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The size of second chambers and European assemblies

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Abstract. Second chamber sizes (in terms of seats) tend to increase with increasing population like first chamber sizes. Population seems to affect first chamber size directly, while the size of the first chamber goes on to affect second chamber size. When selected on the basis of territorial sub-units, the second chamber size tends to be around the geometric mean of first chamber size and the number of sub-units. From the viewpoint of representing the total population and the constituent sub-units, the European Parliament is more akin to a first chamber and its size has been approaching the cube root of population typical of first chambers. The Council of the European Union (CEU) is more akin to a second chamber and its size, in terms of qualified majority voting (QMV) votes, was approaching the size typical of second chambers at a given population. However, the Treaty of Nice has boosted the CEU to a size comparable to that of the European Parliament (EP), which may not be functional. Analogies to domestic first and second chambers suggest that the optimal size for the 27-country CEU might be 150 to 190 seats (Nice proposes 345), while that for the EP might be around 780 seats (Nice proposes 732).

Introduction: The Council of the European Union and national second chambers

The Nice 2000 discussions have brought to the centre of attention the consequences of enlargement of the European Union (EU) for the number of seats in the European Parliament (EP) and the number of votes in the Council of the European Union (CEU). These two bodies arguably offer analogous situations to domestic first and second chambers. The CEU explicitly represents people through their countries, while the EP is organized by party groupings that transcend individual countries. Thus the EP, like a national first chamber, represents individual people more directly, whereas the CEU represents geographic entities like certain national second chambers.

Gerhard Schröder, German Chancellor, has more recently presented a federal vision of the EU where he explicitly considers the EP and the CEU as the incipient federal first and second chambers respectively.¹ Regardless of how one reacts to Schröder's vision, it reinforces the analogy of the combination of the EP and the CEU to a bicameral setup. If so, then the sizes of

national first and second chambers may offer valuable guidelines for the most efficient sizes of the EP and the CEU, provided that one can find regularities in the sizes of first and second chambers and that logical reasons in terms of efficiency optimization can be pinned down for such sizes.

Such guidance could be of help because the expansion of the European Union has led to heated debates about the number of seats various member countries should have in the various European assemblies. Inevitably, this debate also involves the total sizes of these assemblies and their presumed effect on the functioning of these bodies. New assembly sizes for the CEU and the EP were decided with the Treaty of Nice in December 2000, but with the understanding that a new round of discussions would take place in 2004. Thus a broader analysis of the size of first and second chambers is highly timely.

The purpose of the study is to determine and explain empirical patterns about second chamber size and offer recommendations regarding the efficient size of the European Parliament. It will be seen that the ground is well prepared regarding the sizes of first chambers but completely virgin regarding those of second chambers. Consequently, our study first establishes some regularities in the sizes of second chambers. These are quite fluid as one might expect in view of the very diverse functions and historical origins of second chambers. However, we succeed in narrowing the parameters regarding one subgroup – namely those second chambers whose function it is to represent territorial sub-units. Of course, this is precisely the type of second chamber of which the CEU is somewhat reminiscent. Finally, we apply the existing knowledge about first chambers and new knowledge about second chambers to the EP and the CEU.

What exactly do we mean by the size of a chamber? In first chambers representatives as a rule vote as individuals and chamber size is here shorthand for the number of representatives. We use the same definition in the case of second chambers, though recognizing that in some cases individual members are not free to vote as they please. Thus the delegation of each *Land* in the German *Bundesrat* must cast a bloc vote, effectively making each *Land* one member with a weighted vote. In many first chambers, party discipline (or party bloc voting) effectively makes each party one member with weighted vote. The total number of members (or voting weights they represent) still matters given that it can change come next election (in the case of parties) or census (in the case of federal sub-units).

In the case of the CEU, two forms of voting take place: qualified majority voting (QMV), where different countries have different numbers of votes, and unanimity voting, where each country has an equal vote. We will consider the QMV aspect only so that CEU size will be shorthand for the aggregation of voting weights.

Background

The study of assemblies has focused on the first chambers (lower houses) because they predominate in democratic decision making. The original and primary function of the second chambers (upper houses) was to serve as a conservative brake on the more democratically elected lower houses (Lijphart 1999: 203). According to Jean Blondel (1973), second chambers limit the influence and access of the mass public because they are often elected on the basis of limited franchise or may consist of appointed or hereditary members. Even in democracies, second chambers have frequently retained vestiges of earlier aristocratic periods or their main purpose is the representation of geographic sub-units or privileged minorities. Democratization has led some countries to limit the power of second chambers (e.g., the UK) or to disband them entirely (e.g., Sweden).

Although a number of countries have abolished their second chambers in the twentieth century, at the same time a number of newly democratizing countries have introduced them so that presently close to 60 countries in the world have second chambers. Thus about one-third of all countries employ second chambers (Tsebelis & Money 1997: 1). These include many stable democracies starting with the United Kingdom. Larger countries, both in terms of geography and population, are more likely to have bicameral legislatures (Massicotte 2000). In federations, a second chamber seems almost inevitable so as to lend a voice to the federal sub-units (Lijphart 1999: 4). Furthermore, the sub-national governments of federations often have adopted the two-chamber format within their jurisdiction (e.g., the Australian states, apart from Queensland, and the US states, apart from Nebraska, as well as Puerto Rico). In fact, we have well over 100 contemporary cases available for study.

First chambers of legislatures usually represent people as individuals (or claim to do so). Taagepera (1972; also cf. Taagepera & Shugart 1989: 173–183) has shown that their size (F) clusters around the cube root of the population (P) represented: $F = P^{1/3}$. This empirically observed relationship is explained theoretically by a model of minimization of the number of communication channels, which means maximization of an important aspect of efficiency. Because of this logical quantitative foundation, the cube root relation qualifies as a law in the scientific sense.² Dahl and Tufte (1973: 80–84) and Stigler (1976) have confirmed empirically that F tends to increase with P . Moreover, first chamber sizes below 100 seats have a specific effect on politics because they tend to lead to greater representative disproportionality and fewer numbers of political parties (Taagepera & Shugart 1989: 173–174; Lijphart 1994: 12–13, 83–88, 100–102).

