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PII: S0925-5273(15)00135-8  
DOI: <http://dx.doi.org/10.1016/j.ijpe.2015.05.004>  
Reference: PROECO6069

To appear in: *Int. J. Production Economics*

Received date: 9 March 2012  
Accepted date: 20 April 2015

Cite this article as: Mehdi Seifbarghy, Khashayar Nouhi, Amin Mahmoudi, Contract Design in a Supply Chain Considering Price and Quality Dependent Demand with Customer Segmentation, *Int. J. Production Economics*, <http://dx.doi.org/10.1016/j.ijpe.2015.05.004>

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# Contract Design in a Supply Chain Considering Price and Quality Dependent Demand with Customer Segmentation

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Abstract:

We consider a two-level supply chain consisting of a manufacturer and a retailer. The retailer gives a final product to a competitive market with customer sensitive to price. The customer demand is assumed to be constant depending on the price and quality degree of the final product. The manufacturer decides on the quality degree of the product. The optimal values of the major decision variables of the chain are determined for different conditions. The supply chain in centralized condition is considered and the optimal values of the price and the quality degree are found. Chain profit in decentralized condition is optimized and the optimal values of wholesale price and quality degree are determined. Retailer's revenue sharing contract is designed and the optimal values of wholesale price and quality degree are found. Finally, a market segmentation condition in which customers are divided into two categories of quality oriented and price oriented is considered; then, the threshold of the percentage of potential quality oriented customers is determined. A set of numerical examples are designed in order to analyze the optimal values of the decision variables.

**Key words:** Contract design; Supply chain management; Pricing; Quality degree

## 1. Introduction

Nowadays, the competition in markets besides the increasing attention of customers to the factors such as price, quality, lead time, and variety of products make supply chain management more important for manufacturing organizations; however, using new

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