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CARBON TRADING, GREEN REPUTATION AND CONSUMER PREFERENCES: DRIVING MANUFACTURING ENTERPRISES' NET-ZERO EMISSIONS THROUGH NETWORK-BASED POLICY MECHANISMS

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Abstract

This study develops a network game model grounded in prospect theory. The model integrates factors such as dynamic carbon quotas, government subsidies and penalties, consumer low-carbon preferences, and green reputation to analyze the evolutionary patterns of enterprises' low-carbon strategies. The findings reveal that: (1) Dynamic carbon quotas significantly promote enterprises' low-carbon transition rates through price signals, fostering the widespread adoption of low-carbon, negative-carbon, and carbon-sequestration technologies, though high technological costs and low market demand may negatively impact enterprise profitability; (2) Stronger government penalties exert a pronounced positive effect on low-carbon transition rates, accelerating the transition process more effectively than subsidies, with synergistic effects from carbon pricing further enhancing policy outcomes; (3) Consumer low-carbon preferences significantly drive enterprises' low-carbon transitions through network effects, where high consumer preferences combined with moderate carbon pricing effectively increase transition rates while mitigating profitability pressures, thereby promoting economic sustainability; (4) Green reputation positively influences the evolutionary stable strategy of low-carbon transitions by enhancing enterprises' market competitiveness, particularly in environments with high carbon prices and strong consumer preferences, where green reputation significantly strengthens enterprises' inclination to adopt low-carbon strategies, facilitating the evolution of supply chains toward a low-carbon equilibrium.

Key words: dynamic carbon quotas, green reputation, manufacturing enterprises' net-zero emissions, prospect theory, network games

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