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A joint optimal policy for a multiple-suppliers multiple-manufacturers multiple-retailers system

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Abstract

This paper considers an integrated production-inventory model for a three-stage supply chain involving multiple suppliers, multiple manufacturers and multiple retailers. The suppliers/manufacturers produce the raw materials/final goods at a finite rate and deliver the materials/goods in a number of batches to the manufacturers/retailers. We analyze the problem where the lead times from the manufacturers to the retailers are stochastic and shortage is allowed. We also explicitly include the transportation costs from the manufacturers to the retailers into the model. The numerical analysis shows that the coordination mechanism employed is more beneficial for the cases with less unpredictable lead times, lower shortage prices, and no transportation cost.

Keywords: Supply chain coordination; integrated production-inventory; joint economic lot sizing.

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