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THE DEVELOPMENT OF THE DIVISION OF POWER BETWEEN EU COMMISSION, EU COUNCIL AND EUROPEAN PARLIAMENT***

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ABSTRACT: Probabilistic measures of a priori voting power are useful tools to assess actors' influence on collective decision-making either for the purpose of designing a voting organ or to model particular policy cases. This paper makes an attempt to reduce a dynamic voting process into a cooperative voting game and uses the EU as an example. We propose a probabilistic reduced extensive form voting game. By subsequent specialization of power indices we are able to quantify, for example, to what extent the development of the decision-making procedures on the EU has changed the division of power among its main organs.

KEY WORDS: EU, game theory, inter-governmental conference, voting power

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TIIVISTELMÄ: Vaikutusvallan todennäköisyysmittarit ovat hyödyllisiä välineitä arvioitaessa päätöksentekijöiden vaikutusmahdollisuuksia erilaisissa päätöksentekotilanteissa sekä yleisesti että tiettyyn politiikkalohkoon liittyen. Tässä tutkimuksessa tavoitteenamme on laajentaa perinteisiä valta-indeksejä ottamalla huomioon päätöksentekoprosessin dynaamisia piirteitä. Esimerkkinä käytämme EU:n päätöksentekoa. Määrittelemme EU:n päätöksenteprosesseille niin sanotut redusoidut ekstensiiviset muodot, jotka perustuvat päättäjiä koskeviin kooperatiivisten pelien apriorisiin käyttäytymisoletuksiin. Tähän peliin liittyvien valtaindeksien perusteella on mahdollista arvioida EU:n pääinstituutioiden valtasuhteita huomattavasti aikaisempia tutkimuksia perusteellisemmin ja paremmin.

ASIASANAT: EU, peliteoria, hallitusten välinen konferenssi, äänestysvoima

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SUMMARY

Power in EU decision making has two relevant dimensions to study: inter-country and inter-body relations. So far, quantitative studies has concentrated on the former.

The main organs of the EU represent different views in the sense that the Commission is supposedly independent of any particular national views and thus represents the EU as a whole, the Council represents the views of national governments and the European Parliament represents member countries' citizens' views. On the one hand, as the Council is the main decision-making organ emphasizing the inter-governmental nature of the EU, inter-country division of power is, indeed, an important field to study. On the other hand, the traditionally weak role of the European Parliament has directed research parallelly.

In this paper, we extend the analysis of the earlier studies in two ways. First, a voting game model for three organs is defined and applied to measure inter-body relations in the EU. this takes into account the second dimension of interest. Second, the paper contributes to the existing cooperative game literature by taking into account the dynamic aspects of EU decision-making procedure. We start by expliciting the analysis of the three main procedures, consultation, co-operation and co-decision, to take decisions in the EU. Using these extensive forms we show how the dynamic decision making procedures can be reduced into a sequence of cooperative voting games by using the standard behavioural assumptions of power indices. The most important question we pose is, whether the role of the European Parliament has changed and, if it does as claimed, to what extent its power index shows this development.

The future role of the European Parliament is, again, topical due to the inter-governmental conference (IGC) of the EU. An often heard claim is that the co-decision procedure introduced in the Maastricht Treaty gave substantially more powers to the Parliament but its coverage is too limited. Consequently, an easy answer for Parliament's increasing demand for influnce would be to extend the scope of co-decision procedure. In this paper, we measure quantitatively how much power the agents of EU decision making exert under the three main decision making procedures.

The conclusion concerning the inter-organ relations in this paper is three-fold. First, it seems that when cooperation procedure was introduced it was mainly the Council that lost power in favour of the Parliament, not the Commission. An exception is the case of total independence in conditional measures. An intuition behind this is that independence of voters makes the Council relatively more reluctant to accept a proposal indicating in conditional indices that it has as an organ more credibility use threat strategies than the EP and the Commission. A more stronger role of the Parliament seems to be materialized mainly via its veto power as the status quo bias increases significantly when more powers were given to it.

Second, the change in power figures is, surprisingly, almost neligible when cooperation and co-decision procedures are compared. A stronger role of the EP, the usual claim concerning the introduction of the co-decision procedure is not reflected by power indices. This seems to be due to the EP's veto power since the co-decision procedure introduced an unconditional veto to the EP while previously the Commission and a unanimous Council had the right to overrule EP's veto. A more active role of the EP materializes mainly via the so-called conciliatory committee which tries to find a compromise when the Council and EP disagree. These cases where a majority of the EP and a qualified majority of the Council can decide on compromise have, however, a rather small weight in co-decision procedure and as an indication the EP does not gain much power.

Third, whatever behavioural assumptions we apply, the Council always wields more influence than the other two organs. For the Commission and the EP it seems to be, in terms of power, the more profitable the more homogeneously the organs behave. When assessing inter-body relations it is worth stressing that the ultimate agenda setting power of the Commission is disregarded in the analysis. This is due to the high weight of the first period in the extensive game. The rules of the game seem favour a quick solution in the sense that the status quo risk significantly increases over time.

As far as the institutional reform of the EU is concerned the paper argues that neither co-operation procedure nor co-decision-procedure gives to the Parliament as much power as to the Council and that the difference between the two is neligible in quantitative terms. One reason for that is the difference between the majority rules applied in the Parliament and the Council. The status quo bias is higher in the latter and therefore when taking as a single agent the Council is on average more reluctant to accept a proposal than the Parliament. When unanimity between the two is required this gives an additional benefit to the Council. This suggests that in co-decision procedure the majority rules in the Council and the Parliament should be equalized.

YHTEENVETO (Finnish summary)

Vaikutusvallan jakautumista Euroopan unionissa voidaan tarkastella joko jäsenmaiden välisenä kysymyksenä tai EU:n pääinstituutioiden välisenä kysymyksenä.

Euroopan unionin pääinstituutiot edustavat päätöksenteossa eri tahoja. Komissio on teoriassa riippumaton jäsenmaista edustaen näin koko EU:ta. Ministerineuvosto edustaa jäsenmaita hallitustensa välityksellä ja Euroopan parlamentti jäsenmaiden kansalaisia. Koska ministerineuvosto on tärkein päättävä elin, EU:n hallitustenvälinen luonne korostuu. Tämä on myös ohjannut Euroopan unionin vaikutusvallan jakautumisen tutkimusta ensisijaisesti ministerineuvoston päätöksentekoon.

Tässä tutkimuksessa laajennamme aiempia vaikutusvaltatutkimuksia ottamalla huomioon EU:n kaikkien kolmen pääinstituution rooli. Lisäksi tarkastelu pohjautuu aiempaa tarkemmin päätöksentekoprosessin mallittamiseen tuoden mukaan sen dynaamisia aspekteja. Tätä varten EU:n kolme päätöksentekoprosessia (kuulemis- yhteistyö- ja yhteispäätösmenettely) mallitetaan perättäisinä kooperatiivisina peleinä, joissa kunkin vaiheen pelin säännöt määräytyvät ko. prosessin mukaan ja todennäköisyys sille, että tietyn vaiheen peli pelataan päätöksentekijöiden äänestyskäyttäytymisen (preferenssien) perusteella. Kunkin vaiheen alipeli on kaksitasoinen. Ylempi taso on päätöksenteko kolmen instituution välillä, minkä lisäksi ministerineuvoston päätöksenteko on mallitettu 15 hengen kooperatiivisena äänestyspelinä. Koska sekä parlamentti että komissio käyttävät yksinkertaista enemmistöä ja koska molemmissa jäsenet ovat keskenään samanarvoisia niiden sisäiset alipelit on redusoitu mediaaniäänestäjän kannaksi.

Tutkimuksen pääkysymys on, kuinka Euroopan parlamentin asema on muuttunut EU:n päätöksenteossa vaikutusvaltamittareiden perusteella arvioituna. Euroopan parlamentin asema on ajankohtainen, koska EU:n hallitusten välinen konferenssi pyrkii uudistamaan unionin institutionaalista rakennetta, mikä vaikuttaa myös parlamentin tulevaan asemaan.

