Principles of Managerial Finance

Brief Edition

Chapter 17

Accounts Receivable and Inventory

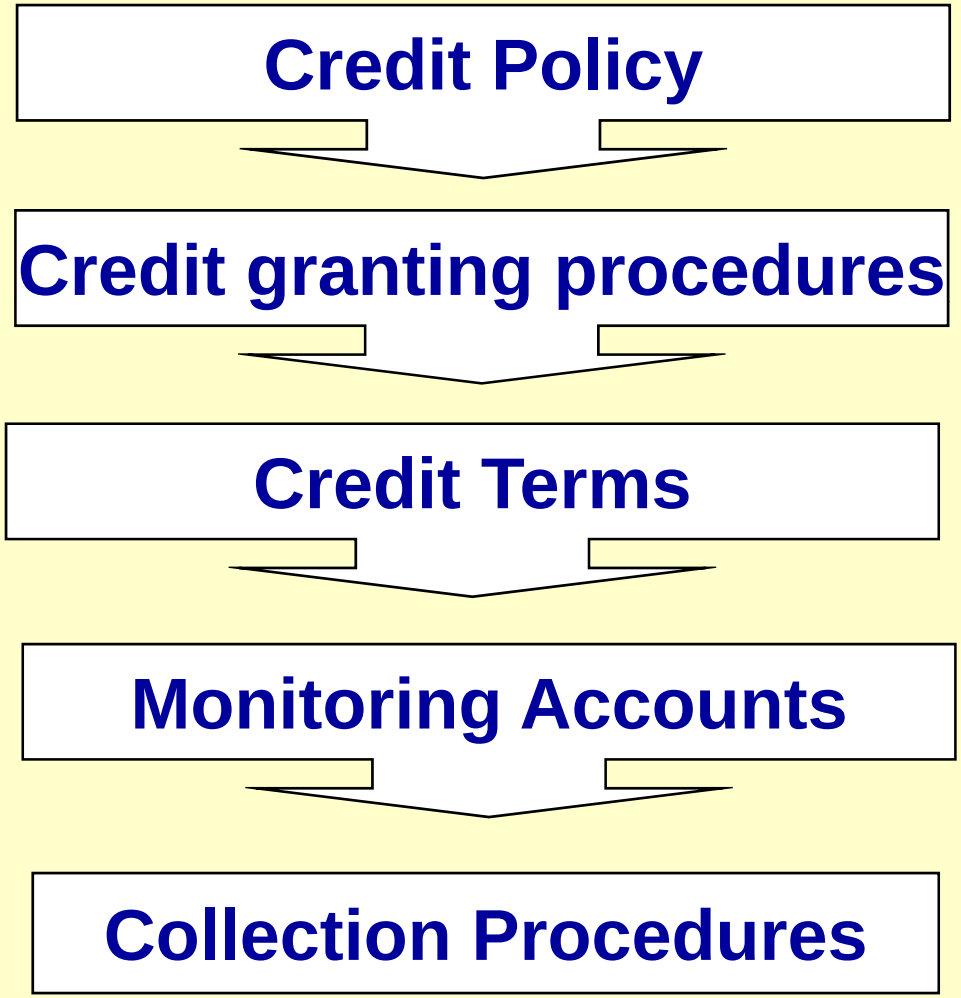
Learning Objectives

- Discuss Credit Selection, including the five Cs of credit, obtaining and analyzing credit information, credit scoring, and managing international credit.
- Use the key variables to evaluate quantitatively the effects of either relaxing or tightening a firm's credit standards.
- Review the effects of changes in each of the three components of credit terms on the key financial variables and on profits, and the procedure for quantitatively evaluating cash discount changes.

Learning Objectives

- Explain the key features of collection policy, including aging accounts receivable, the effects of changes in collection efforts, and the popular collection techniques.
- Understand inventory fundamentals, the relationship between inventory and accounts receivable, and international inventory management.
- Describe the common techniques for managing inventory, including the ABC system, the basic economic order quantity model, the reorder point, the materials requirement planning system, and the just in time system.

