_r} \tag{14}$$

Roughly speaking, the LHS of (14) shows the marginal cost to consumers, and the RHS the marginal benefit, of increasing the growth rate. We are now able to state:

**LEMMA 1** *(i) The consumers' ideal g is uniquely determined in (14), and (ii) an interior solution to (14) exists for* $r > b$.

**Proof**. Note that the LHS and RHS of (14) are monotonically increasing in *g*; also $(\partial MC_r / \partial g)/(\partial MB_r / \partial g) = r/g > 1$, which implies that the MC curve is always steeper than the MB curve for $g \in (0, r)$ (as shown in Figure 1). Moreover, $MB_r - MC_r = b^{a/1-a} > 0$ at $g = 0$ and $MC_r - MB_r = (r/b)^{a/1-a} - 1$ at $g = r$. Therefore a unique interior solution exists for $(r/b) > 1$. ð

**[Figure 1 here]**

Note that the equilibrium is "stable" as the MB curve cuts the MC curve from above.

We can now define the relationship between the consumers' rate of time preference and their preferred fiscal policies (and growth rate):

**LEMMA 2** *The Consumers' ideal t, q, and g are characterised by the following functions:*

$$g = g(r), \quad g' < 0 \tag{15}$$

$$t = t(r), \quad t' < 0 \tag{16}$$

$$q = q(r), \quad q' < 0 \tag{17}$$

**Proof.** In Figure 1, a higher value of $r$ shifts down the $MB_r$ curve, leading to a lower growth rate. In addition, from (12) we know that *g* and $t$ are positively related. Moreover, using (8), equation (12) can be rewritten as:

$$q = \frac{1}{b}\left[1 - \frac{(1-b)}{t}\right] \tag{18}$$

so that $t$ and *q* are also positively related as long as $t > 1 - b$, which we assume to be true.[10] ð

[9] The second-order conditions are assumed to be satisfied.

[10] This assumption makes sense and is required for an interior solution, given the Cobb-Douglas form of the instantaneous utility function, as otherwise it would imply that the elasticity of utility with respect to public consumption would be so great as to swamp the benefits from greater public investment. Consumers would then prefer to allocate no resources at all to public investment.

An important implication of Lemma 2 is that consumers are distributed along the $\underline{M}\overline{M}$ line in Figure 2 according to an appropriately transformed distribution function of $F(r)$ (*M* stands for policy mix). The ideal policy mix of the most impatient consumers ($\bar{r}$) is given by $\underline{M}$, and similarly $\overline{M}$ is the best policy pair for the most patient consumers ($\underline{r}$). In general, we can draw a set of indifference curves for different consumers as defined by (11). In the figure two indifference curves are drawn for consumers located at $\widetilde{M}$ (the solid one) and at *M'* (the dotted one). Obviously, the closer they are to $\widetilde{M}$ or *M'*, the better off they are.

**[Figure 2 here]**

*2.3 Political Parties, Political Uncertainty and Policies*

We assume that there are two political parties, whose political platforms are summarised by their rate of time preference with $r_H$ for party *H* and $r_L$ for party *L* such that $r_H > r_L$. We follow the standard political economy literature on partisan models by assuming a majoritarian system, where the incumbent party has total control on fiscal policy[11]. Taking the policy mix $(t_i, g_i)$ chosen by the political parties as given, consumers will decide whether to vote for party *H* or *L*.

Party *L* is relatively more 'growth-oriented' than party *H* in that it gives greater weight to future outcomes ($r_H > r_L$). In fact, it is possible for a 'policy reversal' to take place, whereby party *H* delivers a higher growth rate along with a higher tax rate, $g_H > g_L$ and $t_H > t_L$. This case is analysed in the Appendix, and does not alter the key

[11] One potential extension of our model, which we do not explore here for reasons of space, is that the minority party may also have some control on fiscal policy through a bargaining framework (see for example Rogoff, 1990).

results of the paper. To facilitate our exposition, we will continue to focus on the case where $g_H < g_L$.[12]

Now suppose that points $M_L$ and $M_H$ in Figure 2 represent the policy mix chosen by parties *L* and *H*, respectively. Then, we can define the threshold consumers who are indifferent between supporting party *H* and party *L*. Suppose that they have the rate of time preference $\tilde{r}$, so that

$$U_t\left(\tilde{r}, t_L, g_L\right) = U_t\left(\tilde{r}, t_H, g_H\right) \tag{19}$$

This is depicted in Figure 2 where $M_L$ and $M_H$ lie on the same indifference curve of the consumers whose ideal policy mix is $\widetilde{M}$. Moreover, note that $M_L$ is always located northeast of $M_H$. Also note that as $r$ rises/falls, the indifference curve drawn for a given level of welfare moves down/up along the $\underline{M}\overline{M}$ line. For example, the dotted indifference curve is for consumers whose optimal policy bundle is at *M'* with their $r$ being lower than $\tilde{r}$. They prefer party *L*'s policy mix $M_L$ to $M_H$. It should now be clear that voters with a higher value of $r$ will vote for party *H* and those with a lower value of $r$ will vote for party *L*.

In this class of majoritarian political economy models, the median voter determines the winning party in the election. Political uncertainty is introduced by assuming random voter turnout (see Alesina and Rosenthal, 1995). The distribution of consumers who actually vote alternates stochastically between the two states. In one state, the distribution function of *voters* is given by $F_l(r)$, and it changes to $F_h(r)$ in another state. We use $r_l$ and $r_h$ to denote the rates of time preference of the median

[12] This assumption is not crucial for our key results, but it simplifies the exposition of the model.

voters associated with each distribution function, i.e. $F_l(r_l) = F_h(r_h) = 1/2$. The only condition that we impose on the distribution functions is[13]:

$$r_l < \tilde{r} < r_h \tag{20}$$

Figure 3 illustrates the possible form of the density functions associated with these distribution functions.

