Comparative Politics and Public Finance*

Torsten Persson† Gerard Roland‡ Guido Tabellini§

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Abstract

We propose a model with micropolitical foundations to compare the public finance outcomes under different political regimes. Compared to a parliamentary regime, the institutions of a presidential-congressional regime produce less incentives for legislative cohesion, but entail a clearer separation of powers. These features create important differences in public finance outcomes. A parliamentary regime has redistribution towards a majority, less underprovision of public goods, more rents to politicians and a higher tax burden, whereas a presidential-congressional regime has redistribution towards powerful minorities, more underprovision of public goods, but less rents to politicians and a smaller government. The predictions regarding the size of government are consistent with recent cross-country data.

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†IIES, Stockholm University; CEPR; NBER. E-mail: Torsten.Persson@iies.su.se

‡ECARE, University of Brussels; CEPR. E-mail: groland@ulb.ac.be.

§IGIER, Bocconi University; CEPR. E-mail: Guido.Tabellini@uni-bocconi.it

1. Introduction

The level and composition of government spending displays enormous variation, both over time and across countries. In a sample of 17 industrialized democracies, the average government expenditure as a fraction of GDP grew from about 12% in 1913 to about 45% in 1990; but the 1990 level ranged from about 32% in Japan to about 59 % in Sweden.[1] Furthermore, while the average GDP share of transfers and subsidies grew very rapidly, from about 8 % in 1960 to about 23 % in 1990, government consumption only increased from about 12 % to 17 %, whereas public investment was almost flat; the cross-country variation is also considerable in these dimensions. In a broader sample of 54 democracies, the cross-country variation in the size and scope of government is even greater (see Section 6, below).

It is fair to say that the economics profession has failed to convincingly explain these first-order differences in public finance outcomes. Research in traditional public finance does not ask the question, since its policy analysis is mostly normative and abstracts from the underlying political institutions generating public finance outcomes. Research in traditional public choice and, more recently, in political economics does attempt to explain actual policy outcomes. So far, however, it has only come up with fragmented explanations for the growth, size, and scope of government.[2]

In our view, a successful positive theory of public finance in a democracy should rest on appropriate micro-political foundations, analyzing the incentives for collective policy decisions entailed in different political regimes. In this paper, we try to take a step towards building such micro-political foundations. More specifically, we try to demonstrate how key differences between real-world political regimes can create systematic differences in collective decisions on taxation, redistribution, public good provision, and rent-seeking.

In our view, a convincing analysis of democratic policy formation should rely on three basic assumptions: (1) *No benevolent actors*: all agents, including politicians, are motivated by their own selfish objectives. (2) *No direct policy decisions*: citizens delegate policy decisions to their political agents. Although delegation should ideally be endogenously derived, we take the prevalence of representative democracy as a starting point, which reflects either specialization in acquiring competence and information, or the practical difficulty in using direct democracy

[1] The data are taken from Tanzi and Schuknecht (1995, 1997).

[2] See Dixit (1996), Persson and Tabellini (1999a), and the contributions in Mueller (1997) for recent surveys of positive modeling of public finance in political economics and public choice.

in all policy decisions. (3) *No outside enforcement:* political candidates cannot commit to policy platforms ahead of the elections. Elected political offices, whether executive or legislative, give important powers that are always partly—sometimes even greatly—unchecked. Unbiased enforcement of electoral promises is therefore not feasible and not observed in the real world. Representatives thus only have limited commitment capacity. Together with non-benevolence and delegation, no enforcement implies an agency problem between voters and their representatives that cannot easily be resolved by political competition, as the incentives of politicians cannot be sharply tailored towards efficient outcomes.

Our three basic assumptions appear in many existing positive models of policy making. But the three are seldom explicitly combined, and their full implications are rarely studied. The traditional public choice school comes close in its emphasis of the agency problem (see, for instance, Brennan and Buchanan (1980)). But it is not very formal in specifying the underlying assumptions, and sometimes neglects the role of elections and other political institutions in disciplining political agents. Moral hazard models of elections (Barro (1973) and Ferejohn (1986)), on the other hand, study how elections may discipline political representatives, but they do not study different institutions. Median-voter models sometimes refer to policy choice under direct democracy (Meltzer and Richard (1981)). But a more convincing interpretation is that they capture the outcome of electoral competition between two office-motivated politicians who can commit to state contingent electoral promises (Downs (1957)), thus implicitly violating the assumption of no outside enforcement. Likewise, models of lobbying and electoral competition among selfish candidates under probabilistic voting assume that some political actors—lobbies, politicians, or both—can undertake explicit commitments (Grossman and Helpman (1994), (1996), Lindbeck and Weibull (1987), Dixit and Londregan (1996)). Models of partisan politics remove the commitment assumption, but typically consider ideological policymakers with altruistic objective functions (Alesina (1988), Alesina and Rosenthal (1996)). Recent models of representative democracy (Besley and Coate (1997)) essentially rely on the same three basic assumptions, but impose restrictions on what policy can do, thereby ruling out the agency problem.

We build a model of public finance outcomes under alternative political institutions that incorporates these assumptions. In our model, the political process must determine a level of taxation, as well as an allocation of tax revenues to public goods, redistribution among voters, and rents for politicians. This public finance problem creates three conflicts of interest: policy-makers may abuse their

power in office and capture public funds for their own benefit at the voters' expense; different groups of voters disagree on the allocation of tax revenues; and the political representatives, who each pursues her own career and personal interests, disagree over the distribution of current and future rents.

Why would these conflicts of interest be resolved differently under different constitutions? The answer is that our basic assumptions imply that a political constitution must be an *incomplete contract.* A constitution can only specify an allocation of decision-making authority to specific groups or individuals: who makes policy proposals, who can approve, amend, or veto them, and who appoints the representatives exercising this authority.[3] Given the three-dimensional conflict in our policy problem, the outcome hinges on how and by whom these authorities are exercised. We illustrate this general point by contrasting two main types of democracies: presidential-congressional vs. parliamentary regimes. In doing so, we concentrate on two important features of these regimes: "separation of powers" and "legislative cohesion", and ask how they shape public finance outcomes.

Separation of powers is present in all modern democracies in some form. Since Locke, Montesqieu and the founding fathers of the American constitution, it is common to consider such separation as limiting abuse and increasing accountability of elected policy-makers. Persson, Roland and Tabellini (1997) show formally that conflicts of interest between different politicians can indeed be exploited by the voters in order to reduce the agency problem. But this requires that the constitution allocates the rights to propose and veto legislation across different representatives to create the right checks and balances.

Legislative cohesion refers to disciplined voting by members of a governing coalition. The pioneering work of Diermeier and Feddersen (1998) shows that legislative cohesion arises when it is costly for a majority coalition to break up, since it loses valuable agenda-setting powers associated with participation in the coalition. The extent to which a political regime displays legislative cohesion thus largely depends on the rights laid down by the constitution concerning the formation and dissolution of governments.

A *presidential-congressional* regime of the US type has *more* separation of powers but *less* legislative cohesion than a parliamentary regime of the European type. Direct election of both the executive and the legislature makes each branch of government directly accountable to the voters. This diminishes the opportu-

[3] This is in close parallel to incomplete contract theory as applied to the governance of firms (see Hart (1995)), which deals with the consequences for firm decisions of the precise allocation of decision-making authority to different stakeholders, such as owners, managers, and creditors.

nities for collusion between the branches of government and can even create outright conflicts between them, as in the case of "divided government". Moreover, the proposal powers over legislation typically reside with powerful congressional committees, and different committees hold power over different policy dimensions. Hence, not only is there effective separation of powers between executive and legislature, but powers within the legislature are also dispersed. As a result, legislative majorities often change from issue to issue. In particular, no stable congressional majority is needed to support the executive, as the latter is directly elected for an entire election period and cannot be voted down by Congress.

In a *parliamentary* regime, by contrast, the executive is only indirectly appointed by the voters and instead derives its power from the support by a majority coalition in the legislature. In addition, the agenda-setting powers over legislation are typically associated with ministerial portfolios, and the policy initiative thus belongs to the government coalition as long as it has the confidence of a majority in parliament. As a result, parliamentary regimes entail less separation of powers than congressional regimes, both between executive and legislature and between different legislators. Moreover, government crises can erupt during an election period, due to the rights of initiating votes of confidence or non-confidence, of dissolving the government, or calling early elections. As shown by Huber (1996), the power to associate a vote on a bill with a vote of confidence reduces the bargaining power of the coalition partners who fear the negative consequences of a government crisis. Precisely because partners in a government coalition risk losing valuable agenda-setting powers after a government crisis, the coalition has strong incentives to form a stable legislative majority that does not shift from issue to issue, as shown by Diermeier and Feddersen (1998). Note that this argument goes beyond party discipline: cohesion *between* parties supporting coalition governments is typically much higher than cohesion *within* parties in the US congress.[4]

Our modeling builds on several earlier contributions. Our goal is to compare alternative political constitutions, representing the key features of each regime with a very stylized model of the policy process. Specifically, the public-finance instruments are chosen in a sequence of simple legislative-bargaining games, in

[4]Naturally, not all parliamentary regimes exhibit the same degree of legislative cohesion, because rules for government breakup and formation differ accross countries (see Huber (1996) and Baron (1998)). Similarly, not all presidential regimes entail the same separation of powers: in the French fifth republic, agenda setting powers rest within the government, which, in turn, is accountable to the legislature; in many Latin-American countries, the legislatures have much weaker powers relative to the president than in the US. See also Lijphart (1992) and Shugart and Carey (1992) for further discussion of these issues.

the style of Baron and Ferejohn (1989); the extensive form of the game represents the specific constitutional procedure. This legislative bargaining is embedded in the same infinitely repeated electoral framework, where voters in each different district hold their legislator accountable for past performance in first-past-the-post elections, as in Ferejohn (1986). Separation of powers in presidential regimes is modeled as in Persson, Roland and Tabellini (1997), namely as an assignment of very sharp proposal rights over different policy dimensions to different politicians. Legislative cohesion in our model of a parliamentary regime is obtained through a simplified version of the model formulated in Diermeier and Feddersen (1998), by assuming that the agenda-setting powers are reallocated, if the legislative coalition breaks down.[5]

Our results suggest that the two political regimes are associated with very different policy outcomes. Separation of powers in the congressional regime produces a smaller government, with less waste, less redistribution, but also inefficiently low spending on public goods. Intuitively, separation of powers enables the voters to discipline the politicians, and this reduces waste and moderates the tax burden. The sharp conflict of interest among politicians, however, prevents them from internalizing all benefits of public good provision. Legislative cohesion in the parliamentary regime, on the other hand, leads to a larger government, with more taxation and more waste, but also more spending on public goods and redistribution benefiting a broader group of voters. Intuitively, there is now more scope for collusion among politicians, which increases waste and taxation. But policy aims to please a majority group of voters which increases public good provision, calls for a more equal redistribution, and makes the majority support a high level of taxation.

These results could help explain some of the observed differences in patterns of spending and taxation among modern democracies. At the end of the paper, we report preliminary evidence based on Persson and Tabellini (1999b), showing that, everything else equal, the size of government in presidential-congressional regimes is smaller than in parliamentary regimes by about 10% of GDP. There is less evidence of significant differences in the composition of public spending across regimes, but distinguishing empirically global from local public goods and redistribution is more difficult and necessitates further research.

From a normative point of view, our results point to a trade-off. A well-functioning presidential regime performs better in terms of accountability, because

[5] Compared to Diermeier and Feddersen (1998), our model is deterministic and continuation values after a government crisis are obtained via a simpler continuation game.

it can cope well with the agency problem between voters and politicians. But a parliamentary regime is better in terms of global public good provision, because it solves the conflict between groups of voters more effectively.

In the following, we first introduce the notation and present the basic policy problem (Section 2). We then study the political equilibrium in a "simple legislature" which has neither separation of powers nor legislative cohesion (Section 3). After these preliminaries, we derive our main results, first for a presidential-congressional regime with separation of powers (Section 4), then for a parliamentary regime with legislative cohesion (Section 5). We then briefly consider the evidence (Section 6). Last (Section 7) we discuss prospective extensions.

