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National and ideological influence in the European Parliament*†

by

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Abstract: In this paper we address the following question: Taking as decisional units national chapters of European political parties, is there a difference between a priori voting power of national groups in the case of "national" coordination of voting and in the case of "partisan" coordination of voting? By coordination of voting we mean two step process: in the first step there is an internal voting in the groups of units (national or partisan), in the second step there is a voting of aggregated groups (European political parties or national representations) in the EP. In both cases the voting has an ideological dimension (elementary unit is a party group), difference is only in dimension of aggregation (European parties versus national representations). Power indices methodology is used to evaluate voting power of national party groups in the cases of partisan and national coordination of voting behaviour.

Keywords: a priori voting power, European Parliament, European political parties, power indices, Shapley-Shubik power index.

1. Introduction

During last two decades we can observe a boom of the power indices literature related to constitutional analysis of European Union institutions and distribution of intra-institutional and inter-institutional influence in the European Union decision making.

While most of the studies, focused on models of the institutional system of the European Union (EU), emphasise analysis of voting power in the EU Council of Ministers as reflecting the influence of member states (or, more precisely,

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member state governments)*, significantly less attention is paid to the power analysis in the European Parliament (EP).

Historically, the first paper on model analysis of the EU institutions (Holler and Kellermann, 1977) was focused on national distribution of voting power in the European Parliament (even before the first direct election to the EP in 1979), but there were not many followers of this direction of model oriented EP analysis. In Johnston (1982) the "fairness" of regional representation in parliamentary bodies was investigated with empirical illustrations based on national representation in the EP. Strategic partnership of Commission and EP under cooperation procedure and conditional agenda setting role of the EP was studied by Tsebelis (1994). Hosli (1997) analyzed the new situation in the EP after 1994 reallocation of seats of national representations and introduced into power considerations the voting strength of European political parties. Nurmi (1997a) formulated a model of political representation in the EP (how voters of different political parties are represented from the point of view of influence of national chapters of European political parties that follows from ideological voting). Hix (2002) investigated two political dimensions (national and ideological) in EP voting and Noury (2002) provided empirical data about voting in the EP to establish the proportion of "nationally" and "ideologically" motivated voting. Mercik, Turnovec, and Mazurkiewicz (2004) demonstrated the fact that for some countries it would be more beneficial to coordinate voting of its members of EP on the national rather than on the ideological level. Hix, Noury and Roland (2006) provide the most extensive insight into the development of political process in the EP, of history of developing European political parties, conflicts and coalition formations.

In this paper we extend the analysis from Nurmi (1997a) and Mercik, Turnovec and Mazurkiewicz (2004), and formulate the following problem: taking as decisional units national groups of European political parties, is there a difference between a priori voting power of national groups in the case of "national" coordination of voting and in the case of "partisan" coordination of voting? By coordination of voting we mean a two step process: in the first step there is an internal voting in the groups of units (national or partisan), in the second step there is a voting of aggregated groups (European political parties or national representations). In both cases the voting has an ideological dimension (elementary unit is a national party group), difference is only in the dimension of aggregation.

To evaluate voting power (or influence) of actors in EP decision making

*Distribution of power in the EU Council of Ministers and the recent developments associated with the 1995, 2004 and 2007 enlargement of the EU have been analyzed in Brams and Affuso (1985), Widgrén (1994, 1995), Steunenberg, Smidtchen and Koboldt (1999), Nurmi (2000), Nurmi, Meskanen and Pajala (2001), Bindseil and Hantke (1997), Laruelle (1998), Felsenthal and Machover (2004), Holubiec and Mercik (1996), Kőnig and Brauninger (2001), Turnovec (1996, 2001, 2002), Plechanovová (2004), Baldwin and Widgrén (2004), Słomczyński and Życzkowski (2006), Hosli (2008) and many others.

we use the power index methodology. Two most widely used power indices were proposed by Penrose and Banzhaf (1946, 1965) and Shapley and Shubik (1954). There exist also some other well defined power indices, such as Holler-Packel index (1983), Johnston index (1978), and Deegan-Packel index (1979). For the most comprehensive survey and analysis of power indices methodology see Felsenthal and Machover (1998, 2004). We selected the Shapley-Shubik power measure for its appealing properties (local and global monotonic property, equality of absolute and relative power, see Turnovec, 1998, 2004, 2007).

In the second section of this paper we shortly recapitulate the committee model and a priori voting power methodology in the setting suitable for hierarchical and more-dimensional extension of the model. Section three presents a two level committee model of power decomposition: in a "grand" committee consisting of subcommittees it is assumed that in the first step each subcommittee looks for joint position in internal subcommittee voting and then (depending on result of internal voting), the subcommittees vote unanimously in the "grand" committee decision making. A short description of the structure of recent EP elected in 2004 is given in Section four. Section five applies the two-level committee model with two dimensions of decision making hierarchy (ideological and national) in EP and defines measures of influence of national party groups, European political parties and national representations in each of two dimensions. Using concept of randomized decision making rule (Shapley, 1962; Berg and Holler, 1986) and empirically established proportion of ideological and nationally driven voting acts we can define (as a synthetic measure) expected power of national party groups, European political parties and national representations reflecting both dimensions of voting. Empirical results of power analysis for the ideological and national dimension of EP decision making are provided in Section six. In Section seven conclusions and further research possibilities in this field are discussed.

