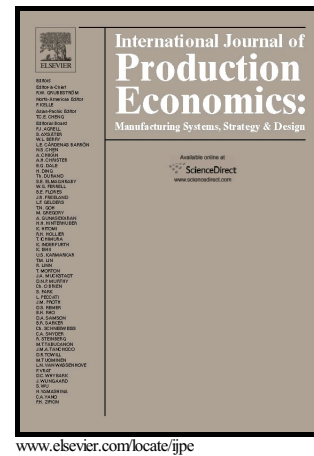


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On the Cost of Capital of Inventory Models with Deterministic Demand

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Abstract

In the operations management literature, the financial risk in an inventory model is usually assumed to be captured by the (constant) weighted average cost of capital (WACC) of the firm. This assumption is, at best, an approximation, since this cost depends on the risk of the cash flows, which, in turn, depends on the inventory policy. We investigate what the right cost of capital should be in an inventory model with deterministic demand. To do so, we study an inventory model with a generic inventory cost function where risk depends on the inventory decision made. Additive and multiplicative financial noise functions are included to assess the impact of these on both the cost of capital of the firm and the optimal inventory policy. We find that, in contrast to previous models, risk is not in general a monotone function of inventory. Also, a rate close to the risk-free rate, which typically deviates significantly from the WACC, should be used to value inventory-related investments when the inventory cost function is dominated by holding cost for large order quantities, even if investments are subject to other sources of financial variability.

Keywords: Supply chain management; risk; operations management-finance link; cost of capital

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