

# **Supply Chain Management (3rd Edition)**

---

## **Chapter 9 Planning Supply and Demand in a Supply Chain: Managing Predictable Variability**

# Outline

---

- ◆ Responding to predictable variability in a supply chain
- ◆ Managing supply
- ◆ Managing demand
- ◆ Implementing solutions to predictable variability in practice

# Responding to Predictable Variability in a Supply Chain

---

---

- ◆ Predictable variability is change in demand that can be forecasted
- ◆ Can cause increased costs and decreased responsiveness in the supply chain
- ◆ A firm can handle predictable variability using two broad approaches:
  - Manage supply using capacity, inventory, subcontracting, and backlogs
  - Manage demand using short-term price discounts and trade promotions

# Managing Supply

---

## ◆ Managing capacity

- Time flexibility from workforce
- Use of seasonal workforce
- Use of subcontracting
- Use of dual facilities – dedicated and flexible
- Designing product flexibility into production processes

## ◆ Managing inventory

- Using common components across multiple products
- Building inventory of high demand or predictable demand products

# Inventory/Capacity Trade-off

---

---

- ◆ Leveling capacity forces inventory to build up in anticipation of seasonal variation in demand
- ◆ Carrying low levels of inventory requires capacity to vary with seasonal variation in demand or enough capacity to cover peak demand during season

# Managing Demand

---

- ◆ Promotion
- ◆ Pricing
- ◆ Timing of promotion and pricing changes is important
- ◆ Demand increases can result from a combination of three factors:
  - Market growth (increased sales, increased market size)
  - Stealing share (increased sales, same market size)
  - Forward buying (same sales, same market size)

# Demand Management

---

- ◆ Pricing and aggregate planning must be done jointly
- ◆ Factors affecting discount timing
  - Product margin: Impact of higher margin (\$40 instead of \$31)
  - Consumption: Changing fraction of increase coming from forward buy (100% increase in consumption instead of 10% increase)
  - Forward buy

# Off-Peak (January) Discount from \$40 to \$39

---

---

<i>Month</i>	<i>Demand Forecast</i>
January	3,000
February	2,400
March	2,560
April	3,800
May	2,200
June	2,200

**Cost = \$421,915, Revenue = \$643,400, Profit = \$221,485**

# Peak (April) Discount from \$40 to \$39

---

---

<i>Month</i>	<i>Demand Forecast</i>
January	1,600
February	3,000
March	3,200
April	5,060
May	1,760
June	1,760

**Cost = \$438,857, Revenue = \$650,140, Profit = \$211,283**

# January Discount: 100% Increase in Consumption, Sale Price = \$40 (\$39)

---

---

<i>Month</i>	<i>Demand Forecast</i>
January	4,440
February	2,400
March	2,560
April	3,800
May	2,200
June	2,200

**Off-peak discount: Cost = \$456,750, Revenue = \$699,560**

# Peak (April) Discount: 100% Increase in Consumption, Sale Price = \$40 (\$39)

<i>Month</i>	<i>Demand Forecast</i>
January	1,600
February	3,000
March	3,200
April	8,480
May	1,760
June	1,760

**Peak discount: Cost = \$536,200, Revenue = \$783,520**

# Performance Under Different Scenarios

<i>Regular Price</i>	<i>Promotion Price</i>	<i>Promotion Period</i>	<i>Percent increase in demand</i>	<i>Percent forward buy</i>	<i>Profit</i>	<i>Average Inventory</i>
\$40	\$40	NA	NA	NA	\$217,725	895
\$40	\$39	January	10%	20%	\$221,485	523
\$40	\$39	April	10%	20%	\$211,283	938
\$40	\$39	January	100%	20%	\$242,810	208
\$40	\$39	April	100%	20%	\$247,320	1,492
\$31	\$31	NA	NA	NA	\$73,725	895
\$31	\$30	January	100%	20%	\$84,410	208
\$31	\$30	April	100%	20%	\$69,120	1,492

# Factors Affecting Promotion Timing

---

---

<i>Factor</i>	<i>Favored timing</i>
High forward buying	Low demand period
High stealing share	High demand period
High growth of market	High demand period
High margin	High demand period
Low margin	Low demand period
High holding cost	Low demand period
Low flexibility	Low demand period

# Factors Influencing Discount Timing

---

---

- ◆ Impact of discount on consumption
- ◆ Impact of discount on forward buy
- ◆ Product margin

# Implementing Solutions to Predictable Variability in Practice

---

---

- ◆ Coordinate planning across enterprises in the supply chain
- ◆ Take predictable variability into account when making strategic decisions
- ◆ Preempt, do not just react to, predictable variability

# Summary of Learning Objectives

---

- ◆ How can supply be managed to improve synchronization in the supply chain in the face of predictable variability?
- ◆ How can demand be managed to improve synchronization in the supply chain in the face of predictable variability?
- ◆ How can aggregate planning be used to maximize profitability when faced with predictable variability in the supply chain?