2. Power index methodology

Let $N = \{1, 2, ..., n\}$ be the set of agents (individuals, parties) and ω_i ($i = 1, ..., n$) be the (real, non-negative) weight of the i-th agent and τ be the total sum of weights of all agents. Let γ be a real number such that $0 \leq \gamma \leq \tau$ (minimal sum of weights necessary to approve a proposal). The $(n+1)$-tuple $[\gamma, \boldsymbol{\omega}] = [\gamma, \omega_1, \omega_2, ..., \omega_n]$ such that

$$\sum_{i=1}^{n} \omega_i = \tau,\ \omega_i \geqslant 0,\ 0 \leqslant \gamma \leqslant \tau$$

we call a committee (or a weighted voting body) of the size $n = \operatorname{card} N$ with quota γ, total weight τ and allocation of weights $\boldsymbol{\omega} = (\omega_1, \omega_2, ..., \omega_n)$. Assume that each agent i uses in voting all his resources given by his weight ω_i undivided, i.e. he casts all his votes either as "yes" votes, or as "no" votes. Any non-empty subset of agents $S \subseteq N$ we shall call a voting coalition. Given an allocation $\boldsymbol{\omega}$ and a quota γ we say that $S \subseteq N$ is a winning voting coalition, if $\sum_{i \in S} \omega_i \geqslant \gamma$ and a losing voting coalition, if $\sum_{i \in S} \omega_i < \gamma$. Let

$$T = \left[(\gamma, \boldsymbol{\omega} \in \mathrm{R}_{n+1} : \sum_{i=1}^{n} \omega_i = \tau \; \omega_i \geqslant 0, \; 0 \leqslant \gamma \leqslant \tau \right]$$

be the space of all committees of the size n, total weight τ and quota γ.

A *power index* is a vector valued function $\mathbf{\Pi} : T \to R_n^+$ that maps the space T of all committees of the size n into non-negative quadrant of R_n. A power index represents for each of the committee agents' a "reasonable expectation" that she will be "decisive" in the sense that her vote (YES or NO) will determine the final outcome of voting. To define a particular power index one has to clarify what this "reasonable expectation" means, to identify some qualitative property (decisiveness) whose presence or absence in voting process can be established and quantified (Nurmi, 1997b). Generally, there are two such properties, related to committee agents' positions in voting, that are being used as a starting point for quantification of an a priori voting power: swing position and pivotal position of a committee agent. We shall use the pivotal positions based power measure introduced by Shapley and Shubik (1954), the so called SS-power.

Let the numbers $1, 2, ..., n$ be fixed names of committee agents, $(i_1, i_2, ..., i_n)$ be a permutation of those numbers, agents of the committee, and let agent k be in position r in this permutation, i.e. $k = i_r$. We shall say that an agent k of the committee is in a pivotal situation (has a pivot) with respect to a permutation $(i_1, i_2, ..., i_n)$, if

$$\sum_{j=1}^{r} \omega_{i_j} \geqslant \gamma \quad \textit{and} \quad \sum_{j=1}^{r} \omega_{i_j} - \omega_{i_r} < \gamma.$$

Let us assume that a strict ordering of agents in a given permutation expresses an intensity of their support (preference) for a particular issue in the sense that, if an agent i_s precedes in this permutation an agent i_t, then agent's i_s support for the particular proposal to be decided is stronger than support by the agent i_t. One can assume that the group supporting the proposal will be formed in the order of positions of agents in the given permutation. If it is so, then the agent k will be in the situation when the group composed of preceding agents in the given permutation still does not have enough votes to pass the proposal, and the group of agents placed behind him in the permutation has not enough votes to block the proposal. The group that will manage to secure his support will win. An agent in a pivotal situation has a decisive influence on the final outcome. In an abstract setting, assuming many voting acts and all possible preference orderings equally likely, under the full veil of ignorance about other aspects of individual agents' preferences, it makes sense to evaluate an a priori voting power of each committee member as a probability of being in pivotal situation. This probability is measured by the SS-power index:

$$\pi_i^{SS}(\gamma, \boldsymbol{\omega}) = \frac{p_i}{n!}$$

where p_i is the number of pivotal positions of the committee agent i and $n!$ is the number of permutations of all committee agents (number of different strict orderings).

Let us add that SS-power index was originally defined axiomatically as a special case of Shapley value of cooperative game with transferable utilities in terms of characteristic functions and imputations (Shapley, 1953). Here we prefer a more intuitive treatment which is consistent with the original definition and allows for probabilistic interpretation of power (see also Straffin, 1980).

3. Two level committee model of power decomposition

Let us consider committee $[\gamma, \boldsymbol{\omega}] = [\gamma, \omega_1, \omega_2, ..., \omega_n]$ in which each agent i can be understood as a group G_i with cardinality ω_i (number of individual members of the committee belonging to i). Each group G_i consists of several subgroups. Let $G_{ij} \subset G_i$ be a subgroup j of the group G_i and $\omega_{ij} = \text{card}\,(G_{ij})$, number of members of G_i belonging to G_{ij}.

