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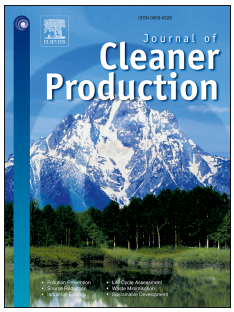

Supply chain enterprise operations and government carbon tax decisions considering carbon emissions

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Supply Chain Enterprise Operations and Government Carbon Tax Decisions Considering Carbon Emissions

Abstract

The reduction of carbon emissions is a world-wide concern. Many countries have implemented various policies to reduce carbon emissions, which has affected the operational decisions of enterprises in the supply chain since most carbon is emitted during the production process. In this paper, the mutual relationship between supply chain enterprise operations and government policy are considered. Governmental carbon emission tax policies are examined using the three-stage Stackelberg game model with a decentralized supply chain and the two-stage Stackelberg game model with a centralized supply chain. The optimal strategies of enterprises and governments are theorized for both types of supply chains. In the decentralized supply chain, a product's retail price and the government's carbon tax are higher than those in centralized decision-making mode. In the centralized supply chain, the stocking factor of the retailer, the profit of the supply chain and the expected social welfare of the government are higher than those in decentralized supply chain. With the increase of carbon emissions tax, the wholesale price of manufacturer and retailing price of retailer under the decentralized supply chain, as well as retailing price of retailer under centralized supply chain increase. The results indicate that the centralized supply chain is more beneficial to enterprises and government than the decentralized supply chain. By performing the comparisons of the manufacturer-dominated supply chain with retailer-dominated and no agent dominated supply chains, it is shown that both the environment performance and financial performance of supply chain are better off when the supply chain members have distributed pricing powers.

Keywords

Carbon tax; Stochastic demand; Supply chain; Stackelberg game