

Some Problems in Inventory Management with Price Inflation

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Abstract

The thesis studies the effect of inflation on an inventory model over a finite planning horizon, where the inflation rate may be constant or random. It concentrates on a periodic review inventory policy for deteriorating items allowing shortages and under permissible delay in payment, where demand is price dependent, and due to the effect of inflation on price, changes over time.

Chapter One studies the literature review and preview of the current work. The thesis is summarized below

Chapter Two studies an inventory model for deteriorating items with constant inflation rate, allowing shortage under linearly price dependent demand. Three types of permissible delay in payment are considered – (i) when the trade credit period is a constant independent of the order quantity, (ii) when the period is dependent on the order quantity, and (iii) when the payment has to be made in two fixed installments. The sensitivity of the model to change in the parameters has been carried out numerically.

In Chapter Three an attempt has been made to study the effect of constant inflation rate on the optimal replenishment policy under iso-elastic and hybrid demand. We determine the optimal number of replenishments and optimum cycle lengths for the different inventory cycles. A sensitivity analysis is also carried out for both the cases.

Chapter Four investigates an inventory model with permissible delay in payment and stochastic inflation conditions. Here we assume that the inflation rate is random variable or mixture of two random variables over an inflationary period in an economy. The optimum policy determined so as to maximize the total profit over the finite planning horizon.

In Chapter Five we describe the inflation rate evolution as a continuous stochastic process and we focus on commonly used processes suggested by the financial literature, such as the Ornstein-Uhlenbeck process (Vasicek and Cox-Ingersoll-Ross (CIR) model). The last 5 years inflation rate (CPI) data from the Ministry of Statistics and Programme Implementation (MOSPI) has been used to estimate the parameters of the models by the maximum likelihood method. The optimal policies have been determined by carrying out a “mean-risk” analysis. The policies have been obtained under linear and iso-elastic demand rates.

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