

Rules Governing Voting in the EU Council

The Treaty of Nice, the Draft Treaty Establishing a Constitution for Europe and a Proposed Compromise Solution

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*I cannot conceive of the Community
without total parity*

Konrad Adenauer to Jean Monnet¹

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1. Introduction

The recent fiasco of the Intergovernmental Conference of the European Union in Brussels has caused many persons in Poland, including known politicians and journalists, to analyse the influence of each individual Member State upon the making of decisions within the Union, and compare the position to be held by Poland pursuant to the Treaty of Nice versus the draft Treaty establishing a Constitution for Europe, as recently adopted by the European Convention. Unfortunately, most of the opinions voiced have been neither based on sound premises nor built on a good theoretical foundation. Instead, their authors have often been perpetuating myths and telling half-truths, widely established in Poland and elsewhere. Below we present a factual description of the situation based on the latest scientific research and our own analysis of the issues involved. The Brussels Conference has failed primarily due to disagreements over the distribution of votes in the Council of Ministers. These are likely to form the main obstacle during the current negotiations on the Constitution for Europe being carried out under the Irish Presidency. Therefore, it is even more important for members of both Polish society and our political elites to have a true picture of the situation which is free from myth.

In general, comments analysing the decision-making procedures within the European Union are based on the following claims:

- I. **The influence of a given Member State upon the decisions made by the EU Council is proportional to the number of votes it has in the Council;**
- II. **An increase in the number of votes allocated to a given Member State in the Council always causes a growth in its voting power;**
- III. **The system proposed by the Convention for counting votes in the Council is more advantageous to Poland than the one provided for in the Treaty of Nice;**
- IV. **There is only one fair and fully democratic system of sharing power among the individual Member States in the Union, all other systems being “unfair”;**
- V. **In a system under which the weights assigned to each Member State are proportional to its population, the influence of each citizen of the Union upon the making of decisions is the same.**

In this paper, which forms an expanded version of our previously published articles (see PSŻ040 and SŻ04a) we will show that **all these assumptions are false**, and propose an **alternative compromise solution for the distribution of votes in the EU Council**, free of the defects characterising both the Nice and the draft Constitution vote distribution systems.

2. Calculation of voting power

Before we compare the decision making methods in the EU Council laid down in the Treaty of Nice (2001)² and the draft Treaty establishing a Constitution for Europe (2003), we will first analyse the more general problem of the calculation of the voting power of each participant under qualified majority rules. This type of issue arises in the case of all decision-making bodies where decisions are made according to predetermined rules concerning what constitutes a majority: parliaments, supervisory boards of stock-exchange-listed companies, the United Nations Security Council, the Board of Governors of the International Monetary Fund, the Electoral College electing the US Presidents, and finally the EU Council of Ministers. Those participating in such decision-making processes may be natural or legal persons, or groups of persons (e.g. parliamentary caucuses), as well as individual countries.

Let us begin with the simple example of a model parliament in which party **X** has won 55% of the seats and party **Y** the remaining 45% and which makes decisions by simple majority rule (more than 50%). Is the voting power of party **X** bigger by only 10% than that of party **Y**? No, it is not, as with its absolute majority party **X** may vote any bill into law. Therefore, it is obvious that it has full power. Mathematical literature on the subject playfully refers to party **X** as the “dictator”, and, by analogy to the bridge player who in a given deal lays down his cards on the table and only passively observes the ensuing game, party **Y** as the “dummy”. With this simple example, it is immediately obvious that **Claim I** is false, whereas **Claim II** can be rejected with the use of an only slightly more complex example. Let us assume that the Parliament of a particular country is comprised of four different parties with the proportion of mandates in Table I.

Table 1. Number of Members within a model Parliament

Party	At the beginning of the term	After the break-up of party B
A	42	54
B	24	-
C	20	26
D	14	20

After the elections parties **A** and **C** formed a coalition, while parties **B** and **D** remained in opposition. After some time, half the members of party **B** broke away to join party **A**, and the remaining ones joined, in equal proportions, parties **C** and **D**. Thus, the number of the Members representing party **C** in this Parliament increased from 20 to 26. Did the voting power of this party increase as well? Obviously not, as with more than a 50% majority, party **A** acquired “dictator” status, being able to rule independently, while parties **C** and **D** could only play the role of “dummy”, passively watching ensuing events.

Thus, how can one determine the effective voting power held by a given party if such power is not necessarily proportional to the number of votes controlled? The English psychiatrist and mathematician Lionel S. Penrose³ (see Pe46 and Pe52) had already considered this problem in 1946, although, in fact, he did not analyse the division of power within a Parliament, but a hypothetical distribution of votes in the UN General Assembly. Applying his theory to the example presented above, we can adopt the following line of reasoning: in order to calculate a voting-power index (known as the *Penrose index*), we must calculate the number of ways in which a given party may form a coalition with other parties in order to gain the required parliamentary majority. Such an approach is fully justified as we are not analysing a one-off process of forming a government but instead dealing with a procedure followed in voting on many different bills where a different parliamentary coalition may be formed for each particular vote. It can be shown with precision that the Penrose index is a simple function of a probability that in a hypothetical vote, the vote cast by a particular party may be decisive. Thus, a mathematical model can be built, enabling one to estimate the voting power likely to be held by a given grouping.

The pioneering work done by Penrose in the United Kingdom remained unnoticed and unappreciated until 1965 when the American attorney John F. Banzhaf III independently carried out a similar analysis and published the results in the American periodical: “Rutgers Law Review” (see Ba65). As a result, this method for the calculation of voting power became popular and the duly standardised index proposed by Penrose became known as the *Banzhaf index* β . Obviously, the Banzhaf index for the “dictator” is 100% and for the “dummy” it is equal to 0%. In the case discussed here, initially the Banzhaf index for party **A** is 50% and for each of the parties **B**, **C**, **D**, approximately 16.7%, to change after the break-up of party **B** into 100% for party **A**, which becomes the “dictator”, and 0% for parties **C** and **D**, reduced to the role of “dummy”.

3. Voting power in the Sejm during the fourth term

It is most informative to look at how the voting power of the different parties in the Sejm [the Lower Chamber of the Polish Parliament] has changed during its fourth term. Table 2 compares the number of Deputies belonging to a parliamentary grouping at the beginning of the term and currently, as well as their voting power expressed by the Banzhaf index β .

