

Abstract

Counterfeiting is a widespread phenomenon in many industries ranging from pharmaceutical, automobile/aerospace/electronic components to software and media products. Retailers tend to sell counterfeit goods along with original products and orders lesser quantity from manufacturer than actual market demand. The objective of this thesis is to analyze the strategy of manufacturer from perspective of supply chain contract design to deal with counterfeiting retailer.

In our **first problem** we shall focus on the role of monitoring and counterfeiting cost in determining the manufacturer-retailer strategy. The monitoring could be either by an external legal enforcement agency or manufacturer could invest in mechanisms to secure the supply chain. The *first model* evaluates the role of external monitoring and counterfeiting cost on optimal decisions of the players. In markets where external monitoring is low, the manufacturer will invest in anti-counterfeiting mechanisms to mitigate counterfeiting. Different countermeasure for counterfeiting would require different levels of investment by the manufacturer and it could lead to varying degree of monitoring effectiveness. Our *second model* identifies the optimal level of monitoring the manufacturer should invest to mitigate counterfeiting.

In the **second problem** we focus on role of uncertainty of the retailer counterfeiting level on player decisions. The manufacturer does not know exact counterfeiting level but knows that it follows a probability distribution. We evaluate the role of this information asymmetry on manufacturer retailer optimal decisions in a linear pricing contract in *model 3*. In *model 4* we analyze the effectiveness of an alternative contract, like two part tariff, under uncertainty in retailer counterfeiting.

Retailer counterfeiting is often associated with inequity perception regarding profit sharing. In our **third problem** we try to understand the phenomenon of retailer counterfeiting from a behavioral perspective. The retailer objective is to maximize his overall utility instead of profit in *model 5*. We analyze the role of advantageous, disadvantageous inequality and retailer perception of fair share of manufacturer profit on counterfeiting behavior. The optimal decisions of this inequity model are compared with profit maximization models.

Keywords: Supply Chain Coordination, Counterfeiting, Game Theory, Information Asymmetry, Behavioral Operations Management.