Smart Pricing

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Open Questions

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

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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)

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Retail Markdowns

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

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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)
  - » Huchzermeier, Iyer, and Freiheit (2002)
  - » Neslin (2002)
  - » Fleischmann, Hall, and Pyke (2004)

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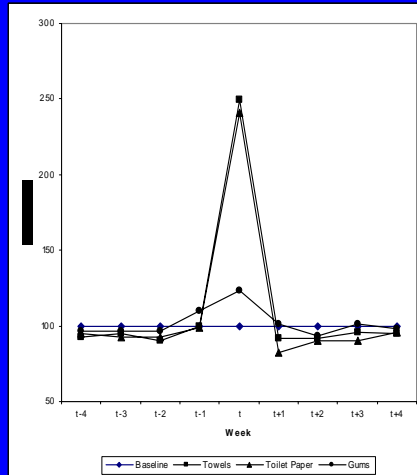
○ Figure 1: Stockpiling and Deceleration (reprinted from Macé & Neslin (2003))

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Promotions

○ Software

» Manugistics: Profitable Promotions Management

» KhiMetrics

○ Management Behavior

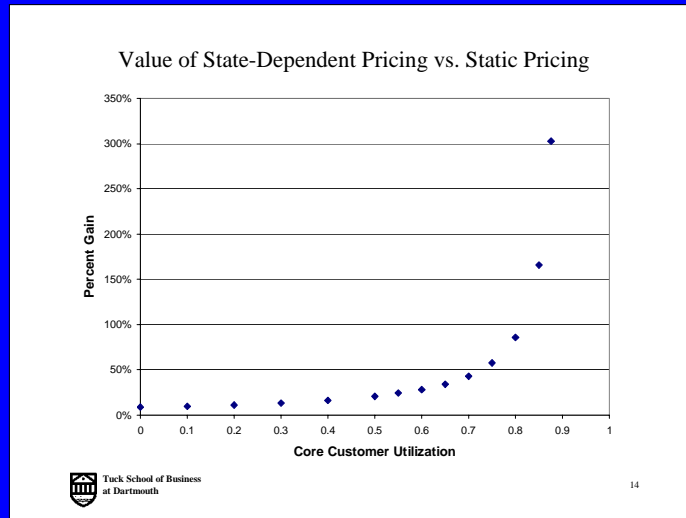» Staples

» Other Retail

» Silos

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Outline

○ Revenue Driven Dynamics
  » Revenue Management
  » Retail Markdowns
  » Promotions
○ *Cost Driven Dynamics*
  » *Capacity*
  » *Inventory*
○ Open Questions

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)
  » Chan, Simchi-Levi, & Swann (2002)
  » Hall, Kopalle, & Pyke (2003)

Value of Coordination

Value of State-Dependent Pricing vs. Static Pricing

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Inventory and Pricing

○ Problem

  » Coordinate inventory ordering with pricing decisions

○ Literature

  » Blattberg (1981)

  » Hall, Kopalle, & Krishna (2003)

  » Federgruen & Heching (1999)

  » Feng & Chen (2002)

  » Chen & Simchi-Levi (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

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- Barriers to implementation?
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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 → markdowns
    - Competition → game theory models
    - Sales incentives → finite horizon models
  - Demand pull
    - Convince managers of the value of coordination (Deere)

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