

1. a. When full-coupon debt is issued, interest paid reduces cash from operations (CFO). When zero-coupon debt is issued, however, no cash interest is paid. CFO is unaffected, and is therefore higher than when full-coupon debt is issued. In addition, when imputed interest on zero-coupon debt is tax deductible, CFO is further increased by the tax benefit.

b. When full-coupon debt is issued, the proceeds are included in cash from financing (CFI). When that debt matures, the amount paid reduces CFI. Assuming the debt is issued and redeemed at par, the net effect on CFI is zero over the life of the debt.

Zero-coupon debt is issued at a discount; CFI is below the full-coupon case. However at maturity the full face amount is paid (same as full-coupon case). The net amount of CFI (outflow) is therefore greater than when full-coupon debt is issued.

c. No effect.

d. Interest on the zero-coupon bond rises each year as the carrying amount rises, increasing the base on which each year's interest expense is computed. All other things being equal, net income declines each year.

2. (i) Net income declines as interest expense increases, reflecting the higher level of interest rates.

(ii) The market value of the firm's debt should remain unchanged. As the interest rate adjusts to changes in market rates, investors will pay the face amount for the debt, assuming no change in credit risk.

5.a. The \$US carrying amount = $1,282/1.37 = \mathbf{\$936 \text{ million}}$.

b. Because the notes have no coupon, they were issued at a discount. The difference between the face amount and the amount computed in part a must be unamortized discount.

c. Interest expense (CHF millions) would be $7\% \times 1,282 = 90$

d. Adding the 1999 interest computed in part c to the carrying amount at December 31, 1998: $90 + 1,282 =$

CHF 1,372 million

e. The most obvious explanation is the change in the exchange rate from 1.37 to 1.60.

In \$US, 1999 interest expense = $7\% \times \$936 = \65 million, making the carrying amount at December 31, 1999 equal to \$1,001 million [$\$936 + \65]. This is much closer to the carrying amount computed at $1,618/1.60 = \$1,011$ million.

A second factor is that interest expense in CHF is computed quarterly, based on average rates for each period. The CHF carrying value at December 31, 1999 equals the 1998 carrying value + 1999 interest expense + translation loss [Swiss franc decline increases the CHF debt amount].

(ii)f. (i) Cash from operations is higher each year when zero coupon notes are issued because there is no cash interest.

Interest expense rises each year (excluding the effect of exchange rates) because it is based on a (rising) \$US carrying amount.

g. The rise in the value of the dollar (decline in Swiss franc) increases interest expense in CHF.

6. (i) Interest expense = Interest paid + change in bond discount

$$\$8,562 \qquad \qquad \qquad = \$7,200 + \$1,362$$

$$(ii) \qquad \qquad \qquad = \text{Market rate} \times [\text{face value} - \text{discount}]$$

$$\qquad \qquad \qquad = .12 \times [\text{face value} - \$8,652]$$

$$\text{Therefore, face value} = (\$8,562/.12) + \$8,652 \qquad \qquad \qquad = \$80,000$$

$$(iii) \quad \text{Coupon rate} \qquad \qquad = \text{interest paid/face value} = \$7,200/\$80,000 = 9\%$$

7.a. An interest rate rise would decrease the market value of the fixed rate bonds but have no effect on the variable rate bonds. The effect on the fixed rate bonds would depend on their duration.

b. An interest rate rise would increase FIF's interest expense because more than half of its bonds have variable rates as well as a small portion of its bank

loans.

c. A finance company seeks to match the interest rate sensitivity of its debt to that of its earning assets. It is likely that FIF's fixed rate receivables increased over the 1996 – 2000 period and the company increased its fixed rate debt to lock in the spread between fixed rate interest income and expense.

d. For a finance company, an analyst is interested in knowing how well the company has matched the interest rate sensitivity of its financial assets and liabilities. When fair value estimates of financial assets are not provided the fair value of debt has very limited usefulness.

8.a. FIF has swapped variable rate interest payments for fixed rate (5.2%) payments on a notional amount of \$25 million.

b.

(\$ thousands)	1999	2000
Interest received	\$ 1,375	\$ 1,750
Interest paid	(1,300)	(1,300)
Net receipt	\$ 75	\$ 450

Interest received = \$25 million X receive rate

Interest paid = \$25 million X 5.2% (both years)

c. The swap reduced the sensitivity to changes in interest rates by converting part of the variable rate obligation to one with fixed rates.