2. A basic model of public finance

Consider a society with three distinct groups of citizens, denoted by $i = 1, 2, 3$. We shall consider these groups as distinguished by their geographical location. Other interpretations are possible, but less natural. Three groups is the minimum number for looking at interesting legislative bargaining under majority rule, but we could carry out the analysis with more than three groups at the cost of more cumbersome algebra. Each group has a large number of identical members: formally we assume that each group has a continuum of voters with unit mass. Time is measured discretely: a typical time period is denoted by t. We consider an infinite horizon.

Preferences of a member of group i in an arbitrary starting period j are given by:

$$u_j^i = \sum_{t=j}^{\infty} \delta^{(t-j)} U^i(q_t), \tag{2.1}$$

where $\delta < 1$ is a discount factor, q_t is a vector of policies at t (to be defined below), and U^i is the per period utility function. The latter is assumed to be quasi-linear in the consumption of private and public goods:

$$U^i(q_t) = c_t^i + H(g_t) = 1 - \tau_t + r_t^i + H(g_t), \tag{2.2}$$

where τ_t is a common tax rate, r_t^i is a transfer payment to group i, and g_t is the supply of Samuelsonian public goods evaluated by the concave and monotonically increasing function $H(g_t)$. We assume that these goods are valuable to citizens, in the sense that $H_g(0) > 1$.

We define the public policy vector q as:

$$q_t = [\tau_t, g_t, \{r_t^i\}, \{s_t^l\}],$$

where all components are constrained to be non-negative. In an economic model, it would only be necessary to distinguish the net government transfer to each group $r_t^i - \tau_t$. But in the political models to be considered below, it is of crucial importance to distinguish the two components, particularly when different politicians have agenda-setting rights over taxes and spending. The component $\{s_t^l\}$ captures the possible diversion of resources by politicians. As discussed in Persson, Roland and Tabellini (1997), we can think of $\{s_t^l\}$ as the financing of political parties, as outright diversion, or as an allocation of resources benefiting the private agenda of the legislators but not the citizens. These diversions benefit some politicians more than others: thus, s_t^l denotes the diversion benefiting legislator l, but no other legislator. From the viewpoint of the citizens, these rents for the legislators represent pure waste. It is natural to think that this diversion takes place in connection with public goods production, g_t.[6] This association between resource diversion and public good provision will play a role below, with reference to the allocation of agenda-setting rights over the various policy instruments.

The public policy vector in period t must satisfy the government budget constraint:

$$3\tau_t = \sum_i r_t^i + \sum_l s_t^l + g_t \equiv r_t + s_t + g_t, \tag{2.3}$$

where r_t and s_t in the rightmost expression, denote aggregate redistributive expenditures and aggregate waste.

To make the public finance problem more interesting, we could extend the model with some private choices distorted by taxation. This would make our results quantitatively, but not qualitatively, different. Note, however, that the micro-political problem inherent in this formulation is quite general: it involves activities benefiting every citizen (g_t and $-\tau_t$) benefiting some citizens but not others ($\{r_t^i\}$), and benefiting some politicians but not others ($\{s_t^l\}$). As we shall see, the trade-off on each different margin of policy choice plays a non-trivial role in shaping the results.

[6] Tanzi and Davoodi (1997) and Mauro (1998) provide empirical evidence consistent with this hypothesis: within OECD countries, as well as in a larger sample, various forms of corruption are indeed strongly associated with expenditure on public projects and infrastructures or with purchases of intermediate goods.

Which public policy would a Pigovian social planner—of the traditional public finance school—choose in this setting? Suppose the planner had a symmetric social welfare function, defined over the utility of the three groups of voters. First of all, the planner would choose to set $s_t^l = 0$. Moreover, with quasi-linear utility, non-distortionary taxes and a symmetric social welfare function, optimal redistributive expenditure is only determined up to the same present value for each group. It is thus always efficient to have $r_t^i = 0$; if taxes were even slightly distortionary, any positive redistribution would strictly decrease welfare. Even without distortionary taxation, any *unequal* redistribution within any period t across symmetric regions with homogeneous voters would also strictly decrease welfare if the utility of private consumption was concave. A Pigovian planner would thus set g_t in any period t so as to maximize:

$$\sum_i U^i(q_t) = 3[1 - \tau_t + H(g_t)] = 3[1 - \frac{g_t}{3} + H(g_t)],$$

yielding the first order condition $3H_g = 1$. The first-best policy is thus to supply public goods up to the point where its marginal aggregate benefit is equal to its marginal social cost, and to raise no more revenue than necessary to finance this optimal public goods provision.

Which public policy would a Leviathan policymaker—of the traditional public choice school—choose? In the absence of any other constraints, the power to generate personal rents would push taxes in any given period towards their maximum, $\tau_t = 1$, diversion towards its maximum, $s_t = 3$, and public goods and redistribution towards their minimum, $g_t = r_t = 0$. Whereas the Leviathan and Pigovian policymakers might agree on the extent of redistribution to voters, they would strongly disagree on the other aspects of public finance. In the paper, however, we leave both the benevolent and the malevolent caricature of the almighty policymaker aside. Instead, we ask what predictions we might get from more structural models of democratic policy choice, within specific political institutions.

3. A simple legislature

We first study a hypothetical political institution labeled a "simple legislature". The simple legislature lacks important characteristics of modern political regimes. Unlike a US style presidential-congressional regime, it does not entail a clear separation of powers within the legislature or between the executive and the legislature.

Neither does it entail, as a parliamentary regime, institutions creating a cohesive majority in Parliament on which the government can count to pass legislative proposals. We mainly use this section to illustrate, in a simple setting, three fundamental political failures: under-provision of public goods, wasteful allocation of tax revenues, and redistribution towards a powerful minority. This sets a point of departure for later sections, where we show the effect of separation of powers and legislative cohesion on these three political failures.

In the simple legislature, each region i coincides with a voting district and is represented by exactly one legislator, so that $i = l = 1, 2, 3$. Separate elections under plurality rule take place in each of these voting districts. In period j, the incumbent legislator l has preferences over outcomes, given by:

$$v_j^l = \sum_{t=j}^{\infty} \delta^{(t-j)} V^l(q_t) D_t^l, \tag{3.1}$$

where the per-period utility is simply:

$$V^l(q_t) = s_t^l, \tag{3.2}$$

and where D_t^l is a dummy variable, equal to unity, if legislator l holds office in period t and zero otherwise. As in Persson, Roland, and Tabellini (1997), the politicians' payoffs are exclusively defined over the rents they endogenously derive from holding office and making policy decisions.[7] This does not imply that legislators only act in their own interest. As legislators value holding office and as voters will hold them accountable for their performance by retrospective voting, the threat of being ousted from office, in fact, makes legislators close to perfect delegates for their constituencies.[8]

[7] Formally, we can think of the rents s_t^i as adding to the legislators' consumption. The linear expression in (3.2) is then consistent with legislators having linear utility of consumption, as have the voters. The legislators' utility function would coincide with the utility function of voters in (2.2), if we added the concave utility of public goods; we omit this term, however, to simplify the analysis. As discussed in Persson and Tabellini (1999a), it would be straigthforward to add exogenous benefits from holding office as an additional motive for re-election and transaction costs in the diversion technology, so that politicians only capture a fraction of the resources diverted from voters.

[8] This framework, adapted from Ferejohn (1986), may appear special to some readers. We believe that many of our general results on comparative politics are likely to survive under a variety of assumptions about the motivation of politicians. As demonstrated in Persson (1998) and Persson and Tabellini (1999a), similar results emanate from a legislative bargaining

At the end of each time period each region holds an election where 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 candidates. Candidates are not inherently different in their competence or in any other attributes: each candidate has exactly the same preferences as the incumbent, once in office. An incumbent who is not reelected can never return.

In period t, the incumbent legislators elected to the simple legislature at the end of period $t-1$ decide on public policy in a very simple legislative bargaining game in the style of Baron and Ferejohn (1989). Specifically, this legislative bargaining in period t is embedded in the sequence of events illustrated in Figure 1, namely:

> (0) Nature randomly selects an agenda-setter a among the three legislators.
>
> (1) Voters formulate their re-election strategies, which become publicly known.
>
> (2) Legislator a proposes a public policy q_t.
>
> (3) 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 $\tau = s^l = \sigma > 0$ and $g = r^i = 0$.[9]
>
> (4) Elections are held.

Figure 1 about here

Once the policy has been implemented, voters observe the outcome of the legislative decision, and all elements in the policy vector. Note that, in line with the *no outside enforcement* assumption mentioned in the introduction, legislators cannot commit to a policy for the next period before the election. This lack of commitment creates contractual incompleteness. Voters can only punish politicians by not reelecting them. The discretionary powers enjoyed by politicians

framework, whether interest groups lobby finance-motivated legislators, or prospectively elect outcome-motivated legislators, rather than retrospectively reelect office-motivated legislators, as in this model.

[9] All qualitative results are valid if one assumes that the default diversion value σ is equal to zero. In the analysis, we keep $\sigma > 0$, since it allows us to better understand the effect of the default diversion.

between elections, however, makes it impossible for voters to insist on having $s_t^l = 0$ for all l in equilibrium. As shown by Persson and Tabellini (1999a), if legislators could commit to a policy before elections, electoral competition between the incumbent and the opponent in each district would force them to set $s_t^l = 0$. Thus, the rents extracted by politicians in equilibrium are a direct result of the contractual incompleteness of the political constitution.[10]

Given the infinite-horizon, there are many sequentially rational equilibria. Throughout the paper, we restrict our attention to equilibria where voters from the same constituency coordinate their strategies, but where voters across constituencies do not cooperate. Cooperation across constituencies with opposing interests on redistribution is not supported by the institutions analyzed and would only be supported by reputational concerns ignored by us. Coordination inside a constituency is more reasonable as all these voters are identical. Such coordination could be supported by the existence of alternative candidates campaigning on the policy that is in the best interest of the constituency. Throughout the paper, we also assume that all players (voters and politicians) are restricted to using strategies which condition their actions in period t on observable pay-off relevant information in period t only, and not on outcomes in any earlier period. This is a reasonable restriction if we assume that voters cannot commit to intertemporal reelection rules across periods. The restriction will effectively make the equilibrium outcome stationary, and we drop time subscripts when there is no risk of confusion.

We assume that voters in each district adopt simple retrospective voting rules, conditional on their representative having been the agenda setter in period t or not. Since we assume that voters in each district coordinate on the voting rule, this implies that:

$$\begin{aligned} D_{t+1}^l &= 1 \\ if \quad U^i(q_t) &\geq b_t^i, \qquad i = l \end{aligned}$$

for $i = a$ and $i \neq a$ at t. Finally, we assume that voters in all regions simultaneously

[10] Persson and Tabellini (1999a), (1999b), following Polo (1998) and Svensson (1997), discuss a setting with probabilistic voting, where endogenous rents from office are not dissipated by electoral competition, even if candidates can make binding commitments before the elections. This happens because alternative political candidates are not perfect substitutes for each other, so that the probability of winning the election does not discontinuously jump to zero for the candidate announcing marginally higher rents for herself.

set their "reservation utilities" b_t^i in a utility-maximizing fashion.[11] While voters cooperate within districts, they thus play Nash against all other districts; see the definition of equilibrium below. The vector of these reservation utilities, b_t, is thus known to politicians when the policy proposal is made, and is not altered by the voters in the course of period t. Due to this feature, legislators will act in the interest of their constituencies. Allowing voters to condition directly on the policy instruments or on the vote of the politicians would not change any of the results.

