

[DOI: 10.20472/IAC.2015.020.050](https://doi.org/10.20472/IAC.2015.020.050)

**SERGUEI KANIOVSKI**

Austrian Institute of Economic Research (WIFO), Austria

**SASCHA KURZ**

Department of Mathematics, University of Bayreuth, Germany

## **REPRESENTATION-COMPATIBLE POWER INDICES**

### **Abstract:**

We use average representations of a weighted voting game to obtain four new indices of voting power for this type of voting games. The average representations are computed from weight and representation polytopes defined by the set of winning and losing coalitions of the game.

These average representations come remarkably close to fulfilling the standard criteria for a coherent measure of voting power. They are symmetric, positive, efficient and strongly monotonic. The dummy property, which assigns zero power to powerless players, can be imposed by restricting the polytopes. The resulting restricted average representations are coherent measures of power.

The defining property of the four new indices is representation compatibility, which ensures proportionality between power and weight. We believe that proportionality makes the new indices ideal measure of power for voting institutions, in which the votes are distributed to the voter based on their contribution to a fixed purse. Examples include shareholder voting in corporations and country member voting in the multilateral institutions of the Bretton Woods Accord (The World Bank, IMF).

The practical significance of representation compatibility lies in institutional design. In a weighted voting game, the design is given by the voting weights and the voting rule, or the number of affirmative votes required to pass a decision. In institutions, in which the number of votes depends on the capital contributions of the voters to a purse of a given size, a voter wants to know which distributions of voting weights confer the desired power or that voter's expected share of the purse. A prime example of such an institution is the corporation. But the same principles can be used for designing any voting body, for example distributing parliamentary seats after a general election, and we provide examples for the German Bundestag and the Austrian Nationalrat.

### **Keywords:**

average representation; power index; proportionality between weights and power

**JEL Classification:** D71, C71