9.a. and b. In ¥ millions

Years	1998	1999	% increase
Issue			
2.14%, 2005	6,248	6,356	1.72%
1.73%, 2003	6,134	6,356	3.61%

The yen amounts were obtained by multiplying the dollar amounts by the exchange rate. For example, for the 2.14% bond at December 31, 1998, \$55 X 113.60 = 6,248. [Note: the yen amounts are rounded.]

c. It appears that both bonds were issued at a discount, creating amortization that increases the carrying amount each year. If we add the 1999 increase to the coupon rate, it appears that the effective interest rates are 3.86% and 5.34% respectively.

d. One possible motivation is to finance Japanese operations that are conducted in yen. A second is that, as a well-known company, BMY may be able to borrow more cheaply by borrowing in yen and swapping the yen proceeds into US dollars.

10.a. The advantage is that, when Takeda's share price rose, the debt was converted into equity, strengthening the balance sheet. As convertible notes are issued with a conversion price that exceeds the then market price, the company effectively sold common shares at a premium. In addition, because of the conversion feature, the interest rate would have been below the rate required by nonconvertible notes.

The disadvantage is that the debt was converted into common shares at a time when Takeda could have sold new shares at a much higher price, obtaining the same capital at a lower cost.

b. Reported data (Yen millions)

	1998	1999
Total debt	44,482	21,338
Equity	829,381	907,373
Total capital	873,863	928,711
Debt/total capital	5.1%	2.3%

The more than 50% debt decrease was the largest factor reducing the debt/total capital ratio.

c. As the market price of Takeda shares was well above the conversion price

in 1998, the convertible debt should be classified as equity. After that adjustment (subtracting 22,000 from debt and adding the same amount to equity) Takeda's debt was virtually unchanged from 1998 to 1999 and the decline in the debt/total capital ratio was small:

Adjusted data (Yen millions)	
	1998
Total debt	22,482
Equity	851,381
Total capital	873,863
Debt/total capital	2.6%

This analysis underscores the discussion in the chapter; the analyst must classify convertible debt based on market considerations. Proper classification results in a more appropriate leverage measure.

11.a. There were two benefits: a lower interest rate than on nonconvertible debt of the same maturity and the possibility of future conversion. If conversion takes place Roche will have sold shares for 25% more than their then market price.

b. First, you must compute the effective rate on the bonds considering their coupon rate and the discount from face value at which they were sold. Interest expense for 2000 would equal the effective rate multiplied by the issue amount of 101.22 billion Yen (105 x 96.4%) prorated for the portion of the year for which the bonds were outstanding.

The carrying amount at December 31, 2000 would equal the issue amount (101.22) plus the excess of interest expense over interest at the coupon rate.

c. If the Yen appreciates (declines) against the Swiss franc, then both interest expense and the carrying amount of the debt will rise (fall).

d. At the issue date the bonds should be considered debt because their conversion price is well above the market price. They should be considered equity only when the market price is sufficiently above the market price that conversion can be considered highly likely.

12.a. The advantages to Network Associates compared with full-coupon nonconvertible bonds were:

Lower interest rate

No cash interest expense

Higher cash flow from operations

~~(iv)~~ The likelihood that the debt would be converted to common shares before its maturity in 20 years

b. The first year interest expense on the bonds is \$16.44 million [$4.75\% \times \346 million ($39.106\% \times \$885$)]. As the bonds were issued in February 1998 interest expense for 1998 would have been below that amount. Assuming 1998 interest expense of \$15 million results in a carrying amount of \$361 million ($\$346 + \15).

Thus 1999 interest expense can be estimated as \$17.15 million ($4.75\% \times \361 million), close to the amount in the cash flow statement. This represents, therefore, the noncash interest expense for 1999.

c. At a common stock price of \$66.25, the conversion value of the bonds was:

\$1,280 million [$\$885 \times (\$66.25/\$45.80)$]

At this price conversion is highly likely and the convertible bonds should be treated as equity.

d. At a common stock price of \$4, the conversion value of the bonds was \$77.3 million [$\$885 \times (\$4/\$45.80)$]. At this price conversion is highly unlikely and the convertible bonds should be treated as debt.

e. Issuing bonds with an embedded put option has the advantage of lowering the interest rate, as investors will accept a lower rate in return for the put option. The disadvantage is that NET may be required to redeem some or all of the bonds if bondholders exercise the put option. As option exercise is likely only if the company's financial condition has weakened and the shares are selling at a low price, option exercise may strain the company's financial condition further.

13.(i) If Munich Re had sold its shares of Allianz in June 2000 it would have incurred a large capital gains tax. In addition, it would have had to sell the large block of shares at a discount to the market price of Allianz.

By selling the exchangeable notes, Munich has postponed the effective sale date, in the expectation that capital gains taxes would be reduced (they were). In addition, assuming the bonds are exchanged for Allianz shares, it sold those shares at a premium of 28% to the market price.

