

Chapter 28 Credit Management

- Terms of the Sale
- The Decision to Grant Credit:
Risk and Information
- Optimal Credit Policy
- Credit Analysis
- Collection Policy
- How to Finance Trade Credit
- Summary & Conclusions

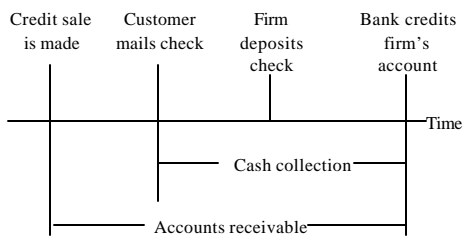
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Introduction

- A firm's credit policy is composed of:
 - Terms of the sale
 - Credit analysis
 - Collection policy

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The Cash Flows of Granting Credit



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Terms of the Sale

- The terms of sale of composed of
 - Credit Period
 - Cash Discounts
 - Credit Instruments

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Credit Period

- Credit periods vary across industries.
- Generally a firm must consider three factors:
 - Probability that the customer will not pay.
 - Size of the account.
 - Extent goods are perishable.
- Lengthening the credit period generally increases sales

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Cash Discounts

- Often part of the terms of sale.
- Tradeoff between the size of discount and increased rate of collection of receivables.

Example - 3/10 net 30

3 - percent discount for early payment
10 - number of days that the discount is available
net 30 - number of days before payment is due

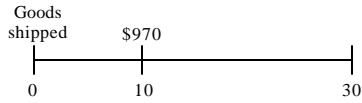
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The Interest Rate Implicit in 3/10 net 30

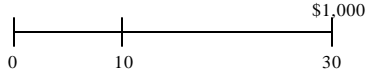
A firm offering credit terms of 3/10 net 30 is essentially offering their customers a 20-day loan.

To see this, consider a firm that makes a \$1,000 sale on day 0

Some customers will pay on day 10 and take the discount



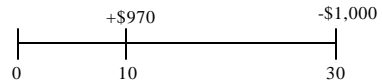
Other customers will pay on day 30 and forgo the discount.



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The Interest Rate Implicit in 3/10 net 30

A customer that forgoes the 3% discount to pay on day 30 is borrowing \$970 for 20 days and paying \$30 interest:



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Effective annual rate of cash discount Alternative method

Effective annual rate

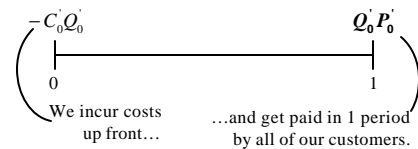
$$= \left(1 + \frac{\text{discount}}{\text{discounted price}}\right)^{365/\text{extra days credit}} - 1$$

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The Decision to Grant Credit: Timing of CF's

- Consider a firm that is choosing between two alternative credit policies:
 - "In God we trust—everybody else pays cash."
 - Offering their customers credit.
- The only cash flow of the first strategy is $Q_0 \cdot (P_0 - C_0)$

- The *expected* cash flows of the credit strategy are:



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The Decision to Grant Credit: Timing of CF's

- The NPV of the cash only strategy is

$$NPV_{\text{cash}} = Q_0 \cdot (P_0 - C_0)$$

- The NPV of the credit strategy is

$$NPV_{\text{credit}} = -C_0 Q_0 + \frac{Q_0 P_0}{(1+r_B)^1}$$

The decision to grant credit depends on four factors:

- The delayed revenues from granting credit, $P_0 Q_0$
- The immediate costs of granting credit, $C_0 Q_0$
- The discount rate, r_B

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Example: NPV of Cash Discount

Current policy – no cash discount, no credit

Proposed policy(1) – no discount, net 30, sales increase 5%

Proposed policy(2) – 3/10 net 30, sales increase by 10%,
12% cost of debt

Current sales - \$1,000,000, variable costs 40% of sales

Answer:

