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Calculating Optimal Assembly Size: Namibia in Comparative Perspective

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This briefing paper focuses on the issue of determining an optimal assembly size for Namibia. The analysis presented is based upon the Cube Root Law of Assembly Size developed by Rein Taagepera and Matthew Soberg Shugart. After a critical assessment of the original theoretical assumptions in their model, we propose some adjustments and alternatives to provide a better fit for small democracies such as Namibia. This paper presents evidence that the current assembly size (72) is very close to what the model predicts (68) and that Namibia's assembly size is slightly bigger than the average assembly size for the 26 small democracies presented here. The model estimates that Namibia should have one representative for every 26,866 citizens. At the current rate of population growth Namibia's assembly size should be 77 by year 2021.

1. Introduction

Modern democracies are representative democracies. Citizens no longer represent their own interests directly. Instead, they appoint representatives to do so. The shift from direct to representative democracy was a pragmatic one. The direct democratic model, given technological constraints, can only effectively accommodate direct input from citizens numbering in the hundreds and decreases in efficiency as population numbers increase. The logical step was for interest groups to appoint representatives to speak on their behalf. This solution in turn created its own problems. One of them is the question of what constitutes fair representation. By *fair* it is meant that all other factors equal what would be the optimal situation for ensuring that any one citizen's or any one group of citizens' concerns enjoy an equal chance of representation *vis-à-vis* those of other citizens or other groups of citizens. Just how many representatives should be elected in order to ensure fair representation?

The answer to this question is important yet not apparent. For instance, there is no standard or universally accepted formula in existence that specifies an optimum citizen–representative ratio. With too many representatives, scarce resources would be wasted and effectiveness sacrificed. With too few representatives, capacity to deliver would become taxed and performance would suffer. A key problem in determining an optimal citizen-representative ratio is the lack of agreement on what should serve as the basis for such a calculation. There are several options:

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use the population of a country; the number of citizens of voting age; the number of registered voters; the number of economically active citizens etc. Few would raise objections about using *people* as the basis for determining the number of representatives, but few would agree upon whom to count and whom to leave out.

One model for determining optimal assembly size is the Cube Root Law of Assembly Size proposed by Rein Taagepera and Matthew Soberg Shugart (1989). This paper puts that model to the test. It questions the applicability of the model to democracies with small population sizes such as Namibia. An adapted version of the model is used to predict the optimal size of the Namibian National Assembly[3]. It is proposed that this model could serve as a guideline for future increases in the size of the National Assembly.

2. Explaining the Model: Assumptions and Composition

The model Taagepera and Shugart constructed is based upon a feedback communications model of politics. The core assumption is that legislators communicate both with constituents (the representative function) and other legislators (the legislative function). Finding the optimum assembly size is to find the right balance between these two functions. Shugart (1997) argued that an oversized or undersized assembly would have an impact on both vertical (communication between legislators and constituents) and horizontal (communication between legislators) channels of communication. An assembly that is too large for its population would make communication between legislators cumbersome, while making communication with constituents more effective, and *vice versa* (Shugart 1997: 1). Hence, the balance between the two needs to be just right otherwise citizens will not receive the quality of representation they are entitled to.[4]

Following the analysis of a database of information on 105 countries for the years 1970 and 1985, Taagepera and Shugart (1989) formulated the basis of Cube Root Law of Assembly Size. This 'law' states that assembly size approximates the cube root of the active population of a country. Mathematically one could express the relationship as:

$$S = (P)^{1/3}$$

where, S = seats and P = population.

Based on the assumption that "countries with low literacy rates tend to have rather small assemblies (at given population size)…" (Taagepera and Shugart 1989: 177), the notion of *active population* is used as the basis for determining assembly size. Active population size is calculated taking into account a country's literacy rate and working-age population. "The number of assembly seats might be determined by literate adult population rather than by total population, since only adults vote and only literate voters are well placed to cast an informed vote" (Taagepera &

[3] Although we focus only on the National Assembly here, the exercise could easily be repeated for sub-national assemblies such a Regional Councils and Local Authority Councils provided that one can obtain the appropriate international data.