The major disadvantage is that Munich Re retains the risk of ownership of Allianz shares. If Allianz shares do not rise by the maturity date of the notes, Munich will still hold the shares and will be required to repay the debt. In addition, Munich will have to pay interest expense on the notes until they mature or are exchanged, although it will also receive any dividends declared by Allianz. [Note: in December 2002 the market price of Allianz shares was €100, far below the €509 price at which the bonds are exchangeable.]

(ii) If Munich Re had sold notes without the exchange feature it would have had to offer a higher interest rate, incurring higher interest expense. In addition, if the notes are exchanged, Munich Re will not have to repay the debt and interest expense will decline as bonds are exchanged for Allianz shares.

The disadvantage is that Munich Re has given up the possibility of a large increase in the value of Allianz shares. Munich has also lost the flexibility of being able to choose the period in which it recognizes the gain on the sale of Allianz shares.

14.a. Future redemption depends on conditions in the credit markets at each “reset” date. Investors would choose redemption if more attractive Swiss franc (SFR) investments were available. That would be the case, for example, if PepsiCo’s credit rating had declined.

PepsiCo would redeem bonds if alternative financing sources are available or if SFR debt is no longer desirable. The latter depends on PepsiCo’s exposure to SFR assets at that time or, if the debt was swapped for debt in another currency, conditions in the swap market at that time.

b. The obligations should be classified as debt. One might argue that, because there is no stated maturity date, these bonds are “permanent” capital and should be considered equity. However the periodic reset provisions suggest that, at some point, either PepsiCo or investors will choose the redemption option. As investors can force redemption, the bonds should be classified as debt.

15.a. An investor who is willing to accept the risk of loss of principal might find the high returns on these bonds attractive.

b. In a period without insurance losses, Scor will be required to pay the high stated interest rates on these bonds, increasing interest expense, reducing reported income, and reducing the interest coverage ratio.

c. In a period with insurance losses, Scor will be required to pay little or no interest on these bonds, increasing net income and the interest coverage ratio.

d. These bonds hedge Scor’s insurance risk. Interest expense on these bonds will be high in periods without losses and low in periods with losses. As a result they reduce the variability of Scor’s reported net income.

16.a. The preferred shares should be categorized as debt. The dividend is set by periodic auctions and the company may redeem them at any time. In effect, they are a form of short-term debt that the company can extend as long as it is willing to pay the rate demanded by the market. Should the company find a cheaper source of financing, it is likely to call the preferred issue. [They were called in June 2001.]

~~b.~~ The ratio calculation before and after adjustment is:

Amounts in \$ millions	Reported	Adjusted
Total debt	\$ 7,647	\$ 7,947
Minority interest	710	710
Stockholders' equity	12,042	11,742
Total capital	\$ 20,399	\$ 20,399
Total debt/total capital	37.5%	39.0%

17.a. The fair value of Wal-Mart’s debt declined relative to book value from 1-

31-99 to 1-31-00. Interest rates must have risen during that time period, as higher rates reduce the present value of future payments.

b. The fair value at 1-31-99 was above book value, implying that (on that date) interest rates were below the average rate of 7.2% on Wal-Mart debt. Thus the company could have borrowed at those lower rates, before rates increased, reducing its average rate.

18.a. Wal-Mart may have believed that variable rates were likely to fall and/or remain below fixed rates over the swap period. Swapping fixed for variable rates would, under that assumption, reduce interest expense.

b. One risk that variable rates would rise so that the swaps would increase interest expense. The second risk is counterparty risk – the risk that the other party to the swap would be unwilling to pay. The second risk would apply only when interest rate changes require payments to Wal-Mart.

⊖ When interest rates rise, the value of the right to receive the fixed rate of 5.75% declines, reducing the fair value of the swap. We know from problem 17a that interest rates rose from 1-31-99 to 1-31-00.

19.a. The market value of AMR's fixed rate debt issues fell relative to book value at December 31, 1999, implying that interest rates must have risen. Higher rates reduce the present value of payments associated with fixed rate debt.

b. The interest rate must have been below 10.2% as the present value exceeds book value.

c. Because the interest rate on variable rate debt floats, fair value should not change except as a result of changes in credit quality.

20.a. Because the average floating rate was below the average fixed rate, the swaps reduced AMR's interest expense.

b. AMR's swaps convert fixed rate to variable rate debt; AMR exchanged the right to receive fixed rates for an obligation to pay variable rates. When interest rates rise, the value of the right to receive fixed rates declines, reducing the fair value of the swap. From the answer to problem 19a, we know that interest rates fell in 1999. The rise in interest rates therefore decreases the fair value of the swaps.

c. AMR's debt nearly doubled in 1999, increasing its exposure to changes in interest rates as much of its debt is fixed rate. Both the notional and fair value of AMR's swaps declined in 1999, reducing their offsetting effect on market risk. Both of these factors increased AMR's exposure.

