

Costs of Taxation and the Size of Government*

Jørgen Juel Andersen[†]

May 29, 2008

Abstract

Existing models of legislative bargaining in representative democracies predicts that forms of governments which emphasizes accountability (e.g., ‘presidential’ systems) unambiguously should be associated with a smaller size of government than regime types favoring representativeness (e.g., ‘parliamentary’ systems). I show that this result can be reversed if taxes are (highly) distortionary. The reason is that the government in the latter regime type represents a larger proportion of the population than the government in the former regime type, and thus have stronger incentives to internalize the social costs of taxation. The model is consistent with the empirical patterns of higher growth and larger variability in the size of the government relative to GDP in countries with a ‘parliamentary’ form of government, compared to countries with a ‘presidential’ form of government.

Keywords: Political economy. Constitution. Tax costs. Comparative politics.

JEL: H3, H4, H5, P51.

*I thank Egil Matsen, Ragnar Torvik, Guido Tabellini, Jørn Rattsø, Kjetil Storesletten, Jon Fiva, Silje Aslaksen, Gérard Roland, Alan J. Auerbach, Tim Kehoe and other participants at the 3rd NHH-UiO Macro Workshop, and seminar participants and colleagues at NTNU for valuable comments and discussions.

[†]Norwegian University of Science and Technology. Address: NTNU, Department of Economics, Dragvoll, NO-7491 Trondheim, Norway. Phone: +47 7359 8337. Fax: +47 7359 6954. E-mail: jorgen.juel.andersen@svt.ntnu.no.

1 Introduction

Existing theory on the economic effects of rules for legislative bargaining predicts that regime types emphasizing accountability, such as the ‘presidential-congressional’ regime type, should produce a smaller size of government and a lower level of public goods provision, compared with ‘parliamentary’ regime types which place more emphasis on representativeness (Persson, Roland and Tabellini, 2000). These predictions, however, critically rest on the assumption that taxation is without distortions. Bringing tax distortions into the model, the monotonic relationship between regime type and the size of government breaks down: when distortionary costs of taxation are high and citizens possess weak preferences for public goods consumption, regime types which promote accountability through a strong separation of powers (A-regime types) produce a larger government sector than regime types favoring representativeness (R-regime types). The main new insight from the model—that the size of the government is more sensitive to tax distortions with the R-regime rules for legislation than with the A-regime rules—is consistent with the observed variation in the size of government, not only across countries but also over time and within regime types.

The model extends the framework of legislative bargaining presented in Persson, Roland and Tabellini (2000) by explicitly taking into account the distortions of taxation. *Distortionary costs of taxation* refer to any type of economic inefficiencies resulting from taxation, including deadweight losses due to price distortions, tax avoidance, tax evasion, compliance costs and collection costs. Recent empirical evidence suggests that the costs of taxation are much higher than indicated by earlier estimates—both in total, and at the margin. For example, Feldstein (1999) finds that the marginal deadweight loss of changes in the income tax rates may be more than ten times as large as implied by the traditional Harberger (1964) calculations. According to Feldstein’s estimates, the relative deadweight loss caused by increasing existing tax rates may exceed \$2 per \$1 of revenue. Other researchers find that also other types of taxation seem to be afflicted with significant costs.¹

Given the massive extent of the distortions of taxation that has been documented in the literature, it seems reasonable to assume that political representatives and their respective voters take these costs into account in the process of making fiscal legislation. In addition to the tax distortions, however, there is also another type of potential tax cost. In the political systems of representative democracies, the legislators have strong incentives to abuse their agenda-setting powers to divert, or waste, resources; henceforth referred to as the *diversionary costs of taxation*.² The constitutional rules for legislative bargaining determine how the two types of tax costs are internalized, and hence how they affect the equilibrium policy vector. I show that the two different

¹See, e.g., Fisman and Wei (2004) on the relationship between tax rates and tax evasion, Slemrod (2007) for an overview of the literature on the magnitude, nature and determinants of tax evasion, and Auerbach (2005) on a review of the incidence and deadweight losses of corporate taxes.

²The existence of political diversion—that is, the distribution of government resources that only benefits the politicians in power—is central in many models of political agency problems. See Persson and Tabellini (2000) and Besley (2006) for thorough overviews of several classes of political agency models.

regime types—the A-regime and the R-regime—entail very different incentives to internalize the two types of tax costs. While the A-regime entails comparatively stronger incentives to hold the legislators accountable for the diversionary costs of taxation, the R-regime is—when the tax distortions exceed some threshold—associated with stronger incentives to internalize the economic distortions of taxation. Hence, there appear to be an institutional trade-off associated with accountability: a strengthening of the incentives to hold the legislators accountable for diversion, by separating the agenda-setting powers, appear to be associated with a weakening of the incentives for internalizing the distortionary costs of taxation.

In the equilibrium of the R-regime, all policy decisions are made by a coalition government—as for example in the assemblies of most of the European parliamentary democracies. Representing a majority of the voters, the government coalition has strong incentives to internalize the interests of the majority. When the distortions from taxation are relatively low, it is in the interest of the majority to levy taxes not only to finance the provision of public goods, but also to redistribute resources from the minority toward the majority. However, because the costs of taxation are borne also by the voters of the government coalition, redistribution is only profitable as long as the distortions of the taxation are not too high. If the distortionary costs of taxation exceed some threshold, the majority will stop the redistribution of income, and only levy taxes to finance the provision of public goods. Interestingly, because the government coalition has incentives to take into account the tax distortions when optimally choosing the level of public goods provision, the provision of public goods in the equilibrium without redistribution is lower than in the equilibrium with redistribution. Consequently, a marginal increase in the distortionary costs of taxation have negative effects for the provision of public goods, and vice versa. The effects of distortionary tax costs on the equilibrium policy vector is characterized by a ‘kink’. Below the threshold, the levels of taxes, public goods provision and redistribution are all high. Above the threshold, the level of taxes and public goods provision are low, and there is no redistribution.

In contrast to the R-regime, the A-regime is defined by an effective separation of the agenda-setting powers—consider for example the separation of powers between the different committees in the U.S. congress. One feature of the separation of legislative powers, in particular when the agenda setter(s) for taxes—the ‘tax minister’—is different from the agenda setter(s) for public expenditures, is that it pushes up the minimum incentive compatible tax level. The reason is that when the level of taxes is set independent of, and preceding to, the level and composition of public expenditures, the ‘tax minister’ can not be certain whether she will be part of the winning expenditures coalition(s) which in turn decides on the allocation of the government budget. The incentive compatible level of taxation is negatively related to the probability of the ‘tax minister’ being in the winning coalition on the expenditures stage of the game. If this probability is high, the marginal expected pay-off for the ‘tax minister’ from levying taxes is high, and a lower level of taxation is thus needed to satisfy the incentive compatibility constraint. If, on the other hand, this probability is low, the ‘tax minister’ must set taxes high to achieve a

minimum incentive-compatible level of expected utility from going along with the equilibrium.³ Hence, the incentive compatible tax rate is in effect higher in the A-regime than in the R-regime, where the agenda-setting legislators in equilibrium know with probability one that they will be part of the winning expenditure coalition. Interestingly, the incentive compatible tax rate in the A-regime is in equilibrium independent of the distortions of taxations: while tax distortions reduces the expected continuation value of being in power, which has a positive effect on the incentive compatible tax rate, they also negatively affect the marginal benefit from taxation, which in turn has a negative effect on the incentive compatible tax rate. In the equilibrium of the model, these two effects cancel out, implying that the incentive compatible tax rate in the A regime—given that this tax rate is high enough to finance the optimally chosen level of public goods consumption—is invariant to the level of tax distortions. Consequently, a positive shift in the distortionary costs of taxation only have first-order effects for the tax revenues and the size of government in the A-regime. If tax costs are high and citizens possess relatively low preferences for public goods, the effect of the tax distortions on the size of government is in fact so much stronger in the R-regime than in the A-regime that the existing comparative results on the size of government is reversed.

Becker and Mulligan (2003) employ a simple model of interest group competition to show that as tax schedules get more efficient over time, the induced changes in the incentives of lobbying should result in a growing public sector.⁴ Becker and Mulligan’s model can however not explain the cross-country variation between regime types that is evident from their Table 1 (Becker and Mulligan, 2003, p.319); during the latter part of the twentieth century, presidential countries have experienced a substantially lower growth in the size of government than parliamentary countries.⁵ Also Persson and Tabellini (2003, p.274) state that: “Indeed, much of the difference

³In the model, the legislators derive positive utility from diversion. Diversion may come in the form of perks, waste, or inefficient resource allocation, for example via earmarks. If the agenda setters in equilibrium are not ‘allowed’ to enjoy the benefit of diverting resources, they will have the incentives to deviate from the equilibrium, which means that they will not opt for re-election but rather make the best of it while they are in office. The outcome for voters of the legislators deviating from the equilibrium path is commonly assumed to be inferior to the equilibrium outcome. Optimal voting behavior in models of representative democracies is therefore typically associated with voters allowing their legislators to divert some *incentive compatible* amount of resources. Note that the incentive compatible level of diversion in the R-regime behaves as a sunk cost, and hence do not on the margin affect the political trade-offs made by the voters and their legislators. The reason why the equilibrium tax rate in the R-regime, when tax distortions are low, exceeds the equilibrium tax rate in the A-regime is thus not due to incentive compatibility constraints, but has to do with other dimensions of the political insitutional framework (to be analyzed below).

⁴Similar points have also been made by Brennan and Buchanan (1980) and Wilson (1990).

⁵It is interesting to note how the present model complements the Becker and Mulligan model in several ways. First, as Becker and Mulligan perform a rich analysis of the comparative statics of tax systems, employing a stylized, reduced-form political model, I do the exact opposite, employing a rich political model and focusing on the role of the political insitutions, while the tax system is in a reduced form. However, incorporating the diversionary costs of taxation, and showing how these costs affects the equilibrium strategies and policies, the analysis also adds to the understanding of how different sources of tax costs interact to affect the political equilibrium. Second, my way of implementing deadweight losses from taxation is supported by the findings of Becker and Mulligan. Third, both models are consistent with the large observed overall growth in the size of government across countries, and should be viewed as complementary—and not competing—theories: Becker and Mulligan’s model is consistent with the observed heterogeneity with respect to the responses in the size of government to different macroeconomic or political shocks; the present model is consistent with the large observed cross-country heterogeneity in the growth rates of the size of government. Finally, both models can—in a complementary way, by studying the trade-offs

in the size of government across regimes can be traced back to a less rapid growth of government in presidential regimes during the 1970s and the 1980s.”⁶ The model offered in this paper, suggesting that there is a stronger internalization of the distortions of taxation in R-regime type ‘parliamentary’ countries, is consistent with the empirical pattern that the growth in the size of government has been stronger in countries with a parliamentary regime type than in countries with a presidential regime type. Moreover, the model is consistent with yet another stylized fact, namely that the observed variance in the size of government within parliamentary countries is much larger than the observed variance in the size of government in presidential countries. I provide indicative evidence supporting these claims.