[4] For our discussion here, we link quality with numbers. We are aware that quality depends on far more than mere numbers, but the focus of this paper justifies some degree of reductionism. Thus, for this paper it is assumed that the quality of representation refers to the number of representatives with all other factors being equal.

Shugart, 1989:177). The use of the working-age population as a variable is not explained. This reasoning produced the following formula:

$$P_a = PLW$$

where, *P* = total population, *L* = literacy rate (as a fraction), and *W* = working-age population (as a fraction).

Based upon the finding (Taagepera and Shugart 1989: 178) that "few countries have assemblies larger than twice the value predicted by the model, and few have assembly sizes smaller that one half of the expected number", Taagepera and Shugart state that the number of seats (*S*) is the product of the cube root of two times the active population (P_a)[5]. Thus, the formula for calculating optimal assembly size is:

$$S = \left(2P_a\right)^{1/3}$$

3. Weaknesses in the Model

Although Taagepera and Shugart (1989) provide both theoretical and empirical proof for their model, they also point out that there are shortcomings. Firstly, they omitted citizens past retirement age (65 years) because of data shortages. This they acknowledge cannot be justified intellectually (Taagepera and Shugart 1989: 177). We agree: those past retirement age should be included for they cannot automatically be deemed to be politically inactive. Furthermore, they are legally entitled to participate in the political process. Secondly, their defence for the use of the economically active part of a population is unclear. It is not uncommon that working age is defined as 15 years and older. Therefore, the model would include a section of the population that is legally excluded from the vote – assuming that voting age is standardised around 18 years of age. This too is not empirically and theoretically sound. Furthermore, one cannot assume that because an individual is economically active (assumed to be working for an income) that he/she is politically active, nor that the economically inactive (unemployed, retired, students etc.) are not politically active.

Thirdly, they omitted countries for which they could not find literacy rates. This would influence their findings. It is not clear how literacy rates are distributed through the cases in their model and which cases have been omitted. If the omitted cases have low literacy rates (which is quite probable given the dearth of information in Third World countries) that would imply that small assembly sizes are systematically under-represented in the model, and hence the model would be biased toward large assembly sizes. This would result in some systematic over-prediction of optimum assembly sizes.

This dovetails with the fourth point of this critique: their assumption that only *literate* voters cast *informed* votes. Although this is not the place to explore this assumption to its full conclusion, this assumption is an oversimplification, especially as far as participation in developing democracies is concerned. As such, they assume that illiterate people have no means to become informed about politics. This is not true: several alternative sources of information to the printed media are

[5] A legislator is seen as a two-way communication channel (he or she is both sender and recipient of information). Therefore, $2P_a$ is used.

available to illiterate people. These include, but are not limited to, informal, personal networks; personal experience with policies and their outcomes; traditional authority structures; membership of political parties and/or trade unions; contacts with a range of developmental and government agencies; and radio and television (though this could be argued to have been peripheral in the 1970s in developing countries).

Fifthly, they included non-democratic and unstable regimes in their analysis. Although this strengthens the case for their findings to take the form of a social science 'law', this variable might also have distorted their findings. The considerations for determining assembly size are different for democracies and non-democratic regimes, and this is too important to ignore. With democracies, the main consideration is adequate and effective representation. In non-democratic regimes, the composition of an assembly is largely the result of patronage or clientelism and the need for social control. It should be questioned to what extent (if any) people have freedom to propose candidates of their choice, since candidates are imposed rather than elected in non-democratic regimes where elections are held. In our view this difference is too fundamental to ignore.