Our assumption about the time when voters formulate their strategies deserves some discussion. The timing means that the voters form their expectations and their demands on politicians once they know the institutional role of their representative at the beginning of the policy formation process. That is, voters want to hold their representative accountable for her deeds in the course of the legislative process. Allowing voters to re-optimize just before the election date would not change the results: as discussed below, the voting rule is ex-post optimal for the voters, since the incumbent and the opponent are identical in the eyes of the voters. Under a different timing, however, there would be many other equilibria, besides the one discussed here. Thus, our timing assumption really amounts to a selection criterion: among the possible equilibria emerging if voters do not commit to a voting rule, we select the only one that survives under the timing spelled out above. If legislators and candidates were inherently different in their competence or other attributes, however, the timing assumption would be more critical, since the equilibrium voting rule would no longer be ex-post optimal.[12]

An equilibrium of this game is defined as follows (the L superscript stands for the simple *L*egislature):

Definition 1. *An equilibrium of the simple legislature is a vector of policies $q_t^L(b_t)$ and a vector of reservation utilities b_t^L, such that in any period t, when all players take as given the equilibrium outcomes of periods $t+k$, $k \geq 1$:*

(I) for any given b_t, at least one legislator $i \neq a$ weakly prefers $q_t^L(b_t)$ to the default outcome;

[11] Retrospective voting conditional on economic outcomes has empirical support; see Lewis-Beck (1988) for general evidence. More specifically, Levitt and Snyder (1997) demonstrate how US federal dollars spent in a house district has a strong impact on the vote share of the incumbent (they also show, however, that direct transfers—the specific policy instrument of redistributive spending in our model—does not affect this vote share).

[12] Banks and Sundaram (1993, 1996) formulate retrospective voting models with heterogeneity among candidate types together with asymmetric information over types.

(II) for any given b_t, the agenda-setting legislator a prefers $q_t^L(b_t)$ to any other policy satisfying (I);

(III) The reservation utilities b_t^{iL} are optimal for the voters in each district i, taking into account that policies in the current period are set according to $q_t^L(b_t)$ and taking as given the reservation utilities in other regions b_t^{-iL} and the identity of the agenda setter.

A unique and stationary equilibrium satisfies these conditions. Its properties are summarized in the following proposition:

Proposition 1. *In the equilibrium of the simple legislature:*
$\tau^L = 1$;
$s^L = 3\frac{(1-\delta)}{1-\delta/3}$;
$\mathrm{g}^L = Min(\ \widehat{g}, \frac{2\delta}{1-\delta/3})$, *where* $\widehat{g}$ *is such that* $H_g(\widehat{g}) = 1 > 1/3$;
$r^{aL} = \frac{2\delta}{1-\delta/3} - g^L \geq 0$, $r^{iL} = 0$ *for* $i \neq a$;
$b^{aL} = H(g^L) - g^L + \frac{2\delta}{(1-\delta/3)}, \quad b^{iL} = H(g^L)$ *for* $i \neq a$.
All politicians are re-elected.

Thus, in equilibrium taxes are maximal, public goods are underprovided relative to the social optimum, some redistribution goes to a minority of voters (unless the public good is very valuable, in which case there is no redistribution at all), and the legislators appropriate positive rents from office.

To understand how the model works, it is useful to prove this proposition in steps. Consider districts $m, n \neq a$. We start with the following:

Lemma 1. *In equilibrium,* $r^m = r^n = 0$.

Proof. Note that any equilibrium entails a minimum winning coalition: that is, the equilibrium proposal is only approved by one other legislator besides the agenda setter. To get the support of the third legislator, the agenda setter would have to spend resources either on her or her district. But these resources are better used to increase s^a. Hence, if legislator n, say, is excluded from the winning coalition, then $s^n = r^n = 0$. By the same logic, the district included in the winning coalition is the one whose vote is the cheapest to buy. As all legislators have the same default payoffs, which district is cheapest to buy only depends on the reservation utilities, b^n and b^m, demanded by the voters. Realizing this, the voters in districts m and n have an incentive to underbid each other up to the

point where $r^m = r^n = 0$, that is up to the point where $b^m = b^n = 1 - \tau + H(g)$. QED.

In other words, the voters become engaged in a "Bertrand competition" game for the redistributive favors of the agenda setter. The utility of voters in district m is discontinuous in the reservation value b^m, at the point where $b^m = b^n$, unless $r^m = 0$. The same argument holds for voters in n. Hence the only equilibrium is at the corner where $r^m = r^n = 0$.

Next, define W as the expected equilibrium continuation value for each legislator at the start of each period, before nature has selected the agenda setter. Then we have:

> **Lemma 2.** *In equilibrium, $s \geq 3 - 2\delta W$ and all legislators are reappointed.*

Proof. Consider the optimal behavior of the agenda setter, and let m be the other legislator supporting her proposal. Then, if a seeks reappointment, she will never offer more to m than:

$$s^m = \sigma - \delta W, \tag{3.3}$$

as this is what would leave m indifferent between voting yes and being reappointed, or voting no, getting the default payoff σ and then losing the election.[13]

Suppose instead a does not seek reappointment, and makes a proposal that would lead to a loss of office for all legislators, under the given voting rules. In this case, she has to offer at least σ to m to win approval of her proposal. Because she does not care about pleasing her voters, the agenda setter can appropriate all available resources, setting $g = r = 0$ and $\tau = 1$. Thus, a will seek reappointment if and only if:

$$s^a + \delta W \geq 3 - \sigma. \tag{3.4}$$

The left-hand side of (3.4) denotes the life-time utility of the agenda setter if she makes a proposal consistent with reappointment, under the given voting rule. The right-hand side is her maximal payoff, given that she does not seek reappointment and has to pay σ to m.

[13] To simplify the analysis, we assume that the parameters are such that in equilibrium $\sigma \geq \delta W$, to ensure that the non-negativity constraint on s^m is satisfied - otherwise, the qualitative results would hold, but the algebra would differ slightly. Given the equilibrium expression of W derived below, this assumption can also be stated as: $\sigma \geq \frac{\delta}{1-\delta/3}$.

By (3.3) and (3.4), legislators a and m will implement a policy leading to their reappointment if and only if:

$$s = s^m + s^a \geq 3 - 2\delta W. \tag{3.5}$$

The optimal voting rule can never be more demanding: if the legislators were induced to forgo reappointment, they would appropriate all resources and leave the voters with low utility. Hence, the optimal voting rule must satisfy (3.5), and both the agenda setter and the legislator supporting the proposal are reelected. The reservation utility of voters in districts m and n is the same, as both districts receive zero transfers (by Lemma 1). As these voters pay the same τ, and enjoy the same level of g, legislator n will also be re-elected. QED.

Note that (3.5) is an incentive compatibility condition on the overall diversion of resources. Note also that legislator a is the "residual claimant" on resources in period t for given reelection strategies. It is thus optimal for her, not only to minimize the payment to legislator m, but also to satisfy the reelection constraints of voters in districts a and m with equality, appropriating any remaining resources for herself. If consistent with her own reelection, she would thus like to set $\tau = 1$.

We are now ready to prove Proposition 1.

Proof of Proposition 1. Consider legislator a. As $r^a = r$, by Lemma 1, the policy maximizing the utility of voters in district a is the solution to:

$$Max\left[r + 1 - \tau + H(g)\right],$$

subject to the government budget constraint, (2.3), and the incentive constraint on legislators a and m, (3.5). Combining (2.3) and (3.5), these constraints can be written as:

$$3(\tau - 1) + 2\delta W \geq r + g. \tag{3.6}$$

The solution to this optimization problem implies: $\tau = 1$, $g = Min[H_g^{-1}(1), 2\delta W]$, $r = 2\delta W - g$, $s = 3 - 2\delta W$. Finally, by Lemma 2, all legislators are reappointed in equilibrium. We thus have:

$$W = \frac{s}{3} + \delta W. \tag{3.7}$$

Solving for W yields $W = \frac{1}{1-\delta/3}$. Inserting the result in the expressions above yields the equilibrium policies of Proposition 1. Inserting these policies in the voters' utility functions yields the equilibrium reservation utilities. By requiring

the voting strategies to maximize the utility of the representative voter in each district in any period, we are guaranteeing that the equilibrium is sequentially rational. As voters simultaneously choose their reelection strategies, no voter has any incentive to change her vote, given the optimal behavior by other voters and of legislators, if she considers herself pivotal.[14] QED.

This outcome is related to an equilibrium in the last section of Ferejohn (1986), where a single policymaker gets away with massive rents when voters directly compete for her favors. In the simple legislature considered here, voters compete across, but not within, districts, as redistribution only takes place across districts by assumption. Therefore, the voters in the agenda setter's region can still discipline the agenda setter and keep rents to a minimum. This is done by adopting a reelection rule that keeps politicians indifferent between diverting as much as possible today but losing office, and diverting a small amount only today but holding on to office and continuing to reap rents in the future.

If $r > 0$, voters in region a obtain net redistribution to their district at the expense of voters in other districts. Therefore, they prefer their representative to set taxes at their maximum: $\tau = 1$. There is an underprovision of public goods since the agenda setter effectively sets policy so as to maximize the utility of voters in district a only. She therefore trades off redistribution to region a and public goods provision one for one—and hence sets $H_g(g) = 1$.

Note also that the interests of voters in district a and their legislator are aligned in some dimensions, but not in others. Both want maximal taxes. But both the voters and the legislator want to keep the revenue to themselves: voters wishing to expand r^a and the legislator wishing to expand s^a. Holding their legislator accountable for performance, the voters can limit the waste as long as they respect the incentive constraint (3.6).

This simple model illustrates a form of legislation that Jefferson called "elective despotism" in his *Notes on North Virginia (*cited by Madison in Federalist Paper XLVIII, p. 310):

> "*All the powers of government, legislative, executive, and judiciary, result to the legislative body. The concentrating these in the same hands is precisely the definition of despotic government. It will be no alleviation that these powers will be exercised by a plurality of hands,*

[14] As remarked above, the voting rule is ex-post (weakly) optimal, since the incumbent and the opponent are identical in each district. Hence, even without the assumption that voters are committed to their voting rule, the equilibrium would still be sequentially rational (though many other equilibria would also exist).

and not by a single one. One hundred and seventy-three despots would surely be as oppressive as one (...) An elective despotism is not what we fought for".

In our model, only the voters from one of three regions can secure redistribution towards their region, whereas the other voters get nothing. Voters of the non-agenda-setting regions cannot discipline their representatives to ask for more equitable redistribution, because they compete with each other to be included in the majority.

In summary, this simple legislative model displays three "political failures", each being defined as a departure from the socially optimal policy: some spending is wasteful ($s^L > 0$); public goods are underprovided ($g^L < H_g^{-1}(1/3)$); and a politically powerful minority receives any equilibrium redistribution ($r^{aL} \geq 0$). We now ask what form these three political failures take under alternative—and more realistic—political constitutions.

4. A presidential-congressional regime

In this section, we modify the previous model by introducing separation of proposal powers within the legislature. By giving different legislators sharp agenda-setting rights over different dimensions of policy, we can approximate the agenda-setting powers of the powerful standing committees in legislatures, such as the US congress. Decisions are made sequentially on different policy dimensions, subject to a budget constraint, where later proposals are bound by decisions taken at an earlier stage. That is, Congress votes directly on each separate proposal. This procedure with different agenda setters leads to separation of powers. The reason is that the agenda setter is a different politician at each stage, accountable to a different group of voters. The political regime therefore captures some features of a presidential regime, like that of the US. The direct election of the executive makes it unnecessary to form a stable majority to support a cabinet. Nothing then constrains the kind of coalitions that can be formed. In other words, incentives for legislative cohesion—the focus of the next section—are absent.

For simplicity, in the model of this section, we mainly focus on two-stage decision making inside Congress, with one stage for taxes, the other stage for allocation of spending. At the end, we comment on how the results would change with separation of agenda-setting powers between the President and Congress and with separation of proposal powers in the allocation of expenditures as well.

Voters use the same kind of retrospective voting rules for their congressional representatives as in (3.3), conditioning their reservation utilities on whether their representative is the agenda setter for the allocation of spending, $i = a_g$, for taxes, $i = a_\tau$, or for neither ($i = n$):

$$\begin{array}{rcl} D_{t+1}^l & = & 1 \\ if \quad U^i(q_t) & \geq & b^i, \quad i = l \quad at\ t \end{array} \tag{4.1}$$

The extensive form of the game in a typical period is illustrated in Figure 2. Specifically, we consider the following sequence of events:

(0) Nature randomly selects two different agenda setters among the incumbent legislators, one for taxes and one for the allocation of public spending, a_τ, and a_g, respectively.

