

International workshop
"Distribution of power and voting procedures in the European Union"
Natolin European Centre, Warsaw
October 12-13, 2007

SPEAKER: **Jesús Mario Bilbao** (Applied Mathematics II, University of Seville, Spain)

TITLE: **The distribution of power in the European cluster game**

ABSTRACT

The weighted voting games are mathematical models which are used to analyze the distribution of the decision power of a nation in a supranational organization like the Council of Ministers of the European Union, the Security Council of the United Nations or the International Monetary Fund. In these institutions, each nation has associated a number of votes and a proposal is approved if a coalition of nations has enough votes to reach an established quota. The power of a country in a supranational organization is a numerical measure of its capacity to decide the approval of a motion. This decisive character is measured calculating the number of times that the vote of a country converts to a coalition that does not reach the quota to take decisions in a winning coalition. The power indices are a priori measures of this power, the most useful are the Shapley-Shubik and Banzhaf indices.

Hagemann and De Clerck-Sachsse obtained the next observation about the coalition formation in the European Union: "But it can be concluded that a consistent pattern can be observed in the distinction between large, medium and small members; the following will reveal whether this differentiation also holds after the enlargement." (Old Rules, New Game. Decision-Making in the Council of Ministers after the 2004 Enlargement, CEPS Annual Conference, March 2007). In this contribution, we study the European Cluster Game defined by the following six players:

Big1 = {Germany},

Big2 = {France, United Kingdom, Italy},

Big3 = {Spain, Poland},

Med1 = {Romania, Netherlands, Greece, Portugal, Belgium, Czech Rep., Hungary},

Med2 = {Sweden, Austria, Bulgaria, Denmark, Slovakia, Finland, Ireland, Lithuania},

Small = {Latvia, Slovenia, Estonia, Cyprus, Luxembourg, Malta}.

The new voting rule proposed by the European Convention for the future European Treaty changes in a very remarkable way the power of the countries in the Council. The reason is that the weighted votes that were approved in Nice are removed and a coalition only needs 15 votes, which at least sum up by 65% of the population to approve a decision with the new

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rule. Furthermore, the minimum number of countries to block a proposal is four and the abstentions are not counted.

Cooperative games under combinatorial restrictions are cooperative games in which the players have restricted communication possibilities, which are defined by a combinatorial structure. The first model in which the restrictions are defined by the connected subgraphs of a graph is introduced by Myerson. Contributions on graph-restricted games include Owen, Borm, Owen, and Tijs. In these models the possibilities of coalition formation are determined by the positions of the players in a communication graph. Another type of combinatorial structure introduced by Gilles, Owen and van den Brink and van den Brink is equivalent to a subclass of antimatroids. This line of research focuses on the possibilities of coalition formation determined by the positions of the players in the so-called permission structure.

We will analyze the European Cluster Game by using the restricted cooperation model derived from a combinatorial structure called augmenting system. This structure is a generalization of the antimatroid structure and the system of connected subgraphs of a graph. Furthermore, this new set system includes the conjunctive and disjunctive systems derived from a permission structure (see Bilbao). We will use the Mathematica system by Wolfram [9] to compute the distribution of power in the European Cluster Game.

Acknowledgments

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SPEAKER: Mika Widgrén (Turku School of Economics, ETLA, CEPR and CESifo, Finland)

TITLE: Strategic power in the EU Council in Consultation and Codecision procedures
(by Mika Widgrén and Stefan Napel)

ABSTRACT

The bulk of quantitative EU decision-making literature has concentrated on analysing the Council of Ministers (CM) which is the main decision-making body of the EU. These studies started to mushroom in the early 1990s and are mostly inspired by EU enlargements and institutional reform where, indeed, the Council was the key institution. A few other studies evaluate national and/or political parties' influence in the European Parliament (EP).

There are also some attempts to evaluate inter-institutional relations and intra-Council power distribution of power using cooperative composite game approach but they have been unsatisfactory as cooperative games do not fit to analysis of decision-making procedures that have strategic elements and determine inter-institutional relations in the EU.

