INTERNATIONAL CENTRE FOR ECONOMIC RESEARCH
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WORKING PAPER SERIES

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Working Paper No. 20 / 2004

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September 2004

ABSTRACT

In this paper we study the relationship between legislature size with respect to general government and welfare spending. According to the theory, legislature size has an indefinite effect on government spending because logrolling and transaction costs have canceling effects. Bicameralism is expected to have a negative effect because of the increased transaction cost of finding a viable majority in two houses with different constituencies. We use a cross-section of 75 countries over the period 1990-1998 controlling for some institutional features that differ among countries. We find that both legislature size and bicameralism do not have a significant effect on the two types of spending.

Keywords: legislature size, bicameralism, interest groups, government spending.

JEL code: H11

* A previous version of this paper was presented at the 60th Congress of the International Institute of Public Finance. I wish to thank Nadia Fiorino, Emma Galli, Gebhard Kirchgaessner and Vassilis Monastiriotis for useful comments on previous versions of this paper. Any errors are mine. The paper started while the author was employed at Royal Holloway, University of London.

I. Introduction

In August 2004 Taiwan's government has announced a reduction in the number of the members of Parliament from 225 to 113. At the same time Italy is debating a reform that will reduce the number of legislators and modify the balance of power between the two houses, and the UK is considering a reform of the House of Lords. Leaving aside any effect on the working of the legislative assemblies, which effect can these changes have on government spending?

According to the interest-group theory of government, in legislatures politicians act as brokers among to various groups in the economy by supplying different pieces of legislation. Lobbyists play an important role in this trading by creating issues, contacting politicians, making possible cross-voting between several laws and interests. The interest-group theory of government assumes that the vast majority of governmental activities involve transfers of resources among citizens. Some of them will ultimately result as net winners in this process, others will be net losers. This circumstance is based upon the fact that information is dispersed among interest-groups, politicians, and lobbyists, and exchanging information implies transaction costs. No Pareto-inferior policy will be adopted where a unanimity rule controls political decisions, and voting is costless. Moving away from this idealized world, wealth-transfer decisions become central: majority rule will raise their amount because it lowers the costs of influencing collective decisions. At the same time, the cost of information is twofold: on the one hand each decision maker has to uncover the effects of an issue on his personal wealth, on the other hand he has to identify other decision makers that will join him on the issue. Legislatures resolve the conflict between different issues acting as place "to clear the market for wealth transfers" (Shughart and Tollison, 1986).

Previous studies have concentrated on the US States because of the homogeneity of the institutions and their rules, with the only exception of Bradbury and Crain (2001) who consider a panel of 38 countries. In this paper we extend previous literature in a number of directions. First, we control for some features that characterize different forms of government, namely presidential/parliamentarian systems and electoral rules. Second, we extend this analysis to a cross-section of 75 democracies for the period 1990-1998.

The paper is organized as follows: in Section 2 we review the theory and the empirics of bicameralism and legislature size and its relationship with government spending. Section 3 presents the relationships and the variables, while Section 4 presents the relevant results. Section 5 concludes.

II. The theoretical and empirical literature

Legislature size[1]

McCormick and Tollison (1981) formalize the problem of an interest group that decides how much to spend on buying legislative influence, and its agent (lobby) must decide how to allocate this budget (E) across the two houses of the legislature to maximize the organization's return from legislative influence. The organization knows that the votes (V) it will receive in the two houses are function of its expenditure in each house (E^h and E^s), and the size of each house (h and s), therefore: $V^h = V^h(E^h, h)$ and $V^s = V^s(E^s, s)$. The problem faced by the interest group is to maximize the net returns from legislative influence $Y_n = Y - E$ subject to $E = E^h + E^s$, $Y = Y(V^h, V^s, L, W, P)$, and the previous vote functions, where W is wealth of the community, P is population, and L is legislative size. Larger legislature size (defined as the sum of lower and upper house) has an indefinite effect on government spending. On the one hand, an increase in the number of legislators results in a lower cost of lobbying because of additional competition between vote suppliers. Furthermore, when the total number of legislators increases, there are potential gains from increased specialization of labor in the committee apparatus. On the other hand, as long as the number of legislators increases, the transaction costs needed to find a viable majority of votes are also increased. Eventually, the problem is an empirical one.

Weingast *et al*. (1981) provide a formal model on the size of legislatures, in which they consider each chamber in itself, not the overall number of legislators. Let $b_i(x)$ be the benefit of spending x dollars in district i to the constituents of legislator i, and let $c(x)$ be the cost of spending. The efficient level of spending is such that $b'_i(x) =$

[1] A seminal contribution on this issue is Stigler (1979). Throughout the paper we interchangeably use the words house, lower house and lower chamber on the one hand, and senate, upper house and upper chamber on the other hand.

$c'(x)$. If there are n districts and taxes are spread evenly across districts, the legislator i bear $(1/n)^{th}$ of the cost of spending in district i. Therefore, legislator i pushes x up to the point in which $b'_i(x) = (1/n)c'(x)$. This implies that the optimal level of spending for each legislator is increasing in n. If legislators logroll and defer to each other regarding such expenditure, then the total spending is increasing in n. This implication is called "the Law of $1/n$".