Credit Selection



Credit Selection

- Credit Policy
  - A company's credit policy establishes to whom and under what conditions the firm will offer credit

Credit Selection

- Credit Policy
- Credit Granting Procedures (Five Cs of Credit)
  - Capital
  - Character
  - Collateral
  - Capacity
  - Conditions

Credit Selection

- Credit Policy
- Credit Granting Procedures
- Credit Terms

Credit Selection

- Credit Policy
- Credit Granting Procedures
- Credit Terms
- Monitoring Receivables
  - focus should be both on trends in overall receivables and on troublesome individual accounts
  - Aging Schedules can be useful for monitoring purposes

Credit Selection

- Credit Policy
- Credit Granting Procedures
- Credit Terms
- Monitoring Receivables
- Collection Procedures

Obtaining Credit Information

- Past financial statements allow the credit analyst to assess the firm's liquidity, activity, debt, and profitability.
- Dun & Bradstreet (D&B) is the largest business credit-reporting agency in the U.S. and provides credit ratings, and estimates of overall financial strength for millions of national and international companies.
- The National Credit Interchange System is a national network of local credit bureaus that provides credit data rather than analysis.

Obtaining Credit Information

- Local, regional, and/or national trade associations often serve as clearinghouses for credit information that is supplied and made available to member companies.
- It is also sometimes possible for a firm's bank to obtain credit information from the applicant's bank.

Analyzing Credit Information

- Credit analysis involves the evaluation of a credit applicants.
- Credit analysis involves not only a determination of the firm's creditworthiness, but also the amount of credit an applicant is capable of supporting.
- The end result is a determination of a line of credit which represents the maximum a customer can owe at any point in time.

Credit Scoring

- Credit scoring is a procedure resulting in a score that measures an applicant's overall credit strength, derived as a weighted-average of scores of various credit characteristics.

Paula's Stores, a major department store chain, uses a credit scoring model to make credit decisions. Paula's uses a system measuring six separate financial and credit characteristics. Scores can range from 0 (lowest) to 100 (highest). The minimum acceptable score necessary for granting credit is 75. The results of such a score for Herb Conseca is illustrated as follows:

Credit Scoring

Credit Standards for Oaula's Stores	
Credit Score	**Action**
Greater than 75	Extend standard credit terms
65 to 75	Extend limited credit
Less than 65	Reject application

Credit Scoring of Herb Conseca by Paula's Stores			
Financial and credit characteristic	**Score (0 to 100)**	**Predetermined weight**	**Weighted score**
Credit references	80	15%	12.00
Home ownership	100	15%	15.00
Income range	70	25%	17.50
Payment history	75	25%	18.75
Years at address	90	10%	9.00
Years on job	80	10%	8.00
		Credit Score	80.25

Managing International Credit

- Credit management is much more complex for companies that operate internationally due in part to exchange rate risk, and also to the delays in shipping goods long distance.
- Because of these risks, companies doing business internationally must “hedge” these risks using currency futures, forward, or options markets.

Changing Credit Standards

Key Variables

Changes in Key Variables Resulting from A Relaxation of Credit Standards		
Variable	**Direction of Change**	**Effect on Profits**
Sales Volume	Increase	Positive
Investment in Accounts Receivable	Increase	Negative
Bad Debt Expense	Increase	Negative

Changes in Key Variables Resulting from A Tightening of Credit Standards		
Variable	**Direction of Change**	**Effect on Profits**
Sales Volume	Decrease	Negative
Investment in Accounts Receivable	Decrease	Positive
Bad Debt Expense	Decrease	Positive

Binz Tool Example

Binz Tool, a manufacturer of lathe tools, is currently selling a product for $10/unit. Sales (all on credit) for last year were 60,000 units. The variable cost per unit is $6. The firm's total fixed costs are $120,000.

Binz is currently contemplating a relaxation of credit standards that is anticipated to increase sales 5% to 63,000 units. It is also anticipated that the ACP will increase from 30 to 45 days, and that bad debt expenses will increase from 1% of sales to 2% of sales. The opportunity cost of tying funds up in receivables is 15%

Given this information, should Binz relax its credit standards?

