Supply chain coordination contract design: The case of farmer with capital constraints and behavioral preferences

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\textbf{ABSTRACT}

Coordination mechanism design is an important issue in agricultural supply chain. This study investigates agricultural supply chain coordination contracts in the presence of output uncertainty. It considers a two-level supply chain comprising a farmer and a retailer, where the farmer faces capital constraints and shows stockout-averse (SA), waste-averse (WA), or stockout- and waste-averse (SW) preferences. The results show that the retailer order, production input, and supply chain expected utility in the decentralized decision framework are lower than those realized under the centralized decision model; hence, the wholesale price contract cannot coordinate the supply chain. Nevertheless, the designed coordination contract mechanism coordinates the supply chain efficiently and realizes a flexible distribution of benefits between the farmer and the retailer. Furthermore, when the revenue-sharing coefficient meets specific conditions, both the farmer and the retailer achieve a win-win situation. Finally, we verify the coordination contract design using numerical simulations and analyze the effects of SA and WA preferences on decision-making and the supply chain expected utility. This study provides theoretical guidance for the coordination mechanism design of agricultural supply chain with capital constraints and behavioral preferences.

\textbf{Keywords:}
Supply chain; Supply chain coordination; Contract design; Capital constraints; Waste-averse preferences; Stockout-averse preferences; Behavioral preferences

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