

## 供需不确定下基于MOI和VMI模式的供应链协同比较研究

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### Comparative Study of Supply Chain Coordination Based on MOI and VMI under Random Yield and Uncertain Demand

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**摘要** 为分析供应链运作机制对降低随机供应商产出和随机需求的影响,对比研究了两供应商-单制造商系统在MOI和VMI两种模式下的供应链协同模型。MOI模式下,制造商管理并持有库存,提出了供应风险共享的协同机制;VMI模式下,供应商管理并持有库存,提出了收益共享与额外惩罚的协同机制。分析了集中决策、MOI和VMI模式下的最优批量决策,证明了VMI模式下存在唯一的纳什均衡。研究还发现,VMI模式更容易协调供应链,有效降低供需不确定的影响。MOI模式下的供应链可实现帕累托改进,但不能实现协调;而当参数满足一定关系时,VMI模式下供应链的期望利润可达到集中决策。

**关键词:** 随机产出量 随机需求 制造商持有库存 供应商管理库存 协同模型

**Abstract:** In order to analyze the effect of operation mode of supply chain on supply chain performance under random yield and uncertain demand, supply chain collaborative models under manufacture-owned-inventory (MOI) and vendor-managed-inventory (VMI) are studied, which consist of two suppliers-one manufacturer assembly system. A collaborative model based on supply risk sharing is proposed under MOI, where the manufacturer is fully responsible for inventory decision and held inventory of components. Another collaborative model based on revenue sharing and additional penalty on critical supplier is proposed under VMI, where suppliers are fully responsible for the production and inventory decisions and held inventory. Optimal lot sizing under centralized decision, MOI and VMI are analyzed, and Nash equilibrium is proved to exist under VMI. Results also show that VMI is much easier to coordinate supply chain than MOI, and is more effective to reduce the effect of random yield and uncertain demand on supply chain performance. Supply chain can achieve Pareto improvements under MOI, but can not be coordinated. However, when parameters satisfy certain relationship, the expected profit under VMI can reach the profit of the centralized decision.

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