Decisions on the Risk-averse Competing Firms under Enhancing Environmental Social Responsibility

Wei Zheng1, Bo Li1 and Junhong Yang2

1College of management and Economics, Tianjin University, Tianjin, China; 2School of Mechanical Engineering, Tianjin University, Tianjin, China
zhengwei931211@foxmail.com, libo0410@tju.edu.cn, yangjunhong@tju.edu.cn

Abstract
This paper studies the decisions of two competing firms with the risk-averse behaviors when enhancing environmental social responsibility (ESR). As a benchmark of two firms without investing ESR, we focus on the other case, that is, one of them invests in ESR. A Nash game together with the conditional value at risk (CVaR) to evaluate the risk-averse behavior is built to model the decisions and the optimal equilibrium solutions are compared under the two cases. We find that once the firm invests ESR, his price will be increased no matter how much his risk-averse degree is. Further, we obtain the conditions under which the firm will select to invest in ESR when he has risk-averse behavior and some important parameters, such as the cost and the demand elasticity, will strongly influence the selection of the firm’s green investment.

Keywords
Environmental social responsibility (ESR); Decision policy; Conditional value at risk; Game theory

Acknowledgements
This paper is supported by the National Nature Science Foundation of China under Grant No. 71472133 and No.71881330167.

Biographies

Wei Zhen received her B.S. degree from College of Management and Economics in Tianjin University, China. He is now a research student towards his Ph.D. degree at College of Management and Economics, Tianjin University, China. His research interest lies in Supply chain management under low-carbon environment, shipping line competitions and enterprises’ environmental social responsibility.

Bo Li is a professor of College of Management and Economics in Tianjin University. She received her Bachelor and Master degree of Mathematics, Computer and System Control from Nankai University, China. She received her Doctor degree of Management Science and Engineering from Tianjin University, China. Her research interests are supply chain management and coordination, logistics optimization and scheduling.

Junhong Yang is an associate professor of School of Mechanical Engineering in Tianjin University. She received her Bachelor and Master degree of Mechanical Engineering from Tianjin University, China. She received her Doctor degree of Engineering thermalphysics from Tianjin University, China. Her research interests are low-carbon technology and management, green combustion technology.