Council, Commission and European Parliament Influence in European Union Decision Making

František Turnovec
Charles University in Prague, Institute of Economic Studies[1]

Abstract
Distribution of decisional power among member states of the EU has remained a hot issue in recent discussions about future design of European Union decision making and Lisbon revision of unsuccessful proposal of Constitutional Treaty. Usually only the distribution of voting weights in the Council of Ministers under qualified majority voting rule is taken into account. In contrast to that, in this paper we formulate simplified models of consultation and co-decision procedures in decision-making of the European Union institutions, reflecting fact that together with Council of Ministers also Commission and European Parliament are important actors in the EU decision making. The main conclusion of the paper is that distribution of voting power in the Council of Ministers voting gives incomplete evidence about national influence in European Union decision making. With rare exceptions decision making is based on consultation and co-decision procedures involving Commission and/or European Parliament. Legislative procedures change inter-institutional distribution of power (among Council, Commission and European Parliament), reducing the power of the Council, and at the same time they change intra-institutional power in the Council (relative power of the member states compared to the Council voting without taking into account Commission and Parliament).

Keywords
Co-decision procedure, committee system, consultation procedure, European Union decision making, Penrose-Banzhaf power indices, qualified majority, simple voting committee, weighted majority game

JEL Classification
C71, D72, H77

[1] Contact address: Frantisek Turnovec, IES Faculty of Social Sciences, Charles University in Prague, Opletalova 26, 110 00 Prague 1, Czech Republic. e-mail: turnovec@mbox.fsv.cuni.cz .

Introduction

In discussions about distribution of decisional power among the member states of the EU only the distribution of voting weights in the Council of Ministers qualified majority voting is taken into account. In contrast to that, in this paper we analyze models of consultation and co-decision procedures in decision-making of the European Union institutions: Commission, Council of Ministers and European Parliament. While consultation procedure is a "game" between Council and Commission with agenda setting role of Commission and consultation role of the European Parliament, co-decision procedure involves all three most important European institution providing each of them with unconditional veto right. Table 1 illustrates broad use of consultation and co-decision procedures in legislative acts decided by European Union institutions during 2000-2006. Consultation and co-decision are usual methods of European governance and Council of Ministers is not an exclusive decision maker in the EU. In this paper, using power indices methodology a distribution of influence among Commission, Council and the Parliament under different decision making procedures is being evaluated, together with voting power of member states and European political parties.

Table 1
Number of legislative proposals under consultation and co-decision procedures 2000-2006

	2000	2001	2002	2003	2004	2005	2006
CNP	150	140	118	152	121	132	126
CDP	94	84	140	117	73	88	112

Source: PreLex database (http://ec.europa.eu/prelex/rech_simple.cfm?CL=en)
CNP = consultation procedure, CDP = co-decision procedure.

The inter-institutional distribution of power (among Commission, Council and European Parliament) in decision making procedures of the EU (consultation procedure, and co-decision procedure) had been analyzed in Widgrén (1996), Laruelle and Widgrén (1997) and Napel and Widgrén (2004). While in the first paper (Widgrén (1996)) traditional committee model is developed for consultation procedure (consultation procedure as a committee of n member states plus Commission with composite voting rule), other models are formulated in terms of three unitary actors (Commission, Council and Parliament) extensive form games, without decomposition of the Council into member states and the Parliament into party factions. European multi-cameral procedures were studied also by König and Bräuninger (2001) by explicit analysis of winning coalitions in multi-cameral decision making, but without formulation of corresponding voting game model. Traditional power indices approach to disaggregate modeling of consultation and co-decision procedure, allowing express both inter-institutional and intra-institutional influence was presented in Turnovec (2004). In this paper we extend this stream of models defining national influence as the influence of member states in the Council of Ministers voting and political influence as the influence of European political parties in basic legislative procedures.

In the first section we provide a short overview of used methodology, introduce logical combinations of weighted majority games and apply power indices methodology for evaluation of voting power in committee systems. We selected Penrose-Banzhaf concept of voting power which is strongly recommended by some authors and frequently used in voting power evaluation in the EU (Felsenthal and Machover 2004a, 2004b, 2007). The second section formulates models of different versions of qualified majority in the Council of Ministers voting: Nice rule (status quo), Lisbon Treaty rule and proposal of "Jagiellonian compromise", based on implementation of "square root rule". Simplified models of consultation and co-decision procedures, developed on the basis of ideas from Widgrén (1996) and Turnovec (2004) are analysed in the third section. The fourth section brings empirical evidence about structural effects of legislative procedures based on Penrose-Banzhaf power index (results calculated from data about EU of 27). Conclusions are resumed in the fifth section.

1. Voting power in committee systems

In this part we define logical combinations of weighted majority games and adjust Penrose-Banzhaf power index for evaluation of its members' influence.

Let n be a positive integer, $\mathbf{w} = (w_1, w_2, \ldots, w_n)$ be a nonnegative real valued vector and q be a real number such that

$$\frac{1}{2}\sum_{i=1}^{n} w_i < q \leq \sum_{i=1}^{n} w_i$$

By a weighted majority game of n members (Owen 1982) we mean a triple [N, q, $\mathbf{w}$] in which N = {1, 2, …, n}. Number w_i is called a weight of member i, q is called a quota, any subset $S \subseteq N$ is called a coalition in [N, q, $\mathbf{w}$]. Coalition S is called a winning one if $\sum_{i\in S} w_i \geq q$ and losing one otherwise. Weighted majority game provides a model of a simple voting committee (single camera committee in which each member has one weight).

