

## Indices.xls

### What is it?

It's an Excel file that enables you to calculate easily the values of 3 indices that are widely used in the analysis of elections:

- Least squares index (measure of disproportionality, i.e. the disparity between vote shares and seat shares);
- Effective number of elective parties (measure of vote fragmentation);
- Effective number of legislative parties (measure of seat fragmentation).

### How does it work?

Download the file Indices.xls from this site

([www.tcd.ie/Political\\_Science/Staff/Michael.Gallagher/ElSystems/index.php](http://www.tcd.ie/Political_Science/Staff/Michael.Gallagher/ElSystems/index.php))

It's a standard MS Excel file. For the election you want to analyse, enter the votes and seats won by each party. The file then tells you:

- % votes and % seats for each party;
- value of least squares index (LSq);
- effective number of vote-winning (Eff no Pv) and seat-winning (Eff no Ps) parties.

### Describe in detail what I need to do

The file contains 11 templates into which the details of an election can be entered. The first has already been filled in as an example, with the seat and vote values of the parties at the 1999 election in Finland (excluding the 1 seat from Åland).

The first blank template begins in row 17.

Enter the total number of votes in cell C18, and the total number of seats in cell C19. Then, for the first party, enter its vote total in cell D18 and its seat total in D19, and repeat across for all the other parties. It doesn't matter in what order the parties are entered (except that 'Others' should be the last one entered, for reasons explained below). But it is essential, obviously, that for each party, its votes and seats appear in the same column; the order in which the parties' vote totals are listed must be the same as the order in which their seat totals are listed.

### Having entered the data, what do I look for?

First, examine cells B18 and B19 (under the 'Check / indices' heading). These are check cells. They tell you if there are any errors in the data. They should return a value of zero. If they don't, that means that the numbers of votes (or seats) you have entered for each party don't add up to the number in the Total cell. Either there is an error in your data or you have made an error when entering them. (However, very minor errors – for example, if you are entering percentages and due to rounding the total adds to 99.9 rather than to 100.0 – are not going to make any difference to the value of the indices that is worth being concerned about.)

If there are no errors, at the most basic level the file now tells you the percentage vote (and seat share) of each party. These figures are found in the fourth (and fifth) row of each template. These percentages should, of course, add to 100, so the cells at the left of these rows (B20 and B21 in the first template) should equal zero.

More usefully, the three indices will now appear in bold at the bottom left-hand corner of the template. In the first template, the figure in cell B22 is the value of the least squares index; B23 contains the effective number of elective parties; B24 contains the effective number of legislative parties.

**How many parties can the file cope with?**

It's designed to deal with elections with up to 50 parties. In the unlikely event that you want to analyse an election with more than 50 parties, a basic knowledge of Excel should enable you to work out how to do this.

Of course, when there are fewer than 50 parties, you only have to enter figures for the parties that did contest the election; you don't need to fill out the rows by entering zeros under the other columns.

**How many elections can it deal with?**

The file that you can download has 10 'blank' templates. Of course, once you have the file, you can extend the number of templates indefinitely simply by copying the template, or by 're-using' each template. But if you 'fill up' the programme that you download, you can always download it again.

**I don't have raw vote totals, just percentages.**

No problem. Just enter the percentages in the 'votes' row. It doesn't affect the calculations at all.

**In the data source I'm using, the votes of a lot of small parties and independents are bunched together in one bloc labelled 'Others'. Does this matter?**

It might. Ideally, you should aim for as much disaggregation as possible. The vote (and seat) total of every small party, even every independent candidate, should ideally be entered separately. If your data source isn't as comprehensive as this, then there are various ways to proceed.

**(i) Effective number of parties.**

(a) The easiest approach is to treat the 'Others' as if they comprised just one party, in other words to enter the votes and seats for 'Others' as if for a regular party. This will give a figure that is somewhat smaller than the 'correct' value (the one we would get if we had votes on every single party, no matter how small), but unless the votes for 'Others' is quite large – over 10 per cent, say – the error will be very minor and this approach is acceptable.

(b) A little more complicated, and likely to produce a value even closer to the correct value (though very slightly larger than it), is to omit the 'Others', which has the same effect as assuming that the category of 'Others' is made up of a large number of very small parties – an assumption that in most cases is valid. This is done by modifying the Excel template for that election so that the sum of the values concerned does not include the 'Others' component. For example, if the 'Others' vote and seat totals have been entered in column J ('Others' should always be the last 'party' entered), modify the sum of the squares (cell C23 in the first template) so that it sums only the values in columns D to I. But, if you do this, be sure to enter the votes and seats for Others; simply omitting them would be a mistake. This will give a value that will almost certainly be very close to the 'correct' value (the one we would get if we had votes on every single party, no matter how small).

(c) The best approach involves two steps. First, adopt what Rein Taagepera terms a 'least components' approach and assume that none of the parties lumped together is larger than the smallest party whose result is reported separately. (For example, if the 'Others' bloc has 10.5 per cent of the votes and the smallest party reported separately has 1.1 per cent, treat the Others as if they are 9 separate parties each with 1.1 per

cent and one party with 0.6 per cent.) Then take the *average* of the value this gives and the value you get by simply omitting the 'Others'.

(d) Conclusion: in virtually all cases, approach (a) can safely be adopted.

(ii) Least squares index.

(a) Now, treating the lumped Others as if they make up a single party would be a serious mistake and is likely to produce a value significantly different from the correct one. Instead, there are two possibilities.

(b) The simplest approach is to omit 'Others', making the assumption that all the parties in this category are very small. Once again, this is achieved by modifying the Excel template so that the sum of the squares does not include the 'Others' component. For example, if the 'Others' vote and seat totals have been entered in column J ('Others' should always be the last 'party' entered), modify the sum of the squares (cell C22 in the first template) so that it sums only the values in columns D to I. But, if you do this, be sure to enter the votes and seats for Others; simply omitting them would be a mistake. In most cases this approach will give a value reasonably close to the 'correct' value.

(c) As when calculating the effective number of parties, it will usually be an improvement to take the *average* of the figure that approach (b) gives and the figure given by the least components approach, which is outlined above.

(d) Conclusion: when the size of 'Others' is small (below 1 per cent) approach (b) is acceptable; otherwise, approach (c) is preferred.

For more detailed advice, see Appendix B of '*The Politics of Electoral Systems*', edited by Michael Gallagher and Paul Mitchell (Oxford: Oxford University Press, 2005): <http://www.oup.co.uk/isbn/0-19-925756-6>.

**What are these indices anyway?**

They have become the standard measures of fragmentation and disproportionality respectively. The 'effective number' measure was devised by Rein Taagepera and Markku Laakso; it tells us how fragmented a voting population or a parliament is. The idea of 'least squares' has a long history in the natural sciences and in the social sciences; this particular index tells us how far the distribution of seats across parties differs from the distribution of votes. You can read more about both measures in Appendix B of '*The Politics of Electoral Systems*', edited by Michael Gallagher and Paul Mitchell (Oxford: Oxford University Press, 2005).