

Coordinating Inventory Control and Pricing Strategies for Perishable Products

Abstract: We analyze a joint pricing and inventory control problem for a perishable product with a fixed lifetime over a finite horizon. In each period, demand depends on the price of the current period plus an additive random term. Inventories can be intentionally disposed of and those that reach their lifetime have to be disposed of. The objective is to find a joint pricing, ordering, and disposal policy so as to maximize the total expected discounted profit over the planning horizon taking into account linear ordering cost, inventory holding and backlogging or lost-sales penalty cost and disposal cost. Employing the concept of L-natural-concavity, we show some monotonicity properties of the optimal policies. Our results shed new light on perishable inventory management, and our approach provides a significantly simpler proof of a classical structural result in the literature. Moreover, we identify bounds on the optimal order-up-to levels and develop an effective heuristic policy. Numerical results show that our heuristic policy performs well in both stationary and non-stationary settings. Finally, we show that our approach also applies to models with random lifetimes and inventory rationing models with multiple demand classes. Our approach appears to be applicable to many other related issues.

Biography:

Dr. Zhan Pang is senior lecturer (associate professor) of Management Science at Lancaster University Management School. He is also an adjunct associate professor at NHH. He obtained BS and MS degrees in Mathematics from Nanjing University, and a PhD degree in Operations Research from Chinese University of Hong Kong. Prior to joining Lancaster University, he had been working at University of Calgary, University of Cambridge, and University of Toronto as research associate. His publications have appeared in several leading operations journals, including Operations Research, Manufacturing and Service Operations Management, Production and Operations Management, IEEE Transactions on Automatic Control, etc. His current research interests include pricing and revenue management, big data and business analytics with applications in marketing, supply chain operations and risk management. As an ex entrepreneur and management consultant, he retains active interactions with industry. He has consulted in the online retailing, pharmaceutical, health service, energy and financial service industries, and is currently an independent director of a public energy technology company listed on the HKEx.