Usein väitetään, että Maastrictin sopimuksessa määritelty yhteispäätösmenettely kohensi Euroopan parlamentin asemaa tuntuvasti verrattuna yhtenäisasiakirjan yhteistyömenettelyyn. Tämän vuoksi helppona ratkaisuna parlamentin aseman vahvistamiseksi on tarjottu yhteispäätösmenettelyn soveltamisalan laajentamista.

Tutkimuksessa tehdään kolme keskeistä johtopäätöstä. Ensinnäkin parlamentin aseman vahvistaminen vuoden 1986 yhteistyömenettelyllä näyttää vähentäneen erityisesti ministerineuvoston vaikutusvaltaa komission aseman säilyessä käytännössä ennallaan. Ainoastaan tilanteessa, jossa ministerineuvoston hyväksyntä aloitteelle on hyvin epätodennäköistä näin ei ole. Parlamentin vallan kasvun vastineeksi myös ministerineuvoston kannattaa olla vastahakoinen, mutta myös parlamentin vallan kasvu itsessään perustuu pitkälti sen veto-oikeuteen. Yhteistyömenettelyssä parlamentti sai heikon veton, mutta yhteispäätösmenettelyssä ehdottoman.

Toiseksi verrattaessa yhteispäätös- ja yhteistyömenettelyä valtajakaumien erot osoittautuivat yllättäen mitättömän pieniksi. Yhteispäätösmenettely ei lisännyt parlamentin valtaa, jos sitä mitataan valtaindekseillä. Tämä näyttää johtuvan siitä, että jo yhteistyömenettely antoi parlamentille heikon veto-oikeuden, jonka vain yksimielinen ministerineuvosto voi kumota. Myöskään niin sanotun sovittelukomitean merkitys parlamentin vallan lisääjänä ei tule kovin selvästi esille.

Kolmanneksi oletettiinpa valtalaskelmien pohjaksi mikä tahansa tavanomainen käyttäytymisoletus, ministerineuvosto on joka tapauksessa vaikutusvaltaisin elin. Tämä johtuu osin siitä, että valtaindeksit eivät kykene ottamaan huomioon asialistan kontrollia, joka komissiolla tosiasiassa on. Tämä teema muodostaakin luontevan jatkotutkimusalueen. Mielenkiintoista on, että huolimatta yhteispäätös- ja yhteistyömenettelyn monimutkaisuudesta, vallankäytön kannalta niissä molemmissa on edullista pyrkiä mahdollisimman nopeaan ratkaisuun.

EU:n instituutioiden uudistamisen kannalta tutkimus vahvistaa parlamentin heikon aseman suhteessa ministerineuvostoon, vaikka käytettäisiin yhteipäätösmenettelyä. Parlamentin ja ministerineuvoston valta-asemien eroa selittää varsin hyvin toisaalta se, että ministerineuvostossa käytetään korkeampaa enemmistösääntöä kuin parlamentissa ja toisaalta se, että parlamentin roolina on ennenkaikkea estää päätöksiä veto-oikeutensa kautta. Näin ollen parlamentin ja neuvoston merkityksen tasaamiseksi niissä käytettävien enemmistösääntöjen yhtäläistäminen voisi olla yksi merkittävä askel.

1 Introduction

The entry of Austria, Sweden and Finland into the European Union (EU) and, especially, the design of the future decision-making rules of the Union, which is the task of the 1996 inter-governmental conference (IGC 1996), have given a substantial impetus to apply power indices of cooperative games to European decision-making. Indeed, EU decision-making is an important research area since the EU has the competence to act as a supranational authority in an expanding area of policies and the right to make nationally binding decisions regarding the 15 member states by majority voting.

The decision-making process of the EU has three main actors: the Commission (C), the Council of Ministers (M) and the European Parliament (EP). They represent different views in the sense that the Commission is supposedly independent of any particular national views and thus represents the EU as a whole, the Council represents the views of national governments and the European Parliament represents member countries' citizens' views. The Commission can also be seen as an organ which promotes integration. The Commission has the agenda setting power: a monopoly of making proposals. The Council, in contrast, is the main decision-maker since its positive vote is always required to a decision. As the Council represents national views it has been usually seen as a brake on integration. The Council has two main decision-making rules: qualified majority with given voting weights to member states and unanimity where the distribution of votes does not matter. When qualified majority is applied the distribution of votes is the following: Germany, Italy, France and the UK 10 votes each, Spain 8 votes, the Netherlands, Belgium, Portugal and Greece 5 votes each, Austria and Sweden 4 votes each, Denmark, Finland and Ireland 3 votes each and, finally, Luxembourg 2 votes. The qualified majority is made up of 62 out of 87 votes. Until 1987, the European Parliament had only an advisory role in EU decision-making but during the last ten years its influence has increased due to the Treaty reforms carried out by EU member states (for details see next section).

The institutional structure of the EU suggests that there are at least two questions of interest

1. national allocation of voting power in the Council

2. inter-body division of power in EU's decision-making procedures.

The former stems from the essence of national governments in EU decision making and the latter from the changes in inter-body relations after the Single European Act (SEA) came into force in 1987. So far, the bulk of the literature has concentrated on the first item. The corresponding studies have assessed mainly the distribution of power in the Council [see Hosli 1993, Widgrén 1994 or Laruelle and Widgrén 1996 and the references therein].[1] These general studies have three following main conclusions.

1. The distribution of power in the Council is rather close to the distribution of votes and thus the usual property of weighted voting games that large voters tend to have a higher power share than a voting share, does not hold [Widgrén 1994].

2. The distribution of power is almost exactly the same in qualified majority and absolute majority voting. Moreover, the so-called double majority rule where an absolute majority of member countries, i.e. 8, and an absolute majority EU citizens, i.e. a group of countries with an absolute majority of citizens in the EU, is required, favours the smallest countries with less than 7 million inhabitants and Germany [Widgrén 1996].

3. In terms of fairness, it can not be argued that the allocation of power favours small countries. It is usual that in for example federal states give more votes proportionate to population to small states and the EU fits to this picture [Laruelle and Widgrén 1996].

Probabilistic voting models are applied to the Council of Ministers in Widgrén [1995] and in Kirman and Widgrén [1995]. These studies show the bias towards the status quo solution even when qualified majority voting is used. Moreover, they give examples why the well-known tendency towards packaging decisions exists. As it seems to be credible to threaten the others by 'taking hostages' and being reluctant to accept the proposals of their interest, the way out of status quo and usually an influence-improving solution would be to make a package deal where a country ensures the passage of proposals of her interest with the cost of accepting the most significant interests of the other countries.

[1] The impact of the expansion phases of EU membership to the UK, Ireland and Denmark in 1973, to Greece in 1981 and to Spain and Portugal in 1986 is studied in Brams and Affuso (1985a, 1985b).

Another field, where probabilistic interpretation, or merely a priori restrictions on coalition formation, is applied is coalition structure games (CS-games). In Widgrén [1993, 1994] the sub-systems of the EU are studied with power indices for CS-games. It is argued in both papers that coalition formation in the EU tends to increase member states' opportunities to block decisions rather than opportunities to promote the passage of proposals. This result is in line with the pure probabilistic approach.

The distribution of power in other organs or among the organs is less studied [see, however, Herne and Nurmi 1993, Bindseil and Hantke 1996]. In regard to the national distribution of power one argument to disregard the European Parliament is the fact that, given that we are only interested in the allocation of power among member states and thus presume that MEPs vote on the basis of their nationality, a qualified majority in the Council implies an absolute majority in the European Parliament. The same holds for the Commission as well. In terms of national distribution the Council has thus the key role. Another argument to disregard the European Parliament from the voting model is that national interests are not the main determinant of MEPs voting behaviour but we rather have two dimensions: national and political [see Johnston 1982]. In fact, that is also one reason to distinguish between the analysis of the European Parliament and the Council of Ministers and to run separate type analysis in regard to these organs.