Taagepera and Shugart (1989: 181-182) admit that at a theoretical level the model has a weakness: "Strictly speaking, the model applies only to single-member districts in polities where assembly members have some independence from party discipline… In this sense the Cube Root Law is not completely proved theoretically." For this and other reasons listed above, this study does not concern itself with the 'law-like' properties of their model. It is treated more as an *approximation* (where *approximation* means *an almost correct solution to a problem where the process of arriving at the solution is not clear)*.[6] As such, the model that Taagepera and Shugart developed for determining assembly size, as well as the modifications applied to it in this paper, should be seen as a tool serving as a general guideline for determining assembly size, since it is not (yet) the result of empirical verification of a scientific law. This is a case of the model proving the law where the law is imagined; or at least in the case of assemblies elected through lists systems, theoretically unproven. One weakness in our model is that it is essentially a single-shot model, it does not use time-series data at all.

4. Testing the Model: Methodology

In order to test Taagepera and Shugart's model a database was compiled featuring data from the *United Nations Human Development Report 2001*; the World Policy worldwide database on lower-house assembly size; and the Freedom House freedom ratings. In order to compare like democracies the following two criteria were set: only democracies with a rating of 'free' on the Freedom House index would be included, and no democracies with a population of more than four million people would be included.

The first criterion serves to eliminate non-democratic and unstable regimes from inclusion in the analysis. The second criterion was set on the assumption that a small democracy is defined as one with a population of four million people or less. This figure is roughly twice the size of the

[6] Taagepera and Shugart's Cube Root Law forms part of a movement within the social studies' discipline to define the equivalent of natural scientific laws for the social realm. Though it has served to help refine research methodology, the only success that this movement has had is to draw the concept of 'law' into question. To date no empirically proven social law exists. In this instance, Taagepera and Shugart looked for what would amout to a 'law'in social sciences: "Given the paucity of theory-based quantitative laws in political science, the Cube Root Law of assembly sizes is among the strongest".

Namibian population at the time of the 2001 Census, when it numbered 1,826,854 (Census Office 2001: 14). Applying the criteria yielded 26 democracies for comparison with Namibia.

Table 1: Small democracies

Country	Population size in millions	Assembly size
Bahamas	0.3	49
Barbados	0.3	28
Belize	0.2	29
Botswana	1.5	47
Cape Verde	0.3	79
Costa Rica	2.0	57
Cyprus	0.8	80
Estonia	1.4	101
Fiji	0.8	70
Guyana	0.8	53
Iceland	0.3	63
Ireland	3.8	166
Jamaica	2.6	60
Latvia	2.4	100
Lithuania	3.7	141
Luxembourg	0.4	60
Malta	0.4	65
Mauritius	1.2	70
Mongolia	2.5	76
Namibia	1.7	72
New Zealand	3.7	120
Panama	2.8	72
Western Samoa	0.2	47
Slovenia	2.0	90
Trinidad & Tobago	1.3	36
Uruguay	3.3	99

Source: *United Nations Human Development Report 2001*

Data contained in the *United Nations Human Development Report 2001* was used because the report was compiled with a standardised means of gathering information. It is one of the largest publicly accessible databases containing comparative biographical data on all countries of the world. This does not mean that all the data is perfectly up to date, but at least it allows one to compare data between countries for which the data is up to date. The Freedom House Freedom Index is a widely accepted yardstick for classifying regime types. It has a liberal democratic bias, which was felt to be acceptable since the dominant type of democracy promoted worldwide is liberal in nature.

5. Testing the Model: Applying Different Variables

Given the concerns over the use of active population (P_A) as the appropriate base for the model, two alternatives were examined: voting-age population (P_{VAP}) and total population (P_T). To test the

impact of each on the predictive value of the existing model, the cube root of each was entered instead of the cube root of the active population. This resulted in the following three equations:

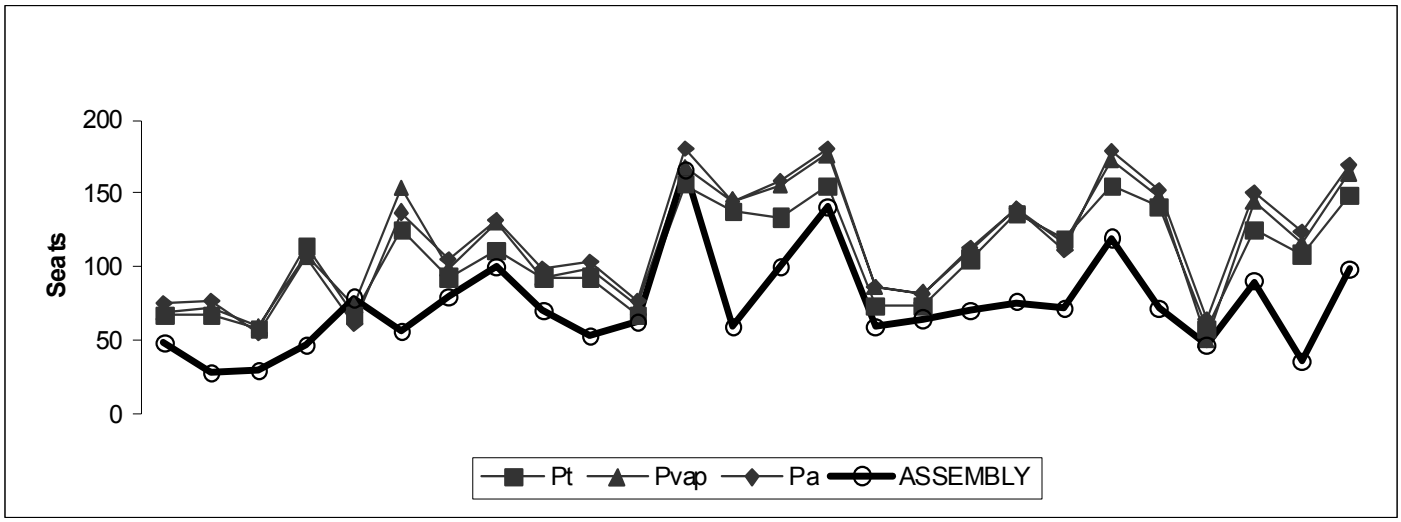
(1) $S = (2P_A)^{1/3}$

(2) $S = (2P_{VAP})^{1/3}$

(3) $S = (2P_T)^{1/3}$

Chart 1 shows that the Cube Root Law of Assembly Size, irrespective of the base option used, consistently overestimates small countries' current assembly size. This led to the conclusion that there is a need to refine the model for small democracies.

Chart 1: Current and predicated assembly sizes



The relation between current assembly size and population for small democracies was found to be:

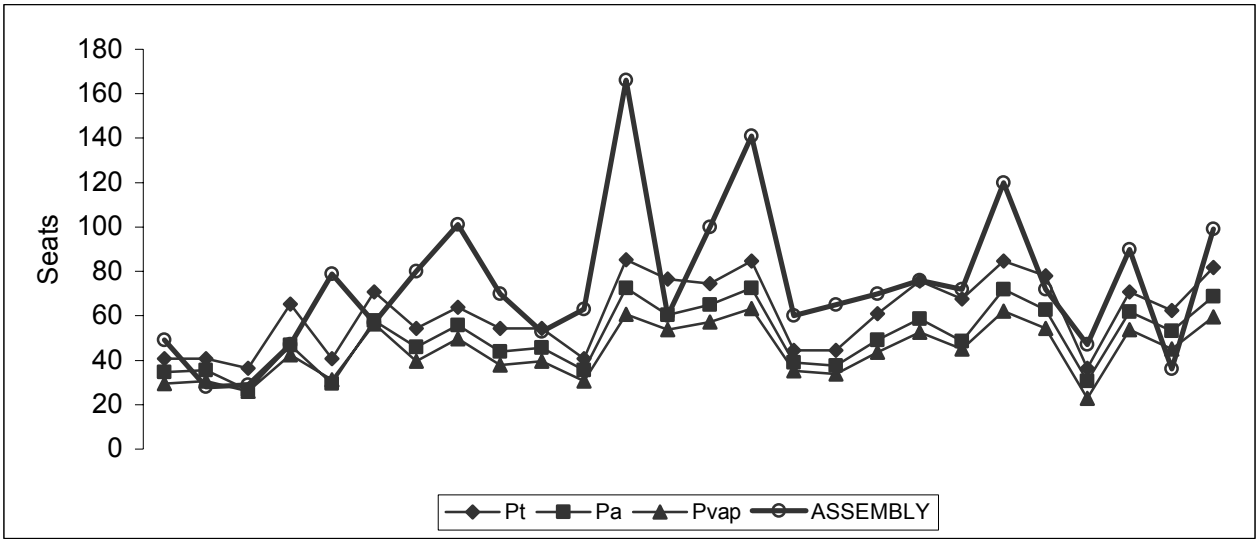
(1) $S = (1.2P_T)^{0.29}$ where P_T is total population