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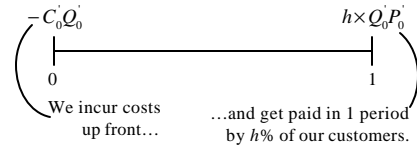
Credit Instruments

- Most credit is offered on **open account**
- **Promissory notes**
- **Commercial drafts**
- **Banker's acceptances**
- **Conditional sales contracts**

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The Decision to Grant Credit: Risk and Information

- Now consider the same two policies, but only $h\%$ of our credit customers pay
 - "In God we trust—everybody else pays cash."
 - Offering their customers credit.
- The only cash flow of the first strategy is $Q_0 \cdot (P_0 - C_0)$
- The *expected* cash flows of the credit strategy are:



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The Decision to Grant Credit: Risk and Information

- The NPV of the cash only strategy is

$$NPV_{cash} = Q_0 \cdot (P_0 - C_0)$$

- The NPV of the credit strategy is

$$NPV_{credit} = -C_0'Q_0' + \frac{h \times Q_0'P_0'}{(1+r_B)^1}$$

The decision to grant credit depends on four factors:

1. The delayed revenues from granting credit, $P_0'Q_0'$
2. The immediate costs of granting credit, $C_0'Q_0'$
3. The probability of repayment, h
4. The discount rate, r_B

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Example of the Decision to Grant Credit

- A firm currently sells 1,000 items per month on a cash basis for \$500 each, cost is \$400.
- If they offered terms net 30, the marketing department believes that they could sell 1,300 items per month, price is \$500, cost is \$425.
- The collections department estimates that 5% of credit customers will default.
- The cost of capital is 10% per annum.

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Example of the Decision to Grant Credit

	No Credit	Net 30
Quantity sold	1,000	1,300
Selling price	\$500	\$500
Unit cost	\$400	\$425
Probability of payment	100%	95%
Credit period (days)	0	30
Discount rate p.a.		10%

$$NPV_{cash} = Q_0 \times (P_0 - C_0) \qquad NPV_{credit} = -C_0'Q_0' + \frac{h \times Q_0'P_0'}{(1+r_B)^1}$$

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Example of the Decision to Grant Credit

How high must the credit price be to make it worthwhile for the firm to extend credit?

The NPV of Net 30 must be at least as big as the NPV of cash only:

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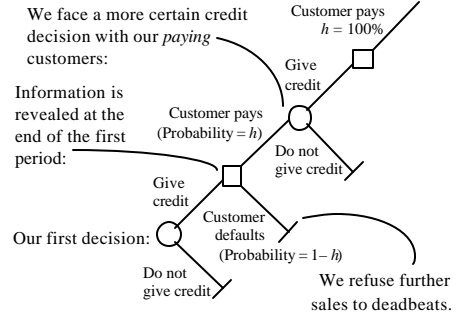
The Value of New Information about Credit Risk

The most that we should be willing to pay for *new* information about credit risk is the present value of the expected cost of defaults:

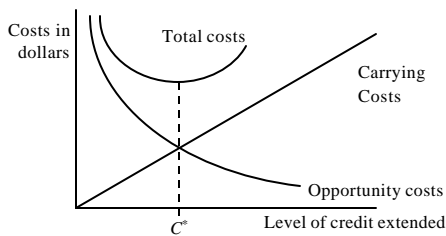
$$\begin{aligned} NPV_{\text{default}} &= -C_0' \cdot Q_0' \cdot (1-h) + \frac{\$0(1-h)(Q \cdot P)}{(1+r_B)} \\ &= -C_0' \cdot Q_0' \cdot (1-h) \end{aligned}$$

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Future Sales and the Credit Decision



Optimal Credit Policy



Optimal Credit Policy

- Trade Credit is more likely to be granted if:
 - Selling firm has a cost advantage over other lenders.
 - Selling firm can engage in price discrimination.
 - Selling firm can obtain favorable tax treatment.
 - Selling firm has no established reputation for quality products or services.
 - Selling firm perceives a long-term strategic relationship.
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Credit Analysis

- Credit Information
 - Financial Statements
 - Credit Reports
 - Banks
 - Customer's Payment History
 - Credit Scoring:
 - The traditional 5 C's of credit
 - Character
 - Capacity
 - Capital
 - Collateral
 - Conditions
 - Some firms employ sophisticated statistical models
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Credit Analysis

Multiple Discriminant Analysis - A technique used to develop a measurement of solvency, sometimes called a *Z Score*. Edward Altman developed a Z Score formula that was able to identify bankrupt firms approximately 95% of the time.