Inter-body relations was first studied by Widgrén [1996a]. He implicitly applies the compound game idea to evaluate the influence of the Commission, when modelled as the 16th member state of the EU. He takes into account that a Commission proposal is always required to a decision and that, in its second reading the Council is able to decide on the basis of its own proposal by unanimity. The role of the European Parliament is disregarded in his study. As can be seen later in this paper this approach models only a part of decision-making procedures of the EU.

In this paper, we extend the analysis of the earlier studies in two ways. First, a voting game model for three organs is defined and applied to measure inter-body relations in the EU. Second, the paper contributes to the existing cooperative game literature by taking into account some dynamic aspects of EU decision-making procedure. We start by expliciting the analysis of the three main procedures to take decisions in the EU. Using these extensive forms we show how the dynamic decision making procedures can be reduced into a sequence of cooperative voting games by using the standard behavioural assumptions of power indices [see Straffin 1988]. The most

important question we pose is, whether the role of the European Parliament has changed and, if it does as claimed, to what extent its power index shows this development.

The rest of the paper is organized as follows. Section 2 describes the three decision-making procedures of the EU and section 3 contains the theoretical considerations. Section 4 shows how we apply the extensive form game in EU decision-making. Section 5 gives the results and, finally, section 6 concludes.

2 Decision-making procedures of the EU

The EU has three main decision-making procedures. They are the consultation procedure (defined in the Treaty of Rome 1957), the cooperation procedure (defined in the Single European Act 1986) and the co-decision procedure (defined in the Maastricht Treaty 1992). These three treaties also form the base of the Union Treaty. In each procedure the Council has two ways of taking a decision: the qualified majority rule and unanimity as described above.[2]

2.1 Consultation procedure

Consultation procedure was the only way to take decisions during 1958-1986. It totally disregarded the EP[3] by giving only an advisory role to it. The decision itself relies on a Commission proposal and a Council decision. Thus, as it it common to all procedures, in consultation procedure the Commission first makes a proposal. Then on the basis of the Commission proposal the Council either accepts or rejects it. However, unanimous Council has the right to amend the proposal of the Commission and thus effectively has a limited right to propose [for a detailed description of the procedure see figure 2].

[2]In this paper we disregard the simple majority of member states in the Council which is used very seldom for minor procedual questions and the rule which requires a qualified majority of votes with the quota of 10 member states. This applies to the second and the third pillar issues of the EU regarding common foreign and security policy and justice and home affairs. The issues where this rule is applied require a unanimous acceptance of the Council before the rule can be applied.

[3]The European Parliament was formerly known as the General Assembly which consisted of national parliamentarists. The European Parliament, as it it today, was first elected in 1979 in general elections in each member state.

2.2 Cooperation procedure

The Single European Act revised the EU decision-making for the first time. It introduced the cooperation procedure [Art. 189c of the Union Treaty]. Compared to the consultation procedure, the cooperation procedure gives some powers to the EP in the sense that the passage of a proposal depends on its vote [for a detailed description of the procedure see figure 2]. The EP also has the right to propose amendments to the Council's preliminary decision. It thus has some indirect agenda setting powers under certain circumstances.

The procedure can be summarized as follows. The Commission makes a draft proposal, which is commented by the EP, and thereafter initiated by the Commission. In its first reading, the Council either accepts (take a common position) or rejects the proposal. In the latter case, the proposal lapses and the Council thus has an unconditional right to veto. The EP has the right to propose a rejection, amendments or acceptance to the common position of the Council. If it does not act its acceptance is presumed. An absolute majority is required for rejection and amendments. In the case of the former, the Council has the next move and unanimity is then required to overrule EP's rejection. Although the EP has not the right to veto it seems to have a quite effective tool to make things more complicated for the Council and the Commission. In practice, however, the EP has used this weapon very seldom. In the case of amendments, the Commission has the next move. It examines the amendments and it can reject them fully or partially or it can accept them completely. Thus its basic choice is between accepting and rejecting but the original proposal can split into pieces. After the Commission's examination, the Council has the next move. In the cases of the Commission's approval, the Council either accepts or rejects the new proposal by qualified majority or it can amend the proposal by a unanimous vote. In the case of the Commission's rejection, the Council need unanimity to make a decision on the basis of the Commission's new proposal or it has the right to amend proposal by a unanimous vote. Basically, in cooperation procedure the EP can enforce the Council to decide unanimously on the original proposal. Therefore, it has certainly indirect influence on the Commission's proposal [Tsebelis 1994].

2.3 Co-decision procedure

An often heard argument is that co-decision procedure, which was introduced in the Maastrich Treaty (Art. 189b), increased the power of the EP. As a comparison of figures 2 and 3 shows, this seems to be true. The beginning of the procedure is similar to the cooperation procedure. The first main difference compared to the cooperation procedure comes when a common position of the Council is examined by the EP. In the co-decision procedure, a unanimous Council can not overrule the EP's veto. Thus an unconditional veto right applies to all three organs in this procedure. In the case of EP's veto, a conciliatory committee is formed between the Council and the EP. It consists of the same number of representatives from each trying to find a compromise that must be approved by a qualified majority of the Council and an absolute majority of the EP. In the case of EP's amendments the main difference from cooperation procedure is that, on the one hand, a unanimous Council can not amend a proposal by itself in its second reading, and on the other hand, in the case of Council's rejection a conciliatory committee is formed and it works as it does in the case of the EP's veto. In regard to the shifts of power it seems that the Commission's role as an agenda setter has weakened in favour of the EP. The Council is also a likely loser since it has not the right to make decisions by itself. One of the aims of this paper is to assess this redistribution of power quantitatively.

3 Reducing the extensive form into a cooperative game

3.1 On cooperative voting games

A *cooperative game* is defined as a pair (N, v) where $N = \{1, ..., n\}$ denotes the set of players and $v : \mathcal{P}(N) \rightarrow R$, the *coalitional form of the game.* Function v assigns a *worth* $v(S)$ for any *coalition* $S \subset N$. In a voting process, a coalition can either make a decision without the vote of the remaining players (the coalition is then referred to as *winning*), or it cannot (the coalition is said to be *losing*). Then the coalitional form v of a *voting game* can be defined simply as an indicator variable, i.e. $v(S) = 1$ if S is winning and $v(S) = 0$ otherwise. In this paper we focus on voting games.

Let p_i be the probability that player i accepts a random proposal. Then

by assuming that for any coalition S, the event $A_i = \{i \in S\}$ is independent of the event $A_j = \{j \in S\}$ we can write the probability that a fixed coalition $S \in \mathcal{P}(N)$ supports a random proposal as follows

$$P(S = S) = \prod_{i \in S} p_i \prod_{j \in N \setminus S} (1 - p_j).$$

Multiplying these probabilities by the worth of the coalition and summing up to all possible coalitions we obtain the mathematical expectation for the worth of a coalition, which is the probability that the proposal is accepted. This expectation is called the *multilinear extension* (MLE) of v [Owen 1972]. The MLE is thus the probability of forming a majority, and it is denoted by $f(p_1, \ldots, p_n)$, $f : [0,1]^N \to R$. Hence

$$f(p_1, ..., p_n) = E[v(S)] = \sum_{S \in \mathcal{W}} \prod_{i \in S} p_i \prod_{j \in N \setminus S} (1 - p_j). \qquad (1)$$

where $\mathcal{W} \subset \mathcal{P}(N)$ denotes the class of winning coalitions.[4]

3.2 Reduced extensive form games

It is usual that proposals can be amended at different periods of the voting procedure by the involved decision-makers. The purpose of this section is to allow this into the cooperative game framework.