Binz Tool Example

Binz Tool Company		
Analysis of Relaxing Credit Standards		
Relevant Data		
Old Sales (units)		60,000
New Sales (units)		63,000
Price/unit ($)	$	10
Variable Cost/unit ($)	$	6
Contributin Margin/unit ($)	$	4
Old Receivables Level (days)		30
New Receivables Level (days)		45
Old A/R Turnover (360/AR)		12
New A/R Turnover (360/AR)		8
Old Bad Debt Level (% of sales)		1%
New Bad Debt Level (% of sales)		2%
Opportunity Cost (%)		15%

Binz Tool Example

Additional Profit Contribution from Sales

Binz Tool Company			
Analysis of Rexaxing Credit Standards			
Additional Profit Contribution from Sales:			
Old Sales Level	60,000	Price/Unit	$ 10
New Sales Level	63,000	Variable Cost/Unit	$ 6
Increase in Sales	3,000	Contribution Margin/Unit	$ 4
Additional Profit Contribution from Sales		(sales incr x cont margin)	$ 12,000

Binz Tool Example

Cost of Marginal Investment in A/R

Binz Tool Company					
Analysis of Rexaxing Credit Standards					
Cost of Marginal Investment in A/R:					
Cost of Marginal Investment in A/R =			(Variable Vost/unit x # of units)		
			Receivables Turnover		
Average Investment Under Proposed Plan					$ 47,250
Average Investment Under Present Plan					$ 30,000
Marginal Investment in Accounts Receivable					$ 17,250
Opportunity Cost					15%
Cost of Marginal Investment in Accounts Receivable					$ (2,588)

Binz Tool Example

Cost of Marginal Bad Debts

Binz Tool Company				
Analysis of Relaxing Credit Standards				
Cost of Marginal Bad Debts:				
Cost of Marginal Bad Debts = (% Bad Debt x Price/unit x # of Units)				
Cost of Marginal Bad Debts under Proposed Plan				$ 12,600
Cost of Marginal Bad Debts under Present Plan				$ 6,000
Cost of Marginal Bad Debts				$ (6,600)

Binz Tool Example

Net Profit From Implementation of Proposed Plan

Binz Tool Company	
Analysis of Relaxing Credit Standards	
Additional Profit Contribution from Sales	$ 12,000
Cost of Marginal Investment in Accounts Receivable	(2,588)
Cost of Marginal Bad Debts	(6,600)
Net Profit From Implementation of Proposed Plan	$ 2,813

Changing Credit Terms

- A firm's credit terms specify the repayment terms required of all of its credit customers.
- Credit terms are composed of three parts:
  - the cash discount
  - the cash discount period
  - the credit period
- For example, with credit terms of 2/10 net 30, the discount is 2%, the discount period is 10 days, and the credit period is 30 days.

Changing Credit Terms

Cash Discount

Variable	Direction of Change	Effect on Profits
Sales volume	increase	positive
Investment in A/R due to		
nondiscount takers paying earlier	decrease	positive
Investment in A/R due to		
new customers	increase	negative
Bad debt expense	decrease	positive
Profit per unit	decrease	negative

Changing Credit Terms

Cash Discount

Binz Tool is considering a initiating a cash discount of 2% for payment within 10 days of a purchase. The firm's current average collection period (ACP) is 30 days (A/R turnover = 360/30 = 12). Credit sales of 60,000 units at $10/unit and the variable cost/unit is $6.

Binz expects that if the cash discount is initiated, 60% will take the discount and pay early. In addition, sales are expected to increase 5% to 63,000 units. The ACP is expected to drop to 15 days (A/R turnover = 360/15 = 24). Bad debts will drop from 1% to 0.5% of sales. The opportunity cost to the firm of tying up funds in receivables is 15%.

Changing Credit Terms

Cash Discount

Binz Tool Company			
The Effect of Initiating a Cash Discount			
Additional Profit Contribution from Sales:			
Old Sales Level	60,000	Price/Unit	$ 10
New Sales Level	63,000	Variable Cost/Unit	$ 6
Increase in Sales	3,000	Contribution Margin/Unit	$ 4
Additional Profit Contribution from Sales		(sales incr x cont margin)	$ 12,000

Changing Credit Terms

Cash Discount

Binz Tool Company					
The Effect of Initiating a Cash Discount					
Cost of Marginal Investment in A/R:					
Cost of Marginal Investment in A/R =			(Variable Vost/unit x # of units)		
			Receivables Turnover		
Average Investment Under Proposed Plan					$ 15,750
Average Investment Under Present Plan					$ 30,000
Marginal Investment in Accounts Receivable					$ 14,250
Opportunity Cost					15%
Cost of Marginal Investment in Accounts Receivable					$ 2,138

Changing Credit Terms

Cash Discount

Binz Tool Company				
The Effects of Initiating a Cash Discount				
Cost of Marginal Bad Debts:				
Cost of Marginal Bad Debts = (% Bad Debt x Price/unit x # of Units)				
Cost of Marginal Bad Debts under Proposed Plan				$ 3,150
Cost of Marginal Bad Debts under Present Plan				$ 6,000
Cost of Marginal Bad Debts				$ 2,850

Changing Credit Terms

Cash Discount

Binz Tool Company			
The Effects of Initiating a Cash Discount			
Cost of Cash Discount:			
Cost = (% discount x %credit sales x price/unit x units sold)			
Cost	$ (7,560)		

Changing Credit Terms

Cash Discount

Binz Tool Company	
The Effects of Initiating a Cash Discount	
Additional Profit Contribution from Sales	$ 12,000
Cost of Marginal Investment in Accounts Receivable	2,138
Cost of Marginal Bad Debts	2,850
Cost of Initiating a Cash Discount	$ (7,560)
Net Profit From Implementation of Proposed Plan	$ 9,428

Changing Credit Terms

Cash Discount Period

Variable	Direction of Change	Effect on Profits
Sales volume	increase	positive
Investment in A/R due to		
nondiscount takers paying earlier	decrease	positive
Investment in A/R due to		
discount takers still getting cash		
discount but paying later	increase	negative
Investment in A/R due to new		
customerrs	increase	negative
Bad debt expense	decrease	positive
Profit per unit	decrease	negative

Changing Credit Terms

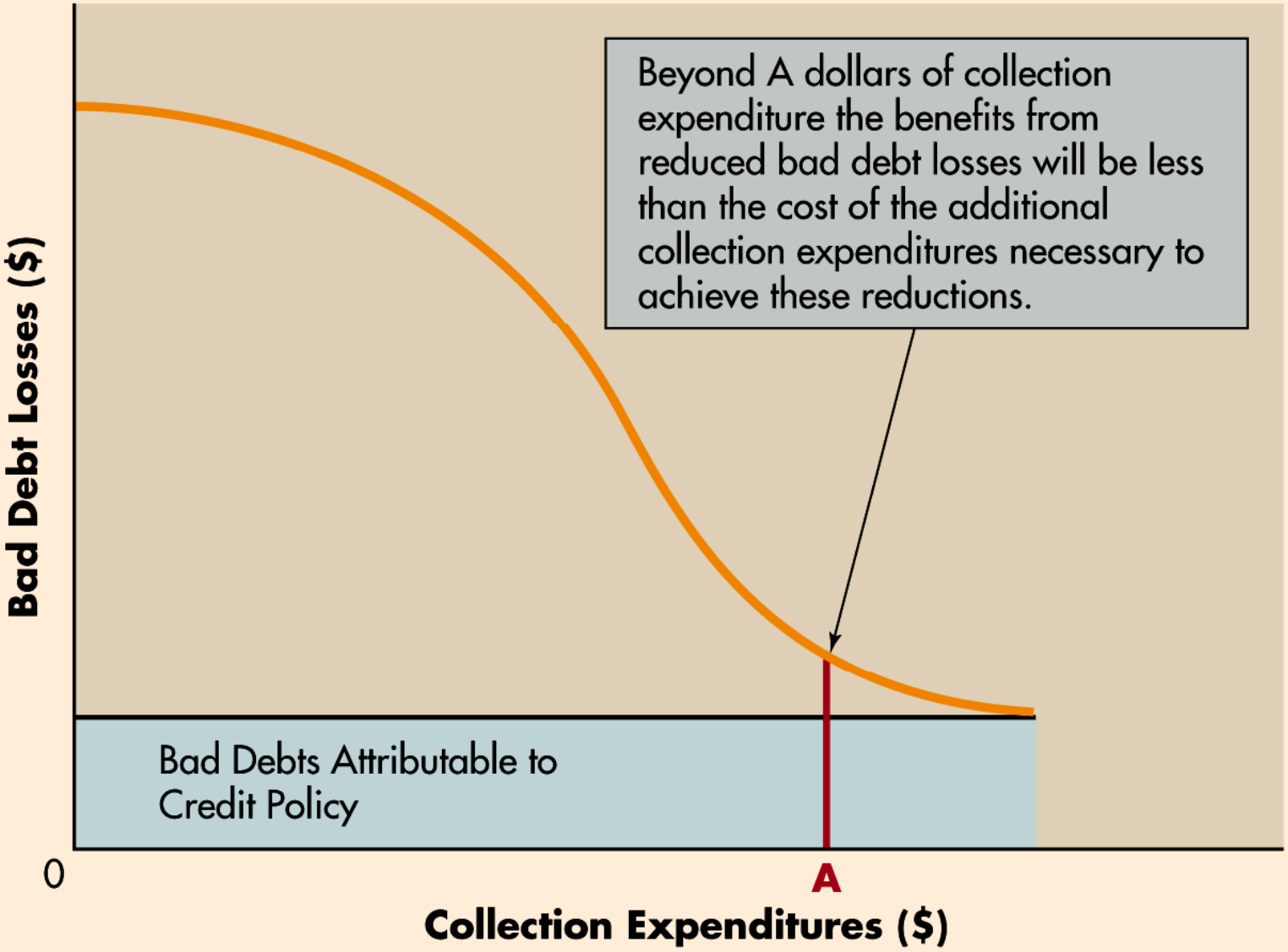
Credit Period

Variable	Direction of Change	Effect on Profits
Sales volume	increase	positive
Investment in A/R	increase	negative
Bad debt expenses	increase	negative

Collection Policy

- The firm's collection policy is its procedures for collecting a firm's accounts receivable when they are due.
- The effectiveness of this policy can be partly evaluated by evaluating at the level of bad expenses.
- As seen in the previous examples, this level depends not only on collection policy but also on the firm's credit policy.
- In general, Funds should be expended to collect bad debts up to the point where the marginal cost exceeds the marginal benefit (Point A on the following slide).

Collection Policy



Collection Policy

Aging Accounts Receivable

Assume that Binz Tool extends 30-day EOM credit terms to its customers. The firm's December 31, 1998 balance sheet shows $200,000 of accounts receivable. An evaluation of the $200,000 of accounts receivable results in the following breakdown:

Days	Current	0-30	31-60	61-90	Over 90	
Month	**December**	**November**	**October**	**September**	**August**	**Total**
Accounts Receivable	$ 60,000	$ 40,000	$ 66,000	$ 26,000	$ 8,000	$200,000
Percentage of Total	30%	20%	33%	13%	4%	100%

Given the firm's credit policy, any December receivables still on the books are considered current. November receivables are between 0 and 31 days overdue, and so on. The percentage breakdown is given in the bottom row indicating the firm may have had a particular problem in October which should be investigated.

Collection Policy

Basic Tradeoffs

- The basic tradeoffs that are expected to result from an increase in collection efforts are as follows:

Variable	Direction of Change	Effect on Profits
Sales volume	none or decrease	none or negative
Investment in A/R	decrease	positive
Bad debt expenses	decrease	positive
Collection procedures	increase	negative

Collection Policy

TABLE 17.5 Popular Collection Techniques

Technique[a]	Brief description
Letters	After a certain number of days, the firm sends a polite letter reminding the customer of its overdue account. If the account is not paid within a certain period after the letter has been sent, a second, more demanding letter is sent. This letter may be followed by yet another letter, if necessary.
Telephone calls	If letters prove unsuccessful, a telephone call may be made to the customer to personally request immediate payment. Such a call is typically directed to the customer's accounts payable department. If the customer has a reasonable excuse, arrangements may be made to extend the payment period. A call from the seller's attorney may be used if all other discussions seem to fail.
Personal visits	This technique is much more common at the consumer credit level, but it may also be effectively employed by industrial suppliers. Sending a local salesperson or a collection person to confront the customer can be very effective. Payment may be made on the spot.
Collection agencies	A firm can turn uncollectible accounts over to a collection agency or an attorney for collection. The fees for this service are typically quite high; the firm may receive less than 50 cents on the dollar from accounts collected in this way.
Legal action	Legal action is the most stringent step in the collection process. It is an alternative to the use of a collection agency. Not only is direct legal action expensive, but it may force the debtor into bankruptcy, thereby reducing the possibility of future business without guaranteeing the ultimate receipt of the overdue amount.

[a]Techniques are listed in the order typically followed in the collection process.

Inventory Management

Inventory Fundamentals

- Classification of inventories:
  - raw materials - items purchased for use in the manufacture of a finished product
  - work-in-progress - all items that are currently in production
  - finished goods - items that have been produced but not yet sold

Inventory Management

Differing Views About Inventory

- The different departments within a firm (finance, production, marketing, etc..) often have differing views about what is an “appropriate” level of inventory.
- Financial managers would like to keep inventory levels low to ensure that funds are wisely invested.
- Marketing managers would like to keep inventory levels high to ensure orders could be quickly filled.
- Manufacturing managers would like to keep raw materials levels high to avoid production delays and to make larger, more economical production runs.

Inventory Management

Inventory as an Investment

Excellent Manufacturing is contemplating making larger production runs to reduce high setup costs associated with the production of its industrial hoists. The total annual reduction in setup costs that can be obtained has been estimated to be $10,000.

As a result of higher runs, the average inventory investment is expected to increase from $200,000 to $300,000. If the firm can earn 15% on equal risk investments, the annual cost of the additional $100,000 will be $15,000 ($100,000 x 15%).

Comparing the annual $15,000 cost with the annual $10,000 savings, the firm should not adopt the proposed change.

Inventory Management

The Relationship Between Inventory & A/R

- Whenever a firm extends credit to its customers, inventory and A/R levels are very closely related.
- As a result, accounts receivable and inventory decisions must be considered together.

For example, the decision to extend credit to a customer can result in an increased level of sales which can only be supported by higher levels of inventory and accounts receivable. The higher the levels of A/R and inventory, the greater the cost.

Inventory Management

The Relationship Between Inventory & A/R

Most Industries estimate that the annual cost of carrying $1 of inventory is 25 cents, whereas the cost of carrying $1 of A/R is 15 cents. The firm currently has an average inventory level of $300,000 and an average A/R level of $200,000.

Most believe that by altering its credit terms, it can induce customers to purchase in larger quantities, thereby reducing its average inventory level to $150,00 and increasing average receivables to $350,000.

The new credit terms are not expected to generate new sales but merely shift its purchasing and payment patterns and they wish to determine the net effect of such a strategy.

Inventory Management

The Relationship Between Inventory & A/R

Most Industries					
Analysis of Shift in A/R -- Inventory Strategy					
		Present		Proposed	
	Cost per	Average	Total	Average	Total
Variable	Dollar	Investment	Cost	Investment	Cost
Average Inventory	25%	$ 300,000	$ 75,000	$ 150,000	$ 37,500
Average Receivables	15%	$ 200,000	$ 30,000	$ 350,000	$ 52,500
		$ 500,000	$ 105,000	$ 500,000	$ 90,000

The above table demonstrates that because the shift in strategy lowers the overall cost of managing A/R and inventory, the change in credit policy should be implemented.

Inventory Management

International Inventory Management

- International inventory management is typically much more complicated for exporters and MNCs.
- The production and manufacturing economies of scale that might be expected from selling globally may prove elusive if products must be tailored for local markets.
- Transporting products over long distances often results in delays, confusion, damage, theft, and other difficulties.

Techniques for Managing Inventory

The ABC System

- The ABC system of inventory management divides inventory into three groups of descending order of importance based on the dollar amount invested in each.
- A typical system would contain, group A would consist of 20% of the items worth 80% of the total dollar value; group B would consist of the next largest investment, and so on.
- Control of the A items would intensive because of the high dollar investment involved.
- The EOQ model would be most appropriate for managing both A and B items.

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

- The ABC system of inventory management divides inventory into three groups of descending order of importance based on the dollar amount invested in each.
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- The EOQ model would be most appropriate for managing both A and B items.

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

$$EOQ = \sqrt{\frac{2 \times S \times O}{C}}$$

- Where:
  - S = usage in units per period (year)
  - O = order cost per order
  - C = carrying costs per unit per period (year)

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

$$EOQ = \sqrt{\frac{2 \times S \times O}{C}}$$

Assume that RLB, Inc., a manufacturer of electronic test equipment, uses 1,600 units of an item annually. Its order cost is $50 per order, and the carrying cost is $1 per unit per year. Substituting into the above equation we get:

$$EOQ = \sqrt{\frac{2(1,600)(\$50)}{\$1}} = 400$$

The EOQ can be used to evaluate the total cost of inventory as shown on the following slides.

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

Ordering Costs = Cost/Order x # of Orders/Year

$$\text{Carrying Costs} = \frac{\text{Carrying Costs/Year x Order Size}}{2}$$

Total Costs = Ordering Costs + Carrying Costs

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

RIB, Inc.	
Inventory Data	
Variable	**Value**
Annual Usage	1,600
Order Cost/Order	$ 50.00
Carrying Costs/year	$ 1.00

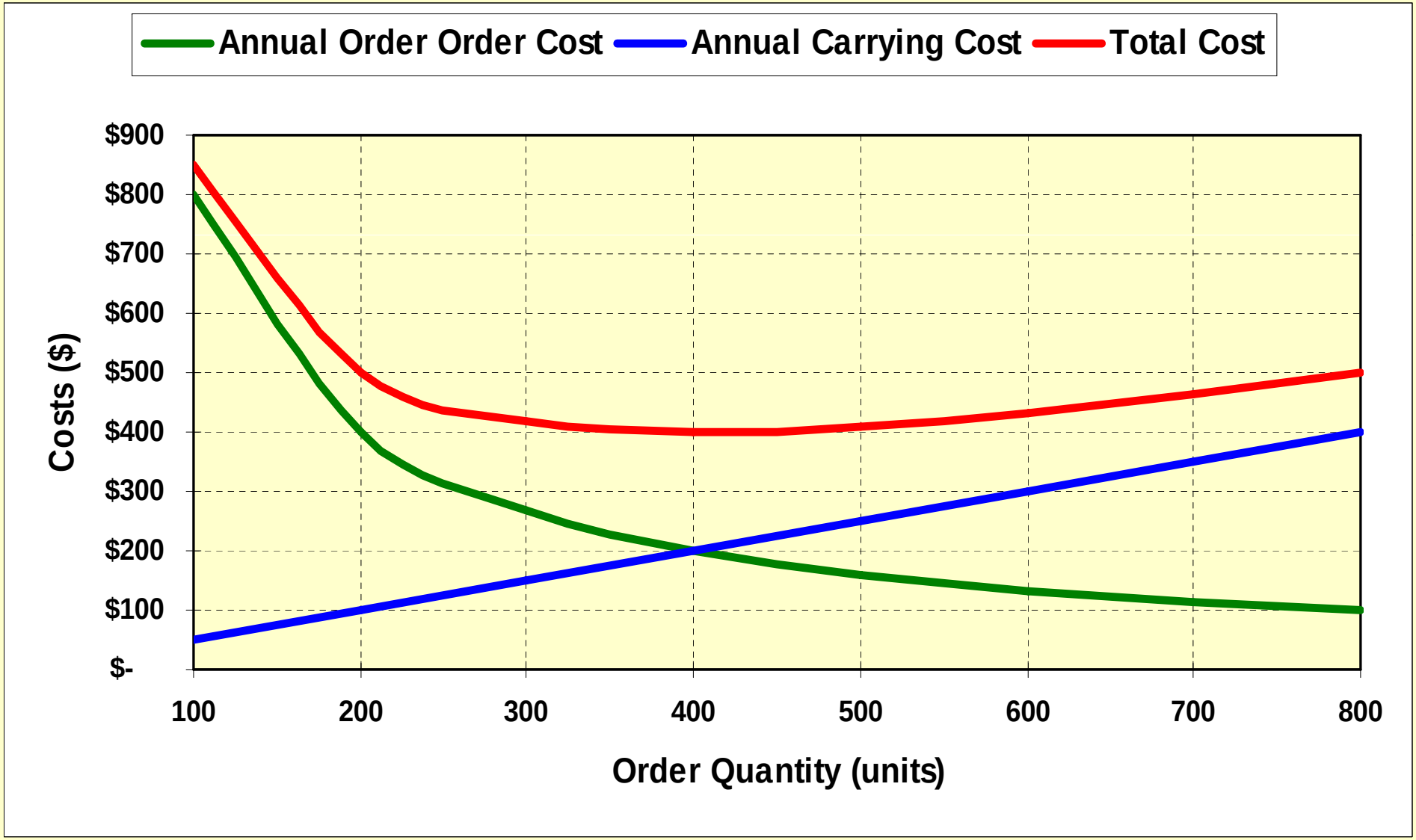
Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model

