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# Carbon emission reduction decisions in the retail-/dual-channel supply chain with consumers' preference

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## ABSTRACT

The reduction of carbon emission has become an inevitable trend and a world-wide consensus. Under the low-carbon environment, it is an important task for supply chain members to reduce carbon emissions through low-carbon progressing. This paper focuses on the emission reduction behaviors for the chain members in both the retail-channel and dual-channel cases using the Stackelberg game model. The paper analyzes a detailed model which incorporates both cap-and-trade regulation and consumers' low-carbon preference. The results suggest that when the degree of consumers' low-carbon sensitivity satisfies certain conditions, the introduction of the online channel is profitable for the manufacturer. In addition, the cap-and-trade mechanism is acceptable for supply chain members when consumers have strong low-carbon preference. Furthermore, two emission reduction strategies are compared, including single manufacturer's emission reduction in production strategy and joint emission reduction strategy, of which entails manufacturer's and retailer's emission reduction. It can be concluded that the joint emission reduction strategy is more profitable for both the manufacturer and the retailer. When considering consumers' low-carbon preference, the retailer always has motivation to implement low-carbon promotion though without the manufacturer's incentives. The low-carbon promotion can help achieve emission reduction goals, promote economic development and social progress. The results can provide useful insights for policy-makers to implement effective regulations and for decision-makers to implement sustainability initiatives.

**Keywords:** Dual-channel; supply chain; low carbon preference; cap-and-trade; carbon emission reduction

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