Shughart and Tollison (1986) find a positive relationship between real per-capita government spending and the number of public and private bills enacted into law. They show that these results hold in the long-run, using US states data for legislature and laws ranging from 1889 to 1980. Gilligan and Matsusaka (1995) find that, after controlling for constituent interests, the number of seats in the upper house is positively associated with per-capita state and local direct general expenditure. Furthermore, a large legislature leads to higher spending in both capital and non-capital programs, welfare, education and highway expenditures. Possibly, these results do not extend to lower chamber because bicameralism is not taken into account as an explanatory variable.

Bradbury and Crain (2001) analyze a panel of 24 bicameral countries and 14 unicameral countries for the period 1971-1989. They include four control variables: log of population, population growth, log of real per-capita GDP, and openness. Results show that the size of the lower chamber is positively related to government expenditure, while the size of the upper chamber is negatively related to spending. The latter point estimate is much smaller in absolute value than the former. We depart from this study by considering a much wider sample of countries in pure cross-section. Indeed, the size and the structure of legislative bodies reveal a very low variability, which forces us to be cautious about the use of data with a time dimension. More important, we point out that countries differ from a range of institutional features that needs to be controlled for to make meaningful cross-country comparisons. We control for the form of government (presidential/parliamentarian), electoral rules (majoritarian/proportional). Finally, we consider central government expenditure as a measure of the size of the government, but we also apply this analysis to central government expenditure on social services and welfare. This kind of expenditure is more universal than other functions of government

outlays, and can be less targeted to specific constituency interests. Therefore we expect that the effect of legislature size would be less relevant in this case.

Bicameralism

Bicameral legislatures have received a consistent support from political economists as a tool to reduce the common pool-problem. Buchanan and Tullock (1962) argue that the most salient feature of this system is the difference in constituencies' preferences on policies with a partial overlapping between the preferences (interests) of the two chambers. In fact, two houses with the same constituencies would work as a unicameral system (Stigler, 1976 and Hayek, 1979).[2] Persson *et al.* (1997) exploit the circumstance that in a bicameral system each house has a veto power over the other to formalize the outcome of this system as a bilateral monopoly over legislative power. Any legislative trade to which both chambers agree must result from a dual consent. The unanimity brings about a limitation in the budgetary outcomes. The mutual agreement by veto constitutes a clear difference with respect to the logrolling between a number of legislators within a single chamber.

Riker (1992) consider another channel that enables bicameralism to tame spending: it reduces the feasible set of policy outcomes, which promotes legislative stability. If preferences are unstable and this leads to frequent turnovers, any majority coalition will try to extract more benefits from government spending that those that it will seek if it had to continue to stay in power. Bicameralism reduces the passage of non-Codorcet winners on multidimensional issues, while allowing majority agreement on single-dimensional issues. Based on this reasoning, Dixit *et al.* (2000) argue that a bicameral system is better than a unicameral system operating under supermajority rule.

An important feature of bicameralism is asymmetry between chambers: typically the lower house has the power to solve disagreement between them, or to initiate the legislative procedure on some issues. Moreover, they typically differ for the size and sometimes the upper house has an explicit territorial base. We can notice that the different size and composition of the houses brings about differences in the median

[2] Diermeier and Myerson (1999) provide a framework to rank legislature structures according to the incentives to centralize decision powers in systems with sequential chambers and a president with veto power.

voters preferences over policies. The more different are the constituencies, the further will be the median voters of each house, and therefore more difficult will be the agreement on policies.

Usually, empirical evidence does not explicitly take into account bicameralism: the tendency in the works surveyed earlier is to treat each chamber separately, as if there were no inter-relation between them, and asymmetries are not taken into account. Thornton and Ulrich (1999) find a strong negative effect of bicameralism on government expenditure in a panel of US states. Bradbury and Crain (2001) uncover a positive effect of legislature size on government spending much stronger in unicameral countries than in bicameral ones. Finally, Bradbury and Crain (2002) consider a panel of US states and find a significantly negative effect of bicameralism government spending in general and in several functional components such as public welfare expenditure, education expenditure, and highway expenditure. They use four measures of bicameralism on the basis of proxies for each chamber.[3]

III. Methodology and variables

The model

We estimate the following general relationship:

$$X_i = \alpha_0 + \alpha_1 LEG + \alpha_2 POL + \alpha_3 EC + u_{i,} \qquad (1)$$

where X is the fiscal variable of interest (either central government expenditure or social and welfare expenditure), *LEG* is a vector of variables that in the case of legislature size includes the size of the lower and the upper houses and the senate over house ratio. *POL* is a vector describing the institutional features of a country, *EC* is a vector of economic and demographic variables, and u is the error term. All government expenditure variables are expressed in percentage of GDP or in per-capita terms.[4] We use a measure

[3] These measures include: average household income, the percentage of constituents with income greater than $50,000, the percentage of constituents receiving Social Security benefits, and the percentage of constituents employed in the manufacturing sector.