**[Figure 3 here]**

Because of the random voter turnout, the number of voters who support each political party changes. The measure of consumers who will vote for party *L* and *H* is denoted by $N_L$ and $N_H = 1 - N_L$, respectively. Since consumers with $r < \tilde{r}$ vote for party *L*, we have $N_L = F_j(\tilde{r})$, *j=l,h*. Given (20), when voters are distributed according to $F_l(r)$, the number of party *L* supporters is $N_L = F_l(\tilde{r}) > F_l(r_l) = 1/2 > N_H$. When the distribution is given by $F_h(r)$, we have $N_L = F_h(\tilde{r}) < F_h(r_h) = 1/2 < N_H$. Hence, the two parties will alternate in power. Party *L* will win the election in the state with $F_l(r)$, and party *H* will win in the state with $F_h(r)$.

We model the degree of political uncertainty by assuming a Markov process for the stochastic change between the two distribution functions:

$$F_l(r) \to F_h(r) \text{ with a flow probability } \quad h$$
$$F_h(r) \to F_l(r) \text{ with a flow probability } \quad l$$

Note that by setting $h = l$ we have a similar situation to one in discrete time where both parties have an equal chance of being elected. An increase in these flow probabilities will increase the degree of political uncertainty because it will lead to a greater number of government changes.

[13] It does not matter if there is a shift in either of the supports of the distribution.

Next we turn our attention to the incentives faced by each party in deciding on its policy mix. Elections are assumed to take place at each instant[14]. Each party maximises the sum of the utility functions of its supporters, i.e. their instantaneous pay-off is $N_i c^b Z^{1-b}$. We also assume that each party is office-motivated, in that it gains a *zero* pay-off when out of office.[15] We can now write down the Bellman equations for party $i=H,L$:

$$V_i(A) = \max_{t,g}\left\{N_i c_t^b Z_t^{1-b} dt + (1-r_i dt)\left[V_i(A+gAdt)(1-p_i dt) + \hat{V}_i(A+gAdt)\,p_i dt\right]\right\} \quad (21)$$

where $V_i(A_t)$ is the value function which party *i* achieves when it is in office, and $\hat{V}_i(A_t)$ when it is out of office, and $p_i$ is defined as the flow probability of losing the current election, given that the party is in office (i.e. $p_L = h$ and $p_H = l$). In (21), party *i* gains utility $N_i c_t^b Z_t^{1-b}$ during interval *dt*. But during this time interval, the technological level of the economy will have improved by $gAdt$, which enters the value function at the end of the time interval. At that time, party *i* will still be in office with a probability of $(1-p_i dt)$, achieving $V_i(A+gAdt)$, or will lose the election with a complementary probability $p_i dt$, attaining $\hat{V}_i(A+gAdt)$.

Given an infinite horizon, a party which loses office will always expect to return to office at some future date and its current policies will therefore have an impact on

[14] As noted previously our conclusions would not be affected by considering a discrete-time version of the model in which elections are held in every period. Our continuous-time set-up merely makes the analysis of our endogenous-growth model easier.

[15] There are different ways of introducing office motivation in a political party's pay-off function (see Rogoff, 1990, Persson and Tabellini, 1990, 1998). In models where elections have a disciplining effect on incumbent governments, one can introduce office motivation as a fixed benefit from being in office, or fixed cost from being out of office. However, our purpose here is to show how policy myopia can arise in a partisan model, and policy myopia effects will emerge as long as the political benefits to a party from being in office are related to the policy actions taken. Thus, for instance, our results would still hold in a model where each party derives some benefit from the policies undertaken by other governing parties, as long as the benefits it receives when in office depend in some measure on the utility of those who elected them. Of course assuming a non-zero pay-off for each party when it is out of office involves a considerable increase in analytical complexity.

future pay-offs even after losing an election. This must be taken into account in computing $\hat{V}_i(A)$ in (21). We can determine $\hat{V}_i(A)$ using the following recursive equation:

$$\hat{V}_i(A) = (1 - r_i dt)\left[\hat{V}_i(A + gAdt)(1 - q_i dt) + V_i(A + gAdt)q_i dt\right] \tag{22}$$

where $q_i$ ($q_L = l$ and $q_H = h$) is each party's flow probability of winning the current election if they are out of office. When party *i* is not in office, at the end of time interval *dt* it will lose the next election with probability $(1 - q_i dt)$, attaining $\hat{V}_i$, or will win the election with a complementary probability $q_i dt$, attaining $V_i$.

In order to determine their equilibrium fiscal policies, the two parties maximise the RHS of (21), holding $\hat{V}_i$ as given. The first-order conditions are:

$$t_i = b\left(\frac{g_i}{b}\right)^{a/1-a} + 1 - b \tag{23}$$

$$V_i^{'}(A) = \frac{y\,N_i}{b}\left(\frac{g_i^{a/1-a}}{1-a} - 1\right) \tag{24}$$

where *i*=*H*,*L* and $y \equiv (ab)^b (1-b)^{1-b}$.

We can compare the chosen policies of the two parties (23) and (24) with the ideal tax and growth policies of consumers with the same rate of time preference (equations (12) and (13)). Whilst (23) is identical to (12), (24) differs from (13). Hence the fiscal policies of each party do not match those of consumers with the same political stance (time preference). We return to this point below.

### *2.4 The Stochastic Steady State Growth Equilibrium under Political Uncertainty*

We are now in a position to solve for the stochastic steady-state equilibrium.

**PROPOSITION 1** *The growth rates determined by political party i, i=L,H, are defined by*

$$\underbrace{\frac{g_i^{a/(1-a)}}{1-a}}_{MC_i} = \underbrace{\frac{a}{1-a}\frac{g_i^{1/(1-a)}}{r_i+\Gamma_i(g_i)}+b^{a/(1-a)}}_{MB_i} \qquad \text{(G)}$$

where $\Gamma_i(g_i)=\dfrac{p_i(r_i-g_i)}{q_i+r_i-g_i}$, $p_L=q_H=h$ and $p_H=q_L=l$ .[16]

**Proof.** The equilibrium is characterised by $V_i(A)=V_i^o A,\ i=H,L$, so that (24) is rewritten as $V_i^o=\dfrac{y\,N_i}{b}\left(\dfrac{g_i^{a/1-a}}{1-a}-1\right)$ where $V_i^0$ is the initial value. Letting $dt\to 0$ in the Bellman equations (21) and (22), and rewriting the resulting equations with the above conditions gives rise to (G).ð