Table 2. Voting power in the fourth term of the Sejm, as expressed by index β

Name of the grouping in the fourth term of the Sejm	Immediately after the election			As at 19.02.2004		
	Number of deputies		Index β (in %)	Number of deputies		Index β (in %)
	Absolute	In %		Absolute	In %	
DLA - UL coalition	216	47.0	75.0	206	44.8	85.0
Civic Platform	65	14.1	5.0	56	12.2	1.9
Law and Justice	44	9.6	5.0	43	9.3	1.9
Polish Peasant Party	42	9.1	5.0	37	8.0	1.9
Self-defence of the RP	53	11.5	5.0	31	6.7	1.9
League of Polish Families	38	8.3	5.0	30	6.5	1.9
Federative Parliamentary Grouping	0	0.0	0.0	15	3.3	1.7
Peoples' Conservative Party	0	0.0	0.0	8	1.7	0.7
Polish Peoples' Block	0	0.0	0.0	6	1.3	0.5
Catholic National Movement	0	0.0	0.0	5	1.1	0.4
Polish Alliance	0	0.0	0.0	3	0.7	0.3
Movement for Reconstr. of Poland	0	0.0	0.0	3	0.7	0.3
German Minority	2	0.4	0.0	2	0.4	0.2
Non-affiliated Deputies*	0	0.0	0.0	15	3.3	15 x 0.1
Total	460	100.0	100.0	460	100.0	100.0

The table presented above shows clearly that the voting power of each parliamentary grouping is not proportional to the number of its seats in the Sejm. The Banzhaf index for the League of Polish Families initially was and currently is the same as that for the Civic Platform represented by a much larger number of Deputies, as these parties can form similar majority coalitions. On the other hand, although the number of seats occupied in the Sejm by the Deputies of the Democratic Left Alliance (DLA) - Union of Labour (UL) coalition decreased by 10, the index for this coalition increased from 75 to 85% due to the further break up of the opposition into many smaller fractions! This change is confirmed by political practice. At the beginning of the term the DLA and the UL had to form a coalition with the Polish Peasant Party in order to be able to rule, whereas in 2003 the minority government formed by only the DLA and the UP was easily able to achieve its desired outcome during voting in the Sejm. This example also shows the fallacy of **Claims I and II**.

The calculation presented above is only intended to serve as a model and exclusively concerns the potential rather than the actual voting power of each parliamentary grouping. Such a calculation of the voting power is based on the assumption that forming any coalition is equally likely. In reality, the experience shows that some coalitions are *a priori* more probable than other ones. The model does not take into consideration the differences in the discipline among the Deputies representing different political parties

* In this case, the Banzhaf index applies to each non-affiliated Deputy separately.

during a particular vote and the existence of the second chamber of the Polish Parliament as well as the influence the Head of State may exert on the legislative procedure. Nevertheless all these elements may be included in the model, following the necessary modifications. The model for the calculation of voting power based on the counting up of majority coalitions is applicable to an even greater degree in the case of analysing institutions in which determinations are made by voting with blocks of votes, and in which alliances are not permanent, but change depending upon the nature of the matter under consideration. The Council of Ministers of the European Union constitutes just such a body.

4. Voting power in the EU Council

The model presented above may be used for analysing rules governing the taking of decisions in the EU Council. It is important to clearly differentiate here between the *voting weight* of a given country and its potential *voting power*, the latter reflecting the extent to which it may influence decisions taken by the Council when all possible coalitions between different countries are taken into consideration. The voting power depends on the difference between the number of winning coalitions formed with the participation of a particular country and the number of such coalitions formed without it. Expressing these differences in percentages, we obtain indices reflecting the voting power. Depending on the assumptions made, these may be the Banzhaf (see Ba65) or Shapley-Shubik (see SS54)⁴ indices. In this article, following the example of most analysts (see BBGW00, FM00, L02, BW03a, BW03b, FM03, PI03, ABF04, BJ04, BW04, PI04) we use the Banzhaf index β . It is easy to show that the voting power held by a given country depends not only on its voting weight but also on the distribution of the weights among all the remaining Member States of the European Union. To sum up: **the distinction between the number of votes and their power is of crucial importance for the problem discussed here.**

Often, during discussions on voting power, it is claimed that the Banzhaf index can only reflect the power of a particular country to form a blocking coalition within the EU Council. This claim is also false. In reality, indices reflecting the power to block a decision (i.e. *Coleman preventive power index*) and the power to form a coalition capable of forcing a decision (i.e. *Coleman initiative power index*) are both mutually proportional and depend proportionally on the Banzhaf index. However, the ratios of proportionality depend on the decision rule. Nevertheless, under any decision rule, if one country has more preventive power than another, then it also has more initiative power. So, both phenomena form, simply, the two sides of the same coin.

5. Voting rules laid down in the Nice Treaty and the draft Constitution

The EU legislative procedure can be described briefly as follows: legislative proposals are put forward by the European Commission, voted by the European Parliament, and then approved by the Council of Ministers. The forthcoming enlargement of the EU to 25 Member States makes the adoption of new rules governing voting in the enlarged Council necessary. The relevant provisions of the Treaty of Nice and of the draft Treaty establishing a Constitution for Europe differ considerably in this regard.

Pursuant to the Treaty of Nice, votes in the Council are measured by weights which to some degree reflect the population of each individual Member State (see Table 2). The Council adopts a piece of legislation if:

- (a) The sum of the weights of the individual Member States voting in favour exceeds **232** (with the sum of the weights of 25 Member States being **321**) which is approximately **72%**;
- (b) The Member States constituting a qualified majority represent at least **62%** of the total population of the Union;
- (c) A majority of Member States (i.e. at least **13** out of **25**) vote in favour.

The outcome of the vote is binding if all three of these conditions are met, but, as the mathematical analysis has shown, condition (a) is the most significant one, as the probability of forming a coalition which would meet only this condition and not meet the other two, is extremely low.

The system for calculating a qualified majority of votes provided for in Article 24(1) of the draft Constitution is based on only two criteria, which must both be met for a piece of legislation to be adopted:

- (b) Member States comprising the qualified majority must represent at least **60%** of the total population of the Union;
- (c) A majority of Member States (i.e. **13** out of **25**) must vote in favour.

As can be seen, the draft Constitution removes condition (a): adding the weights of the individual votes. To put it differently, weights directly proportional to the population of each individual Member State are applied.

6. Which of the vote counting systems is more advantageous for Poland?

Table 3 presents basic data essential for the analysis of both systems for calculating a qualified majority in the Council of Ministers. The table shows the population of each individual Member State⁵ (expressed in absolute values and as a percentage of the total population of the European Union of 25), which in accordance with the proposal of the Convention is the only factor determining the weight of their respective vote, as well as the weights of each individual Member State (the number of votes on the Council) as provided for in the Treaty of Nice. The key for comparing both methods is the Banzhaf index β calculated by us⁶ for each case.

Table 3. Comparison of voting power (as expressed by the Banzhaf index) of each individual Member State in the EU Council in accordance with the Nice Treaty and the draft Constitution

Country	Draft Constitution			Nice Treaty		
	Population (in m)	Population (in %)	Index β (in %)	Votes in the Council	Weight	Index β (in %)
Germany	82,54	18,19	13,36	29	9,03	8,56
France	59,63	13,14	9,49	29	9,03	8,56
United Kingdom	59,33	13,08	9,49	29	9,03	8,56
Italy	57,32	12,63	9,18	29	9,03	8,56
Spain	40,68	8,97	6,96	27	8,41	8,12
Poland	38,22	8,42	6,74	27	8,41	8,12
Netherlands	16,19	3,57	3,65	13	4,05	4,23
Greece	11,02	2,43	2,96	12	3,74	3,91
Portugal	10,41	2,29	2,91	12	3,74	3,91
Belgium	10,36	2,28	2,91	12	3,74	3,91
Czech Republic	10,20	2,25	2,85	12	3,74	3,91
Hungary	10,14	2,23	2,85	12	3,74	3,91
Sweden	8,94	1,97	2,73	10	3,12	3,27
Austria	8,07	1,78	2,62	10	3,12	3,27
Denmark	5,38	1,19	2,27	7	2,18	2,31
Slovak Republic	5,38	1,19	2,27	7	2,18	2,31
Finland	5,21	1,15	2,22	7	2,18	2,31
Ireland	3,96	0,87	2,10	7	2,18	2,31
Lithuania	3,46	0,76	2,04	7	2,18	2,31
Latvia	2,33	0,51	1,87	4	1,25	1,33
Slovenia	2,00	0,44	1,81	4	1,25	1,33
Estonia	1,36	0,30	1,75	4	1,25	1,33
Cyprus	0,72	0,16	1,69	4	1,25	1,33
Luxembourg	0,45	0,10	1,64	4	1,25	1,33
Malta	0,40	0,09	1,64	3	0,93	1,00
Total	453,70	100,00	100,00	321	100,00	100,00

