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A joint economic lot size model with financial collaboration and uncertain investment opportunity

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Abstract

Establishing long-term relationships among the members of a supply chain has become necessary to enhance the supply chain's competitiveness in a globalized environment. Besides coordinating operational decisions, such as how much and when to produce or to order, the members of a supply chain may also share financial resources or act jointly on the capital market. This is important especially when companies have unequal access to capital, for example because they are located in countries with different economic conditions and banking policies and/or they have different credit ratings. The joint financing of investments across the supply chain may thus ensure the stability of production and of the flow of products to the customers. In addition, it strengthens the established relationships among the supply chain members. The paper at hand takes up these issues and presents a joint economic lot size model that allows investments financed cooperatively by the members of the supply chain. In particular, it considers a two-stage single-vendor single-buyer supply chain and assumes that the vendor has the option to invest in increasing its production rate. The outcome of these attempts to improve production capabilities, however, is uncertain and subject to an investment success probability. Due to different access to capital, the vendor and the buyer may also share the investment and the outcome uncertainty, which can be beneficial to both parties.

Keywords

Integrated inventory; Supplier credits; Variable production rate; Uncertain investment; Annuity stream approach

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