



Seat allocation in federal second chambers: Logical models in Canada and Germany



Trevor J. Allen^{a,*}, Rein Taagepera^{a,b}

^a University of California, Irvine, United States

^b University of Tartu, Estonia

HIGHLIGHTS

- A model for seat allocation in federal second chambers is proposed and evaluated.
- The model is only informed by number of seats, federal units, and population.
- The predicted seat allocation aligns with empirical allocations in Canada and Germany.
- The model does accurately forecast seat allocation in unitary states' second chambers.

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ABSTRACT

Most federal second chambers give subunits equal representation. A few apply per capita representation, like most first chambers. Only Germany and Canada compromise between territorial and per capita representations. Both broadly allocate seats following the power equation format $S_i = SP_i^n / \sum P_k^n$. Two values have been proposed for n . The rigid $n = 0.5$ approximates the Canadian pattern but does not fit the German. The flexible $n = [1/\log T - 1/\log S]/[1/\log T - 1/\log P]$ takes into account the number of subunits (T) and total seats (S), for given total population (P). The flexible model better predicts seat allocation both in Canada and Germany. This model has been shown to apply to the European Parliament and the EU Council. Hence it may express what countries intuitively grope for when trying to strike a compromise between representations per capita and per subunit. As such, it does not fit the seat allocation of administrative subunits in unitary states, France and Italy.

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1. Introduction

Territorial representation lies at the very foundation of federalism. Although second chambers (i.e., upper houses) generally have diverse historical origins and serve a variety of different functions, the second chambers of federal states almost always represent territorial subunits. These chambers are typically paired with a first chamber representing people on a per capita basis (Taagepera and Recchia, 2002). Thus, territorial and per capita seat allocation principles permeate federations, and are entrenched in both mature and fledging assemblies (Griffiths and Nerenberg, 2002).¹ The former principle expresses the idea

that a territory is a territory, regardless of its population; the latter suggests that a person is a person, regardless of his or her location. In theory, the spectrum of possibilities for striking a balance between said principles is expansive. In practice, surprisingly few second chambers deviate from the territorial norm.² Of those federal countries that do deviate from territorial representation in second chambers, only the second chambers of Canada and Germany attempt an explicit compromise between the territorial and per capita allocation principles, allotting more seats to larger units while still falling short of proportionality. It is the formula for this compromise between territorial and per capita representations that is of primary interest in this study.

Because of the dual emphasis on proportional and territorial representations, models predicting seat allocation in the European

* Corresponding author.

E-mail addresses: trevorja@uci.edu (T.J. Allen), rtaagepe@uci.edu (R. Taagepera).

¹ These are the contradictory principles of equality among the states and equality among citizens (Laslier, 2012).

² For instance, Austria allocates its second chamber seats to territorial units purely based on their population, similarly to the first chamber.

Parliament and Council are hypothesized to be especially effective in forecasting the seat distribution among subunits in federations, as they have similar representative goals (Taagepera and Hosli, 2006).³ That is, representation in international organizations recognizes countries as well as populations just as federations must when a compromise between territorial and per capita norms of representation is attempted. We examine these models in the context of the Canadian Senate and German *Bundesrat*. We consider each case over time to examine how each state's second chamber is informed by the two allocation rules during their various expansions. Finally, as counterexamples, we also consider two unitary countries, France and Italy, where seats in the second chamber are also apportioned on a territorial basis. In these cases, seat allocation by subunit is done for administrative rather than representative purposes, so the quantitative models are hypothesized to underestimate the proportionality of these chambers.

First, however, it is useful to introduce the general logical models used in the analysis below. This allows consideration of allocation rules in a manner consistent with the vocabulary used throughout the study. We also tabulate the prevalence of the various allocation rules (territorial representation, per capita representation, and some mixed or alternative models) to show the rareness of attempting a compromise between territorial and per capita representations. The study then focuses on Germany and Canada, which attempt a compromise between “a territory is a territory”, (T is T) and “a person is a person” (P is P). We compare their empirical seat allocations from bivariate regressions of seat number on population share with the allocation predicted by logical models *a priori*. We compare two models that have been proposed for allocating seats in international organizations and federations, and which have been also shown to fit seat allocation in the European Parliament and the weighted votes in the EU Council (Taagepera and Hosli, 2006), to different degrees. These models are chosen because of the importance of both territorial and per capita norms of representation in European institutions, and the apparent importance of both norms in the Canadian Senate and German *Bundesrat* (Benz and Broschek, 2013; Milne, 2005). We then present these ideal, empirical, and predictive intermediary options graphically. One of the models seems to predict the degree to which the second chambers of the compromise cases deviate from proportionality, such that the predictive model gives a slope similar to the regression slope coefficient of logged seats on logged population share. Hence, *this model may express what federal countries are intuitively groping for* when trying to strike a compromise between representations per capita and per subunit.

