

## A note on a $(Q, r)$ model

Chih-Hsiung Wang \*

*Department of Business Administration  
National Pingtung Institute of Commerce  
51 Min-Sheng E. Road, Pingtung  
Taiwan 900*

---

### Abstract

Hadley and Whitin's lot-size, reorder point model  $(Q, r)$  has been widely used in industry because the effects of uncertain demands during lead time is incorporated properly. However, there is no efficient solution procedure for computing the optimal policies. In the literature, an iterative solution procedure is proposed. To avoid iterative computations for an optimal policy, the  $(Q, r)$  model has been studied to derive an explicit formula for the optimal solution when lead time demand distribution possesses a certain property. Unfortunately, this result can not be applicable for the lead time demand distributions, Gamma or Normal, and they are sometimes considered the most appealing distributions for modeling the lead time demand. In this paper, we study the  $(Q, r)$  model assuming that the lead time demand is generally distributed. Some useful results are obtained to facilitate a robust and efficient solution procedure for the optimal policy. A numerical example is provided to illustrate the solution procedure for the optimal lot-size and reorder point policy.

---

*Keywords and phrases* :  $(Q, r)$  model, inventory control policies, lead time demand.

### 1. Introduction

The  $(Q, r)$  model has been extensively studied in the last several decades because it can apply to a wide variety of systems. Under the  $(Q, r)$  model developed by Hadley and Whitin [3], the inventory position is

---

\*E-mails: [chwang@isu.edu.tw](mailto:chwang@isu.edu.tw), [chwang@npic.edu.tw](mailto:chwang@npic.edu.tw)