Condition (G) shows the marginal costs and benefits of increasing the growth rate to each party, and exactly parallels equation (14), which showed the voters' preferred growth rate. Unlike the consumers' ideal choice for *g*, the political parties' decisions are affected by the additional term $\Gamma_i(g_i)$, *i=L,H*: this captures the *policy myopia* created by political uncertainty. Before discussing the policy myopia effect in detail, we first establish the following proposition:

**PROPOSITION 2** *(i) The growth rate generated by party i's fiscal policies is uniquely determined in (G) and (ii) and interior solution to (G) exists for r>b.*

**Proof**. First note that the only difference between (G) and (14) lies in $\Gamma_i(g_i)$. Also note that $\Gamma_i'(g)<0$, so that $MB_i$ is monotonically increasing in $g\in(0,r)$. In addition, $\Gamma_i(g)>0$ for $g\in(0,r)$ and $\Gamma_i(g)=0$ at $g=0$ and $g=r$ . Hence, as Figure 4 shows, the $MB_i$ curve is located entirely below the $MB_r$ curve associated with (14), except for $g=0$ and $g=r$ where they coincide. Hence, given Lemma 1, a unique interior solution exists for $r>b$. ð

**[Figure 4 here]**

The policy myopia effect in (G) results from the presence of political uncertainty. The two parties essentially use an uncertainty-adjusted discount rate,

[16] Note that (G) is independent of (i) the number of consumers who vote for the parties (i.e. they do not care about the extent of loss/win of the election) and (ii) the political platform of the other party (e.g. $g_L$ is not affected by $r_H$ ). This is due to the simplifying assumption that the political parties get zero payoffs when out of office.

$r_i + \Gamma_i(g)$ which is higher to that of consumers with the same rate of time preference. Figure 4 shows that the growth rate chosen by party *i* is not identical to the ideal *g* chosen by consumers who share the party's political preferences. The knowledge that party *i* will lose office at some stage in the future creates this short-sightedness in policy. As regards the tax rate and the proportion of tax revenue spent on government consumption, the results are summarised in (ii) and (iii) of the following proposition:

**PROPOSITION 3** *Political parties always set policies such that (i) the growth rates are lower, (ii) taxes are lower and (iii) the fraction of tax revenue spent on public consumption is higher than would be chosen by consumers with the identical rate of time preference.*
**Proof**. (i) is apparent from Figure 4. (ii) is clear from (12) and (23). (iii) is due to (8).ð

Policy myopia manifests itself as fiscal policy biased towards government consumption and against growth. The magnitude of the bias depends on the degree of political uncertainty. Consider party *L*: a higher flow probability of losing office (i.e. $p_L = h$) increases the myopia term, $\Gamma_L$, and the $MB_L$ curve shifts downward in Figure 4, reducing $g_L$. Similarly, an increase in $p_H = l$ causes party *H* to reduce $g_H$. This result is formally stated as follows:

**PROPOSITION 4** *If the probability of losing election rises, the incumbent political parties (i) reduce the growth rate, (ii) decrease the tax rate, and (iii) increase the proportion of public consumption.*
**Proof**. See Proposition 3.ð

However, an increase in the flow probability of the incumbent party losing office is equivalent to a higher probability of the opposition party winning the election. The myopia term $\Gamma_L$ is increasing in $h$, but $\Gamma_H$ is decreasing in $h$. We are interested in the net effect on the average growth rate of changing the degree of political uncertainty. The average growth rate is given by

$$g = \Lambda g_L + (1-\Lambda) g_H \tag{25}$$

where $\Lambda = l/(l+h)$. But increasing either $h$ or $l$ unilaterally is equivalent to asking if a *biased* increase in political uncertainty encourages or discourages growth.

A more sensible way to examine the effect of political uncertainty is to consider an unbiased increase in political uncertainty, by increasing $l$ and $h$ simultaneously. For this purpose, define $p \equiv l = h = p_i = q_i$. Then, a higher *p* increases political uncertainty that is not biased against a particular party. Both parties alternate in power more frequently, with neither party increasing its average share of time in office. In this case, the average growth rate becomes $g = (g_L + g_H)/2$. Moreover, the policy myopia term is given by $\Gamma_i(g_i) = \dfrac{p(r_i - g_i)}{p + r_i - g_i}$ which is strictly increasing in *p*. Thus, a greater political uncertainty shifts down the $MB_i$ curve for both parties in Figure 4. This leads to the following proposition, which complements Proposition 4:

**PROPOSITION 5** *Following an unbiased increase in political uncertainty, the policy myopia increases and the average growth rate falls.*

The intuition behind this result is that current fiscal policy is influenced more by the gloomier prospects of the outcome in the immediate election than by the brighter prospect of being re-elected after losing, since the latter is too distant in future to matter significantly now.

### *2.5 Economic Efficiency*

Next we consider whether the steady-state stochastic political-economy equilibrium described above is efficient in terms of consumer welfare. We have already established that growth is lower than would be preferred by each party's natural constituency of voters. However, in itself this it does imply an inefficient outcome.

Given different preferences among consumers we have to define what we mean by an 'efficient outcome'. There are four possible metrics to use for our purpose: (i)-(ii) the median or mean consumer in the entire population, and (iii)-(iv) the median or mean of the voters' distribution which fluctuates. The choice of the entire population or the voting population depends on whose welfare should be compared to the political outcome. The use of the median voter metric may be justified by noting that this would be the chosen policy, if economic policies were directly chosen by the electorate[17]. The mean voter is relevant if welfare is measured by a Utilitarian Social Welfare Function. However, whatever metric is used, some inefficiency is bound to arise, given the assumption that the distribution of the rates of time preference of consumers and the position of political parties are both *exogenously* given.

A more interesting exercise is to identify the inefficiency caused by the policy myopia. To do this, we compare the political-economy outcome with the growth rates which would be chosen by the median or mean voters, assuming that their rates of time preference happen to coincide with those of the political parties. That is, we ignore the inefficiency which arises purely because of exogenous differences in $r$ between these mean or median voters and the political parties, and focus solely on the impact of policy myopia. Note that it does not matter whether the median or mean voters are used for our purpose.