[4] All per-capita figures are international prices expressed in dollars with base 1995.

of the size of government as government expenditure and social and welfare expenditure as dependent variables because the former is less constituency-specific in nature, therefore we expect a smaller effect of legislature size.

The basic database is taken from Persson and Tabellini (2003). However, for the cross-section database, because of data availability and the application of a stricter concept of democracy (a Gastil Index lower than 4.5), the database reduced to 75 countries. Data on legislature size are taken from Inter-Parliamentary Union (various years), averaging figures from 1990 to 1998 in analogy with the other data provided by Persson and Tabellini (2003). A detailed description of the dataset is given in an appendix at the end of the paper.

Legislature variables

The size of legislatures enters in our analysis in three ways. With the variable *LEG* we sum up the number of seats of the lower and the upper houses, the latter may yield a number equal to zero if the system is unicameral. According to the theory, there is no expected sign on this variable. With the variables *HSIZE* and *SSIZE*, we indicate the number of legislators in each chamber, under the expectation of a positive sign, according to the "Law of 1/*n*". We face the problem of fully appointed upper house. On the one hand, the capture of these members of the parliament from interest groups is not an issue here because they do not seek election and therefore votes from them. On the other hand, still a fully appointed house belong to a bicameral system, and the double veto argument applies. Nonetheless, the two chambers may have radically different median voters, and the previous discussion on bicameralism may still hold. Therefore, we have constructed two databases: the first is called "broad" and includes all the countries for which we have data, the second ("narrow"), excludes eight countries in which the upper house is fully appointed.[5]

Bicameralism plays an important role in the legislature size theory and in determining the costs structure for lobbies. By the variable *S/H* we measure the size of the upper house relative to the size of the lower house. From this definition we can

[5] These countries are: Bahamas, Barbados, Belize, Canada, Fiji, Thailand, Trinidad and Tobago, and United Kingdom. The latter is a dramatic outlier in the sample, and this removal also woks as a robustness check to the presence of this country.

obtain different degrees of bicameralism.[6] The degree of bicameralism affects the production cost of legislation in two ways: by altering the similarity between the bases of representation in the two chambers, and by altering the labor specialization within each chamber. For a given polity size (i.e., a given sum of house plus senate legislators), an increase in the relative size of one chamber alters the representation within each assembly, tending to reduce the homogeneity of the constituency between the two respective bases. For example, if the degree of bicameralism shrinks, the majority needed for each senator to be re-elected has broadened to encompass other minority interests. By the same token, the number of constituents per legislator in the lower house has been reduced, having the reverse effect of increasing the homogeneity of the interests within each constituency. As the level of bicameralism decreases, the disparity between the respective bases of representation increases, raising decision-making costs. Therefore, finding a viable majority in both houses becomes more expensive for interest-groups. Bicameralism also affects the specialization of work in committees and house(s). Legislators in smaller houses carry a higher per-man workload than representatives in larger houses, and this is especially reflected in the work in committees, which can be modified by changing the size and the number of these bodies. Higher degrees of bicameralism lower the net cost of decision making, and have a positive effect on legislative output, given the assumption of diminishing returns.

Table 1 reports the average number of seats for each chamber for each country in the considered period. It shows that although countries have different size in terms of population and land area, the dispersion of the size of their parliaments is definitely lower. Legislature variables are taken from Inter-Parliamentary Union (various years).

[6] Perfect bicameralism would imply two houses of the same sizes. A low degree of bicameralism entails two chambers of radically different sizes and possibly different bases of representation (e.g., one elected on the basis of population, and the other on the basis of geographic/administrative delimitation).

Table 1 –Upper and lower house sizes.

Country	Upper house size	Lower house size	Country	Upper house size	Lower house size
Argentina	48	257	Japan	252	511
Australia	76	147	Latvia	-	100
Austria	62	183	Luxembourg	-	60
Bahamas	16	49	Malawi	-	165
Bangladesh	-	330	Malta	-	65
Barbados	21	28	Mauritius	-	70
Belgium	127	181	Mexico	93	500
Belize	10	29	Namibia	-	72
Bolivia	27	130	Nepal	60	205
Botswana	-	40	Netherlands	75	150
Brazil	81	510	New Zealand	-	96
Bulgaria	-	240	Nicaragua	-	92
Canada	104	295	Norway	-	165
Chile	46	120	Pakistan	87	217
Colombia	102	166	Papua N. Guinea	-	109
Costa Rica	-	57	Paraguay	45	80
Cyprus	-	56	Peru	-	100
Czech Republic	81	200	Philippines	24	250
Denmark	-	179	Poland	100	460
Dominican Rep.	30	120	Portugal	-	230
Ecuador	-	67	Romania	140	350
El Salvador	-	84	Russia	176	449
Estonia	-	101	Slovak Republic	-	140
Fiji	34	70	South Africa	90	400
Finland	-	200	Spain	254	350
France	321	577	Sri Lanka	-	225
Gambia	-	51	St. Vincent and G.	-	21
Germany	68	668	Sweden	-	349
Ghana	-	200	Switzerland	46	200
Greece	-	300	Thailand	270	370
Guatemala	-	95	Trinidad and T.	31	37
Honduras	-	128	Turkey	-	450
Hungary	-	386	United Kingdom	1200	651
Iceland	-	63	USA	100	440
India	245	498	Uruguay	30	99
Ireland	60	160	Venezuela	50	203
Israel	-	120	Zambia	-	150
Italy	326	630			