Consider a voting procedure of m periods with $N = \{N_1, ..., N_m\} = \{1_1, ..., n_1, ..., 1_m, ..., n_m\}$ as the set of players where i_k denotes player i ($i = 1, ..., n$) at period k ($k = 1, ..., m$).[5] At each period of time k ($k = 1, ..., m$), a

[4] Some voting processes are indirect. The set of players is divided into subsets of players and the sub-groups elect first their representatives who then vote for an outcome of the game. The coalitional form of a compound voting game is denoted $u = v[v_1, .., v_k]$ to underline that u is made of a game v of the sub-games v_j. The MLE of a compound game composes. Let $f, g_1, ..., g_k$ and h denote the MLEs of $v, v_1, ..., v_n$ and u respectively. Then it can be proved [see Owen 1982, 207-208] that h can be obtained by the composition of the functions f and $g_1, ..., g_n$: $h = f(g_1, ..., g_n)$. Hence:

$$h(p_{1(1)}, ..., p_{n_1(1)}, ..., p_{1(k)}, ..., p_{n_k(k)}) = f(g_1(p_{1(1)}, ..., p_{n_1(1)}), ..., g_k(p_{1(k)}, ..., p_{n_k(k)})$$

[5] We can think that we can distinguish between players' voting behaviour in different phases of the game. Then the whole process is a sequence of sub-games with the same player set but with differentiated preferences at different phases of the process.

new proposal is made by one of the players and the decision-making rule may vary. If the proposal is accepted (according to the voting rule of this period), the decision is made and the process terminates. Otherwise, the proposal is again amended or the process terminates without a decision. Let us assume that the probability of making a new proposal at period k is P^k. Let us also restrict the analysis to finite time-horizon, i.e. the process terminates after m periods regardless of the outcome of the process.
At one period, the voting game (N_k, v^k) is simply

$$v^k(S_k) = \begin{cases} 1 & \text{if } S_k \in \mathcal{W}_k \\ 0 & \text{otherwise} \end{cases}$$

where $\mathcal{W}_k$ denotes the set of winning coalitions at period k. The coalitional form for the whole process can be defined on the basis of the winning coalitions of the different periods: $v(S_k) = v^k(S_k)$. We assume that the reduced extensive form of the process in time-separable and then cross-period coalitions are not allowed. Thus $i_k \in S \Rightarrow j_l \notin S$. Moreover, let us assume that $P(v^0(S_0) = 1) \equiv P_0$ and that $v^{m+1}(S_{m+1}) \equiv 0$[6] Due to the separability we can reduce the extensive form to the following sum of expectations

$$\begin{aligned} R(v(S)) &= \sum_{j=0}^{m+1}[E(v^k(S_k))] = \sum_{j=0}^{m+1}[\prod_{i=0}^{j}[1-\delta_i]P(\mathcal{S}_j = S_j)v^j(S_j)] \qquad (2) \\ &= \sum_{j=0}^{m+1}.[\prod_{i=0}^{j}(1-\delta_i)E(v^j(S_j))] \\ &= 1 - \prod_{i=0}^{k}(1-\delta_i) \end{aligned}$$

where δ_i denotes the probability that the process is terminated before the period i.

Let us next define the combination of the cooperative approach described in previous sub-sections to the reduced extensive form. Let p_{i_k} be the probability that player i accepts a random proposal at period k. We assume as previously that the event $A_{i_k} = \{i_k \in S\}$ is independent of the event $A_{j_k} = \{j_k \in S\}$. Moreover to guarantee that cross-period coalitions are

[6]These are technical details. The former can be interpreted as the complement probability of agenda setting since it terminates the process in period 0. The latter simply rules out the cases where a winning coalition is formed after the last period of the game.

impossible, we impose that the events $A_{i_k} = \{i_k \in S\}$ and $A_{j_l} = \{j_l \in S\}$ cannot occur simultaneously.

Using the definitions of previous sub-sections we can now write the following conditional coalitional form.

$$E[v(S_k) \mid k \text{ is reached}] = \sum_{S \subset N} \left[\prod_{i_k \in S_k} p_{i_k} \prod_{j_k \in N \setminus S_k} (1 - p_{j_k}) \right] v^k(S_k)$$

We can derive the probability of accepting a proposal at period k by multiplying this by the probability of reaching period k (which corresponds to the probability of not terminating the process before. Hence

$$E[v(S_k)] = \prod_{t=0}^{k-1} P^t \sum_{S \subset N} \left[\prod_{i_k \in S_k} p_{i_k} \prod_{j_k \in N \setminus S_k} (1 - p_{j_k}) \right] v^k(S_k)$$

Then, the probability of accepting a proposal during the whole process is simply as follows

$$\begin{aligned} E[v(S)] &= \sum_{k=1}^{m} E[v(S_k)] \\ &= \sum_{k=1}^{m} \prod_{t=0}^{k-1} P^t \sum_{S \subset N} \left[\prod_{i_k \in S_k} p_{i_k} \prod_{j_k \in N \setminus S_k} (1 - p_{j_k}) \right] v^k(S_k) \end{aligned}$$

which corresponds with $R(S)$.

The term $\sum_{k=1}^{m} \prod_{t=0}^{k-1} (1 - P^t)$ can be interpreted as a measure of the status quo bias in the process as it expresses the probability of termination without a decision. It can also be noticed that the term P^0 measures the agenda setting power. Moreover $\prod_{t=0}^{k-1} (1 - P^t)$ can be seen as discount factors since they are determined by the behavioral assumptions of voting games.

3.3 On power indices

When measuring a player's individual effect in a voting body an obvious question to pose is: "What is the difference that her vote will make?" Player i 's individual effect for an arbitrarily chosen coalition S can be measured by the difference $v(S) - v(S \setminus i)$. It can be easily seen that for voting games

$v(S) - v(S \setminus i\ )$ is either 1, when player i swings a coalition from losing to winning, or 0 otherwise. Thus $E[v(S) - v(S \setminus i\ )]$ indicates the probability of i's vote being crucial for an arbitrarily chosen coalition S. This expectation can be derived from the MLE [see Owen 1972] as follows

$$\begin{aligned} E[v(S) - v(S \setminus i)] &= \sum_{\substack{S \subset N \\ i \in S}} \prod_{j \in S \setminus \{i\}} p_j \prod_{j \in N \setminus S} (1 - p_j)\,[v(S) - v(S \setminus i)] \\ &= \frac{df}{dp_i}(p_1, ..., p_n) \end{aligned}$$

Player i's power ψ_i is defined as the average probability that player i's vote be crucial in an arbritrarily coalition S. Thus

$$\begin{aligned} \psi_i &= \int_0^1 ... \int_0^1 \sum_{\substack{S \subset N \\ i \in S}} \prod_{j \in S \setminus \{i\}} p_j \prod_{j \in N \setminus S} (1 - p_j)[v(S) - v(S \setminus i)]\, dp_1 ... dp_n \\ &= \int_0^1 ... \int_0^1 \frac{df}{dp_i}(p_1, ..., p_n)\, dp_1 ... dp_n \end{aligned}$$

For the calculation purposes we have to define the p_i probabilities explicitly. In the literature, there are two following standard assumptions. First, the independence assumption whereby

$$p_i \sim U(0,1)\ \ \forall\, i \in N$$

The obtained index is the unnormalized Banzhaf index (β_i), which can be calculated by using either of the following formulae [See Owen 1982 and Straffin 1988 for the derivation of the index]:

$$\begin{aligned} \beta_i &= \sum_{\substack{S \subset N \\ i \in S}} \left(\tfrac{1}{2}\right)^{n-1} [v(S) - v(S \setminus i)] \\ &= \frac{df}{dp_i}\left(\tfrac{1}{2}, ..., \tfrac{1}{2}\right) \end{aligned}$$

