

An integrated vendor-buyer model with equal shipments, normally distributed demand and empirically distributed lead-time

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Abstract

This study addresses joint economic lot-sizing (JELS) problem with a vendor and a buyer which replenishes a given product from the vendor. Shipments transferred from the vendor to the buyer are assumed to have equal sizes. In addition, unlike the previous studies, demand and delivery are assumed to be stochastic and following normal and experimental distributions respectively. In the given model, we assume that the combination of the two types of backordered and lost demand can exist. In addition, service level constraint is also considered. The purpose is to find the optimal order values, the number of shipments, reorder point and safety stock. We present a heuristic method in order to reach the decision variables of the model. Numerical examples indicated frugality in chain cost in the integrated model and efficiency in the heuristic method. In addition, the results showed that chain costs increase by increasing delivery time, but the values of reorder point and safety stock depend on the changes in the level of services and they increase as the service level increases.

Keywords: Supply chain, Vendor-buyer integration, Equal shipments, Stochastic demand; Stochastic lead-time.