In contrast, second chambers, if they exist, tend to be constituted on very different grounds ranging from heredity and appointment to elections with rules deviating from those of the first chamber. In addition, the sizes of second chamber (S) have received scant scholarly attention. Lijphart (1999: 204) simply notes that second chambers tend to be smaller than first chambers. In their major study of bicameralism, Tsebelis and Money (1997: 48–52) tabulate the various modes of selection of the upper houses for bicameral countries but do not even list their sizes. The underlying assumption may be that this size does not matter and is randomly determined by historical accident. But how do we know unless we investigate it? Do second chamber sizes tend to increase like those of first chambers with increasing population? Are there other factors that influence S ?

At the very least, awareness of factors that influence second chamber sizes could inform the debate when changes in size are contemplated. This is the case currently in the United Kingdom. The issue becomes of considerable interest when one finds parallels between second chambers in federal countries and certain supranational assemblies such as the CEU. In both cases such an assembly represents the constituent units rather than the total population on an equal per capita basis.

We may suspect that second chamber sizes may tend to increase with population. It may be so because larger populations may need larger bodies and can more easily afford them. The cause may also be indirect. The second chamber size may be affected by first chamber size, itself connected to population size by the aforementioned cube root law. If the second chamber reflects federal or other territorial sub-units, it may be larger when there are more sub-units – and this may be the case for countries that are larger geographically. The impact of population size, first chamber size or the number of territorial sub-units may be conditioned on the functions and political importance of the second chamber, including whether it is meant to reflect the territorial sub-units or the entire country. The second chamber could also conceivably be smaller for a given population in non-sovereign entities such as the US states compared to independent countries.

Against this background the present study focuses on 28 countries that currently have federal or otherwise sub-unit-based second chambers, but also considers 30 other countries with second chambers as well as the US states and Puerto Rico. The following specifics are investigated, with second chamber size (S) as the dependent variable.

- (a) The impact of population (P). An empirical correlation is found.
- (b) The impact of first chamber size (F). An empirical correlation is found.
- (c) The impact of political function and importance. No effect is found.

- (d) The relationship of S with the number (N) of territorial sub-units on which the second chamber is based. For this subset of second chambers an empirical correlation is found; moreover, a logical quantitative model in terms of F and N supports it.

We then apply the previous and current results to the EP and the CEU over the last 40 years to see whether their patterns differ from those of national first and second chambers. It will be seen that some regularities emerge, enabling one to make suggestions regarding the optimal range of sizes of sub-unit-based second chambers and supranational assemblies depending upon what type of representation one wishes to have.

Factors influencing the second chamber size

Table 1 shows the population (P) and the sizes of first and second chambers (F and S , respectively) for those 28 contemporary countries where federal or other territorial sub-units presently form the basis of election or appointment of at least part of the second chamber – this part being indicated as S' in the next column.³ The number (N) of territorial sub-units is also shown, as well as an index f that will be explained later. Our analysis focuses on these 28 cases.

Table 2 shows the populations and the sizes of first and second chambers for about 30 countries where the second chamber is *not* elected or appointed on the basis of federal or other territorial sub-units.⁴ These are analyzed in this study only as a side issue.

The criterion for including countries in Table 1 is some involvement of territorial sub-units in the election of all or part of the second chamber. Sometimes the voters elect the second chamber members directly; sometimes the provincial governor (Canada) or assembly (Spain, in part) appoints them. For our purposes the main criterion is that the members emerge from within the territorial sub-unit (which may be called state, province or district) rather than the country as a whole. The country may or may not be federal in the formal sense as long as it satisfies this criterion.

Difficulties arise when part of the second chamber is selected on the basis of sub-units while another part is selected on some other basis. This other component may be minimal (e.g., former presidents as lifetime members in Venezuela) or dominant (e.g., the case of Spain).⁵ In some other cases, such as the Netherlands and France, the linkage of second chamber members to the territorial sub-units is tenuous.⁶ The first reaction is to play it safe and use only those countries where the entire second chamber has a sub-unit basis. However, we would then be reduced to only 17 cases. We decided to include

Table 1. The 28 countries with sub-unit based second chambers around 2000

Country	P (millions)	f	S	S'	N	f	Notes on S and S'
Palau	0.02	16	14	14	2	0.94	
Italy	57	630	326	315	20	0.80	11 appointed for life
Belgium	10	150	74	61	2	0.79	40 + 21 reg., 10 co-opted, 3 royal
Australia	18	148	76	76	8	0.77	
Netherlands	16	150	75	75	12	0.73	province-based electoral college
Yugoslavia	10	138	40	40	2	0.71	
India	952	545	245	233	32	0.70	12 nominated by president
France	58	577	321	321	100	0.67	province-based electoral college
Canada	29	301	104	104	12	0.67	appointed by provincial governor
Croatia	5	127	68	68	21	0.65	president <i>may</i> appoint 5
Austria	8	183	64	64	9	0.65	
South Africa	42	400	90	90	9	0.61	
Japan	125	500	252	152	47	0.50	100 nationally elected
Haiti	7	83	27	27	9	0.49	
Argentina	35	257	72	72	24	0.46	
Russian Federation	148	450	178	178	89	0.43	
Bolivia	7	130	27	27	9	0.41	
Mexico	100	500	128	96	32	0.40	one-quarter nationally elected
Germany	82	662	68	68	16	0.39	
Chile	14	120	48	39	19	0.39	9 appointed + former presidents
Brazil	163	513	81	81	27	0.37	
Spain	39	350	257	103	52	0.36	49 + 51 by regions
Venezuela	22	203	52	50	25	0.33	2 former presidents
United States	266	435	100	100	50	0.32	
Poland	39	460	100	100	49	0.32	
Switzerland	7	200	46	46	26	0.28	
Czech Republic	10	200	81	81	81	0.00	
Dominican Republic	7	120	30	30	30	0.00	
Arithmetic mean	81	288	109	97	29	0.506	
Geometric mean	23	238	81	75	19	–	
Median	26	230	76	68	22	0.45	

Note: $f = \log(S'/N)/\log(f/N)$. Countries are listed by decreasing f .