Second, the homogeneity assumption, whereby

$$p_i = t\ \forall\, i \in N\ \wedge\ t\ \sim U(0,1)$$

which leads to the Shapley-Shubik index (Φ_i). It can be calculated as follows: [see Straffin 1988]

$$\Phi_i = \sum_{\substack{S \subset N \\ i \in S}} \frac{(s-1)!\,(n-s)!}{n!} \left[v(S) - v(S \setminus i)\right]$$

$$= \int_0^1 \frac{df}{dp_i}(t, ..., t)\, dt$$

where n and s denote the cardinalities of sets N and S respectively. The main difference between these assumptions is that under the homogeneity assumption voters' behaviour is totally positively correlated, while independende indicates totally independent and uncorrelated behaviour. However other assumptions can be made on the distribution of probabilities, as well [for an application see Widgrén 1995].[7]

3.4 Measuring power in reduced extensive form games

It was noted above that, given the time-separability, the reduced game can be written simply as the sum expressed in 2. Due to the separability assumption and since the sub-games are simple, the computation of power indices is straightforward and i's power simply the weighted sum of her power indices

[7]Although the MLE of a compound game composes, power indices of compound games do not compose in general. Thus, in general, we can not write $\psi_{i(j)}[u] = \psi_j[v]\psi_i[v_j]$. Let $i \in N_j$ be a single player. We have

$$\psi_{i(j)}(u) = = \int_0^1 \cdots \int_0^1 E[u(S) - u(S \setminus i)] dp_{1(1)} ... dp_{n_k(k)}$$

$$= \int_0^1 \cdots \int_0^1 \frac{dh}{dp_{i\ (j)}}(p_{1(1)}, ..., p_n) dp_{1(1)} ... dp_{n_k(k)}$$

$$= \int_0^1 \cdots \int_0^1 \frac{df}{dp_j}(g_1(p_1, ..., p_{n_1}), ..., g_k(p_1, ..., p_{n_k})) \cdot \frac{dg_j}{dp_i}(p_1, ..., p_{n_j}) dp_{1(1)} ... dp_{n_k(k)} \quad (3)$$

By using the probabilistic assumptions as described above this formula can be used to evaluate power of one player.

with different labels (the sum of power exerted in different periods). The weights are the discount factors introduced above. Hence

$$\psi_i(v) = \int_0^1 \dots \int_0^1 \sum_{j=0}^{k} [\prod_{i=0}^{j} (1-\delta_i)] \psi_i(v^j) dp_{1_1} \dots dp_{n_m} = \int_0^1 \dots \int_0^1 E_j \psi_i(v^j) dp_{1_1} \dots dp_{n_m}. \tag{4}$$

Note that due to the status quo bias the sum of individual indices does not sum up to unity as the process can terminate without a decision. In this unconditional case a player's power is defined as the average probability that her vote makes a difference to an outcome. The probability of being crucial for one player is simply her probability of being crucial at the different periods.

$$P[i \text{ is crucial}] = \sum_{k=1}^{m} E\left[v^k(S_k) - v^k(S_k \setminus i)\right]$$

and by using the voting probabilities we obtain player i's power

$$\psi_i(v) = \int_0^1 \dots \int_0^1 \sum_{k=1}^{m} E\left[v^k(S_k) - v^k(S_k \setminus i)\right] dp_{1_1} \dots dp_{n_m}$$

This measure depends on the probabilistic assumptions of acceptability of a random bill (see section 3.3) at different periods of the process. It is worth noting that this framework allows the correlation of the players' behaviour and, also, the correlation through time.

In some cases it could be reasonable to concentrate the analysis on the distribution of power among the decision-makers. As it is easy to see from the decomposition of status quo bias $\prod_{i=0}^{k}(1-\delta_i) = (1-P_0) + \prod_{i=1}^{k}(1-\delta_i)$ this requires that we disregard the agenda setting power and the status quo bias during the process. In standard cooperative game theory, these both are implicitly inclusive in the model if we assume that there is no agenda setting power (which is usual) and that voters behave homogeneously. In reduced extensive form model, this consequently requires a restriction of the analysis only to paths leading to winning coalitions and an assumption of voters' homogeneity at each period. This can be done by using conditional probabilities. Then, when assuming homogeneity in each period a coalition which is able to form a majority reagardless of the period and the rules has unit expected worth. Note that this does not remove the status quo bias that

arises from the independent behaviour of voters at one period. By assuming $P_0 = 1$ in 4 and stating

$$\sum_{j=0}^{k-1}[\prod_{i=0}^{j}(1-\delta_i)]P_{j+1} = 1$$

we obtain

$$\bar{\psi}_i(v) = \sum_{j=0}^{k}[\prod_{i=0}^{j}(1-\delta_i)]\psi_i(v^j) = E[\psi_i(v^j)|v^j(S_j) = 1]. \quad (5)$$

which expresses a player's conditionally expected contribution to a winning coalition. In this sense it is a kind of normalization of the probabilistic voting procedure in the same spirit as the normalized Banzhaf-index and the public good index are in static games.

4 EU decision making as a reduced extensive form

4.1 The game trees of EU decision-making procedures

The three decision-making procedures (see figures 1-3) of the EU can be represented as ordinary extensive game-trees. Each non-terminal node represents a choice of one organ. The arcs define the possible moves of the organ. The terminal nodes define the outcomes of the procedure, i.e. whether a decision is taken or not. The dotted lines represent the amendement of the proposals, i.e. the beginning of a new period. We can model each procedure by an reduced extensive form tree by assuming that the players vote simultaneously between two amendements.

[Figures 1-3 about here]

4.1.1 Consultation procedure:

Figure 1 describes the game tree of the consultation procedure. From this tree, it can be seen that there are two periods. The periods-games are the following:
$N_1 = \{C_1, P_1, M_1\}$

$$v^1(S_1) = \begin{cases} 1 & \text{if } S_1 \ni C_1 \text{ and } M_1 \\ 0 & \text{otherwise} \end{cases}$$
$N_2 = \{C_2, P_2, M_2\}$
$$v^2(S_2) = \begin{cases} 1 & \text{if } S_2 \ni M_2 \\ 0 & \text{otherwise} \end{cases}$$

4.1.2 Cooperation procedure:

Figure 2 describes the game tree of the cooperation procedure. From this tree, it can be seen that there are four periods. The periods-games are the following:
$N_1 = \{C_1, P_1, M_1\}$
$$v^1(S_1) = \begin{cases} 1 & \text{if } S_1 = N_1 \\ 0 & \text{otherwise} \end{cases}$$
$N_2 = \{C_2, P_2, M_2\}$
$$v^2(S_2) = \begin{cases} 1 & \text{if } S_2 = N_2 \text{ or } S_2 \ni P_2 \text{ and } M_2 \text{ or } S_2 \ni M_2 \\ 0 & \text{otherwise} \end{cases}$$
$N_3 = \{C_3, P_3, M_3\}$
$$v^3(S_3) = \begin{cases} 1 & \text{if } S_3 \ni M_3 \\ 0 & \text{otherwise} \end{cases}$$
$N_4 = \{C_4, P_4, M_4\}$
$$v^4(S_4) = \begin{cases} 1 & \text{if } S_4 \ni M_4 \\ 0 & \text{otherwise} \end{cases}$$

4.1.3 Co-decision procedure:

Figure 3 shows the game tree for the co-decision procedure. From this tree, it can be seen that there are five periods. The periods-games are the following:
$N_1 = \{C_1, P_1, M_1\}$
$$v^1(S_1) = \begin{cases} 1 & \text{if } S_1 = N_1 \\ 0 & \text{otherwise} \end{cases}$$
$N_2 = \{C_2, P_2, M_2\}$
$$v^2(S_2) = \begin{cases} 1 & \text{if } S_2 = N_2 \text{ or } S_2 \ni P_2 \text{ and } M_2 \\ 0 & \text{otherwise} \end{cases}$$
$N_3 = \{C_3, P_3, M_3\}$
$$v^3(S_3) = \begin{cases} 1 & \text{if } S_3 \ni P_3 \text{ and } M_3 \\ 0 & \text{otherwise} \end{cases}$$

$N_4 = \{C_4, P_4, M_4\}$

$$v^4(S_4) = \begin{cases} 1 & \text{if} \quad S_4 \ni P_4 \text{ and } M_4 \\ 0 & \text{otherwise} \end{cases}$$

$N_5 = \{C_5, P_5, M_5\}$

$$v^5(S_5) = \begin{cases} 1 & \text{if} \quad S_5 \ni P_5 \text{ and } M_5 \\ 0 & \text{otherwise} \end{cases}$$

4.2 Probabilities of reaching the sub-games

To determine the probability that a proposal is accepted, we must first compute the probabilities of reaching the different period-games. This distribution may be derived from the probabilities of acceptance of a proposal, e.g. the standard behavioural assumption of voting games.