(1) Voters set reservation utilities for their voting rule, b^i.

(2) a_τ proposes a tax rate, τ.

(3) Congress votes. 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.

(4) a_g proposes $[g, \{s^i\}, \{r^i\}]$, subject to the budget constraint: $r + s + g \leq 3\tau$.

(5) Congress votes. If at least two legislators are in favor, the policy is implemented. Otherwise, a default policy, with $g = 0$, $r^i = 0$, $s^i = \tau$, is put in place.

(6) Elections are held.

Figure 2 about here

Note that the sequentially of decisions matters also outside of equilibrium. Whatever the outcome of the decision over taxes, that outcome is binding at subsequent stages, even if there is disagreement over the allocation of spending (see the default outcome at stage (5)). This feature is critical for the result stated below. At stage (4) legislator a_g attempts to form the coalition that is best for

her. In case a_g is indifferent between the other two, we assume they have the same probability of being included in the winning coalition. The reason why we must spell out how coalitions are formed in the last stage of the legislative bargaining is that legislators are forward-looking. Hence, their behavior in stages (2) and (3) depends on their expectations of what happens in subsequent stages - in particular on whether they expect to be part of the winning coalitions later on. Below, we discuss the consequences of making alternative assumptions about coalition formation.

An equilibrium is defined as in the previous section, except that here, 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 taking equilibrium behavior at subsequent nodes of the same period into account. A precise definition can be found in the Appendix.

The stationary equilibrium is unique. Its features are summarized in the following (a C super-script stands for Presidential-Congressional regime):

Proposition 2. *In the equilibrium of the presidential-congressional regime:*

$\tau^C = \frac{1-\delta/3}{1+2\delta/3} < 1$;

$s^C = 3\frac{(1-\delta)}{1+2\delta/3} < s^L$;

$g^C = Min(\widehat{g}, \frac{2\delta}{1+2\delta/3}) \leq g^L$, where $\widehat{g}$ is such that $H_g(\widehat{g}) = 1 > 1/3$;

$r^{aC} = \frac{2\delta}{1+2\delta/3} - g^C \leq r^{aL}$, $r^{iC} = 0$ for $i \neq a$;

$b^{aC} = H(g^C) - g^C + \frac{2\delta}{(1+2\delta/3)}$, $b^{iC} = H(g^C)$ for $i \neq a$.

All politicians are reelected.

Proof. To prove this proposition, begin at stages (4) and (5) of the game. Here, the agenda setter a_g takes τ as given. By the same argument as in the proof of Lemma 2, incentive compatibility implies that she must get at least:

$$s^{a_g} \geq 2\tau - \delta W \tag{4.2}$$

and that she offers:

$$s^{m_g} = \tau - \delta W \tag{4.3}$$

to her junior coalition partner in order to win approval. Thus, total diversion in equilibrium must be at least:

$$s \geq 3\tau - 2\delta W. \tag{4.4}$$

Together with the budget constraint, (4.4) implies that voters cannot get more public goods and redistribution than:

$$r + g \leq 2\delta W. \tag{4.5}$$

Repeating the same steps as in the proof of Lemma 1, one can show that, in equilibrium, all r (if any) is distributed to the district of a_g. That is, $r^a = r$. As in the previous section, the voters of $i \neq a_g$ become involved in a Bertrand competition. If voters in one district demand more than voters in the other, they are left in the minority and get no transfers at all. Moreover, if one district demands a utility level requiring positive transfers, for any given tax rate, the voters in the other district will underbid them by an infinitesimal amount to become included in the winning coalition. Thus, the only equilibrium is one where the voters of $i \neq a_g$ demand no transfers at all from their representatives.

Given this property of the equilibrium, what are the optimal amounts of r and g from the point of view of the voters in district $i = a_g$? These voters take τ as given and face the constraint in (4.5). Thus, from their point of view, the optimal allocation between g and r maximizes $[r + H(g)]$, subject to (4.5). This gives: $g = Min(H_g^{-1}(1), 2\delta W)$, $r = 2\delta W - g$, and $s = 3\tau - 2\delta W$.

Next, consider stages (2) and (3). By assumption, $a_\tau \neq a_g$, implying that neither a_τ nor the voters she represents are direct residual claimants of higher taxes. Thus, the optimal voting rule requires a_τ to set taxes as low as possible, given the following incentive-compatibility condition:

> **Lemma 3.** *In the equilibrium of the presidential-congressional regime*: $\tau^C \geq 1 - \delta W$.

Proof of Lemma 3. Under our stated assumptions, there is no difference, from the point of view of legislator a_g, between the two legislators $i \neq a_g$ at stage (4). Therefore, a_τ will be included as a junior partner in the minimum winning coalition at stage (4), with probability 1/2, in the equilibrium subgame, or in an out-of-equilibrium subgame. Hence, for a_τ to go along with the equilibrium, she must receive a payoff of:

$$s^m/2 + \delta W \geq v^d. \tag{4.6}$$

The left-hand side of (4.6) is the equilibrium continuation value for a_τ when making a proposal τ consistent with equilibrium. In this case, a_τ receives s^m with probability 1/2 (the probability of being in the winning coalition at stage (4)), and is reappointed with certainty. On the right-hand side of (4.6), v^d denotes the expected utility of a_τ in a disequilibrium history, i.e. after a proposal of τ which is inconsistent with the reservation utility required by the voters, and after approval of this disequilibrium proposal. What is the highest possible value of v^d? Suppose that a_τ proposed a tax rate $\tau^d > \tau^C$. It is easy to see that profitable deviations from the equilibrium must be towards higher tax rates, never towards lower ones. Such proposals would always be approved by a^g, who is the residual claimant of higher taxes. Moreover, the agenda setter at the next stage, a^g, would always continue along the disequilibrium, proposing $g = r = 0$, $s^a = 2\tau^d$, and leaving her junior coalition partner with $s^m = \tau^d$. All legislators are then thrown out of office once elections are held.[15] It follows that the optimal deviation for a_τ would be to set $\tau^d = 1$. Taking into account that a_τ is included in the winning coalition of stage (4) with probability 1/2, we have: $v^d = 1/2$. By (4.3) and (4.6), therefore, $\tau^C \geq 1 - \delta W$. *QED*.

Continuing the proof of Proposition 2, suppose for now that

$$1 - \delta W > \frac{2}{3}\delta W. \tag{4.7}$$

By (4.5), a tax rate $\tau^C = 1 - \delta W$ is then high enough to finance the maximum incentive compatible amount of public goods. The optimal voting rule for the voters of a_τ makes her propose:

$$\tau^C = 1 - \delta W. \tag{4.8}$$

Such a proposal is always approved by the third legislator, $i \neq a_g, a_\tau$. By voting no, she causes $\tau = \sigma$. If $\sigma < 1 - \delta W$; this is self-defeating, as all legislators are residual claimants (in expected value) of higher tax rates. If $\sigma > 1 - \delta W$, voting no, given the equilibrium election strategy of voters, implies that all legislators are thrown out of office. But given $\sigma < 1$, this yields a lower utility than approving the proposed tax rate, by the same argument as above.

[15] Faced with a tax rate $\tau^d > \tau^C$, the next agenda setter a^g could seek reappointment by setting $r^a = r^C + \tau^d - \tau^C$, thereby neutralizing the effects of the previous deviation on her voters. But it is easy to see that a^g would always prefer to exploit the high taxes to her advantage and forgo reappointment. The intuitive reason is that in equilibrium, a^g must be indifferent between seeking reappointment or not. Hence, a higher tax rate provides more opportunities for diversion and tilts the balance in favor of no reappointment.

We can now easily complete the proof of Proposition 2. As in Section 3, W is defined by (3.8). Inserting (3.8) and (4.8) in the previous expressions and solving for τ, s, g and r we can verify that (4.7) is always satisfied, and we obtain the equilibrium values stated in the proposition. QED.

It is interesting to compare this outcome with that in the simple legislature. The presidential-congressional regime raises less taxes, spends less on redistribution, and entails less waste of resources. The overall amount of public goods is the same, or smaller in the case of a corner solution.

What is the intuition for these results? The underprovision of public goods occurs for the same reason as in the simple legislature. Competition between districts for shares in the distributive pie drives all equilibrium transfers towards a single district. The voters in that district, therefore, optimally trade off public goods against redistribution one for one, and severe underprovision of public goods remains.

Because the voters in district a_g are the residual claimants on tax revenue not spent on public goods, in the same way as in the simple legislature, the majority of voters would like to constrain redistributive spending. As the voters in district a_τ indeed belong to this majority, they have a natural way of achieving this, namely not to reelect a_τ, unless she keeps taxes at the minimum needed to finance the optimal level of public goods, given the incentive compatibility constraints in the political process. These checks and balances limit the "elective despotism" of the minority present in the simple legislature.

Finally, the lower waste occurs because the agenda setter controlling diversion, namely a_g, now has access to less revenue. The maximum threat she can impose on the voters, by diverting all available resources, is thus smaller. As a result, the incentive compatibility constraint faced by the voters is less severe. Taxes cannot go below a lower bound, however, as the legislator proposing taxes has some chance of getting a share in the prospective rents created by a diversive Leviathan-style proposal with maximal taxes. The general intuition for this result is the same as in Persson, Roland and Tabellini (1997). When decision-making authority is split between different policy-makers, who are still required to make joint decisions, voters can exploit the conflict of interest among policymakers and hold them more closely accountable.

Would the results change with an alternative bundling of decision-making rights, over different policy dimensions? What is crucial is the separation of decisions over the *size* and the *allocation* of the budget. A finer separation of decisions among different legislators would not make much difference, as long as

the decision on taxes is kept separate from decisions on allocation. In a previous version (available upon request) we split the allocation stage into a redistribution stage, with decisions taken on $\{r^i\}$, and a public-goods stage, with decisions taken on $[g, \{s^l\}]$. Thus, each legislator was assumed to have agenda-setting power on a separate dimension of public finance, perhaps in a closer approximation of the US committee system. The results are very similar to those stated above. One interesting difference is that no proposal with positive redistribution can get equilibrium support in Congress, so that in equilibrium, $r = 0$. The reason is that the non-agenda setting legislators at the redistribution stage do not benefit (directly or indirectly) from $r > 0$, and would rather have the tax revenue spent on rents for themselves. If, however, the decision on taxes is combined with allocative decisions, we return to the equilibrium of the simple legislature. In particular, combining the decision on (τ, g, s) and separating it from that on r would make it impossible for voters to enforce $\tau < 1$, as the agenda-setting legislator for τ would be the residual claimant of higher taxes. Similarly, combining the decision on (τ, r), while keeping it separate from that on (g, s), would also break the equilibrium, since the voters of the legislator in charge of proposing the size of the budget would want maximal tax revenues.

The results would also change if the separation of powers was diluted by substantial amendment rights to policy proposals, or if collusive deals could be struck between the legislators. This is why sequential decision making is important; it implies that collusive agreements cannot be enforced. Initial promises made by a_g to a_τ, conditional on the latter setting a high tax rate, are not credible, because a_g has all the bargaining power once taxes are decided. Under the reasonable assumption that contracts between legislators cannot be written or enforced by third parties, enforcement of such collusive deals would have to rely solely on reputational forces.

We rule collusion out by our assumption that both legislators are included in the winning coalition at stages (4) and (5), with equal probability. Relaxing this assumption and allowing for a joint deviation between a_g and a_τ would break the equilibrium described above. Indeed, if a_τ is included with probability 1 in the majority coalition by a_g, then she will be fully residual claimant at the margin on any proposed increase in the tax rate.[16] Therefore, voters cannot discipline her to keep the tax rate down. The fact that collusion can break the separation of powers equilibrium points to a deeper difference between the parliamentary and

[16] If γ is the probability that a_τ is included in the coalition by a_g at the allocation stage, then (4.8) would become $\tau^C = 1 - \frac{1-\gamma}{\gamma}\delta W < 1$ as long as $\gamma < 1$ but $\tau^C = 1$ for $\gamma = 1$.

the presidential-congressional regimes: trying to introduce a sequential budgetary procedure in a parliamentary regime will not create the checks and balance effect of Proposition 2. Indeed, legislative cohesion is an endogenous outcome that sustains collusion (co-operation), due to the basic institutions in a parliamentary regime, as we will see in the next section.

