

# WHAT IS A FAIR DISTRIBUTION OF POWER IN THE COUNCIL OF MINISTERS OF THE EU?

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## Voting in the EU-Council – a brief sketch

At least since the EU-summit in Nice in December 2000 there has been an intensive discussion about the voting procedure in the EU-Council. The Treaty of Nice contains a very complicated procedure which consists of three voting criteria. A proposal is accepted by the Council if:

- 1) the (simple) majority of states support the proposal
- 2) the proposal receives a “qualified majority” of votes. Each state has a certain voting weight (from 3 votes for Malta to 29 votes for the four biggest states). A qualified majority means: At least 232 votes out of 321 possible votes is required (for the 25-member Union).
- 3) The countries supporting the proposal should represent at least 62 % of the population of the EU.

It turns out that in this complicated voting system the first and the third criterion play virtually NO role.

In contrast to this the draft Constitution contains a voting procedure which consists merely of step 1) and 2) of the Nice procedure. This procedure is called the “double majority” rule. More precisely, the Constitution rule requires a majority of (more than 50%) of the countries and more than 60% of the population.

Especially Spain and Poland objected to this procedure since they claim they do not get enough influence in the Council by that procedure. (In fact, they are right, as we will see.)

As a compromise the Irish Presidency proposed to change the quota in the double majority rule to 55% of the states and 65% of the population. It is quite likely that this voting system will be accepted by the European Governments. We will see below that for Spain and Poland this system is even worse than the original draft Constitution.

## How to analyse “power”

With 25 member states and complicated voting procedures it is not a trivial task to analyse the distribution of power in the Council. However, there is a mathematical concept called “Power Index” to quantify the influence of a member of a committee, as in the Council for example.

The main idea is that power is the ability to change the decision of the committee by your vote. Suppose we know how all the other members vote (“Yes” or “No”). Your vote is decisive in this situation if your “Yes” will make the proposal pass, your “No” will make it fail. The power index counts how frequently your vote is decisive. We

consider all possible votes of the other members and compute the percentage of situations where our vote is decisive. This is the “unnormalised” power index (Penrose number). We sum up the unnormalized power indices of all members. The percentage of our Penrose number from this sum is our share of power. This number is called the power index (Banzhaf index). Roughly speaking, the power index tells us how frequently we can change the outcome of the voting by changing our vote.

The power index is well defined in any voting system. For example, it is easy to compute it for the Nice voting system. Of course, there are many ways the member states can vote with either “Yes” or “No”, in fact 25 members have  $2^{25}$  (more than 30 million) ways to vote. It is, of course, impossible to do these considerations by hand. However, it is not hard to compute the power indices using a PC.

There is another quantity related to the above reasoning which will be useful below. This is the so called “decision probability”. Here we consider which fraction of all possible subsets of the body is able to push a proposal through. In a parliament with simple majority rule the decision probability is 0.5, since if we divide the parliament in two groups exactly one of them will be have a majority. (We assume for simplicity that we have an odd number of deputies to avoid a draw.) If a 2/3 majority is required the decision probability is much smaller, in fact it depends on the size of the parliament.

The smaller the decision probability the harder it is to take a proposal approved. It may be good to have a decision probability in the EU-Council well below one half to protect minorities of states. On the other hand a decision probability too small will make it impossible to get any reform done or even to make the necessary everyday decisions.

### **What is a due share of power for a country?**

If we accept that the EU is a union of people it is reasonable to suppose that any EU-citizen should have the same influence on decisions of the Council regardless of his or her home country. It is likely that the European Convention had something like this in mind when they suggested the population criterion of the voting procedure. In deed, it sounds convincing that choosing weights proportional to the population implements equal influence for all citizens. In fact most national parliaments try to represent the various regions of their country in this way.

However, there is an important difference between a parliament and the Council. In a parliament the people of a region are represented by a certain number of deputies who vote independent of each others— at least in principle. So, if 55% of the people in the region are in favour of a proposal, the percentage of deputies from that region favouring the proposal should also be about 55%. In contrast to this, the governments in the EU-Council cannot split their votes. So, if 55% of the Spanish population favours a proposal, the Spanish government has to cast all its votes in favour of the proposal. This reasoning already indicates that a number of votes proportional to the population will give more influence to citizens in bigger countries than in smaller ones.

To make a quantitative argument out of this reasoning we first consider the Penrose number a citizen has in his or her country. It is clear that this number decreases as the number  $N$  of citizens in this country increases. It is not hard to see that the Penrose number of a citizen is proportional to one over the square root of  $N$ .

So, to compensate this effect, the Penrose number (and hence the power index) of the corresponding country in the Council should be proportional to the square root of N. This is the celebrated “Square root law” by Penrose. L. Penrose proved it as early as 1946.