In this paper, we evaluate the distribution of power within the Council of Ministers in spatial context. We do, however, approach the issue very differently from all existing studies. Although our main emphasis is in the power distribution in the Council, in our evaluation, we don't make the assessment in isolation of the other EU institutions. Specifically, we use a procedural inter-institutional non-cooperative framework of EU decision-making where also the CM members act strategically to evaluate CM as an integrated part of EU decision-making. This extends the literature that concentrates only on intra-institutional distribution of power in CM. Moreover, we extend the previous analyses by considering weighted voting in the Council in spatial inter-institutional set-up.

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SPEAKER: Axel Moberg (Private capacity, normally Swedish Ministry for Foreign Affairs)

TITLE: Is the double majority really double? The second round in the debate of the voting rules in the EU Constitutional Treaty

ABSTRACT

The voting rules in the Council of the EU have been under constant negotiation over the past 15 years, in the light of successive enlargements. An agreement on the voting rules after the Eastern enlargement was reached in the Nice Treaty in 2000. . The Constitutional Treaty was to replace the traditional system of weighted votes, with a double majority of 55% of member states, representing 65% of the population, and this was taken on in the mandate for the Inter-Governmental Conference (IGC) on a Reform Treaty that will take place in the autumn 2007.

The discussion should be seen mainly in the perspective of the power balance between large and small states in the enlarged Union. This paper aims to explain the effects of the double majority with cruder but more realistic methods than voting power calculations, and by putting them into their political context. It shows that the heavy criticism of the Nice rules for their complexity and ineffectiveness is largely exaggerated. In the double majority under the Constitutional Treaty the balance of power between member states would in practice be determined entirely by the size of their populations. The state leg would hardly ever play a role, irrespective of the thresholds for population or states. The result is a substantial change in the balance between member states. The voting rules were the most controversial issue in the negotiations about the Constitutional Treaty and about the mandate for the new IGC. Poland and the Czech Republic made proposals for a different model. Therefore, this paper also examines a few other options that have figured in this and earlier negotiations.

The outcome was the introduction of the double majority was postponed and some modifications in the 'Ioannina' mechanism for suspensive veto. Time will show whether the latter will make any difference.

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SPEAKER: Běla Plechanovová (Faculty of Social Sciences, Charles University Prague, Czech Republic)

TITLE: The relevance of the voting rules in the EU Council: what can we learn about the decision-making in the Council after the first eastern enlargement from the empirical data?

ABSTRACT

The presentation will point to several findings about the patterns of decision-making in the EU Council after the first eastern enlargement and their possible consequences for the question of change of the decision-making rule as designed in the Constitutional/Reform Treaty. These findings allow us to formulate concrete hypotheses which we may try to test on the data collected, i.e. the records of all proposals which were contested by at least one dissenting member state in the Council and the dissenting position/s were put to the Council minutes or monthly summary.

- (1) The pattern of voting of individual member states indicates that the relevance of the question of the blocking minorities may be overestimated as overwhelming majority of observations show that dissenting states hardly ever reach this criterion. The strength of the large countries seems to lie in the ability to bring together the coalition that supports the proposal which is being contested by some members.
- (2) The weight of the new member countries in the decision-making in the Council is a substantial factor and seems to be growing from the accession up to now. Even we cannot discern any permanent coalition of which the new members would part of, the pattern of voting is not random and certain coalitions appear to be more probable than others.

The presentation will elaborate on these issues and will try to bring an assessment of the possible consequences for the future decision-making rule.

Next to this, the findings of the empirical analysis may also illuminate certain arguments or positions in the discussion about institutional reform of the EU.

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SPEAKER: **Tadeusz Sozański** (Institute of Philosophy and Sociology, Pedagogical University, Krakow, Poland)

TITLE: **Blocking Minorities and the Distribution of Blocking Power in Voting Systems Used by or Designed for the EU Council**

ABSTRACT

In designing decision procedures for the EU Council, European leaders have always concerned themselves with the distribution of "voting power" among the Council members. However, their understanding of voting power has usually been too vague or differed from that proposed by independent experts who have offered their help in the designing of an acceptable voting system. When the members of a group are to decide on how to allocate a divisible good among themselves, they may wish to get acquainted with "theoretical" ways of "fair division", yet they don't need any "theory" to define their own interests: each of them simply wants to get the largest possible share of the good in question. By contrast, when a member of a voting body demands that the "rules of the game" be designed so as to maximize his voting power, he must first clarify what he wants to maximize by showing the way in which voting power is to be calculated. And to define voting power in such a way, no politician can do without "theorizing", no matter whether he chooses to theorize by himself or to seek help from the scientists.