Finally, we could easily allow the legislator proposing the size of the budget to be elected on a national ballot, rather than in a district. He would then be accountable to the whole electorate, as a president or a state governor. The results would be very similar to those of Proposition 2. The majority of voters, not benefiting from subsequent redistribution, would hold him accountable to propose low taxes in order to discipline subsequent agenda setters.[17] This yields a stronger and more collusion-proof separation of powers than the one discussed in Proposition 2, since the elected president will never be part of the coalition at the allocation stage. Voters can thus discipline him to propose a low tax rate since he is not a residual claimant on tax revenue.[18] A president with only veto powers but no proposal rights over taxes, however, would not be able to affect the size of government. In equilibrium he would be compensated with some rents so as not to exercise his veto power, but without effective proposal rights he would not be able to impose a small budget on the other legislators.

5. A parliamentary regime

In this section, we consider a different modification of the simple legislative game from Section 3, which is designed to capture the essentials of a parliamentary regime. At the outset of each period, Nature picks two legislators as members of a majority coalition constituting the "government". One of these "ministers" prepares a budget proposal on behalf of the government. The proposal then goes to Parliament for a vote. In this vote, each coalition partner has a veto right. The

[17] Persson, Roland and Tabellini (1997) discuss the checks and balances associated with sequential budgeting in a presidential system. Chari, Jones and Marimon (1997) obtain a related result in a setting with prospective voters and outcome-oriented politicians: by endogenously electing a "fiscally conservative" president, voters collectively manage to control the overspending of a Congress, to which every district finds it individually optimal to elect a "maximally spendthrift" representative.

[18] The incentive constraint is then such that the two legislators other than a_g must be convinced to vote in favor of τ^C, proposed by the president. It can be shown that when each of these has an equal probability of being included in the coalition at the allocation stage, (4.8) becomes $\tau^C = \sigma - \delta W$, which for $\sigma < 1$ is smaller than in (4.8).

veto can be thought of as a vote of confidence on the government. If the veto is exercised, a government crisis follows. To simplify the analysis, we assume that in 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 simple legislature of Section 3. This may be a plausible assumption in parliamentary regimes without a constructive vote of no-confidence.[19] In any event, the assumption captures the basic cost of triggering a government crisis in a parliamentary regime, namely the prospective loss of valuable proposal powers associated with ministerial portfolios. Examining public finance under alternative rules for government break-up, as in Baron (1998), is an interesting issue for further work.

The specific game examined in each period is illustrated in Figure 3. It consists of the following stages:

(0) 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.

(1) Voters set reservation utilities for their voting rule, $\{b^i\}$.

(2) a proposes $[\tau_a, \{r_a^i\}, g_a, \left\{s_a^l\right\}] : r_a + g_a + s_a \leq 3\tau_a$.

(3) The junior coalition partner can veto the joint proposal from stage (2). If approved, the proposal is implemented and the game goes to stage (8). If not, the government falls and the game goes on to stage (4').

(4') Nature randomly selects a new agenda setter a', among the three legislators

(5') Voters reformulate their reelection strategies, conditional on the status of their representative after the government crisis.

(6') The agenda-setter a' proposes an entire allocation $q_{a'}$.

(7') Parliament votes on this proposal. If approved by at least two legislators, $q_{a'}$ is implemented. If not, the legislative bargaining ends and a default outcome with $\tau = s^i = \sigma$ and $g = r^i = 0$ is implemented.

(8) Elections are held.

[19] Huber (1996) uses the same short-cut to approximate the consequences of a vote of confidence procedure on government decisions in a parliamentary system.

Figure 3 about here

Before continuing, it is worthwhile to discuss the formulation of this game and relate it to the previous ones. Compared to the simple legislature of Section 3, the junior coalition partner has a preassigned veto right. Exercising this veto triggers a government crisis (i.e., a new game in which agenda-setting powers are reallocated) instead of a status quo outcome. This veto right gives the junior coalition partner and the voters she represents more bargaining power and induces legislative cohesion. Compared to the presidential-congressional regime, voting over different policy dimensions is not sequential. Hence there are no checks and balances and no effective separation of powers. 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, it would undo previous proposals since the budgetary process would have to start over again at stage (4'). This is in accordance with the rules of a parliamentary democracy. In a previous version of the paper, we indeed considered two- and three-stage budget preparations within government, with separate ministers making sequential proposals. The results are identical.

The previous version also expanded the legislative bargaining by adding an initial government formation stage, where nature selects a "prime minister" who, in turn, chooses a government partner and optimally allocates the agenda-setting powers between herself and the other politician. In equilibrium, the prime minister always keeps the valuable spending portfolio to herself, since that determines who gets higher rents in equilibrium.[20]

The other building blocks of the game remain the same as before. Thus, legislators have the same objective functions as in Section 3. Elections take place in each district at the end of each period. Voters in each district coordinate on utility-maximizing retrospective voting strategies, conditioning their re-election on the position of their representative: outside the government, or which position, if inside government $(l = a, m, n)$:

$$\begin{aligned} D^l_{t+1} &= 1 \\ if \quad U^i(q_t) &\geq b^i, \quad i = l \end{aligned} \tag{5.1}$$

[20]Laver and Shepsle (1996) provide an exhaustive treatment of a considerably richer formal model of government formation. But in their formal analysis, they ignore both the electoral stage and the treatment of government proposals in parliament.

and agenda setter, or not in the case a breakdown of government has occurred ($l = a^{'}, l \neq a^{'}$):

$$\begin{array}{rcl} D_{t+1}^{l} & = & 1 \\ if \quad U^{i}(q_t) & \geq & b^{i}, \quad i = l. \end{array} \tag{5.2}$$

An equilibrium is defined as in previous sections (a precise definition can be found in the Appendix).

The equilibrium features are summarized in the following proposition (the P superscript stands for parliamentary regime), which is formally proved in the Appendix:

Proposition 3. *In the parliamentary regime, there is a continuum of equilibria, such that*:

$\tau^{P} = 1 = \tau^{L} > \tau^{C}$.
$s^{P} = 3\frac{1-\delta}{1-\delta/3} = s^{L} > s^{C}, \quad s^{aP} = \frac{2}{3}s^{P}, \quad s^{mP} = \frac{1}{3}s^{P}$
$\bar{g} \geq g^{P} > g^{C}$, *with* $\bar{g}$ *defined by* $H_g(\bar{g}) = \frac{1}{2}$.
$r^{P} = \frac{2\delta}{1-\delta/3} - g^{P} \geq 0$.
$r^{iP} \geq 0 \; if \; i = a, m$, $r^{iP} = 0 \; if \; i = n$.
$If \; r^{iP} > 0 \; for \; i = a, m$, *then* $g^{P} = \bar{g}$
$b^{iP} = H(g^{P}) + r^{iP}, \quad b^{a'P} = H(g') - g' + \frac{2\delta}{1-\delta/3}$, $b^{'} = H(g')$ *with* $g' = \min\{\widehat{g}, \frac{2\delta}{1-\delta/3}\}$
All politicians are re-elected and a government crisis never occurs.

The key to understand the features of this equilibrium is the veto rights enjoyed by both coalition partners. Under the assumed timing, this veto right allows voters in the districts of a and m to demand a high share of redistribution without fear of being excluded from the coalition. In other words, bilateral monopoly replaces Bertrand-competition in the determination of the redistributive budget. In equilibrium, the requests of voters in the majority districts must be mutually compatible. The reservation utilities b^{a} and b^{m} can be considered as the threat points in intra-government bargaining, where the ministers act on behalf of their constituencies in order to earn re-election. For consistency, a higher b^{a} is associated with a lower b^{m} in equilibrium, and vice-versa. But this can happen in many ways. Hence the multiplicity of equilibria.

These multiple equilibria thus have nothing to do with the infinite-horizon folk theorem (we have ruled out such multiplicity by the restriction to "historyless" strategies). Instead, they are multiple Nash equilibria in the game between voters in the different districts. They are closely related to the multiple equilibria in delegation games with observable contracts, analyzed by Fershtman, Kalai and Judd (1991). Here, the voting strategies play the role of observable contracts.

The equilibria in the parliamentary regime thus typically entail redistribution towards a majority, unlike the simple legislature and the presidential-congressional regime, where any redistribution instead goes to a minority.

Associated with this majority-oriented redistribution, we also find a higher provision of public goods. Why? The equilibrium policy must be jointly optimal for the voters represented in the governing coalition, given that it satisfies the incentive constraint for rents. Hence, the benefit of the public good for two out of three districts are internalized. If the-non negativity constraints on r^i do not bind, for $i = a, m$, public goods must be jointly optimal for the two groups of voters in the majority. Then, we have: $g^P = \bar{g}$, where $2H_g(\bar{g}) = 1$. Public good provision falls short of this level only if the non-negativity constraint on r^i binds, either for $i = a_g$ or for $i = a_\tau$. For instance, this can happen if b^m or b^a are set exactly at $E(u')$. In that case, the only way of transferring utility from one group of voters to the other is to reduce spending on the public good, while at the same time increasing the transfer to the favored group. As long as the interregional transfers after a government crisis r' are strictly positive, however, the level of public goods must still be strictly higher than in the simple legislature—and thus also than in the presidential-congressional regime—because voters' utilities must be at least as large as $E(u')$. No transfers to region m or a must then be compensated by a higher level of public goods. Public goods at the first-best level with $3H_g = 1$ can never be an equilibrium, however.

The threat of going through a government crisis, followed by a simple legislative game with no additional constraints, enables the legislators to appropriate as much rents as in the simple legislature, irrespective of the equilibrium tax rate. But the bargaining power of the junior partner implies that rents are more equally distributed within the majority. Compared to the presidential-congressional regime, the lack of separation of powers implies more scope for collusion among the coalition partners. This means that politicians earn more rents in the parliamentary regime.

Equilibrium taxes are also higher than in the presidential-congressional regime. Not only do the legislators in the governing coalition have a strong selfish interest

in high taxes. But now a majority of the voters, namely the voters in districts a and m, also benefits from redistribution at the expense of the minority. This majority thus has a strong incentive to induce their elected representatives to maximize tax revenues.

Alternative assumptions on what would happen after a government crisis would not affect our qualitative results but would change the continuation value for individual legislators and/or for voters, which would mainly affect the bargaining power of individual coalition partners over s.

Let us close the theoretical part of the paper by a brief discussion of normative issues. Since we have a characterization of the equilibria in the presidential-congressional and in the parliamentary regime, it is tempting to ask which is better for the voters. Using the equilibrium allocation in Propositions 2 and 3 as well as in (2.2)-(2.3), we can compute the ex ante expected utility of a voter in any of the three districts, in each of the two regimes. Straightforward calculations give the following expected utility difference between the parliamentary and presidential-congressional regimes:

$$\begin{aligned} & E(u^{iP}) - E(u^{iC})] \qquad (5.3) \\ = \; & \frac{1}{1-\delta}\left[[(H(g^P) - \frac{1}{3}g^P) - (H(g^C) - \frac{1}{3}g^C)] - \frac{\delta(1-\delta)}{(1-\delta/3)(1+2\delta/3)}\right]. \end{aligned}$$

The first term inside the large square bracket captures the welfare effect of higher public goods provision and its financing under the parliamentary regime. It is always positive, as the expression $H(g) - \frac{1}{3}g$ is maximized at the socially optimal level (cf. Section 2) and as $g^P > g^C$. The second term captures the welfare effect of the higher waste (and higher associated taxes) under the parliamentary regime. It is always negative. Loosely speaking, the parliamentary regime is thus better for the voters if public goods are very valuable (so that g^P is considerably higher than g^C), or if the political agency problem is small (as δ approaches unity).[21]

Even though we do not want to get into the difficult question about endogenous institutional choice in this paper, this result points towards the conditions under

[21] Aghion and Bolton (1998) provide another example of a normative comparison between alternative political constitutions. They compare alternative required majorities to change the status quo, and show that contractual incompleteness can give rise to an ex-ante preference for a majority rule, and more generally for decision-making rules weaker than unanimity. Even though they focus on contractual incompleteness, they consider a model of direct democracy where agency problems between voters and politicians do not arise.

which we may observe the two regimes. Note, however, that the tension between a Pigovian and a Leviathan approach appears at the level of institutional choice as well. As rents in our model are always higher in the parliamentary regime, it would always be preferred by the legislators (the expected utility difference for a legislator would just be the negative of the second term in (5.2)). The outcome of a referendum and a vote in the legislature on institutional reform might thus be very different. This, in turn, suggests that it may be unwise to delegate constitutional reforms to the same elected political representatives that are supposed to choose public policy within the reformed constitution. Constitutional reforms in the true interest of the voters are more likely to be carried out by a Constitutional Assembly elected for that specific purpose.