The calculations presented show that **with the change of the system, the influence of our country upon the making of decisions within the Council of Ministers measured by the Banzhaf index would decrease from 8.12% to 6.74% and Poland would lose more than one-sixth of the relative voting power negotiated in Nice.** This is so in respect of the relative blocking power, facilitating the rejection of undesirable bills as well as the relative initiating power, reflecting ability to form a constructive coalition, and this even though the weight assigned to Poland in the draft Constitution adopted by the Convention, reflecting its percentage of the total EU population (8.42%), is just slightly higher than that granted to it at Nice ($27/321 \approx 8.41\%$)⁷. It is proper to clearly state that the proposals put forward by the Convention give Poland smaller influence upon the making of decisions within the EU Council of Ministers than the arrangements worked out in Nice and therefore **Claim III** is also false.

A detailed comparison of the changes in the Banzhaf index β resulting from the change in the method of counting votes from the one adopted in Nice to the one worked out by the Convention is presented in Diagram 1.

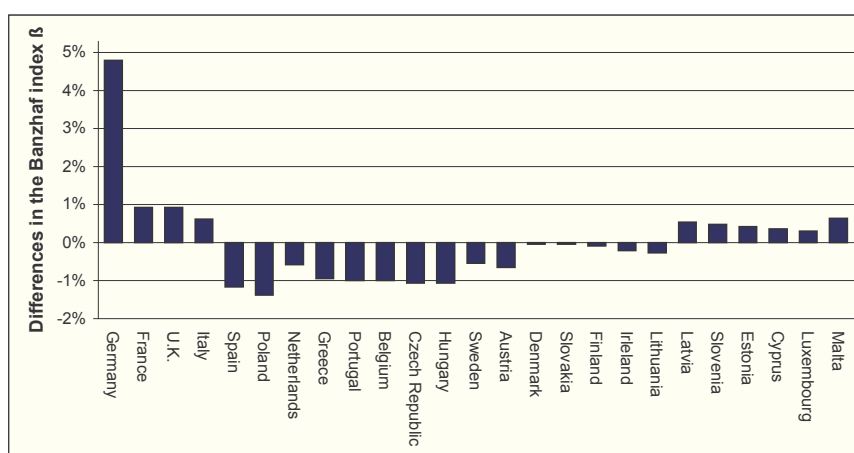


Diagram 1. Differences in voting power in the EU Council between the proposals put forward by the Convention and the relevant provisions of the Treaty of Nice

A cursory glance at the Diagram provides a quick response to answer the fundamental question: *cui bono*? Our western neighbour gains the most. In addition to the four most populous countries (i.e. Germany, France, United Kingdom, and Italy), for which the deciding factor is the demographic one, the change also benefits the smallest countries (from Latvia to Malta), for which condition (c) is of special relevance, while all the medium-sized countries (from Spain to Lithuania) lose out. This suggests looking among the members of this latter group for possible allies in the fight to defend the provisions of the Treaty of Nice. It is Poland that would stand to lose the most if the rules proposed by the Convention were to be adopted⁸.

We decided to examine how the possible conclusion of the Treaty establishing the Constitution for Europe, as drafted by the Convention, would change the influence upon the making of decisions within the Council held by the coalition formed by the EU Member States forming the so-called “inner core”, or as some like to put it, the “fast track group”: Germany, France, Belgium, and Luxembourg. It is not a simple matter as paradoxically the voting power of coalitions formed by few countries is not equal to the sum of the voting powers of all the members of the coalition. Our calculations indicate that if the rules laid down in Nice were to stand, the potential voting power of this group would be only 14.9%, whereas if the Treaty drafted by the Convention were to be concluded, it would reach 31.2%, increasing by a factor of more than two! No wonder, then, that during the debates within the Convention and the subsequent summit meeting in Brussels these countries fought so strongly for the adoption of rules governing voting in the Council of Ministers which favour them.

Furthermore, it is important to stress that similar results can be achieved by examining how other indices of the potential voting power change (see FPS03). On the other hand, analysing the so-called actual voting power indices, reflecting mutual relations between different countries, we obtain results which are even more alarming. For example, in their article (see BP04), the authors showed that, should the arrangements proposed by the Convention be adopted, the resultant actual-voting-power index would assign Poland the last but one place among all the Member States (the last being Luxembourg).

7. Does the draft adopted by the Convention lead to democratic rules of voting?

[...] if two votings were required for every decision, one on a *per capita* basis and the other upon the basis of a single vote for each country, the system would be inaccurate in that it would tend to favour large countries [...]

Penrose, 1952⁹

One of the most widely spread myths, cited by various European politicians, says that the voting system in the Council of Ministers of the European Union, as proposed in the draft Treaty establishing a Constitution for Europe, is the simplest and the most democratic possible. Even some of the opponents of the proposals agreed upon by the Convention repeat this claim. Yet it can be proven that the proposed system is not at all the simplest possible and compares unfavourably with the Nice system as regards the realisation of the principle of equality of citizens.

In fact, all voting systems in the decision-making bodies of the European Union, and formerly of the European Communities, have been based on a compromise between two principles: the principle of equality of Member States, and that of equality of citizens. However, even when the emphasis is shifted onto the latter principle, as was the Convention’s intent, it is possible to demonstrate with precision that there exists no ideal voting mechanism under which that principle would always be realised.

In indirect elections, the influence of a vote cast by a citizen upon the final-decision-making process depends on the product of the voting power during the direct elections to the government of his country and the voting power of his representative, which in our case is a Member of the Council of Ministers of the European Union. The bigger the population of a particular country, the smaller the voting power of each of its citizens – it is easy to imagine that an average German has smaller influence on the voting of his government than for example a citizen of neighbouring Luxembourg. Relatively simple mathematical considerations¹⁰ show that the voting power of a citizen during direct voting is inversely proportional to the square of the number of citizens of the country concerned. In order to make up for this interrelation it is necessary, as has already been noted by Penrose, to assign a country participating in the voting a weight roughly proportional to the square root of the number of its citizens – this is the well known *Penrose's Square Root Law*. To put it more precisely, the law proposed by Penrose states that **the influence of each citizen of the Union upon the outcome of the voting in the Council will be the same if the voting power of a given Member State in the Council is roughly proportional to the square root of the number of its citizens**, rather than to the number of citizens (*the first square-root rule*, see Pe46, Pe52).