Let $C_1 = [N_1, q_1, \mathbf{w}_1]$ and $C_2 = [N_2, q_2, \mathbf{w}_2]$ be a pair of weighted majority games. Then w_{ij} (j = 1, 2) denotes the weight of member $i \in N_j$ in C_j, and q_j is the quota in committee C_j. Let $N = N_1 \cup N_2$. By $\overline{\mathbf{w}}_1$ and $\overline{\mathbf{w}}_2$ we denote zero extension of weight vectors $\mathbf{w}_1$, $\mathbf{w}_2$ with respect to $N = N_1 \cup N_2$ such that $\overline{w}_{ij} = w_{ij}$ if $i \in N_j$ and $\overline{w}_{ij} = 0$ if $i \notin N_j$. Let $S_1 \subseteq N_1$ be a coalition in C_1 and $S_2 \subseteq N_2$ be a coalition in C_2, then $S = S_1 \cup S_2 \subseteq N$ is a joint coalition of members of C_1 and C_2. We assume that the same members (if any) vote identically in both committees. Weighted majority game $\overline{C}_j = [N_1 \cup N_2, q_j, \overline{w}_j]$ we call a zero extension of C_j with respect to $N_1 \cup N_2$. Considering an interrelated system of two simple voting committees with different (possibly overlapping) sets of members in which final outcome of voting depends on result of voting in both committees we have to substitute the corresponding weighted majority games by their zero extensions with the same sets of members.

The union $C_1 \cup C_2$ of two games $C_1 = [N_1, q_1, \mathbf{w}_1]$ and $C_2 = [N_2, q_2, \mathbf{w}_2]$ is the game $\overline{C}_1 \cup \overline{C}_2 = [N_1 \cup N_2, q_1 \wedge q_2, \overline{\mathbf{w}}_1, \overline{\mathbf{w}}_2]$ with the following composite voting rule: a proposal to be passed has to obtain votes representing at least total weight q_1 in game C_1 **or** at least total weight q_2 in game C_2. A coalition $S \subseteq N = N_1 \cup N_2$ is a winning coalition in $C_1 \cup C_2$ if S_1 is winning coalition in C_1 or S_2 is winning coalition in C_2, The set of all winning coalitions in $C_1 \cup C_2$ is equal to the union of the sets of all winning coalitions in $\overline{C}_1$ and $\overline{C}_2$.

The intersection $C_1 \cap C_2$ of two games $C_1 = [N_1, q_1, \mathbf{w}_1]$ and $C_2 = [N_2, q_2, \mathbf{w}_2]$ is the game $\overline{C}_1 \cap \overline{C}_2 = [N_1 \cup N_2, q_1 \vee q_2, \overline{\mathbf{w}}_1, \overline{\mathbf{w}}_2]$ with the following composite voting rule: a proposal to be passed has to obtain votes representing at least total weight q_1 in game C_1 **and** at least total weight q_2 in game C_2. A coalition $S \subseteq N = N_1 \cup N_2$ is a winning coalition in $C_1 \cup C_2$ if S_1 is winning coalition in C_1 and S_2 is winning coalition in C_2, The set of all winning coalitions in $C_1 \cap C_2$ is equal to the intersection of the sets of all winning coalitions in $\overline{C}_1$ and $\overline{C}_2$.

Using union and intersection operations we can construct logical combinations of weighted majority games. For example, $[N_1 \cup N_2 \cup N_3, (q_1 \vee q_2) \wedge q_3, \overline{\mathbf{w}}_1, \overline{\mathbf{w}}_2, \overline{\mathbf{w}}_3]$ is a logical combination of three weighted majority games $[N_1, q_1, \mathbf{w}_1]$, $[N_2, q_2, \mathbf{w}_2]$, $[N_3, q_3, \mathbf{w}_3]$ with the following composite voting rule: a proposal to be passed has to obtain either at least q_1 weights in simple committee $[N_1, q_1, \mathbf{w}_1]$ and at least q_2 weights in simple committee $[N_2, q_2, \mathbf{w}_2]$, or at least q_3 weights in simple committee $[N_3, q_3, \mathbf{w}_3]$. Logical combinations of weighted majority games provide models of committee systems (committees in which each member has more weights or multi-camera committees consisting of several simple voting committees and complex voting rules).

Models of simple voting committees and committee systems are applicable to political science, as they provide instruments for analysis of a priori voting power of their members. Voting power analysis seeks an answer to the following question: Given a simple voting committee or a committee system, what is an influence of its members over the outcome of voting? Voting power of a member i is a probability that i will be decisive in the sense that such situation appears in which she would be able to reverse the outcome of voting by reversing her vote. To define a particular power measure means to identify some qualitative property (decisiveness) whose presence or absence in voting process can be established and quantified (e.g. Nurmi 1997). One of such properties related to committee members' positions in voting, that is frequently used as a starting point for quantification of voting power, is swing position of committee members.[2]

Let S be a winning coalition in a weighted majority game [N, w, q]. A member $k \in S$ has a swing in coalition S if $\sum_{i \in S} w_i \geq q$ and $\sum_{i \in S \setminus \{k\}} w_i < q$. Assuming all coalitions equally likely, it makes sense to evaluate a priori voting power of each member of the committee by probability to have a swing. This probability is measured by absolute Penrose-Banzhaf (PB) power index

$$\Phi_i^{PB}(N, q, \mathbf{w}) = \frac{\sigma_i}{2^{n-1}}$$

(where σ_i is the number of swings of the member i and 2^{n-1} is the number of coalitions with i as a member). To compare relative power of different members of the committee, the relative (normalized) form of Penrose-Banzhaf power index is used:

[2] Another property, used in definition of an alternative Shapley-Shubik power index (Shapley and Shubik (1954)) is concept of pivot. Relations between swings and pivots see in Turnovec (2007). Most comprehensive exposition of power indices methodology gives Felsenthal and Machover (1998).

$$\phi_i^{PB}(N,q,\mathbf{w}) = \frac{\sigma_i}{\sum_{k\in N}\sigma_k}$$

(Penrose 1946, Banzhaf 1965).

Definition of swings and PB power indices can be easily extended for logical combinations of weighted majority games.