RIB, Inc.				
Evaluation of Economic Order Quantity (EOQ)				
Order Quantity	Annual Orders	Annual Order Cost	Annual Carrying Cost	Total Cost
100	16.0	$ 800	$ 50	$ 850
200	8.0	$ 400	$ 100	$ 500
300	5.3	$ 267	$ 150	$ 417
400	4.0	$ 200	$ 200	$ 400
500	3.2	$ 160	$ 250	$ 410
600	2.7	$ 133	$ 300	$ 433
700	2.3	$ 114	$ 350	$ 464
800	2.0	$ 100	$ 400	$ 500

Techniques for Managing Inventory

The Basic Economic Order Quantity (EOQ) Model



Techniques for Managing Inventory

The Reorder Point

- Once a company has calculated its EOQ, it must determine when it should place its orders.
- More specifically, the reorder point must consider the nead time needed to place and receive orders.
- If we assume that inventory is used at a constant rate throughout the year (no seasonality), the reorder point can be determined by using the following equation:

Reorder point = lead time in days x daily usage

Daily usage = Annual usage/360

Techniques for Managing Inventory

The Reorder Point

Using the RIB example above, if they know that it requires 10 days to place and receive an order, and the annual usage is 1,600 units per year, the reorder point can be determined as follows:

Daily usage = 1,600/360 = 4.44 units/day

Reorder point = 10 x 4.44 = 44.44 or 45 units

Thus, when RIB's inventory level reaches 45 units, it should place an order for 400 units. However, if RIB wishes to maintain safety stock to protect against stock outs, they would order before inventory reached 45 units.

Techniques for Managing Inventory

Materials Requirement Planning (MRP)

- MRP systems are used to determine what to order, when to order, and what priorities to assign to ordering materials.
- MRP uses EOQ concepts to determine how much to order using computer software.
- It simulates each product's bill of materials structure all of the product's parts), inventory status, and manufacturing process.
- Like the simple EOQ, the objective of MRP systems is to minimize a company's overall investment in inventory without impairing production.

Techniques for Managing Inventory

Just-In-Time (JIT) System

- The JIT inventory management system minimizes the inventory investment by having material inputs arrive exactly at the time they are needed for production.
- For a JIT system to work, extensive coordination must exist between the firm, its suppliers, and shipping companies to ensure that material inputs arrive on time.
- In addition, the inputs must be of near perfect quality and consistency given the absence of safety stock.