There is yet another argument for the application of such weights. Let us examine a simple example of a model “Union” comprised of two Member States: one large State *A* with 36 million citizens and one small State *B* with 4 million citizens. Let us assume that in State *A* 19 million citizens¹¹ are for the adoption of a particular piece of legislation, and all the citizens of the State *B* are against it. If the weights of the both States are: 36 and 4 respectively, they are proportional to the number of their citizens, and the Ministers vote in accordance with the rules of democracy, i.e. in accordance with the will of the majority in their respective countries, the piece of legislation will be adopted, in spite of the fact that only 19 million of 40 million citizens of the “Union” were in favour of it. What is even more interesting, similar paradoxes can be found for each method for the calculation of qualified majority in indirect voting. In this way it is possible to show that there are no ideal voting arrangements under which the will of the majority of the citizens of the European Union would always prevail. (Under the supposition that all the votes of a Member State in the Council are always cast as a bloc.) On the other hand, one may ask: With what method for the counting of weights to be assigned to each Member State **would the likelihood of a decision being taken against the will of the majority be reduced to a minimum?** It can again be shown in this case that it will be so, **if the voting weight of each Member State in the EU Council will be roughly proportional to the square root of the number of its citizens** (*the second square-root rule*, see FM98, FM99).

These facts are well known to all scientists interested in voting theory (see LW98, BBGW00, L01, W03), but the authors of the draft Treaty establishing a Constitution for Europe ignored these. No wonder that analysts in many countries are openly sceptical of the arrangements proposed by the Convention (see BW03a, BW03b, FM03, FPS03, PS03, ABF04, BJ04, BW04, FM04b, P104)¹², which in addition dramatically shift voting power towards the four most populous Member States. It is most informative in this context to study the book published by Penrose in 1952 (see Pe52). The fragment

ending it, quoted at the beginning of this section, may be interpreted as a prophetic and critical opinion on the arrangements laid down in the draft Constitution, formulated 50 years before its adoption by the Convention.

Furthermore, the replacement of the Nice arrangements with the arrangements proposed by the Convention seems to lead to a shake-up of the balance between the three UE bodies: the Commission, the Parliament and the Council. The ease of forming majority coalitions in the UE Council means that its importance decreases in favour of the European Commission, responsible for drafting and putting legislative proposals to the vote, and the European Parliament, responsible for voting on them. Furthermore, it is worthy of note that the weights assigned to individual Member States at Nice are quite close to the Penrose law and therefore **the arrangements adopted at Nice distribute the influence upon the decision-making process in the Council among all the citizens of the Union more evenly than those proposed by the Convention**. The fact that the draft adopted by the Convention makes use of only two criteria, does not remedy another of its basic defects: **an average citizen has no simple way of calculating the potential voting power held by each Member State under this system**; this requires equally complex mathematical calculations as under the Nice system. To sum up arguments presented in this section, we explicitly state that widely accepted **Claims IV** and **V**, presented in the first section of this article, are also false.

Therefore, we have established that the voting arrangements in the Council of Ministers of the European Union laid down in the draft Constitution, are neither advantageous for Poland nor particularly democratic. Seeing this, we may now calmly and somewhat more critically examine the Treaty of Nice. What objective defects characterise the arrangements adopted at Nice? The basic defect lies in the low decision making effectiveness index¹³. Where in the case of the rules laid down in the draft Constitution, approximately 22.5% of the likely coalitions lead to the adoption of a piece of legislation, in the case of the Nice Treaty this index is only 3.6%, which means that the achievement of qualified majority in the EU Council of Ministers may be difficult under this system¹⁴. Another defect of the Nice system lies in the necessity to apply three criteria simultaneously in the calculation of the qualified majority: the weight assigned to each Member State, the number of its population, and the number of the Member States.

The studies conducted by Felsenthal and Machover (see FM01) have shown however that with a slight correction of the weights assigned to each country one can achieve a system exactly equivalent to the Nice one, but which is much simpler, as it is based on the weight criterion alone. Therefore, the rules underlying the Nice system may be cut ruthlessly with Ockham's razor, as the mechanism based on the three criteria is needlessly complex and difficult to comprehend by the average citizen of the Union. On the other hand, the works of Baldwin and Widgrén (see BBGW00, BW03b, BW04) show that with no fundamental change in the voting power of each particular Member State, the Nice system may be modified so that its effectiveness increases many times. One must therefore honestly admit that both defects in the Nice system turn out to be insignificant, while the advantages of the system provided for in the draft Constitution prove to be deceptive.

8. Luxembourg Lesson

It has been the case on a number of occasions in the history of the European Communities that the voting system introduced was devised without consultation with experts or an in-depth analysis of the issues involved. The best-known example of this is provided by the rules governing voting in the first Council of Ministers of the European Economic Community (EEC) which were applicable from 1958 to 1972. During that period, France, Germany and Italy had four votes each on the Council, Belgium and the Netherlands two, and Luxembourg one, while the qualified majority was 12 votes. It might have seemed that Luxembourg was “over-represented” on the Council as, with a population two hundred times smaller than that of Germany, it held as many as 25% of the latter’s votes. In reality, Luxembourg played the role of dummy – any potential majority coalition could perfectly well function without its participation and the power of its vote was equal to zero! After the 1972 enlargement of the EEC to include the United Kingdom, Ireland and Denmark, the decision was made to change this state of affairs and Luxembourg was assigned two votes on the Council of Ministers.

However, upon the next expansion of the EEC, which brought in Greece, Luxembourg came to match Denmark and Ireland in voting power, although each of the latter two countries had one more vote on the Council (a similar situation exists in the current Polish Sejm where the Civic Platform and the League of Polish Families enjoy identical voting power).

As these examples attest, even in a case involving a small number of countries it is essential to conduct precise mathematical analysis of the consequences of introducing any proposed voting system before its adoption. By browsing through recent volumes of scholarly periodicals or visiting websites on the Internet, we can easily identify the names of Europeans who have something to say on the issue of precise evaluation of the characteristics of voting systems. It is regrettable that their opinions are, in most cases, not taken into consideration by politicians and negotiators from the EU, nor by journalists who shape public opinion in the individual Member States.

9. Proposed Compromise Solution: P-62

It is clear from the preceding analysis that the optimal compromise solution for the problem of voting on the EU Council should satisfy the following conditions:

- The voting system should be as **simple** as possible (optimally, based on a single weighting criterion with a defined threshold), **objective** (that is, founded on scientific principles and not an outcome of political haggling) and easily **modifiable** (so that it can be applied to future enlargement of the EU);
- That system should be moderately **conservative**, that is, it cannot lead to a dramatic transfer of voting power relative to the existing arrangements;
- Weights should be chosen in a way which assures that the system is **representative** (equal influence of each EU citizen on decisions taken by the EU Council);
- The threshold should be set in such a manner that the system be, on the one hand, **effective** (moderately high probability of reaching decisions), and, on the other, **transparent** (potential voting power of a country as measured by the Banzhaf index β needs to be equal to the weight assigned thereto).

Taking advantage of the literature on the subject, we have sought to work out a **compromise solution** that does not duplicate the defects of either the Treaty of Nice or the draft Constitution for Europe, while satisfying **all the above conditions**.