### The power indices for various voting procedures

Let us compute the power indices for various voting procedures for the EU-Council. We compare the figures for the Nice procedure, the draft Constitution rule with 50/60 and with 55/65 majority. We contrast this with the square root numbers, which in our opinion are the fair shares of power:

Country	Population in Million	Nice	Draft Constitution		Square Root
			50/60	55/65	
Germany	82,54	8,56	13,36	12,48	10,36
France	59,63	8,56	9,52	9,05	8,81
UK	59,09	8,56	9,48	9,01	8,77
Italy	57,07	8,56	9,21	8,75	8,62
Spain	40,68	8,12	6,95	6,46	7,27
Poland	38,21	8,12	6,75	6,09	7,05
Netherlands	16,19	4,23	3,63	3,74	4,59
Greece	11,02	3,91	2,97	3,13	3,79
Portugal	10,41	3,91	2,90	3,06	3,68
Belgium	10,36	3,91	2,90	3,06	3,67
Czech Rep	10,20	3,91	2,87	3,03	3,64
Hungary	10,15	3,91	2,86	3,02	3,63
Sweden	8,94	3,27	2,71	2,87	3,41
Austria	8,06	3,27	2,61	2,78	3,24
Denmark	5,38	2,31	2,27	2,45	2,65
Slovakia	5,38	2,31	2,27	2,45	2,65
Finland	5,21	2,31	2,24	2,43	2,60
Ireland	3,96	2,31	2,09	2,28	2,27
Lithuania	3,46	2,31	2,02	2,22	2,12
Latvia	2,33	1,33	1,87	2,08	1,74
Slovenia	2,00	1,33	1,83	2,04	1,61
Estonia	1,36	1,33	1,75	1,97	1,33
Cyprus	0,80	1,33	1,66	1,88	1,02
Luxembourg	0,45	1,33	1,64	1,86	0,76
Malta	0,40	0,99	1,63	1,85	0,72

One can see from these figures that the biggest and the smallest states are over represented by the draft constitution. The middle size states from Spain to Lithuania get less influence than they should have. It is also obvious that Germany does not get its fair share of power from the Nice Treaty (but gets too much influence in the Constitution).

The modification of the quota of the draft Constitution from 50-60 to 55-65 was reportedly made to give Spain and Poland more weight. Our computations show that the opposite is the case: Spain and Poland even lose from this modification.

One can also compute the figures for another variant of the draft Constitution proposed by the Irish Presidency. They suggest the quota 55-65 with the modification that three countries should not be able to block a proposal even if they represent more than 35 % of the EU-population. This procedure will further reduce the power of the bigger states from Germany to Poland but only to  $10^{-5}$  % by order of magnitude. Hence this complication is completely negligible as far as the power index is concerned.

We also computed the decision probability for the procedures discussed above. It is very small for the Nice Treaty (3.6 %), it equals 22.5 % for the draft Constitution and 13.5 % for the 55/65-rule. One may argue that 22.5 % is somewhat high for the present state of the Union. However, the value of 3.6 % is unacceptably low. It will make decisions extremely hard.

### **Can one implement the Square Root Law ?**

The square root law tells us how the power should be distributed among the countries. It is, however not clear at a first glance how to implement it in terms of voting weights, as the voting weights do not give the power indices immediately.

However, it turns out that if we distribute voting weights proportional to the square root of the populations **and** set the quota at 62 % the power indices will obey the square root law up to very small errors. This was computed by Wojciech Słomczyński and Karol Życzkowski from the University of Krakow, Poland and further advertised in a common paper of Moshé Machover, Słomczyński, Życzkowski and the present author. This suggestion is not only based on scientific reasoning, it could also serve as a fair compromise between the Nice Treaty and the draft Constitution. We emphasize that the choice of the correct quota is important here. The decision probability for this procedure is about 16.6 % which seems to be a reasonable value.

This procedure can be combined with a simple majority of states. Then, the share of power of the bigger states will be lower than the square root of the population, the power of the smaller states will be bigger. This may be justified by the fact, that the EU is not only a union of people, but also a union of states. The deviation from the square root law will not be very dramatic and much smaller than for the Nice Treaty or the draft Constitution.

In a letter to the Governments of the EU-member states 47 scientists from 10 countries (called "Scientists for a Democratic Europe") proposed to use a voting system for the EU-Council based on the square root law. We strongly believe that an unjust system will block the democratic development of the European Union for many years. Information on the "Open letter" can be found on the web site listed below.

## References

For more information see: <http://www.rub.de/mathphys>

This paper is based in part on the following publications:

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Some of the computations were made using the program:

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