6. Some evidence

The theory developed in the previous sections generates clear predictions on how the level and composition of government spending depends on the political regime. Are such predictions supported by empirical evidence? We here report a preliminary answer, drawing on a more extensive empirical analysis by Persson and Tabellini (1999b) based on data from 54 democracies.[22]

According to the theory, countries should be classified on the basis of two criteria: (i) whether they have institutions inducing *legislative cohesion* and (ii) whether there is *effective separation of powers* between different political actors, with regard to decisions over the size and composition of spending. Our primary source for classifying countries along these dimensions is Shugart and Carey (1992), ch.8. With regard to legislative cohesion, we consider rules for government formation and government termination, as well as rules for the dissolution of the assembly. Countries where cabinet survival depends on the support of a majority in the legislature, where Parliament has strong rights of censure over the government, or where a directly elected President has little influence over government formation or dismissal, are ranked as having stronger legislative cohesion. With regard to separation of powers, we consider whether or not there is a directly elected president and, if so, we rank his veto rights (in all policy dimensions) and his rights of initiative over the budget; the stronger are these presidential rights,

[22] We classify a country as a democracy if it scores between 1 and 5 according to the Gastil (1987) index of political rights, on average over the period 1985-90. This selection criterion picks out 64 countries; for 10 of these, however, data on fiscal outcomes or necessary control variables are not available.

the more effective is separation of powers likely to be.

Combining these two dimensions, countries are classified in two groups, as parliamentary or presidential-congressional regimes. The two groups have roughly the same size (30 parliamentary and 24 presidential-congressional regimes). A detailed list is provided in Table 1. Regimes coded as parliamentary induce legislative cohesion but have weak separation of powers. Countries without a directly elected president end up in the parliamentary regime. The one exception is Switzerland which is included among the presidential-congressional regimes, as the cabinet—even though chosen by the Assembly—has a life of its own, where survival does not depend on majority support in the Assembly. Among the parliamentary regimes, however, we have included a number of countries with a directly elected president, such as France, Finland, and Portugal. In these countries, the rules for government formation and dissolution imply considerable legislative cohesion. Recent periods of "cohabitation" illustrate that the majority in the French National Assembly really has more power than the elected president (see e.g. Pierce (1991)). Besides the US, many presidential regimes are found in Latin America.

Table 1 about here

Clearly, it is very difficult to pigeon-hole the observed variety of political institutions along a single dimension, and our classification probably entails some arbitrary decisions. The classification is supported by the in depth investigation of Shugart and Carey (1992), however, and it is based on criteria that have no connection with the observed fiscal policies. Of the two criteria identified by the theory, institutions producing legislative cohesion and separation of budgetary powers, we are probably weighing the former more than the latter. While the idea of legislative cohesion is in line with earlier research by political scientists, and is probably accurately captured in our classification, the notion of separation of budgetary powers has been studied by economists such as Von Hagen and Hallerberg (1997), but has received scant attention by researchers in comparative politics. Further research is required to develop precise measures of separation of powers corresponding to the theory developed in this paper.

Let us now turn to observed fiscal policy in these two country groups. Here we mainly focus on size of government. According to the theory, legislative cohesion and lack of separation of powers in parliamentary regimes promote a larger government. For each of the 54 democracies in our sample, we measure the size of

government by the average total spending of central government, as a function of GDP, over five years, centered on 1990. Data sources and definitions are described in the Appendix.

Figure 4 plots the data on size of government, also reported in Table 1. Parliamentary regimes come first, and countries are ordered by their IMF codes within regimes (industrial countries come first). The white bars display the raw data on government spending. The difference in the size of government is striking: on average, and without controlling for anything else, parliamentary regimes spend 17–18 percentage points of GDP more than Congressional-Presidential regimes; see also the averages at the bottom of Table 1. Some of these differences in the size of government may be due to other economic and social variables, unrelated to the political regime. To control for these other determinants, we have estimated a regression of the size of government on the following variables: the log of per capita income (INCOME), the log of openness (OPEN), the share of the population above 65 years of age (OLD), and a measure of ethno-linguistic fractionalization (ETHNO) (the Appendix gives precise definitions). As discussed in Persson and Tabellini (1999b), these variable have been included as determinants of the size of government in various earlier cross-country studies—for instance, by Cameron (1978), Rodrik (1999), Goode (1984), Easterly and Levine (1997).

Figure 4 about here

The black bars in Figure 4 and the second column in Table 1 display the estimated residuals of this regression (omitting any measure of political regime from the specification). Some of the observed differences disappear, but both Table 1 and Figure 4 indicate that important differences remain across regimes. This is confirmed by a regression which, in addition to the socio-economic control variables, also includes a dummy variable taking a value of 1 for countries classified as presidential and zero otherwise (PRES): the estimated coefficient on this variable is -10.0, with a t-statistic (corrected for heteroscedasticity) of 3.6. Thus controlling for other determinants of fiscal policy, spending by central government is 10 percentage points of GDP lower in presidential-congressional regimes. Persson and Tabellini (1999b) do some sensitivity analysis, measuring spending by general rather than central government, enlarging the set of economic controls, and adding dummy variables that group countries according to their geographic location or their degree of industrial development. They also control for the electoral

rule. The estimated coefficient on PRES remains stable and highly significant, suggesting that the results are very robust. This is not surprising, in light of the data displayed in Figure 4.

The theory in this paper also has implications concerning other fiscal policy variables, in particular public good provision and wasteful government spending or outright corruption. Both are harder to measure than the size of government. Persson and Tabellini (1999b) consider a measure of public good provision, defined as the sum of spending by central government on transportation, education and order and safety. In some specifications, public spending on health services are also included. This is clearly an imperfect measure of spending on pure public goods, since it also includes local public goods and redistribution in kind. Here, the evidence is much weaker. The two groups of countries spend, on average, the same amounts (as a percentage of GDP) on these items. Controlling for other economic, social and political variables, the dummy variable PRES has a negative estimated coefficient, as expected, but it is not statistically different from zero.

Thus, the evidence suggests that the size of government is strongly affected by the constitutional features studied in this paper, as predicted by the theory. Whether the lack of robust evidence regarding public good provision is due to poor measurement, or to a real failure of the theory, remains to be investigated more carefully. Other predictions of the theory, concerning wasteful spending (or, more generally, corruption) and the shape of redistributive programs, also lend themselves to empirical analysis. The encouraging results obtained for the size of government suggest that such an empirical investigation is worthwhile, and might further enhance our understanding of the determinants of fiscal policy choices.

7. Concluding remarks

Before sketching possible extensions of our analysis, let us consider a possible criticism of such a research program. It is related to the uneasiness sometimes expressed over game-theoretic research in the modern literature on industrial organization. Will our results not be extremely sensitive to the particular extensive-form game and could we not "prove anything" by picking the right form? One answer is self-evident: one should derive and report results under different assumptions, as we have done at the end of Sections 4 and 5. Another answer is that empirical regularities found in real-world constitutions, rather than the researcher's imagination, should govern the assumptions. The precise features of actual constitutions are very well documented and their essence can often be

well-captured by varying the rules of an extensive-form game. Indeed, one can argue that comparative politics is an area where the scope for empirically guided applications of game theory is much greater than in industrial organization.

We thus believe that the analysis in this paper can be productively extended in different directions. One would be to introduce (in the model of Section 4) a president, and contrast a line-item veto with a veto on the entire budget. The line-item veto might allow the president to better discipline congress, but may also make the president a more direct prey to special interests. Another direction would be to consider alternative rules for government breakup observed in parliamentary regimes around the world, and ask how they would alter the trade-offs in public finance (in the model of Section 5). The results in Baron (1998) suggest that different rules would fundamentally redistribute the bargaining powers among the members of the governing coalition. A third extension, motivated both by presidential regimes in Latin America and parliamentary regimes in Europe, would be to consider electoral regimes with proportional representation. In the model, proportional representation could be captured by studying one district and three representatives elected in that district. This is likely to introduce competition among voters within districts, along the lines of Ferejohn (1986). It would be desirable (but difficult) to introduce political parties. These could be modeled as long-lasting coalitions of politicians that allocate agenda-setting powers taking electoral outcomes into account. With appropriate individual heterogeneity within each district, these parties could then seek the support of voters across districts. Recent work by Morelli (1998) is an example of how these difficult questions might be tackled in a more abstract framework.

Finally, our analysis suggests difficult—but fascinating—questions regarding the design of political institutions. These include normative questions about the optimal choice of political system and positive questions about how to explain observed political reforms.

8. APPENDIX

8.1. Definition of equilibrium in the presidential-congressional regime

Definition 2. *An equilibrium of the presidential-congressional regime is a vector of policies* $q_t^C(b_t) = [\tau_t^C(b_t), g_t^C(\tau_t^C(b_t), b_t), \{s_t^{iC}(\tau_t^C(b_t), b_t)\}, \{r_t^{iC}(\tau_t^C(b_t), b_t)\}]$ *and a vector of reservation utilities* b_t^C *such that in any period* t*,with all players taking as given the expected equilibrium outcomes of periods* $t+k$, $k \geq 1$ *:*

(I) for any given b_t*, at stage (3), at least one legislator* $i \neq a_\tau$ *weakly prefers accepting rather than rejecting proposal* τ_t^C*, taking as given the expected equilibrium proposals and decisions at stages (4) and (5);*

(II) for any given b_t*,* a_τ *prefers proposing* τ_t^C *to any other* τ_t *satisfying (I), taking as given the expected equilibrium proposals and decisions at stages (4) and (5);*

(III) for any given b_t *and* τ_t*, at stage (5) at least one legislator* $i \neq a_g$ *weakly prefers accepting rather than rejecting the proposal* $g_t^C(\tau_t(b_t), b_t), \{s_t^{iC}(\tau_t(b_t)), b_t)\}, \{r_t^{iC}(\tau_t(b_t)), b_t)\}$*;*

(IV) for any given b_t *and* τ_t*, at stage (4)* a_g *prefers the proposal* $g_t^C(\tau_t(b_t), b_t), \{s_t^{iC}(\tau_t(b_t)), b_t)\}, \{r_t^{iC}(\tau_t(b_t)), b_t)\}$ *to any other proposal satisfying (III) and the budget constraint;*

(V) The reservation utilities b_t^{iC} *are optimal for the voters, in each district* i*, taking into account that policies in the current period will be set according to* $q_t^C(b_t)$*, and taking as given the reservation utilities in other regions* b_t^{-iC} *as well as the identity of* a_τ*,* a_g*.*

8.2. Definition of equilibrium in the parliamentary regime

Definition 3. *An equilibrium of the parliamentary regime is defined by* $q_t^P(b_t) = [\tau_t^P(b_t), \{r_t^{iP}(b_t)\}, g_t^P(b_t), \{s_t^{iP}(b_t)\}]$ *and the reservation utilities* b_t^{iP}*,* $b_t^{iP'}$*, such that in any period* t*, and taking as given the expected equilibrium outcomes of periods* $t+k$*,* $k \geq 1$ *:*

(I) for any given vectors b_t*, and given the proposal made at stage (2), at stage (3) the junior partner of the coalition optimally chooses whether to accept or reject these proposals, taking as given the expected reservation utilities* b_t' *and the expected policy outcome in stages (4')-(7');*

(II) the reservation utilities $b_t^{iP'}$ *are optimal for the voters in each district* i*, after a government crisis at stage (3), taking into account that policies will be set according to* $q_t'(b_t^{iP'})$ *as in the simple legislature equilibrium, and taking as given*

the reservation utilities in other regions $b_t^{-iP'}$;
(III) for any given b_t *and* b'_t*, the agenda-setter in the coalition prefers* $q_t^P(b_t) = [\tau_t^P(b_t), \{r_t^{iP}(b_t)\}, g_t^P(b_t), \{s_t^{iP}(b_t)\}]$ *, given (I) and (II) and the government budget constraint;*

(IV) The reservation utilities b_t^{iP} *are optimal for the voters, in each district* i*, taking into account that policies in the current period will be set according to* $q_t^P(b_t^{iP})$*, taking as given expected* $b_t^{iP'}$ *and the fact that policies will be set according to* $q'_t(b_t^{iP'})$ *after a government crisis at stage (3), and also taking as given the reservation utilities in other regions* b_t^{-iP}.