Table 4 shows the data calculated for our proposal, which is grounded in Penrose's Square-Root Rule and inspired by the works of Felsenthal and Machover (see Rule B Project, FM00, FM01, FM03, FM04b), as well as referring to a Swedish proposal of 2000 (see CONFER 4750/00, CONFER 4769/00) and a concept formulated recently by a French mathematician, Mabillet (see Ma03)¹⁵. The proposed solution (see also SŽ04a and PSŽ04a) is based on two rules, one for the calculation of weights to be assigned to each particular Member State's vote and the other for setting the decision making threshold or quota (the EU Council reaches a decision when the sum of the weights of the Member States voting in favour exceeds that threshold):

1. **In accordance with Penrose's rule, the voting weight of each Member State is allocated proportionally to the square root of its population;**
2. **The decision-taking threshold is set at 62% of the sum of weights of all the EU Member States.**

The above rules, which explain the name given to our proposed solution (**P-62**), require some commentary:

Re. 1: Determining the number of citizens of each Member State based on statistical data¹⁶, requires that some further technical details be worked out. For example, the accuracy of data provided by individual Member States and their sources ought to be assessed, and it is necessary to solve the problem of double citizenship or population

migration. Once population data for a given Member State is available, the calculation of the voting weight to be assigned thereto will not be difficult, as a simple calculator with the square root function would suffice for that purpose. The weights set should be adjusted at specified intervals or before each subsequent enlargement of the EU.

Re. 2: The calculation of the value of an appropriate decision-taking threshold is a complex operation (LM03), and its setting materially affects the effectiveness of the system. We have succeeded in identifying a possible objective criterion for choosing such a threshold (see SŽ04b). Namely, its value is calculated in a manner which ensures that the **voting power** of each individual Member State, **as measured by the Banzhaf index** (which also depends on the choice of the threshold), constitutes the best approximation of **the weight proportional to the square root of the population**¹⁷ (see Annex). This seems to have enormous practical significance: when the threshold is set, the system becomes maximally transparent, for the calculated voting powers correspond almost exactly to the declared weights. Detailed calculations show, moreover, that the threshold set with the use of this method ($R_{opt} = 62\%$) guarantees a reasonable effectiveness of the system.

Furthermore, the **P-62** system (Penrose's rule plus the threshold set at 62%), which represents one of the possible forms of a compromise solution, offers the following advantages:

- It is simple (only a single criterion is required!);
- In contrast to some compromise solutions proposed recently, it has not been produced *ad hoc*, but is based on strict theoretical foundations;
- It may be used in the event of subsequent EU enlargements to include additional countries, such as Bulgaria or Romania, and in the future also Turkey or former Yugoslav countries¹⁸;
- On the one hand, it takes into account the aspirations of Germany, and, on the other hand, while admittedly significantly reducing the voting power of Spain and Poland, it preserves the position of these countries among the "big countries" of the European Union; in contrast to the proposal put forward by the Convention, it does not disturb the existing balance between the Commission, the Council, and the Parliament¹⁹;
- It is representative, as it reflects the principle of equality among all the EU citizens to a significantly greater degree than the proposal put forward by the Convention;
- The decision-making effectiveness index is **16.6%**, which is a much higher value than in the case of the arrangements laid down in the Treaty of Nice;
- The voting power of each Member State, as measured by the Banzhaf index (see Table 4, column 6), is almost identical to the weight of the vote cast by its representative on the Council.

Table 4. Comparison of voting power of each particular Member State on the EU Council of Ministers as measured by the Banzhaf index β , in accordance with the P-62 proposal worked out by the authors.

Distribution of votes on the Council of Ministers: A compromise solution				
Member State	Population (in m)	Population square root	Weight (in %)	Index β (in %)
Germany	82,54	9,09	10,37	10,36
France	59,63	7,72	8,81	8,82
U.K.	59,33	7,70	8,78	8,79
Italy	57,32	7,57	8,64	8,65
Spain	40,68	6,38	7,28	7,29
Poland	38,22	6,18	7,05	7,06
Netherlands	16,19	4,02	4,59	4,59
Greece	11,02	3,32	3,79	3,79
Portugal	10,41	3,23	3,68	3,68
Belgium	10,36	3,22	3,67	3,67
Czech Rep.	10,20	3,19	3,64	3,64
Hungary	10,14	3,18	3,63	3,63
Sweden	8,94	2,99	3,41	3,41
Austria	8,07	2,84	3,24	3,24
Denmark	5,38	2,32	2,65	2,65
Slovakia	5,38	2,32	2,65	2,65
Finland	5,21	2,28	2,60	2,59
Ireland	3,96	1,99	2,27	2,27
Lithuania	3,46	1,86	2,12	2,12
Latvia	2,33	1,53	1,75	1,75
Slovenia	2,00	1,41	1,61	1,61
Estonia	1,36	1,17	1,33	1,33
Cyprus	0,72	0,85	0,97	0,97
Luxembourg	0,45	0,67	0,76	0,76
Malta	0,40	0,63	0,72	0,72

Such a compromise solution would in any case represent a far-going concession on the part of Poland, which in practice would hand some of its votes in the Council over to Germany. Unfortunately, recent statements by German and French politicians defending the draft Constitution, as adopted by the Convention, indicate that the path to a settlement may be arduous. Should this tendency persist in the future, Polish politicians ought to continue to defend the system devised at Nice that is favourable to Poland, or to search for a possible compromise based on that system.

Conclusions

1. Viewed from the perspective of Poland's voting power on the Council of Ministers of the European Union, the arrangements laid down in the Treaty of Nice are much more favourable to Poland than the draft of the European Constitution; thus, the defence of the former lies in our national interest.
2. Neither the voting rules approved at Nice nor those adopted by the European Convention are optimal. Our aim should be to negotiate some reasonable compromise arrangements, which are free of the defects of both the Nice system (low effectiveness of the EU Council's operations) and the system embodied in the draft Constitution (undermining principle of equality of EU citizens; shifting power towards the biggest countries). The authors analyse a compromise solution called P-62, which seems to be optimal by virtue of being simple, representative, objective, easily modifiable, effective, and transparent.
3. The computation of voting power is a challenging task from both a mathematical and computational technology points of view. In attempting to work out an optimal compromise, it is therefore advisable to take advantage of the knowledge of those who are dealing with the issues involved as professionals. The examples cited in this paper show that in the matter of numbers, weights and algorithms, European politicians often take decisions that prove difficult to explain rationally later on, making their effective defence not easy.

Acknowledgments

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Appendix

How to select the optimal decision threshold

The choice of an appropriate decision-taking threshold affects both the distribution of voting power on the Council (and thus also the **representativeness** of the system) and the voting system's **effectiveness** and **transparency**. In working out our compromise solution we have strived to set a threshold that would produce the maximally transparent system, that is, a system under which the voting power of each Member State, as measured by the Banzhaf index, would be equal to their voting weight. Since the weights were chosen to be proportional to the square root of the population (in accordance with the Penrose rule), the resultant threshold simultaneously assures complete representativeness of the system.

Diagram 2 illustrates the dependence of the square root of the sum of square residuals (σ) between Banzhaf index values and voting weights (for the entire EU) on the value of the threshold (R). Since the evident minimum value for this curve is $R_{opt} = 62\%$, we are able to work out the optimal value for the threshold, for which both the voting power and weights coincide.