The rest of the paper is organized as follows. Section 2 defines the micro foundations of the model. In Section 3, the regime types are defined, and equilibrium is defined in Section 4. Sections 5 and 6 constitute the core of the paper, and consist of a comparative analysis of the role of diversionary and distortionary tax costs, respectively, in determining economic policies within the two regime types. In Section 7, I show that the main insights of the model are consistent with simple cross-country empirical patterns.

2 The model

The society consists of three distinct groups of citizens, denoted by $i = 1, 2, 3$. Each group has a large number of identical members, formally modeled as a continuum of voters with unit mass. Time t is measured discretely, and the time horizon is infinite.

The preferences of a member of group i in an arbitrary starting period j are given by $u_j^i = \sum_{t=j}^{\infty} \delta^{(t-j)} U^i(\mathbf{q}_t)$, where $\delta < 1$ is a discount factor, \mathbf{q}_t is a vector of policies at t (to be defined below), and U^i is the utility function per period. Period utility is quasi-linear and given by $U^i(\mathbf{q}_t) = c_t^i + H(g_t) = y_t(1 - \tau_t) + r_t^i + H(g_t)$, where y_t is private income, τ_t is the tax rate, r_t^i is a transfer payment to group i , and g_t is the supply of Samuelsonian public goods. Public goods are valuable to citizens, such that $H_g(0) > 1$.

The public policy vector \mathbf{q} in period t is defined by $\mathbf{q}_t = [\tau_t, g_t, \{r_t^i\}, \{s_t^l\}]$, where g_t , r_t^i and τ_t are all constrained to be nonnegative, and s_t^l denotes the diversion benefiting legislator l . Imposing a balanced budget restriction, the government budget constraint in period t is given by $3\tau_t(1 - \alpha) = \sum_i r_t^i + \sum_l s_t^l + g_t \equiv r_t + s_t + g_t$.

In contrast to Persson, Roland and Tabellini (2000), the budget constraint reflects that there may be real costs associated with levying taxes. In particular, collecting taxes is assumed to be associated with a marginal cost, $\alpha \in [0, 1]$.⁷ The product of the parameter α and the equilibrium

made by the different political actors—contribute to the understanding of the composition of government spending across political entities and, importantly, how this is related to the costs of taxation.

⁶Acemoglu (2005) offers a critical review of Persson and Tabellini (2003), and points out that there are methodological problems attached to some of their findings. The broad patterns in the growth of the size of government across regime types is however not sensitive to Acemoglu’s critique.

⁷The most commonly used application of distortionary tax costs is labor supply costs. Assuming that labor supply is elastic, a proportional income tax distorts the relative prices of consumption and leisure. Hence, an

level of taxation 3τ represents on a reduced form the prospective efficiency losses due to different types of distortions of taxation. The tax cost function is similar to the one applied by Becker and Mulligan (2003), and implies larger efficiency losses the higher is the overall level of taxes in the economy. As a higher level of taxation is associated with higher levels of efficiency losses, the marginal effect on government revenues from increasing the tax rate is less than one.

Each region i coincides with a voting district and is represented by exactly one legislator $l = 1, 2, 3$. Separate elections under plurality rules take place in each voting district. In period j , the incumbent legislator l has preferences over outcomes, given by $v_t^l = \sum_{t=j}^{\infty} \delta^{(t-j)} V^l(\mathbf{q}_t) D_t^l$, where $V^l(\mathbf{q}_t) = s_t^l$ is the utility in each period. D_t^l is a dummy variable which equals one if legislator l holds office in period t , and zero otherwise.

At the end of each time period, each region holds an election and the candidate with the largest number of votes wins. The incumbent runs against a single opponent, who is drawn at random from a large set of identical candidates. An incumbent who is not reelected can never return.

3 The regime types

3.1 The A-regime

In the A-regime, decisions on different policy dimensions are made sequentially, and later proposals are thus bound by decisions made at an earlier stage. I focus on a two-stage decision-making process, with one stage for taxes and the other stage for the allocation of spending.⁸

The sequence of events is as follows:

- (1) nature randomly selects two agenda setters among the incumbent legislators, one for taxes and one for the allocation of public spending, a_τ and a_g , respectively;
- (2) voters set their reservation utilities for their voting rule, b^i ;
- (3) agenda setter a_τ proposes a tax rate;
- (4) the legislators vote. If at least two legislators are in favor of the proposal, the policy is implemented. Otherwise, a default tax rate $\tau = \sigma < 1$ is enacted;
- (5) agenda setter a_g proposes $[g, \{s^i\}, \{r^i\}]$ subject to the budget constraint $r + s + g \leq 3\tau(1 - \alpha)$;

increase in the proportional—or, equivalently, the marginal—tax rate creates a real efficiency loss by reducing labor supply, and hence real income (given that labor demand is also elastic). However, levying taxes may generate a myriad of efficiency losses in different markets. Since the present analysis focuses on the effects of economic distortions from taxation in general, rather than in one particular market, it seems reasonable to model the distortions on a reduced form. In a recent contribution on inefficient redistribution policies, Drazen and Limão (2008) models the tax collection costs in a similar way. Battaglini and Coate (2007) employ endogenous distortions in a dynamic model of legislative bargaining to explain the size and composition of government spending, but do not perform comparative politics with regard to the rules for legislation. Their main intuition of the effects of tax distortions on the political equilibrium is however consistent with the intuition in the present paper.

⁸One may easily expand the analysis by adding separate stages for each policy dimension, cf. Persson, Roland and Tabellini (2000).

(6) the legislators vote. If at least two legislators are in favor, the policy is implemented. Otherwise, a default policy, with $g = 0$, $r^i = 0$, and $s^i = \tau(1 - \alpha)$, is put in place;

(7) elections are held.

Voting is retrospective. Note that the sequence of decisions also matters outside of equilibrium; earlier decisions form constraints at subsequent stages. Also note that at stage 5, legislator a_g attempts to form the coalition that is best for her. If a_g is indifferent between the other legislators, it is assumed that they have the same probability of being included in the winning coalition.

3.2 The R-regime

The key feature distinguishing the R-regime from the A-regime is that agenda setter powers are gathered in the hands of a government coalition. Each coalition partner has a veto right. The veto can be thought of as a vote of no confidence for the government. If the veto is exercised, a government crisis follows. In the case of a government crisis, a new agenda setter is picked at random and the decision-making process reverts to the same rules as in the Primitive regime type described in the *Appendix*.⁹

The specific game consists of the following stages:

(1) nature randomly selects two coalition partners (ministers) among the incumbent legislators; one becomes the agenda setter for public finance decisions, a , and the other her junior partner, m ;

(2) voters set reservation utilities for their voting rule, $\{b^i\}$;

(3) agenda setter a proposes $[\tau_a, \{r^i\}, g, \{s^l\}] : r_a + g_a + s_a \leq 3\tau_a(1 - \alpha)$;

(4) the junior coalition partner can veto the joint proposal from stage 3. If approved, the proposal is implemented and the game goes to stage 9. If not, the government falls and the game goes on to stage 5;

(5) nature randomly selects a new agenda setter a' among the three legislators;

(6) voters reformulate their reelection strategies, conditional on the status of their representative after the government crisis;

(7) the agenda setter a' proposes an entire allocation $\mathbf{q}_{a'}$;

(8) the legislators vote on this proposal. If approved by at least two legislators, $\mathbf{q}_{a'}$ is implemented. If not, the legislative bargaining ends and a default outcome with $\tau = \frac{s^l}{1 - \alpha} = \sigma$ and $g = r^i = 0$ is implemented;

(9) elections are held.

Note that sequential proposals within government would not add any effective separation of powers—as long as a veto at the last proposal stage triggers a government crisis, sequential intra-governmental voting would produce identical results.¹⁰

⁹The model captures the basic costs of triggering a government crisis in, e.g., parliamentary systems without a constructive vote of confidence—namely the prospective loss of valuable proposal powers associated with ministerial portfolios. Huber (1996) and Persson, Roland and Tabellini (2000) use the same approximation.

¹⁰Persson, Roland and Tabellini (1997) provide a proof.

4 Equilibrium

In all regime types, an equilibrium is a vector of policies $q_t^L(\mathbf{b}_t)$ and a vector of reservation utilities b_t^C , such that, in any period t , when all players take as given the equilibrium outcomes of periods $t+k$, $k \geq 1$: (1) for any given b_t , at least one legislator $i \neq a$ weakly prefers $q_t^L(\mathbf{b}_t)$ to the default outcome; (2) for any given b_t , the agenda-setting legislator a prefers $q_t^L(\mathbf{b}_t)$ to any other policy satisfying part 1; (3) the reservation utilities b_t^{iL} are optimal for the voters in each district i , when one takes into account that policies in the current period are set according to $q_t^L(\mathbf{b}_t)$ and takes as given the reservation utilities in other regions b_t^{-iL} and the identity of the agenda setter; (4) the optimality conditions for policy proposals and for voting by the legislators must hold at each node of the game, for any given voting rules and decisions at earlier nodes in the same period, and when one takes into account equilibrium behavior at subsequent nodes of the same period.

5 Tax costs and fiscal policy

Interestingly, from the point of view of the voters, the model entails costs of taxation even without distortionary tax costs. The reason is that the legislators, once in office, are endowed with powers to divert resources; when determining the level of diversion, the agenda setting legislators, a_g and a respectively, trade off the benefits from diversion against the negative effect diversion has on their respective re-election probabilities and expected future payoffs. This constitutes a cost of taxation—a *diversionary tax cost*—because the opportunity to divert is ultimately constrained by the size of the government budget, which in turn, in the model, is uniquely determined by the level of taxation. Consequently, when voters in equilibrium approve of some level of taxation by re-electing the incumbent legislators, they implicitly determine the equilibrium level of diversion. The diversionary tax costs are—holding the institutional framework, the preferences for public goods, and the (macro) economic constraints constant—determined by the time preference structure in the economy δ : if δ is high, legislators are patient and demand lower levels of diversion in each period; if δ is low, legislators are myopic and demand higher levels of diversion.

