

BASE STOCK LIST PRICE POLICY IN CONTINUOUS TIME

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Abstract

Pricing and replenishment strategies are studied separately, in general. Attempts have been made to consider the two problems jointly. However this is done only in discrete time. Since without pricing a complete theory exists in discrete as well as in continuous time, it is natural to study the extension of the continuous time theory in order to incorporate pricing. We assume in this paper no fixed cost, only a variable cost of ordering. Without pricing in discrete time, under very natural assumptions, the optimal ordering policy is given by a Base stock. There is a value S , such that, if the inventory x is below S , the optimal order is $S - x$, and if the inventory is larger than S , then the optimal order is 0. Extensions have been made in discrete time, to incorporate pricing. The natural extension of the Base stock policy, is the Base stock list price policy, see [4]. This policy is characterized as follows. There is a Base stock S . When the stock x is below S the optimal ordering is $S - x$, and the optimal price is a function of S , $\pi(S)$. When the stock x is larger than S , the optimal order is 0, and the optimal price is $\pi(x)$. Moreover, $\pi(x)$ is decreasing in x , and $\pi(x) \leq \pi(S)$. This property means that, when the stock is too large, it is optimal to offer a rebate. The larger the stock, the larger the rebate. Our objective in this work, is to extend this idea to continuous time situations, which has not been done considered before. We adopt for model of the demand the classical situation of a deterministic rate of demand per unit of time, with a gaussian uncertainty described by a Wiener process. However the rate is influenced by price. The price policy must be decided together with the inventory control. We show that the base stock list price policy concept, can be extended to this situation, under some assumptions which couple the demand characteristics and the various costs. We cover the case of an average demand which decreases with price as a power function.

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References

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