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Dual-Channel Closed-Loop Supply Chain: Competition and Channel Coordination

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Abstract

Due to changing environmental laws, adoption of sustainable practices, and shortage of raw materials, manufacturers are increasingly focusing on remanufacturing. The implementation of successful remanufacturing practices is dependent on efficient recollection. Many firms are adopting dual-channel recollection to enhance their recollection efficiency. We study a dual-channel recollection efficiency of a closed-loop supply chain consisting of a manufacturer, a retailer, and a third-party collection agent, where the manufacturer recollects using any two of the three agents. We analyze three competitive hybrid recollection channels under full and asymmetric information settings using wholesale price, linear and non-linear two-part tariff contracts. Our key findings are as follows: (i) two part tariff (LTT) contracts can coordinate the recollection channel consisting of OEM and retailer irrespective of reverse channel competition, (ii) recollection using OEM and retailer works better when OEM offers wholesale price contract, (iii) if OEM offers LTT contract, then recollection channel consisting of OEM and retailer performs better with low competition intensity, and recollection channel consisting of OEM and a third-party (3P) vendor performs better with high competition intensity, (iv) an OEM cannot design channel coordination mechanism whenever a 3P vendor is involved but she can design Pareto-optimal contracts to improve profitability, (v) in asymmetric information game, an OEM's profit increases if recollection agents share their hidden cost information with her, and (vi) OEM earns more profit by employing herself and another supply chain agent for product recollection if OEM's recollection efficiency is higher; in case of complete outsourcing of recollection activity through a retailer and a 3P vendor, OEM earns more profit if the retailer is more efficient than the vendor.

Keywords

Dual-channel, Closed-loop supply chain, competition, channel coordination.