Before discussing the effect of economic distortions of taxation, it is instructive to review the effects of the diversionary costs of taxation on the equilibrium levels of taxation. Importantly, the diversionary tax costs are in equilibrium determined by a combination of economic and institutional characteristics. The institutional framework determines which economic characteristics that on the margin affects the equilibrium policy vector: in the A-regime, the voters internalize the diversionary tax costs when trading off costs and benefits of public goods provision; in the R-regime, when there are no economic distortions of taxation, the diversionary tax costs are sunk and independent of the level of public goods provision.

Consider first the equilibrium of the A-regime.¹¹

Proposition 1 *The equilibrium in the A-regime is characterized by the following equilibrium policy vector.*

$$\tau^A = \begin{cases} 1 - \frac{\delta}{(1+\frac{2}{3}\delta)} & \text{if } r^A > 0 \\ \min \left[1, \frac{1-\delta/3}{2\delta(1-\alpha)} H_g^{-1}(1) \right] & \text{if } r^A = 0 \text{ and } \frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1 \\ \min \left[1, \frac{1-\delta/3}{2\delta(1-\alpha)} H_g^{-1} \left(\frac{1-\delta/3}{2\delta(1-\alpha)} \right) \right] & \text{if } r^A = 0 \text{ and } \frac{1-\delta/3}{2\delta(1-\alpha)} > 1 \end{cases}, \quad (1)$$

$$s^A = \begin{cases} \frac{3(1-\alpha)(1-\delta)}{1+2\delta/3} & \text{if } r^A > 0 \\ \min \left[\frac{3(1-\delta)}{2\delta} H_g^{-1}(1), \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} \right] & \text{if } r^A = 0 \text{ and } \frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1 \\ \min \left[\frac{3(1-\delta)}{2\delta} H_g^{-1} \left(\frac{1-\delta/3}{2\delta(1-\alpha)} \right), \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} \right] & \text{if } r^A = 0 \text{ and } \frac{1-\delta/3}{2\delta(1-\alpha)} > 1 \end{cases}, \quad (2)$$

$$g^A = \begin{cases} \min \left[H_g^{-1}(1), \frac{2\delta(1-\alpha)}{1-\delta/3} \right] & \text{if either } r^A > 0 \text{ or } \frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1 \\ \min \left[H_g^{-1} \left(\frac{1-\delta/3}{2\delta(1-\alpha)} \right), \frac{2\delta(1-\alpha)}{1-\delta/3} \right] & \text{if } \frac{1-\delta/3}{2\delta(1-\alpha)} > 1 \end{cases}, \quad (3)$$

$$r^A = \begin{cases} \frac{2\delta(1-\alpha)}{1+\frac{2}{3}\delta} - g^A & \text{if } H_g^{-1}(1) < 2\delta W \\ 0 & \text{otherwise} \end{cases}, \quad (4)$$

$$b^{a_g A} = \begin{cases} H(g^A) - g^A + \frac{2\delta(1-\alpha)}{1+\frac{2}{3}\delta} & \text{if } r^A > 0 \text{ and } \frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1 \\ H(g^A) & \text{otherwise} \end{cases}, \quad (5)$$

$$b^{a_\tau A} = \begin{cases} H(H_g^{-1}(1)) & \text{if } \frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1 \\ H \left(H_g^{-1} \left(\frac{1-\delta/3}{2\delta(1-\alpha)} \right) \right) & \text{otherwise} \end{cases}, \quad (6)$$

$$b^i = H(g^A), \quad i \neq a_g, a_\tau. \quad (7)$$

All politicians are reelected.

Proof. Voters a_τ are not direct residual claimants of public funds and demand the lowest incentive compatible tax rate, given that the tax revenues are high enough to finance their optimal choice of public goods provision under the actual institutional constraints.

The tax rate is constrained downward by the legislators' incentive compatibility constraints. All legislators $i \neq a_g$ are in the winning coalition (on stages 5 and 6) in any subgame with a probability of 1/2. Thus, the junior partner at stages 5 and 6, m , demands diversion s^m to satisfy $s^m/2 + \delta W \geq v^d$, where $v^d = \frac{1}{2}(1-\alpha)$ and represents expected payoff in a disequilibrium history with maximized taxes and diversion. W is the equilibrium continuation value and hence an implicit function of the equilibrium tax rate. In equilibrium, incentives must be compatible such that $s^m = \tau(1-\alpha) - \delta W \geq 1-\alpha - 2\delta W$. The implied tax rate satisfies $\tau^A \geq 1 - \frac{1}{1-\alpha}\delta W$.

¹¹Note that the equilibrium in Proposition 1 also include the case where citizens possess strong preferences for public goods, which is excluded from the equilibrium in PRT (2000).

The demand for public goods provision depends on the tax costs. The legislators' incentives to divert resources are decreasing in the legislators time preference factor δ , and voters must take this into account when setting their respective reservation tax rates. In addition, the costs of taxation are increasing in α . The threshold for when α and δ actively constrain the equilibrium level of public goods provision is implicitly and simultaneously defined by voters a_τ 's perceived marginal cost of public goods, $\frac{1-\delta/3}{2\delta(1-\alpha)}$, and is given by $\frac{1-\delta/3}{2\delta(1-\alpha)} = 1$:¹²

- If $\frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1$, the aggregate costs of taxation are below the threshold, and optimization implies that voters a_τ demand a tax rate compatible with a provision of public goods equal to $H_g^{-1}(1)$. If the non-negativity constraint on r is binding, the implied tax rate equals 1.
- If $\frac{1-\delta/3}{2\delta(1-\alpha)} > 1$ and citizens have strong preferences for public goods, it is optimal for voters a_τ to demand a tax rate that finances a level of public goods provision no higher than, and equal to, $H_g^{-1}\left(\frac{1-\delta/3}{2\delta(1-\alpha)}\right)$. This level of public goods provision will be realized by legislator a_g and his junior partner at stage 5 and 6. If citizens have weak preferences for public goods, the tax rate is constrained downward by the incentive compatibility constraint.

The incentive compatibility constraints implicitly defines the equilibrium level of diversion, such that $s^m \geq \tau(1-\alpha) - \delta W$ and $s^{a_g} \geq 3\tau(1-\alpha) - \tau(1-\alpha) - \delta W$, and consequently $s = s^{a_g} + s^m \geq 3\tau(1-\alpha) - 2\delta W$. If the non-negativity constraint on r is not binding and $\frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1$, it is straight forward to calculate W and then substitute to find the equilibrium diversion s^A . If $\frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1$ and the non-negativity constraint on r is binding, it is optimal for voters a_τ to demand taxes that are high enough to finance a level of public goods provision equal to $H_g^{-1}(1)$; if a level of public goods provision equal to $H_g^{-1}(1)$ is not feasible, voters a_τ demand a tax rate equal to 1. If $\frac{1-\delta/3}{2\delta(1-\alpha)} > 1$, the perceived aggregate marginal costs of taxation are higher for voters a_τ than for voters a_g , implying that voters a_τ effectively constrains the equilibrium level of diversion s^A by demanding a lower tax rate.

Because of Bertrand competition for redistribution among voters $i \neq a_g$ on stages 5 and 6, all residual government revenues accrue to voters a_g . Redistribution only occurs if the non-negativity constraint on r is not binding—that is, if $H_g^{-1}(1) < 2\delta W$ —and $\frac{1-\delta/3}{2\delta(1-\alpha)} \leq 1$. The equilibrium level of redistribution, r^C , follows directly from the government budget constraint.

■

Now consider the equilibrium in the R-regime.

¹²To arrive at this expression, first note that it will by definition be optimal for a_g and her voters to implement $r = 0$ when either the preferences for public goods are sufficiently strong or the tax costs exceed the threshold, implying that (i) $g = 3\tau(1-\alpha) - s$. Second, from the expression for the continuation value $W = s/3 + \delta W$ and the combined incentive compatibility condition $s = 3\tau(1-\alpha) - 2\delta W$, we get that $W = \frac{3(1-\alpha)}{3-\delta}$ and (ii) $s = [(1-\alpha)\tau] \frac{3(1-\delta)}{1-\delta/3}$. Substituting (ii) back into (i) gives $g = [(1-\alpha)\tau] \frac{2\delta}{1-\delta/3}$, which implies that the marginal tax cost facing voter a_τ of increased public goods provision is given by $\frac{\partial \tau}{\partial g} = \frac{1-\delta/3}{2\delta(1-\alpha)}$.

Proposition 2 *In the R-regime, there is a continuum of equilibria such that:*

$$\tau^R = \begin{cases} 1 & \text{if } \alpha \leq 2/3 \\ \min \left[1, \frac{1-\delta}{1-\delta/3} + \frac{1}{3(1-\alpha)} H_g^{-1} \left(\frac{1}{3(1-\alpha)} \right) \right] & \text{if } \alpha > 2/3 \end{cases} ; \quad (8)$$

$$g^R = \min \left[\widehat{g}, \frac{2\delta(1-\alpha)}{1-\delta/3} \right]$$

$$\widehat{g} : \begin{cases} H_g^{-1}(1/2) \geq \widehat{g} > H_g^{-1}(1) & \text{if } \alpha \leq 2/3 \\ H_g^{-1} \left(\frac{1}{3(1-\alpha)} \right) & \text{if } \alpha > 2/3 \end{cases} ; \quad (9)$$

$$s^R = s' = \frac{3(1-\alpha)(1-\delta)}{1-\delta/3}; \quad (10)$$

$$r^R = \begin{cases} \frac{2\delta(1-\alpha)}{1-\delta/3} - g' \geq 0 & \text{if } \alpha \leq 2/3 \text{ and } H_g^{-1}(1) \leq \frac{2\delta(1-\alpha)}{1-\delta/3} \\ 0 & \text{if } \alpha \in [0, \frac{2}{3}] \text{ and } H_g^{-1}(1) > \frac{2\delta(1-\alpha)}{1-\delta/3}, \text{ or } \alpha > 2/3 \end{cases} ; \quad (11)$$

$$b^{a'R} = \begin{cases} H(g') - g' + \frac{2\delta(1-\alpha)}{1-\delta/3} & \text{if } \alpha \leq 2/3 \\ H(g') - g' - \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} & \text{if } \alpha > 2/3 \end{cases} \quad (12)$$

$$b^{i'R} = H(g') \quad \text{for } i \neq a \text{ if } \alpha \leq 2/3. \quad (13)$$

$$b^{i'P} = H(g') - g' - \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} \quad \text{for all } i \text{ if } \alpha > 2/3 \quad (14)$$

All politicians are reelected and a government crisis never occurs.