2. Allocation by power law in actual federations

Half a century ago, Theil (1969) proposed that, when more than two subunits are involved, the only “internally consistent”⁴ allocation of seats on the basis of population is

$$S_i = SP_i^n / \sum P_k^n. \quad (1)$$

In this model, S is the total number of seats, S_i is the number of seats for the i th subunit, with population P_i , and k in the

summation ranges from 1 to T , the number of territorial subunits. Exponent n expresses how close allocation comes to proportional representation of population.

Implicit in this expression is the norm that smaller states should have less representatives than larger states, yet more than proportionally to their population. This norm is referred to as “the principle of degressive proportionality” (Koriyama et al., 2013).⁵ Weights are said to exhibit degressive proportionality to the population if $P_i < P_j$ leads to $S_i \leq S_j$ and $S_i/P_i \leq S_j/P_j$, and hence also $S_i/S_j \leq P_i/P_j$.⁶ Eq. (1) satisfies these conditions when $1 \geq n \geq 0$ and yields a specific outcome, once n is specified.⁷

As n ranges from zero to one, Eq. (1) is able to express the entire range of outcomes, from allocation proportional to population, to mixed allocation, and to equal allocation for each subunit. That is, when $n = 1$, Eq. (1) is reduced to $S_i = SP_i / \sum P_k$. In this case, $\sum P_k$ further reduces to P (the total population), and we have $S_i = (S/P)P_i$, meaning that seats are allocated in proportion to subunit population. Hence $n = 1$ expresses proportional allocation of seats, “ P is P ”. Conversely, when $n = 0$, Eq. (1) reduces to $S_i = S/T$, given that $P^0 = 1$ for any population, and therefore $\sum P_k$ is equal to the number of subunits, T . All subunits have the same number of seats, S/T . Therefore $n = 0$ expresses the familiar territorial allocation principle for second chambers, T is T . Values of n between 0 and 1 represent compromises between territorial and proportional representations. This model can be extended to circumstances wherever overrepresentation of smaller subunits is desired.

Before discussing intermediary values for n , Table 1 briefly considers how the seat allocation is actually done in federations. Our database consists of all the countries in the *Handbook of Federal Countries* (Griffiths and Nerenberg, 2002). Of these, Micronesia, St. Kitts, United Arab Emirates, and Venezuela did not have a second chamber. The remaining 21 federal states are shown in Table 1.

From the table it is apparent that most federations allocate their second chamber seats either purely on territorial basis (six cases), corresponding to $n = 0$, or with only minor modifications (eight cases). At the opposite extreme, only Austria allocates purely on population basis $n = 1$, while four others do so with minor modifications. For instance, India's subunits with population shares of 0.6%–0.9% would deserve two seats, but they actually receive three or even four, in a minor concession to the norm T is T .⁸ Two subunits in Spain, at 2.7% of the population, are also rounded upwards: two seats rather than one. Belgium, Bosnia, and Ethiopia are somewhat idiosyncratic. The Ethiopian House of Federation (determined principally by population) represents ethnic groups rather than regional states, although the two often coincide (Habtu, 2005). Similarly, Belgium also allocates seats by the number of speakers of Flemish, French and German (Griffiths and Nerenberg, 2002). Bosnia allocates seats equally to three ethnic groups rather than territorial subunits.

⁵ The first European Union document that mentioned this principle formally was the Lisbon Treaty, in reference to seat allocation in the European Parliament (Mehlhausen, 2016).

⁶ Applying the decreasing marginal utility assumption commonly used in economics, Koriyama et al. (2013) place degressive proportionality principle on a firmer basis. Degressive proportionality is obtained as the result of assigning weights proportional to the sum of the marginal utilities so that the utilitarian social welfare is maximized. The specific allocation formula is left open.

⁷ Rounding fractional seats to integers may infringe on $S_i/S_j = P_i/P_j$ in a minor way, whichever apportionment rule is applied. This has only minute effects on testing the degree of fit of various models to actual cases, which is the central purpose of this study.

⁸ With a stronger concession to territory, a proposal for the European Parliament (the Cambridge Compromise) first allocates 6 seats to each member state (“ T is T ”) and then most of the seats by proportionality (“ P is P ”), using the D'Hondt method (Grimmett, 2012).

³ Taagepera and Hosli suggest their model should generalize (2006, p. 370).

⁴ What does “internally consistent” mean? Eq. (1) is equivalent to $S_i/S_j = (P_i/P_j)^n$. Theil (1969) showed that, if the ratio of seats of two components is at all a function of the ratio of their populations – $S_i/S_j = f(P_i/P_j)$ – then $f(P_i/P_j)$ must be $(P_i/P_j)^n$, if the outcomes are to fit for 3 or more components taken pairwise. This is designated as “internally consistent” among components. Theil further shows that Eq. (1) minimizes entropy. Theil's format has proved itself empirically in various allocation situations.

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