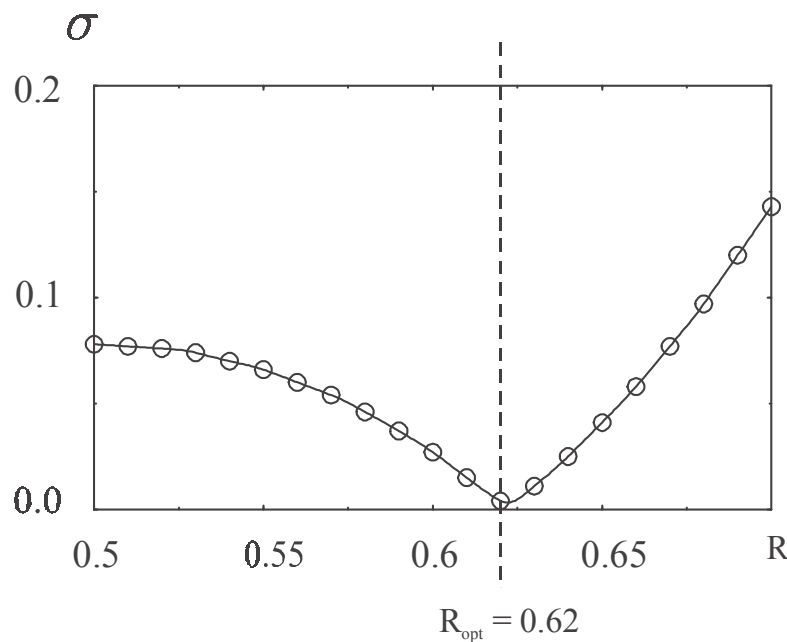


Diagram 2. Index σ illustrates the cumulative residual between the voting weight and power for all 25 EU countries as dependent on the value of the threshold R

An alternative method of calculating this value is shown on Diagram 3, which represents the ratio of voting power, as expressed by the Banzhaf index β , to the voting weight,

relative to the threshold value (R) for five selected Member States of the European Union. All these curves intersect in the vicinity of $R_{opt} = 62\%$, for which Banzhaf index values are equal to the voting weights. It is worth noting that, as the threshold is raised, the voting power of the big countries declines while that of the small ones rises. Seen in this perspective, Poland belongs to the group of “middle-sized” countries since its voting power (with the given distribution of weights) appears with good approximation to be independent of the threshold set.

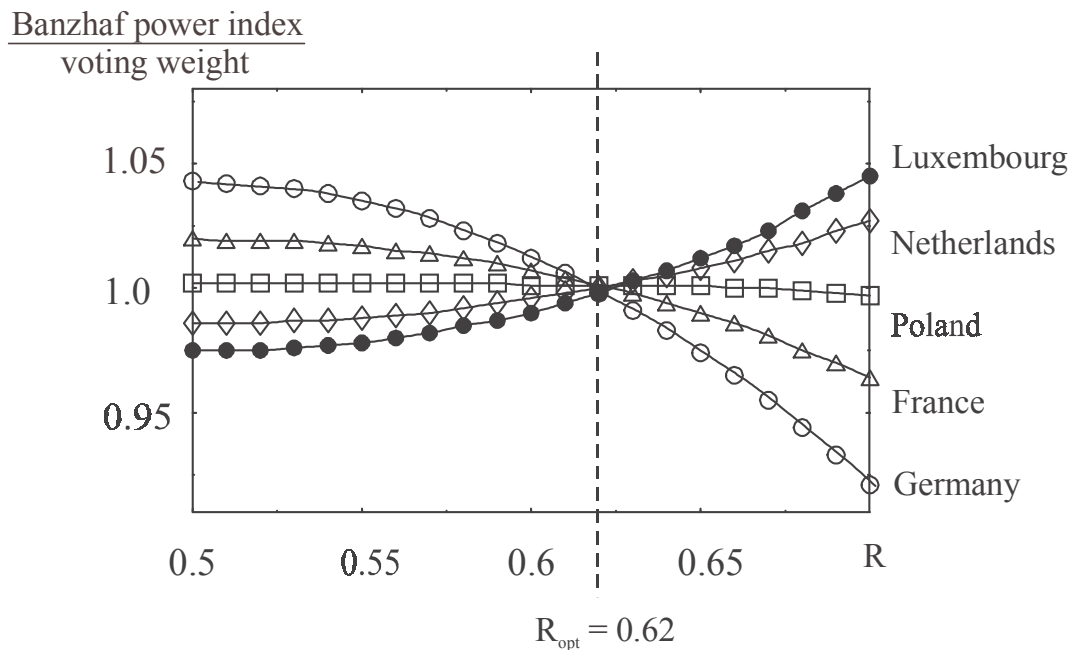


Diagram 3. Ratio of voting power to vote weight, relative to the threshold set, for five selected Member States (Luxembourg, the Netherlands, Poland, France, and Germany)

Another argument in favour of the adoption of the threshold $R_{opt} = 62\%$ is provided by an analysis of the effectiveness index. Diagram 4 depicts the dependence of that index value on the threshold variable (R) selected. For comparison, it also shows the value of this indicator under the Nice system and the draft Constitution adopted by the Convention. As we can see, when the threshold $R_{opt} = 62\%$ is set, the effectiveness remains at a reasonable level of 16.6%, which exceeds significantly the effectiveness level of 7.8% for the current EU of 15 (see BW03b).

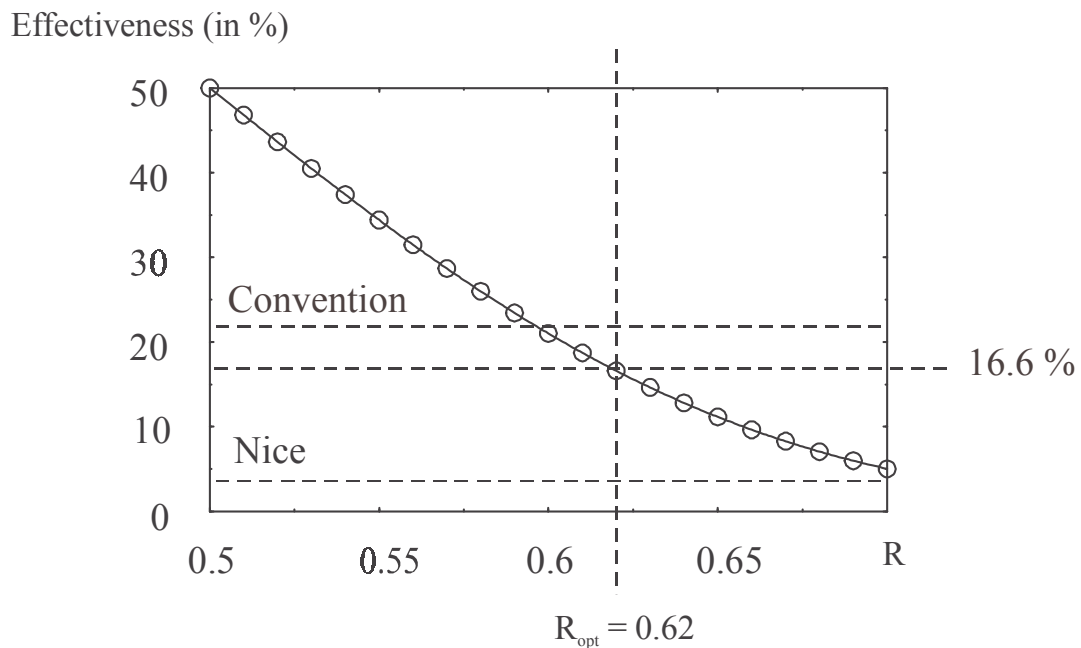


Diagram 4. Dependence of effectiveness index (Coleman collectivity index) on the threshold value

Bibliography

- ABF04: E. Algaba, J. M. Bilbao, J.R. Fernández (2004), European Convention versus Nice Treaty. Preprint.
- BBGW00: R. Baldwin, E. Berglöf, F. Giavazzi, M. Widgrén (2000), EU Reforms for Tomorrow's Europe. Centre for Economic Policy Research. Discussion Paper No 2623.
- BW03a: R. Baldwin, M. Widgrén (2003), Decision Making and the Constitutional Treaty: Will the IGC discard Giscard? Centre for European Policy Studies. Policy Briefs No 37.
- BW03b: R. Baldwin, M. Widgrén (2003), A Study of the Constitutional Treaty's Voting Reform Dilemma. Centre for European Policy Studies. Policy Briefs No 44.
- BW04: R. Baldwin, M. Widgrén (2004), Winners and losers under various dual majority rules for the EU's Council of Ministers. Preprint.
- Ba65: J. F. Banzhaf (1965), Weighted voting does not work: A mathematical analysis. Rutgers Law Review 19, 317-343.
- BJ04: S. Barberà, M. O. Jackson (2004), On the Weights of Nations: Assigning Voting Weights in a Heterogeneous Union. Preprint.