From (14), the growth rates, which the critical (median or mean) voters would choose, are defined by

$$\frac{\hat{g}_i^{\,a/(1-a)}}{1-a} = \frac{a}{1-a}\frac{\hat{g}_i^{\,1/(1-a)}}{r_i} + b^{a/(1-a)}, \qquad i = H, L \tag{26}$$

[17] See Muscatelli (1998) for an example of a model where the economic efficiency of different regimes is evaluated with distributed preferences in a partisan model of monetary policy.

where $r_i$ is assumed to be identical to the rate of time preference of the critical voters.

The associated average growth rate is given by

$$\hat{g} = \Lambda \hat{g}_L + (1-\Lambda)\hat{g}_H \tag{27}$$

We take $\hat{g}$ as the socially optimal growth rate. Now we are in a position to state the following proposition:

**PROPOSITION 6** *Policy myopia caused by political uncertainty tends to result in inefficiency with the average growth rate lower than the social optimum.*
**Proof.** From (25) and (27), we have

$$\hat{g} - g = \Lambda\left(\hat{g}_L - g_L\right) + (1-\Lambda)\left(\hat{g}_H - g_H\right) \tag{28}$$

However, we know from Proposition 3 that the political parties always choose the growth rates which are lower than those preferred by consumers with the identical rate of time preference, i.e. $\hat{g}_i > g_i$, *i=H,L.* Therefore, Proposition 6 results. ð

From propositions 3 and 6, it immediately follows that:

**PROPOSITION 7** *The policy myopia effect tends to make the tax rate inefficiently low and the proportion of tax revenue spent on public investment excessively low compared with the social optimum.*

Finally, we can briefly comment on the assumption that the rates of time preferences of consumers and political parties are both given. This is a common assumption in such partisan political economy models (see Alesina and Rosenthal, 1995). Voters' preferences tend to show some persistence over time for cultural reasons. Political parties also tend to change their policy platforms slowly, partly because they would suffer a loss of credibility if they showed too much mobility over time (Alesina and Rosenthal, 1995). Of course consumer preferences do tend to change gradually, as demographic influences have an impact on desired fiscal policies. In response, political parties will adapt slowly to a new political landscape. If it takes time for political parties to reposition themselves following a major voter realignment, then inefficiencies caused by differences in $r$ between consumers and political parties could

be exacerbated[18]. In contrast, the inefficiency would tend to be reduced, as political parties try to follow the median or mean voter in a 'Hotelling effect'. Nevertheless, the policy myopia effect would still persist as long as some degree of political uncertainty remains, and will not be eliminated by the repositioning of the political parties relative to the electorate.

## 3. Empirical Evidence on the Relationship between Fiscal Policy and Political Instability

In this section we provide some new empirical evidence on the link between political instability and fiscal policy, particularly in relation to public investment. An important element of our model exploits the link between public investment and growth. A large literature on the impact of government investment spending on productivity growth concludes that there is strong evidence to suggest that public investment, particularly spending on public infrastructure, has a positive impact on productivity growth in industrialised economies[19]. In contrast, most studies tend to find a negative impact of government consumption on economic growth (see Barro, 1996). Policymakers increasingly perceive that long-term economic success requires a reallocation of government spending towards public investment. In the UK, the Labour government has certainly emphasised a commitment towards a 'golden rule' of public

[18] One can think for instance of how long it took the UK's Labour Party in the 1980s to reassess its views on taxation and public spending and ask whether the Conservative Party's position on public spending was close to that of the median voter, or merely closer than that of the Labour opposition.
[19] This includes both evidence from production and cost function estimates (see *inter alia* Aschauer, 1989, Munnell, 1990, Morrison and Schwartz, 1992), and from cross-country panel studies (see, for example, Easterly and Rebelo, 1993). Although the *size* of the total impact of public capital spending on productivity growth is a matter of some debate (see Holtz-Eakin and Schwartz, 1994) and obviously varies between countries and sectors, the evidence is generally that government investment is productive. For some contrary evidence from developing countries where sometimes capital spending is misallocated, see Devarajan *et al.* (1996).

spending, whereby deficit spending would only be allowed (over the cycle) on public investment.

The evidence linking political instability and fiscal policy is more mixed. There are numerous studies which explain the rise in the proportion of current expenditures in total government spending since the mid-1960s in many of the OECD economies in terms of the political complexion and the weakness of governments (see Roubini and Sachs, 1989, Alesina and Perotti, 1996, 1997). Many of the attempts in the European economies to stabilise increasing debt burdens in the late 1980s and 1990s have resulted in increases in taxation and cuts in capital outlays (see Alesina and Perotti, 1996, 1997). Perotti and Kontopoulos (1998) provide some evidence linking fragmentation in governments (the numbers of parties in coalition governments and the number of ministers in cabinet) to different dimensions of fiscal policy. Here we provide further evidence on the links between key fiscal variables identified in our theoretical model and political instability. The value added of this empirical work derives from the fact that we use an extended set of measures of political instability, which go beyond the usual measures reported in sources such as Woldendorp *et al.* (1993) and Mackie and Rose (1991, 1997). In particular, we not only use variables which measure the fragmentation of coalition governments, but also investigate measures of political instability relating to composition of cabinets, and electoral volatility. The political data used is documented extensively in Carmignani (1999), and the interested reader is referred to this for further details of sources and data construction[20].

[20] The construction of this data set constitutes part of Fabrizio Carmignani's Ph.D. dissertation. We are grateful to him for access to his data set, which is defined for individual legislatures and governments, and which we converted to an annual data set for the purposes of our empirical work.

