

A Study on Replenishment Policies for Two-echelon Inventory Systems with Deteriorating Items

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ABSTRACT

Inventory management plays an important role for enterprises to manage the supply chain well. Studies on inventory control under supply chain environment usually assume no item deterioration. However, inventory items deteriorate through time in many inventory systems. Item deterioration reduces available inventory quantity and may lead to shortages if not taken into consideration. Inventory control problems become more complicated when deteriorating items are involved.

This study considers a two-echelon inventory system with a deteriorating item. The inventory system is composed of one distributor and multiple retailers. Periodic review policies are applied. Search algorithms are developed to find optimal control parameter values with an objective of minimizing total costs of the two-echelon inventory system. An intensive numerical study is conducted and the performance is compared and analyzed. Through our experiments, it can be shown that the proposed heuristic algorithm performs better when proper adjustment is made during the procedure. It is found that deteriorating factors indeed damage the performances of each party in a supply chain, and particular, retailers receive greater impact. In addition, the results show how inventory control policies and system costs are affected by deteriorating items.

Keyword: Two-echelon Inventory System Deteriorating Items Inventory Policy