Assuming that each group (agent) i is partitioned into $m(i)$ subgroups G_{ij}, we can consider the following two step procedure of voting: first, each agent G_i looks for joint position in a subcommittee $[\gamma_i;\ \omega_{i1},\ \omega_{i2},\ \ldots,\ \omega_{im(i)}]$, where γ_i is the quota for voting in subcommittee i (e.g. the simple majority). There is a vote inside the group first (micro-game) and then the group is voting together in the committee on the basis of results of internal voting (macro-game).

Let $\mathbf{s}_i = (s_{i1}, s_{i2}, \ldots, s_{im(i)})$ be the Shapley-Shubik power index (internal power distribution) in subcommittee $[\gamma_{i;}\omega_{i1}, \omega_{i2}, \ldots, \omega_{im(i)}]$, s_{ij} being an internal a priori power of subgroup G_{ij} in subcommittee voting (probability that subgroup G_{ij} is pivotal in its subcommittee voting). Let $\boldsymbol{\pi} = (\pi_1, \pi_2, \ldots, \pi_n)$ be the vector of Shapley-Shubik power indices of agents in the committee $[\gamma, \boldsymbol{\omega}] = [\gamma,\ \omega_1\ , \omega_2\ , ...,\ \omega_n]$, π_i being an a priori power of group G_i (probability that group G_i voting uniformly is pivotal in the committee of groups).

Now, what is an a priori voting power of a subgroup G_{ij} in committee of groups voting? G_{ij} is pivotal in the committee of groups voting if and only if it is pivotal in its subcommittee voting and its group G_i is pivotal in the committee of groups voting. Let us denote by $\boldsymbol{\pi}_i = (\pi_{i1}, \pi_{i2}, \ldots, \pi_{im(i)})$ the power distribution of members of group G_i in the committee of groups $[\gamma, \boldsymbol{\omega}] = [\gamma, \omega_1, \omega_2, ..., \omega_n]$. To measure a priori voting power π_{ij} of subgroup G_{ij} in the committee of groups voting we use conditional probability $\pi_{ij} = \pi_i s_{ij}$ of two independent random events – pivotal position of subgroup G_{ij} in its subcommittee and pivotal position of group G_j in committee of groups. From properties of SS-power index it follows that

$$\sum_{j=1}^{m(i)} \pi_{ij} = \pi_i$$

so we obtained decomposition of the power of group G_i among the subgroups G_{ij}.

There exist different multi-level committees. For example, the upper houses of national parliaments have twofold affiliation of its individual members: they represent citizens of the region they were elected in and on the other hand they are affiliated to some political party. The same is true for the European Parliament: each individual member is affiliated to some European party faction, and at the same time he represents interests of citizens of his own country. Formally, we can develop two models of such a committee: one model with agents aggregated into the party factions, the second with regional (country) aggregation. Then it makes sense to compare the distribution of power in each of the two dimensions: partisan coordination and national coordination.

4. European Parliament

The European Parliament, designed to represent the citizens of European Union member states, is the only directly elected institution of the European Union. European Parliament (EP) has a dual structure: members of EP represent their own countries (and in certain extent they are aware of national interests) and at the same time they belong to national political parties (and in this sense they represents ideological preferences of the groups of citizens). Internally, members of European Parliament are clustered in European political parties, forming clubs (factions) in the EP.

In the sixth legislative term (2004-2009) there are 732 members of the EP elected by citizens of 25 member states (we are reflecting the situation after the 2004 election, before the 2007 extension). They are divided into seven political groups (European political parties):

PPE-DE - Group of the European People's Party (Christian Democrats) and European Democrats,

PSE - Socialist Group in the European Parliament,

ALDE - Group of the Alliance of Liberals and Democrats for Europe,

Verts/ALE - Group of the Greens/European Free Alliance,

GUE/NGL – Con-federal Group of the European United Left - Nordic Green Left,

IND/DEM - Independence/Democracy Group,

UEN - Union for Europe of the Nations Group,

NI - Not-attached Members.

European Parliament acts on the basis of the simple majority rule, and in some cases absolute majority is required. Composition of the European Parliament after the 2004 elections is provided in Table 1.

Table 1. Members and political factions of European Parliament of the sixth term, situation as at 30 November 2004

Country	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI	Total
Austria	6	7		2				3	18
Belgium	6	7	6	2				3	24
Cyprus	3		1		2				6
CzechR.	14	2			6	1		1	24
Denmark	1	5	4	1	1	1	1		14
Estonia	1	3	2						6
Finland	4	3	5	1	1				14
France	17	31	11	6	3	3		7	78
Germany	49	23	7	13	7				99
Greece	11	8			4	1			24
Hungary	13	9	2						24
Ireland	5	1	1		1	1	4		13
Italy	24	16	12	2	7	4	9	4	78
Latvia	3		1	1			4		9
Lithuania	2	2	7				2		13
Luxemburg	3	1	1	1					6
Malta	2	3							5
Netherlands	7	7	5	4	2	2			27
Poland	19	8	4			10	7	6	54
Portugal	9	12			3				24
Slovakia	8	3						3	14
Slovenia	4	1	2						7
Spain	24	24	2	3	1				54
Sweden	5	5	3	1	2	3			19
United Kingdom	28	19	12	5	1	10		3	78
Total	268	200	88	42	41	36	27	30	732

Individual members of the EP represent the citizens of member states and the number of seats is distributed roughly proportionally to the size of population among the member states. The election to the EP has an ideological dimension: using proportional electoral systems citizens are casting votes for national political parties.