Let $[N_1, q_1, \mathbf{w}_1]$ and $[N_2, q_2, \mathbf{w}_2]$ be two weighted majority games. If $S \subseteq N_1 \cup N_2$, then

a) $k \in S$ has a swing in the committee system $[N_1 \cup N_2, q_1 \wedge q_2, \overline{\mathbf{w}}_1, \overline{\mathbf{w}}_2] = [N_1, q_1, \mathbf{w}_1] \cup [N_2, q_2, \mathbf{w}_2]$ in coalition S if and only if either $\sum_{i\in S}\overline{w}_{i1} \geq q_1$ and $\sum_{i\in S\setminus\{k\}}\overline{w}_{i1} < q_1$, or $\sum_{i\in S}\overline{w}_{i2} \geq q_2$ and $\sum_{i\in S\setminus\{k\}}\overline{w}_{i2} < q_2$ (or both),

b) $k \in S$ has a swing in the committee system $[N_1 \cup N_2, q_1 \vee q_2, \overline{\mathbf{w}}_1, \overline{\mathbf{w}}_2] = [N_1, q_1, \mathbf{w}_1] \cap [N_2, q_2, \mathbf{w}_2]$ in coalition S if and only if $\sum_{i\in S}\overline{w}_{i1} \geq q_1$ and $\sum_{i\in S}\overline{w}_{i2} \geq q_2$, and either $\sum_{i\in S\setminus\{k\}}\overline{w}_{i1} < q_1$, or $\sum_{i\in S\setminus\{k\}}\overline{w}_{i2} < q_2$ (or both).

Lemma

Let C_1 and C_2 be two weighted majority games (without loss of generality we assume the same member set N in both games), $i \in N$, $\Phi_i^{PB}(C)$ denotes absolute PB power index and $\phi_i^{PB}(C)$ denotes relative PB power index of member i in a game C, then for any $i \in N$

$$\Phi_i^{PB}(C_1 \cup C_2) + \Phi_i^{PB}(C_1 \cap C_2) = \Phi_i^{PB}(C_1) + \Phi_i^{PB}(C_2)$$

and

$$\phi_i^{PB}(C_1 \cup C_2) + \phi_i^{PB}(C_1 \cap C_2) = \phi_i^{PB}(C_1) + \phi_i^{PB}(C_2)$$

Proof follows directly from definition of swings in union and intersection of games C_1 and C_2. Member k has a swing in coalition S in union of games C_1 and C_2 if and only if he has a swing in S in game C_1, or in game C_2, or in both games C_1 and C_2. Member k has a swing in coalition S in intersection of games C_1 and C_2 if and only if he has swing in S in both games C_1 and C_2. Let $\sigma_i(C_1)$ be number of swings of i in C_1 and $\sigma_i(C_2)$ is number if swings of i in C_2, then sum $\sigma_i(C_1) + \sigma_i(C_2)$ contains two times swings of intersection of games C_1 and C_2. Therefore, to obtain number of swings in union of games C_1 and C_2 from sum of swings in C_1 and C_2, we have to subtract number of swings in intersection of C_1 and C_2. From it follows that $\sigma_i(C_1 \cup C_2) = \sigma_i(C_1) + \sigma_i(C_2) - \sigma_i(C_1 \cap C_2)$. Applying definition of PB power indices we obtain statement of the lemma.

2. Council of Ministers: qualified majority problem

Most of the analyses of the EU decision making are focused on voting in the Council. Distribution of power in the EU Council of Ministers and European and the development associated with the 1995, 2004 and 2007 enlargement of the EU has been analyzed in Brams and Affuso (1985), Widgrén (1994, 1995), Turnovec (1996, 2001, 2002), Bindseil and Hantke (1997), Laruelle (1998), Steunenberg, Smidtchen and Koboldt (1999), Nurmi (2000), Nurmi, Meskanen and Pajala (2001), Kőnig and Brauninger (2001), Leech (2002), Felsenthal and Machover (2004a, 2004b), Hosli and Machover (2004), Plechanovová (2004), Baldwin and Widgrén (2004), Słomczyński and Życzkowski (2006, 2007), Hosli (2008), Leech and Azis (2008) and many others. Also in political discussions the problem of influence in Council voting is presented as the crucial one, as a corner stone of national influence in the EU decision making. Let us shortly resume models of qualified majority voting in terms of unions and intersections of simple voting committees.

2.1 Status quo, the Nice Treaty

By Nice Treaty (2000) a qualified majority in the Council voting in recent EU is reached if the following three conditions are met:

a) minimum of 255 votes of member states is cast in favour of the proposal, out of a total of 345 votes,
b) a majority of Member states approve the proposal,[3]
c) the votes in favour represent at least 62% of the total population of the Union.

Each member state has a fixed number of votes. The number of votes allocated to each country is roughly determined by its population, but progressively weighted in favour of less populated countries (see Table 2).

Let us consider three weighted majority games:

$$C_1 = [N, q, \mathbf{v}]$$
$$C_2 = [N, r, \mathbf{p}]$$
$$C_3 = [N, c, \mathbf{e}]$$

where N is the set of member states (n = card (N) is the number of member states), q is the quota of votes, **v** is the vector of Member States votes, r is the population quota, **p** is the vector of Member States shares of population (in %), c = int (n/2) + 1 is the member states quota and **e** is a summation vector (one state one vote). The Nice qualified majority rule can be modeled as committee system generated by the intersection of C_1, C_2, and C_3:

$$C_{QMN} = C_1 \cap C_2 \cap C_3 = [N, q \vee r \vee c, \mathbf{v}, \mathbf{p}, \mathbf{e}]$$

In EU27 n = 27, q = 345, r = 62%, c = 14 (member states weights and quotas see in Table 2).

[3] In some cases (when the Council is not acting on a proposal of Commission) two-thirds majority is required.