In what follows we examine the impact of political instability on fiscal policy decisions in a panel of 13 European OECD countries[21]. These include basically all of the main Western European nations, excluding Greece, Portugal and Spain because they did not have democratic regimes in place throughout our sample period. The reason for restricting our analysis to European countries is that the specification of our panel data model requires some homogeneity in the countries being considered, and there are some data limitations in the case of the non-European OECD economies for the political data. Clearly, with the exception of the UK, these European economies have electoral systems that tend to give rise to coalition governments. Although our theoretical model is cast in terms of a two-party system, its results can readily be interpreted for coalition governments. The key result, which is that government myopia leads to under-spending on public investment and a shift to public consumption, will carry over in the case where the two parties (L and H) are interpreted as alternating coalitions, whose probability of re-election is partly a function of fluctuating electoral preferences, but also in part dependent on the strength of the coalition. The latter will be affected by shifts in the coalition groupings, parliamentary and cabinet fragmentation between different parties, and the perceived time horizon or probability of survival of the incumbent coalition government.

We examine how two key fiscal ratios, the ratio of government consumption (GC) in total government spending (GTOT)[22], and the tax revenue (T) to GDP ratio, are affected by a set of measures of political instability. Our panel data regressions are

[21] Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, the Netherlands, Norway, Sweden, the UK.

[22] As the government investment ratio (GI/GTOT) is simply a linear transformation, 1-(GC/GTOT), we focus simply on GC/GTOT.

estimated over the period[23] 1960-96, and the regressions are estimated using a fixed-effects specification. A fixed-effects specification was seen as most appropriate given our choice of countries in the sample[24]. In addition to the political variables described below, we include two lags of real GDP (Y) growth, in order to capture cyclical variations in the fiscal measures due to automatic stabilisers and not to the political environment. The political variables used are listed in Table 1. One reason for using several indicators of political instability is that different indicators might be more important in capturing instability in different countries[25]. For instance, in the case of Italy, one finds very little electoral volatility in terms of shifts in parliamentary representation until 1994 (because of its pure proportional representation system), but much more volatility in the time horizon of each cabinet, and in the effective number of parties in the governing coalition. In contrast, in the case of Belgium, electoral volatility is a much more important variable.

[23] Although our political data ranges from 1945-98, we choose to use fiscal data from the OECD in order to ensure consistent definitions across the 13 countries, and this limits the range of our sample. The panel is unbalanced because the political data is only available up to 1995 for some countries, and the fiscal data is also truncated for some countries because of changes in definitions over time in the OECD series.

[24] We experimented with a random-effects specification and obtained very similar results. In the case of the random-effects models, the Hausman specification test found no significant correlation between the random effects and the regressors.

[25] One difficulty in measuring the degree of political uncertainty or instability from data on actual outcomes is that these represent measures of instability as perceived *ex post*. This is not a perfect measure of the *ex ante* degree of political uncertainty and external competition experienced by the incumbent government during its term of office. Mid-term elections (where these take place) and regular opinion polls may provide a better guide to the changing pattern of electoral preferences. However, mid-term national elections tend to be the exception (cf. the United States), and it is difficult to obtain systematic opinion poll data on a comparable basis, at least for the period before 1980. Hence it is difficult to conceive of feasible alternatives to our chosen measures of political instability.

**Table 1 – Measures of Political Environment used in Regression Analysis**

| Measure | Definition |
|---|---|
| **Governing Coalition's Share of Seats** | The share of seats held by the governing coalition in parliament. This measures the extent to which the governing coalition has a secure majority in parliament which might affect its perceived ability to survive. |
| **Effective No. of Parties (ENP) in Governing Coalition** | Calculated as $[1/\sum_{i=1}^{n}(SH(i))^2]$, for a coalition of n parties where *SH(i)* is the share of seats held by party i. This provides a measure of the effective number of parties in the governing coalition, and is a measure of the fractionalisation of the cabinet – i.e. whether one or two large parties dominate it or made up of many small parties of equal size. See Laasko and Taagepera (1979). |
| **Ideological Position of Governing Coalition** | Calculated as $[\sum_{i=1}^{n} SH(i)L(i)]/n$ for a coalition of n parties where *L(i)* is each party's location on a left-right linear scale, , as composed by political scientists. The median location is 5.5, so that a value > 5.5 indicates a right-of centre government. Unlike the simple 5-point complexion scale reported in Woldendorp *et al.* (1993), which is generally used by economists (see Alesina *et al.*, 1998), our data uses updated scales, capturing the increasing centralisation of parties over time. See Laver and Schofield (1990), Carmignani (1999). |
| **Time Horizon of Incumbent** | It measures the potential time horizon of the incumbent government from the date it takes office. It is calculated each time a new coalition is formed and equals (maximum time between elections – time elapsed since the last election)/maximum potential period of office. |
| **Concentration of the Opposition** | This is equal to the seats held by the largest opposition party divided by the total seats held by the opposition. It therefore measures the degree to which the government faces a united opposition. See Strom (1984). |
| **Fragmentation of Parties in Parliament** | This is obtained by computing ENP in parliament (not just in the coalition, as measured above), and transforming its as follows: fragmentation=1/(1-ENP). See Laasko and Taagepera (1979). |
| **Electoral Volatility** | This measures the share of votes or seats added or lost by each party relative to the position after the previous election, divided by 2. A large volatility reflects volatile voter preferences and makes electoral outcomes more uncertain. See Powell (1982). |
| **Survival Rate of Government** | This is equal to the proportion of days the government lasted divided by the maximum period between elections allowed constitutionally. It measures the degree to which governments manage to survive for the whole of the legislature. |

From the point of view of finding support for our theoretical model, we would expect two results to emerge from our empirical work. First, in line with the assumption

of the partisan model, we should find some link between the ideological position of the government and the fiscal policy actions taken. Second, we would expect to find that government policy is affected by perceived political instability insofar as it impacts on the perceived duration of the incumbent government's tenure. Our panel regressions results are reported in Tables 2 and 3. In each case we report three different equations. The first table shows the results obtained when all the available measures of political instability are included in the regression. The second panel shows the result of a 'general-to-specific' search, excluding those political measures found to be less significant in the first version. The third version checks for the robustness of our results to the inclusion of a 'Maastricht effect', by including both a dummy variable and a time trend to cover the post-1989 period. This is because most of the countries in our sample were, by then, engaged in a process of nominal convergence in the run-up to European Monetary Union, and we want to ensure that our results are not dependent on picking up a spurious correlation between the political series and the fiscal corrections in the latter part of our sample. There seems to be no significant nominal convergence effect on (GC/GTOT), whilst we do capture, as one might expect, an effect on (T/Y) post-1989: taxes are higher during the convergence phase, with fiscal pressure slowly subsiding over the period 1989-96. However, these 'Maastricht variables' have no impact on the signs of the coefficients of the political variables or on their statistical significance.

