

A Multi-Echelon (R, S) Inventory System with Direct Shipment

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Abstract

It is vital for enterprises to maintain careful management of inventory in order to keep high levels of customer service. We study a multi-echelon, periodic-review (R, S) inventory system where direct shipment can be used to reduce the risk of stockout. The system consists of a distribution center, a warehouse and multiple retailers. Beside normal ordering channels from the warehouse, inventory in retailers can also be replenished by shipment directly from the distribution center with shorter lead time, but at a higher cost. We propose a direct shipment policy that can be applied on such a system to reduce total costs by decreasing shortages. Related costs, including holding, transportation, ordering, shortage and direct shipment cost, for such systems with and without the option of direct shipment are formulated and compared. Results of numerical experiment show that the implementation of the direct shipment policy can effectively cut down the number of shortages and reduce the total system costs.

Keywords: service level, (R, S) stock policy, multi-echelon inventory system, direct shipment.