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Lead-time investigation and estimation in divergent supply chains

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Abstract

This paper investigates the delay experienced by retailers in a distribution system due to shortages at the central warehouse. Simple formulae are developed to estimate the mean and variance of this delay. The formulae are based on replacing the stochastic lead-time demand with a stochastic demand rate, and they differ in how this demand rate is estimated. An extensive numerical study shows improved accuracy compared to existing methods with similar computational complexity. The numerical study also shows that the batch quantities and the service level have a large influence on the delay. Both the mean and variance of a retailer's delay decrease with the service level and increase with the batch quantities used at the warehouse and at the retailer. No other variables seem to have a significant impact on the delay.

Keywords: Lead-time, Stochastic, Inventory control, Multi echelon, (R,nQ)-policy

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