



Chapter 27

Providing and Obtaining Credit

1



Topics in Chapter

- Receivables management
 - Credit policy
 - Days sales outstanding (DSO)
 - Aging schedules
 - Payments pattern approach
- Cost of bank loans

2



Elements of Credit Policy

- Cash Discounts: Lowers price. Attracts new customers and reduces DSO.
- Credit Period: How long to pay? Shorter period reduces DSO and average AR, but it may discourage sales.

(More...) 3



Credit Policy (Continued)

- Credit Standards: Tighter standards reduce bad debt losses, but may reduce sales. Fewer bad debts reduces DSO.
- Collection Policy: Tougher policy will reduce DSO, but may damage customer relationships.

4



Receivables Monitoring

Assume the following sales estimates:

January	\$100	April	\$300
February	200	May	200
March	300	June	100

Terms of sale: Net 30.

5



Expected Collections

- 30% pay on Day 10 (month of sale).
- 50% pay on Day 40 (month after sale).
- 20% pay on Day 70 (2 months after sale).
- Annual sales = 18,000 units @ \$100/unit.
- 365-day year.

6



What is the firm's expected DSO and average daily sales (ADS)?

$$\text{DSO} = 0.30(10) + 0.50(40) + 0.20(70) = 37 \text{ days.}$$

How does this compare with the firm's credit period?

$$\text{ADS} = \frac{18,000(\$100)}{365}$$

$$= \$4,931.51 \text{ per day.}$$

7



What is the expected average accounts receivable (AR) level? How much of this amount must be financed if the profit margin is 25%?

$$\text{AR} = (\text{DSO})(\text{ADS}) = 37(\$4,931.51) = \$182,466$$

$$0.75(\$182,466) = \$136,849.$$

8

If notes payable are used to finance the AR investment, what does the firm's balance sheet look like?

Assets		Liabilities & Equity	
AR	\$182,466	Notes payable	\$136,849
		Retained earnings	<u>45,617</u>
			<u>\$182,466</u>

9

If bank loans cost 12 percent, what is the annual dollar cost of carrying the receivables?

- Cost of carrying receivables
= $0.12(\$136,849)$
= \$16,422.
- In addition, there is an opportunity cost of not having the use of the profit component of the receivables.

10

What are some factors which influence a firm's receivables level?

- Receivables are a function of average daily sales and days sales outstanding.
- State of the economy, competition within the industry, and the firm's credit policy all influence a firm's receivables level.

11

What are some factors which influence the dollar cost of carrying receivables?

- The lower the profit margin, the higher the cost of carrying receivables, because a greater portion of each sales dollar must be financed.
- The higher the cost of financing, the higher the dollar cost.

12

New Data on Collections

- 30% of the firm's customers pay in the month of sale
- 50% pay in the month following the sale
- Remaining 20% pay in the second month following the sale

13

What would the receivables level be at the end of each month?

AR = 0.7(Sales in that month) + 0.2(Sales in previous month).

<u>Month</u>	<u>Sales</u>	<u>AR</u>
January	\$100	\$ 70
February	200	160
March	300	250
April	300	270
May	200	200
June	100	110

14

What is the firm's forecasted average daily sales (ADS) for the first 3 months? For the entire half-year? (assuming 91-day quarters)

$$\text{Avg. Daily Sales} = \frac{\text{Total Sales}}{\text{\# of days}}$$

$$1^{\text{st}} \text{ Qtr: } \$600/91 = \$6.59$$

$$2^{\text{nd}} \text{ Qtr: } \$600/91 = \$6.59$$

15

What DSO is expected at the end of March? At the end of June?

$$\text{DSO} = \frac{\text{AR}}{\text{ADS}}$$

$$1^{\text{st}} \text{ Qtr: } \$250/\$6.59 = 37.9 \text{ days.}$$

$$2^{\text{nd}} \text{ Qtr: } \$110/\$6.59 = 16.7 \text{ days.}$$

16

What does the DSO indicate about customers' payments?

- It appears that customers are paying significantly faster in the second quarter than in the first.
- However, the receivables balances were created assuming a constant payment pattern, so the DSO is giving a false measure of payment performance.
- Underlying cause is seasonal variation.

17

Construct an aging schedule for the end of March and the end of June.

Age of account (Days)	March		June	
	AR	%	AR	%
0-30	\$210	84%	\$70	64%
31-60	40	16	40	36
61-90	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	\$250	100%	\$110	100%

Do aging schedules "tell the truth?"

18

Uncollected Balances Schedules for the End of March

Months	Sales	Contrib. to AR	AR to Sales
January	\$100	\$0	0%
February	200	40	20
March	300	<u>210</u>	<u>70</u>
End of Qtr. AR		<u>\$250</u>	<u>90%</u>

19

Uncollected Balances Schedules for the End of June

Months	Sales	Contrib. to AR	AR to Sales
April	\$300	\$0	0%
May	200	40	20
June	100	<u>70</u>	<u>70</u>
End of Qtr. AR		<u>\$110</u>	<u>90%</u>

20

Do the uncollected balances schedules properly measure customers' payment patterns?