In the model, the Commission is assumed to represent a supranational view and is supposed to take a single position. The sub-game in the Commission with a given label is thus a one-person game. The EP may also be considered as a single player for three reasons. First, because the voting patterns are likely to reflect ideological dimension rather than nationality. Second, a priori, nothing is known about the political division in the EP. Third every MP exerts the same amount of power and the EP uses a simple majority rule, which implies that on average its probability of acceptance is 0.5. We thus may see the EP and the Commission through a median MP or MC. In the Council, national, often opposite, interests are represented and the national numbers of votes are defined by the Union Treaty. Therefore, it is natural to model the the game in the Council as a voting game of the national views.Let us adopt the following notations.

p_{P_k} as the probability that the EP accepts the proposal at the period k

p_{C_k} as the probability that the Commission accepts the proposal at period k

p_{mj_k} as the probability that the Minister j accepts the proposal at period k

The probability that the Council of Ministers accepts or rejects a proposal depends on the ministers' probabilities of acceptance and on the way that the decisions are made. Let $p_{M_k(QM)}$ and $p_{M_k(U)}$ denote the probabilities that the Council accepts the proposal at period k when the qualified majority or the unanimity is required respectively. Hence

$$p_{M_k(U)} = \prod_{j=1}^{15} p_{mj_k}$$

$$p_{M_k(QM)} = \sum_{S_k \subset M_k} \left[\prod_{j_k \in S_k} p_{mj_k} \prod_{j_k \in N_k \setminus S_k} (1 - p_{mj_k}) \right] y^k(S_k)$$

where (M_k, y^k) represents the game played within the Council of Ministers[8]: $M_k = \{m1_k, ..., m15_k\}$

$$y^k(S_k) = \begin{cases} 1 & \text{if } \sum_{j_k \in S_k} \omega j_k \geq 62 \\ 0 & \text{otherwise} \end{cases}$$

where ωj_k denotes state j number of votes in the Council.

4.2.1 Consultation procedure:

From figure 1, it can be seen that the probability of reaching the two period-games are the following:

$P(\text{reaching period 1}) = 1$

$P(\text{reaching period 2}) = p^1_C \cdot (1 - p^1_{M(QM)})$

4.2.2 Cooperation procedure:

From figure 2, it can be seen that the probability of reaching the different periods are the following:

$P(\text{reaching period 1}) = 1$

$P(\text{reaching period 2}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P)$

$P(\text{reaching period 3}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P) \cdot p^2_P \cdot p^2_C \cdot (1 - p^2_{M(QM)})$

$P(\text{reaching period 4}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P) \cdot p^2_P \cdot (1 - p^2_C) \cdot (1 - p^2_{M(U)})$

4.2.3 Co-decision procedure:

From figure 3, it can be seen that the probability of reaching the different periods are the following:

$P(\text{reaching period 1}) = 1$

$P(\text{reaching period 2}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P)$

$P(\text{reaching period 3}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P) \cdot p^2_P \cdot p^2_C \cdot (1 - p^2_{M(QM)})$

$P(\text{reaching period 4}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P) \cdot p^2_P \cdot (1 - p^2_C) \cdot (1 - p^2_{M(U)})$

$P(\text{reaching period 5}) = p^1_C \cdot p^1_{M(QM)} \cdot (1 - p^1_P) \cdot (1 - p^2_P)$

[8]The procedure can thus be seen as a compound game: at the lower level the Ministers vote within the Council and at upper level the Council votes with the Commission and Parliament.

4.3 Behavioural assumptions and power

As shown above a player's power can be defined as follows:

$$\psi_i(v) = \int_0^1 \dots \int_0^1 \sum_{k=1}^{m} E\left[v^k(S_k) - v^k(S_k \setminus i)\right] dp_{1_1} \dots dp_{n_m}$$

For the calculation purposes we have to define players' probabilities of accepting a proposal explicitly. We will consider the following assumptions:
1. Total independence: all players have independent probabilities of accepting a proposal.

p_{mi_k}	$\perp$	p_{mj_k}			$\forall\, i_k,\ j_k$	$\forall\, k$
p_{C_k}	$\perp$	p_{P_k}	$\perp$	p_{mi_k}	$\forall\, i_k$	$\forall\, k$
p_{C_k}	$\perp$	p_{C_t}				$\forall\, t,\ k$
p_{P_k}	$\perp$	p_{P_t}				$\forall\, t,\ k$
p_{mi_k}	$\perp$	p_{mi_t}			$\forall i$	$\forall\, t,\ k$

2. Correlation within the Council of Ministers: all Ministers have the same probability of accepting a proposal at one period.

p_{mi_k}	$=$	p_{mj_k}			$\forall\, i_k, j_k$	$\forall\, k$
p_{C_k}	$\perp$	p_{P_k}	$\perp$	p_{mi_k}	$\forall\, i_k$	$\forall\, k$
p_{C_k}	$\perp$	p_{C_t}				$\forall\, t,\ k$
p_{P_k}	$\perp$	p_{P_t}				$\forall\, t,\ k$
p_{mi_k}	$\perp$	p_{mi_t}			$\forall i$	$\forall\, t, k$

3.The Ministers, the Parliament and the Commission have the same probability of accepting a proposal at one period.

p_{mi_k}	$=$	p_{mj_k}			$\forall\, i_k, j_k$	$\forall\, k$
p_{C_k}	$=$	p_{P_k}	$=$	p_{mi_k}	$\forall\, i_k$	$\forall\, k$
p_{C_k}	$\perp$	p_{C_t}				$\forall\, t,\ k$
p_{P_k}	$\perp$	p_{P_t}				$\forall\, t,\ k$
p_{mi_k}	$\perp$	p_{mi_t}			$\forall i$	$\forall\, t, k$

Moreover we assume that we have: $p \sim U(0,1)$ for each independent probability

5 Results

Tables 1 and 2 show the unconditional and conditional power measures for the organs in the EU decision-making process when assuming that proposals are independent of each other. The former contains procedual status quo

bias and thus takes into account that the process can terminate without a decision while the latter states this term to zero. We do not report the cases with correlated proposals (periods) here because the figures are then very similar to those reported in tables 1 and 2.

[Tables 1 and 2 about here]

By assuming total independence of players the figures are, indeed, small irrespective of conditionality to a decision. As power is here the probability of being crucial this illustrates the high status quo risk in questions that are chosen totally behind a veil of ignorance (see Straffin 1988). In the case of total independence, the probability of passage of a random proposal is 4 per cent in consultation procedure and 2 per cent in cooperation and co-decision procedures. Status quo bias is the complement probability of these figures, 96 and 98 per cent respectively.

In regard to the EU the total independence assumption seems unrealistic since the competence of the Union covers policy areas that are defined as common by unanimity of member states. It is thus likely that at least member states' governments have a common standards when they evaluate a proposal, i.e. are homogeneous, while this might not be the case between the organs representing different things.

The status quo bias reduces as the correlation between voters' behaviour increases. Intra-organ homogeneity increases the probabilities of proposal's passage to 18 per cent in consultation procedure, 9 per cent in cooperation procedure and 10 in co-decision procedure. When assuming inter-organ homogeneity the probabilities are 28, 23 and 22 per cent respectively.

