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Permissible Delay in Payments in the Two-echelon Inventory System with Controllable Setup Cost and Lead Time under Service Level Constraint

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Abstract

The single-vendor single-buyer integrated production-distribution inventory system has been an object of study for a long time, but little is known about the effect of investing in reducing setup cost and trade credit financing on the integrated inventory models. In this study an integrated production-distribution inventory model is presented for a single-vendor single-buyer supply chain with the consideration of vendor offers permissible delay period to buyer, buyer review his inventory using continuous review policy, vendor setup cost can be reduced through further investment, controllable lead time and Service Level Constraint (SLC). A mathematical model is derived to investigate the effects of setup cost reduction and permissible delay in payments on the integrated inventory system. This study develops an iterative procedure for determining the optimal solutions of inventory lot-size, lead time and total number of deliveries in one production run simultaneously with the objective of minimizing joint total expected cost whereas satisfying SLC of the buyer. A numerical example is presented to illustrate the model and sensitivity analysis has been carried out to illustrate the behaviors of the proposed model.

Keywords: Permissible delay in payments, setup cost, service level constraint.