Table 2. Countries with second chambers *not* based on territorial sub-units around 2000

Country	Population (P) (in millions)	First chamber size (F)	Second chamber size (S)	$f = \log S / \log F$
Taiwan	22	164	334	1.14
United Kingdom	58	659	1,200	1.09
Antigua	0.07	17	17	1.00
Trinidad	1.3	36	31	0.96
Thailand	59	393	260	0.93
Mauritania	2.3	79	56	0.92
Egypt	64	454	264	0.91
Colombia	37	163	102	0.91
Barbados	0.25	28	21	0.91
Kazakhstan	17	77	47	0.89
Paraguay	6	80	45	0.87
Romania	23	341	143	0.85
St Lucia	0.16	17	11	0.85
Malaysia	20	154	68	0.84
Jordan	4	80	40	0.84
Kyrgystan	4	70	35	0.84
Pakistan	130	217	87	0.83
Fiji	0.8	70	34	0.83
Swaziland	1	65	30	0.81
Ireland	3.5	166	60	0.80
Nigeria	88.5	360	109/91	0.80/0.77
Liberia	2.7	64	26	0.78
Nepal	22	205	60	0.77
Ethiopia	57	548	117/120	0.76
Namibia	1.6	72	26	0.76
Uruguay	3.2	99	31	0.75
Botswana	1.4	40	16	0.75
Bahamas	0.25	40	16	0.75
Jamaica	2.6	60	21	0.74
Philippines	74	226	24	0.59

Note: Countries are listed by decreasing $\log S / \log F$. For Nigeria and Ethiopia, two values of S have been found.

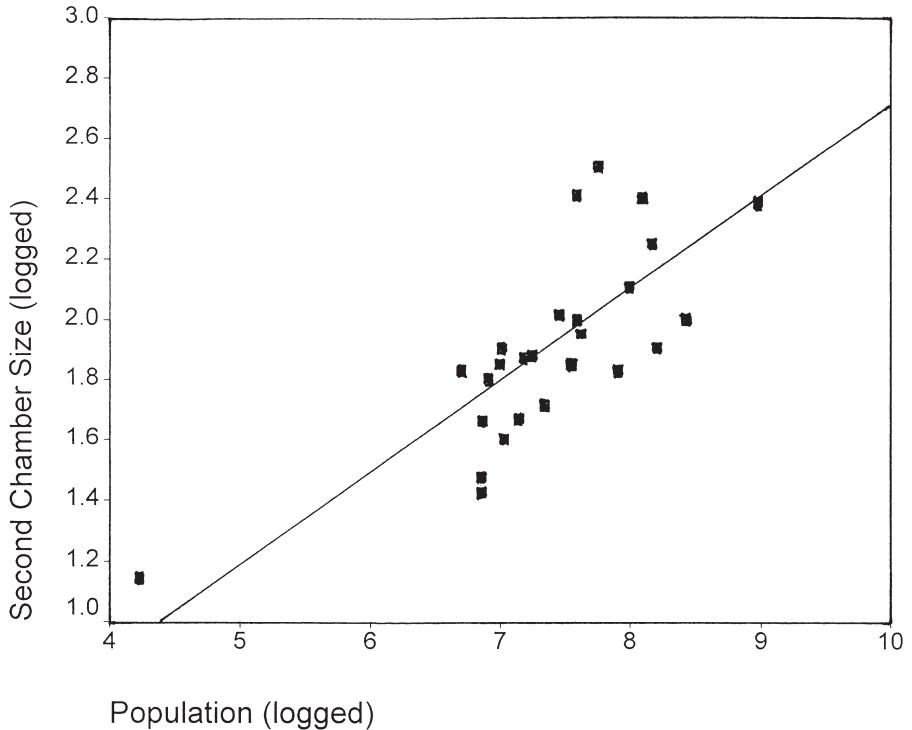


Figure 1. Size of subunit-based second chambers size vs. population.
Source: See Table 1.

the mixed cases, designating as S' the number of territorially selected members of the second chamber, but also to keep track of how the outcome would differ were these questionable cases excluded.

On average, the first chamber sizes in Tables 1 and 2 follow the aforementioned cube root law at high populations but tend to fall to about one-half of the cube root of the population at very low populations. The first chamber sizes in Table 1 are extremely highly correlated with P : $R^2 = 0.81$ between $\log F$ and $\log P$.⁷ The first chambers of the US states tend to be around three-quarters of the cube root of their populations, suggesting that non-sovereign entities may have marginally smaller assemblies at the given population. This issue is not investigated in the present study.

The impact of population on second chamber size

As in the case of first chambers, the sizes of second chambers tend to grow with population size. Figure 1 shows S graphed against P (on log-log scale) for

the 28 countries in Table 1. The largest upward deviations from the best-fit line are Italy and France (superimposed), Spain and Japan. The largest downward deviations are Haiti and Bolivia (superimposed), Dominican Republic, Germany and Brazil.

The best-fit line corresponds to $S = 0.46P^{0.304}$ (where P is in units, not millions) or, with some rounding off, $S = 0.48P^{0.30}$. The correlation is $R^2 = 0.56$ between $\log S$ and $\log P$. The power index 0.30 is somewhat lower than in the cube root law of first chamber sizes (power index 0.33). Thus the empirical observation is that second chamber size tends to increase with increasing population somewhat less steeply than the third root of the population.

The impact of first chamber size on second chamber size

Now we turn to the relationship between the sizes of second and first chambers graphed on log-log scale in Figure 2. The largest upward deviations from the best-fit line are Spain, France and Italy. The largest downward deviations are Germany, Brazil and Bolivia.