While informal, naive theory, which is still most popular in the world of politics, identifies the power a voter with his *weight* (e.g. number of nominal votes), the formal *theory of voting games*, to quantify a voter's ability to influence group decisions, uses the number of *winning* coalitions containing the given voter as a *critical* member. However, besides this theory there is another theory which relates an actor's power to the number of small size *blocking* coalitions he can form with other actors. There are reasons to believe that it is this third theory that has informed, along with the naive theory, the construction of voting systems for the EU Council.

Unlike many academic experts, I'm not going to convert the "tribe" of European politicians to the approach which has prevailed in mathematics. Instead of criticising their practice of counting "blocking minorities" rather than "qualified majorities", I would like to propose to the "natives" a mathematical elaboration of their understanding of voting power as *blocking power*. A *blocking coalition* C is usually defined by the condition that the complement of C is not a winning coalition. Thus, if all members of a blocking coalition C fail to vote for a bill,

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the bill will not be passed, even if all members of $N-C$ (N stands for the assembly of voters) vote for it. If C is at the same time a winning coalition, then the condition that $N-C$ is not winning is automatically met (because of the assumption that C and $N-C$ can't be winning simultaneously). In order to distinguish between winning and proper blocking coalitions, I adopt a narrower definition of the latter term: C is blocking if neither $N-C$ nor C is winning. To give an example, consider the coalition {Germany, France, Spain} in the Nice voting game. Since the total population of these 3 states exceeds 38.0% of the EU-27 total, no bill can be passed by the Council if Berlin, Paris and Madrid refuse to support it.

Let me close this introduction to my presentation with the list of the main topics I'm going to discuss (see more at www.cyf-kr.edu.pl/~usozans/voting.htm).

- Formal properties of the distribution of the number of minimal blocking coalitions by player and size (illustrated with the voting system used in UE-15): regularity (monotonic dependence on weight), number of levels, within-level hierarchy vs. equality, the smallest size of a minimal blocking coalition.
- The comparison of the blocking structure in the Nice voting system and the Constitution system.
- Relational analysis of blocking power: how two players can block each other's initiatives and who of them is relatively stronger (illustrated with the case of France and Germany in the Nice and Constitution voting games)
- Blocking power in few weighted voting games with square root weights and various quotas, including the quota recently proposed by Słomczyński and Życzkowski.

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SPEAKER: **Vincent Merlin** (CNRS and University of Caen, France)

TITLE: **Majority Efficient representation of the citizens in a federal Union** (based on the joint work with M.R. Fix¹, D. Lepelley, J.L. Rouet and L. Vidu)

ABSTRACT

All the federal unions, like the United States of America or the European Union face the issue of finding a “good” two step voting mechanism. In particular, a crucial question is to know how many mandates should be given to each country or state in a two tiers voting system, given that the majority rule is used at each level. We here propose a new normative criterion to evaluate these voting rules: an apportionment of the seats among the states is majority efficient if probability of electing the candidate who receives less than 50% of the votes in a two candidate competition over the whole union is minimized. Using computer simulations, we suggest that either the proportional or the square root rule can emerge as an optimal apportionment method depending on the probability model we use to describe the electoral process. As a byproduct, we also study the influence of unequal populations on the probability of picking a minority candidate through two-tiers voting mechanisms.

SPEAKER: **Wojciech Słomczyński** (Jagiellonian University, Kraków, Poland)

¹ Marc Feix passed away on July 4th 2005 at the age of 78. Though he never saw the last version of this paper, he gratefully contributed to this piece of work.