EP is institutionally structured on ideological principle, individual EP members work in factions of the European political parties. Empirical evidence indicates, that almost in all cases members of the national party groups are voting together, but Noury (2004) demonstrated, using empirical data about voting acts in EP of the fifth term, that ideological dimension in EP voting prevails (in almost 80% of cases EP members voted according European party affiliation), but there were still more than 20% of voting driven by national dimension (voting by national affiliation). Consequently, to measure the influence in the EP the basic decision making unit is a national party group and it makes sense to measure not only voting power of European political parties and/or voting power of national representations, but also the voting power of national party groups, both in the ideologically driven voting and in the nationally driven voting.

5. Modelling distribution of power in the European Parliament

To evaluate distribution of power of national party groups in European Parliament as the basic decision making units we use the Shapley-Shubik concept of voting power and model of two-level committee from Section 3. To reflect the double dimensionality in voting we use two dimensions of the committee structure: the European party factions decomposed into national groups, and the national representations decomposed into the party groups. The basic unit remains the same in both cases: the national party group. Then, we obtain two schemes of decision making coordination: first based on European party factions and national party groups, second based on national representations and national party groups.

First (ideological) dimension leads to the committee model A with European parties as agents voting together, $[\gamma, p_1, p_2, \ldots, p_n]$, the second (national) dimension leads to committee model B with national representations as agents voting together, $[\gamma, n_1, n_2, \ldots, n_m]$, where γ is the quota (the same for both models), p_i is the weight (number of seats) of European party i, n_k is the weight (number of seats) of member state k (n is the number of European parties, m is the number of member states).

Committee A generates n subcommittees A_j such that $[\gamma_j, p_{1j}, p_{2j}, \ldots, p_{mj}]$, where p_{ij} denotes the number of members of party group j from country i, γ_j being a specific quota for subcommittee A_j. Each of these subcommittees consists of at most m national subgroups of the European political party j, where in each subcommittee the members of each party from the same member state k are voting together. We shall refer to the corresponding two-level model

$$\left\{ \begin{array}{c} A \\ A_1, A_2, ..., A_n \end{array} \right\}$$

as the ideologically structured committee system $\{A/A_j\}$.

Committee B generates m subcommittees B_k such that $[\delta_k, p_{k1}, p_{k2}, \ldots, p_{kn}]$, where p_{ki} denotes the number of members of party group i from country k, δ_k

being a specific quota for subcommittee B_k. Each of these subcommittees consists of at most n party subgroups of the national representation k, where in each subcommittee the members of the same party j are voting together. We shall refer to the corresponding two-level model

$$\left\{ \begin{array}{c} B \\ B_1, B_2, ..., B_m \end{array} \right\}$$

as the nationally structured committee system $\{B/B_k\}$.

Let us denote by:

α_j - voting power of the European party j in the committee A (voting by ideological dimension), probability that party j will be pivotal in ideologically coordinated voting,

β_k - voting power of the nation k in the committee B (voting by national dimension), probability that nation k will be pivotal in nationally coordinated voting,

α_{kj} - voting power of the national segment k of party j in subcommittee A_j, probability that national segment k of party j will be pivotal in internal party voting,

β_{kj} - voting power of the national segment k of party j in subcommittee B_k, probability that party segment j of representation of country k will be pivotal in internal national voting,

π_{kj} - voting power of the national segment k of party j in the committee $\{A/A_j\}$, probability that national segment k of party j will be pivotal in the grand committee voting based on ideological coordination,

φ_{kj} - voting power of the national segment k of party j in the committee $\{B/B_k\}$, probability that party segment j of national representation k will be pivotal in the grand committee voting based on national coordination.

Using standard algorithms we can find SS-power indices α_j in committee A and α_{kj} in committees A_j (probabilities of being pivotal in corresponding committees) and then calculate a priori voting power of subgroups

$$\pi_{kj} = \alpha_{kj}\alpha_j \ .$$

as conditional probability of two independent random events – pivotal position of j in grand committee A and pivotal position of k in subcommittee A_j. From the probabilistic interpretation and the properties of SS-power indices

$$\sum_{j=1}^{n} \alpha_j = 1, \quad \alpha_j \geqslant 0 \quad \textit{and} \quad \sum_{k=1}^{m} \alpha_{kj} = 1, \quad \alpha_{kj} \geqslant 0$$

for all $j = 1, 2, \ldots, n$ and $k = 1, 2, \ldots, m$ it follows that

$$\sum_{k=1}^{m} \pi_{kj} = \alpha_j \sum_{k=1}^{m} \alpha_{kj} = \alpha_j.$$

The sum of voting powers of national groups of European political party j in ideological voting is equal to the voting power of the European political party. The total power is decomposed among the national units of the party. In a more intuitive way: the national group k of political party j is in a pivotal position in ideologically structured committee system $\{A/A_j\}$ if and only if it is in pivotal position in subcommittee A_j and the party j is in a pivotal position in committee A.