By restricting the analysis to the class of winning coalitions along each path we remove the procedual status quo bias, which is intuitively due to the fact that a proposal is amended and the rules of the game change from period to period. However, in each period, status quo bias still remains in similar manner as in usual cooperative games. In regard to the case of the EU these biases are reported in Widgrén [1996b].

The conclusion concerning the inter-organ relations is three-fold. First, it seems that when cooperation procedure was introduced it was mainly the Council that lost power in favour of the Parliament, not the Commission. An exception is the case of total independence in conditional measures. An intuition behind this is that independence of voters makes the Council relatively more reluctant to accept a proposal indicating in conditional indices that it has as an organ more credibility use threat strategies than the EP and the Commission. A more stronger role of the Parliament seems to be material-

ized mainly via its veto power as the status quo bias increases significantly when more powers were given to it. Second, the change in power figures is, surprisingly, almost neligible when cooperation and co-decision procedures are compared. A stronger role of the EP, the usual claim concerning the introduction of the co-decision procedure is not reflected by power indices. This seems to be due to the EP's veto power since the co-decision procedure introduced an unconditional veto to the EP while previously the Commission and a unanimous Council had the right to overrule EP's veto. A more active role of the EP materializes mainly via the so-called conciliatory committee which tries to find a compromise when the Council and EP disagree. These cases where a majority of the EP and a qualified majority of the Council can decide on compromise have, however, a rather small weight in co-decision procedure and as an indication the EP does not gain much power. Third, whatever behavioural assumptions we apply, the Council always wields more influence than the other two organs. For the Commission and the EP it seems to be, in terms of power, the more profitable the more homogeneously the organs behave.[9] This is due to the high weight of the first period in the extensive game. The rules of the game seem favour a quick solution in the sense that the status quo risk significantly increases over time.

6 A Concluding Remark

In this paper we have attempted to reduce an extensive form game into a cooperative game by using the probabilistic approach of the latter. The paper shows that probabilistic assumptions of cooperative voting games are useful tools even in the cases of analysing dynamic voting procedures. As a first attempt, this paper does not try to solve all problematic features of cooperative voting models: they are left for future research. One of them is agenda setting power. In the theoretical part of this paper we have given the basic tools how to deal with it in cooperative context but a deeper analysis of it is missing from this paper on purpose. Another important feature of extensive form games is players' time-preferences. In this paper, voters' time-preferences stem from behavioural assumptions regarding the acceptance of a random proposal. Theoretical part of this paper give here, again, much wider collection of tools than used in the EU example, as we have, for example,

[9]When assessing inter-body relations it is worth stressing that the ultimate agenda setting power of the Commission is disregarded in the analysis.

disregarded all the inter-dependencies between the periods.

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Table 1. Unconditional power indices for EU organs

	Consultation		
	Commission	Council	Parliament
Total indepenence	0.012	0.099	0
Intra-organ homogeneity	0.048	0.099	0
Inter-organ homogeneity	0.079	0.197	0
	Cooperation		
	Commission	Council	Parliament
Total independence	0.001	0.005	0.001
Intra-organ homogeneity	0.016	0.027	0.013
Inter-organ homogeneity	0.060	0.117	0.057
	Co-decision		
	Commission	Council	Parliament
Total independence	0.001	0.006	0.001
Intra-organ homogeneity	0.013	0.029	0.018
Inter-organ homogeneity	0.057	0.110	0.057

Table 2. Conditional power indices for EU organs

	Consultation		
	Commission	Council	Parliament
Total indepenence	0.034	0.190	0
Intra-organ homogeneity	0.136	0.394	0
Inter-organ homogeneity	0.286	0.714	0
	Cooperation		
	Commission	Council	Parliament
Total independence	0.039	0.253	0.039
Intra-organ homogeneity	0.166	0.289	0.137
Inter-organ homogeneity	0.257	0.501	0.242
	Co-decision		
	Commission	Council	Parliament
Total independence	0.037	0.266	0.041
Intra-organ homogeneity	0.130	0.290	0.180
Inter-organ homogeneity	0.253	0.492	0.254