The best-fit line corresponds to $S = 1.00F^{0.786}$ with $R^2 = 0.68$ between $\log S$ and $\log F$. Recall that we have $R^2 = 0.81$ between $\log F$ and $\log P$. We have seen that correlation is lower for $\log S$ and $\log P$ (0.56). What these R^2 values may suggest is that while first chamber size is logically and directly connected to population, second chamber size is so connected only indirectly through first chamber intermediation. In graphical form: $\log P \text{ --.81--> } \log F \text{ --.68--> } \log S$ leads to a lower direct correlation $\log P \text{ --.56--> } \log S$.⁸

In the absence of a logical quantitative model, we again have only the empirical observation that second chamber size tends to increase with first chamber size, being on the average close to one-third of the latter. However, it will be seen that for sub-unit-based second chambers we can make theoretical progress by taking into consideration the number of sub-units.

Other potential factors

Apart from population and first chamber size, the size of the second chamber might depend on its function and political importance as well as the degree of sovereignty of the entity concerned.

For political importance we used Lijphart's (1999: 212) ratings of second chamber strength. In order to have a sufficiently large sample we considered all countries in Lijphart's set of stable democracies. Once population is controlled for, we find no difference in size between strong and weak second

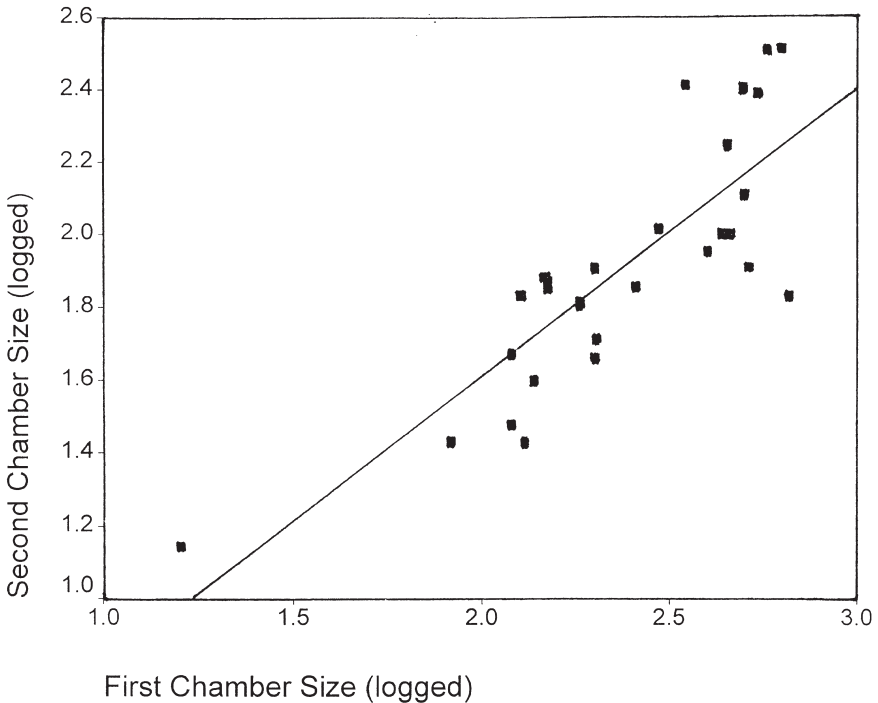


Figure 2. Size of subunit-based second chambers size vs. size of first chamber.
Source: See Table 1.

chambers. However, sub-unit-based second chambers tend to be strong while non-territorially allocated ones tend to be weak.⁹

When the non-territorially constituted second chambers of independent states in Table 2 and those of the US states and Puerto Rico are added to those in Table 1, the same pattern of population dependence is maintained with practically the same degree of correlation: $R^2 = 0.58$ instead of 0.56. Within this general extent of scatter, we find no systematic differences between directly elected and other second chambers, sub-unit-oriented ones and others, and those of provinces and independent countries. The average correlation of second chamber size with population does not seem affected by such factors.

The same is the case for correlation with first chamber size. Once more, when the non-territorially constituted second chambers of independent states in Table 2 and those of the US states and Puerto Rico are added, the same broad pattern between second and first chamber sizes is maintained. Scatter increases moderately ($R^2 = 0.56$ instead of 0.68).¹⁰

The impact of the number of territorial sub-units

When the second chamber members are selected on the basis of territorial sub-units (states, provinces, etc.), they can be assumed to somehow represent both these territorial sub-units and the total population. Thus their size may depend on total population like first chambers and also on the number of sub-units into which this population is divided. Can we specify some logical constraints on the size of the second chamber when the number of sub-units matters? If there are constraints on the sizes of one category of second chambers, they may well spill over to other second chambers due to imitation effects. Thus, if we could specify the sizes of territorially constituted second chambers we would be closer to explaining the sizes of second chambers more generally.

The logical quantitative model

We can consider the following two constraints on the sizes (S) of second chambers when they are selected on the basis of territorial sub-units.

Lower limit. If N sub-units are to be represented, the chamber would need to have at least N seats: $S \geq N$.

Upper limit. If people were represented as individuals, without bunching into territorial sub-units, the second chamber would amount to another first chamber and would be expected to have the same size (F). Since such bunching does take place in the case of sub-unit-based second chambers, fewer seats should be needed or at most the same: $S \leq F$.

Hence S is a function of N and F , subject to constraints $N \leq S(F, N) \leq F$. The simplest way to introduce these constraints into $S = S(F, N)$ is to posit $S = F^f N^n$ where the power indices f and n add up to unity: $f + n = 1$. Thus $S = F^f N^{1-f}$. Here f is the relative weight of the first chamber size in determining the size of the second chamber, while $n = 1 - f$ is the weight of the number of territorial sub-units. For $f = 1$ we have $S = F$, while for $f = 0$ we have $n = 1$ and $S = N$.