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Credit Analysis

Multiple Discriminant Analysis - A technique used to develop a measurement of solvency, sometimes called a **Z Score**. Edward Altman developed a **Z Score** formula that was able to identify bankrupt firms approximately 95% of the time. A score above 2.7 indicates good credit.

Altman Z Score formula

$$Z = 3.3 \frac{\text{EBIT}}{\text{total assets}} + 1.0 \frac{\text{sales}}{\text{total assets}} + 0.6 \frac{\text{market value of equity}}{\text{total book debt}} + 1.4 \frac{\text{retained earnings}}{\text{total assets}} + 1.2 \frac{\text{working capital}}{\text{total assets}}$$

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Example - If the Altman Z score cut off for a credit worthy business is 2.7 or higher, would we accept the following client?

$$\frac{\text{EBIT}}{\text{total assets}} = .12$$

$$\frac{\text{retained earnings}}{\text{total assets}} = .4$$

$$\frac{\text{sales}}{\text{total assets}} = 1.4$$

$$\frac{\text{working capital}}{\text{total assets}} = .12$$

$$\frac{\text{market equity}}{\text{book debt}} = .9$$

Altman Z Score formula

$$Z = 3.3 \frac{\text{EBIT}}{\text{total assets}} + 1.0 \frac{\text{sales}}{\text{total assets}} + 0.6 \frac{\text{market value of equity}}{\text{total book debt}} + 1.4 \frac{\text{retained earnings}}{\text{total assets}} + 1.2 \frac{\text{working capital}}{\text{total assets}}$$

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Credit Analysis

- Credit analysis only worthwhile if expected savings exceed the cost.
 - Don't undertake full credit analysis unless order is big enough to justify it.
 - Undertake full credit analysis for doubtful orders only.

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Collection Policy

- *Collection* refers to obtaining payment on past-due accounts.
- Collection Policy is composed of:
 - Firm's willingness to extend credit --- reflected in the firm's investment in receivables.
 - Collection Effort

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Average Collection Period

Measures the average amount of time required to collect an account receivable.

$$\text{Average collection period} = \frac{\text{Accounts receivable}}{\text{Average daily sales}}$$

For example, a firm with average daily sales of \$20,000 and an investment in accounts receivable of \$750,000 has an average collection period of

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Accounts Receivable Aging Schedule

- Shows receivables by age of account.
- The longer an account has been unpaid, the less likely it is to be paid.

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Aging Schedule

Age of Account	Percent of Total Value of Accounts Receivable
0 – 30 days	55%
31 – 60 days	10%
61 – 90 days	15%
Over 90 days	20%

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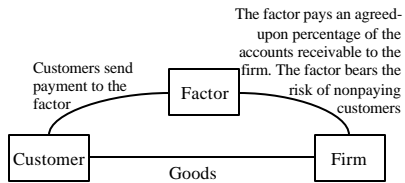
Collection Effort

- Most firms follow a protocol for customers that are past due:
 1. Send a delinquency letter.
 2. Make a telephone call to the customer.
 3. Employ a collection agency.
 4. Take legal action against the customer.
- Potential for a conflict of interest.
- Strike a balance.

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Factoring

- The sale of a firm's accounts receivable to a financial institution (known as a *factor*).
- The firm and the factor agree on the basic credit terms for each customer.



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How to Finance Trade Credit

- There are three general ways of financing account receivables:
 1. Secured Debt
 2. Captive Finance Company
 3. Securitization

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