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TITLE: **From a toy model to the double square-root voting system** (based on the joint work with K. Życzkowski)

ABSTRACT

We investigate systems of indirect voting based on the law of Penrose, in which each representative in the voting body receives the number of votes (voting weight) proportional to the square root of the population he or she represents. For a generic population distribution, the quota required for the qualified majority can be set in such a way that the voting power of any state is proportional to its weight. For a specific distribution of population the *optimal quota* has to be computed numerically. We analyse a toy voting model for which the optimal quota can be estimated analytically as a function of the number of members of the voting body. This result, combined with the normal approximation technique, allows us to design a simple, efficient, and flexible voting system, which can be easily adopted for varying weights and number of players. The system consists of a single criterion only and is determined by the following two rules:

- The voting weight attributed to each member of the voting body of size M is proportional to the square root of the population he or she represents;
- The decision of the voting body is taken if the sum of the weights of members of a coalition exceeds the quota

$$\frac{1}{2} \left(1 + \frac{1}{\sqrt{M}} \right).$$

These rules characterize the *double square root* system: On one hand, the weight of each state is proportional to the square root of its population, on the other hand, the quota decreases to 0.5 inversely proportionally to the square root of the size of the voting body. If the populations N_i are fixed, one can set the quota to:

$$\frac{1}{2} \left(1 + \frac{\sqrt{\sum_{i=1}^M N_i}}{\sum_{i=1}^M \sqrt{N_i}} \right)$$

or just take the optimal quota which, however, requires more computational effort.

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SPEAKER: **Antti Pajala** (University of Turku, Finland)

TITLE: **The computation of voting power**

ABSTRACT

My presentation has three themes:

In the first part I talk about voting power and the idea or ideas behind it in a very general level and without virtually any mathematical terms. Basically, the questions that voting power analysis provides an answer to are very simple and intuitive.

In the second part I outline the computation of voting power and some power indices. The power indices are tools for voting power estimation. I shortly introduce a website dedicated to voting power and power indices. The website contains material related to voting power and two computation services which allow for easy power index computation over the Internet. I shortly discuss open problems and challenges in the index computation.

The third part is EU specific. Based on my experiences after visiting many of the EU permanent representations and some scholarly voting power analyses I will shortly discuss Council votes vis-a-vis Member States vis-a-vis voting power.

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SPEAKER: Moshé Machover (Voting Power and Procedures, LSE, United Kingdom)

TITLE: Penrose's Square-Root Rule and the EU Council of Ministers - Significance of the Quota

ABSTRACT

In a two-tier decision-making system such as the EU Council of Ministers, if the number of constituencies (member-states) is sufficiently large (say, 15 or more), Penrose's Square-Root rule can be implemented to a high level of approximation by a simple weighted decision rule at the top level (the Council) with any given quota q smaller than the total weight.

This leaves one degree of freedom: the value of q as a free parameter, to be determined by some additional condition. I propose to survey and discuss critically the most important considerations for fixing this value -- some of which have actually been used by theoreticians or practitioners:

- Efficiency
- Transparency
- Sensitivity (total voting power of citizens)
- Mean majority deficit
- Giving certain "privileged" coalitions blocking status

Some of these considerations are reasonably compatible; others less so. Some kind of compromise is clearly needed. But which? This is essentially a political matter; but a political decisions ought to be made in a theoretically enlightened way.

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SPEAKER: **Stefan Napel** (University of Bayreuth)

TITLE: **Equal representation in a median voter world** (joint work with Nicola Maaser)

ABSTRACT

The principle of "one person, one vote" is generally taken to be a cornerstone of democracy. It is not clear, however, how this principle ought to be operationalized in practice either in terms of apportioning an integer number of seats for given non-integer 'ideal shares' or in determining what are the ideal shares. This paper addresses the latter problem for two-tier voting systems that involve multiple constituencies of different population size. We concentrate on voting bodies such as the *EU Council of Ministers* in which a single agent represents each constituency and is endowed with a number of votes that somehow reflect population size.

Although it seems straightforward to allocate weights proportional to population sizes, this ignores the combinatorial properties of weighted voting and the possibly nonlinear relationship between population size and an individual's effect on the respective constituency's top-tier policy position. The most well-known solution to this problem is the one first suggested by Penrose (1946): constituencies' voting weights should be such that their power at the top-tier as measured by the Penrose-Banzhaf index is proportional to the *square root* of the respective constituency's population size.