Less trivial is the following result: a country k is in a pivotal position in ideological coordination of voting if some party group from k is in pivotal position. Pivotal positions of national party groups of the same country in ideological voting are mutually exclusive random events, hence the probability that some party group from state k is in a pivotal position is

$$\sum_{j=1}^{n} \pi_{kj} = \sum_{j=1}^{n} \alpha_j \alpha_{kj} = \theta_k$$

(sum of power indices of all party groups from member state k). Then, θ_k can be interpreted as a measure of influence of country k in ideologically coordinated voting. From properties of SS-power it follows that

$$\sum_{k=1}^{m} \theta_k = \sum_{k=1}^{m} \sum_{j=1}^{n} \alpha_j \alpha_{kj} = \sum_{j=1}^{n} \alpha_j \sum_{k=1}^{m} \alpha_{kj} = \sum_{j=1}^{n} \alpha_j = 1.$$

There is no other direct way to evaluate θ_k.

In the same way we can find β_k in committee B and β_{kj} in committees B_k and then calculate

$$\varphi_{kj} = \beta_{kj} \beta_k$$

as conditional probability of two independent random events - pivotal position of k in grand committee B and pivotal position of j in subcommittee B_k. Measure of influence of party j in the nationally coordinated voting is

$$\sum_{k=1}^{m} \varphi_{kj} = \sum_{k=1}^{m} \beta_k \beta_{kj} = \vartheta_j$$

(sum of power indices of party group j from all member states).

Shapley (1962) introduced and Berg and Holler (1986) extended the concept of randomized decision making rule: let D be a set of decision making rules and Q a probability measure over D, then appropriate power measure in family of committees $[d \in D; \omega_1, \omega_2, \ldots, \omega_n]$ is the expected value

$$\overline{\pi_i} = \int_{d \in D} \pi_i(d) dQ$$

where $\pi_i(d)$ stands for power index in the committee $[d \in D; \omega_1, \omega_2, \ldots, \omega_n]$. For discrete $D = \{d_1, d_2, \ldots, d_k\}$ with probabilities $p_1, p_2, \ldots, p_k$ the expected value is

$$\overline{\pi_i} = \sum_{t=1}^{k} p_t \pi_t.$$

In our case we have two matrices of power indices of national party groups, $\mathbf{\Pi}$ and $\mathbf{\Phi}$, corresponding to two decision making rules (partisan and national coordination). Assuming a mix of the national and party coordination with probability λ of partisan coordination of voting and probability 1-λ of national coordination of voting, we obtain expected voting power of national party groups in our model as

$$\Sigma(\lambda) = \lambda\mathbf{\Pi} + (1-\lambda)\mathbf{\Phi},$$

where $\Sigma(\lambda) = (\boldsymbol{\sigma}_{ij}(\lambda))$, while $\boldsymbol{\sigma}_{ij}(\lambda)$ stands for expected a priori voting power of party group j from region i.

6. Empirical results

In Table 2 we provide internal distribution of the Shapley-Shubik power of national party groups in national representations (in our notation β_{kj}). Table 3 presents distribution of SS power among national party groups, national representations and European parties in simple majority voting based on national coordination (in our notation φ_{kj}, β_k and ξ_j). Table 4 shows internal distribution of the Shapley-Shubik power of national party groups in European parties (in our notation α_{kj}). Distribution of SS power among national party groups' and national representations in simple majority voting based on ideological coordination is presented in Table 5 (in our notation π_{kj}, α_j and θ_k). Table 6 compares the power of national representations in voting based on partisan and national coordination and Table 7 compares the power of European political parties in voting based on partisan and national coordination. All results are multiplied by 100 (in percentage terms), data are rounded. Using Hix, Noury and Roland (2007) for empirical evaluation of proportion of ideologically and national driven voting coordination with $\lambda = 0.8$ and 1-$\lambda = 0.2$, we obtain expected power of national party groups, European political parties and national representations (Table 8).

We demonstrated that different dimensions of voting (ideological, national) lead to different levels of influence of the same national party group, European political party and national representation. For example, by our model the national chapter of the two Czech Social Democrats has zero influence in national coordination of voting, but measurable non-zero influence in partisan coordination within parliamentary faction of PSE (Tables 3 and 5). The national influence of the Czech Republic and Poland in ideologically coordinated voting is greater than in nationally coordinated voting. Poland, having the same number of seats in EP as Spain, exercises significantly greater Shapley-Shubik voting power (7.59%) than Spain (6.71%) in ideologically coordinated voting (having the same voting power in nationally coordinated voting, Table 6). While the influence of PSE in ideologically coordinated voting is 18.93%, in nationally coordinated voting it increases to 24.12% (Table 7). Disaggregated structural effects, neglected by most of standard analyses, are at least as important as aggregated effects.

