Key Concepts and Skills

- Understand the key issues related to credit management
- Understand the impact of cash discounts
- Be able to evaluate a proposed credit policy
- Understand the components of credit analysis
- Understand the major components of inventory management
- Be able to use the EOQ model to determine optimal inventory ordering

Chapter Outline

- Credit and Receivables
- Terms of the Sale
- Analyzing Credit Policy
- Optimal Credit Policy
- Credit Analysis
- Collection Policy
- Inventory Management
- Inventory Management Techniques

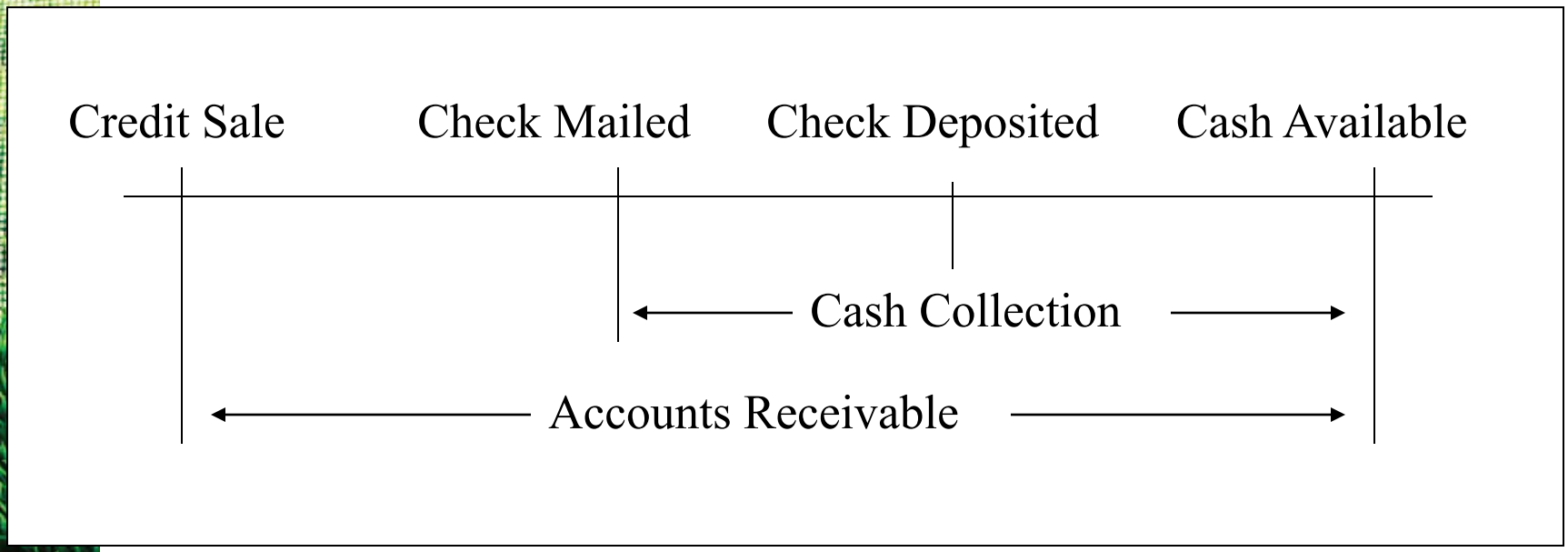
Credit Management: Key Issues

- Granting credit generally increases sales
- Costs of granting credit
  - Chance that customers will not pay
  - Financing receivables
- Credit management examines the trade-off between increased sales and the costs of granting credit

Components of Credit Policy

- Terms of sale
  - Credit period
  - Cash discount and discount period
  - Type of credit instrument
- Credit analysis – distinguishing between “good” customers that will pay and “bad” customers that will default
- Collection policy – effort expended on collecting receivables

The Cash Flows from Granting Credit



Terms of Sale

- Basic Form: 2/10 net 45
  - 2% discount if paid in 10 days
  - Total amount due in 45 days if discount not taken
- Buy $500 worth of merchandise with the credit terms given above
  - Pay $500(1 - .02) = $490 if you pay in 10 days
  - Pay $500 if you pay in 45 days

Example: Cash Discounts

- Finding the implied interest rate when customers do not take the discount
- Credit terms of 2/10 net 45
  - Periodic rate = 2 / 98 = 2.0408%
  - Period = (45 – 10) = 35 days
  - 365 / 35 = 10.4286 periods per year
- APR = periodic rate x number of periods per year
  = 2.0408% x 10.4286 = 21.28%
- EAR = $(1.020408)^{10.4286} - 1 = 23.45\%$

Another Example: Cash Discounts Part I

Given terms of 1/10 net 40
Periodic rate = 1/99 = 1.01%
For an additional 30 days of credit (period), the purchaser pays 1.01% more.