(2) $S = (1.5P_A)^{0.28}$ where P_A is active population

(3) $S = (1.7P_{VAP})^{0.27}$ where P_{VAP} is voting-age population

Of the three options it is voting-age population that is closest to the original Cube Root Law. However, our findings suggest that the importance of the vertical channel of communications model upon which the Cube Root Law is based is overemphasised and its influence needs to be reconsidered for small democracies. Chart 2 shows the results of the refined model.

Chart 2: Current and predicted assembly sizes – revised



Of the three options used in the revised model, active population is the weakest predictor of assembly size in small democracies (R^2=0.44). The remaining two options have equal prediction powers (R^2=0.47). Thus, the choice of which one to use is discretionary and should be influenced by considerations other than prediction power. For the purpose of this paper total population size was used to determine the optimal assembly size for Namibia because it most consistently produced results closest to the current assembly size.

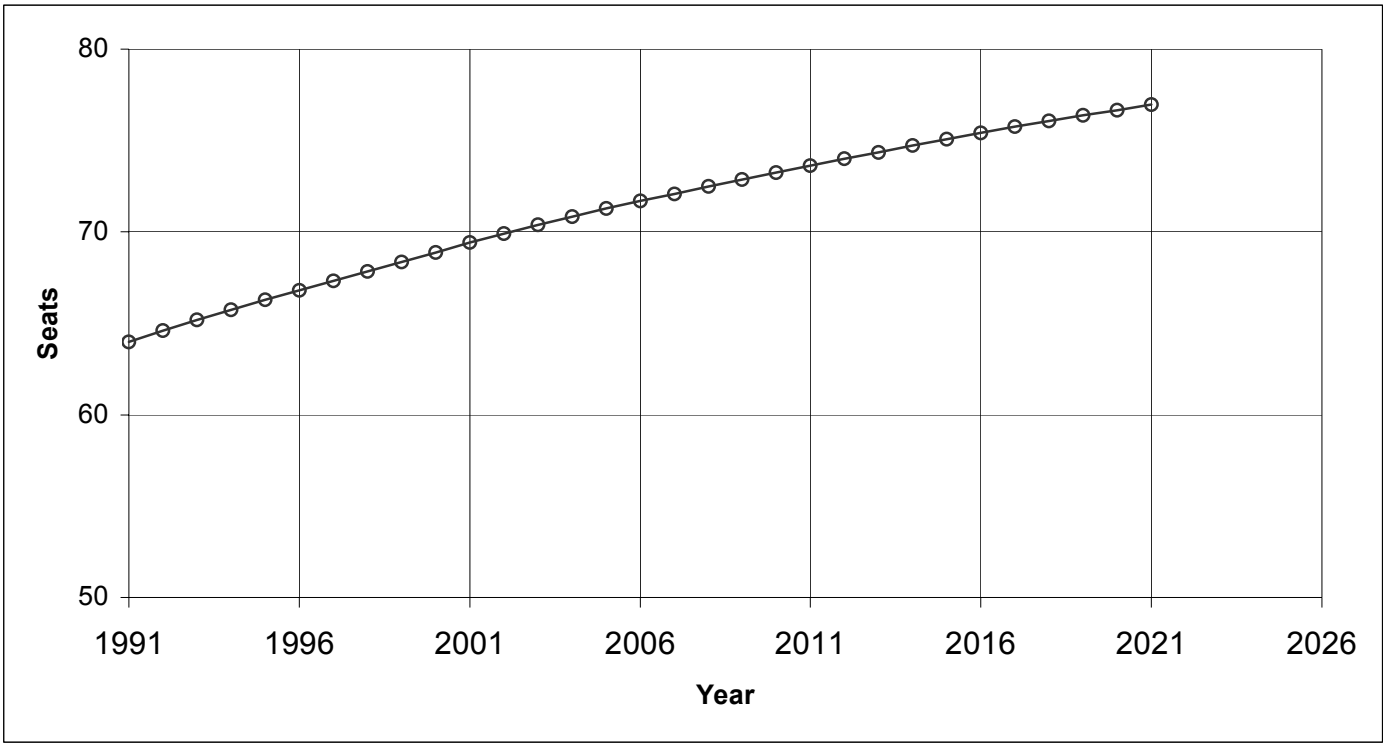
6. Calculating an Optimal Assembly Size for Namibia