8.3. Proof of Proposition 3

Equilibrium rents are given in the following:

Lemma 4. *In all equilibria of the parliamentary regime,* $s^P = 3\frac{1-\delta}{1-\delta/3} = s^L$, *distributed as* : $s^{aP} = \frac{2}{3}s^P, \quad s^{mP} = \frac{1}{3}s^P$.

Proof. The equilibrium is solved by backward induction, starting from the last stages of the game and moving forward. Suppose first that a government crisis materializes, so that we reach the subgame consisting of stages (4')-(7'). By an argument analogous to that in Section 3, it is easily shown that $g' = Min(\widehat{g}, 2\delta W)$, $\tau' = 1$, $r' = 2\delta W - g'$, and $s' = 3 - 2\delta W$. Note, however, that W is the equilibrium value of holding office in the parliamentary regime, not in the simple legislature. Thus, the expected continuation value of reaching this subgame (where all legislators are re-elected) for all legislators is:

$$E(v') = \frac{1}{3}s' + \delta W, \tag{8.1}$$

and the expected (one-period) continuation payoff for voters in each district is:

$$E(u') = H(g') + \frac{1}{3}r' = H(g') + \frac{1}{3}(2\delta W - g'). \tag{8.2}$$

To construct the equilibrium, note first that at stage (3), m will veto any proposal that does not give her the same value as after a government breakup. An accepted proposal, yielding reelection, must thus satisfy $s^m + \delta W \geq E(v')$. As

a will not pay more than necessary for support, this means $s^n = r^n = 0$ and by (8.1),

$$s^m = \frac{1}{3}s'.$$

Voters will not be able to push the total equilibrium payoff for legislators below what they get after a government crisis, which, in turn, implies the following incentive constraint:

$$\begin{aligned} s &\geq s' = 3 - 2\delta W \\ s^a &= s - s^m \geq \frac{2}{3}s'. \end{aligned} \tag{8.3}$$

Clearly, in equilibrium the voters will not leave excess rents to the legislators, and all the weak inequalities above will hold as equalities.

To conclude the argument, we solve for W from:

$$W(1-\delta) = \frac{1}{3}s = \frac{1}{3}s' = 1 - \frac{2\delta}{3}W,$$

which yields:

$$W = \frac{1}{1-\delta/3}. \tag{8.4}$$

Substituting the implied value of $2\delta W$ into the expressions for s, one easily derives the equilibrium expressions for s^P in Lemma 4 and Proposition 3. QED.

Inserting equilibrium rents in the government budget constraint, the remaining policy instruments must satisfy:

$$g + r = 2\delta W + 3(\tau - 1) \equiv \frac{2\delta}{1-\delta/3} + 3(\tau - 1), \tag{8.5}$$

where the identity follows from (8.4).

Here there are no other incentive constraints to worry about. The worst threat the coalition partners could impose on voters, even if they were to collude, would be to set $\tau = 1$, $r = g = 0$. But that threat is already entailed in the value for s'. Hence, a will make a proposal consistent with her constituency achieving the required level of utility. A similar argument applies to the behavior of m at stage (3), when she decides whether to say accept or reject the proposal of a.

To characterize the equilibrium policy, we must therefore pin down the equilibrium reservation utilities required by the voters in the governing coalition, b^a

and b^m. Clearly, these two reservation levels must be mutually consistent under the relevant constraints. Specifically, in equilibrium, the reservation utility b^a must be optimal for voters in district $i = a$, given the equilibrium value of b^m, and viceversa. But this requirement is satisfied by many pairs of (b^a, b^m), as the voters' reservation utilities are chosen simultaneously, once a government is formed. Hence, there are multiple equilibria. We can only rule out policies that, from the point of view of the voters in the governing coalition, are dominated by the outcome in the simple legislature. The reason is that a disagreement inside the coalition can bring down the government. Knowing what they can get in expected value in the event of a crisis, voters of each member in the governing coalition must optimally demand at least this amount from their representatives. Hence, the equilibrium reservation utilities and the equilibrium policies must satisfy

$$b^i \equiv 1 - \tau + H(g) + r^i \geq E(u'), \qquad i = a, m \tag{8.6}$$

where the right hand side of (8.6) is given by (8.2).

The equilibrium policy can therefore be computed as the solution of the following optimization problem for the voters from the region of the agenda-setting minister, given any b^m such that $b^a \equiv 1 - \tau + H(g) + r^a \geq E(u')$:

$$\max_{g, r^a, r^m, \tau} [1 - \tau + H(g) + r^a] \tag{8.7}$$

$$s.t. 1 - \tau + H(g) + r^m \geq b^m \geq H(g') + \frac{1}{3} r' \tag{8.8}$$

$$\tau \leq 1 \tag{8.9}$$

$$r^a \geq 0 \tag{8.10}$$

$$r^m \geq 0. \tag{8.11}$$

Replacing τ by its expression from the budget constraint $\tau = \frac{g}{3} + \frac{r^a}{3} + \frac{r^m}{3} + 1 - \frac{2}{3}\delta W$ and calling, respectively, $\lambda, \mu, \nu^a, \nu^m$ the multipliers of the constraints (8.8)–(8.11), one gets the following first order conditions:

$$H_g(g^P)(1 + \lambda) = \frac{\mu}{3} + \frac{1}{3}(1 + \lambda)$$

$$1 - \frac{1}{3}(1 + \lambda) - \frac{\mu}{3} + \nu^a = 0$$

$$-\frac{1}{3}(1 + \lambda) + \lambda - \frac{\mu}{3} + \nu^m = 0$$

yielding

$$\lambda = 1 + \nu^a - \nu^m \tag{8.12}$$

and

$$H_g(g^P) = \frac{1+\nu^a}{2+\nu^a-\nu^m}. \tag{8.13}$$

If we had $\tau < 1$, then $\mu = 0, H_g(g^P) = \frac{1}{3} = \frac{1+\nu^a}{2+\nu^a-\nu^m}$ from which we deduct that $1 + 2\nu^a = -\nu^m$ which is impossible. Therefore, $\tau = 1$. If $\nu^m = \nu^a = 0$, we get $\lambda = 1$ and $2H_g(g^P) = 1$. If $\nu^m = 0, \frac{1}{2} < \frac{1+\nu^a}{2+\nu^a} < 1$. If $\nu^a = 0, \frac{1}{2-\nu^m} > \frac{1}{2}$. In the latter case, by (8.8), with $r' > 0$, we must have $H(g) > H(g')$ where $g' = g^C$. Therefore, we must have $g^P > g^C$. With $r' = 0$, there is no surplus to be shared by the government coalition with respect to the expected continuation payoff after a crisis $E(u')$ but then $g^P = g' = 2\delta W = \frac{2\delta}{1-\delta/3}$ which is then still larger than the relevant g^C, $\frac{2\delta}{1+2\delta/3}$. QED.

8.4. Data sources

SIZE : total spending by central government, in percentage of GDP. Each country observation refers to the average of the period 1988-92. Sources. Government Finance Statistics, IMF, and Inter-American bank
INCOME: log of real per capita income in 1990. Source: Summers and Heston, Penn World Tables, Mark 5.6 (available on line at www.nber.org)
OPEN: log of (exports plus imports over GDP) in (1990). Source: see INCOME.
OLD: share of population above 65 years of age, in 1985. Sources: Barro and Lee, Data Set for a Panel of 138 countries (available on line at www.nber.org), and United Nations Demographics Yearbook.
ETHNO: Index of ethno-linguistic fractionalization in 1960. Source: Mauro (1995)

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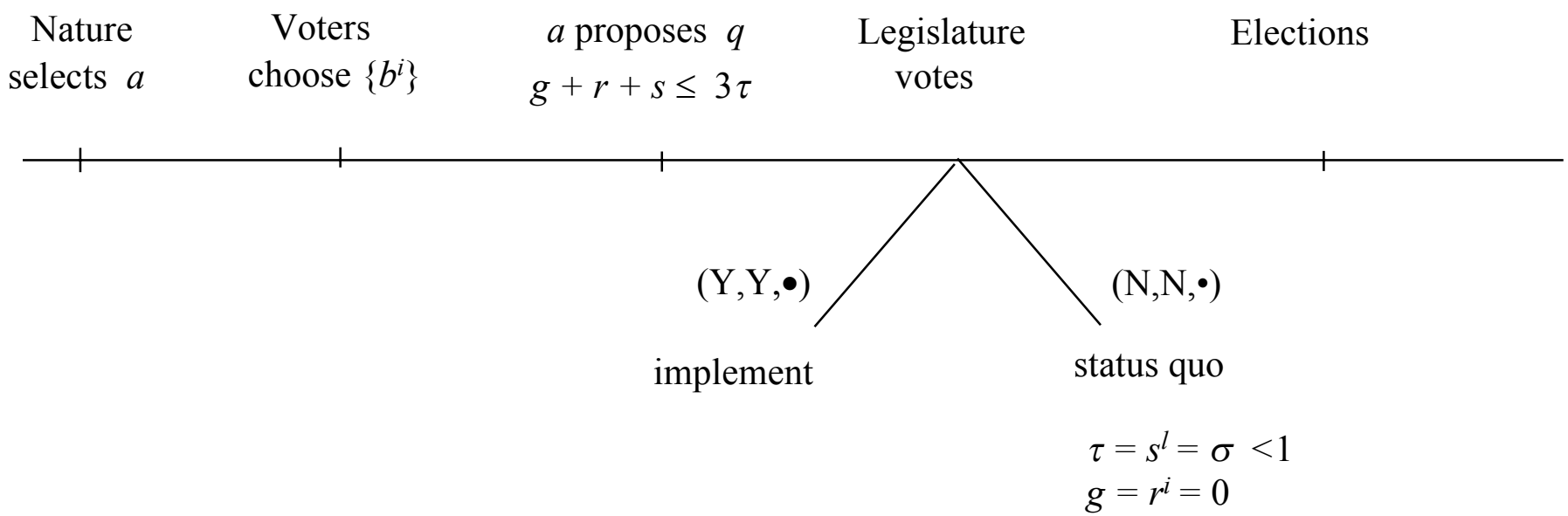

