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LOW CARBON EMISSION REDUCTION AND SUBSIDY DECISION OF SUPPLY CHAIN UNDER CAPITAL CONSTRAINTS

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Abstract

The sustainable operation of low-carbon transformation is the cognition of the government and enterprises. In view of the current situation that small and medium-sized enterprises are facing financial constraints, it is particularly important for the government to take incentives for them to achieve their low-carbon transformation. This paper builds a Stackelberg game model between a manufacturer subject to capital constraints and a retailer with low-carbon procurement needs, and introduces green credit subsidy, emission reduction research and development (R&D) technology subsidy and low-carbon product production subsidy into the model, and comprehensively analyzes three subsidy strategies effect and incentives for the manufacturer to reduce emissions. The research shows that although the low-carbon procurement demand of the retailer may not increase the additional emission rate of the capital-constrained manufacturer, it can increase the profits of the manufacturer and the retailer. Although the government's increase in green credit and emission reduction R&D technology subsidies can motivate the manufacturer to reduce emissions, it will cause a contradiction between emission reduction effects and corporate profits. The government's implementation of low-carbon product production subsidy can increase the profits of the manufacturer and the retailer, but the emission reduction effect may not be optimal. In addition to considering the factors of government subsidy intensity, it is also necessary to comprehensively consider the impact of basic market demand, the consumers' low-carbon preference, the bank interest rate and initial capital of the manufacturer on the emission reduction effect.

Key words: capital constraints, emission reduction, game theory, government subsidy, low carbon procurement requirements

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