Table 2
Weights and quotas in EU27

	Votes	Share (%)	Population (mil.)	Share (%)	Square root pop.	Share (%)	Country	Share (%)	Seats	Share (%)
Council of Ministers										
Germany	29	8,41	82,10	16,71	9,06	9,45	1	3,70		
France	29	8,41	61,40	12,49	7,84	8,17	1	3,70		
UK	29	8,41	60,50	12,31	7,78	8,11	1	3,70		
Italy	29	8,41	58,00	11,80	7,62	7,95	1	3,70		
Spain	27	7,83	44,70	9,10	6,69	6,98	1	3,70		
Poland	27	7,83	38,10	7,75	6,17	6,44	1	3,70		
Romania	14	4,06	21,70	4,42	4,66	4,86	1	3,70		
Netherlands	13	3,77	16,50	3,36	4,06	4,24	1	3,70		
Greece	12	3,48	11,10	2,26	3,33	3,48	1	3,70		
Portugal	12	3,48	10,60	2,16	3,26	3,40	1	3,70		
Belgium	12	3,48	10,40	2,12	3,22	3,36	1	3,70		
Czech R.	12	3,48	10,30	2,10	3,21	3,35	1	3,70		
Hungary	12	3,48	10,00	2,04	3,16	3,30	1	3,70		
Sweden	10	2,90	9,10	1,85	3,02	3,15	1	3,70		
Austria	10	2,90	8,30	1,69	2,88	3,01	1	3,70		
Bulgaria	10	2,90	7,70	1,57	2,77	2,89	1	3,70		
Slovakia	7	2,03	5,40	1,10	2,32	2,42	1	3,70		
Denmark	7	2,03	5,40	1,10	2,32	2,42	1	3,70		
Finland	7	2,03	5,20	1,06	2,28	2,38	1	3,70		
Island	7	2,03	4,20	0,85	2,05	2,14	1	3,70		
Lithuania	7	2,03	3,40	0,69	1,84	1,92	1	3,70		
Latvia	4	1,16	2,30	0,47	1,52	1,58	1	3,70		
Slovenia	4	1,16	2,00	0,41	1,41	1,48	1	3,70		
Estonia	4	1,16	1,30	0,26	1,14	1,19	1	3,70		
Cyprus	4	1,16	0,80	0,16	0,89	0,93	1	3,70		
Luxembourg	4	1,16	0,50	0,10	0,71	0,74	1	3,70		
Malta	3	0,87	0,40	0,08	0,63	0,66	1	3,70		
European Parliament										
EPP-ED									277	35,29
PES									218	27,77
ALDE									105	13,38
UEN									44	5,61
Greens-EFA									42	5,35
GUE-NGL									41	5,22
IND-DEM									23	2,93
ITS									21	2,68
NI									14	1,78
Total	345	100	491,40	100	95,85	100	27	100	785	100,00
Quotas										
quota Nice	255	73,91%	304,67	62%			14	50,01%	393	50,01
quota Lisbon			319,41	65%			15	55%	393	50,01
quota SR					58,85	61,40			393	50,01

Source: http://europa.eu/institutions/inst/index_en.htm

2.2 Controversial future, Lisbon Treaty

If the Lisbon Treaty (2007) comes into force, qualified majority rule will be simplified. In this case, for passing a proposal in the Council, a "double majority" of at least 55% of the member states[4] that represent at least 65% of the population of the Union is required. In addition, a proposal backed by n-3 member states is always adopted, even if they do not represent 65% of population.

Let us consider three weighted majority games:

$$C_1 = [N, r, \mathbf{p}]$$
$$C_2 = [N, c_1, \mathbf{e}]$$
$$C_3 = [N, c_2, \mathbf{e}]$$

where N is the set of member states (n = card (N) is the number of member states), r is the population quota, **p** is the vector of Member States shares of population (in %), c_1 = int (55n/100) + 1 is the member states quota, c_2 = n-3 is alternative member states quota and **e** is a summation vector (one state one vote).The Lisbon qualified majority rule can be modeled as a committee system generated by the intersection of $C_1$and C_2, and union of $(C_1 \cap C_2)$ and C_3:

$$C_{QML} = (C_1 \cap C_2) \cup C_3 = [N, (r \vee c_1) \wedge c_2, \mathbf{p}, \mathbf{e}, \mathbf{e}],\ c_2 > c_1$$

In EU27 r = 65%, c_1 = 15, c_2 = 24 (member states weights and quotas see in Table 2).

2.3 Fairness and square-ness story

In the late summer of 2004 an open letter of European scientists to the governments of the EU member states was distributed in European academic community. Open letter was originally signed by the group of nine distinguished scientists from six EU countries, calling themselves "Scientists for a democratic Europe", later cosigned by 38 other colleagues, and submitted to the governments of member states and to Commission[5].

The basic idea of the proposal supported by the open letter is the following concept of "fairness": *If the European Union is a union of citizens, then it is fair when each citizen (independently on her national affiliation) exercises the same influence over the union issues. It is achieved when voting weight of each national representation in Council of Ministers is proportional to the square root of population.*

So called square root rule is attributed to British statistician Lionel Penrose (1946) and is closely related to indirect voting power measured by Penrose-Banzhaf power index. Different aspects of square root rule are analysed in Felsenthal and Machover (1998, 2007), Laruelle and Widgrén (1998), Baldwin and Widgrén (2004), Słomczyński and Życzkowski (2006, 2007) and Leech and Aziz (2008).

[4] When the Council is not acting on a proposal of Commission, majority of 72% of member states is required.
[5] The letter (including added tables) and list of its signatories see e.g. at the following web address: http://www.esi2.us.es/~mbilbao/pdffiles/letter.pdf

Concept of indirect voting power is based on the following rather artificial construction: Assume n units (e.g. regions) with different size of population (voters), represented in a super-regional committee that decides different agendas relevant for the whole entity. Each unit representation in the committee has some voting weight (number of votes). Decision making process is performed by series of referenda in each unit and units' representations in the committee are voting according results of referenda. In each unit an individual citizen has the same voting weight (one vote) that provides him with a voting power (each citizen from one unit has the same voting power). Also each super-regional representation has some voting power in the committee that follows from its voting weight in the committee. Then indirect voting power of a citizen from particular unit is given by product of her voting power in local referenda and voting power of her representation in the committee. The representation of units in the committee is considered fair, if each citizen has the same indirect voting power independently of the unit he belongs to.

