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Facing How Firms Respond Intelligently in a Supply Chain Uncertain Market Prices?

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ABSTRACT
Faced by the volatile market price uncertainty, companies within a supply chain should timely respond to the changes of market conditions by the collaboration among the suppliers and retailers and by the involvement in an efficient supply chain management system. To address the importance of supply chain collaboration, this paper proposes a valuation model in the context that a firm owns two sequential production processes, based on the work of Gonzalo and Eduardo. We propose a maximization framework for the value of a supply chain under continuous time and stochastic market price. A t wo-echelon supply chain is considered: the first level is a business market, in which a single supplier delivers stock to a single retailer, while the second level is the consumer market, in which a single retailer sells its stock to multiple customers. A perpetual American call option is adopted to evaluate the supply chain facing uncertain market prices changed with time. The delivery cost is embedded in the framework to investigate its impact on the supply chain value. The entry threshold of the market prices for the supplier and the retailer are derived separately and the optimal value of the supply chain is calculated. Sensitivity analyses are finally performed in the last section to provide readers with more managerial insights into our framework in practice.

Keywords: supply chain, uncertain market price, entry threshold, delivery cost, American call option