Control variables

Countries considered in this paper differ from several institutional features, an issue that we have to contemplate doing a cross-country comparative analysis. We highlight the role of two characteristics that can be controlled for. The first one is related with the presidential or parliamentarian nature of the political system. Recent studies in comparative politics (Persson and Tabellini, 1999) show that presidential systems are

more accountable and tend to reduce government spending. Presidential systems are centred on a directly elected president that has formal power on the government and even veto power on parliamentary decisions. Building on the idea of legislative cohesion, Persson *et al.* (2000) also argue that in parliamentary regimes a stable majority of legislators act in the joint interest of its voters. Spending is directed towards broad social welfare programs and general public goods, the opposite happening in presidential systems. The prediction is that presidential government are smaller than parliamentarian, have lower taxation and are more fiscally responsible, and favor broad spending programs. The variable *PRES* is a dummy variable that is equal to one for the presidential form of government and zero for parliamentary ones. Voting rules also greatly differ among political systems. With the dummy variable *MAJ* that is equal to one for plurality systems and zero otherwise we capture this difference. Our prior on both variables is that both negatively affect government spending. Milesi-Ferretti *et al*. (2002) show that voters anticipating government policymaking under different electoral systems have an incentive to elect representatives more prone to higher total primary spending in proportional (majoritarian) system when the share of transfer spending is high (low). In Austin-Smith (2000) under the assumption of a smaller number of parties represented under plurality than proportional representation (PR), plurality leads to single-handed policy decisions, while more parties form coalitions under PR. The interaction among elections, redistributive taxation, and endogenous formation of economic groups produces larger government expenditure under PR than under plurality.

We also control for the Wagner Law, the relationship that maintains that government spending tends to increase as income grows, using log of per-capita GDP (*LYP*). Log of population (*LPOP*) enters in our regressions to take into account three effects. First, a large population increases the marginal benefit of spending if population density creates unique public good problems. Second, large populations may present opportunity for economies of scale in the production of government services. Third, the logrolling theory we are going to test relies on the idea that representatives can target spending to specific subsets of population, and holding constant the number of districts, this should be more difficult with a small population rather than with a large population. We consider the degree of openness to international trade (measured via the variable

OPEN as sum of import and export over GDP), since a certain literature maintains that countries that are more open to trade are more exposed to external shocks, and therefore seek insurance through a larger government sector (Rodrik, 1998). Finally, we control for the proportion of people above age 65 in the population (*PROP65*), since especially in developed countries, a large amount of government spending is devoted to pensions and healthcare expenditure for the elderly. Control variables are taken from Persson and Tabellini (2003). Table 2 reports the summary statistics for the variables involved in the analysis (broad cross-section).[7]

Table 2 – Descriptive statistics, broad sample.

		Mean	St. dev.	Min	Max
APP	Appointed Senate	0.108	0.312	0	1
CGEXP	Central government spending (% GDP)	29.414	10.452	9.743	51.178
CGEXPPC	Central government spending (per capita)	2303.801	2189.83	136.596	7553.840
HSIZE	House size	217.280	166.310	21.000	668.000
LYP	Log of per-capita GDP	8.586	0.906	6.273	9.942
MAJ	Majoritarian electoral rule	0.347	0.476	0	1
OPEN	Openness	73.963	36.639	17.562	190.470
LPOP	Log of population (000s)	2.191	1.833	-2.205	6.812
PRES	Presidential system	0.387	0.487	0	1
PROP65	Population aged > 65 (%)	8.718	4.900	2.260	17.430
S/H	Senate/house size	0.226	0.304	0.000	1.843
SSIZE	Senate size	66.773	153.420	0.000	1200.000
SSW	Central social and welfare spending (% GDP)	8.571	6.674	0.129	22.385
SSWPC	Central social and welfare spending (per capita)	889.989	1027.315	2.083	4009.235

[7] The correlation matrix is available upon request from the author.

IV. Empirical results

In obtaining and presenting the estimates we carry on the following procedure. First, we estimate a general model and then reduce the economic variables to those who are significant (while always keeping the other institutional variables). Second, we start from this reduced specification and separate the estimates for *SSIZE*, *HSIZE* and *S/H* to address possible multicollinearity. In particular, we first estimate *SSIZE* and *S/H* together, then *SSIZE* only, always with the controls. Finally we estimate a model with *HSIZE* and *S/H*.[8] Because most of the previous empirical evidence has been obtained in per-capita terms, we present our results both as a percentage of GDP and in per-capita terms. As motivated earlier, we use two different databases: broad (estimates 1-5) and narrow (6-10), depending on the elective nature of the upper house.