The results from Table 2 indicate that political instability, as measured by a larger effective number of parties in the coalition, and fragmentation of the parliament does tend to encourage a shift towards government consumption and away from government investment. The total share of the seats held by the coalition has a positive effect on GC/GTOT, but this probably reflects the fact that larger coalitions are

generally more fragmented and not necessarily more stable. The other important point to note from Table 2 is that a significant ideological effect is present, with right-wing governments generally spending less on government investment than left-wing governments. Turning to Table 3, we find that tax revenues as a proportion of GDP increase with political instability (as measured by the turnover of seats in parliament and the fragmentation of parliament in terms of political parties). Again, the coalition share of seats is probably capturing an inverse correlation with the effective number of parties in the coalition. A larger effective number of parties in the coalition tend to lead to a higher tax burden. The effect of ideology on taxation is weaker, although the first regression in Table 3 shows that right wing parties tend to impose lower tax burdens, although the p-value of this estimated coefficient is 0.119, and it is taken out following a general-to-specific search.

In terms of our theoretical model, the results for the GC/GTOT regression are readily interpretable: there is evidence that political instability tends to generate a bias against government investment and that partisan effects do seem to be important in explaining GC/GTOT. The behaviour of T/GDP is slightly more problematic, but this is likely to be due to the rather simple way in which tax finance is handled in our model. Recall that in our theoretical model no deficit financing is allowed, and because of the absence of private investment, a monotonic relationship[26] holds between $g$, $t$ and $q$. Empirically the link between a higher spend on public investment and taxation holds. The link is weaker than our simple analytical model suggests, but that is bound to be the case given that in practice deficit financing is possible, and that optimal taxation and

[26] This monotonic relationship between public spending and growth would disappear if one included a negative effect of taxation on growth at higher tax rates. However, this would lead to a much more complex political economy model, in that each voter and each political party would have a different policy mix in a 3-dimensional policy plane (instead of Figure 2). A decision rule would then need to be assumed for voters to choose between political parties with different policy platforms.

public investment levels will not follow a monotonic relationship. Furthermore, other effects of electoral uncertainty on government finance are likely to co-exist to those identified in our theoretical model. For instance, Milesi-Ferretti and Spolaore (1994) stress the strategic role played by government debt across electoral deadlines. Other authors (e.g. Alesina and Tabellini, 1990) stress the importance of governments spending excessively on the public goods they prefer during their period of office. Indeed, the latter effect is likely to be important: greater political instability seems to leads to higher, not lower, taxation from our regression results, and this is probably due to the fact that governments with little chance of survival tend to finance excessive public consumption spending with high taxation. This is also entirely consistent with previous empirical studies, as summarised in Alesina and Perotti (1996, 1997).

## 4. Conclusions.

This paper has argued that there is a significant link between increased political instability, reduced public investment and lower productivity growth in the OECD economies. We explain this observed correlation using a model of endogenous growth with rational partisan policymakers. Our model shows that, with greater political uncertainty, it is rational for policy myopia effects to set in and for incumbent politicians to reduce public spending and taxation, and to increase the share of government consumption in total government spending. These effects remain, even if there is a prospect of exit from office and a subsequent return to power by the incumbent politicians. A more significant result is that the policy myopia tends to make political parties adopt growth-discouraging policy platforms with lower taxes and lower government investment spending than their own constituency would prefer. Furthermore, policy myopia causes inefficient underinvestment by the government with a growth rate which is too low compared to the social optimum.

We also provide some empirical verification for this theoretical model. Using political data and a panel for 13 European countries over the period 1960-96 we show that there is a strong correlation between increased political instability and the reduction in government investment as a proportion of total fiscal spending. We also detect significant partisan effects on government decisions on public investment and taxation. Our theoretical model also complements existing political economy models of fiscal policy. Whilst our empirical results provide strong support for our basic theoretical model, there is evidence that other complementary factors are important in explaining the tax revenue to GDP ratio in these economies.

A number of extensions of this framework are possible and we intend to take these up in future work. One possible extension of our framework is the inclusion of an explanation for different rates of time preference amongst voters-consumers. The existence of demographic trends in an overlapping-generations model might explain why, over time, the distribution of consumer preferences might change, thus affecting fiscal policy and the long-term growth prospects of the economy. One might then be able to explain changes in political polarisation and political platforms as functions of more fundamental forces such as gradual demographic change in the industrialised economies. We also intend to extend our empirical work (see Darby *et al.*, 2000), to analyse the impact of political instability on a wider range of fiscal policy measures, which will provide a fuller picture of the importance of partisan effects and political instability on fiscal policy.

**Table 2: Dependent Variable = GC/GTOT**
**Estimation Method: OLS, White Heteroscedasticity-Consistent Standard Errors**
**Unbalanced Panel: 13 countries, maximum time span 1960-96.**

| | Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|---|
| Coalition Share of Seats | 0.56 | 0.14 | 3.90 | 0.000 |
| ENP in Coalition | -12.73 | 3.46 | -3.68 | 0.000 |
| Ideology | 6.27 | 1.17 | 5.37 | 0.000 |
| Coalition Time Horizon | 4.74 | 10.01 | 0.47 | 0.636 |
| Concentration of the Opposition | -12.93 | 16.39 | -0.79 | 0.431 |
| Fragmentation | 75.89 | 20.16 | 3.76 | 0.000 |
| Electoral Volatility | 0.35 | 0.30 | 1.15 | 0.251 |
| Survival Rate | 2.15 | 10.19 | 0.21 | 0.833 |
| GDP growth (-1) | -0.19 | 0.08 | -2.42 | 0.016 |
| GDP growth (-2) | -0.21 | 0.08 | -2.62 | 0.009 |

