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Survey of Inventory Models with Permissible Delay in Payments

PRAVESH KUMAR SHARMA | MEWAR UNIVERSITY, RAJASTHAN

ABSTRACT

In the present paper we analyzed the literature review of inventory models with permissible delay in payments. The present study provides an up to date review of inventory models with permissible delay in payments.

INTRDUCTION:

There have been a lot of discussions in the existing literature for the possible extension of the basic economic order quantity model to a number of situations where its assumptions are not valid up to now. Permissible delay in payment is one of the important factors in present day competitive marketing strategy. As a result, wholesalers/suppliers offer different types of facilities to their retailers to promote their business. Among these facilities, one such facility is to offer to sell a large volume of goods on credit. In that case, wholesalers/suppliers offer a certain credit period to their retailer. For this period, no interest is charged by the supplier. However, after this period, a higher rate of interest is charged by the supplier under certain terms and conditions by an agreement between retailer and supplier. This type of inventory problem is known as inventory problem with permissible delay in payments. It is also known as trade credit financing inventory problem. A business either manufactures the products it sells or it purchases the products to sell from other businesses. In either case, an increase in inventory usually involves a corresponding increase in accounts payable.raw materials used in the production process are purchased on credit, and many other manufacturing costs are not paid for immediately. Products from other businesses are bought on credit. Instead of making immediate cash payment when inventory is increased, a business delays payment, perhaps by a month or so. that the customers are allowed some grace period before they settle the account with the supplier. This gives a very advantage to the customers due to the fact that they do not have to pay the supplier immediately after receiving the product, but instead, they can delay their payment until the end of the allowed period. The customer pays no interest during the fixed period they have to settle the account, but if the payment is delayed beyond that period, interest will be charged. The permissible delay in payments brings some advantages to the buyer, as he would try to earn some interest for the payment received during this period. When a supplier allows a fixed time for settling the account, he is actually giving a loan to the buyer without interest during this period. Therefore, it is economical to delay in the settlement of accounts to the last moment of the permissible delay in payments.

ANALYSIS:

Inventory policy with trade credit financing was formulated by **Haley** and **Higgins (1973)**. The effect of payment rules on ordering and stock holding in purchasing was suggested by **Kingsman (1983)**.Different inventory policies with trade credit was developed by **Chapman et al. (1984)** and **Chapman** and **Ward (1988)**. **Goyal (1985)** was the first to develop the economic order quantity under conditions of permissible delay in payments. Author has assumed that the unit selling price and the purchase price are equal. In practice, the unit selling price should be greater than the unit purchasing price. **Aggarwal** and **Jaggi (1995)** developed ordering policies of deteriorating items under permissible delay in payments. The demand and deterioration were exponentially deteriorating products under the condition of permissible delay in payments was discussed by **Hwang** and **Shinn (1997)**. **Jamal et al. (2000)** presented optimal payment time for a retailer under permitted delay of payment by the wholesaler. The wholesaler allowed a permissible credit period to pay the dues without paying any interest for the retailer. In the study, a retailer model was considered with a constant rate of deterioration. An inventory model for initial-stock-dependent consumption rate was suggested by **Liao et al. (2000)**. Shortages were not allowed. The effects of inflation rate, deterioration rate, initial stock-dependent consumption rate and delay in payments were discussed. **Chang** and **Dye (2001)** developed an inventory model for deteriorating items with partial backlogging and permissible delay in payments. **Chung et al. (2002)** have discussed the inventory decision for EOQ inventory model under permissible delay in payments. An EOQ model for deteriorating items with credit policy was discussed by **Chang et al. (2003)**. Lot sizing decision policy was presented by **Chung and Liao (2004)**. In this policy trade credit was depending on the ordering quantity. **Teng et al. (2005)** presented an optimal pricing and ordering policy under permissible delay in payments. Deterioration rate was taken as constant and shortages were not allowed in the study. The optimal ordering policy in a DCF analysis for deteriorating items was suggested by **Chung and Liao (2006)**. In this policy trade credit was also depending on the ordering quantity. **Huang (2007)** levels of trade credit policy within the economic production quantity (EPQ) framework. Author has assumed that the supplier would offer the retailer a delay period and the retailer also adopted the trade credit policy replenishment model. Replenishment rate was taken as finite. **Sana** and **Chaudhuri (2008)** Increasing deterministic demands were discussed in the environment of permissible delay in payment and discount offer to the retailer. An inventory model under two levels of trade credit policy was proposed by **Jaggi** et al. **(2008)** with credit-linked demand. C.K. Jaggi, K.K. Aggarwal, P. Verma, Inventory and pricing strategies for deteriorating items with limited capacity and time proportional backlogging rate, Int. J. Oper. Res. 8 (2010) 331–354.**Jaggi et al.(2010) ,**discussed a Supply chain models for deteriorating items with stock-dependent consumption rate and shortages under inflation and permissible delay in payment. **Jaggi** and **Kausar(2011),** formulated aRetailer's ordering policy in a supply chain when demand is price and credit period dependent. **Bhunia** and **Shaikh(2011)** derived a two warehouse inventory model for deteriorating items with time dependent partial backlogging and variable

demand dependent on marketing strategy and time. **Bhunia et al.(2011)** discussed an inventory model of two-warehouse system with variable demand dependent on instantaneous displayed stock and marketing decisions via hybrid RCGA. **Jaggi et al(2011)** formulated a two-warehouse partially backlogging inventory model for deteriorating items with linear trend in demand under inflationary conditions.. **Jaggi and Mittal (2012),** derived a Retailer's ordering policy for deteriorating items with initial inspection and allowable shortages under the condition of permissible delay in payments. **Yang and Chang (2013)**, formulated a two-warehouse partial backlogging inventory model for deteriorating items with permissible delay in payment under inflation. **Bhunia et al.(2014)** discussed a two warehouse inventory model for deteriorating items under permissible delay in payment with partial backlogging.

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