

Selective Clearance Markdowns for End-of-Season Inventory Under Demand Uncertainty

Bhawna Priya

Assistant Professor, Operations & Quantitative Techniques Area
Indian Institute of Management (IIM) Raipur
Raipur, India
bpriya@iimraipur.ac.in

Abstract

Clearance sales are a common response to over-ordering under demand uncertainty in short life-cycle products, yet deep markdowns can erode revenue and weaken brand positioning. This note develops a Selective Markdown Inventory (SMI) perspective: when leftover inventory is high, lowering the clearance price can eventually create negative marginal revenue, implying that it is optimal to clear only a selective portion of leftovers at a profit-maximizing clearance price and dispose the remainder at zero salvage value (for instance, through bundling). The setting is a two-period model with a regular season at a fixed price and stochastic demand, followed by a clearance period where the clearance price is chosen after observing leftover inventory. Clearance demand is represented through a linear inverse demand relationship, which implies a concave clearance-revenue function with a peak at a finite clearance quantity. Accordingly, the optimal policy is to sell up to this best clearance quantity and discard any inventory beyond it, rather than pursuing progressively deeper discounts. This SMI logic contrasts with the classic newsvendor setting with a fixed salvage value: by avoiding value-destroying deep markdowns when inventory is abundant, selective clearance can temper ordering incentives while protecting (and potentially improving) expected profit.

Keywords

Inventory clearance, newsvendor model, short life-cycle products, endogenous salvage value.

Biography

Bhawna Priya is an Assistant Professor in the Operations & Quantitative Techniques area at Indian Institute of Management (IIM) Raipur. She holds a Ph.D. in Operations Management from IIM Lucknow, an M.Tech. in Mathematics and Computation from Indian Institute of Technology (IIT) Delhi, and a bachelor's degree in Electronics and Telecommunication from the College of Engineering Pune (COEP). Her research interests include Inventory Management, Mathematical Modeling, Financially Constrained Supply Chain, Optimization, Game Theory, Supply Chain Coordination, and System Dynamics. She is the recipient of the 2019 Emerging Economies Doctoral Student Award (EEDSA) conferred by the Production and Operations Management Society (POMS), USA. She is the finalist of the 2020 Best Student Paper Award competition organized by the International Society of Inventory Research (ISIR), Budapest, Hungary. Dr. Bhawna's scholarly contributions include publications in peer-reviewed journals and numerous presentations at academic conferences.