| | | | |
|---|---|---|---|
| Included observations: 417 | | Mean of Dependent Variable | 0.850 |
| R squared | 0.648 | SD of Dependent Variable | 0.051 |
| Adjusted R squared | 0.628 | Akaike Information Criterion | -4.033 |
| S.E. of Regression | 0.031 | Schwartz Information Criterion | -3.810 |

| | Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|---|
| Coalition Share of Seats | 0.53 | 0.15 | 3.56 | 0.000 |
| ENP in Coalition | -14.37 | 3.30 | -4.35 | 0.000 |
| Ideology | 5.98 | 1.16 | 5.16 | 0.000 |
| Coalition Time Horizon | | | | |
| Concentration of the Opposition | | | | |
| Fragmentation | 90.47 | 18.73 | 4.83 | 0.000 |
| Electoral Volatility | | | | |
| Survival Rate | | | | |
| GDP growth (-1) | -0.19 | 0.08 | -2.40 | 0.017 |
| GDP growth (-2) | -0.21 | 0.08 | -2.66 | 0.008 |

| | | | |
|---|---|---|---|
| Included observations: 423 | | Mean of Dependent Variable | 0.850 |
| R squared | 0.642 | SD of Dependent Variable | 0.051 |
| Adjusted R squared | 0.626 | Akaike Information Criterion | -4.041 |
| S.E. of Regression | 0.031 | Schwartz Information Criterion | -3.859 |

| Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|
| Coalition Share of Seats | 0.53 | 0.15 | 3.56 | 0.000 |
| ENP in Coalition | -14.37 | 3.30 | -4.35 | 0.000 |
| Ideology | 5.98 | 1.16 | 5.16 | 0.000 |
| Coalition Time Horizon | | | | |
| Concentration of the Opposition | | | | |
| Fragmentation | 90.47 | 18.73 | 4.83 | 0.000 |
| Electoral Volatility | | | | |
| Survival Rate | | | | |
| GDP growth (-1) | -0.19 | 0.08 | -2.40 | 0.017 |
| GDPgrowth (-2) | -0.21 | 0.08 | -2.66 | 0.008 |
| Maastricht T | -1.12 | 1.58 | -0.71 | 0.478 |
| Maastricht C | 26.33 | 7.56 | 3.48 | 0.001 |

| | | | |
|---|---|---|---|
| Included observations: 423 | | Mean of Dependent Variable | 0.850 |
| R squared | 0.667 | SD of Dependent Variable | 0.051 |
| Adjusted R squared | 0.651 | Akaike Information Criterion | -4.103 |
| S.E. of Regression | 0.030 | Schwartz Information Criterion | -3.902 |

**Table 3: Dependent Variable = T/GDP**
**Estimation Method: OLS, White Heteroscedasticity-Consistent Standard Errors**
**Unbalanced Panel: 13 countries, maximum time span 1960-96.**

| | Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|---|
| Coalition Share of Seats | -0.38 | 0.18 | -2.14 | 0.033 |
| ENP in Coalition | 4.63 | 3.51 | 1.32 | 0.189 |
| Ideology | -1.61 | 1.03 | -1.56 | 0.119 |
| Coalition Time Horizon | 0.62 | 8.11 | 0.08 | 0.939 |
| Concentration of the Opposition | 9.77 | 12.67 | 0.77 | 0.441 |
| Fragmentation | 50.67 | 15.39 | 3.29 | 0.001 |
| Electoral Volatility | 0.48 | 0.23 | 2.05 | 0.041 |
| Survival Rate | -3.79 | 7.17 | -0.53 | 0.598 |
| GDP growth (-1) | -0.24 | 0.06 | -4.21 | 0.000 |
| GDP growth (-2) | -0.17 | 0.05 | -3.19 | 0.002 |

| | | | |
|---|---|---|---|
| Included observations: 323 | | Mean of Dependent Variable | 0.280 |
| R squared | 0.861 | SD of Dependent Variable | 0.058 |
| Adjusted R squared | 0.851 | Akaike Information Criterion | -4.033 |
| S.E. of Regression | 0.031 | Schwartz Information Criterion | -3.810 |

| | Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|---|
| Coalition Share of Seats | -0.33 | 0.12 | -2.62 | 0.001 |
| ENP in Coalition | | | | |
| Ideology | | | | |
| Coalition Time Horizon | | | | |
| Concentration of the Opposition | | | | |
| Fragmentation | 57.84 | 13.10 | 4.42 | 0.000 |
| Electoral Volatility | 0.51 | 0.23 | 2.21 | 0.030 |
| Survival Rate | | | | |
| GDP growth (-1) | -0.24 | 0.06 | -4.25 | 0.000 |
| GDP growth (-2) | -0.16 | 0.05 | -2.86 | 0.000 |

| | | | |
|---|---|---|---|
| Included observations: 331 | | Mean of Dependent Variable | 0.280 |
| R squared | 0.855 | SD of Dependent Variable | 0.057 |
| Adjusted R squared | 0.847 | Akaike Information Criterion | -4.711 |
| S.E. of Regression | 0.022 | Schwartz Information Criterion | -4.505 |

| | Coefficient | Std. Error | t-Statistic | t-Prob. |
|---|---|---|---|---|
| Coalition Share of Seats | -0.33 | 0.12 | -2.74 | 0.001 |
| ENP in Coalition | | | | |
| Ideology | | | | |
| Coalition Time Horizon | | | | |
| Concentration of the Opposition | | | | |
| Fragmentation | 49.07 | 13.54 | 3.63 | 0.000 |
| Electoral Volatility | 0.58 | 0.25 | 2.32 | 0.020 |
| Survival Rate | | | | |
| GDP growth (-1) | -0.23 | 0.06 | -4.11 | 0.000 |
| GDP growth (-2) | -0.16 | 0.05 | -3.01 | 0.000 |
| Maastricht T | -3.36 | 1.11 | -3.03 | 0.000 |
| Maastricht C | 19.17 | 5.23 | 3.66 | 0.000 |

| | | | |
|---|---|---|---|
| Included observations: 331 | | Mean of Dependent Variable | 0.280 |
| R squared | 0.860 | SD of Dependent Variable | 0.057 |
| Adjusted R squared | 0.852 | Akaike Information Criterion | -4.738 |
| S.E. of Regression | 0.022 | Schwartz Information Criterion | -4.508 |

# Appendix

This appendix will derive the condition for $g_H < g_L$ and $t_H < t_L$.