Figure 1
Simple legislature

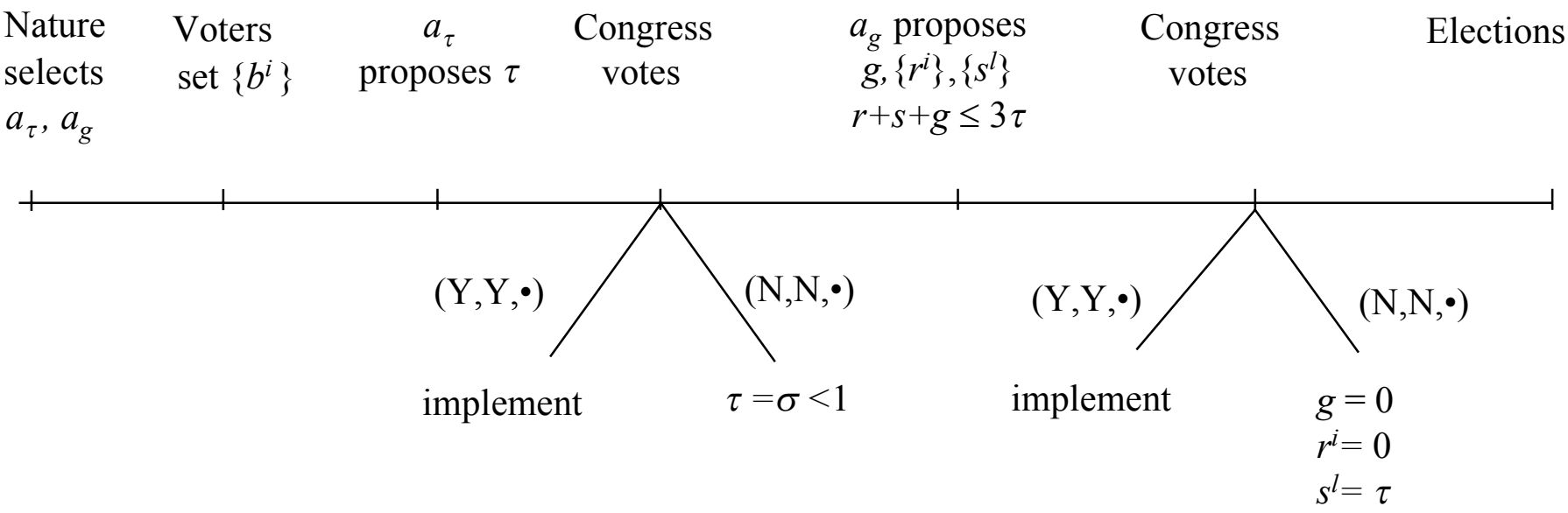

Figure 2
Presidential-congressional regime

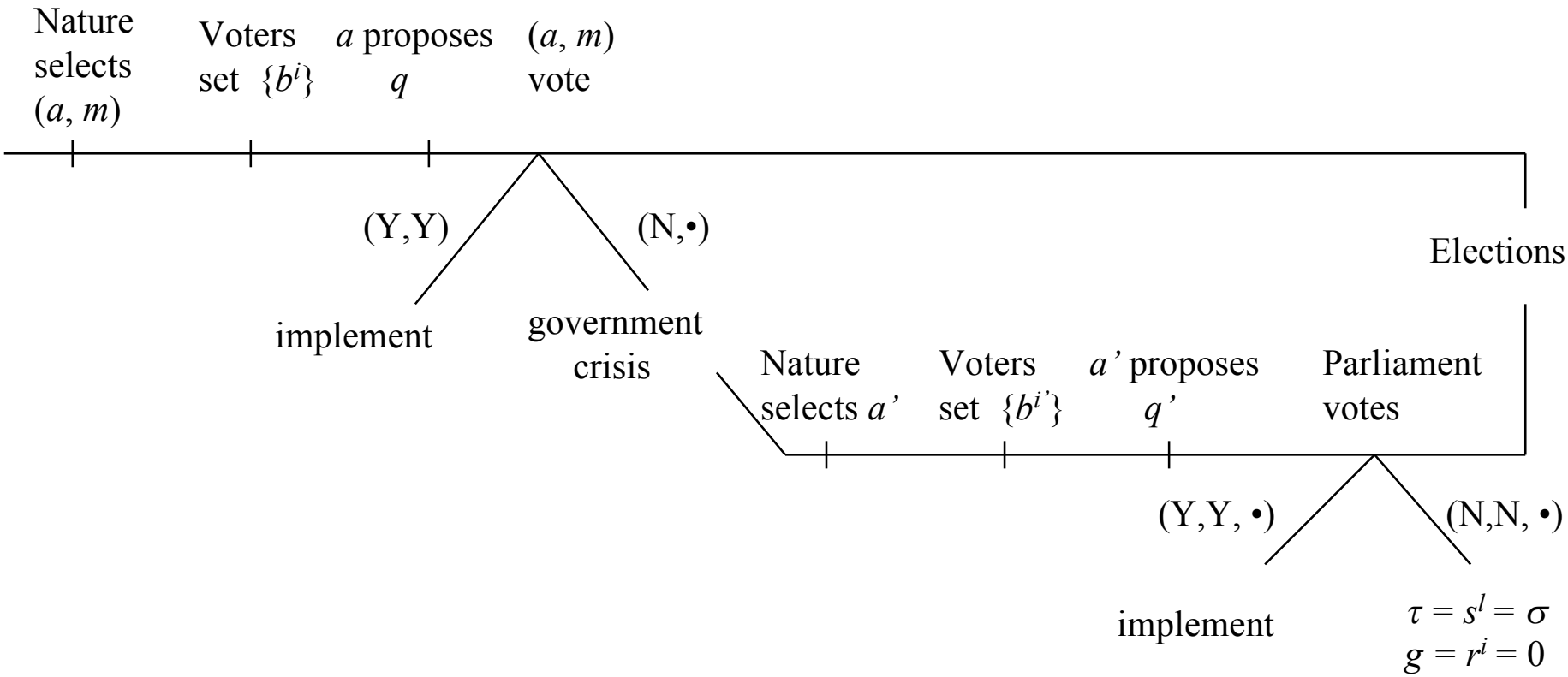

Figure 3
Parliamentary regime

Figure 4
Size of Government

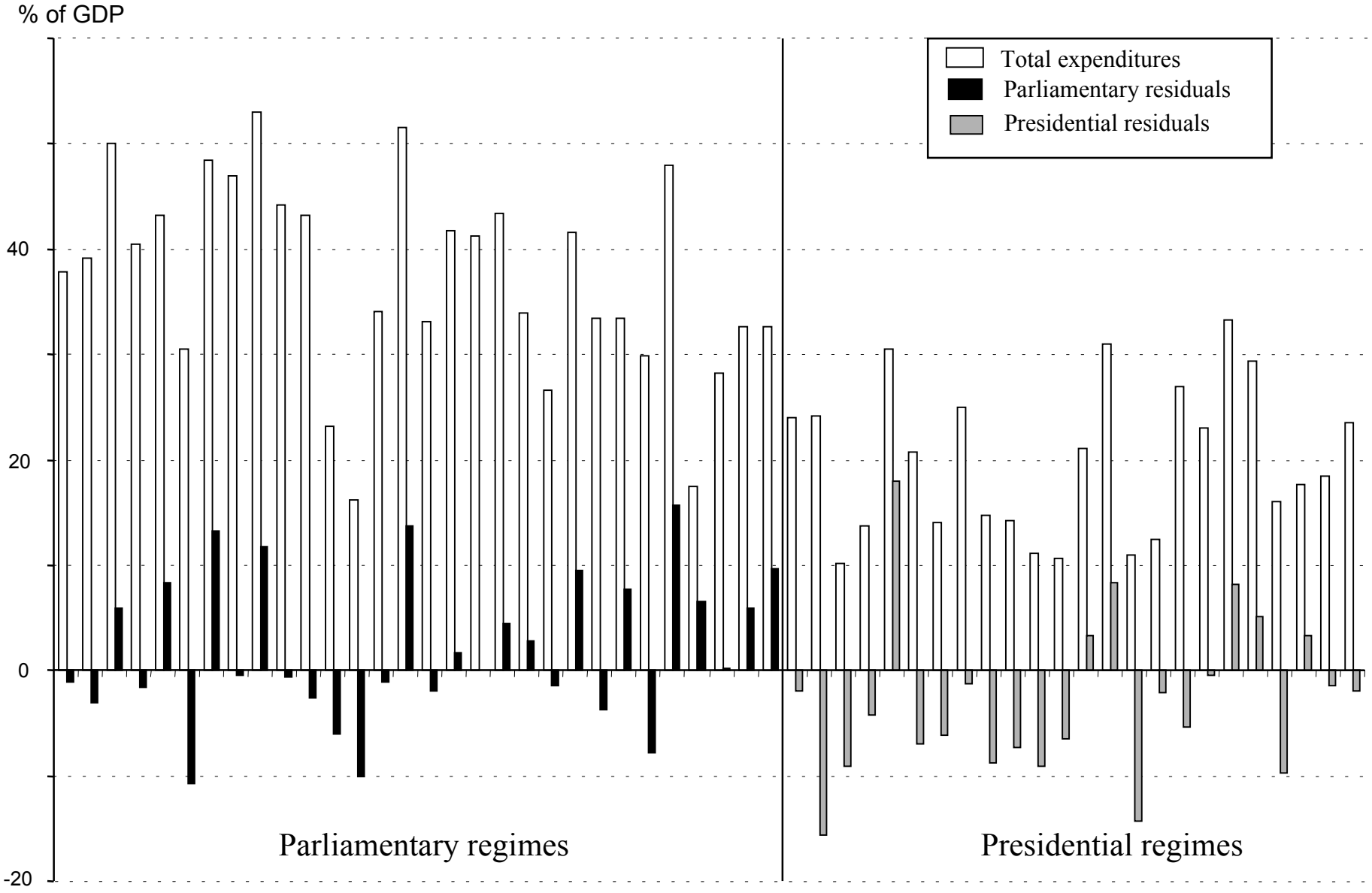

Table 1

Parliamentary Regime			Presidential Regime		
Country	**Size**	**Residual**	**Country**	**Size**	**Residual**
U.K.	37,81	-1,09	U.S.A.	24,04	-1,94
AUSTRIA	39,23	-2,99	SWITZERLAND	24,20	-15,58
BELGIUM	50,03	5,94	ARGENTINA	10,12	-9,09
DENMARK	40,49	-1,59	BOLIVIA	13,67	-4,13
FRANCE	43,26	8,36	BRAZIL	30,47	17,91
WEST GERMANY	30,47	-10,66	CHILE	20,67	-6,99
ITALY	48,43	13,26	COLOMBIA	13,99	-6,20
LUXEMBOURG	46,89	-0,52	COSTA RICA	24,98	-1,27
NETHERLAND	52,95	11,80	DOMINICAN R.	14,77	-8,71
NORWAY	44,16	-0,63	ECUADOR	14,19	-7,26
SWEDEN	43,17	-2,49	EL SALVADOR	11,19	-9,16
CANADA	23,14	-6,06	GUATEMALA	10,63	-6,40
JAPAN	16,12	-10,01	MEXICO	21,07	3,31
FINLAND	34,17	-1,03	NICARAGUA	31,03	8,32
GREECE	51,54	13,74	PARAGUAY	10,96	-14,27
ICELAND	33,14	-1,85	PERU	12,43	-2,10
IRELAND	41,68	1,70	URUGUAY	26,95	-5,39
MALTA	41,26	0,11	VENEZUELA	23,01	-0,38
PORTUGAL	43,37	4,42	EGYPT	33,35	8,19
SPAIN	33,89	2,77	SRI LANKA	29,30	5,09
AUSTRALIA	26,59	-1,48	KOREA REP.	16,03	-9,72
NEW ZEALAND	41,62	9,53	NEPAL	17,56	3,35
BARBADOS	33,41	-3,64	PHILIPPINES	18,50	-1,42
TRINIDAD & TO	33,47	7,75	GAMBIA	23,48	-1,93
CYPRUS (G)	29,82	-7,81			
ISRAEL	47,98	15,71			
INDIA	17,41	6,58			
MALAYSIA	28,18	0,24			
BOTSWANA	32,60	5,97			
PAPUA N. GUIN	32,56	9,72			
AVERAGE	**37,29**	**2,19**	**AVERAGE**	**19,86**	**-2,74**

Data on government size refer to total expenditures by central government on average between 1988-92.

Residuals for government size have been generated by the following (OLS) regression estimated on the full sample:

SIZE = -14.08(-0.73) + 0.02(0.01) * INCOME + 8.01(4.23) * OPEN
+ 152.9(3.51) * OLD - 0,06(-1.24) * ETHNO

(*t*-statistics in brackets),
adjusted R^2=0.57

Data sources in the Appendix.