Proof. The subgame in case of a government crisis—which may be initiated by a veto from any of the members of the government coalition—sets a benchmark, and effectively constrains the equilibrium in the R-regime. In case of a government crisis, a subgame similar to the primitive regime type (see the Appendix, A1), defined by stages (5) to (8), comes into force. The legislators' expected continuation value, *given a government crisis*, is defined by $E(v') = s'/3 + \delta W$. Thus, at stages 3 and 4, the junior partner m must be offered at least this much to go along with the equilibrium (and not veto the proposal from a), hence $s^{m_g} \geq E(v') - \delta W$. These conditions must hold in every period, implying that $E(v') - \delta W = s'/3 = (1-\delta)W$.

The voters are forced to accept a level of diversion defined by $s \geq s'$, independent of the equilibrium tax rate in the R-regime; if the voters are more demanding, any member of the government coalition have the incentive to initiate a crisis. Consequently, voters demand in equilibrium for diversion to be as low as possible, given the incentive compatibility condition $s \geq s'$, implying that relation (10) holds with equality.

Consider the voters of the government coalition, voters a and m . To go along with the equilibrium, their equilibrium reservation utilities, b^i , $i = a, m$, must weakly dominate the reservation utilities in case of a crisis, $E(u')$, defined by equations (25) and (26) (see A1). Hence, $b^i = 1 - \tau + H(g) + r^i \geq E(u')$. Moreover, the reservation utilities of these voters must be mutually consistent for them to be best responses in a Nash game for redistribution. Thus, the

equilibrium in the R-regime is characterized by multiple equilibria; any equilibrium policy vector optimizes b^a , given any b^m .

The problem facing voters a is defined by

$$\max_{g, r^a, r^m, \tau} [1 - \tau + H(g) + r^a], \quad (15)$$

subject to:

$$1 - \tau + H(g) + r^m \geq b^m \geq H(g') + r'/3 = b^{aP}; \quad (16)$$

$$\tau \leq 1; \quad (17)$$

$$r^a \geq 0; \quad (18)$$

$$r^m \geq 0. \quad (19)$$

The solution to the Kuhn Tucker problem facing voters a , defined by equations (15) through (19) is consistent with the equilibrium policy vector given by equations (8) through (14) (see the Appendix A2 for proof)¹³. ■

5.1 Low levels of distortionary tax costs: $\alpha \leq 2/3$

It follows from Proposition 1 that the *diversionary* costs of taxation have equilibrium effects for *all* of the elements in the policy vector in the A-regime, even with *no* distortionary costs of taxation. It turns out that this feature of the equilibrium in the A-regime becomes important when introducing distortionary tax costs in the model, and that it uniquely distinguishes the equilibrium of the A-regime from the equilibrium of the R-regime.

Corollary 1 *In the equilibrium of the A regime, if $\alpha \leq 2/3$, α has effects for all of the elements in the equilibrium policy vector. The effect on the size of government is ambiguous.*

From Proposition 1 it follows directly that when citizens possess weak preferences for public goods, such that in equilibrium $r^A > 0$, distortionary costs of taxation have only first-order effects for the size of government. In this case, the effect of α on the size of government is negative, and proportional to the tax rate, which is smaller than one. If, on the other hand, citizens possess strong preferences for public goods, implying that $r^A = 0$, the marginal effect of distortionary costs of taxation on fiscal policy in the A-regime is non-zero and continuous. In this region, any marginal increase in α induces a lower equilibrium level of diversion s^A and—because public goods become relatively more expensive—a lower equilibrium level of public goods provision g^A .

¹³In Proposition 2, superscript $'$ denotes the equilibrium policies that are constrained and pinned down by the subgame in case of a government crisis. Note that the policies denoted $'$ are in effect identical to the equilibrium policies in a primitive legislature without any institutional constraints promoting accountability—such as, e.g., separation of legislative powers or a continuous confidence requirement for the government. The equilibrium of the simple legislature is delegated to the Appendix, A1.

The effect on the equilibrium tax rate τ^A , however, is ambiguous. On the one hand, a lower equilibrium level of public goods provision implies lower taxes. On the other hand, as public goods become more expensive when α increases, higher taxes is necessary to sustain any given level of public goods provision. Which effect is the strongest can not be pinned down without making stronger assumptions about the shape of $H(\cdot)$. The effects of tax distortions on the size of government in the A-regime, when $\alpha \leq 2/3$ and citizens have strong preferences for public goods, are hence ambiguous.

Because of the lack of separation of powers in the R-regime, the logic behind the equilibrium of the R-regime is fundamentally different from the A-regime. The majority coalition represents a majority of the citizens, and it is as long as the tax distortions are relatively low in the interest of its respective voters to implement the highest obtainable tax rate.

Corollary 2 *In the equilibrium of the R-regime, if $\alpha \leq 2/3$, distortionary tax costs have only first-order effects on equilibrium fiscal policy in general, and the size of government in particular.*

Corollary 2 states that in the equilibrium of the R-regime, when the distortions of taxation are relatively low, the distortions have no effects on the equilibrium tax rate. The intuition goes as follows. A veto triggers a government crisis, which leads to a dissolution of the government. Between a crisis and the next election period, a new legislator from the assembly is chosen at random to lead the process of legislative bargaining. This legislator is hence provided with substantial agenda setting powers, which will be exploited in order to push up the level of diversion. The subgame following a government crisis, although never played in equilibrium, has real effects on equilibrium policies because the prospect of a government crisis constitutes a threat—a worst-case scenario—to the voters. This threat effectively restricts the voters opportunities to constrain the equilibrium level of diversion; if the voters of the government coalition do not allow for a sufficient level of diversion, politicians are better off by provoking a government crisis than going along with the equilibrium. From the viewpoint of the voters of the government coalition, these diversionary tax costs are entirely sunk. Moreover, since the voters of the government coalition constitute a majority of the citizens, they have incentives to maximize tax revenues as long as the marginal private benefits from doing this exceeds the marginal private costs. Consequently, taxes are in equilibrium maximized as long as $\alpha \leq 2/3$. Hence, in addition to the level of diversion, also the level of taxes is determined independent of the other elements in the policy vector. Finally note that because the diversionary costs of taxation are sunk, the equilibrium tax rate is—contrary to the A-regime— independent of the intensity in the preferences for public goods. Hence, if $\alpha \leq 2/3$, both the level of diversion and the level of the distortionary tax costs are in effect sunk.

Corollary 3 *If $r^A > 0$, α have stronger effects for the size of government in the R-regime than in the A-regime. If $r^A = 0$, the comparative effects of α for the size of government are ambiguous.*

It follows from the discussions following Corollaries 1 and 2 that the marginal effect of the distortionary costs of taxation on the size of government, measured as the change in total tax

revenues in GDP from a marginal change in α , is larger in the R-regime than in the A-regime if citizens have weak preferences from public goods ($r^A > 0$). Under the prevailing assumptions, tax distortions only have first-order effects for the size of government and the intuition is straight forward: Because the size of government is larger in the R-regime than in the A-regime, the direct (first-order) impact of the tax distortions, which is proportional to the tax cost parameter α , is strongest in the R-regime.

If citizens have strong preferences for public goods or, in the A-regime, the combined costs of taxation are sufficiently high ($\frac{1-\delta/3}{2\delta(1-\alpha)} > 1$)—implying that there is no redistribution in the equilibrium of the A-regime ($r^A = 0$)—the comparative results on the effect of tax distortions on the size of government is indefinite, and generally depend on the shape of $H(\cdot)$.

5.2 High levels of distortionary tax costs: $\alpha > 2/3$

The discussion in the previous section highlighted that while the voters in the A-regime have incentives to internalize both the diversionary *and* the distortionary costs of taxation. The voters in the R-regime, on the other hand, perceive the diversionary tax costs as sunk and have no incentives to internalize the distortionary tax costs when the level of distortions is low. However, when the tax distortions exceed some threshold—in particular, when $\alpha > 2/3$ —the comparative results on the incentives to internalize the tax costs are somewhat turned upside down.

Corollary 4 *In the equilibrium of the A-regime, if $\alpha > 2/3$ and $r > 0$, the level of taxes is independent of α and pinned down by the incentive compatibility condition, and α has only first-order effects for the size of government.*

Note that $\alpha > 2/3$ is a sufficient (but not necessary) condition for $\frac{1-\delta/3}{2\delta(1-\alpha)} > 1$. Hence, when $\alpha > 2/3$, the combined marginal tax costs $\frac{1-\delta/3}{2\delta(1-\alpha)}$ exceed one *independent* of the level of the diversionary tax costs δ . Yet, because the incentive compatibility condition constrain taxes downwards, the optimal level of public goods provision, $H_g^{-1}\left(\frac{1-\delta/3}{2\delta(1-\alpha)}\right)$, may not be feasible in equilibrium. Consider the problem of legislator a_τ and her voters. If citizens have weak preferences for public goods, a_τ would prefer a low tax rate, but is forced to implement the minimum tax rate implied by the incentive compatibility condition. The implied tax rate is, by Proposition 1, completely independent of the level of tax distortions. Moreover, given the incentive compatible tax rate, it is up to legislator a_g and her voters to determine the level of public goods provision by trading off the benefits from public goods provision against benefits from redistribution towards her own constituency. Since at this stage the tax rate has already been determined, a_g and her voters have no incentives to take into account tax distortions either. The separation of powers in the A regime thus leads to an incomplete internalization of distortionary costs of taxation, and the tax distortions have only first-order effects for the size

of government.¹⁴

Corollary 5 *In the equilibrium of the R-regime, if $\alpha > 2/3$, the distortionary costs of taxation are fully internalized and no redistribution will take place. If $\tau^R < 1$, the implied provision of public goods, $H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right)$, equals the social optimum.*

In the R-regime, the allocation of residual government revenues between the constituencies of the coalition government is determined in a multiple equilibria Nash game. When $\alpha > 2/3$, an outcome involving redistribution can not be sustained as an equilibrium outcome. To see this, consider the subgame that follows a government crisis.¹⁵ If $\alpha > 2/3$, Proposition 2 implies that the reservation utilities for any voter i is given by $H(g') - g' - \frac{3(1-\alpha)(1-\delta)}{1-\delta/3}$, which involves no redistribution and a level of public goods provision equal to $g^R = \min\left[H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right), \frac{2\delta(1-\alpha)}{1-\delta/3}\right]$. Hence, any policy proposal in the R-regime involving redistribution to the constituencies of one or both of the government partners, would be vetoed by the coalition member whose voters benefit the least from the redistribution.

Moreover, given that the equilibrium tax rate is less than one, the equilibrium level of public goods provision equals the social optimum. When $\alpha > 2/3$, the costs of a marginal increase in the provision of public goods as perceived by each of the members of the coalition government equals $\frac{1}{3(1-\alpha)}$. The members of the government coalition and their respective voters have the same marginal benefit from public goods provision, and agree on a level of public goods provision of $H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right)$. Thus, contrary to the A-regime, the equilibrium of the R-regime implies that tax distortions are fully internalized even if preferences for public goods is weak, and effectively reduce the equilibrium level of public goods provision.