**LEMMA A-1** *(i) For* $l \geq h$*, it is always the case that* $g_H < g_L$ *and* $t_H < t_L$*, and (ii) for* $l < h$*, a sufficient condition for* $g_H < g_L$ and $t_H < t_L$ is $\frac{r_H - r_L}{h - l} > \frac{C(0)-1}{C(0)+1}$*, where* $C(g) = \left(\frac{r_H - g}{h} + 1\right)\left(\frac{r_L - g}{l} + 1\right) > 1.$

**Proof:** Comparing condition (G) for parties *L* and *H*, the only difference lies in the uncertainty-adjusted discount rate, $r_i + \Gamma_i(g)$. Thus, if $r_H + \Gamma_H(g) > r_L + \Gamma_L(g)$, the $MB_H$ curve lies entirely below the $MB_L$ for $g \in (0, r_L)$ in Figure 4, so that $g_H < g_L$. Moreover, $g_i$ and $t_i$ are positively related through (23).

(i) It is easy to show that:

$$r_H + \Gamma_H(g) - r_L - \Gamma_L(g) = \frac{(r_H - r_L)[C(g)+1] + (l-h)[C(g)-1]}{C(g)} \qquad (29)$$

which is always positive for $l \geq h$.

(ii) For $l < h$, (29) is positive iff $\frac{r_H - r_L}{h - l} > \frac{C(g)-1}{C(g)+1}$. Moreover, $\frac{C(g)-1}{C(g)+1}$ is strictly decreasing in *g*, i.e. the maximum value is at *g*=0. Thus, $\frac{r_H - r_L}{h - l} > \frac{C(0)-1}{C(0)+1}$ implies $r_H + \Gamma_H(g) > r_L + \Gamma_L(g)$. ð

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Figure 1:

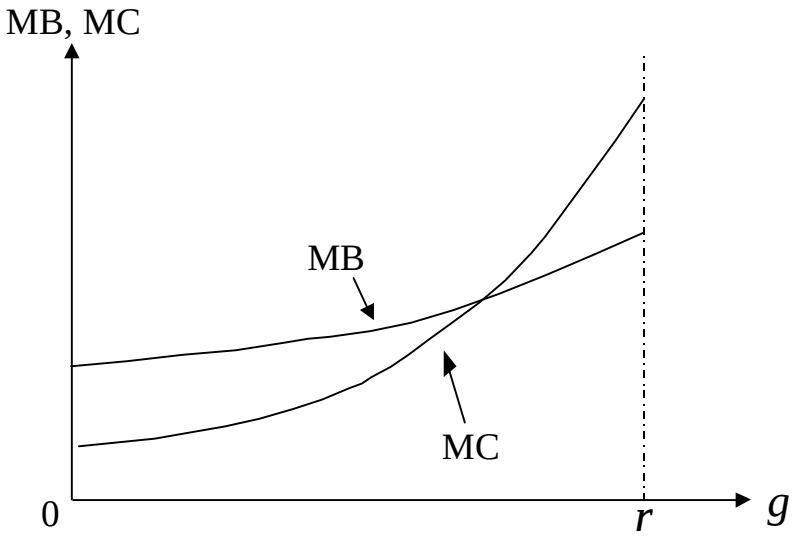


Figure 2:

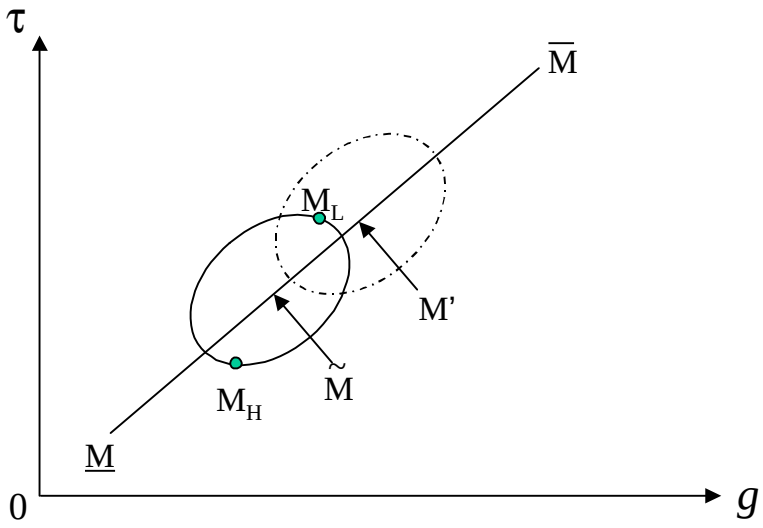

Figure 3:

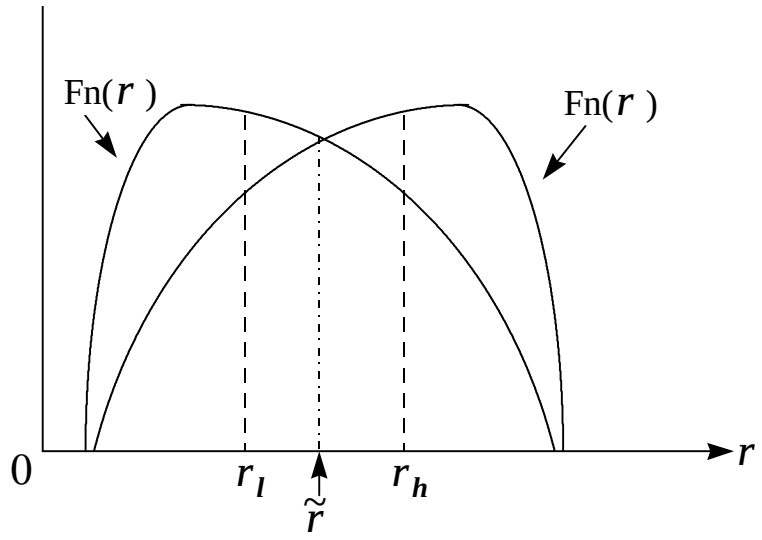


Figure 4: