

Chapter 20

Credit and Inventory Management

Chapter Organization

- 20.1 Credit and Receivables
- 20.2 Terms of the Sale
- 20.3 Analyzing Credit Policy
- 20.4 Optimal Credit Policy
- 20.5 Credit Analysis
- 20.6 Collection Policy
- 20.7 Inventory Management
- 20.8 Inventory Management Techniques
- 20.9 Summary and Conclusions
- 20.A More on Credit Policy Analysis

T20.2 Credit and Inventory Management: Key Issues

■ Key issues:

- ◆ What is the tradeoff between a *flexible* versus a *restrictive* credit policy?
- ◆ What are the components of an inventory management system?

■ Preliminaries: credit policy

- ◆ Analysis of a credit policy change
- ◆ Credit information and evaluation of customer credit capacity

■ Preliminaries: inventory policy

- ◆ Use of EOQ inventory model
- ◆ Extensions of EOQ model
- ◆ Inventory management systems

T20.3 Components of Credit Policy

- Terms of sale

The conditions under which a firm sells its goods and services for cash or credit.

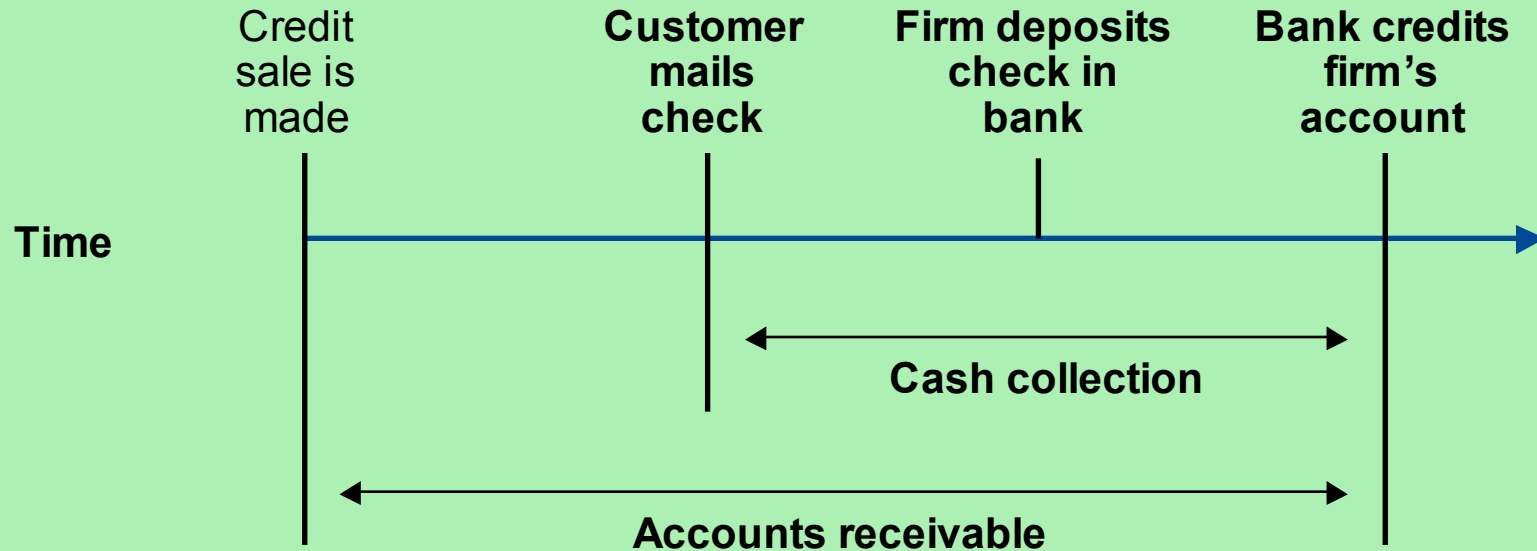
- Credit analysis

The process of determining the probability that customers will not pay.

- Collection policy

Procedures followed by a firm in collecting accounts receivable.

T20.4 The Cash Flows from Granting Credit



T20.5 Determinants of the Length of the Credit Period

- Several factors influence the length of the credit cycle. Among these factors are:
 - ◆ Perishability and collateral value
 - ◆ Consumer demand for the product
 - ◆ Cost, profitability and standardization
 - ◆ Credit risk of the buyer
 - ◆ The size of the account
 - ◆ Competition in the product market
 - ◆ Customer type

T20.6 Credit Policy Effects

- Revenue effects

Payment is received later, but price and quantity sold may increase

- Cost effects

Running a credit department and collecting receivables has costs

- The cost of debt

The firm must finance receivables and, therefore, incur financing costs

- The probability of nonpayment

The firm always gets paid if it sells for cash, but risks losses due to customer default if it sells on credit

- The cash discount

Discounts induce buyers to pay early; the size of the discount affects payment patterns and amounts

T20.7 Evaluating a Proposed Credit Policy

- P = price per unit
- v = variable cost per unit
- Q = current quantity sold per period
- Q' = new quantity expected to be sold
- R = periodic required return

The *benefit* of switching is the *change* in cash flow:

New cash flow - old cash flow

$$[(P - v) \times Q'] - [(P - v) \times Q]$$

rearranging,

$$(P - v) \times (Q' - Q)$$

T20.7 Evaluating a Proposed Credit Policy (concluded)

The *present value* of switching is:

$$PV = [(P - v) \times (Q' - Q)]/R$$

The *cost* of switching is the amount uncollected for the period + the additional variable costs of production:

$$\text{Cost} = PQ + v(Q' - Q)$$

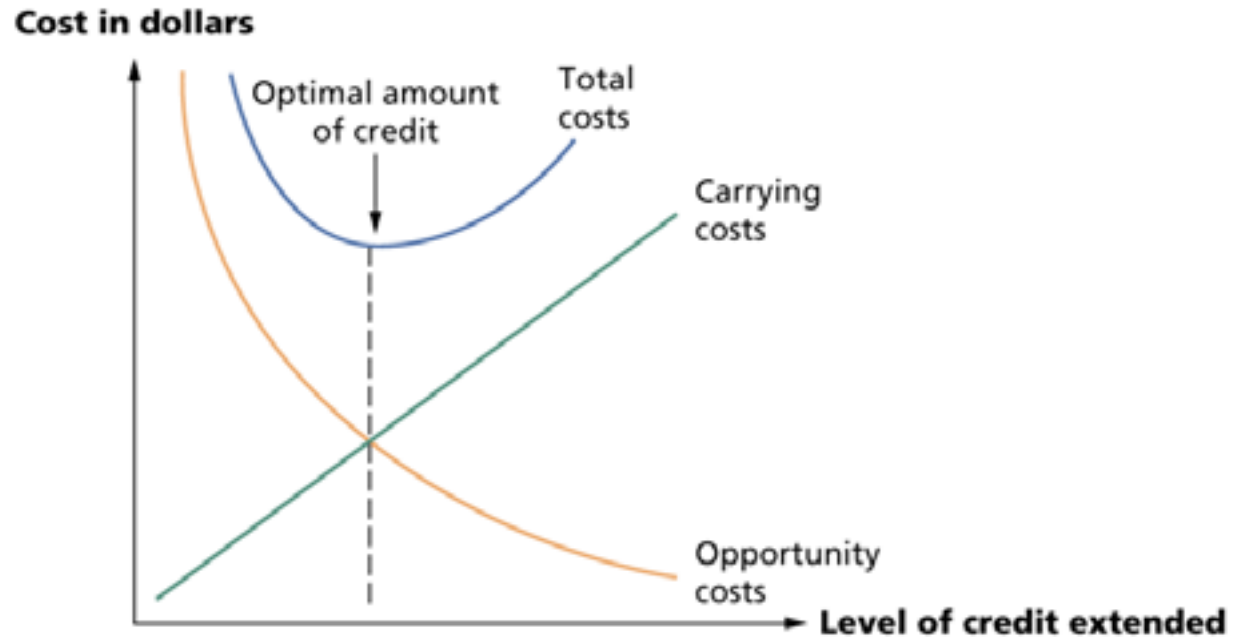
And the *NPV* of the switch is:

$$NPV = -[PQ + v(Q' - Q)] + [(P - v)(Q' - Q)]/R$$

T20.8 The Costs of Granting Credit (Figure 20.1)

Figure 20.1

The costs of granting credit



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 from refusing credit. These costs go down when credit is granted.

T20.9 The Five C's of Credit

- Character
The borrower's willingness to pay
- Capacity
The borrower's ability to pay
- Capital
Financial reserves/borrowing capacity
- Collateral
Pledged assets
- Conditions
Relevant economic conditions

T20.10 Credit Scoring with Multiple Discriminant Analysis

Sales/Total assets

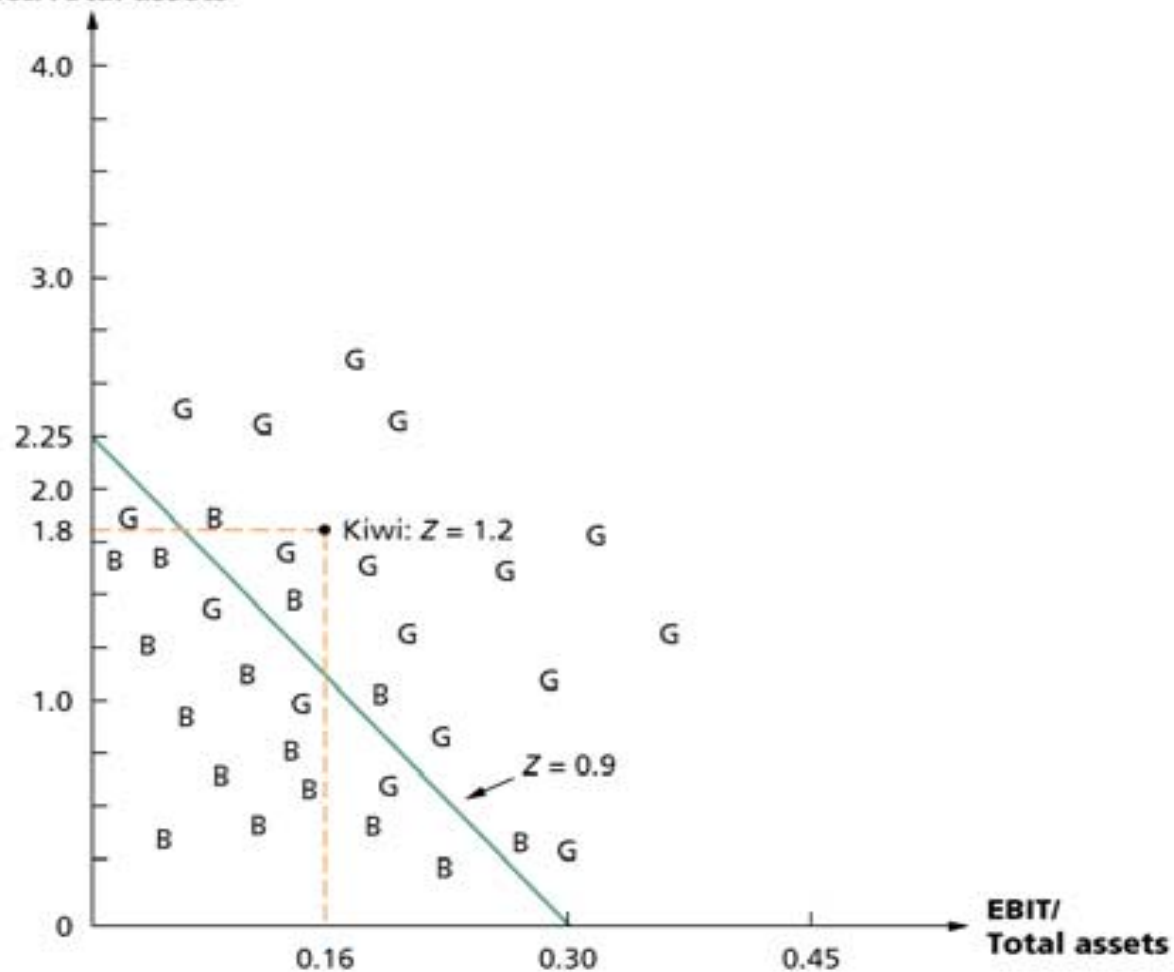


Figure 20.3

Credit scoring with multiple discriminant analysis

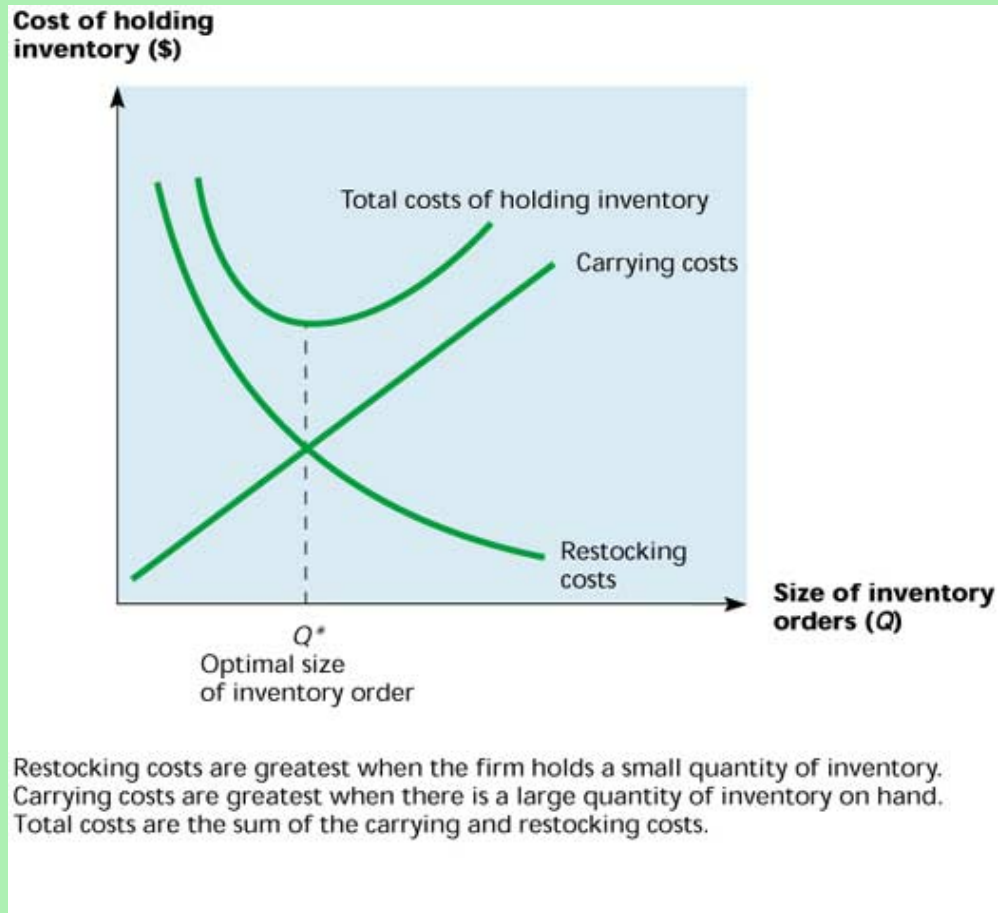
$$Z = 0.4 \left[\frac{\text{Sales}}{\text{Total assets}} \right] + 3.0 \left[\frac{\text{EBIT}}{\text{Total assets}} \right]$$

T20.11 Inventory Management

- Inventory Types
 - ◆ Raw Materials
 - ◆ Work-in-Progress
 - ◆ Finished Goods

- Inventory Costs
 - ◆ Storage and tracking costs
 - ◆ Insurance and taxes
 - ◆ Losses due to obsolescence, deterioration, or theft
 - ◆ Opportunity cost of capital on the invested amount

T20.12 Costs of Holding Inventory (Figure 20.5)



T20.13 Inventory Management Techniques

- ABC Approach
 - ◆ Compare number of items with the value of the items
 - ◆ An illustration of the “80-20” rule

- EOQ Model

Economic **O**rders **Q**uantity is most widely known approach.

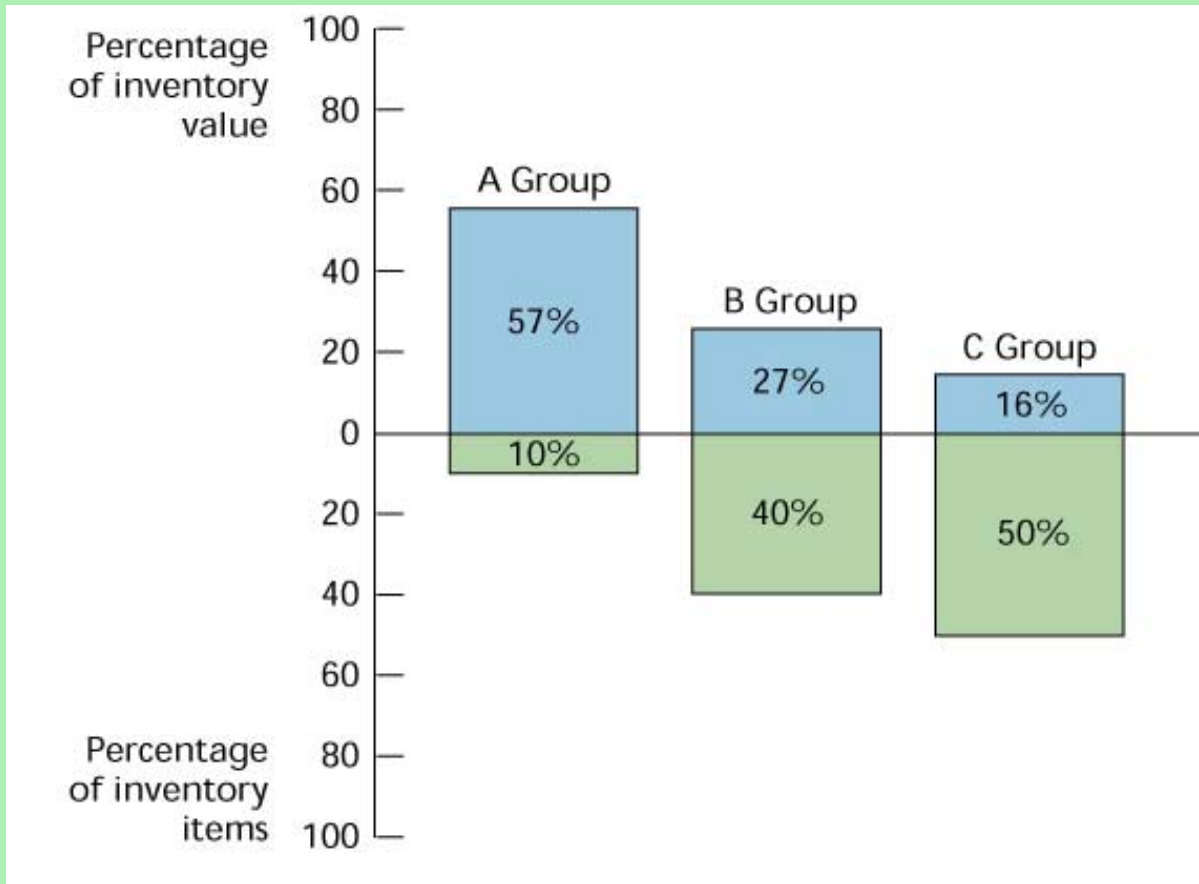
 - ◆ Inventory depletion rate
 - ◆ Carrying costs
 - ◆ Shortage costs and Restocking costs
 - ◆ Total costs

- Extensions to EOQ
 - ◆ Safety stocks
 - ◆ Reorder points

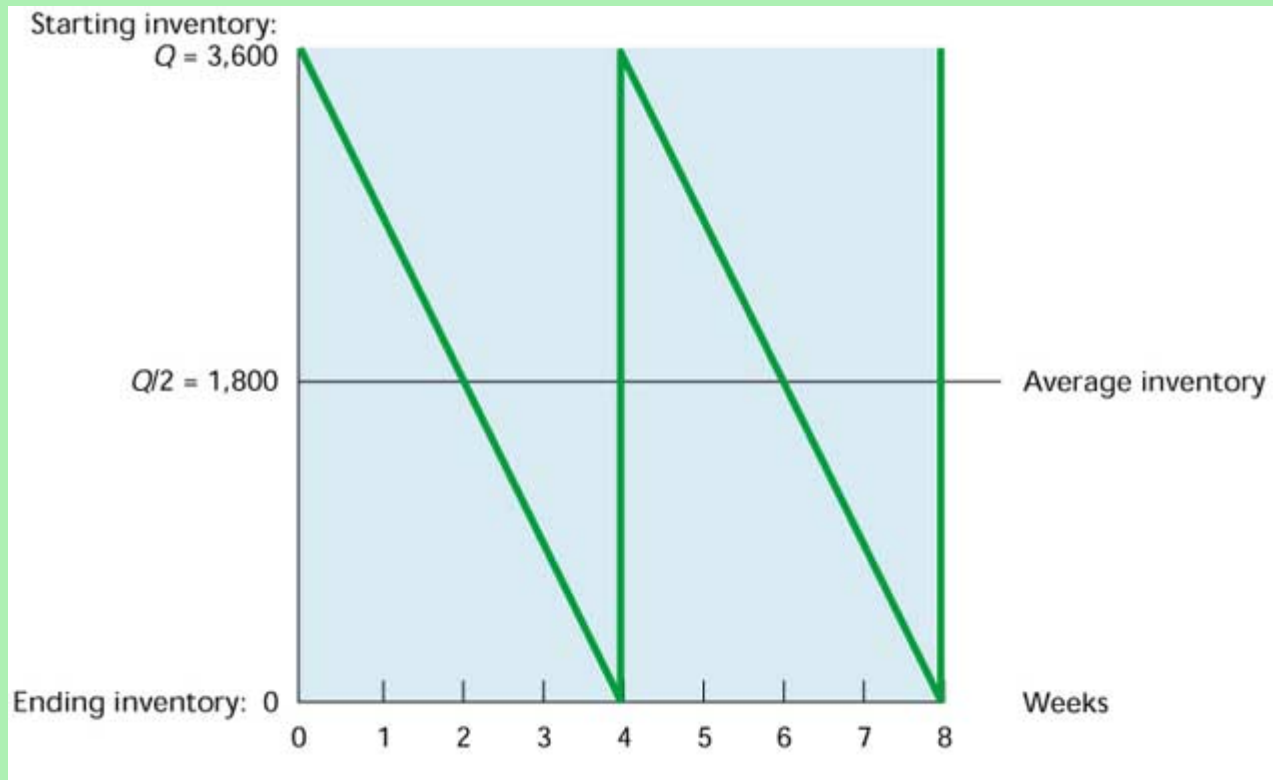
- MRP - Material Requirements Planning

- Just-in-Time Inventory

T20.14 ABC Inventory Analysis (Figure 20.4)

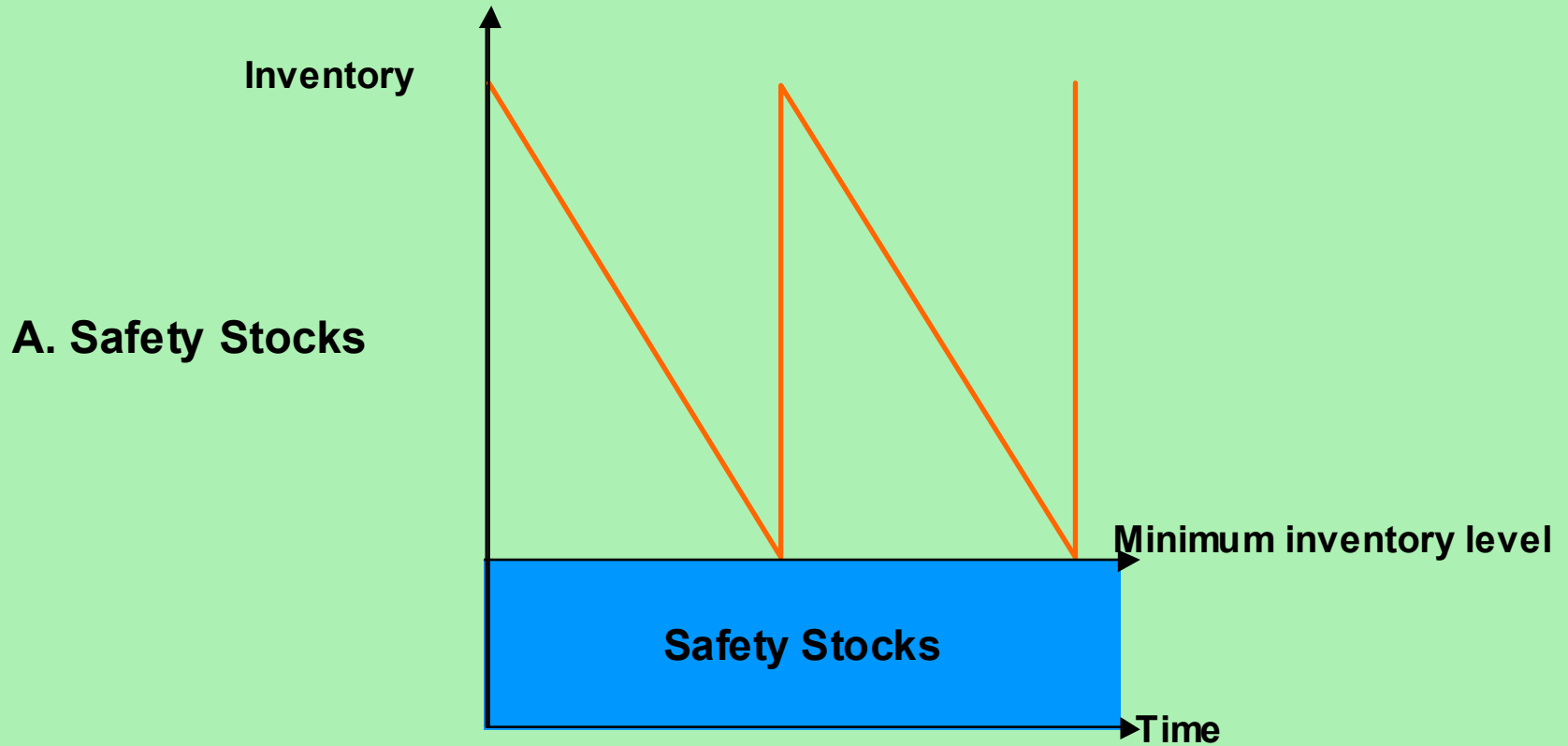


T20.15 Inventory Holdings for the Transcan Corporation (Figure 20.6)



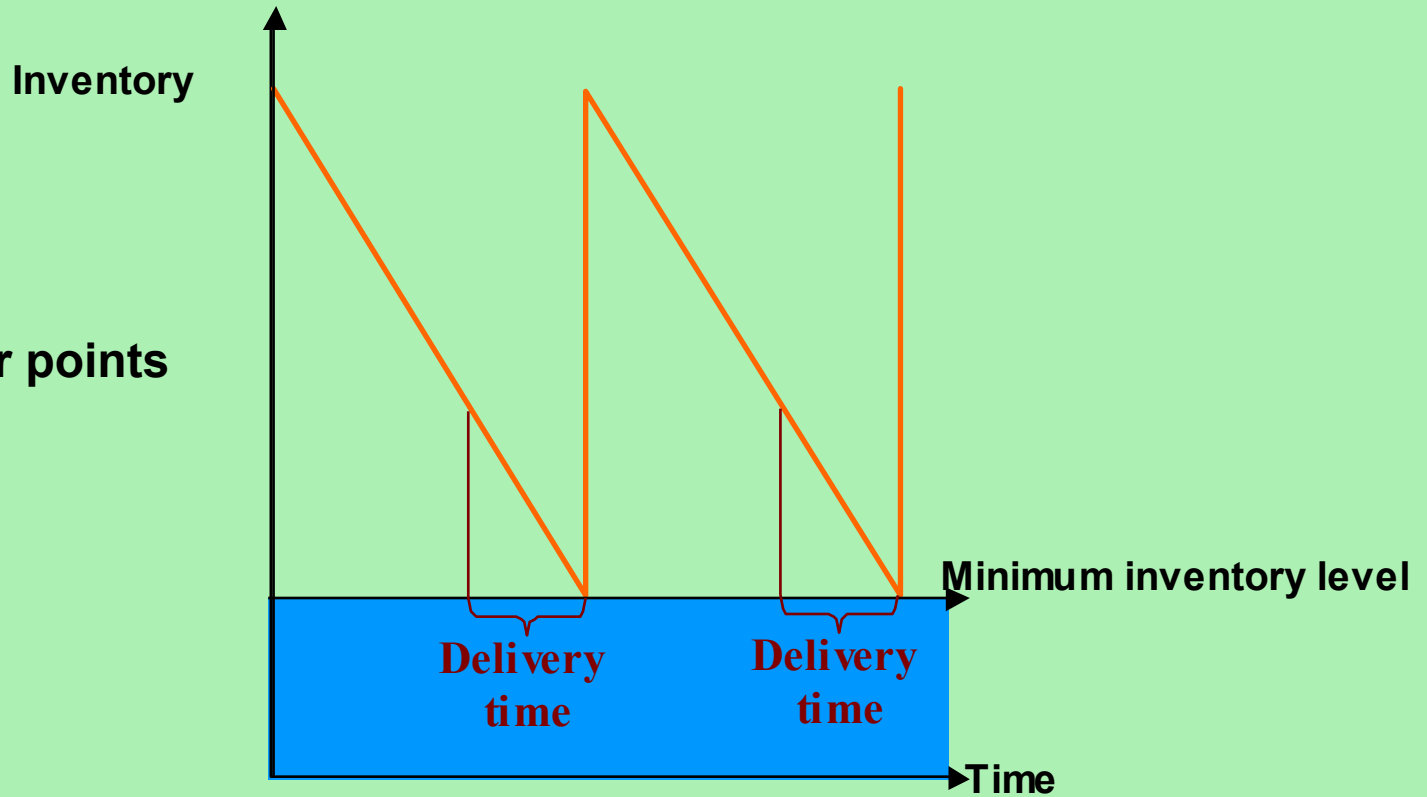
The Transcan Corporation starts with inventory of 3,600 units. The quantity drops to zero by the end of the fourth week. The average inventory is $Q/2 = 3,600/2 = 1,800$ over the period.

T20.16 Safety Stocks and Reorder Points (Figure 20.7)

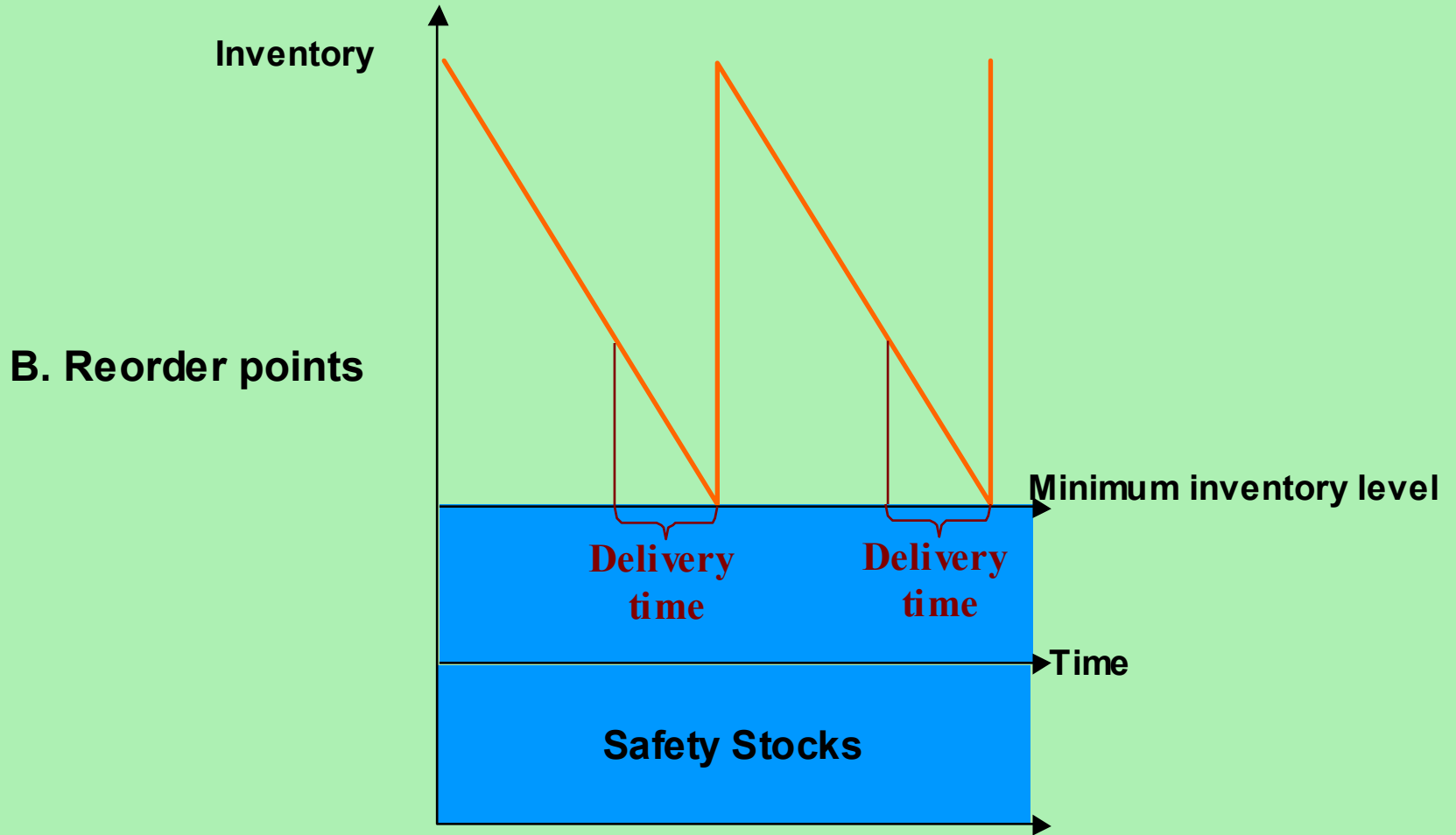


T20.16 Safety Stocks and Reorder Points (Figure 20.7)

B. Reorder points



T20.16 Safety Stocks and Reorder Points (Figure 20.7)



T20.17 Chapter 20 Quick Quiz

1. What is credit analysis?

Estimation of the probability that credit customers will not pay

2. How does one compute the value of the firm's investment in receivables?

Average daily sales \times Average collection period (ACP)

3. What is the relationship between credit policy and firm value? How is this quantified?

The optimal credit policy is that which maximizes firm value; the NPV method quantifies the effects of changes in credit policy

4. What is the four-step sequence of procedures to deal with customers whose payments are overdue?

Delinquency letter; telephone call; collection agency; legal action

T20.18 Solution to Problem 20.5

- A firm offers terms of 1/7, net 45. What effective annual interest rate (EAR) does the firm earn when a customer does not take the discount? Without doing any calculations, explain what will happen to this effective rate if:
 - a. the discount is changed to 2 percent.
 - b. the credit period is increased to 60 days.
 - c. the discount period is increased to 15 days.

T20.18 Solution to Problem 20.5 (concluded)

$$\begin{aligned}\text{Nominal interest rate} &= .01/.99 \\ &= .01010 \text{ for } 45 - 7 = 38 \text{ days}\end{aligned}$$

$$\text{EAR} = (1.01010)^{365/38} - 1 = \underline{\hspace{2cm}} \%$$

$$a. \ .02/.98 = .0204; \quad \text{EAR} = (1.0204)^{365/38} - 1 = \underline{\hspace{2cm}} \%$$

$$b. \ \text{EAR} = (1.\underline{\hspace{1cm}})^{365/\underline{\hspace{1cm}}} - 1 = \underline{\hspace{2cm}} \%$$

$$c. \ \text{EAR} = (1.0101)^{365/\underline{\hspace{1cm}}} - 1 = \underline{\hspace{2cm}} \%$$

T20.18 Solution to Problem 20.5 (concluded)

$$\begin{aligned}\text{Nominal interest rate} &= .01/.99 \\ &= .01010 \text{ for } 45 - 7 = 38 \text{ days}\end{aligned}$$

$$\text{EAR} = (1.01010)^{365/38} - 1 = 10.13 \%$$

$$a. .02/.98 = .0204; \quad \text{EAR} = (1.0204)^{365/38} - 1 = 21.42\%$$

$$b. \text{EAR} = (1.0101)^{365/53} - 1 = 7.17\%$$

$$c. \text{EAR} = (1.0101)^{365/30} - 1 = 13.01\%$$

T20.19 Solution to Problem 20.10

- Ogello, Inc. is considering a change in its cash-only sales policy. The new terms of sale would be net one month. Based on the information below, determine if Ogello should proceed or not. Describe the buildup of receivables in this case. The required return is 1.5 percent per month.

	<i>Current Policy</i>	<i>New Policy</i>
Price per unit	\$750	\$750
Cost per unit	\$375	\$375
Unit sales per month	525	680

T20.19 Solution to Problem 20.10 (concluded)

$$\text{Cost of switching} = \$____ (525) + \$375(______ - ______) = \$______$$

$$\begin{aligned}\text{Perpetual benefit of switching} &= (\$750 - \$375)(680 - 525) \\ &= \$58,125\end{aligned}$$

$$\text{NPV} = -\$ ______ + \$58,125 / ______ = \$3,423,125$$

The firm must bear the cost of sales for one month before they receive any revenue from credit sales, which is why the initial cost is for one month. Receivables will grow over the one month credit period, and then will remain about stable with payments and new sales offsetting one another.

T20.19 Solution to Problem 20.10 (concluded)

$$\text{Cost of switching} = \$750(525) + \$375(680 - 525) = \$451,875$$

$$\begin{aligned} \text{Perpetual benefit of switching} &= (\$750 - \$375)(680 - 525) \\ &= \$58,125 \end{aligned}$$

$$\text{NPV} = -\$451,875 + \$58,125/.015 = \$3,423,125$$

The firm must bear the cost of sales for one month before they receive any revenue from credit sales, which is why the initial cost is for one month. Receivables will grow over the one month credit period, and then will remain about stable with payments and new sales offsetting one another.

T20.20 Solution to Problem 20.11

- Bell Mfg. uses 1,600 switch assemblies per week and then reorders another 1,600. If the relevant carrying cost per assembly is \$40, and the fixed order cost is \$800, is Bell's inventory policy optimal? Why or why not?

$$\text{Carrying costs} = (\text{_____}/2)(\$40) = \$\text{_____}$$

$$\text{Order costs} = (52)(\$\text{_____}) = \$\text{_____}$$

$$\text{EOQ} = [2(52)(1,600)(\$800)/\$40]^{1/2} = \text{_____ units}$$

The firm's policy (*is/is not*) optimal, since the costs are not equal.

Bell should _____ the order size and _____ the number of orders per year.

T20.20 Solution to Problem 20.11

- Bell Mfg. uses 1,600 switch assemblies per week and then reorders another 1,600. If the relevant carrying cost per assembly is \$40, and the fixed order cost is \$800, is Bell's inventory policy optimal? Why or why not?

$$\text{Carrying costs} = (1,600/2)(\$40) = \$32,000$$

$$\text{Order costs} = (52)(\$800) = \$41,600$$

$$\text{EOQ} = [2(52)(1,600)(\$800)/\$40]^{1/2} = 1,825 \text{ units}$$

The firm's policy *is not* optimal, since the costs are not equal.

Bell should *increase* the order size and *decrease* the number of orders per year.