- BMN03: J. Barcz, C. Mik, A. Nowak-Far (2003), Ocena Traktatu Konstytucyjnego: wyzwania dla Polski, Instytut Spraw Publicznych, Warszawa. (in Polish)
- BP04: J. Barr, F. Passarelli (2004), Who has the Power in the EU? Rutgers University. Newark Working Paper No 2004-005.
- Bo01: F. Bobay (2001), Political Economy of the Nice Treaty: Rebalancing the EU Council. French-German Economic Forum. Centre for European Integration Studies. Policy Paper No B 28.
- C03: M. A. Cichocki (2003), Negatywna logika integracji, in Polskie Forum Strategii Lizbońskiej, Niebieskie Księgi 2003 No 1. Czy Unia Europejska zmienia swoją naturę? p. 33-45. (in Polish)
- COE04: Making Europe Work: A Compromise Proposal on Voting in the Council, College of Europe, Natolin, Warszawa.
- CONFER 4750/00: Conference of the Representatives of the Governments of the Member States, Intergovernmental Conference of Institutional Reform. Presidency report to the Feira European Council, CONFER 4750/00.
- CONFER 4769/00: Conference of the Representatives of the Governments of the Member States. Working Document: Weighting of votes in the Council, CONFER 4796/00.
- FPS03: B. Felderer, I. Paterson, P. Silárszky (2003), Double Majority Implies a Massive Transfer of Power to the Large Member States – Is this Intended? Short Policy Paper for EU Convention Forum, Institute for Advanced Studies, Vienna, June 2003.
- FM98: D. S. Felsenthal, M. Machover (1998), Measurement of Voting Power: Theory and Practice, Problems and Paradoxes, Edward Elgar, Cheltenham.
- FM99: D. S. Felsenthal, M. Machover (1999), Minimizing the mean majority deficit: The second square-root rule. *Mathematical Social Sciences* 37, 25-37.
- FM00: D. S. Felsenthal, M. Machover (2000), Enlargement of the EU and Weighted Voting in its Council of Ministers, Centre for Philosophy of Natural and Social Science, London School of Economics, VPP Working Paper No 01/00.
- FM01: D. S. Felsenthal, M. Machover (2001), Treaty of Nice and qualified majority voting, *Social Choice and Welfare* 18, 431-464.
- FM03: D. S. Felsenthal, M. Machover (2003), Analysis of QM rules in the Draft Constitution for Europe proposed by the European Convention, to appear in: *Social Choice and Welfare*.
- FM04a: D. S. Felsenthal, M. Machover (2004), A priori voting power: What is it all about? *Political Studies Review* 2, 1-23.
- FM04b: D. S. Felsenthal, M. Machover (2004), Population and Votes in the Council of Ministers: Squaring the Circle, The European Policy Centre, Issue Paper No 10.
- FM04c: D. S. Felsenthal, M. Machover (2004), Voting Power Measurement: A Story of Misreinvention, to appear in: *Social Choice and Welfare*.
- J03: L. Jesień (2003), Czy Unia Europejska zmienia swoją naturę? in: *Polskie Forum Strategii Lizbońskiej, Niebieskie Księgi 2003 Nr 1; Czy Unia Europejska zmienia swoją naturę?* p. 12-32. (in Polish)
- K04: J. Kranz (2004), Między Niceą a Brukselą albo życie po śmierci. Centrum Stosunków Międzynarodowych. Raporty i Analizy nr 3/04. (in Polish)

- LW98: A. Laruelle, M. Widgrén (1998), Is the allocation of power among EU states fair? *Public Choice* 94, 317-339.
- L01: D. Leech (2001), Fair Reweighting of the Votes in the EU Council of Ministers and the Choice of Majority Requirement for Qualified Majority Voting during Successive Enlargements. Centre for Philosophy of Natural and Social Science, London School of Economics, CSGR Working Paper No 75/01.
- L02: D. Leech (2002), Designing the voting system for the EU Council of Ministers, *Public Choice* 113, 437-464.
- LM03: D. Leech, M. Machover (2003), Qualified Majority Voting: The Effect of the Quota, in: *European Governance, Jahrbuch für Neue Politische Ökonomie*, 2003, ed. M. Holler et al. Tübingen, Mohr Siebeck; p. 127-143.
- LiM04: I. Lindner, M. Machover (2004), L. S. Penrose's limit theorem: proof of some special cases, *Mathematical Social Sciences* 47, 37-49.
- Ma03: L. Mabilie (2003), see: N. Dubois, Pondération des voix: la preuve par «27». *Liberation*, 26/11/2003.
- Me99: J. W. Mercik (1999), Siła i oczekiwania, Decyzje grupowe, PWN, Warszawa. (in Polish)
- PS03: I. Paterson, P. Silárszky (2003), Draft Constitution and the IGC: Voting can be Simple and Efficient – without introducing the Massive Transfer of Power implied by the Convention's Double Majority Proposal, Institute for Advanced Studies, Vienna, December 2003.
- Pe46: L. S. Penrose (1946), The elementary statistics of majority voting, *Journal of the Royal Statistical Society* 109, 53-57.
- Pe52: L. S. Penrose (1952), *On the Objective Study of Crowd Behaviour*. H. K. Lewis & Co, London.
- PSŻ04: M. Pieńkowski, W. Słomczyński, K. Życzkowski (2004), W poszukiwaniu optymalnego systemu głosowania w Radzie Ministrów Unii, *Polski Kalendarz Europejski*, 1-2 (85-86), 20-24. (in Polish)
- PI03: B. Plechanovová (2003), The Treaty of Nice and the Distribution of Votes in the Council – Voting Power Consequences for the EU after the Oncoming Enlargement, *European Integration online Papers (EIoP)* 7 (6); <http://eiop.or.at/eiop/texte/2003-006a.htm>
- PI04: B. Plechanovová (2004), Draft Constitution and the Decision-Making Rule for the Council of Ministers of the EU – Looking for Alternative Solution. Preprint.
- SS54: L. S. Shapley, M. Shubik (1954), A method for evaluating the distribution of power in a committee system, *American Political Science Review* 48, 787-792.
- SŻ04a: W. Słomczyński, K. Życzkowski (2004), Czy warto umierać za Niceę? - prawda i mity, Wyliczony kompromis, *Rzeczpospolita* No 25/2004. (in Polish)
- SŻ04b: W. Słomczyński, K. Życzkowski (2004), Voting in EU according to the „square root law” of Penrose, (in preparation).
- Sm03a: K. Smyk (2003), Zasady podejmowania decyzji a pozycja Polski w Radzie Unii Europejskiej. *Biuletyn analiz UKiE* 11, p. 155-174. (in Polish)
- Sm03b: K. Smyk (2003), Pozycja Polski w Radzie Unii Europejskiej – Ustalenia Traktatu Nicejskiego a podejmowanie decyzji większością kwalifikowaną w projekcie Traktatu konstytucyjnego, *Wspólnoty Europejskie* 7/8. (in Polish)