Let us have n countries, i = 1, 2, …, n with population $p_1, p_2, \ldots, p_n$. Consider a randomly selected "yes-no" issue and suppose that member nations decide their approval or disapproval by referendum. For simplicity assume the number of voters participating in referendum is equal to the number of population, and the quota (number of votes required to approve proposal) is equal $m_i < p_i$. We can assume simple majority quota

$$m_i = \text{int}\left(\frac{1}{2}p_i + 1\right) \approx \frac{1}{2}p_i$$

(the least integer greater than pi/2). Then the number of cases in which the average citizen of country i will have a swing (the outcome of national referendum will be identical with her vote) is

$$\frac{m_i}{p_i}\binom{p_i}{m_i} = \frac{m_i}{p_i}\frac{p_i!}{(p_i - m_i)!m_i!} \approx \frac{1}{2}\frac{p_i!}{\left(\left(\frac{p_i}{2}\right)!\right)^2}$$

and probability to have a swing is

$$P_i(p_i) = \frac{m_i}{2^{p_i-1}p_i}\frac{p_i!}{(p_i - m_i)!m_i!} \approx \frac{1}{2^{p_i}}\frac{p_i!}{\left(\left(\frac{p_i}{2}\right)!\right)^2}$$

(power of a citizen of country i, absolute Penrose-Banzhaf index). From $P_i(p_i)$ formula it follows that the less population, the higher is Penrose-Banzhaf power of an average citizen (assuming simple majority quota). Using Stirling's formula

$$n! \approx \frac{n^n}{e^n}\sqrt{2\pi n}$$

(Felsenthal and Machover (1998)), for sufficiently large p_i we obtain approximation

$$P_i(p_i) \approx \sqrt{\frac{2}{\pi p_i}}$$

(proof see Laruelle and Widgrén (1998)). The larger size of population in the country i, the smaller is individual citizen Penrose-Banzhaf power in referendum-type country voting. Of the countries representations in the Council of Ministers are voting in each issue according to results of national referenda and Φ_i is the Penrose-Banzhaf absolute power of the country i the Council, then

$$\Phi_i P_i(p_i) = \Pi_i \sqrt{\frac{2}{\pi p_i}}$$

is the i-th country average citizen (indirect) power in the Council of Ministers decision making. To guarantee equal indirect power of citizens of different countries in the Council, it must hold

$$\Phi_i \sqrt{\frac{2}{\pi p_i}} = const$$

for all i. It holds if $\Pi_i = \alpha\sqrt{p_i}$, i.e. if voting power of member states is proportional to the square root of population.

There is still one problem to be solved: what allocation of voting weights among member states leads to proportionality of power to the square root of population? Supporters of square root rule are proposing to allocate the weights in the Council proportionally to the square of population, assuming that in committees with large number of members the distribution of weights is a good proxy of voting power. But a priori voting power seldom reflects distribution of voting weights. If [N, q, **w**] is a simple weighted committee and Φ[N, q, w] is a vector of power indices of its members, then usually Φ[N, q, **w**] ≠ α**w.**

Being aware of this problem, Słomczyński and Życzkowski (2006) formulated the following minimization problem:

Minimize sum of square residuals between the normalized Penrose-Banzhaf power indices and voting weights defined as proportional to the square roots of population according to the quota q

$$\sigma^2(q) = \sum_{i \in N} \left(\phi_i^{PB}(N, q, \sqrt{\mathbf{p}}) - \frac{\sqrt{p_i}}{\sum_{k \in N} \sqrt{p_k}} \right)^2$$

for $q \in (0.5, 1]$. They used heuristic and found approximation of optimal quota $q \approx 61.4\%$ for the EU of 27. So, the final proposal, known as "Jagiellonian Compromise", reads as follows: "*The voting weight of each member state is allocated proportionally to the square of its population, the decision of the Council being taken if the sum of weights exceeds a (certain) quota*" (Słomczyński and Życzkowski (2006)), setting the quota equal to 61,4% of the sum of square roots of population in the member states of the EU.

In our notations square root qualified majority can be formalized as the weighted majority game

$$C_{QMS} = [N, r, \sqrt{\mathbf{p}}]$$

where N is the set of member states, r is a population square root quota and $\sqrt{\mathbf{p}}$ is the vector of Member States square roots of population (in %). In EU27 r = 61,4 and square root of population see in Table 2.

3. Commission, Council of Ministers and European Parliament: consultation and co-decision procedure

Let

N be the set of decision of members states ($i = 1, 2, \ldots, n$),

$N \cup \{1\}$ be the set of actors in consultation procedure (member states plus Commission),

M be the set of factions in European Parliament (European political parties),

v_i be the number of votes assigned to member state i,

s_j be the number of seats of European political party j,

$\mathbf{v}$ be the of vector member states votes in the Council (vote weights, as defined in Nice),

$\mathbf{p}$ be the vector of shares of member states population,

$\sqrt{\mathbf{p}}$ be the vector of square roots of population shares (population weights),

$\mathbf{e}$ be summation vector (one state – one vote weights),

$\mathbf{s}$ be the vector of "weights" (numbers of seats) of political parties in the European Parliament**,**

q be the votes quota in the Council (minimal number of votes required to pass a proposal),

c be the member states quota in the Council (minimal number of member states required to pass a proposal),

r be a population quota in the Council (the countries supporting the proposal must represent at least r% of total population of the member states supporting the proposal),

t be a quota in the European Parliament (minimal number of the members of EP required to pass a proposal).

If $\mathbf{x} \in R_n$, then

$\mathbf{x}^{(-k)} \in R_{n+k}$ denotes left zero extension of x (first k components are equal zero),

$\mathbf{x}^{(+k)} \in R_{n+k}$ denotes right zero extension of x (last k components are equal zero),

$\mathbf{e}_{(n,j)} \in R_n$ denotes the n-dimensional unit vector with j-th component equal to 1, all other components equal 0.

