

## INTEGRATED PRICING, ORDERING, AND PAYMENT DECISIONS WITH NON-INSTANTANEOUS REPLENISHMENT UNDER TWO-PART TRADE CREDIT

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**ABSTRACT.** *In today's business environment, many upstream companies offer a two-part trade credit ( $r/t_1$ , net  $t_2$ ) to downstream companies. In many situations, the goods may also be delivered from the vendor to the buyer in small, frequent batches during the replenishment period. This situation is most commonly found in mass ordering with a long-term contract. This paper deals with the problem of determining the retailer's price, ordering, and payment policies simultaneously under two-part trade credit with non-instantaneous replenishment. This study develops an algorithm to solve this problem. Computational analysis demonstrates that the results of the proposed model are consistent with economic insights.*

**Keywords:** Inventory, Two-part trade credit, Non-instantaneous replenishment, Pricing, Payment

1. **Introduction.** A company may employ an inventory policy for many reasons. The main reason for holding inventory is to satisfy variable customer demand. The average inventory cost across the U. S. manufacturing sector is approximately 30% to 35% of the inventory's value. The EOQ model is the most widely used model in inventory management. For example, IBM has developed a parts inventory management system (PIMS), which is based on the EOQ model, to provide prompt and reliable customer service. Recently, Su [1], Tominaga *et al.* [2], Hsu *et al.* [3] and Chou [4] studied the inventory control topic of reducing the total cost or satisfying variable customer service levels.

The traditional EOQ model tacitly assumes that the payment must be made to the vendor (supplier) for the items immediately after the buyer (retailer) receives the products. In practice, the vendor often provides forward financing to the buyer. This means that the vendor allows the buyer a certain fixed period (credit period) in which to settle the amount owed, and does not charge any interest on the amount owed during this period. For example, Wal-Mart, the largest retailer in the world, uses trade credit as a larger source of capital than bank loans; trade credit for Wal-Mart is 8 times the amount of capital invested by shareholders. Over the years, a number of studies have been published that deal with the economic order quantity problems under conditions of permissible delay in payments, i.e., credit period in our research.

Goyal [5] examined the effect of the credit period on the optimal inventory policy. Chung [6] later simplified the optimal solution search for Goyal's problem. Teng [7] then amended Goyal's model by considering the difference between unit price and unit cost. Chang *et al.* [8] and Chung *et al.* [9] considered the inventory model under the condition of an order-size dependent credit period. Chung and Huang [10] considered an inventory model that allowed items with imperfect quality under a permissible delay in payments.