- The focal point of the uncollected balances schedule is the receivables - to-sales ratio.
- There is no difference in this ratio between March and June, which tells us that there has been no change in payment pattern.

(More...)

21

- The uncollected balances schedule gives a true picture of customers' payment patterns, even when sales fluctuate.
- Any increase in the AR to sales ratio from a month in one quarter to the corresponding month in the next quarter indicates a slowdown in payment.
- The "bottom line" gives a summary of the changes in payment patterns.

22

- Assume it is now July and you are developing pro forma financial statements for the following year.
- Furthermore, sales and collections in the first half-year matched predicted levels. Using Year 2 sales forecasts, what are next year's pro forma receivables levels for the end of March and June?

23

March 31

Months	Predicted Sales	Predicted AR to Sales Ratio	Predicted Contribution to AR
January	\$150	0%	\$ 0
February	300	20	60
March	500	70	<u>350</u>
Projected March 31 AR balance			\$410

24

June 30

Months	Predicted Sales	Predicted AR to Sales Ratio	Predicted Contribution to AR
April	\$400	0%	\$ 0
May	300	20	60
June	200	70	<u>140</u>
Projected June 30 AR balance			\$200

25

What four variables make up a firm's credit policy?

- Cash discounts
- Credit period
- Credit standards
- Collection policy

26

Disregard any previous assumptions

- Current credit policy:
 - Credit terms = Net 30.
 - Gross sales = \$1,000,000.
 - 80% (of paying customers) pay on Day 30.
 - 20% pay on Day 40.
 - Bad debt losses = 2% of gross sales.
- Operating cost ratio = 75%.
- Cost of carrying receivables = 12%.

27

The firm is considering a change in credit policy

- New credit policy:
 - Credit terms = 2/10, net 20.
 - Gross sales = \$1,100,000.
 - 60% (of paying customers) pay on Day 10.
 - 30% pay on Day 20.
 - 10% pay on Day 30.
 - Bad debt losses = 1% of gross sales.

28



What is the DSO under the current and the new credit policies?

- Current:
 $DSO_0 = 0.8(30) + 0.2(40)$
 $= 32 \text{ days.}$
- New:
 $DSO_N = 0.6(10) + 0.3(20) + 0.1(30)$
 $= 15 \text{ days.}$

29



What are bad debt losses under the current and the new credit policies?

- Current:
 $BDL_0 = 0.02(\$1,000,000)$
 $= \$20,000.$
- New:
 $BDL_N = 0.01(\$1,100,000)$
 $= \$11,000.$

30



What are the expected dollar costs of discounts under the current and the new policies?

- $Discount_0 = \$0.$
- $Discount_N =$
 $0.6(0.02)(0.99)(\$1,100,000)$
 $= \$13,068.$

31



What are the dollar costs of carrying receivables under the current and the new policies?

- Costs of carrying receivables₀
 $= (\$1,000,000/365)(32)(0.75)(0.12)$
 $= \$7,890.$
- Costs of carrying receivables_N
 $= (\$1,100,000/365)(15)(0.75)(0.12)$
 $= \$4,068.$

32

What is the incremental after-tax profit associated with the change in credit terms?

	<u>New</u>	<u>Old</u>	<u>Difference</u>
Gross Sales	\$1,100,000	\$1,000,000	\$100,000
Less: Disc.	<u>13,068</u>	<u>0</u>	<u>13,068</u>
Net Sales	\$1,086,932	\$1,000,000	\$ 86,932
Production costs	<u>825,000</u>	<u>750,000</u>	<u>75,000</u>
Profit before credit costs and taxes	\$ 261,932	\$ 250,000	\$ 11,932

33

Should the company make the change?

	<u>New</u>	<u>Old</u>	<u>Diff.</u>
Prof. bef. credit costs and taxes	\$261,932	\$250,000	\$11,932
Credit-related costs			
Carrying costs	4,068	7,890	(3,822)
Bad debts	<u>11,000</u>	<u>20,000</u>	<u>(9000)</u>
Profit before taxes	\$246,864	\$222,110	\$24,754
Taxes (40%)	<u>98,745</u>	<u>88,844</u>	<u>9,902</u>
Net income	\$148,118	\$133,266	\$14,852

34

Sensitivity Analysis of Change

- Assume the firm makes the policy change, but its competitors react by making similar changes. As a result, gross sales remain at \$1,000,000. How does this impact the firm's after-tax profitability?

Gross sales	\$1,000,000
Less: discounts	<u>11,880</u>
Net sales	\$988,120
Production costs	<u>750,000</u>
Pre-tax op. profit	\$238,120
Carrying costs	3,699
Bad debt losses	<u>10,000</u>
Profit before taxes	\$ 224,421
Taxes	<u>89,769</u>
Net Income	<u>\$ 134,653</u>

36



Cost of Bank Loans: \$100,000 at 8% Quoted Rate, 1 Year

- What is the EAR for a loan with:
 - Simple annual interest.
 - Discount interest.
 - Discount interest with 10% compensating balance.
 - Installment loan, add-on, 12 months.
- What is the EAR for the first 3 loans if interest is compounded quarterly?
- How much must be borrowed to get \$100,000 of usable funds at origination?