Applying the square root rule has, unfortunately, two weaknesses: First, Penrose's result critically depends on equiprobable 'yes' and 'no'-decisions by all voters (or at least a 'yes'-probability which is random and distributed independently across voters with mean exactly 0.5). If the 'yes'-probability is lower or higher, or if it exhibits dependence across voters - say, they are influenced by the same newspapers - then the square root rule may result in highly unequal representation. Second, rigorous justifications for using the square root rule as the benchmark have so far concerned only preference-free binary voting. Real decisions are rarely binary, e.g., about *either* introducing a tax, building a road, accepting a candidate, introducing affirmative action, etc. *or* not. At least at intermediate levels there is a preference-driven compromise that involves *many* alternative tax levels, road attributes, suitable candidates, degrees of affirmative action, etc.

We consider policy alternatives from a finite interval and impose two key assumptions: first, the policy advocated by the top-tier representative of any given constituency coincides with

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the ideal point of the respective constituency's *median voter*. Second, the decision taken at the top tier is the position of the pivotal representative, with pivotality determined by the weights assigned to constituencies and a 50% decision quota. We conduct Monte-Carlo simulations for a vast number of randomly generated population configurations as well as recent data for the EU. Top-tier weights proportional to the square root of population turn out optimal for most practically relevant population configurations. Even for extreme artificial cases, the rule yields good results and becomes optimal if the number of constituencies gets large. The square root rule is thus a much more robust norm for egalitarian design of two-tier voting systems than previous analysis suggests. In particular, it continues to apply in the presence of many finely graded policy alternatives and strategic interactions consistent with the median voter theorem. To the extent that this still produces independent median voters, the rule is even robust to the introduction of preference dependence within or across constituencies.

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SPEAKER: **Hannu Nurmi** (Academy of Finland and University of Turku, Finland)

TITLE: **Observations on agenda-based voting procedures**

ABSTRACT

An important focus of research on the design and evaluation of the institutions of the European Union has been on the distribution of influence in the Council of Ministers. The main approaches have been the application of a priori voting indices (especially the Shapley-Shubik and Banzhaf) and – more recently – various spatial measures of voting power. Yet, one could argue that the functioning of institutions should be of equal importance. Institutions, no matter how fair their distribution of voting power, are not of much consequence if the machinery of governance comes to a standstill. This presentation calls attention to one essential aspect of the functioning of multimember bodies, viz. the voting procedures used within their framework.

Arguably, all voting is based on some agenda. The theoretical importance of agendas is well-known especially in the amendment procedure, but they play equally crucial roles in successive voting and, indeed, in all voting systems. Somewhat less well known is the existence of an antidote for agenda manipulation, viz. strategic or sophisticated voting. I review the basic theoretical results in the literature on voting systems. The primary interest is on their underlying assumptions. I argue that even though our theoretical models become richer in institutional detail – and thus presumably more practically relevant – they still omit important information or are based on questionable interpretations of theoretical concepts. I discuss two examples: (i) the relationship between power and representation, and (ii) the modelling of political skill. The standard assumption in voting power studies is that for any voter the increase in votes increases his/her power or influence over voting outcomes. Yet, it can be shown that there are situations where a voter is better off with fewer votes than with more votes. This observation is known as Schwartz's paradox. We discuss its implications to power studies. By political skill I refer to a politician's ability not only to build agendas to further his/her own interests but – more importantly - to form packages of issues to be voted upon. Our models can predict the voting outcomes given voter preferences and agenda. Some

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authors have even outlined models with endogenous agendas. What, however, remains to be modelled is how various packages of issues are formed and voted upon in real world politics. Aggregation paradoxes illustrate the importance of issue packaging in the determination of voting outcomes. Some of these paradoxes are dealt with in the presentation.

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SPEAKER: Gianfranco Gambarelli (Dept. of Mathematics, Statistics, Computer Science and Applications, University of Bergamo, Italy)

TITLE: Electoral systems, multicameral cohesion majorities and Europe

ABSTRACT

Two results are shown: the first for normative applications (electoral systems) and the second for forecasting (multicameral coherent majorities). The latter is applied to some current situations in Europe.