3.1 Consultation procedure

We assume that voting in the Commission is not influenced by citizenship of Commissioners and by their ideological preferences, Commission is deciding as a collective body and results of its voting are not known.

The European Commission sends its proposal to both the Council of Ministers and European Parliament, but it is the Council that officially consults Parliament and other bodies. However, the Council is not bound by Parliament's position, so the Parliament can not change the proposal or prevent its adoption. Then Council either approves the proposal by qualified majority or rejects it by blocking minority, or amends it by unanimity. Depending on the version of qualified majority in the Council we have three models of consultation procedure.

a) Nice version of consultation procedure

From committee system for qualified majority $C_{QMN} = [N, q \vee r \vee c, \mathbf{v}, \mathbf{p}, \mathbf{e}]$ we obtain the following model of consultation procedure:

$$C_{CNPN} = [N \cup \{1\}, ((q \vee r \vee c) \vee 1) \wedge n, \mathbf{v}^{(+1)}, \mathbf{p}^{(+1)}, \mathbf{e}^{(+1)}, \mathbf{e}_{(n+1,n+1)}, \mathbf{e}^{(+1)}]$$

The proposal is accepted if it is supported by Commission and approved by Nice qualified majority in the Council (not less than q = 345 votes, at least r = 62% of population and at least c = 14 member states), or changed if it has unanimity support of all n member states in the Council, even if the change is not supported by Commission.

b) Lisbon version of consultation procedure

$$C_{CNPL} = [N \cup \{1\}, ((r \vee c_1) \wedge c_2) \vee 1) \wedge n, \mathbf{p}^{(+1)}, \mathbf{e}^{(+1)},), \mathbf{e}^{(+1)}, \mathbf{e}_{(n+1,n+1)}, \mathbf{e}^{(+1)}]$$

The proposal is accepted if it is supported by Commission and approved by Constitution qualified majority in the Council (at least r = 65% of population and at least c_1 = 55% of member states, or at least 24 member states even without population quota, or changed if it has unanimity support, even if the change is not supported by Commission).

c) Square root version of consultation procedure

$$C_{CNPS} = [N \cup \{1\}, (r \vee 1) \wedge n, \sqrt{\mathbf{p}}^{(+1)}, \mathbf{e}_{(n+1,n+1)}, \mathbf{e}^{(+1)}]$$

The proposal is accepted if it is supported by Commission and approved by square root qualified majority in the Council (at least r = 61,4% of square root population weights), or changed if it has unanimity support, even if the change is not supported by Commission).

3.1 Co-decision procedure

Co-decision procedure was introduced in 1992 (Maastricht) and modified in 1997 (Amsterdam).

New legislative proposal is drafted by Commission and submitted to the Council and the Parliament. In the first reading the Council adopts by qualified majority „common position“, including amendments, and EP approves by simple majority its position including amendments. If the two institutions have agreed on the same amendments after the first reading, the proposal becomes law. Otherwise there is a second reading in each institution, where each considers the others' amendments. If the institutions are unable to reach agreement after second reading, a conciliation committee is set up with equal number of members of Parliament and Council. The committee attempts to negotiate a compromise text which must be approved by both institutions. Both Parliament and Council have the power to reject a proposal either in second reading or following conciliation, causing the proposal to fall. Commission may also withdraw its proposal in any time.

European Parliament of the EU of 27 has 785 members in 8 political groups (European political parties): European People's Party-European Democrats (EPP-ED), Group of the Party of European Socialists (PES), Alliance of Liberals and Democrats for Europe (ALDE), Union for Europe of the Nations (UEN), European Greens – European Free Alliance (Greens-

EFA), European United Left – Nordic Green Left (GUE-NGL), Independence and Democracy (IND-DEM), Identity, Tradition, Sovereignty (ITS), Non Attached (NI).Distribution of seats see among political groups in Table 1, national representation in EP is roughly proportional to the population. Voting quota in EP is 393 votes (simple majority).

We assume that the European Parliament represents interests of citizens and acts on the basis of ideological principles expressed by European political parties, hence voting in the Parliament is in not necessarily correlated to the voting in the Council.

a) Nice version of co-decision procedure

From committee system for qualified majority $C_{QMN} = [N, q \vee r \vee c, \mathbf{v}, \mathbf{p}, \mathbf{e}]$ we obtain the following model of co-decision procedure:

$$C_{CDPN} = [N \cup \{1\} \cup M, ((q \vee r \vee c) \vee 1) \vee t, \mathbf{v}^{(m+1)}, \mathbf{p}^{(m+1)}, \mathbf{e}^{(m+1)}, \mathbf{e}_{(n+m+1,n+1)}, \mathbf{s}^{(-n-1)}]$$

The proposal is accepted if it is supported by Commission, approved by Nice qualified majority in the Council (more than q = 345 votes, at least r = 62% of population and at least c = 14 member states), and by required majority in the European Parliament (t = 393).

b) Lisbon version of co-decision procedure

$$C_{CDPL} = [N \cup \{1\} \cup M, ((r \vee c_1) \wedge c_2) \vee 1) \vee t, \mathbf{p}^{(m+1)}, \mathbf{e}^{(m+1)},^{)}, \mathbf{e}^{(m+1)}, \mathbf{e}_{(n+m+1,n+1)}, \mathbf{s}^{(-n-1)}]$$

The proposal is accepted if it is supported by Commission and approved by Lisbon qualified majority in the Council (at least r = 65% of population and at least c_1 = 55% of member states, or at least c_2 = 24 member states even without population quota), and by required majority in the European Parliament (t = 393).

c) Square root version of co-decision procedure

$$C_{CDPS} = [N \cup \{1\} \cup M, (r \vee 1) \vee t, \sqrt{\mathbf{p}}^{(m+1)}, \mathbf{e}_{(n+m+1,n+1)}, \mathbf{s}^{(-n-1)}]$$

The proposal is accepted if it is supported by Commission and approved by square root qualified majority in the Council (at least r = 61,4% of square root population weights), and by required majority in the European Parliament (t = 393).