Number of periods per year = 365 / (Days taken – Discount period) = 365 / (40-10) = 12.17

$$\text{APR} = \text{Periodic rate} \times \text{No of periods per year}$$

$$= \frac{\text{Discount}}{1 - \text{Discount}} \times \frac{365}{\text{Days taken} - \text{Discount period}}$$

$$= \frac{1}{99} \times \frac{365}{30} = 12.29\%$$

Another Example: Cash Discounts Part II

When payments are made ***during*** the year, not at year-end, the effective rate is higher.

$$\text{EAR} = \left(1 + \text{Periodic rate}\right)^{\text{number of periods per year}}$$

$$= \left(1 + \frac{\text{discount}}{1 - \text{discount}}\right)^{\frac{365}{(\text{Days taken-Discount period})}} - 1$$

$$= \left(1 + \frac{1}{99}\right)^{\frac{365}{40\text{-}10}} - 1 = 13\%$$

Credit Policy Effects

- Revenue Effects
  - Delay in receiving cash from sales
  - May be able to increase price
  - May be able to increase total sales
- Cost Effects
  - Cost of the sale will still be incurred even though the cash from the sale has not been received
  - Cost of debt: must finance receivables
  - Probability of nonpayment: some percentage of customers will not pay for products purchased
  - Cash discount: some customers will pay early and pay less than the full sales price

Example: Evaluating a Proposed Policy Part I

- Your company is evaluating a switch from a cash only policy to a net 30 policy. The price per unit is $100, and the variable cost per unit is $40. The company currently sells 1,000 units per month. Under the proposed policy, the company expects to sell 1,050 units per month. The required monthly return is 1.5%.
- What is the NPV of the switch?
- Should the company offer credit terms of net 30?

Example: Evaluating a Proposed Policy Part II

- Incremental cash inflow
  (100 – 40)(1,050 – 1,000) = 3,000
- Present value of incremental cash inflow
  3,000/.015 = 200,000
- Cost of switching
  100(1,000) + 40(1,050 – 1,000) = 102,000
- NPV of switching
  200,000 – 102,000 = 98,000
- Yes, the company should switch

Example: Evaluating a Proposed Policy Part III

Cash only policy

	Month		
	1	2	3
Current quantity sold per month, Q	1000	1,000	1,000
Price per unit, P	100	100	100
Variable cost per unit, v	40	40	40
Cash flow under old policy	60,000	60,000	60,000

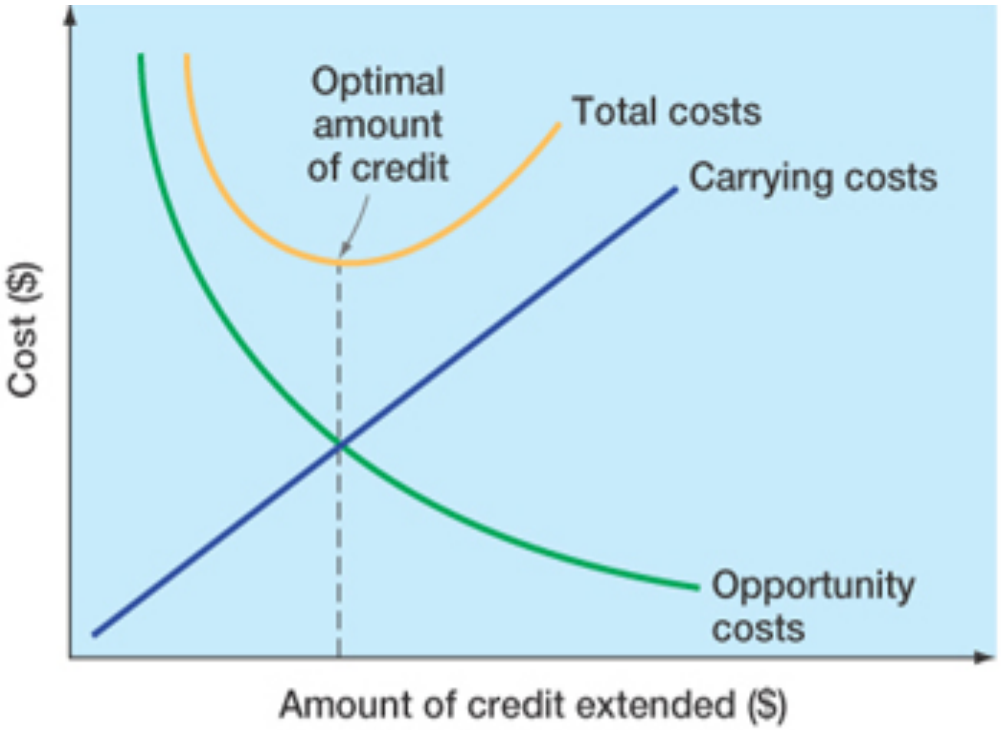
Company switches to net 30 days on sales. The receipt of (1050*$100) is deferred by 1 month.