In the absence of any other knowledge except $N < S < F$ where $N < F$, our best guess would be the geometric mean of the limits (see Taagepera 1999), meaning that both limiting constraints play an equal role: $f = n = 0.5$. This could be expressed as $S = (NF)^{0.5}$. When only a part S' of the second chamber seats are based on territorial sub-units, the model should be specified as $S' = (NF)^{0.5}$. Let us test this logical quantitative model with actual data.

Testing the model

The previous Table 1 shows the total population (P), the size of the first chamber (F), the total size of the second chamber (S) and its sub-unit-based component (S'), and the number of federal sub-units (N). The value of power index f can be calculated from $S' = FN^{1-f}$.¹¹ This index is also included in Table 1 and the countries are arranged in decreasing order of f . This means that placed at the top are those countries where the second chamber is relatively large compared to the first chamber, regardless of the number of territorial sub-units. At the bottom of the table are the countries with only one representative per subunit, regardless of the size of the first chamber.

The mean power index f (0.506) is indeed very close to 0.50, so our expectation is confirmed. This suggests that first chamber size and the number of sub-units influence the number of sub-unit-based seats in second chambers about equally.¹² Figure 3 shows sub-unit-based second chamber seats (S') graphed against the geometric mean of first chamber size (F) and the number

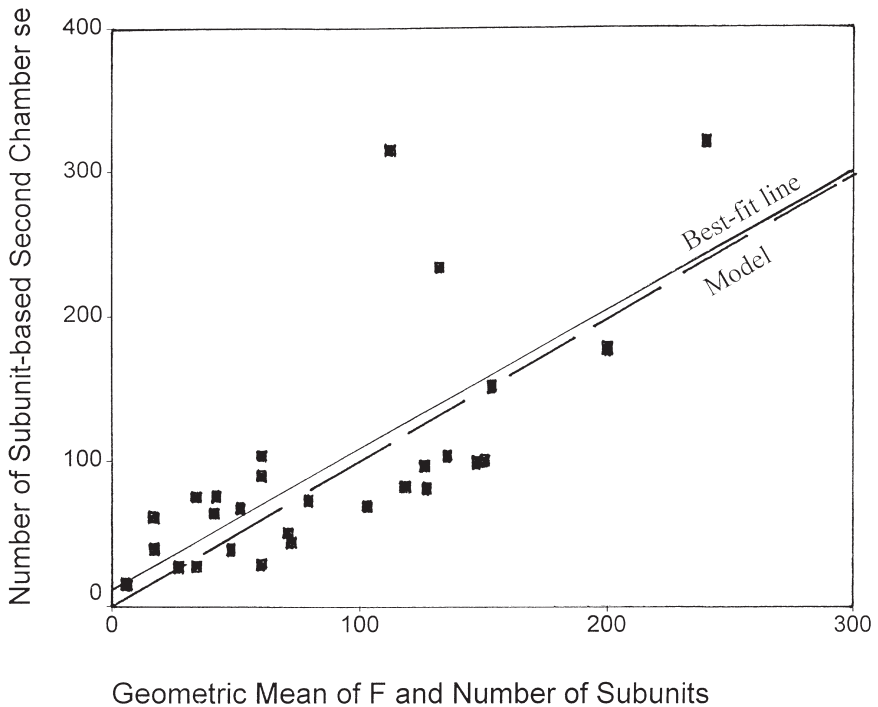


Figure 3. Number of subunit-based second chamber seats vs. the geometric mean of first chamber size and the number of subunits.

Source: See Table 1.

of sub-units (N). The model $S' = (NF)^{0.5}$ is extremely close to the best-fit line which is $S' = 0.96(NF)^{0.5} + 12$, with $R^2 = 0.52$ between S' and $(NF)^{0.5}$. Italy, India and France deviate the most from expectations in the upward direction.

An inspection of the values of f in Table 1, however, hints at a double-peaked distribution with relatively few cases around $f = 0.45$ to 0.65 . (The other apparent gap around $f = 0.05$ to 0.25 is an artifact.¹³) What it suggests is that countries follow, in fairly equal numbers, one of the following two philosophies.

The countries might focus on the sub-units and decide on whether they would allocate each unit one seat (Dominican and Czech Republics) or two (Russia, USA, Venezuela; also Chile, Poland, Spain), or three (Argentina, Haiti, Bolivia, Brazil; also Japan), largely oblivious of comparison with the size of the first chamber which remains appreciably larger. In this case they tend to allocate each sub-unit the same number of seats regardless of its population. This leads to the histogram peak ranging from 0 to 0.50 corresponding to rather small S compared to F .

Alternatively, the countries might start with the size of the first chamber as a benchmark. They might decide on how much smaller they feel the second chamber should be and then allocate those seats to the territorial sub-units, usually giving the more populous units more seats. This leads to the histogram peak ranging from 0.60 to 0.94, corresponding to rather large S compared to F .¹⁴

The sizes of the Council of the European Union and the European Parliament

The patterns observed here offer a guide for future introduction of second chambers or changes in the existing sizes by offering a mapping of what other countries have chosen. In the case of sub-unit-based second chambers, some theoretical reasons also have been outlined as to why certain sizes prevail. With obvious caution and reservations, one may attempt to apply the patterns observed for the sizes of national first and second chambers to supranational entities that have two-tiered assemblies. The European Community is a prime case, with the European Parliament (EP) and the smaller Council of the European Union (CEU).¹⁵

From 1960 to the Treaty of Nice

Table 3 presents the sizes of the EP (the number of members taken as F) and the CEU (the number of QMV votes taken as S) at different times. The total

Table 3. Population and number of countries of the European Economic Community/Union and size of the European Parliament* and the Council of the European Union (QMV)

Year	Population (millions)	EP (F)	CEU (S)	N	f
1960	173	142	17	9	0.23
1975	259	198	58	9	0.60
1979	262	410	58	9	0.49
1984	273	434	63	10	0.49
1989	342	518	76	12	0.49
1994	347	567	76	12	0.48
1999	373	626	87	15	0.47
2001	375	535	237	15	0.77
2003?	481	732	345	27	0.77
Second chamber pattern	481	784	193	27	0.58
Constraints model	481	784	145	27	0.50

*EP prior to 1979, European Assembly (not 'European Consultative Assembly').

population (P) and the number of member states (N) are also shown. The last column (f) will be discussed later.