There are 72 vote-carrying members in the Namibian National Assembly.[7] This means that there is currently one representative for every 25,373 Namibians. This is slightly higher than average for our sample of small democracies, which is one representative for every 21,088 people. When applying the formula $S = (1.2P_T)^{0.29}$ the optimum assembly size for Namibia is 68. This is somewhat higher than the average optimum size for the entire sample (61). This means that Namibia should have one representative for approximately every 26,866 people.

Chart 3 shows the projected change in Namibia's National Assembly size for the period 1991-2011[8] using $S = (1.2P_T)^{0.29}$. Given that Namibia's current assembly size is larger than the projected optimal size, actual changes should be considered only a few years from now (around 2009). By 2021 the optimal assembly size would be 77.

[7] The actual size of the National Assembly is 78. The State President appoints six non-voting members to the Assembly.
[8] These projections are based upon population projections for the same period (see NPC 2001).

Chart 3: Projected changes in assembly size, Namibia



7. Conclusion

In this paper we have argued that there are good theoretical and methodological reasons for adjusting the original Cube Root Law of Assembly Size proposed by Taagepera and Shugart (1989). One of these is that the total population, and not the active population, be used as the basis for calculating optimum assembly size. Since we are less concerned about Taagepera and Shugart's quest for a social 'law', we have also adjusted the model by redefining the basis for comparison. For reasons explained above, we included only democracies with less than four million citizens in our sample.

We are well aware that the size of the population is not the only variable that explains assembly size. In fact, our model explains only about 47% of variance in assembly size, with population size as the sole independent variable. At this point in time with limited data available, we can only guess what these additional variables could be, and chances are that they would differ from case to case. One example will suffice. Looking at the type of electoral system used, we discovered that the slopes for assemblies elected by means of proportional electoral systems are different from the slopes for those elected by means of plurality systems. The error terms are also different. This means that the models for plurality and PR systems are slightly, yet significantly, different and thus that the type of electoral system is also a significant factor when selecting optimal assembly size. PR systems tend to have larger assemblies than plurality systems. Despite the shortcomings of the models presented here, this study has shown that the models are much better than pure guesswork for deciding how big national assemblies should be, and that policy-makers could benefit from a more systematic approach to institutional design.

8. Bibliography

Census Office. (2002). 2001 Population and Housing Census: Preliminary Report. National Planning Commission: Windhoek.

Taagepera, R. and Shugart, M. (1989). Seat and Votes: The Effects and Determinants of Electoral Systems. Yale University Press: New Haven.

Shugart, M. (1997). Parliamentary Size. Retrieved from http://www.aceproject.org/main/english/es/esc03/

UNDP. (2001). United Nations Human Development Report 2001. Oxford University Press: Oxford.