4. Empirical findings

In Table 3 we provide Penrose-Banzhaf power indices (in relative form) calculated for three different procedures (qualified majority, consultation procedure and co-decision procedure) in three alternative settings (Nice, Lisbon, square roots). We apply Lemma from section 1 on 9 corresponding committee systems.

Table 3
Inter-institutional and intra-institutional relative power in EU27 legislative procedures (Penrose-Banzhaf index)

	Qualified majority			Consultation procedure			Co-decision procedure		
	Nice	Lisbon	SR	Nice	Lisbon	SR	Nice	Lisbon	SR
Germany	7,78	11,67	9,47	7,02	10,15	8,21	6,08	7,66	6,49
France	7,78	8,87	8,18	7,02	7,71	7,09	6,08	5,72	5,6
UK	7,78	8,75	8,12	7,02	7,61	7,03	6,08	5,65	5,55
Italy	7,78	8,43	7,95	7,02	7,33	6,89	6,08	5,46	5,44
Spain	7,42	6,69	6,97	6,7	5,82	6,04	5,8	4,39	4,76
Poland	7,42	5,71	6,44	6,7	4,97	5,58	5,8	4,01	4,38
Romania	4,26	4,19	4,86	3,86	3,65	4,21	3,34	2,78	3,3
Netherlands	3,97	3,53	4,23	3,61	3,07	3,67	3,12	2,42	2,87
Greece	3,68	2,87	3,54	3,34	2,5	3,07	2,89	2,05	2,35
Portugal	3,68	2,81	3,4	3,34	2,54	2,94	2,89	2,01	2,3
Belgium	3,68	2,79	3,35	3,34	2,43	2,91	2,89	2	2,27
Czech R.	3,68	2,78	3,34	3,34	2,42	2,9	2,89	1,99	2,26
Hungary	3,68	2,74	3,29	3,34	2,38	2,85	2,89	1,97	2,23
Sweden	3,09	2,63	3,15	2,81	2,29	2,73	2,43	1,9	2,13
Austria	3,09	2,53	3	2,81	2,21	2,6	2,43	1,85	2,03
Bulgaria	3,09	2,46	2,88	2,81	2,14	2,5	2,43	1,81	1,95
Slovakia	2,18	2,18	2,42	1,98	1,9	2,09	1,71	1,64	1,63
Denmark	2,18	2,18	2,42	1,98	1,9	2,09	1,71	1,64	1,63
Finland	2,18	2,16	2,37	1,98	1,88	2,06	1,71	1,63	1,61
Ireland	2,18	2,04	2,13	1,98	1,77	1,85	1,71	1,56	1,44
Lithuania	2,18	1,94	1,92	1,98	1,69	1,66	1,71	1,5	1,3
Latvia	1,26	1,81	1,58	1,98	1,57	1,37	1,71	1,42	1,07
Slovenia	1,26	1,77	1,47	1,13	1,54	1,27	0,98	1,4	0,99
Estonia	1,26	1,69	1,19	1,13	1,46	1,03	0,98	1,35	0,8
Cyprus	1,26	1,63	0,93	1,13	1,41	0,8	0,98	1,32	0,63
Luxembourg	1,26	1,58	0,74	1,13	1,38	0,64	0,98	1,29	0,5
Malta	0,94	1,57	0,66	0,86	1,27	0,57	0,74	1,29	0,44
EPP-ED							4,87	6,74	7,13
PES							2,63	4,05	4,27
ALDE							2,5	3,38	3,56
UEN							0,75	1,35	1,43
Greens-EFA							0,75	1,35	1,43
GUE-NGL							0,75	1,35	1,43
IND-DEM							0,41	0,43	0,47
ITS							0,41	0,43	0,47
NI							0,41	0,43	0,47
Council	100	100	100	91,34	86,99	86,65	79,04	69,71	67,95
Commission				8,66	13,01	13,35	7,48	10,78	11,39
Parliament							13,48	19,51	20,66
Council +Commission +Parliament				100	100	100	100	100	100

Source: own calculations

Results demonstrate changes in inter-institutional influence of the three most important EU institutions – Council, Commission and Parliament. In case of consultation procedure Lisbon qualified majority rule increases power of Commission compared to Nice and square root rule increases its power compared to Lisbon (and power of Council as an aggregate power of member states is declining). In co-decision procedure, where we have three institutional actors - Council, Commission and Parliament, we can observe the same tendency: Lisbon increases power of Commission and Parliament and decreases power of Council compared to Nice and square root increases power of Commission and Parliament and decreases power of Council compared to Lisbon. Moreover, in the co-decision procedure the influence of big European political parties can be compared to the influence of big member states, so the political or ideological dimension of European Union decision making becomes measurably more important than in earlier stages of the EU development. The influence of member states is procedurally dependent and differs from their internal influence in the Council of Ministers internal voting not only by size, but also by structure.

In Table 4 we provide structural comparison of distribution of power in the Council in internal Council qualified majority voting, consultation procedure voting and co-decision procedure voting. The entries of the Table 3 express share of voting power of each member state in total inter-institutional power in procedures considered (e.g. if the relative power of Germany in co-decision procedure under Lisbon voting rules is 7.66% and relative power of the Council in the co-decision procedure is 69.71%, then the share of relative power of Germany in the co-decision relative power of the Council is 10.99%).

Relative intra-institutional power of member states in Council of Ministers in different legislative procedures is defined as a ratio of number of swings the member state has in given procedure to the total number of swings of all member states in the procedure. In segment (1) we provide relative power of individual member states in the Council voting under recent voting rules of Treaty of Nice: QM stands for qualified majority voting in the Council only (without interaction with other institutions), CNP stands for qualified majority Council voting in the consultation procedure, and CDP stands for qualified majority Council voting in co-decision procedure. The same information for Lisbon voting rules can be found in segment (2) and for square root rules in segment (3).