It can be seen in Figure 4 that the initial size of the EP around 1960 amounted to only one-quarter of the cube root of the population represented, but in 1979 it was expanded to three-quarters of the cube root of the population. The Treaty of Nice momentarily reduced the size of the EP in anticipation of imminent expansion, but it also foresaw, once the expansion from 15 to 27 countries is completed, a size that corresponds to 93 per cent of the cube root of the expanded population. In sum, the EP has been steadily (indeed, asymptotically) approaching the size expected on the basis of the cube root law.¹⁶

The pattern for the CEU was rather similar during 40 years but has recently been thrown off the expected course. CEU size was initially only one-eighth of what is typical of the second chambers in Table 1 and Figure 1 (i.e., $S = 0.46P^{0.304}$) but it rose to three-eighths of this level in 1973 and inched to one-half of it in 1995. Up to 1999, the overall pattern of S in Figure 4 was not inconsistent with asymptotically approaching the curve $S = 0.48P^{0.30}$. With the Treaty of Nice, however, CEU size burst through this ceiling. The expansion to 27 countries would take the CEU 81 per cent above this level unless the Treaty of Nice figures are heavily revised downwards.

We have cautiously assumed that the EP corresponds to the first chamber of the European Union and the CEU to the second. One is encouraged in

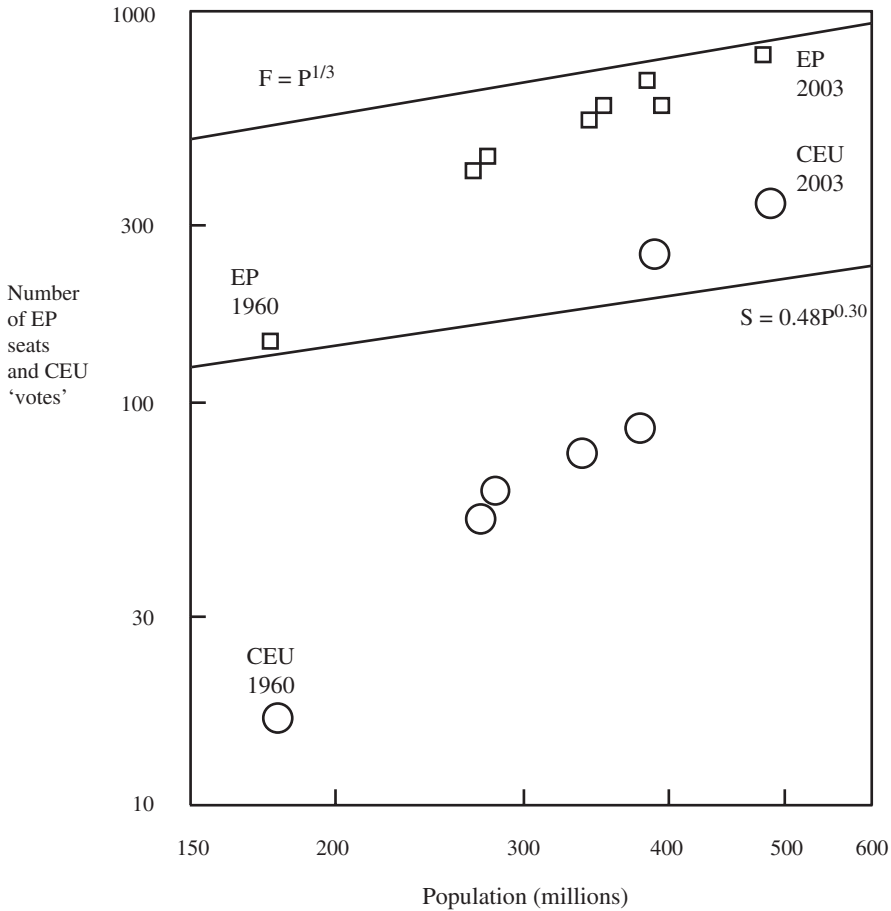


Figure 4. Sizes of the European Parliament and the Council of EU versus population of the European Economic Community/European Union from 1960 to 2003. Source: See Table 3.

such a leap of faith by the observation (Figure 4) that the sizes of the CEU and, in particular, the EP for 40 years seemed to follow an asymptotic course toward the values typical of those of domestic second and first chambers, respectively.¹⁷ In this light, the previous equation $S = F^f N^{1-f}$ can be applied to calculate f for the CEU. The resulting values are included in Table 3. The initially low values of f suggest that initially the number of states dominated over considerations of total population as individuals. By 1980 the value of f stabilized around 0.5, the mean for sub-unit-based second chambers, suggesting equal attention to the number of states and their combined population. The Treaty of Nice brings f to 0.77, suggesting reduced attention to the number of

member states *qua* states and more attention to European population as individuals. This means that, in its QMV votes, the CEU would compete with the EP in representing the population of Europe as individuals rather than representing the member states.

Why the CEU size decided at Nice should be reconsidered

The total sizes of the CEU and the EP are only one aspect of the larger package that also includes the issue of how to allocate the total size among the member states. This aspect is being dealt with in a separate study (Taagepera & Hosli 2001) based on a model of logical constraints. Their result is a single equation without free parameters that well predicts the distribution of EP seats and CEU votes over the last 40 years based only on the number and population of member states and the total number of seats/votes. The population of a candidate country is a given, but the total number of seats in an assembly seems to offer a wide range of choices. The present study delineates some possible constraints on such choice.

