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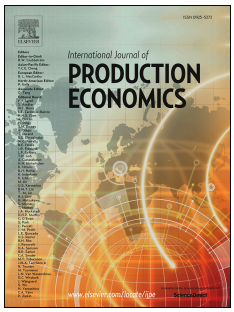

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Sunil Tiwari, Leopoldo Eduardo Cárdenas-Barrón, Mark Goh, Ali Akbar Shaikh

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Joint pricing and inventory model for deteriorating items with expiration dates and partial backlogging under two-level partial trade credits in supply chain

Sunil Tiwari[1], Leopoldo Eduardo Cárdenas-Barrón[2*], Mark Goh[1, 3], Ali Akbar Shaikh[2]

[1]The Logistics Institute-Asia Pacific, National University of Singapore, 21 Heng Mui Keng Terrace, #04-01, Singapore 119613

[2]School of Engineering and Sciences, Tecnológico de Monterrey, E. Garza Sada 2501 Sur, C.P. 64849, Monterrey, Nuevo León, México

[3]NUS Business School, National University of Singapore, Singapore

Abstract

This paper develops an inventory model for deteriorating items under a two-level partial trade credit with allowable shortages. This paper considers a supplier-retailer-customer supply chain in which (a) for settling the cost of purchasing, the retailer receives a partial trade credit from the supplier and at the same time the retailer offers a separate partial trade credit to the customer, (b) the downstream credit period not only increases demand but also opportunity cost, (c) the deterioration rate is non-decreasing over time and the product is fully deteriorated close to its expiration date, and (d) shortages are allowed. The objective of the problem is to determine the optimal selling price, the optimal replenishment cycle time and the time taken for the inventory to reach zero at the same time such that, the total profit per unit is maximized. Theoretical results are established. A numerical example is provided to illustrate the theoretical results and yield some managerial insights.

***Keywords*:** Inventory; Deterioration; Expiration dates; Trade credit; Shortages; Partial Backlogging; Pricing

[*]Corresponding author. Tel. +52 81 83284235, Fax +52 81 83284153.
E-mail: sunil.tiwari047@gmail.com, lecarden@itesm.mx, bizgohkh@nus.edu.sg, aakbarshaikh@itesm.mx, aakbarshaikh@gmail.com

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