

DISCOVERING ELECTORATE PREFERENCES IN VOTING PROCEDURES

J.Holubiec , G. Szkatula , D. Wagner
Systems Research Institute of the Polish Academy of Sciences

Abstract: The aim of the paper is to show in which way machine learning and rough set approaches can be used in discovering the rules describing electorate preferences during voting procedures

In the first part the theoretical considerations are presented. The second part give examples of practical applications of the method, based of Polish parliamentary elections .

Econometric estimation of hidden factor in group decision making – an impact on power index estimation.

Jacek Mercik

Wroclaw University of Technology, Poland

Abstract: In real life, estimation of power index (any a priori power index as Shapley-Shubik or Penrose-Banzhaf ones based on simple games) depends on the right evaluation of all factors influencing on final result of voting. Usually models build with use of set of certain factors are statistically significant but at the same moment they are low determined by those factors. The econometric technique how to improve the determinacy of such model is proposed and consequently the evaluation of power index is improved too. Such attempt lets also to investigate the characteristics of hidden factor by observing its reflex and variation in the model. Some examples and algorithm of improving of the econometric model are presented as well. The paper is proposed within the frame of Gianfranco Gambarelli's special session on group decision making and power indices analysis.

Keywords: econometrics, hidden factor, power index

Power Indices: a General Concept of Decisiveness

Frantisek Turnovec
Charles University in Prague

Abstract: Power indices methodology is widely used to measure an a priori voting power of members of a committee. Two most widely used power indices were proposed by Penrose and Banzhaf (1946, 1965) and Shapley and Shubik (1954). In this paper we analyse Shapley-Shubik and Penrose-Banzhaf concepts of power measure and classification of so called I-power (voter's potential influence over the outcome of voting) and P power (expected relative share in a fixed prize available to the winning group of committee members) introduced by Felsenthal, Machover and Zwicker (1998). We show that objections against Shapley-Shubik power index, based on its interpretation as a P-power concept, are not sufficiently justified. Both Shapley-Shubik and Penrose-Banzhaf measure could be successfully derived as cooperative game values, and at the same time both of them can be interpreted as probabilities of being in some decisive position (pivot, swing) without using cooperative game theory at all, see also Turnovec, (2004) and Turnovec, Mercik, Mazurkiewicz (2004).

It is demonstrated in the paper that both pivots and swings can be introduced as special cases of a more general concept of decisiveness based on assumption of equi-probable weak orderings expressing intensity of committee members' support for voted issues. New general a priori voting power measure is proposed distinguishing between absolute and relative power. This power measure covers Shapley-Shubik and Penrose-Banzhaf indices as its special cases

Keywords: Absolute power, cooperative games, decisive situation, I-power, pivot, power indices, P-power, relative power, swing.

Minimax Multi-district Apportionments (1)

Gianfranco Gambarelli (2) and Arsen Palestini (3)

Arsen Palestini

Florence

Abstract:

It is a well known fact that no apportionment method exists which is able to jointly respect the multiple criteria formulated for electoral systems as some criteria contradict others (see for instance [5]). Starting from some results by Balinski, Demange and Young ([1],[2],[3]), Gambarelli introduced in [7] an apportionment method which:

- a) is custom made for each case,
- b) respects the principal criteria of electoral systems (Hare minimum, Hare maximum, and Monotonicity) and
- c) satisfies, where possible, other criteria in order of preference.

Of special importance among these criteria is the one of power indices, which characterizes the democracy of a system (see for instance [4], [6], [8], [9], [10] and [11]).

The problem of fair apportionments becomes even more complicated in multi-district systems, as there are further conditions which the totals must satisfy and these are often contradictory. Therefore, it is necessary to find solutions which respect the most important criteria and which minimize distortions. This is what this paper proposes, generalizing [7].

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(2) Dept. of Mathematics, Statistics, Computer Science and Applications, University of Bergamo, Italy

(3)

Keywords: Apportionments, Power Indices, Hare minimum, Hare maximum, Monotonicity

The Public Good Index and Winning Coalitions

Gianfranco Gambarelli

University of Bergamo

Abstract: The "Public Good Index" introduced by Manfred J. Holler in (1978) led to several interesting applications. Holler and Packel axiomatized this index in (1983). A modification of one of these axioms (the "mergeability") done by Holler and Li in (1995), led to the "Public Value". In this work another index is built, and axiomatically characterized, taking into account all winning coalitions, instead of the minimal winning coalitions (as considered by Holler in (1978)).