The problem of seat apportionment in electoral systems is quite complex, since no apportionment method exists which is successful in verifying all the principal fairness criteria. Gambarelli introduced in (1999) an apportionment technique which is custom made for each case, respects Hare minimum, Hare maximum and Monotonicity and satisfies other criteria in order of preference. In this work by Gambarelli and Palestini (2007) a generalization of that method is proposed, in order to extend it to the multi-district election case, where criteria should be respected both at global as well and local levels. An existence theorem and a generating algorithm are supplied.

On the subject of Multicameral coherent majorities, this work links two research branches regarding cooperative games: the multicameral games and the a priori coalitions.

Regarding the former subject, most of the parliaments are based on a bicameral system where propositions have to be approved by both chambers. The parties' power indices are affected by it. In fact a political party, for one certain coalition, can be crucial in one chamber and not in the other. Usually the problem can be solved by building a unified game, related to two or more chambers, where the global power indices can be calculated.

Concerning cohesion games, some coalitions among parties could be possible, but they are unrealizable (or have low probability of materializing) if the parties involved have very different ideologies. It is necessary to take this into consideration when we compute the relative power indices.

In this work, a model is built that takes into consideration both problems. An automatic calculation algorithm is elaborated and is applied to the current situations in Belgium, the Czech Republic, France, Italy, the Netherlands, Poland and Romania, considering the

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location of the parties on the left-right axis. This model is then applied globally to the European Union.

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International workshop
"Distribution of power and voting procedures in the European Union"
Natolin European Centre, Warsaw
October 12-13, 2007

SPEAKER: Madeleine O. Hosli (Department of Political Science, Leiden University, The Netherlands)

TITLE: Explaining Voting Behavior in the Council of the European Union

ABSTRACT

This paper explores patterns of voting in the Council of the European Union (EU) by analyzing the full set of voting records for this institution between 1995 and 2004. It uses ordered probit regression to explain the propensity of EU member states to vote 'yes', abstain from voting, or vote 'no' in formal Council voting procedures. The paper explains voting behavior on the basis of a range of independent variables, including governments' positions on the left-right policy scale, pro-integration sentiments within domestic publics, governments' position as either net beneficiary or net payer into the EU budget, and number of votes in the Council. The analysis reveals that the further the distance of a government from the average EU government left-right positioning, the lower the support for EU integration in domestic public opinion and the larger an EU member state, the more likely it is to oppose the majority in Council voting procedures.

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SPEAKER: Marcin Malawski (Institute of Computer Science, Polish Academy of Sciences and Leon Koźmiński Academy of Management and Entrepreneurship, Poland)

TITLE: Equality in multicameral voting

ABSTRACT

One of the important issues in the recent discussion of the voting system in the EU Council of Ministers was the concern about equal treatment of all (voting) citizens of all EU states by the voting rule, regardless of their citizenship. In particular, the square root system proposed by Słomczyński and Życzkowski has been designed explicitly with the purpose of ensuring every European voter the same influence on the outcome of voting in the Council. However, their system enjoys this property only under some plausible but disputable assumptions about both the way of measuring “influence” of an individual on the outcome of multistep voting and the probabilistic model of how individuals vote. Some weaknesses of this model will be pointed out, and some alternative models will be proposed. I shall also discuss the underlying notion of equal treatment of equals when the voting is conducted in separate chambers (here, countries) and their representatives make the final decision thereafter, and the applicability of various power indices in this context.

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SPEAKER: **Silvia Fedeli** (Universita' di Roma "La Sapienza", Facolta' di Economia, Dipartimento di Economia Pubblica, Italy)

TITLE: **The Constitutional power of the voting owners in the European Parliament**
(Based on previous works on the EU Parliament by S. Fedeli and F. Forte)

ABSTRACT

The European Parliament (EP) has acquired increasing power after the Maastricht Treaty (1992) and the Amsterdam Treaty (1997): it shares co-decision power with the Council of Ministers (ECM) in several field of legislation; it has a consultation power in most other legislation matters; it may issue motions on any matter related to the EU institutions; it approves the appointments of the head of the European Commission (EC) and of its members chosen by the ECM and it may vote their dismissal in (extreme) cases of miss-behaviour.