5.3 Comparative politics and the size of government

The discussion in the previous sections demonstrate that the incentives to internalize the costs of taxation in general, and the distortionary tax costs in particular, to a high degree depend on the constitutional rules for bargaining in the legislature. Two clear cases emerges. When the tax distortions are not too high ($\alpha \leq 2/3$), tax costs are on the margin internalized in the A-regime—given that $\frac{1-\delta/3}{2\delta(1-\alpha)} > 1$ and $r = 0$ —but not in the R-regime. However, because the level of taxation is higher in the R-regime, the effects of tax distortions on the size of government is stronger in the R-regime if preferences for public goods are weak, and the comparative effect is indecisive if preferences for public goods are strong. If tax distortions exceeds a threshold ($\alpha > 2/3$), on the other hand, it is the agenda setters in the R-regime who fully internalize

¹⁴Note however that whenever the combined, or aggregate, marginal tax costs exceed the threshold $\left(\frac{1-\delta/3}{2\delta(1-\alpha)} > 1\right)$ and citizens have strong preferences for public goods, both types of tax costs are internalized and effectively constrain the equilibrium of the A-regime (c.f. Corollary 1). It is hence only when the preferences for public goods are sufficiently weak, such that $r > 0$ in equilibrium, that the A-regime is associated with an incomplete internalization of the tax costs. Yet, as will be shown below, the internalization of the tax distortions are weaker than in the R-regime.

¹⁵Note that, although the mechanics and the intuition is slightly different, the equilibrium policy vector of the R-regime and the primitive regime type (see the Appendix, A1) when $\alpha > 2/3$ is identical.

the tax distortions, while the agenda setters in the A-regime only internalize the tax costs if preferences for public goods are sufficiently strong. In this section, I ask whether the incentives to take into account tax distortions have qualitative effects for the comparative results on the size of government in the two regime types, or if the result from existing theory (Persson, Roland and Tabellini 2000)—that the R-regime produce a larger size of government than the A-regime—still goes through.

Proposition 3 *When $\alpha > 2/3$, $\delta > 3/7$ and $r > 0$, the size of government in the equilibrium of the R-regime is smaller than the size of government in the A-regime.*

Proof. Consider the equilibrium tax rates in the two regime types, defined in Propositions 1 and 2. When $\alpha > 2/3$ and the nonnegativity constraint on r in the equilibrium of the A-regime is not binding, the difference between the size of government in the A-regime and in the R-regime is given by

$$3\tau^A - 3\tau^R = 3 \left(1 - \frac{\delta}{1 + 2\delta/3} \right) - 3 \left[\frac{1 - \delta}{1 - \delta/3} + \frac{1}{3(1 - \alpha)} H_g^{-1} \left(\frac{1}{3(1 - \alpha)} \right) \right].$$

If $H_g^{-1} \left(\frac{1}{3(1 - \alpha)} \right) \rightarrow 0$, $\delta \in (3/7, 1)$ is a necessary and sufficient condition for $\tau^A - \tau^R$ to be positive. ■

If $H_g^{-1} \left(\frac{1}{3(1 - \alpha)} \right) > 0$, $\delta \in (3/7, 1)$ is a necessary, but not a sufficient, condition for $\tau^A - \tau^R$ to be positive. In this last case, an even more restrictive condition on δ is required to have that $\tau^A - \tau^R$.

In other words, when there are high inefficiencies of taxation, legislators are patient, and citizens attach a sufficiently low value to consumption of public goods, the size of government will be larger in the A-regime than in the R-regime. The intuition behind this result is that the *perceived* relative price of redistributionary policies, under the prevailing conditions, is lower in the A-regime than in the R-regime: when a_g decides on g^A and r^A , the only cost of redistribution is the opportunity cost of public goods consumption. The coalition government of the R-regime, however, decides on τ^R , g^R and r^R simultaneously, and has thus strong incentives to internalize the tax distortions: when $\alpha > 2/3$, the marginal costs of redistribution are higher than the marginal benefits, providing the coalition government with strong incentives to abstain from levying taxes with the purpose of redistribution.

However, although the incentive structures are such that—in the case of high tax distortions and weak preferences for public goods—the equilibrium levels of both redistribution and public goods provision will be higher in the A-regime, it is still the case that the level of diversion, because of the threat of a government crisis, will be higher in the R-regime. It is hence not obvious that the equilibrium tax level is higher in the A-regime than in the R-regime. To see why this is still the case, remember from Proposition 1 that when a_τ sets the tax rate, she takes into account that the probability of her becoming a member of the winning coalition at the public expenditures stage of the game is less than one. Since the legislators discount their expected

future payoffs with the probability of being in the winning coalition, taxes must be set higher in the A-regime than in the R-regime for the legislators to go along with the equilibrium.

6 Some evidence and discussion

Due to poor cross-sectional and time-dimensional data on preferences for public goods and on the aggregate economic costs of taxation, the main insight from the model—that the size of government in R-regimes should be more responsive to changes in the distortionary costs of taxation than the size of government in A-regimes—may not be subject to direct empirical investigation. However, some interesting indirect evidence may still be provided.

The existing evidence in the literature suggests that taxation has become more efficient over time.¹⁶ Moreover, there is no evidence in the literature of overall tax efficiency being correlated with constitutional features. Unfortunately, cross-country panel data on tax distortions are very scarce. One feasible way of capturing some of the cross-country variation in efficiency losses from taxation, however, is to follow Becker and Mulligan (2003), who propose that deadweight losses are positively related to the top statutory marginal tax rates. The available cross-country data displays no systematic and statistically significant differences in the top statutory marginal tax rates between countries with a presidential and a parliamentary form of government.¹⁷ Keeping these ‘stylized facts’ in mind, I proceed by exploring to what degree the observed patterns in the data on the relative size of government are consistent with the proposed model.

A dynamic interpretation of the comparative statics of the model suggests that as taxes become more efficient over time, one should observe a stronger growth in the size of government in countries with a parliamentary, as opposed to presidential, form of government. Second, if the size of government in parliamentary regimes is more responsive to changes in tax efficiency, an equal distribution of tax efficiency between the regime types implies that the variation in the size of government should be higher among the parliamentary than among the presidential countries.

Table 1 displays summary statistics regarding the average, relative size of government (Mean *cgexp*), and the standard deviation of the size of government (St.dev. *cgexp*), for presidential

¹⁶Becker and Mulligan (2003) provide an overview of the different proxies for tax efficiency that have been proposed. These include agricultural dependence (Becker and Mulligan, 1998), “modernization” (Peltzman, 1980), “corporatism” (Summers, Gruber and Vergara, 1993), and population and per capita income (Easterly and Rebelo, 1993). In addition, Becker and Mulligan suggest their own two measures of tax efficiency: revenue raised by social security, payroll, and sales taxes, as a ratio to other tax revenue; and the ratio of the “economy-wide” average individual income tax rate to the top statutory individual income tax. Observing the development over time of these proxies suggests that there has been an overall, cross-country pattern of increased tax efficiency (Becker and Mulligan, 2003).

¹⁷Countries are classified as ‘presidential’ if the confidence of the assembly is not necessary for the executive—even if an elected president is not chief executive, or if there is no elected president (consult, e.g., Persson and Tabellini, 2003, for a more precise definition). In the context of the present model, the theoretical counterparts to ‘parliamentarian’ and ‘presidential’ countries are the ‘R-regime’ and the ‘A-regime’, respectively. Data on the highest marginal corporate- and individual income taxes are available in the World Bank’s WDI database, although not earlier than 1998. See Tables 4 through 6 in the Appendix A3 for the test statistic, where the sample of Table 4 corresponds to the sample of Table 1, and similarly Tables 5 and 6 correspond to Tables 2 and 3, respectively.

Table 1: Summary statistics for relative size of government in presidential and parliamentary countries, respectively.

	Presidential			Parliamentary		
	1960	1998	d6098	1960	1998	d6098
Mean <i>cgexp</i>	16.8 (8)	20.3 (19)	21.0	21.2 (11)	32.4 (27)	47.4
St.dev. <i>cgexp</i>	5.9	5.4		7.7	9.8	
Mean <i>polity_gt</i>	1.8 (8)	1.1 (19)		0.5 (11)	0.6 (27)	
Mean <i>cgexp</i> *	17.5 (1)	20.9 (3)	19.5	23.6 (9)	35.3 (15)	49.8
St.dev. <i>cgexp</i> *		6.8		6.1	6.9	
Mean <i>polity_gt</i> *	0.3 (1)	0.8 (3)		0.6 (9)	0.4 (15)	

Note: The parentheses indicate sample size. An asterisk indicates that the sample is restricted to include only member countries of the OECD.

and parliamentary countries respectively, in the years 1960 and 1998.¹⁸ The size of government is measured as the ratio of central government expenditures to GDP. The total sample size is 19 in 1960 and 46 in 1998, of which about two-thirds are parliamentary countries. The lower panel of Table 1 contains summary statistics for the sub-sample of OECD-countries. The OECD sample, however, is much more limited—for 1960, only 10 countries are represented, while for 1998 there are data for 16 countries. Note that the U.S. is the only presidential country in the OECD sample in 1960; in 1998, the two presidential countries Mexico and Switzerland are added to the sample. Finally, I report the average democracy score (Mean *polity_gt*) in 1960 and 1998, to substantiate that countries and years are reasonably comparable.¹⁹

Consistent with the findings in Persson and Tabellini (2003), Table 1 shows that the relative size of government is considerably larger among the parliamentary than among the presidential countries; in 1998, the average size of government was more than 50 percent higher in group of parliamentary countries than in the group of presidential countries. In 1960, however, the relative difference in size of government was only about one third of the difference in 1998. Indeed, the average percentage growth in the size of government (d6098) was more than twice as high in the group of parliamentary countries than in the group of presidential countries. The same patterns are evident also when just considering the OECD. The figures in Table 1 also illustrate large differences in the within-regime variation of the size of government; in 1998, the standard deviation in the size of government is more than 70 percent larger among the parliamentary countries than among the presidential countries. Both these patterns—the stronger growth and the larger variation in the size of government among the parliamentary countries—are consistent

¹⁸The data, as well as a data appendix defining the variables, are available on the homepage of Guido Tabellini: <http://www.igier.uni-bocconi.it/personal/tabellini/homepage.htm>. *cgexp* is central government expenditures as a percentage of GDP, constructed using the item Government Finance-Expenditures in the IFS, divided by GDP at current prices and multiplied by 100. Source: IMF-IFS CD-Rom and IMF-IFS Yearbook.

¹⁹The variable *polity_gt* is a linear transformation of the Polity_2 variable, which is a score for democracy provided by the Center for International Development and Conflict Management (See Polity IV Project, <http://www.cidcm.umd.edu/inscr/polity/index.htm>). *polity_gt* is normalized to compare with the Gastil Index, provided by the Freedom House (see Persson and Tabellini, 2003). Any country receiving a *polity_gt* score below 3.667 (corresponding to positive numbers of the Polity_2 variable) is classified as ‘democratic’. The numbers in Table 1 show that, on average, all groups of countries score well below this threshold.

Table 2: Summary statistics for relative size of government on a time-consistent sample.

	Presidential countries			Parliamentary countries		
	1960	1998	d6098	1960	1998	d6098
Mean <i>cgezp</i>	17.7 (7)	20.0 (7)	13.0	19.8 (8)	32.3 (8)	63.1
St.dev. <i>cgezp</i>	5.7	2.9		6.9	9.7	
Mean <i>polity_gt</i>	1.8 (7)	1.3 (7)		0.6 (8)	0.7 (8)	

Note: The parentheses indicate sample size.

Table 3: Summary statistics for relative size of government on a time-consistent sample of strict democracies.

	Presidential countries			Parliamentary countries		
	1970	1998	d7098	1970	1998	d7098
Mean <i>cgezp</i>	19.5 (4)	21.6 (4)	10.7	26.4 (13)	35.3 (13)	33.7
St.dev. <i>cgezp</i>	5.2	2.5		2.4	11.1	
Mean <i>polity_gt</i>	0.6 (4)	0.9 (4)		0.7 (13)	0.6 (13)	

Note: The parentheses indicate sample size.

with the prediction that the size of government is more sensitive to variation in tax efficiency if the form of government is of the R-regime type.

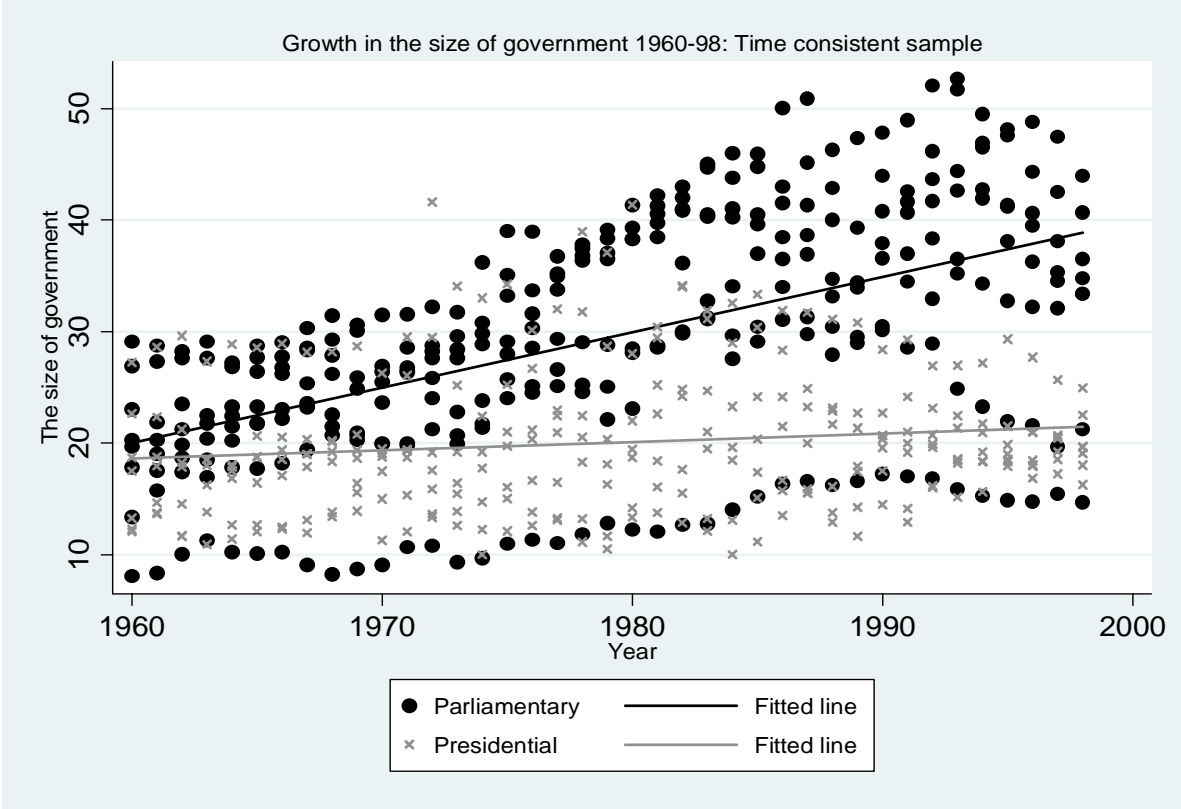
One problem with the evidence provided in Table 1 is that the sample under consideration varies over time. In Table 2 I restrict the sample to only consider countries for which there exist data in both 1960 and 1998.²⁰ From Table 2, it is clear that the differences in growth in the relative size of government are now even more striking: while the average relative size of government in the seven presidential countries in the sample grew by only 13 percent, the average growth in the size of government among the eight parliamentary countries was 63 percent. Note also the variation in the size of government across regime types: in 1998 the standard deviation among the eight parliamentary countries was more than three times higher than among the seven presidential countries. Figure 1 plots the data, and suggests that the empirical patterns are not driven by any single outlying observation, or group of outliers. Figure 2 plots the average growth in the size of government from 1960 to 1998 against the average democracy score in the same time period, and illustrates that the patterns are not generated by the level of democracy either.

Finally, although the countries in Table 2, and in Figures 1 and 2, all were considered democratic in both 1960 and in 1998, some of them indeed experienced non-democratic periods in between. In addition, a concern may be to what degree the results are robust to narrowing the time frame to more recent experiences. In Table 3, I show that excluding all countries that have experience non-democratic episodes, and regarding the growth in the size of government from 1970, rather than 1960, produces similar results as in Tables 1 and 2.

In sum, the evidence in Tables 1–3 is highly consistent with the predictions of the model.

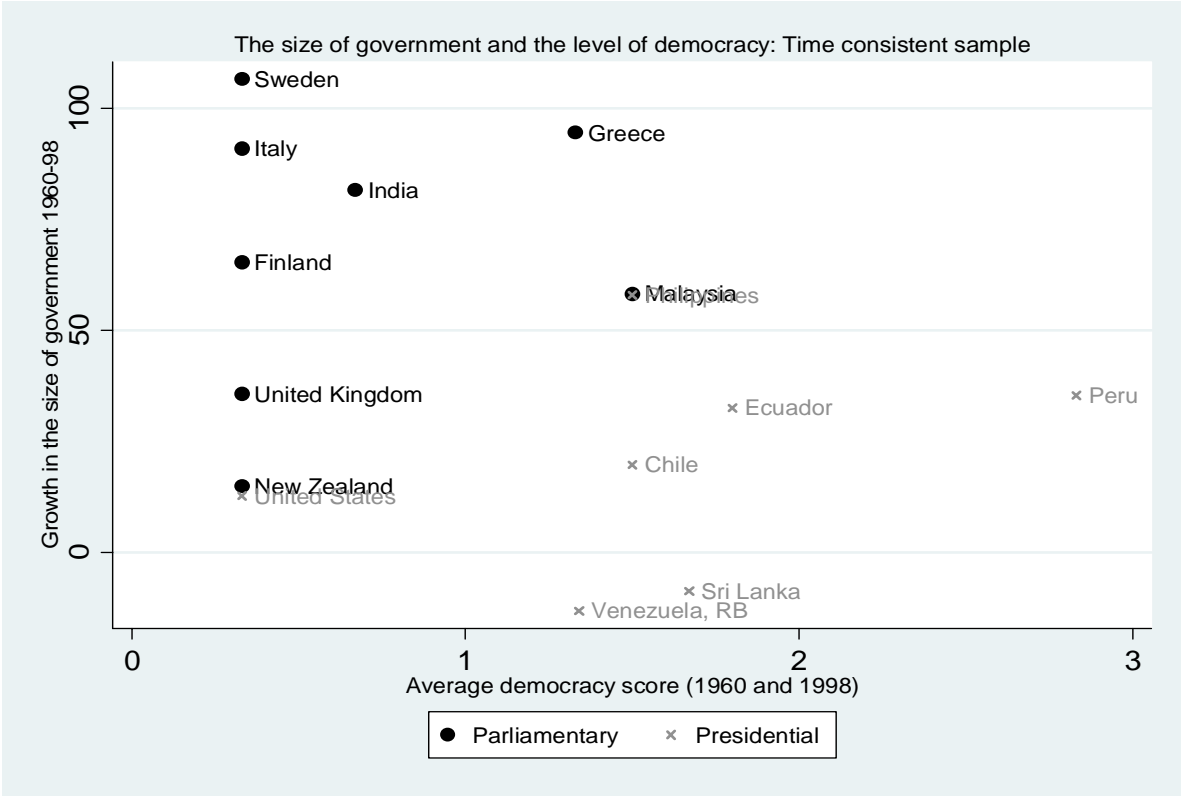
²⁰The eight parliamentary countries in the time consistent-sample are: Finland, Greece, India, Italy, Malaysia, New Zealand, Sweden and U.K. The seven presidential countries are Chile, Ecuador, Peru, Philippines, Sri Lanka, U.S.A. and Venezuela.

Figure 1



Note: Figure 1 plots the size of government (*cgexp*) from 1960 to 1998 in parliamentary and presidential countries, respectively. The sample is identical to the time-consistent sample in Table 2.

Figure 2



Note: The figure plots the average growth in the size of government (*cgexp*) from 1960 to 1998, against the average of the democracy score (*polity_gt*) in 1960 and in 1998. The sample is identical to the time-consistent sample in Table 2.

The average growth in the size of government, which coincides with an increase in the efficiency of taxation, has been much stronger in countries with forms of governments that emphasize representativeness than in countries with forms of governments that emphasize accountability. Moreover, the relatively higher variability in the size of governments in the countries with R-regimes, suggests that R-regimes are much more sensitive to variation in underlying determinants of the size of governments, such as the efficiency of the tax system.

Although the coarse cross-country empirical patterns between the form of government and the size of government are consistent with the proposed model, there may indeed be other plausible and competing hypotheses. One hypothesis is that the observed cross-country variations in the size and composition of government spending largely can be explained by variation in preferences. Indeed, Alesina and coauthors (Alesina, Di Tella and MacCulloch, 2004; Alesina and Angeletos, 2005; Alesina and La Ferrara, 2005) find that preferences—or, alternatively, the beliefs about the fairness of social competition—can explain U.S. vis-a-vis continental European perceptions about income inequality and choices of redistributive policies. Hence, it is possible that the pattern *in levels* observed among OECD countries in Table 1, of which all countries with the exception of New Zealand are parliamentary, may be explained by the distribution of preferences—or alternatively the distribution of beliefs about the fairness of social competition—between the U.S. and continental Europe. The theories of Alesina and coauthors can, however, not explain why the size of government has grown almost three times as fast in Europe than in the U.S.—unless preference- and belief differentials have changed substantially over the past 40 or so years. Moreover, it is not clear that the similar fiscal patterns of the U.S. and the other presidential countries in the sample, of which most are Latin American, can be explained by similarities in preference structures, which in turn are fundamentally different from the preferences found in parliamentary democracies.

7 Concluding remarks

By taking into account the economic distortions associated with taxation, one of the central predictions in the literature on the economic effects of rules for legislative bargaining is reversed: if preferences for public goods are relatively low and the economic distortions of taxation exceed a certain threshold, the ‘presidential-congressional’ regime type—which usually is characterized by accountability and strong separation of legislative powers—produce a larger size of government than the ‘parliamentary’ regime type. This result contrasts earlier findings, suggesting that the ‘presidential-congressional’ regime type unambiguously promote a smaller size of government. The reason for the seemingly conflicting results, in terms of size of government, is to find in the very different incentives the two political systems promote when it comes to the internalization of the costs of taxation. While the ‘presidential’ regime type entails comparatively stronger incentives to hold the legislators accountable by internalizing the *diversionary* costs of taxation—defined by the costs arising from the legislators’ inclination to abuse their agenda-setting powers

to divert, or waste, some fraction of the tax revenues—, the ‘parliamentary’ representativeness regime is associated with stronger incentives to internalize the distortionary effects of taxation. Hence, there appear to be an institutional trade-off associated with accountability: by creating incentives to hold the legislators accountable for diversion, through dispersion of agenda-setting powers, the incentives for holding the same agenda setters ‘accountable’ for the economic distortions of taxation are weakened.

Aggregated cross-country data on the economic distortions of taxation is scarce and incomplete. The empirical patterns of the growth and variation in the size of governments across countries and over time are however consistent with the mechanisms of the proposed model. Given that the general trend in tax efficiency across countries has been upward—toward more efficient tax systems and technology of taxation—a dynamic interpretation of the static model is consistent with the following predictions: (i) average growth in the size of government should be stronger in countries with a parliamentary form of government than in countries with a presidential form of government; and (ii) the variation in size of government should be higher in parliamentary countries. Both prediction (i) and prediction (ii) fit the observed empirical patterns. Comparing average growth in the relative size of government across the two regime types between 1960 and 1998, the governments in the parliamentary countries have grown almost five times faster than in the presidential governments. Moreover, the standard deviation in the size of government in parliamentary countries is more than three times the standard deviation in the size of government in presidential regimes in the same year. Hence, in contrary to the existing models in the literature on the effects of rules for legislative bargaining, the proposed model is consistent with observed cross-country patterns in the growth and variation of government spending.

There are several possible avenues for future research. First, it is important to analyze the comparative effects of different tax systems, as they may interact in different ways with different political systems. Second, the development of panel data on tax efficiency, either across countries or across different sub-national regime types, would strongly enhance the possibilities of statistical inference.²¹ As indicators of tax efficiency continue to be developed, the prospects of future empirical research within this field are indeed promising. Third, the form of government may interact with other features of the politico-economic environment, such as the electoral rules (Persson, Roland and Tabellini 2007), or lobbying (Helpman and Persson 2001). None of these models takes into account the distortionary costs of taxation, which may, as the present analysis show, have important effects for the equilibrium outcomes. Finally, not only the level of taxes, but also the tax systems, may indeed be endogenous to the political institutions. Besley and Persson (2007) show how economic institutions regarding legal and fiscal capacity are determined endogenously in an intertemporal game between present and future governments, and note that (p.17): “... we should see more investment in legal and fiscal capacity in such [ref. parliamentary] democracies ...”. Besley and Persson do however not explicitly include the rules for legislative

²¹Some researchers have divided sub-national governments into “presidential” or “parliamentary”, based on the local rules for legislation (see, e.g., Baqir, 2002).

bargaining in their model, and it is thus an open question whether their prediction regarding the effect of a parliamentary form of government holds true when taking legislative bargaining into account.

8 References

Acemoglu, D. 2005. "Constitutions, Politics and Economics: A Review Essay on Persson and Tabellini's The Economic Effects of Constitutions." *Journal of Economic Literature* 43: 1025-1048.

Alesina, A., R. Di Tella and R. MacCulloch. 2004. "Inequality and happiness: are Europeans and Americans different?" *Journal of Public Economics* 88: 2009-2042.

Alesina, A. and E. La Ferrara. 2005. "Preferences for Redistribution in the Land of Opportunities." *Journal of Public Economics* 89: 897-931.

Alesina, A. and G. Angeletos. 2005. "Fairness and Redistribution: US vs. Europe." *American Economic Review* 95: 913-35.

Auerbach, A.J. 2005. "Who Bears the Corporate Income Tax: A Review of What We Know." NBER Working Paper No. 11686. Cambridge, Mass. National Bureau of Economic Research.

Battaglini, M. and S. Coate. 2007. "Inefficiency in Legislative Policymaking: A Dynamic Analysis." *American Economic Review* 97: 118-149.

Baqir, R. 2002. "Districting and Government Spending." *Journal of Political Economy* 110: 1318-1354.

Becker, G.S., and C.B. Mulligan. 2003. "Deadweight Costs and the Size of Government." *Journal of Law and Economics* vol. XLVI: 293-340.

Becker, G.S., and C.B. Mulligan. 1998. "Deadweight Costs and the Size of Government." NBER Working Paper No. 6789. Cambridge, Mass. National Bureau of Economic Research.

Besley, T. 2006. *Principled Agents? The Political Economy of Good Government*, Oxford University Press, Oxford.

Besley, T. and T. Persson. 2007. "The Origins of State Capacity: Property Rights, Taxation, and Politics." NBER Working Paper No. 13028. Cambridge, Mass. National Bureau of Economic Research.

Brennan, H.G. and J.M. Buchanan. 1980. *The Power to Tax: Analytical Foundations of a Fiscal Constitution*. Cambridge, Mass. Cambridge University Press.

Drazen, A. and N. Limão. 2008. "A Bargaining Theory of Inefficient Redistribution Policies." *International Economic Review* 49, 621-657.

Easterly, W. and S. Rebelo. 1993. "Fiscal Policy and Economic Growth: An Empirical Investigation." *Journal of Monetary Economics* 32: 417-58.

Feldstein, M. 1999. "Tax Avoidance and the Deadweight Loss of the Income Tax." *The Review of Economics and Statistics* 81: 674-680.

Fisman, R. and S. Wei. 2004. "Tax Rates and Tax Evasion: Evidence from "Missing Imports" in China." *Journal of Political Economy* 112: 471-495.

Harberger, A. 1964. "Taxation, Resource Allocation, and Welfare." in J. Due (ed.), *The Role of Direct and Indirect Taxes in the Federal Revenue System*, Princeton University Press, Princeton, NJ.

Helpman, E. and T. Persson. 2001. "Lobbying and Legislative Bargaining." *Advances in Economic Analysis & Policy* 1: Iss.1, Article 3.

Huber, J.D. 1996. "The Vote of Confidence in Parliamentary Democracies." *American Polit. Sci. Rev.* 90: 269-282.

Peltzman, S. 1980. "The Growth of Government." *Journal of Law and Economics* 23: 209-87.

Persson, T., G. Roland, and G. Tabellini. "Comparative Politics and Public Finance." mimeo, IGIER, 1997.

Persson, T., Roland, G., and G. Tabellini. 2000. "Comparative Politics and Public Finance." *Journal of Political Economy* 108: 1121-1161.

Persson, T., Roland, G., and G. Tabellini. 2007. "Electoral Rules and Government Spending in Parliamentary Democracies." *Quarterly Journal of Political Science* 2: 155-188.

Persson, T. and G. Tabellini. 2000. *Political Economics: Explaining Economic Policy*, Cambridge MA, MIT Press.

Persson, T. and G. Tabellini. 2003. *The Economic Effects of Constitutions: What Do the Data Say?*, MIT Press, Cambridge MA.

Slemrod, J. 2007. "Cheating Ourselves: The Economics of Tax Evasion." *Journal of Economic Perspectives* 21: 25-48.

Summers, L.H., J. Gruber and R. Vergaram. 1993. "Taxation and the Structure of Labor Markets: The Case of Corporatism." *Quarterly Journal of Economics* 108: 385-411.

Wilson, J.D. 1990. "Are Efficiency Improvements in Government Transfer Policies Self Defeating in Political Equilibrium?" *Economics and Politics* 2: 241-58.

Appendix

A1 A primitive regime type

In the primitive regime type, building on the "simple legislature" in Persson, Roland and Tabellini (2000), there are no specific rules guiding the process of legislative bargaining ensuring accountability or representativeness. That is, the primitive regime represents the simplest possible general setup of a representative democracy, and is defined by the following sequence of events: (1) nature randomly selects an agenda setter a among the three legislators; (2) voters formulate their reelection strategies $\{b^i\}$, which become publicly known; (3) legislator a proposes a public policy \mathbf{q}_t ; (4) the legislature votes on the proposal. If a majority (at least two legislators) support the proposal, it is implemented. If not, a default policy is implemented, with $\tau = \frac{s^i}{(1-\alpha)} = \sigma > 0$ and $g = r^i = 0$; (5) elections are held. Voting is retrospective, and voters thus condition their

votes on the position of their representative in the legislature: $D_{t+1}^l = 1$ if $U^i(\mathbf{q}_t) \geq b^i$, $i = l$ at t .

Proposition A1 *The equilibrium in the primitive regime type is characterized by the following equilibrium features:*

$$\tau^P = \begin{cases} 1 & \text{if } \alpha \in [0, \frac{2}{3}] \\ \frac{1-\delta}{1-\delta/3} + \frac{1}{3(1-\alpha)} H_g^{-1} \left(\frac{1}{3(1-\alpha)} \right) & \text{if } \alpha \in (\frac{2}{3}, 1) \end{cases} ; \quad (20)$$

$$s^P = \frac{1-\delta}{1-\delta/3} [3(1-\alpha)]; \quad (21)$$

$$g^P = \begin{cases} \min \left[H_g^{-1}(1), \frac{2\delta(1-\alpha)}{1-\delta/3} \right] & \text{if } \alpha \in [0, \frac{2}{3}] \\ \min \left[H_g^{-1} \left(\frac{1}{3(1-\alpha)} \right), \frac{2\delta(1-\alpha)}{1-\delta/3} \right] & \text{if } \alpha \in (\frac{2}{3}, 1) \end{cases} ; \quad (22)$$

$$r^{aP} = \begin{cases} \frac{2\delta(1-\alpha)}{1-\delta/3} - g^P \geq 0 & \text{if } \alpha \in [0, \frac{2}{3}] \\ 0 & \text{if } \alpha \in (\frac{2}{3}, 1) \end{cases} ; \quad (23)$$

$$r^{iP} = 0 \text{ for } i \neq a; \quad (24)$$

$$b^{aP} = \begin{cases} H(g^P) - g^P + \frac{2\delta(1-\alpha)}{1-\delta/3} & \text{if } \alpha \in [0, \frac{2}{3}] \\ H(g^P) - g^P - \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} & \text{if } \alpha \in (\frac{2}{3}, 1) \end{cases} ; \quad (25)$$

$$b^{iP} = H(g^P) \text{ for } i \neq a \text{ if } \alpha \in \left[0, \frac{2}{3} \right]. \quad (26)$$

$$b^{iP} = H(g^P) - g^P - \frac{3(1-\alpha)(1-\delta)}{1-\delta/3} \text{ for all } i \text{ if } \alpha \in \left(\frac{2}{3}, 1 \right) \quad (27)$$

All politicians are reelected.

Proof. First, consider the legislators demand for diversion. For a to seek reappointment, her expected continuation rents from holding office must be at least as high as the maximum expected rents she can get from exploiting her current status and being expelled by her constituency. Moreover, a must, in any case, offer $s^m \geq \sigma(1-\alpha) - \delta W$ to one of the other legislators (legislator m) to win approval. Thus, a seeks reappointment only if $s^a + \delta W \geq (3-\sigma)(1-\alpha)$. Hence, a and m jointly seek reappointment only if $s = 3(1-\alpha) - 2\delta W$. In equilibrium, all l are reappointed and the equilibrium continuation value W may be expressed as $W = \frac{s}{3} + \delta W$, implying that $W = \frac{1-\alpha}{1-\delta/3}$. Inserting back into the expression for s we get the equilibrium diversion s^P given by equation (21) in Proposition A1.

Second, consider the problem of voters a . Because of Bertrand competition for redistribution among voters $i \neq a$, $r^i = 0$ and all potential redistribution in equilibrium benefit voters a (Eq. (24) defined). Hence, voters a maximize $1 - \tau + H(g) + r$, subject to $3(\tau - 1)(1 - \alpha) + 2\delta W \geq r + g$.²² Now, consider the tax incentives of voters a . Voters a recognize that all

²²We arrive at this condition by substituting the incentive compatibility constraint given by s^L into the governments budget constraint.

excess revenues in the government budget, after the public good is financed, will be redistributed towards themselves. However, raising tax revenues comes with a cost, given by the marginal tax cost $\alpha > 0$. Voters a will demand the maximum tax rate $\tau = 1$ if the marginal benefit, $2/3$, weakly exceeds the marginal cost; $\alpha \in [0, \frac{2}{3}]$. Note, however, that taxes can in equilibrium never be set to zero, even if $\alpha \in (\frac{2}{3}, 1)$. To realize this, first note that in all equilibria $3\tau(1-\alpha) \geq s^P$. Hence, $\tau > 0$ even if $\alpha \in (\frac{2}{3}, 1)$. Moreover, taxes are further raised up to the point where the marginal benefit, in terms of higher public goods provision, equals the marginal cost $\frac{1}{3(1-\alpha)}$, as perceived by voters a (Eq. (22) defined.). The tax rate satisfying this condition is defined by $3\tau(1-\alpha) = s^P + H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right)$, where $H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right) < H_g^{-1}(1)$ because $\frac{1}{3(1-\alpha)} > 1$. Solving for τ gives the equilibrium tax rate g^P in Proposition A1, eq. (20).

Third, all residual resources, if any, are transferred to voters a , as demonstrated in eq. (23).

Fourth, voters reservation utilities reflects the status of their respective representative. Hence, only voters a may expect to benefit from potential residual redistributive favours, as shown in eq. (25). Voters $i \neq a$ compete for redistribution in a Bertrand manner, and do, in equilibrium, not expect any redistribution, as shown in eq. (26). This completes the proof of Proposition A1. ■

A2 Proof of the maximization problem in Proposition 2

Inserting for s' in the budget restriction and solving for τ , gives $\tau = \frac{g}{3(1-\alpha)} + \frac{r^a}{3(1-\alpha)} + \frac{r^m}{3(1-\alpha)} - \frac{2\delta/3}{3(1-\alpha)(1-\delta/3)} + \frac{1-\delta}{1-\delta/3}$. Inserting back into the object function of voters a , and optimizing, gives the following necessary Kuhn Tucker optimality conditions:

$$-\frac{1}{3(1-\alpha)} + H_g + \lambda \left[-\frac{1}{3(1-\alpha)} + H_g \right] - \mu \frac{1}{3(1-\alpha)} = 0; \quad (28)$$

$$-\frac{1}{3(1-\alpha)} + 1 + \lambda \left[-\frac{1}{3(1-\alpha)} \right] - \mu \frac{1}{3(1-\alpha)} + \omega^a = 0; \quad (29)$$

$$-\frac{1}{3(1-\alpha)} + \lambda \left[-\frac{1}{3(1-\alpha)} + 1 \right] - \mu \frac{1}{3(1-\alpha)} + \omega^m = 0; \quad (30)$$

where λ , μ , ω^a , and ω^m are the multipliers of equations (16) through (17), respectively. Equations (29) and (30) imply that $\lambda = 1 + \omega^a - \omega^m$. Equations (28) and (29) imply that

$$g^R = H_g^{-1} \left(\frac{1 + \omega^a}{2 + \omega^a - \omega^m} \right). \quad (31)$$

If $\tau < 1$, then $\mu = 0$, and hence $\frac{1}{3(1-\alpha)} = \frac{1+\omega^a}{2+\omega^a-\omega^m}$, implying $\omega^a = \frac{3\alpha-1-\omega^m}{2-3\alpha}$. The solution is thus critically depending on the value of the tax cost parameter α :

(i) When $\alpha \in [0, \frac{2}{3}]$, $\omega^a = \frac{3\alpha-1-\omega^m}{2-3\alpha}$ is impossible, and hence $\tau = 1$. If $\omega^m = \omega^a = 0$, then $\lambda = 1$ and $g^R = H_g^{-1}(1/2)$. If $\omega^m = 0$, then $H_g^{-1}(1) < g^R = H_g^{-1}\left(\frac{1+\omega^a}{2+\omega^a}\right) < H_g^{-1}(1/2)$. If $\omega^a = 0$, then $g^R = H_g^{-1}\left(\frac{1}{2-\omega^m}\right) < H_g^{-1}(1/2)$. In this last case, by eq. (16), with $r' > 0$, it must

be the case that $g^R > g'$. If $r' = 0$, there is no surplus to be shared by the government coalition and, hence, $g^R = g'$.

(ii) When $\alpha \in (\frac{2}{3}, 1)$, $\omega^a = \frac{3\alpha-1-\omega^m}{2-3\alpha}$, $\omega^m, \omega^a \neq 0$, and hence $r = 0$. More specifically, when there, in equilibrium, is no room for redistribution, optimal public goods provision is found by substituting $\omega^a = \frac{3\alpha-1-\omega^m}{2-3\alpha}$ into eq. (31), which gives that $g^R = H_g^{-1}\left(\frac{1}{3(1-\alpha)}\right) < H_g^{-1}(1)$. To see this, note that any positive amount of redistribution would violate voter demands, as defined in eq. (16) – that is, the voters in at least one of the constituencies $i = a, m$ would prefer a government crisis to an outcome with a positive level of redistribution.

A3 Empirical evidence: Comparing top statutory marginal tax rates

The tables below report mean values, standard deviations and t-statistics on the hypothesis of equal mean top statutory marginal tax rates in ‘presidential’ and ‘parliamentary’ democracies. The samples in Tables A1, A2 and A3 correspond to the samples in Table 1, 2 and 3, respectively. Data on marginal tax rates are taken from the World Bank’s WDI database. In the tables, *mtax_corporate* is the highest marginal corporate tax rate and *mtax_individual* is the highest marginal individual tax rate, in a given country in 1998. 1998 is the first year in which these data are available.

Table 4: Average top statutory marginal tax rates, full sample.

	Presidential	Parliamentary	$\Pr(T > t)$
Mean <i>mtax_corporate</i>	29.5 (18)	30.4 (23)	0.7112
St.dev. <i>mtax_corporate</i>	7.2	7.7	
Mean <i>mtax_individual</i>	31.5 (15)	41.0 (22)	0.0006
St.dev. <i>mtax_individual</i>	7.9 (15)	8.6	

Note: The parentheses indicate sample size. $\Pr(|T|>|t|)$ is the significance level of the t-test, where the null hypothesis is equal means.

Table 5: Average top statutory marginal tax rates, time-consistent sample.

	Presidential	Parliamentary	$\Pr(T > t)$
Mean <i>mtax_corporate</i>	29.0 (6)	32.5 (8)	0.3138
St.dev. <i>mtax_corporate</i>	7.9	4.6	
Mean <i>mtax_individual</i>	34.0 (6)	37.9 (8)	0.3001
St.dev. <i>mtax_individual</i>	7.3	6.1	

Note: The parentheses indicate sample size. $\Pr(|T|>|t|)$ is the significance level of the t-test, where the null hypothesis is equal means. Note that data on marginal tax rates for Venezuela in 1998 is missing.

Table 6: Average top statutory marginal tax rates, strictly democratic sample.

	Presidential	Parliamentary	$\Pr(T > t)$
Mean <i>mtax_corporate</i>	33.5 (4)	32.6 (13)	0.7652
St.dev. <i>mtax_corporate</i>	2.4	5.5	
Mean <i>mtax_individual</i>	32.3 (4)	42.9 (13)	0.0437
St.dev. <i>mtax_individual</i>	6.3	8.9	

Note: The parentheses indicate sample size. $\Pr(|T|>|t|)$ is the significance level of the t-test, where the null hypothesis is equal means. Note that data on marginal tax rates for Venezuela in 1998 is missing.