The issue is of special interest regarding the current enlargement of the European Union. Remember that the cube root law of assembly sizes mentioned at the beginning of this article is based on minimization of the number of communication channels and hence maximization of a major aspect of efficiency. Observed to apply widely to the first chambers of national assemblies, it also seems to be the norm towards which the EP has been groping for the last 40 years. The envisaged expansion to 27 countries with a total population of about 481 million would call for about 784 seats according to the cube root law. The Treaty of Nice stipulates 732, which is remarkably close (within 7 per cent).

Matters are quite different with the CEU. Of course the theory regarding the efficient sizes of second chambers is still incomplete, but we have found an opening by tying the number of sub-unit-based seats to the number of such sub-units and first chamber size. Empirically at any rate, one observes an average relationship to population ($S = 0.48P^{0.30}$) that may reflect groping for maximum efficiency by trial and error. For 40 years the successive expansions of CEU votes (QMV) seemed to build toward the corresponding size for the given population, but the Treaty of Nice burst the ceiling. For a total population of about 481 million, the empirical equation above would suggest a total size of 193 while Treaty of Nice stipulates 345 – almost half the size of the EP. Having two bodies of comparable size might not prove to be efficient.

True, several countries with sub-unit-based second chambers do have second chambers about half the size of the first chamber – such as Italy, Belgium, Australia, Netherlands, India and France (cf. Table 1). However, it

also depends upon the number of territorial sub-units represented. The model presented in our study expresses the balance through index f that can range from 0 to 1. As seen in Table 1, the average f is around 0.5 – and this was also the case for the CEU as compared to the EP from 1979 to 2000 (cf. Table 3). The Treaty of Nice raises it to 0.77 on a par with the highest individual country values in Table 1. This means that the CEU would implicitly compete with the EP in representing the population of Europe as individuals rather than representing the member states as states. Is this style of representation desirable?

As the Treaty of Nice comes under reconsideration around 2004, our observations and modeling suggest the following changes regarding the sizes of the EP and the CEU. These recommendations assume 27 countries with total population size around 481 million.

- (a) Keep the European Parliament size as stipulated in the Treaty of Nice or expand it very moderately from 732 to around 784 seats.
- (b) Reduce the Council of the European Union size (in terms of QMV votes) appreciably, compared to the Treaty of Nice stipulations, from 345 to around 145 and certainly not above 193 ‘votes’.¹⁸

One simple way to reduce the CEU would be to divide the QMV votes proposed in Nice by two, rounding the half-votes up to even numbers. The relative voting weights of countries would be essentially preserved, apart from the very smallest countries who may win or lose in a noticeable way. Such reduction is possible now because no physical seats are involved. Pressures may eventually build toward ‘one vote, one person’ in the CEU, turning abstract ‘votes’ into seats. Then a rollback toward fewer seats would become much more difficult.

The question addressed here is what total sizes should be adopted. How to allocate these seats/QMV votes among member states is outside the scope of this article. A constraint-based formula established by Taagepera and Hosli (2001) reflects quite accurately the previous allocations for both the CEU and the EP from 1960 to 2000 (for given total size) including the allocations made by the Treaty of Nice. Hence it is highly likely to be followed spontaneously by European decision makers in the future as well.

Conclusion

Like those of first chambers, second chamber sizes tend to increase with increasing population but with more scatter and greater complexity. Population seems to affect first chamber size directly, and the size of the first chamber

affects second chamber size. When selected on the basis of territorial sub-units, second chamber size also tends to increase with the number of these sub-units for a given population. On average, second chamber size is the geometric mean of first chamber size and the number of sub-units, but variation around this mean is wide.

From the viewpoint of representing the total population and the constituent sub-units, the EP is more akin to a first chamber and its size has been approaching the size typical of first chambers at a given population. The CEU, on the other hand, is more akin to a second chamber and its size (in terms of QMV votes) was approaching the size typical of second chambers at a given population. However, the Treaty of Nice has boosted the CEU to a size comparable to that of the EP, which may prove not to be functional. To the extent that these bodies can be assumed to be analogous to domestic first and second chambers, the domestic precedents may offer some guidance as to what the optimal sizes of the CEU and the EP might be.

Appendix: The impact of population on the number of sub-units

The number of territorial sub-units itself tends to increase with population. For the 14 smaller countries in Table 1 (those with populations under 25 million), the median N is 10.5; while for the 14 larger countries (those with populations over 25 million), it is 31. However, the correlation is quite limited. At the same population of 10 million, Belgium has 2 sub-units and the Czech Republic 81 for the purposes of second chamber selection.

The previous models $S' = (FN)^{0.5}$ and $F = P^{1/3}$ imply that $S' = P^{1/6}N^{1/2}$. If we take the previous empirical best fit $S = 0.48P^{0.30}$ at face value and assume that S' is close to S (as it is in Table 1 except for Japan and Spain), then the combination of the latter two equations suggests that $N = 0.2P^{0.275}$ approximately. When graphing $\log N$ versus $\log P$ (graph not shown here) this is found to be a fair fit, although something close to $N = 0.3P^{0.25}$ is better. Another way to put it is that the population of sub-units (P/N) increases roughly as power three-quarters of the total population.

It might be that such a relation minimizes of the number of communication channels in a federal or quasi-federal system. This was the approach that led to the cube root law of first chambers (Taagepera 1972). Building a logical quantitative model for the optimal number of sub-units is beyond the scope of this study. Let us merely point out that if such an endeavour should succeed, then in conjunction with $S' = (FN)^{0.5}$ and $F = P^{1/3}$ the size of sub-unit-based second assemblies would receive a complete theoretical explanation.