	Month		
	1	2	3
New quantity sold per month, Q'	1050	1,050	1,050
Price per unit, P	0	100	100
Variable cost per unit, v	40	40	40
Cash flow under new policy	-42,000	63,000	63,000
CF under new policy - CF under old policy	-102,000	3,000	3,000

Total Cost of Granting Credit

- Carrying costs
  - Required return on receivables
  - Losses from bad debts
  - Costs of managing credit and collections
- Shortage costs
  - Lost sales due to a restrictive credit policy
- Total cost curve
  - Sum of carrying costs and shortage costs
  - Optimal credit policy is where the total cost curve is minimized

Figure 20.1



Carrying costs are the cash flows that must be incurred when credit is granted. They are positively related to the amount of credit extended.

Opportunity costs are the lost sales resulting from refusing credit. These costs go down when credit is granted.

Credit Analysis

- Process of deciding which customers receive credit
- Gathering information
  - Financial statements
  - Credit reports
  - Banks
  - Payment history with the firm
- Determining Creditworthiness
  - 5 Cs of Credit
  - Credit Scoring

Example: One-Time Sale

- NPV = -v + (1 - π)P / (1 + R)
- Your company is considering granting credit to a new customer. The variable cost per unit is $50; the current price is $110; the probability of default is 15%; and the monthly required return is 1%.
- What is the NPV of this one-time sale?
  - NPV = -50 + (1-.15)(110)/(1.01) = 42.57
- What is the break-even probability?
  - 0 = -50 + (1 - π)(110)/(1.01)
  - π = .5409 or 54.09%

Example: Repeat Customers

- NPV = -v + (1-π)(P – v)/R
- In the previous example, what is the NPV if we are looking at a repeat customer?
- NPV = -50 + (1-.15)(110 – 50)/.01 = 5,050
- Repeat customers can be very valuable (hence the importance of good customer service)
- It may make sense to grant credit to almost everyone once, as long as the variable cost is low relative to the price
- If a customer defaults once, you don't grant credit again

Credit Information

- Financial statements
- Credit reports on customer's payment history with other firms
- Banks
- Payment history with the company

Five Cs of Credit

- Character – willingness to meet financial obligations
- Capacity – ability to meet financial obligations out of operating cash flows
- Capital – financial reserves
- Collateral – assets pledged as security
- Conditions – general economic conditions related to customer's business

Collection Policy

- Monitoring receivables
  - Keep an eye on average collection period relative to your credit terms
  - Use an aging schedule to determine percentage of payments that are being made late
- Collection policy
  - Delinquency letter
  - Telephone call
  - Collection agency
  - Legal action

Inventory Management

- Inventory can be a large percentage of a firm's assets
- There can be significant costs associated with carrying too much inventory
- There can also be significant costs associated with not carrying enough inventory
- Inventory management tries to find the optimal trade-off between carrying too much inventory versus not enough

Types of Inventory

- Manufacturing firm
  - Raw material: starting point in production process
  - Work-in-progress
  - Finished goods: products ready to ship or sell
- Remember that one firm's "raw material" may be another firm's "finished goods"
- Different types of inventory can vary dramatically in terms of liquidity

Inventory Costs

- Carrying costs – range from 20 to 40% of inventory value per year
  - Storage and tracking
  - Insurance and taxes
  - Losses due to obsolescence, deterioration, or theft
  - Opportunity cost of capital
- Shortage costs
  - Restocking costs
  - Lost sales or lost customers
- Consider both carrying costs and shortage costs, and minimize the total cost

