Analysis of Quantity Discount Model from both Seller’s and Buyer’s Point-of-View

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Abstract
Quantity discounts have long been used in many industries and trading companies. Most of traditional
inventory management models, especially quantity discount models, analyze the inventory systems
solely from one perspective, the buyer's point of view. This paper presents a review of some analytical
approaches about how to design the terms of a vendor (seller or supplier) oriented. It develops the
terms of an “optimal” quantity discount pricing schedule, to be used by the seller to obtain larger
orders quantity from the buyer or major customer. The discount schedules are determined by a
mathematical model which anticipates the buyer’s likely reaction to any vendor proposal. The ultimate
schedule is one which maximizes the supplier’s resultant economic gains, but does so at absolutely no
added cost to the buyer. Another alternative called the rational lot-size production policy is also
presented in this paper. The rational lot-size production policy can be considered and compared with
the quantity discount policy in order to maximize the yearly net profit. Finally, a numerical example
validates the models.

Keywords: inventory/production policies, inventory deterministic models, quantity discount

1. Introduction
The traditional deterministic inventory models try to minimize the total inventory costs
related to the buyer. Only the buyer is advised how to best respond to the fixed discount terms
of supplier. But in the seller’s or supplier’s point of view, for instance, how do the seller know
what terms should be offered? And how many discounts should be proposed? And what is the
limit of the discounts? Should the seller consider other alternatives than giving discounts?

From that reason above, an analysis based on the seller’s point of view needs to be developed.
Both buyers and sellers can negotiate some arrangements in the trading process to gain mutual
benefit. The price and order quantity which can minimize the inventory costs, both the buyer
and seller, can be quantitatively analyzed.

2. Price Discounts: The Vendor’s Leverage
Many vendors (suppliers) would doubtlessly like to see their customers (buyers) increase the
size of their current orders. Larger individual orders, if maintained with the same order
frequency, obviously would mean higher total annual sales. But, even if accompanied by
declining order frequency, larger individual orders may still be quite profitable to the vendor.

A number of specific economic advantages come to mind. First, larger individual orders mean
the vendor will need to process fewer orders per year from this customer. Thus, with larger
orders the vendor should be able to reduce the yearly order processing cost.

Potentially even more important, however, are the manufacturing cost savings made possible
by larger customer orders. This is especially true for the vendor who also the manufacturer of
the item. Larger orders, if produced based on the order received, will mean longer production