

The Hong Kong University of Science and Technology
School of Business and Management

PhD Thesis Presentation

Two Essays in Supply Chain Management

by

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Date: July 15, 2009 (Wednesday)

Time: 10:00 - 11:30 pm

Venue: Room 4379 (4/F Conference Room, Lifts 17/18)

Abstract

In the first essay, we consider a retailer that replenishes its inventory by making a delivery request without specifying order quantity, then deciding the quantity when the delivery vehicle arrives after one period. A fixed cost is incurred whenever a delivery request is made, regardless of the quantity ordered later. The new feature of this research relative to previous work is the postponement of ordering until one-period demand information is observed. We show that the optimal policy for delivery requests is of a threshold type. And there might be multiple order-up-to levels on the optimal ordering. Numerical studies show, nonetheless, that the cost of an ordering policy that considers (at most) two order-up-to levels is close to the minimal, especially when the planning horizon is not too short. We also identify conditions under which a base-stock policy is optimal for ordering. To understand the effects of ordering postponement, we compare our model with the traditional model in which the two decisions must be made at the same time. We show that postponement leads not only to a lower cost, but also a higher threshold for making delivery requests.

In the second essay, we consider a supply chain of a supplier and a retailer where the lifespan of the product is controllable and subject to investment. We derive the optimal order quantity and product lifespan decisions for a couple of decentralized supply chain models, one assumes only the retailer may invest into the product lifespan and the other allows both parties to invest. Our analysis indicates that the investment opportunity creates significant benefits to the entire supply chain. Whenever a party, whether the retailer or the supplier, chooses to invest into the product lifespan, both parties benefit yet her profit share within the supply chain decreases. Other relevant issues such as the impacts on channel coordination and pricing are also investigated.

❖ *All interested are welcome!* ❖