

## **Full returns policy and Pareto efficiency under decentralized supply chain**

Shu-Hui Chang <sup>1</sup> \*

Ai-Fen Tsai <sup>2</sup>

Lee-Mei Sheen <sup>1</sup>

<sup>1</sup> *Department of Business Administration  
Takming University of Science and Technology  
No. 56, Sec. 1, Huanshan Road  
Neihu District, Taipei City  
Taiwan 11451, R.O.C.*

<sup>2</sup> *Department of Applied Foreign Languages  
Takming University of Science and Technology  
Taiwan, R.O.C.*

---

### **Abstract**

In this paper, we explore how manufacturer uses quantity discount and return policy to reach channel coordination and Pareto efficiency from the view of information symmetry. This paper can be modeled into a three-stage game. From the model we indicate the range of the retailer's participation constraint that manufacturer is willing to give in order to reach channel coordination and Pareto efficiency under quantity discount strategy or together with return policy.

---

*Keywords and phrases :* *Quantity discount, return policy, channel coordination, Pareto efficiency.*

### **1. Introduction**

The existing literature suggests that contract terms such as quantity discount and return policy may be used to coordinate profit distribution among supply chain to improve the efficiency of supply chain. For example, Pasternack (1985) presents a model to overcome double marginalization by return policy, and suggests that in the case of a decentralized channel, channel coordination can be reached by the manufacturer

---

\*E-mail: shchang@mail.takming.edu.tw