Results for legislature size and government spending as percentage of GDP (Table 3) show that the size of both chambers does not have a significant effect on government spending, with two exceptions for *SSIZE*, which has the expected positive sign. The same is true for bicameralism, which has the expected negative sign, but is significant in two out of eight estimations. Among other variables, openness and the proportion of the elderly have the expected positive effect, whilst population (in the broad sample) and per-capita income are not significant in the general estimates. The two institutional variables have a different behaviour: presidentialism leads to a reduction in government spending as predicted by the theory, whilst a majoritarian voting system has the expected negative sign but is usually insignificant. The regressions explain a fair amount of the variability of the relationship, and the F statistics are highly significant.

[8] We do not report the estimations for the *HSIZE* alone. They are very similar to those with *HSIZE* and bicameralism, and are available upon request from the author.

Table 3 - Legislature size and government spending (as percentage of GDP).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	8.796	15.785	24.511†	27.292‡	23.009†	19.6430*	18.685‡	20.241‡	20.015‡	16.734‡
	(11.653)	(11.210)	(10.381)	(10.343)	(11.056)	(11.606)	(4.840)	(3.873)	(3.927)	(4.551)
SSIZE	0.016	0.021*	0.014	0.003		0.030	0.030	0.039*	0.0127	
	(0.012)	(0.011)	(0.009)	(0.006)		(0.026)	(0.026)	(0.021)	(0.014)	
HSIZE	0.014	-0.011			0.007	0.005	0.005			0.012
	(0.012)	(0.009)			(0.007)	(0.009)	(0.009)			(0.007)
S/H	-7.612	-8.439*	-7.148		-2.474	-9.052	-9.104	-10.829*		-2.241
	(5.354)	(4.663)	(4.556)		(2.956)	(7.372)	(7.286)	(6.510)		(4.256)
LPOP	-0.933					-0.016*	-0.016*	-0.015*	-0.013	-0.016*
	(1.074)					(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
LYP	2.287*	-0.365				-0.131				
	(1.174)	(1.318)				(1.439)				
OPEN	0.077†	0.095‡	0.079‡	0.076‡	0.089‡	0.087‡	0.087‡	0.079‡	0.076‡	0.092‡
	(0.037)	(0.029)	(0.023)	(0.023)	(0.029)	(0.030)	(0.029)	(0.025)	(0.026)	(0.029)
MAJ	-0.514†	0.287	-0.253	-0.288	-0.219	-1.426	-1.422	-1.639	-1.500	-0.927
	(0.201)	(0.297)	(0.193)	(0.193)	(0.194)	(2.161)	(2.141)	(2.091)	(2.120)	(2.104)
PRES	-0.790‡	-0.430*	-0.601‡	-0.594‡	-0.554†	-0.647‡	-0.646‡	-0.666‡	-0.713‡	-0.641‡
	(0.234)	(0.221)	(0.209)	(0.211)	(0.215)	(0.226)	(0.224)	(0.219)	(0.221)	(0.225)
PROP65	1.111‡	1.108‡	1.121‡	1.187‡	1.156‡	0.865‡	0.846‡	0.865‡	0.866‡	0.871‡
	(0.268)	(0.280)	(0.283)	(0.282)	(0.287)	(0.323)	(0.241)	(0.238)	(0.241)	(0.241)
Sample	Broad	Broad	Broad	Broad	Broad	Narrow	Narrow	Narrow	Narrow	Narrow
Adj-R^2	0.554	0.660	0.631	0.617	0.625	0.664	0.664	0.663	0.647	0.656
Obs.	75	75	75	75	75	67	67	67	67	67
F	10.26‡	14.02‡	16.39‡	18.32‡	15.88‡	12.54‡	14.35‡	16.56‡	18.32‡	16.12

Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

These results are confirmed when we turn to the specification in per-capita terms (Table 4). The only notable exception, as far as legislature size is concerned, is that only in the narrow sample *HSIZE* is sometimes significant, whilst *S/H* is insignificant and quite unstable as long as its sign and magnitude are concerned. *SSIZE* is typically insignificant. Among control variables, the picture is quite different: institutional variables are significantly negative across all the estimates Economic variables are usually insignificant, with the exception of *LYP*, which points towards government spending being a normal good. The adjusted R^2 is higher than in the previous set of estimates, and the F statistics are significant.