The EP is elected every five years by direct universal suffrage of the EU citizens with a pure proportional electoral system, given the *seats' allotment per Member State* laid down by the Treaties. Unlike the ECM (made up of national delegations), the EP assembly is officially organised in political groups (parties) composed by the Members of the European Parliament (MEP) of different countries affiliated to them: the EU Treaty explicitly recognises a political role to the parties in the EP as important factor of integration "to form an European conscience and to express the political will of the citizens of the Union". The EP decisions are taken under simple majority voting rule.

There is a claim that the *national seats' allotment* mainly favours the electors of big countries voting for big parties. The opposite claim also occurs asserting that the distribution of votes among countries is "unfair", particularly after the enlargement, because it is biased in favour of small countries. This lecture is devoted to draw the theoretical framework for assessing, in terms of voting power, which claim is true - for the 5th term (with 15 EU countries) and 6th term (with 25 and 27 EU countries) - and whether the EU enlargements have modified the EP outcomes.

The theoretical framework takes under consideration the fact that the MEP are organised in **political groups**. However, the issues under vote, several times, cross the parties involving "**national**" interests (as the national sharing of regional and social funds, the agricultural policy and the decisions on the internal market rules). Indeed, the electorate of the various

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countries rationally participate to the EP elections to pursue, *via* their representatives, both political and national interests. For this reason, the EP parties' leaders do not seem willing to call the elected representatives for a party discipline in some relevant occasions, leaving often the MEP explicitly vote according to national interests. In other words, rather than playing the political game, when voting on the relevant amendments, the MEP can combine in national blocs and play a "multi-partisan" game, merging with their country's mates of different ideology for the adoption of a common (national) line. For the electorate, the question arises of the choice of the political group that properly represents it in both the political game and the cross-party game of pursuance of national interests.

To capture this complexity of EP decision making, we split the assembly into sub groups – **cells** – composed of MEP that belong to both a given nationality and a given political group. We assess the (Penrose and Banzhaf) voting powers indexes of the cells in two basic **composite** games: the **political game** in which each national group belonging to a given party tries to address the policy of its political group in the assembly, and the **national game** in which cells of different parties combine into a national group, trying to influence its policy to some specific national interest. As a benchmark we shall also consider an **anarchic or uncoordinated game** in which each cell plays separately. In these contexts, fairness is referred to the principle "**one person one vote**" (OPOV), by which the voting power of the representatives (of each cell) should be proportional to the population represented. The fairness thus defined is measured by an index of voting rights of the electors as given by the ratio of the share of voting power of each cell in the EP to the share of population of EU that it represents.

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SPEAKER: **Victoriano Ramírez-González** (Department of Applied Mathematic, University of Granada, Spain)

TITLE: **Allotment of the seats in the European Parliament: the parabolic method**

ABSTRACT

We present a method for distributing the seats of the European Parliament amongst the States of the European Union, in accordance with the restrictions established in article I-20 of the projected European Constitution. The proposed method can be applied not only to the current composition of the EU, but also if there is a change in the number of States or in their populations. It is based on adjusting the quotas of every country to verify the constitutional restrictions, and so that their rounding to the closest integer number constitute an allotment of the seats of the Parliament.

The project of Constitution of the EU establishes that the seats must be distributed following a degressively proportionality, assigning a minimum of 6 representatives to any state as small as it could be, and a maximum of 96, though its quota could be very superior to this figure. Nevertheless, the project of Constitution does not specify which formula must be used to assign the seats to the States.

With this aim, we have established several mathematical properties for a “degressively proportional allotment”, and we have developed the *Parabolic Method* of allotment of the seats of the EP, according to the project of Constitution, as one of the simplest to be applied. Thus, we present this method and their application to the current data and the possible enlargement when Croatia is included. Also, we show that the square root method does not verify some of the established basic properties for allotment with degressively proportionality.

Finally, we demonstrate the MERPE program, developed in collaboration with professor Martínez-Aroza (of my research group), to allocate the seats of the European Union using the parabolic method, and to simulate cases other than current.