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Notes

1. *Der Spiegel*, 30 April 2001.
2. The logical quantitative model actually yields a slightly more complex equation that involves age structure and literacy. For our purposes the simplified form shown here suffices.
3. Nigeria and Romania also may qualify but we could not find data on the number of sub-units.
4. Publication of such basic data might look superfluous but to our surprise we found few extensive compilations. Kurian (1998), Banks and Muller (1999) and Massicotte (2000) come the closest. Thus Massicotte lists the sizes of those 27 second chambers which are directly elected – but omits the sizes of corresponding first chambers (although the electoral formula is indicated for both chambers). We are also concerned with the size of indirectly elected and even appointed second chambers. Do their sizes differ systematically from those of elected chambers? The only category where data on P, F and S are readily available (see, e.g., Hoffmann 1992: 372–376, 622–647), and hence need not be re-tabulated here, is the US states. Because our analysis uses the logarithm of population, which is insensitive to moderate population increases, the precise year of population data is not critical.
5. In Belgium the tiny German-speaking community also has appointed representation, but the number of effective sub-units is much closer to 2 than to 3. Spain is the most confusing case. It has 47 mainland provinces and 5 overseas enclaves and islands, hence $N = 52$. Our reading is that, out of the 257 second chamber seats, 154 are elected nationwide, 52 are elected one each from the 52 sub-units and 51 are appointed by provincial assemblies.
6. In the Netherlands the provinces have weighted representation in the electoral college that elects the second chamber (actually termed ‘First Chamber’ in that country), but the election is from among nationwide party lists. The situation is comparable in France.
7. With the first chambers in Table 2 and those of the US states and Puerto Rico added, the same broad pattern of population dependence is maintained but scatter increases: $R^2 = 0.64$ instead of 0.81, between $\log F$ and $\log P$.
8. When the non-territorially constituted second chambers of independent states in Table 2 and those of the US states and Puerto Rico are added, such indirect connection through first chamber size weakens: $\log P - 0.64 \rightarrow \log F - 0.56 \rightarrow \log S$; yet the degree of direct correlation is maintained: $\log P - 0.58 \rightarrow \log S$.
9. Lijphart (1999) assigns 4 points to strong bicameralism (symmetrical and incongruently elected chambers), 3 points to mixed cases, 2 points to weak bicameralism (asymmetrical and congruently elected chambers) and 1 point to unicameralism. Of the countries

- in Tables 1 and 2, Lijphart rates 21. Of these, 14 assign at least some second chamber seats on the basis of territorial sub-units and the mean strength of the second chamber is 3.3, while 7 assign them purely on some different basis and the mean strength is only 2.4.
10. In two historically grounded cases (the UK and Taiwan), the second chambers are actually larger than the respective first chambers. In the Philippines, the second chamber is very small compared to both population and the first chamber. In New Hampshire, the first chamber is strikingly large compared to population while the second chamber fits the average.
 11. The index f in $S = F^f N^{1-f}$ is obtained from $f = \log(S'/N)/\log(F/N)$. Note that only the federally based component (S') of the second chamber is used.
 12. The mean f is 0.47 for the clear 18 cases, those where $S' = S$ and the Netherlands and France are excluded because the sub-unit basis of the second chamber is tenuous. It is 0.57 for the remaining 10 more debatable cases where the second chamber includes non-territorially assigned seats. These cases are fairly equally distributed across Table 1 and the means are not significantly different from 0.50 in view of the small number of cases.
 13. With 1 seat per territorial sub-unit, $f = 0.00$. With 2 seats per sub-unit, we already vault to $f > 0.3$. It would take an unusual allocation of about 1.4 seats per sub-unit to fall around $f = 0.15$ and fill the gap in the histogram. The lowest value above $f = 0$ actually observed is Switzerland (1.8 seats per sub-unit) due to the existence of cantons and half-cantons. Hence the entire range of f from 0 to 0.45 really represents a single peak.
 14. In an extremely formal sense, the formula $S = F^f N^{1-f}$ might be extended to non-territorially allocated second chambers through the following reasoning. Consider a unitary state – unitary in the sense of not using territorial sub-units to allocate second chamber seats. Then the number of sub-units is $N = 1$ and the above formula becomes $S = F^f$, where $f = \log S/\log F$. For the countries in Table 2, the resulting median f is around 0.85 with a range extending from $f = 0.6$ to 1.0 (when overlooking the UK and Taiwan with their special histories). Thus these countries align themselves with the second peak in Figure 3, the one that corresponds to countries that de-emphasize the importance of territorial sub-units in the choice of second chamber size. While it would be disturbing to find otherwise, it still does not explain why those countries choose S to be smaller than F to the extent they do. One may protest that the extension of the model to $N = 1$ is outrageous, and we sort of agree. However, the empirically existing correlation between S and F begs for an explanation and anything that might guide us toward a more general logical model should not be overlooked.
 15. There are further ancillary bodies, but the CEU and the EP clearly stand out.
 16. The US House of Representatives followed a similar initial pattern. It started in 1790 at about 40 per cent of the cube root of the population but caught up with the cube root within 40 years (cf. graph in Taagepera & Shugart 1989: 175). However, from the very beginning, the House represented the total population on an equal per capita basis (except the slaves) as first chambers generally do. In contrast, the populations of smaller countries are over-represented in the EP, which in this sense also involves an element of second chamber thinking. If so, then it may remain smaller than predicted by the cube root law.
 17. The United Nations, with its General Assembly and Security Council, offers a different picture. Its larger assembly, the General Assembly, has one seat per member, paying no attention to population. This feature makes it more akin to a second chamber – and one with extreme emphasis on representing states rather than individuals. The smaller body,

the Security Council, has fewer seats than the United Nations has member states. This is outside the range of our model and will not be discussed here. However, the model we present may become relevant to the UN once the General Assembly is expanded to give the more populous countries more votes with corresponding changes in the Security Council.

18. With 784 seats for the EP, as suggested by the cube root law, and 193 'votes' in the CEU, as suggested by the empirical equation above, index f would be 0.58, which is still on the high side compared to the average of sub-unit-based national second chambers (0.51). It would also be higher than the value of f for the CEU itself from 1979 to 2000 (0.49 to 0.47). For $f = 0.50$ (and 784 EP seats for 27 countries), the CEU would have to have only $S = (784 \times 27)^{0.5} = 145$ seats. This would mean less than the typical second chamber size for the given total population because the number of sub-units is on the low side.

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