Table 4 – Legislature size and government spending (in per capita terms).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	15.504‡	15.148‡	-14.731‡	-14.679‡	-14.943‡	14.720‡	14.571‡	-14.888‡	-14.877‡	-15.008‡
	(1.353)	(1.264)	(1.218)	(1.201)	(1.259)	(1.429)	(1.258)	(1.204)	(1.193)	(1.173)
SSIZE	-0.0015	-0.0017	-0.0008	-0.0011*		-0.0036	-0.309	0.0011	0.0009	
	(0.0014)	(0.0014)	(0.0011)	(0.0007)		(0.0032)	(0.318)	(0.0023)	(0.0014)	
HSIZE	0.0004	0.00117			0.0005	0.00117	0.0021†			0.0013*
	(0.0014)	(0.0009)			(0.0008)	(0.00118)	(0.0009)			(0.0007)
S/H	-0.991	0.729	-0.200		-0.591	0.583	0.714	-0.133		-0.126
	(0.621)	(0.603)	(0.578)		(0.376)	(0.908)	(0.892)	(0.825)		(51.691)
LPOP	0.094					0.001				
	(0.125)					(0.001)				
LYP	2.016‡	1.988‡	1.998‡	1.991‡	1.995‡	1.929‡	1.913‡	1.930‡	1.928‡	1.914‡
	(0.136)	(0.131)	(0.131)	(0.128)	(0.131)	(0.174)	(0.131)	(0.135)	(0.133)	(0.131)
OPEN	-0.0031					-0.004				
	(0.0042)					(0.004)				
MAJ	-0.826‡	-0.826‡	1.178‡	1.163‡	1.202‡	-0.695‡	-0.799‡	1.131‡	1.133‡	1.144‡
	(0.233)	(0.232)	(0.229)	(0.223)	(0.232)	(0.266)	(0.244)	(0.249)	(0.247)	(0.206)
PRES	-0.793‡	-0.742‡	1.046‡	1.043‡	1.109‡	-0.728‡	-0.842‡	1.222‡	1.216‡	1.265‡
	(0.272)	(0.263)	(0.251)	(0.249)	(0.263)	(0.278)	(0.237)	(0.244)	(0.238)	(0.237)
PROP65	-0.032					0.002				
	(0.036)					(0.039)				
Sample	Broad	Broad	Broad	Broad	Broad	Narrow	Narrow	Narrow	Narrow	Narrow
Adj-R^2	0.802	0.801	0.796	0.796	0.796	0.811	0.803	0.787	0.787	0.799
Obs.	75	75	75	75	75	67	67	67	67	67
F	33.51‡	38.46‡	44.38‡	53.92‡	44.21‡	27.26‡	40.77‡	45.27‡	57.48‡	48.4‡

Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

Turning to social and welfare expenditure, we first note that we have a smaller number of observations, since for some countries data for this variable is not available. Results for the relationship between legislature size and welfare spending (Table 5) do not change the evidence previously uncovered. In the broad sample the size of the two houses is never significant (only in column 5 *HSIZE* is borderline insignificant. The same applies to *S/H*, which has a large significant effect in one estimation only. One should note that the size of some variables is strongly reduced when one of the houses is dropped from the independent variables. This happens to *S/H*, *MAJ* and *PRES*. In the former it brings this variable to loose significance. The demographic variable is not affected by this, whereas *OPEN* is still significant (though at a lower level) and its point estimates are marginally affected. The explicative power of the estimates is reduced somehow with respect to general government spending, yet is quite high. The F statistic is always highly significant. The narrow sample shows a rather similar picture for all the variables of interest, both economic and institutional.

Table 5 – Legislature size and welfare spending (as percentage of GDP).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	25.148†	17.862‡	-3.041	-3.074	-4.334*	-14.381†	-5.385*	-2.704	-2.697	-4.169
	(10.991)	(4.634)	(2.040)	(1.988)	(2.252)	(6.463)	(2.835)	(2.190)	(2.167)	(2.513)
SSIZE	0.012	0.013	0.002	0.001		-0.002	0.003	0.007	0.008	
	(0.011)	(0.010)	(0.005)	(0.003)		(0.013)	(0.014)	(0.010)	(0.006)	
HSIZE	0.007	0.002			0.004	0.011*	0.010			0.004
	(0.008)	(0.008)			(0.003)	(0.006)	(0.006)			(0.004)
S/H	-6.433	-7.395*	-0.209		-0.151	1.970	2.329	0.228		1.697
	(4.735)	(4.151)	(2.389)		(1.439)	(3.806)	(3.853)	(3.399)		(2.194)
LPOP	-0.012					-0.027*	-0.022			
	(0.008)					(0.015)	(0.015)			
LYP	-0.955					1.216				
	(1.343)					(0.788)				
OPEN	0.079‡	0.084‡	0.028*	0.028*	0.027*	0.035†	0.033†	0.024*	0.024*	0.032†
	(0.029)	(0.029)	(0.013)	(0.012)	(0.015)	(0.015)	(0.016)	(0.013)	(0.013)	(0.016)
MAJ	-2.036	-2.497	-1.683*	-1.484	-1.414	-0.624	-0.622	-1.532	-1.540	-1.336
	(1.961)	(1.943)	(1.043)	(1.034)	(1.016)	(1.252)	(1.270)	(1.174)	(1.156)	(1.142)
PRES	-0.603‡	-0.573‡	-0.019	-0.014	0.147	0.627	0.404	-0.489	-0.479	-0.327
	(0.253)	(0.214)	(1.105)	(1.094)	(1.099)	(1.299)	(1.309)	(1.217)	(1.196)	(1.218)
PROP65	1.078‡	1.001‡	1.144‡	1.145‡	1.116‡	0.877‡	1.061‡	1.055‡	1.0551‡	1.044
	(0.287)	(0.219)	(0.117)	(0.116)	(0.116)	(0.178)	(0.134)	(0.135)	(0.133)	(0.133)
Sample	Broad	Broad	Broad	Broad	Broad	Narrow	Narrow	Narrow	Narrow	Narrow
Adj-R^2	0.643	0.629	0.785	0.785	0.789	0.796	0.786	0.772	0.773	0.776
Obs.	65	65	65	65	65	58	58	58	58	58
F	13.01‡	16.28‡	35.32‡	43.1‡	36.25‡	20.88‡	22.55‡	28.9‡	35.36‡	29.53

Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

In per-capita terms (Table 6), results are quite similar for the all variables of interest. Compared with estimates as percentage of GDP, population enters significantly in all the regressions, whilst *OPEN* is significant only in the narrow sample. In turn, *PRES* is always significant. The goodness of fit is substantially lower, whereas the F statistic is always highly significant. Once again the narrow sample mostly confirms the results of the broad sample.

Table 6 – Legislature size and welfare spending (in per-capita terms).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	19.308*	71.717‡	56.982‡	57.549‡	68.425 ‡	55.552	66.754‡	56.460‡	56.395‡	59.669‡
	(9.164)	(17.203)	(13.838)	(1.344)	(15.057)	(36.167)	(15.504)	(12.218)	(12.082)	(14.157)
SSIZE	0.022	0.015	-0.014	-0.008		-0.013	-0.014	-0.033	-0.038	
	(0.038)	(0.038)	(0.032)	(0.018)		(0.076)	(0.075)	(0.579)	(0.037)	
HSIZE	-0.041	-0.049			-0.042	-0.044	-0.045			-0.096
	(0.034)	(0.034)			(0.028)	(0.034)	(0.033)			(0.021)
S/H	-0.008	-3.822	3.237		1.630	-6.683	-6.236	-2.169		-9.713
	(0.002)	(16.550)	(15.927)		(9.570)	(21.305)	(21.067)	(1.987)		(12.357)
LPOP	0.0153*	0.181*	0.096	0.094	0.172*	0.178†	0.185†	0.181†	0.191†	0.197†
	(0.084)	(0.093)	(0.072)	(0.071)	(0.090)	(0.084)	(0.081)	(0.086)	(0.091)	(0.096)
LYP	7.037					1.515				
	(0.047)					(4.407)				
OPEN	-0.146					-0.181†	-0.183‡	-0.174†	-0.175†	-0.185†
	(0.099)					(0.088)	(0.087)	(0.074)	(0.073)	(0.088)
MAJ	1.619	2.365	4.676	5.722	3.199	-0.617	-0.614	2.225	2.301	2.414
	(7.306)	(7.366)	(7.048)	(6.986)	(7.020)	(7.005)	(6.942)	(4.546)	(4.450)	(4.431)
PRES	-0.216‡	-0.237‡	-0.196‡	-0.196‡	-0.229‡	-0.189‡	-0.191‡	-0.130*	-0.131*	-0.132*
	(0.079)	(0.079)	(0.074)	(0.074)	(0.077)	(0.073)	(0.071)	(0.068)	(0.067)	(0.068)
PROP65	3.959‡	2.964‡	3.067‡	3.081‡	2.914‡	2.567‡	2.338‡	2.224‡	2.221‡	2.255‡
	(0.010)	(0.780)	(0.783)	(0.774)	(0.765)	(0.994)	(0.732)	(0.751)	(0.744)	(0.747)
Sample	Broad	Broad	Broad	Broad	Broad	Narrow	Narrow	Narrow	Narrow	Narrow
Adj-R^2	0.406	0.382	0.361	0.360	0.381	0.392	0.391	0.326	0.325	0.324
Obs.	65	65	65	65	65	58	58	58	58	58
F	4.18‡	4.34‡	4.593‡	5.442‡	5.013‡	3.446‡	3.933‡	4.105‡	5.018‡	4.075‡

Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

Finally, we consider two robustness checks. First, a different measure of bicameralism, a dummy variable which takes value 1 if the country has two houses, and 0 otherwise. This because the continous, linear variable *S*/*H* might underestimate the nonlinear effect of having or not having a second chamber. Table 7 shows that this different specification does not change our previous results.[9]

