

基于随机产出与随机需求的农产品供应链风险共担合同

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The Risk-sharing Contracts under Random Yield and Stochastic Demand in Agricultural Supply Chain

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- 摘要
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摘要 本文采用单位价格补贴的风险共担机制,分析了农产品供应链中随机产出和随机需求下供应商-制造商采取不同的风险共担合同对农资投入、供应商、制造商以及整个供应链的利润的影响。文中的风险共担合同包括风险无共担合同、需求风险共担合同、产出风险共担合同、产出-需求风险共担合同,结合算例,结论得出:需求风险分担可以使供应链利润增加;产出风险分担可以增加供应商的利润收益,而赋予制造商控制供应商农资投入积极性的权利;产出-需求共担合同既能增加供应链及各成员的利润收益,同时还使得双方相互制约、相互协调,促使供应链良好发展。最后,结合非线性补贴的风险分担形式对上述合同的有效性进行了验证,研究表明,不同的补贴形式只在量上对决策存在影响,而本质上的结论并没有变化。

关键词: 农产品供应链 风险共担 随机产出 随机需求 价格补贴

Abstract: The yield of the crops is influenced by the natural environment heavily, as a result of the changes of weather and seasons, the yield of the crops are stochastic. Considering the stochastic characters of the market demand, the agricultural supply chain faces both yield uncertainty and demand uncertainty. Consequently, how to design an efficiency contract to reduce the harm of the uncertainties is an urgent problem for both the supplier and manufacturer in the agricultural supply chain. Through adopting a price-subsidies' risk-sharing mechanism, it is analyzed that different risk-sharing contracts which supplier and manufacturer used will bring the differences of agricultural investment, supplier's profit, manufacturer's profit and entire supply chain's profit. The risk-sharing contracts in the paper include no risk-sharing contract, yield risk-sharing contract, demand risk-sharing contract and yield-demand risk-sharing contract. Combined with numerical calculation, it is concluded that sharing the risk of demand could increase the profits of the chain and each firm, while by sharing the yield risk, the manufacturer can change the investment proportion of the supplier, and the yield-demand risk sharing is benefit for both the supplier and the manufacturer. They construal and coordinate each other to prompt the supply chain's development. In addition, the non-linear price-subsidies' risk-sharing mechanism for the risk-sharing contracts is shown as an example. The analysis shows that the form of the price-subsidies can only influence the decisions quantitatively, while the findings are substantially the same.

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