Smart Pricing

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Open Questions

- Barriers to implementation?
- Recent software developments?
- Research opportunities?
- Research mandates?
Outline

- Revenue Driven Dynamics
  - Revenue Management
  - Retail Markdowns
  - Promotions
- Cost Driven Dynamics
  - Capacity
  - Inventory
- Open Questions

Revenue management

- Problem
  - Sell given capacity for maximum price within given time window
  - Drivers of pricing dynamics:
    - Perishability / finite horizon
    - Demand uncertainty
  - Cost side: Negligible
- Literature
  - Talluri & Van Ryzin (2004)
  - McGill and Van Ryzin (1999)
  - Boyd and Bilegan (2003)
Revenue management

- Software
  - SABRE
  - Manugistics Group, Inc.
  - PROS Revenue Management
- Management Behavior
  - Airlines
  - Hotels
  - Advertising time

Retail Markdowns

- Problem
  - Sell leftover stock at end of season for maximum price
  - Drivers of pricing dynamics:
    - Finite horizon
    - Demand uncertainty
  - Cost side:
    - Sunk cost at time of markdown
    - Per unit purchase price prior to season
- Literature
  - Gallego and Ryzin (1994)
  - Smith and Achabal (1998)
  - Bitran, Caldentey, & Mondschein (1998)
Retail Markdowns

- Software
  - ProfitLogic
  - 4R Systems
  - Markdown Management Inc.
  - i2
- Management Behavior
  - Retail
  - Fashion apparel

Promotions

- Problem
  - Temporary price cuts, boosting sales
  - Drivers
    - Market segmentation
    - Competition
    - Store traffic, etc.
  - Cost side:
    - Inventory build-up / excess capacity required
    - Bull-whip
- Literature
  - Iyer and Ye (2000)
  - Neslin (2002)
  - Fleischmann, Hall, and Pyke (2004)
Promotion Effects

Figure 1: Stockpiling and Deceleration (reprinted from Macé & Neslin (2003))

Promotions

- Software
  - Manugistics: Profitable Promotions Management
  - KhiMetrics
- Management Behavior
  - Staples
  - Other Retail
  - Silos
Outline

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Capacity and Pricing

- Problem
  - Use dynamic pricing to improve capacity utilization and profitability
  - Coordinate capacity expansion decisions with pricing decisions
- Literature
  - So & Song (1998)
  - Van Mieghem & Dada (1999)
  - Swann (2001)
  - Hall, Kopalle, & Pyke (2003)
Value of Coordination

Value of State-Dependent Pricing vs. Static Pricing

Inventory and Pricing

- Problem
  » Coordinate inventory ordering with pricing decisions

- Literature
  » Blattberg (1981)
  » Hall, Kopalle, & Krishna (2003)
  » Federgruen & Heching (1999)
  » Feng & Chen (2002)
Capacity and Inventory

- Software
  - Rapt
  - DemandTec
  - KhiMetrics
  - Retek
  - Manugistics

- Management Behavior
  - Mostly on inventory/capacity or pricing, but little evidence of truly linked decisions

Open Questions

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Open Questions

- Barriers to implementation
  - Silos
  - Trust
  - Incentives
  - Reporting relationships

- Research mandates
  - Joint work with Marketing
    - More accurate pricing and promotion models
  - Distinguish reasons for promotions
    - Excess inventory \(\rightarrow\) markdowns
    - Competition \(\rightarrow\) game theory models
    - Sales incentives \(\rightarrow\) finite horizon models
  - Demand pull
    - Convince managers of the value of coordination (Deere)