Table 7 - A different specification of bicameralism

	CGEXP					
	(1)	(2)	(3)	(4)	(5)	(6)
SSIZE	0.002	0.006		0.012	0.022	
	(0.007)	(0.006)		(0.019)	(0.017)	
HSIZE	0.016		0.016*	0.016		0.019*
	(0.010)		(0.009)	(0.011)		(0.010)
BIC	1.982	-2.606	-2.395	-2.436	-3.189	-1.483
	(1.866)	(1.750)	(1.675)	(2.621)	(2.593)	(2.166)
Sample	Broad	Broad	Broad	Narrow	Narrow	Narrow
Adj-R^2	0.642	0.627	0.638	0.659	0.647	0.656
Obs.	75	75	75	67	67	67
F	12.93‡	16.06‡	16.87‡	12.24‡	13.26‡	13.85‡
	SSW					
	(1)	(2)	(3)	(4)	(5)	(6)
SSIZE	-0.002	-0.001		-0.002	0.004	
	(0.003)	(0.003)		(0.010)	(0.009)	
HSIZE	0.005		0.005	0.008		0.007
	(0.005)		(0.005)	(0.006)		(0.005)
BIC	0.981	0.906	0.697	1.591	1.105	1.451
	(0.916)	(0.914)	(0.932)	(1.420)	(1.376)	(1.131)
Sample	Broad	Broad	Broad	Narrow	Narrow	Narrow
Adj-R^2	0.786	0.782	0.794	0.788	0.781	0.788
Obs.	65	65	65	58	58	58
F	29.99‡	34.76‡	27.01‡	19.86‡	21.86‡	22.79‡

Regressions also include *LPOP*, *LYP*, *OPEN*, *MAJ*, *PRES*, and *PROP65*. Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

[9] Table 7 only reports results for central government spending and social and welfare spending as percentage of GDP. Results in per-capita terms are available from the author upon request.

Second, instead of estimating two different panels, we use a dummy variable for the appointed senate. Results do not show any remarkable difference with previous ones as far as the size of the houses and bicameralism are concerned. Interestingly, the dummy variable for appointed upper house is sometime significantly negative, though at a low level of significance.

Table 8 – Appointed upper house

	CGEXP			CGEXPPC		
	(1)	(2)	(3)	(4)	(5)	(6)
SSIZE	0.006	0.015		1.661	1.866	
	(0.011)	(0.009)		(1.630)	(1.359)	
HSIZE	0.017		0.019†	0.376		1.275
	(0.011)		(0.009)	(1.626)		(1.367)
S/H	-0.124	-3.587	2.101	-3.962	-4.740	2.414
	(5.595)	(5.153)	(3.597)	(8.198)	(7.423)	(5.302)
APP	-6.883*	-5.575	-7.237*	-1.048*	-1.018*	-1.149†
	(3.854)	(3.792)	(3.773)	(0.564)	(0.546)	(0.556)
Adj-R^2	0.659	0.647	0.657	0.831	0.831	0.828
Obs.	75	75	75	75	75	75
F	12.36‡	13.22‡	13.86‡	31.46‡	35.46‡	34.81‡
	SSW			SSWPC		
	(1)	(2)	(3)	(4)	(5)	(6)
SSIZE	-0.004	0.001		0.025	0.548	
	(0.006)	(0.004)		(1.053)	(0.849)	
HSIZE	0.008		0.006	0.865		0.879
	(0.006)		(0.005)	(1.024)		(0.821)
S/H	2.835	0.879	1.437	1.458	-1.605	1.557
	(3.027)	(2.695)	(1.793)	(5.204)	(4.584)	(3.073)
APP	-3.355*	-2.795	-3.206*	-0.537	-0.479	-0.548*
	(1.949)	(1.922)	(1.820)	(0.375)	(0.327)	(0.311)
Adj-R^2	0.804	0.797	0.802	0.751	0.748	0.751
Obs.	65	65	65	65	65	65
F	22.08‡	23.94‡	24.81‡	16.29‡	18.12‡	18.44‡

Regressions also include *LPOP*, *LYP*, *OPEN*, *MAJ*, *PRES*, and *PROP65*. Numbers in parentheses are robust standard errors. *, †, and ‡ denote significance at 10%, 5%, and 1% levels, respectively.

V. Conclusions

In this paper we have extended empirical analysis of legislature size and bicameralism to cross-section of countries, conditioning for economic and especially institutional variables. First, we find evidence that the number of legislators has an indefinite effect on government and welfare spending as predicted by the theory. In particular, we can rarely distinguish between the effects of the two chambers, which are typically insignificant. In terms of the theoretical models constructed to analyze legislature size, logrolling and increased number of represented interests have a canceling effect. Second, bicameralism - measured as the ratio in legislature size between the two chambers to capture the difference in their constituencies and as a dummy variable - does not have an effect on government and welfare spending. Third, our results are not sensitive to the inclusion in the sample of countries that have a non-elective upper house. Fourth, an appointed upper house tend to reduce government spending, possibly because these constituencies are usually more conservative than the society at large. These results reinforce previous findings concerning the US on the effect of legislature size, which were not confirmed in an international study. To conduct this analysis across countries, we introduce a number of control variables to take into account their different institutional features. Results for these variables are substantially similar to those found in previous studies, with a partial exception of majoritarian electoral rules. This allows us to discriminate between institutional variables that have sizable effects (presidential system and majoritarian voting) and those who do not (legislature size and bicameralism).

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