Accepted Manuscript

A new axiomatization of the Shapley-solidarity value for games with a coalition structure

Xun-Feng Hu, Deng-Feng Li

PII: S0167-6377(17)30504-7
DOI: https://doi.org/10.1016/j.orl.2017.12.006
Reference: OPERES 6320

To appear in: *Operations Research Letters*

Received date : 5 September 2017
Revised date : 16 December 2017
Accepted date : 16 December 2017

Please cite this article as: X.-F. Hu, D.-F. Li, A new axiomatization of the Shapley-solidarity value for games with a coalition structure, *Operations Research Letters* (2017), https://doi.org/10.1016/j.orl.2017.12.006

A new axiomatization of the Shapley-solidarity value for games with a coalition structure

Xun-Feng Hu[a], Deng-Feng Li[b,*]

a. School of Business Administration, Guangzhou University, Guangzhou 510006, China

b. School of Economics and Management, Fuzhou University, Fuzhou 350108, China

Abstract: In this paper, we propose a new kind of players as a compromise between the null player and the A-null player. It turns out that the axiom requiring this kind of players to get zero-payoff together with the well-known axioms of efficiency, additivity, coalitional symmetry, and intra-coalitional symmetry characterize the Shapley-solidarity value. This way, the difference between the Shapely-solidarity value and the Owen value is pinpointed to just one axiom.

Key words: Transferable utility cooperative game, coalition structure, Shapley-solidarity value, Owen value.

Mathematics Subject Classification: 91A06, 91A12.

1 Introduction

Recently, Calvo and Gutiérrez [4] proposed the Shapely-solidarity value for transferable utility cooperative games with a coalition structure (henceforth CS-TU games) [1]. As the name suggests, this value is a combination of the Shapley value [17] and the solidarity value [18]. It is defined in the same two-step procedure as the Owen value [15]. First, all a priori unions play a quotient game and get its payoff according to the Shapley value. And then, all players belonging to the same union play an induced game [15] and get its payoff according to the solidarity value.

The Shapely-solidarity value shares many axioms with the Owen value, such

*Corresponding author: School of Economics and Management, Fuzhou University, No.2, Xueyuan Road, Daxue New District, Fuzhou District, Fuzhou 350108, Fujian, China.
Email: guyue85868@163.com (Xun-Feng Hu), lidengfeng@fzu.edu.cn (Deng-Feng Li).