Table 2. Internal distribution of Shapley-Shubik power of national party groups in national representations

	Internal SS-power of national party groups in national representations (in %}								
Country	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI	Total
Austria	25	41.67	0	8.33	0	0	0	25	100
Belgium	28.33	36.68	28.33	3.33	0	0	0	3.33	100
Cyprus	66.67	0	16.66	0	16.66	0	0	0	100
CzechR.	100	0	0	0	0	0	0	0	100
Denmark	7.14	35.72	21.44	7.14	7.14	7.14	7.14	7.14	100
Estonia	16.67	66.67	16.67	0	0	0	0	0	100
Finland	28.33	28.33	36.67	3.33	3.33	0	0	0	100
France	13.81	50.48	13.81	7.14	3.81	3.81	0	7.14	100
Germany	60	10	10	10	10	0	0	0	100
Greece	41.67	25	0	0	25	8.33	0	0	100
Hungary	100	0	0	0	0	0	0	0	100
Ireland	40	10	10	0	10	10	20	0	100
Italy	38.46	21.07	14.4	1.07	7.02	4.4	9.18	4.4	100
Latvia	16.67	0	16.67	16.67	0	0	50	0	100
Lithuania	0	0	100	0	0	0	0	0	100
Luxemburg	75	8.33	8.33	8.33	0	0	0	0	100
Malta	0	100	0	0	0	0	0	0	100
Netherlands	30	30	20	6.67	6.67	6.67	0	0	100
Poland	43.37	13.33	8.33	0	0	18.33	8.33	8.33	100
Portugal	16.67	66.67	0	0	16.67	0	0	0	100
Slovakia	100	0	0	0	0	0	0	0	100
Slovenia	100	0	0	0	0	0	0	0	100
Spain	31.67	31.67	6.67	23.34	6.67	0	0	0	100
Sweden	30	30	13.33	0	13.33	13.33	0	0	100
United Kingdom	44.28	19.29	19.29	2.62	0.95	10.95	0	2.62	100

Table 3. Distribution of SS power of national party groups in simple majority voting based on national coordination

Country	SS power of national party groups in voting based on national coordination								*SS**
	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI	
Austria	0.59	0.98	0.00	0.19	0.00	0.00	0.00	0.59	2.34
Belgium	0.89	1.15	0.89	0.10	0.00	0.00	0.00	0.10	3.14
Cyprus	0.51	0.00	0.13	0.00	0.13	0.00	0.00	0.00	0.77
CzechR.	3.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14
Denmark	0.13	0.65	0.39	0.13	0.13	0.13	0.13	0.13	1.81
Estonia	0.13	0.51	0.13	0.00	0.00	0.00	0.00	0.00	0.77
Finland	0.51	0.51	0.66	0.06	0.06	0.00	0.00	0.00	1.81
France	1.52	5.56	1.52	0.79	0.42	0.42	0.00	0.79	11.02
Germany	8.72	1.45	1.45	1.45	1.45	0.00	0.00	0.00	14.53
Greece	1.31	0.79	0.00	0.00	0.79	0.26	0.00	0.00	3.14
Hungary	3.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01
Ireland	0.67	0.17	0.17	0.00	0.17	0.17	0.34	0.00	1.68
Italy	4.24	2.32	1.59	0.12	0.77	0.48	1.01	0.48	11.02
Latvia	0.19	0.00	0.19	0.19	0.00	0.00	0.58	0.00	1.16
Lithuania	0.00	0.00	1.68	0.00	0.00	0.00	0.00	0.00	1.68
Luxemburg	0.58	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.77
Malta	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.64
Netherlands	1.06	1.06	0.71	0.24	0.24	0.24	0.00	0.00	3.54
Poland	3.18	0.98	0.61	0.00	0.00	1.35	0.61	0.61	7.35
Portugal	0.52	2.09	0.00	0.00	0.52	0.00	0.00	0.00	3.14
Slovakia	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81
Slovenia	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90
Spain	2.33	2.33	0.49	1.71	0.49	0.00	0.00	0.00	7.35
Sweden	0.74	0.74	0.33	0.00	0.33	0.33	0.00	0.00	2.47
United Kingdom	4.88	2.13	2.13	0.29	0.10	1.21	0.00	0.29	11.02
*SS***	41.57	24.12	13.13	5.34	5.60	4.58	2.67	2.99	100

*SS** - power of national representations based on national coordination
*SS*** - power of parties based on national coordination

Table 4. Internal distribution of Shapley-Shubik power of national party groups in European political parties

	Internal SS power of national party groups in European political parties							
Country	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI
Austria	2.09	3.17	0	4.15	0	0	0	9.76
Belgium	2.09	3.17	6.74	4.15	0	0	0	9.76
Cyprus	1.04	0	1.07	0	4.53	0	0	0
CzechR.	5.02	0.89	0	0	15.14	2.54	0	1.43
Denmark	0.34	2.24	4.39	2.01	2.25	2.54	6.67	0
Estonia	0.34	1.33	2.16	0	0	0	0	0
Finland	1.39	1.33	5.55	2.01	2.25	0	0	0
France	6.16	15.97	13.18	12.8	6.98	8.17	0	25.24
Germany	20.81	11.27	7.96	39.57	18.27	0	0	0
Greece	3.9	8.58	0	0	9.54	2.54	0	0
Hungary	4.65	4.11	1.07	0	0	0	0	0
Ireland	1.74	0.44	1.07	0	2.25	2.54	13.33	0
Italy	8.94	7.55	14.6	4.15	18.27	12.06	36.67	11.9
Latvia	1.04	0	1.07	2.01	0	0	13.33	0
Lithuania	0.69	0.89	7.96	0	0	0	6.67	0
Luxemburg	1.04	0.44	1.07	2.01	0	0	0	0
Malta	0.69	1.33	0	0	0	0	0	0
Netherlands	2.45	3.17	5.55	8.26	4.53	4.68	0	0
Poland	6.94	3.63	4.39	0	0	28.37	23.33	22.38
Portugal	3.17	5.55	0	0	6.98	0	0	0
Slovakia	2.81	1.33	0	0	0	0	0	9.76
Slovenia	1.39	0.44	2.16	0	0	0	0	0
Spain	8.94	11.82	2.16	6.18	2.25	0	0	0
Sweden	1.74	2.24	3.25	2.01	4.53	8.17	0	0
United Kingdom	10.6	9.1	14.6	10.68	2.25	28.37	0	9.76
Total	100	100	100	100	100	100	100	100