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Keywords: Cooperative Games, Power Index, Public Good Index, Minimal Winning Coalitions

On the donation paradox for the Shapley-Shubik index for ternary voting games

Josep Freixas

Technical University of Catalonia

Abstract: Chua and Huang (2003) show that although the Shapley-Shubik index is immune to the donation paradox in weighted binary games, extension of the index to ternary games along the direction suggested in Felsenthal and Machover (1996, 1997) will cause it to be vulnerable to the paradox and this is the case as long as the number of players in the game exceeds three. They claim that this “undermines the attractiveness of the Shapley-Shubik index as a measure of a priori voting power.”

Freixas and Zwicker (2003) introduce the class of (j,k) simple games and propose a definition for weighted games in this context, a combinatorial property in terms of grade trade robustness characterize (j,k) games within the class of all (j,k) simple games. The most conspicuous example of $(3,2)$ simple games are ternary voting games. Freixas in (2005) provides a Shapley-Shubik notion for such games. In this work it is proved that this Shapley-Shubik notion applied to ternary weighted games is immune to the donation paradox. The obtained results are also extended to voting systems with several levels of approval in the input, i.e, to $(j,2)$ simple games.

Keywords: donation paradox, ternary voting games, Shapley-Shubik index for ternary voting games

Media Location and Political Influence

Ramon Xifre

ESCI - Universitat Pompeu Fabra

Abstract: An incumbent, whose type is not known with certainty, is running for an election. The incumbent knows his type but voters and a media outlet do not. Voters are heterogeneous ex-ante; they differ in their prior assessment of the incumbent's type. The media outlet observes a verifiable signal about the incumbent's type and decides which message to send and the segment of voters whom to send it. The outlet's profits are increasing in the change its message causes on voters' assessment of the incumbent's type. Before informing voters, the incumbent makes an offer to the outlet proposing a message and a segment of voters to inform in exchange for a monetary transfer. In absence of political influence, we show the outlet has a tendency to inform those extremist voters more reluctant with the message. This aligns outlet's and incumbent's interest partially in equilibrium. If the outlet's quality of information is not good enough, it may accept incumbent's offer to conceal adverse signals in equilibrium.

Keywords: D72, D82

On influence and power indices

Michel GRABISCH

University of Paris I

Abstract: The Hoede-Bakker index computes the overall decisional power of a player in a social network. It is assumed that each player has an inclination (original decision) to say "yes" or "no" which, due to the influence of other players, may be different from the final decision of the player. The main drawback of the Hoede-Bakker index is that it hides the actual role of the influence function, analyzing only the final decision in terms of success and failure. In this paper, we further investigate the Hoede-Bakker index, proposing an improvement which fully takes into account the mutual influence among players, by distinguishing an influence index from a power index. We focus especially on the definition of a suitable influence index (degree) of a given coalition on a given player. We propose three indices, which describe a possible influence, a certain influence, and an equidistributed influence. A general definition of a weighted index encompasses the three preceding indices. Properties of these indices are studied, and related on the one hand to special classes of influence functions, in particular pure influence functions of S upon T , where S, T are coalitions, and on the other hand to the notion of set of followers of a given coalition of players.

Keywords: social network, Hoede-Bakker index, influence index

Party Loyalty and Caps on Campaign Spending

Laurence Long

National University of Ireland Maynooth

Abstract: Campaign spending reform is a hot topic of conversation in many countries today. Although Ireland, France, New Zealand, Great Britain and others have introduced such reform, there are those such as the U.S, which have not. A cap places clear limits on campaign spending. Those who support caps on campaign spending argue that they will reduce wasteful spending by political parties and encourage smaller parties, while those against caps argue that imposing such restrictions violates free speech. However, does this type of reform work? Will it allow the smaller political parties a chance to compete? What effect will it have on popular parties? We introduce, in this paper, the assumption of party loyalty among voters. Campaign spending does not influence the voting behaviour of the party loyal. ‘Swing’ voters however, are assumed to be more likely to vote for the party with greater spending. This paper shows that when parties have a loyal support base, the party with the greater loyal support will have a greater probability of winning. When a cap is then introduced, expected total campaign spending will indeed decrease. However, the probability of winning for the party with the greater loyal base, contrary to belief, actually increases.

Keywords: Party Loyalty, Campaign Spending Caps

Strategic power indices

László Á. Kóczy
Maastricht University

Abstract: While they use the language of game theory the known measures of a priori voting power are hardly more than statistical expectations assuming the random behaviour of the players. Focusing on normalised indices we show that rational players would behave differently from the indices predictions and propose a model that captures such strategic behaviour.

Keywords: Banzhaf index, Shapley-Shubik index, a priori voting power, rational players