The Loss-averse Newsvendor Solutions via Conditional Value-at-Risk Measure

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Abstract
This paper studies the optimal order quantity in the loss-averse newsvendor model with shortage cost. The retailer's loss aversion is characterized by introducing a loss version coefficient and then a novel utility functions proposed for the retailer. The optimal order quantity for the retailer has been obtained to maximize the expected utility. In order to reduce the risk arising from the uncertainty in market demand, the CVaR measure has been introduced and the optimal order quantity for the retailer has been obtained to maximize the CVaR objective about utility. It is found that the optimal order quantity with CVaR objective decreased in the retail price under certain conditions. This significant finding has never been reported in the previous newsvendor literature. Under the optimal order quantity with CVaR objective, it is proved that the retailer's expected utility is decreasing in the confidence level. This confirms the fact that low risk means low return while high return comes with high risk. A numerical example is given to illustrate the results and some management insights are suggested for the loss-averse newsvendor model.

Keywords
Newsvendor model; CVaR measure; Expected utility
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Biography

Felix T.S. Chan received his BSc Degree in Mechanical Engineering from Brighton Polytechnic (now University), UK, and obtained his MSc and PhD in Manufacturing Engineering from the Imperial College of Science and Technology, University of London, UK. Professor Chan is now working at the Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University. He is also the Associate Dean (Research) serving the Faculty of Engineering. His current research interests are Logistics and Supply Chain Management, Operations Management, Distribution Coordination, Systems Modelling and Simulation, Supplier Selection. To date, he has published 16 book chapters, over 310 refereed international journal papers and 270 peer reviewed international conference papers, h index=33 under the Web of Science. He is a chartered member of the Chartered Institute of Logistics and Transport in Hong Kong.

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