So04: T. Sozański (2004), Niza o muerte, O pożytkach z teorii gier, Dziennik Polski No 23/2004. (in Polish)

St04: P. D. Straffin (2004), Teoria gier, Warszawa, Wydawnictwo Naukowe „Scholar”, Second edition; chapters 27 and 28. (in Polish)

Sz04: K. Szymański (2004), Nicea dobrze policzona, Rzeczpospolita No 6/2004. (in Polish)

Sz01: Ł. Szymczyk (2001), Analiza postanowień instytucjonalnych Traktatu Nicejskiego (Part II), Biuletyn analiz UKiE 6, p. 177-183. (in Polish)

T03: R. Trzaskowski Projekt traktatu konstytucyjnego – pogłębienie integracji czy utrwalenie hegemonii najważniejszych państw członkowskich? Polskie Forum Strategii Lizbońskiej, Niebieskie Księgi 2003 No 1, Czy Unia Europejska zmienia swoją naturę? p. 46-56. (in Polish)

W03: M. Widgrén (2003), Power in the Design of Constitutional Rules, European Economy Group, Working Paper No 23

¹ On the rule of parity among the largest Member States of the Community, at a meeting held in Bonn on 4th April 1951 during the preparations leading up to the signing of the “Treaty establishing the European Coal and Steel Community”. Jean Monnet, *Mémoires*, Fayard, 1976, p. 414-415 (see Bo01).

² These rules are discussed in detail in, for example, Sz01.

³ His last name is also now more widely known thanks to the activities of his three exceptional sons: the physicist Oliver, mathematician Roger and the chess player Jonathan.

⁴ The literature also examines the Coleman index (1971), which is directly proportional to the Banzhaf index, as well as other values, such as, for example Deegan-Packel (1979), Hoede-Bakker (1982) and Holler (1982) indices, the analysis of which allows one to draw conclusions similar to those discussed in this article. A full discussion of voting power theory may be found in the monograph by Felsenthal and Machover (see FM98), and these issues are covered in Polish in the book by Mercik (see Me99), as well as in the textbook by Straffin (see St04). A historical perspective on the issues involved is presented in FM04a, FM04c.

⁵ Although the Nice arrangements apply equally to Bulgaria and Romania, we only took into consideration the 25 countries which will be members of the Union following enlargement in May 2004.

⁶ The indices have been calculated based on the population data for 1 January 2003, published by Eurostat [Eurostat, Statistics in Focus – Theme 3 –1/2004, Tab. 1 - *Population 1.1.2003*] taking into consideration all 33,554,432 possible coalitions among 25 Member States; analogous results may be found in other papers.

⁷ This has misled, *inter alia*, even persons well acquainted with the issues involved, such as politicians: **Jacques Delors** (former President, for many years, of the European Commission), interview for the Polish daily Gazeta Wyborcza, 3 February 2004; **Dariusz Rosati** (former Minister of Foreign Affairs), the “*Move away from Nice*”, Gazeta Wyborcza, 16 November 2003, and **Marcin Świącicki** (the OBWE Coordinator for economic matters, former President of the City of Warsaw), “*It is not worth dying for Nice*”, Gazeta Wyborcza, 28 September 2003, as well as analysts: **Zbigniew Czachór**, “*Is it worth dying for Nice?*”, lecture at the Centre for European Integration, 30 October 2003; **Michał Czaplicki**, the “*Constitution for Europe – Is this a document which is worthy of being vetoed?*”, Polski Kalendarz Europejski, 9-10 2003; **Marek Dąbrowski**, the “*European false start*”, Polish daily Rzeczpospolita, 22 December 2003; **Rafał Dymek**, “*As admirable as Nice*”, Polski Kalendarz Europejski, 9-10 2003 and **Mariusz Urbanek**, the “*Battle of Nice*”, Polish monthly Odra, November 2003. Unfortunately, their opinions are characterised by lack of knowledge of mathematical theory on the calculation of voting power or, at least, an unwillingness to make use of its achievements.

⁸ It has recently been proposed to change the double-majority system proposed by the Convention and raise the population threshold from three-fifths to two-thirds. This so-called “*El Pais*” proposal is even more

disadvantageous for Poland, as additionally it increases the difference between our country and the other “large” Member States of the Union. Following such a change, the value of the Banzhaf index for Poland is 6.7%, while for Germany it is 14.5%! Nearly as disadvantageous for Poland is the recently made proposal to fix both the population threshold and the number of countries at 55%. Following the adoption of such a proposal, the values of the Banzhaf index for Poland and Germany would be 5.4% and 9.4% respectively. See also BW04.

⁹ See Pe52, p.73.

¹⁰ They are based on the fundamental proposition of probability theory: the Central Limit Theorem.

¹¹ For the sake of simplicity, let us assume that all the citizens of a given country participate, which has no bearing on the paradox concerned.

¹² The decided majority of Polish experts hold similar views (see BMN03, C03, J03, Sm03a, Sm03b, T03, K04, So04, Sz04).

¹³ Literature on the subject refers to it as the *Coleman Collectivity Index*, equal to the *a priori* probability of an act being approved.

¹⁴ Let us note though that the low effectiveness of the system does not at all have to be treated as a disadvantage, as it automatically forces EU Member States to seek a compromise.

¹⁵ See also P104. Other compromise proposals were recently put forward by Paterson and Silársky (see PS03, Project *Synthesis*) and Baldwin and Widgren (see BW03b, Project *Emergency Repair*). After the publication of our proposal, an interesting modification had already been presented by an international group of students from the European College in Natolin (see COE04).

¹⁶ See end note 6.

¹⁷ Previously, such an equalisation of the values of voting weights and voting power has been observed and theoretically explained in the case of a very large number of countries, which constitutes the substance of Penrose’s Limit Theorem (see Pe52, LiM04). In a separate theoretical paper (see SŽ04b), the authors demonstrate that by setting the threshold appropriately it is possible to produce the same effect for a small number of countries.

¹⁸ The only adjustment required would involve a minor reduction in the value of the threshold set. Thus, once these countries accede to the EU, the system being described here would be described more aptly as P-61.

¹⁹ Some politicians believe that any voting system on the EU Council must observe the principle that no decision may be approved by vote if it is not supported by a majority of the EU Member States (CONFER 4769/00). While the P-62 does not, in fact, satisfy this requirement, the smallest possible (and highly unlikely) winning coalition numbers the nine (biggest) countries, which together represent 82.7% of the total population of the Union. What is more, among all winning coalitions, 97.5% comprise 13 or more countries. If necessary, the P-62 system could be modified by adopting weights that are proportional to the number of citizens raised to the power of 0.53, setting the threshold at 66% of the sum of weights, and by adding the second criterion of a mandatory majority of the Member States. A system modified in this manner would be characterised by the same transparency (for all the Member States, the weight of their vote would be proportional to their respective voting power), but would be more complex than P-62.