Figure 1. Consultation procedure

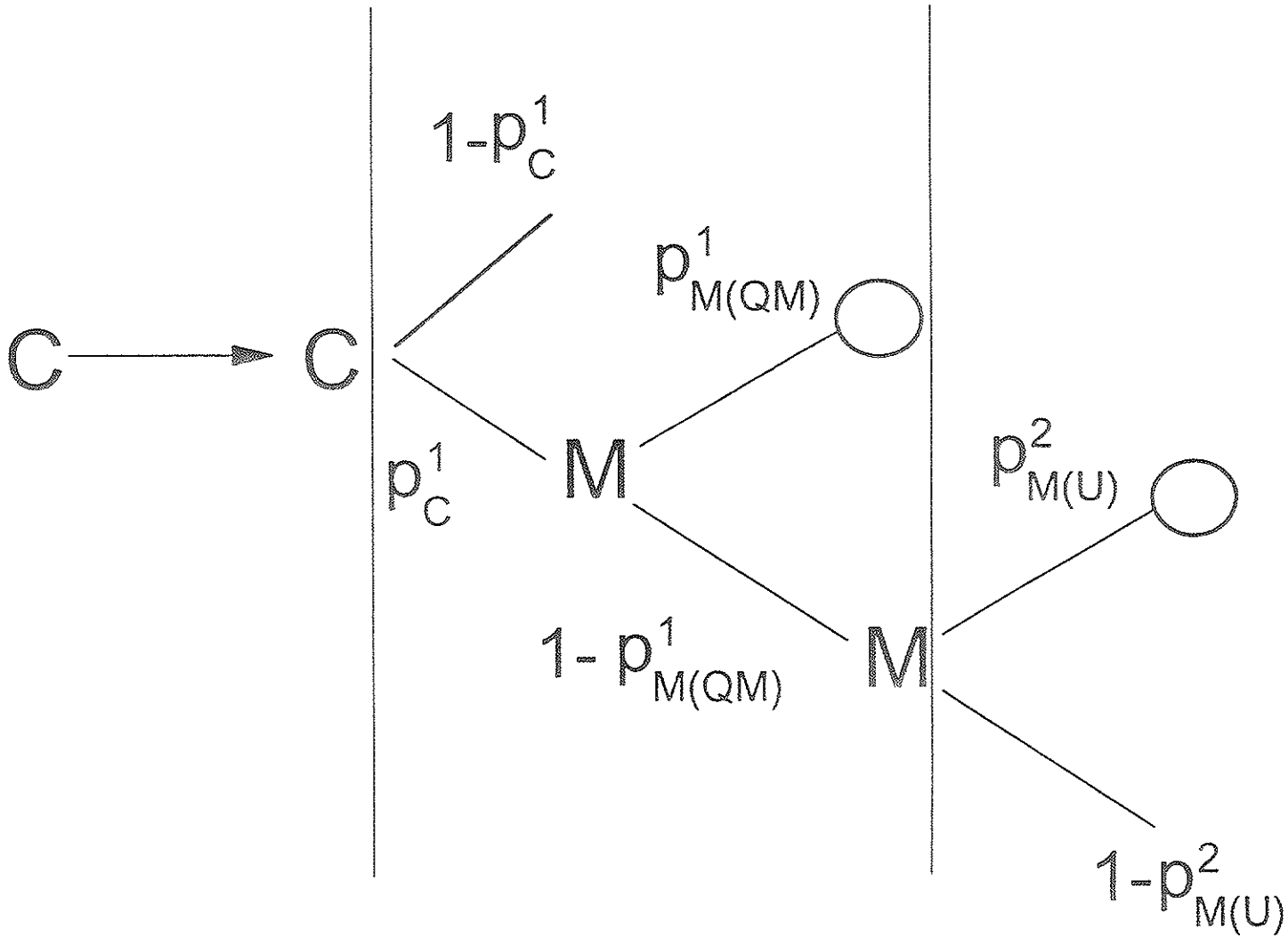


Figure 2. Cooperation procedure

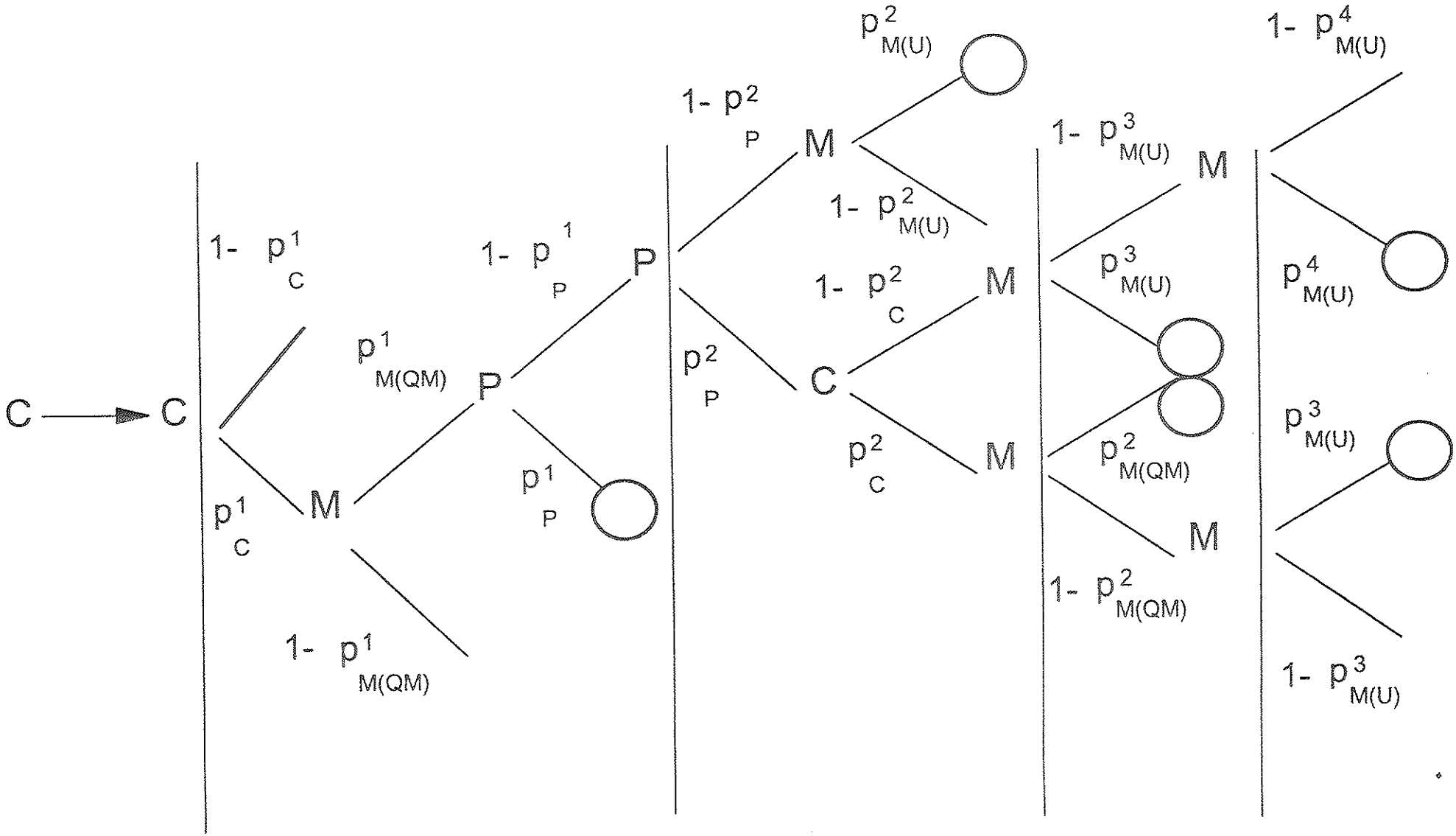
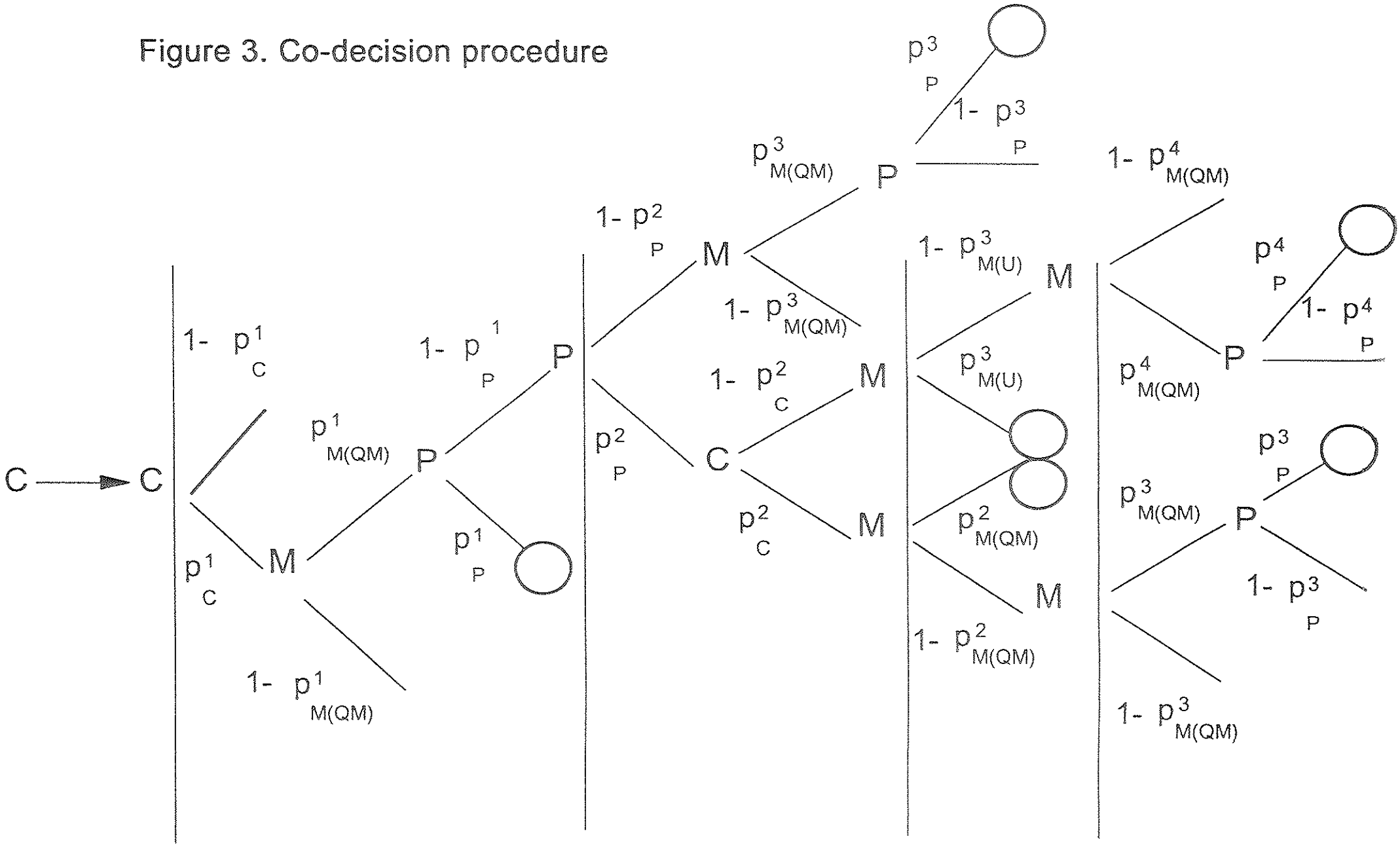


Figure 3. Co-decision procedure



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