We can see that legislative procedures influence structure of member states relative power in Council voting. Under Nice rules consultation and co-decision procedures have negligible effect on internal distribution of national power with one exception only (significant increase of relative power of Latvia). In Lisbon case we can observe negligible effect of consultation procedure, but quite significant impact of co-decision procedure, generating decrease of relative power of the five biggest member states, slight increase of power of Poland, decrease of relative power of Romania and Netherlands and increaser of relative power of all other medium size and small countries. Square root rule leads to increase of relative power of five biggest states, does not change relative power of Romania, and decreases or leaves unchanged relative power of medium size and small member states.

Table 4
Relative power of member states in EU27 legislative procedures
(Penrose-Banzhaf index)

	(1) Nice			(2) Lisbon			(3) Square root		
	QM	CNP	CDP	QM	CNP	CDP	QM	CNP	CDP
Germany	7,78	7,68	7,69	11,67	11,67	10,99	9,47	9,47	9,55
France	7,78	7,68	7,69	8,87	8,86	8,21	8,18	8,18	8,24
UK	7,78	7,68	7,69	8,75	8,75	8,11	8,12	8,11	8,17
Italy	7,78	7,68	7,69	8,43	8,43	7,83	7,95	7,95	8,01
Spain	7,42	7,33	7,34	6,69	6,69	6,3	6,97	6,97	7,01
Poland	7,42	7,33	7,34	5,71	5,71	5,75	6,44	6,44	6,45
Romania	4,26	4,23	4,23	4,19	4,2	3,98	4,86	4,86	4,86
Netherlands	3,97	3,93	3,95	3,53	3,53	3,47	4,23	4,24	4,22
Greece	3,68	3,66	3,66	2,87	2,87	2,94	3,54	3,54	3,46
Portugal	3,68	3,66	3,66	2,81	2,92	2,88	3,4	3,39	3,38
Belgium	3,68	3,66	3,66	2,79	2,79	2,87	3,35	3,36	3,34
Czech R.	3,68	3,66	3,66	2,78	2,78	2,85	3,34	3,35	3,33
Hungary	3,68	3,66	3,66	2,74	2,74	2,83	3,29	3,29	3,28
Sweden	3,09	3,08	3,07	2,63	2,63	2,73	3,15	3,15	3,13
Austria	3,09	3,08	3,07	2,53	2,54	2,65	3	3	2,99
Bulgaria	3,09	3,08	3,07	2,46	2,46	2,6	2,88	2,89	2,87
Slovakia	2,18	2,17	2,16	2,18	2,18	2,35	2,42	2,41	2,39
Denmark	2,18	2,17	2,16	2,18	2,18	2,35	2,42	2,41	2,39
Finland	2,18	2,17	2,16	2,16	2,16	2,34	2,37	2,38	2,37
Ireland	2,18	2,17	2,16	2,04	2,03	2,24	2,13	2,14	2,12
Lithuania	2,18	2,17	2,16	1,94	1,94	2,15	1,92	1,92	1,91
Latvia	1,26	2,17	2,16	1,81	1,8	2,04	1,58	1,58	1,57
Slovenia	1,26	1,24	1,24	1,77	1,77	2,01	1,47	1,47	1,46
Estonia	1,26	1,24	1,24	1,69	1,68	1,94	1,19	1,19	1,18
Cyprus	1,26	1,24	1,24	1,63	1,62	1,89	0,93	0,92	0,93
Luxembourg	1,26	1,24	1,24	1,58	1,6	1,85	0,74	0,74	0,74
Malta	0,94	0,94	0,95	1,57	1,47	1,85	0,66	0,65	0,65
Total	100	100	100	100	100	100	100	100	100

Source: own calculations

5. Conclusions

The author is aware of the fact that used models of consultation and co-decision procedures are highly simplified (assumption about equal probability of all possible coalitions, they do not reflect multi-stage character of the games and complex amendment process). But, under hypothesis that the models reflect basic features of legislative procedures, they lead to interesting conclusions.

Influence of member states in European Union decision making cannot be reduced to relative voting power in qualified majority voting in the Council independently of used legislative procedures, involving Commission and European Parliament. Consultation procedure (with explicit interaction of Commission and Council, where Commission has agenda setting authority), and co-decision procedure involving Commission, Council and

European Parliament (with de facto unconditional veto right of all three institutions) affects distribution of inter-institutional voting power of EU institutions and intra-institutional voting power of decision making actors (member states and European political parties). With rare exceptions decision making is based on consultation and co-decision procedures involving Commission and/or European Parliament.

Qualified majority, consultation and co-decision procedures can be modeled as logical combinations of weighted majority games and power indices methodology can be used. If one wants to measure national influence on the basis of the influence in the Council, then inter-institutional influence has to be taken into account. In consultation procedure the Council shares the power with Commission. In co-decision procedure the Council shares the power with Commission and the Parliament. Consultation procedure reduces power of the Council in favor of Commission, and co-decision procedure reduces power of the Council and Commission in favor of European Parliament. In both procedures this implies not only reduction of power of member states in the Council, but also changes of the structure of their power in the Council. On the other hand, in co-decision procedure European political parties become important actors in the EU decision making. To evaluate different proposals of qualified majority rules from the standpoint of "fairness" of a member states power share, one has to consider their effects on member states power in the legislative procedures. National influence in the EU decision making should be measured as the weighted average of the power in legislative procedures with weights given by frequency of use of these procedures.

Power indices methodology has its critics. What exactly power indices are measuring is controversial, see e.g. 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 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 than a priori evaluation of voting power matters. Moreover, analyses of institutional design of decision making could benefit from power indices methodology (Holler and Owen 2001, Lane and Berg 1999). Continuing research and deeper understanding of power indices methodology reflect an actual demand for amendment of traditional legal and political analysis of institutional problems by quantitative approaches and arguments.

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