Inventory Management - ABC

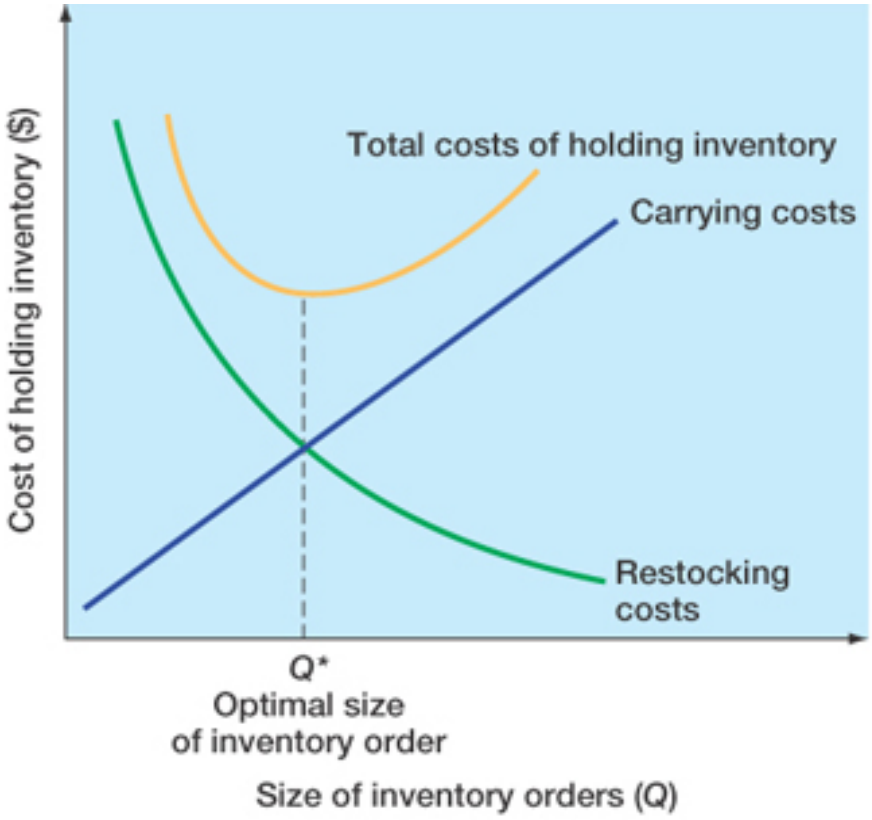
- Classify inventory by cost, demand, and need
- Those items that have substantial shortage costs should be maintained in larger quantities than those with lower shortage costs
- Generally maintain smaller quantities of expensive items
- Maintain a substantial supply of less expensive basic materials

EOQ Model

- The EOQ model minimizes the total inventory cost
- Total carrying cost = (average inventory) x (carrying cost per unit) = (Q/2)(CC)
- Total restocking cost = (fixed cost per order) x (number of orders) = F(T/Q)
- Total Cost = Total carrying cost + total restocking cost = (Q/2)(CC) + F(T/Q)

$$Q^* = \sqrt{\frac{2TF}{CC}}$$

Figure 20.3



Restocking costs are greatest when the firm holds a small quantity of inventory.
Carrying costs are greatest when there is a large quantity of inventory on hand.
Total costs are the sum of the carrying and restocking costs.

Example: EOQ

- Consider an inventory item that has carrying cost = $1.50 per unit. The fixed order cost is $50 per order, and the firm sells 100,000 units per year.
  - What is the economic order quantity?

$$Q^* = \sqrt{\frac{2TF}{CC}}$$

$$Q^* = \sqrt{\frac{2(100{,}000)\ (50)}{1.50}} = 2{,}582$$

Extensions

- Safety stocks
  - Minimum level of inventory kept on hand
  - Increases carrying costs
- Reorder points
  - At what inventory level should you place an order?
  - Need to account for delivery time
- Derived-Demand Inventories
  - Materials Requirements Planning (MRP)
  - Just-in-Time Inventory

Quick Quiz

- What are the key issues associated with credit management?
- What are the cash flows from granting credit?
- How would you analyze a change in credit policy?
- How would you analyze whether to grant credit to a new customer?
- What is ABC inventory management?
- How do you use the EOQ model to determine optimal inventory levels?

Comprehensive Problem

- What is the effective annual rate for credit terms of 2/10 net 30?
- What is the EOQ for an inventory item with a carrying cost of $2.00 per unit, a fixed order cost of $100 per order, and annual sales of 80,000 units?

End of Chapter