Simulation Study On Two-Stage Inventory Policies With Non-unit Sized Demand

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Abstract

In most research on inventory management, inventory policies are studied under the assumption of unit-sized demands. However, demands from customers are usually non-unit sized in practice. With batch ordering, demand variability is enhanced and causes complexity in inventory control decision making. Firms in the upstream of the supply chain are affected more as the variability is magnified. Therefore, the inventory policies originally developed assuming unit-sized demands have to be modified in order to be applied in systems with batch demands.

This study considers a two-stage inventory system that contains a retailer and a supplier. Customer arrivals at the retailer are assumed to be Poisson distributed. Order quantity of a customer is assumed to be normally distributed. Inventory control policies with and without the consideration of non-unit sized demands are developed. Methods for determining reorder points and order quantities are proposed in attempt to reduce total costs with various degrees of information sharing. Two scenarios with different batch demand sizes are designed and examined through simulation study. Affects of each inventory control policy to system performance in each scenario are analyzed.

Keywords: Non-unit sized demand, Two-stage inventory system, Simulation