Table 5. Distribution of SS power of national party groups in simple majority voting based on party coordination

Country	SS power of national party groups in voting based on partisan coordination								*SS**
	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI	
Austria	0.85	0.60	0.00	0.27	0.00	0.00	0.00	0.43	2.14
Belgium	0.85	0.60	0.96	0.27	0.00	0.00	0.00	0.43	3.10
Cyprus	0.42	0.00	0.15	0.00	0.26	0.00	0.00	0.00	0.84
CzechR.	2.04	0.17	0.00	0.00	0.88	0.13	0.00	0.06	3.28
Denmark	0.14	0.42	0.62	0.13	0.13	0.13	0.29	0.00	1.87
Estonia	0.14	0.25	0.31	0.00	0.00	0.00	0.00	0.00	0.70
Finland	0.56	0.25	0.79	0.13	0.13	0.00	0.00	0.00	1.87
France	2.50	3.02	1.87	0.84	0.41	0.42	0.00	1.11	10.17
Germany	8.45	2.13	1.13	2.59	1.07	0.00	0.00	0.00	15.37
Greece	1.58	1.62	0.00	0.00	0.56	0.13	0.00	0.00	3.89
Hungary	1.89	0.78	0.15	0.00	0.00	0.00	0.00	0.00	2.82
Ireland	0.71	0.08	0.15	0.00	0.13	0.13	0.59	0.00	1.79
Italy	3.63	1.43	2.07	0.27	1.07	0.62	1.61	0.52	11.22
Latvia	0.42	0.00	0.15	0.13	0.00	0.00	0.59	0.00	1.29
Lithuania	0.28	0.17	1.13	0.00	0.00	0.00	0.29	0.00	1.87
Luxemburg	0.42	0.08	0.15	0.13	0.00	0.00	0.00	0.00	0.79
Malta	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.53
Netherlands	0.99	0.60	0.79	0.54	0.26	0.24	0.00	0.00	3.43
Poland	2.82	0.69	0.62	0.00	0.00	1.45	1.03	0.98	7.59
Portugal	1.29	1.05	0.00	0.00	0.41	0.00	0.00	0.00	2.74
Slovakia	1.14	0.25	0.00	0.00	0.00	0.00	0.00	0.43	1.82
Slovenia	0.56	0.08	0.31	0.00	0.00	0.00	0.00	0.00	0.95
Spain	3.63	2.24	0.31	0.40	0.13	0.00	0.00	0.00	6.71
Sweden	0.71	0.42	0.46	0.13	0.26	0.42	0.00	0.00	2.41
United Kingdom	4.30	1.72	2.07	0.70	0.13	1.45	0.00	0.43	10.81
*SS***	40.60	18.93	14.17	6.55	5.83	5.12	4.40	4.40	100

*SS** - SS power of national representations based on partisan coordination \\
*SS*** - SS power of parties based on partisan coordination

Table 6. Power of national representations in voting based on partisan and national coordination

Country	SS power of national representations based on party coordination	SS power of national representations based on national coordination
Austria	2.14	2.34
Belgium	3.10	3.14
Cyprus	0.84	0.77
CzechR.	3.28	3.14
Denmark	1.87	1.81
Estonia	0.70	0.77
Finland	1.87	1.81
France	10.17	11.02
Germany	15.37	14.53
Greece	3.89	3.14
Hungary	2.82	3.01
Ireland	1.79	1.68
Italy	11.22	11.02
Latvia	1.29	1.16
Lithuania	1.87	1.68
Luxemburg	0.79	0.77
Malta	0.53	0.64
Netherlands	3.43	3.54
Poland	7.59	7.35
Portugal	2.74	3.14
Slovakia	1.82	1.81
Slovenia	0.95	0.9
Spain	6.71	7.35
Sweden	2.41	2.47
United Kingdom	10.81	11.02
Total	100.00	100.00

Table 7. Power of European political parties in voting based on partisan and national coordination

Party	SS power of European parties based on party coordination	SS power of European parties based on national coordination
PPE-DE	40.6	41.57
PSE	18.93	24.12
ALDE	14.17	13.13
Verts/ALE	6.55	5.34
GUE/NGL	5.83	5.6
IND/DEM	5.12	4.58
UEN	4.4	2.67
NI	4.4	2.99
Total	100	100

Table 8. Expected power of national party groups, European political parties and national representations based on a mix of national and party coordination with λ=0.8

