Application of Cross Efficiency in Stock Exchange

Mozhgan Mansouri Kaleibar[a] **and** **Sahand Daneshvar**[b]

[a] Young Researchers Club, Tabriz Branch, Islamic Azad University, Tabriz,Iran
Email: Mozhganmansouri953@gmail.com

[b] Tabriz Branch, Islamic Azad University, Tabriz, Iran
Email: Sahanddaneshvar@yahoo.com

Abstract

This paper firstly revisits the cross efficiency evaluation method which is an extension tool of data (envelopment analysis. In this paper, we consider the $DMUs$ as the players (institutions) in a cooperative game, where the characteristic function values of institutions are defined to compute the Shapley value of each DMU (institution), and the common weights associate with the imputation of the Shapley values are used to determine the ultimate cross efficiency scores for institution of Stock Exchange of Tehran. This paper introduces the models for computing benefit for each institution. Using shapely value we obtain the effect of each institution, and through determining common weight for each company we find out the ultimate weight which shows how much the existence or not existence of that institution affects the interesting competence.

Keywords: Data Envelopment Analysis (DEA), Cross efficiency, Cooperative game, Shapley value, Common weights, stock exchange.

References

[1] G. Owen, *On the Core of Linear Production Games,* Mathematical Programming, 1975, No. 9, 358- 370.

[2] J. Wu, L. Liang and F. Ynag, *Determination of The Weights for The Ultimate Cross Efficiency Using Shapley Value in Cooperative Game,* Expert Systems with Applications, 2009, No. 36, 872-876.

[3] K. Nakabayashi and K. Tone, *Egoist's Dilemma: a DEA Game,* The International Journal of Management Science, 2006, No. 36, 135-148.

[4] S. Daneshvar and M. Mansouri Kaleibar, *The Minimal Allocated Cost and Maximal Allocated Benefit,* Presented at the Int Conf. Engineering System Management and Application Sharjah, UAE, 2010.

[5] W. Cooper, L.M. Seiford and K. Tone, *Data Envelopment Analysis,* Boston: Klawer Academic publishers, 2000.