38



Why must we use Effective Annual Rates (EARs) to evaluate the loans?

- Each loan has an 8% nominal (quoted) rate, but:
 - We want to compare loan cost rates and choose the alternative with the lowest cost.
 - Because the loans have different terms, we must make the comparison on the basis of EARs.

39



Simple Annual Interest, 1-Year Loan

“Simple interest” means not discount or add-on.

$$\text{Interest} = 0.08(\$100,000) = \$8,000.$$

$$r_{\text{Nom}} = \text{EAR} = \frac{\$8,000}{\$100,000} = 0.08 = 8.0\%.$$

On a simple interest loan of one year,

$$r_{\text{Nom}} = \text{EAR}.$$

40



Simple Annual Interest, 1-Year Loan, Quarterly Interest and Usable Funds

- $EAR = (1 + 0.08/4)^4 - 1$
- $EAR = 1.0824 - 1 = 0.0824 = 8.24\%$.
- For simple interest, the full amount of the loan is usable at origination.

41



8% Discount Interest, 1 Year

- Interest payment is:
 - $8\% \times \$100,000 = \$8,000$.
- Usable funds:
 - $\$100,000 - \$8,000 = \$92,000$.
- Effective interest rate:
 - $EAR = \$8,000 / \$92,000 = 0.087 = 8.7\%$.

42



8% Discount Interest, 1 Year: EAR if Quarterly Interest

- Quarterly interest payment is:
 - $(0.08/4) \times (\$100,000) = \$2,000$.
- Usable funds:
 - $\$100,000 - \$2,000 = \$98,000$.
- Quarterly periodic rate:
 - $\$2,000 / \$98,000 = 0.0204$
- $EAR = (1.0204)^4 - 1 = 0.0842 = 8.42\%$.
- Discount interest imposes less of a penalty on shorter-term than on longer-term loans.

43



8% Discount Interest: Amount of Loan Needed (Annual Interest)

$$\begin{aligned} \text{Amt. borrowed} &= \frac{\text{Amount needed}}{1 - \text{Nominal rate (decimal)}} \\ &= \frac{\$100,000}{0.92} = \$108,696. \end{aligned}$$

44

8% Discount Interest, 10% Compensating Balance, 1 Year

- Interest payment is:
 - $8\% \times \$100,000 = \$8,000$.
- Compensating balance is:
 - $10\% \times \$100,000 = \$10,000$.
- Usable funds =
 - $\$100,000 - \$8,000 - \$10,000 = \$82,000$.
- Effective interest rate:
 - $\text{EAR} = \$8,000 / \$82,000 = 0.0976 = 9.76\%$

45

8% Discount Interest, 10% Compensating Balance, Quarterly

- Interest payment is:
 - $(0.08/4) \times \$100,000 = \$2,000$.
- Compensating balance is:
 - $10\% \times \$100,000 = \$10,000$.
- Usable funds =
 - $\$100,000 - \$2,000 - \$10,000 = \$88,000$.
- Periodic interest rate:
 - $\text{EAR} = \$2,000 / \$88,000 = 0.02273 = 2.273\%$
- $\text{EAR} = (1.02273)^4 - 1 = 0.0941 = 9.41\%$

46

8% Discount Interest, 10% Compensating Balance: Required Face Value at Origination

$$\begin{aligned}
 \text{Face amount of loan} &= \frac{\text{Amount needed}}{1 - \text{Nominal rate} - \text{CB}} \\
 &= \frac{\$100,000}{1 - 0.08 - 0.1} \\
 &= \$121,951.
 \end{aligned}$$

(More...) 47

1-Year Installment Loan, 8% “Add-On”

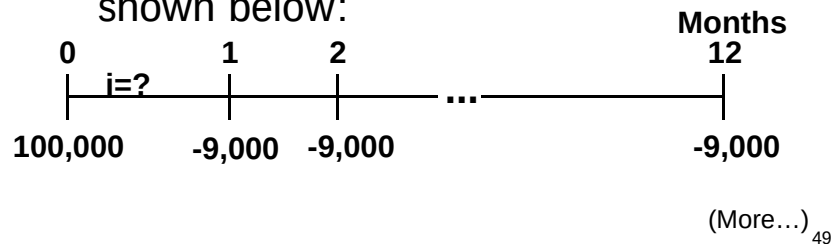
- $\text{Interest} = 0.08(\$100,000) = \$8,000$.
- $\text{Face amount} = \$100,000 + \$8,000 = \$108,000$.
- $\text{Monthly payment} = \$108,000 / 12 = \$9,000$.

(More...)

48

Installment Loan

- To find the EAR, recognize that the firm has received \$100,000 and must make monthly payments of \$9,000. This constitutes an ordinary annuity as shown below:



Find the monthly rate.

12 100000 -9000 0
 N I/YR PV PMT FV
 1.2043% = rate per month

(More...) ₅₀

Find the annualized rate.

- $r_{\text{Nom}} = \text{APR} = (1.2043\%)(12) = 14.45\%.$
- $\text{EAR} = (1.012043)^{12} - 1 = 15.45\%.$
- The full face value of the loan is usable at origination.