	Expected SS power of national party groupsin voting based on mix of nationa and party coordination								*SS**
Country	PPE-DE	PSE	ALDE	Verts-ALE	GUE-NGL	IND-DEM	UEN	NI	
Austria	0.80	0.68	0.00	0.26	0.00	0.00	0.00	0.46	2.19
Belgium	0.86	0.71	0.94	0.24	0.00	0.00	0.00	0.36	3.11
Cyprus	0.44	0.00	0.15	0.00	0.24	0.00	0.00	0.00	0.82
CzechR.	2.26	0.13	0.00	0.00	0.71	0.10	0.00	0.05	3.25
Denmark	0.14	0.47	0.58	0.13	0.13	0.13	0.26	0.03	1.86
Estonia	0.14	0.30	0.27	0.00	0.00	0.00	0.00	0.00	0.71
Finland	0.55	0.30	0.76	0.12	0.12	0.00	0.00	0.00	1.85
France	2.31	3.53	1.80	0.83	0.41	0.42	0.00	1.05	10.34
Germany	8.50	2.00	1.19	2.36	1.14	0.00	0.00	0.00	15.20
Greece	1.53	1.46	0.00	0.00	0.60	0.16	0.00	0.00	3.74
Hungary	2.11	0.62	0.12	0.00	0.00	0.00	0.00	0.00	2.86
Ireland	0.70	0.10	0.15	0.00	0.14	0.14	0.54	0.00	1.77
Italy	3.75	1.61	1.97	0.24	1.01	0.59	1.49	0.52	11.18
Latvia	0.38	0.00	0.16	0.14	0.00	0.00	0.59	0.00	1.27
Lithuania	0.22	0.13	1.24	0.00	0.00	0.00	0.23	0.00	1.83
Luxemburg	0.45	0.08	0.13	0.12	0.00	0.00	0.00	0.00	0.79
Malta	0.22	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.55
Netherlands	1.01	0.69	0.77	0.48	0.26	0.24	0.00	0.00	3.45
Poland	2.89	0.75	0.62	0.00	0.00	1.43	0.94	0.91	7.54
Portugal	1.13	1.26	0.00	0.00	0.43	0.00	0.00	0.00	2.82
Slovakia	1.27	0.20	0.00	0.00	0.00	0.00	0.00	0.34	1.82
Slovenia	0.63	0.07	0.24	0.00	0.00	0.00	0.00	0.00	0.94
Spain	3.37	2.26	0.34	0.67	0.20	0.00	0.00	0.00	6.84
Sweden	0.71	0.49	0.43	0.11	0.28	0.40	0.00	0.00	2.42
United Kingdom	4.42	1.80	2.08	0.62	0.13	1.40	0.00	0.40	10.85
*SS***	40.80	19.97	13.96	6.31	5.79	5.01	4.05	4.12	100.00

*SS** - Expected SS power of national representations for a mix of national and party coordination
*SS*** - Expected SS power of European parties for a mix of national and party coordination

7. Concluding remarks

We tried to show that it is possible to evaluate not only the influence of European political parties as entities in ideologically driven voting and of national representations as entities in nationally driven voting, as it is usually done in analytical papers (Holler and Kellermann, 1977; Hosli, 1997; Nurmi, 1997a) but also the influence of national chapters of European political parties both in ideological and national voting and the national influence in ideological voting, as well as the European political parties' influence in national voting. Moreover, using a mix of partisan coordination and national coordination (based on empirical ex post data about voting and assuming the same behaviour in future), we can evaluate the expected power of national party groups, European political parties and national representations reflecting both ideological and national dimension.

The findings of our model analysis open the problem of strategic considerations, such as coalition formation, that can go across the existing structure, e.g. coalition of a country representation with some European political party, or preferring national coordination of different party groups of the same country to ideological coordination (this problem was opened with respect to Poland in Mercik, Turnovec, and Mazurkiewicz, 2004). There is a broad area for extensions of the presented model.

A natural way of extension is Owen's a priori unions model (Owen, 1977) reflecting the fact that some agents may be more likely to act together than others. Then, national party chapters are the agents in the voting and European political parties and/or national representations their a priori unions. Power of an agent in a priori union voting game follows not only from the power of the union she is a member of, but also from the possibility to defect and form a coalition with another union. The problem is the very large size of the voting game (in the case of EP: product of the number of European political parties and the number of member states) and new, more efficient algorithms for the calculation of the Shapley-Shubik power indices in games with a priori unions have to be developed first.

Another open question is extension of the two-dimensional model of voting for the Penrose-Banzhaf concept of voting power based on probability to have a swing (absolute power and a priori unions).

New situation, after the 2007 extension of the EU and the 2009 election to the European Parliament with two new member states, new European political parties and their new national chapters should be analysed. There is also space for applications of the model to national two-chamber parliamentary systems.

The here used methodology of power indices has its critics. What exactly power indices are measuring is controversial, see, e.g., the arguments of Garrett and Tsebelis (1999) about ignoring preferences, and response of Holler and Widgrén (1999), but they are of general interest to political science because they may measure players' ability to get what they want. Admittedly, a significant share of decisions under the EU decision making procedures are taken without recourse to a formal vote. But it may well be the case that the outcome of negotiation is conditioned by the possibility that a vote could be taken, and then a priori evaluation of voting power matters. Moreover, analyses of institutional design of decision making could benefit from power index methodology (Holler and Owen, 2001; Lane and Berg, 1999). Continuing research and deeper understanding of power index methodology reflects an actual demand for amendment of traditional legal and political analysis of institutional problems by quantitative approaches and arguments.

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