21.a. An argument for inclusion is that, for Fannie Mae, the issuance and retirement of debt are recurring operating activities whose consequences should be included in operating earnings.

An argument for exclusion is that gains or losses from debt repurchase reflect economic changes during the entire period the debt was outstanding and should not be included in operating earnings for the period in which management chose to realize the gain.

b. An argument for including the hedging loss is that hedging activities are part of Fannie Mae's normal operating activities.

An argument for exclusion is that the hedging loss was unusually large and inclusion distorts the trend of operating earnings.

c. We believe that gains and losses from debt retirement should be excluded from operating earnings for most firms. These gains and losses result from management decisions and because (as discussed in the chapter) refinancing may not yield any economic gain or loss despite the accounting gain or loss. Hedging results should be included in operating earnings as hedging gains and losses should offset other economic effects that are also included.

However, Fannie Mae may be an exception. As stated in part a, the company routinely issues and retires debt, suggesting that gains and losses should be included in operating earnings. Before doing so, the analyst should try to determine whether the gains or losses for the particular quarter are unusual or reflect interest rate changes over multiple periods, suggesting that the gains or losses should (analytically) be spread over several quarters.

22.a. The \$300 million gain should be excluded from Arco's operating earnings for 1997 because the gain results from the appreciation of Lyondell shares in prior years (possibly including years prior to the bond issuance).

b. Arco may have chosen to issue the exchangeable notes to maintain its controlling interest in Lyondell for strategic reasons postpone the income tax consequences of sale obtain a higher price for the shares than the market price at that time avoid an unfavorable impact on sale proceeds due to the effect on Lyondell's share price of selling a large block of shares retain the flexibility to report the gain in a period of management's choice

€ On Arco's balance sheet, the investment in Lyondell shares is reduced by the cost basis of the shares exchanged; debt is reduced by the carrying value of the notes retired; equity is increased by the (after-tax) gain.

The income statement reports the gain on the sale and the related income tax expense.

The transaction is noncash. However Arco's cash flow statement will report (as an adjustment to net income in the cash from operations section) the amount of the gain and any deferred income tax effect.

24.a. The data needed to calculate the ratios for each of the three options follows (\$ thousands):

Financing Method Number		1	2	3
		Preferred	Full	Zero
		Shares	Coupon Bond	Coupon Bond
CFO before interest		\$ 390	\$ 390	\$ 390
Interest paid1	Given	\$ 200	\$ 200	\$ 200
	New	0	100	0
Total		\$ 200	\$ 300	\$ 200
Preferred dividends	Given	\$ 0	\$ 0	\$ 0
	New	100	0	0
Total		\$ 100	\$ 0	\$ 0
Long-term debt2	Given	\$2,000	\$2,000	\$2,000

		New	0	1,000	1,100
Total			\$2,000	\$3,000	\$3,100
Tangible assets	fixed	Given	\$5,000	\$5,000	\$5,000
	New		1,000	1,000	1,000
Total			\$6,000	\$6,000	\$6,000

1 No cash interest is paid on the zero coupon bond (see note 2).

2 Unpaid interest on the zero coupon bond increases the liability.

Times interest earned (cash basis):

CFO Before interest / Interest paid 1.95 1.30 1.95

Fixed charge coverage (cash basis):

CFO Before interest / Interest paid + preferred dividends 1.30 1.30 1.95

Debt to gross tangible assets:

Long-term debt / Gross tangible fixed assets 0.33 0.50 0.52

The resultant ratios for each of the three options are shown above, with ratios that violate the applicable covenant in boldface. Note that each of the options violates at least one of the covenants and the conventional bond violates two.

The zero-coupon bond seems to be the "best" as it results in high coverage ratios (no cash interest payment) and the debt to assets limit is barely violated. It violates this covenant because debt increases to reflect the unpaid interest.

b. The best approach is to combine the zero-coupon bond, which violates only the debt/assets covenant, with another financing method that brings down that ratio without lowering either of the other ratios excessively. Preferred stock dominates conventional bonds as it has a lower debt/assets ratio and its coverage ratios are at least as high. Thus the optimal choice is a combination of preferred stock and zero coupon bonds. Because the times interest coverage ratio is identical at 1.95 for both we need only consider the last two ratios:

CFO/(interest + preferred dividends) must exceed 1.80

Long-term debt/gross assets must be less than 0.50

If P dollars are raised via preferred shares and Z dollars via zero coupon bonds, then P + Z = \$1,000,000. For the zero coupon bonds, the amount of debt at year-end is 1.1Z because of the accrual of unpaid interest. These constraints reduce to the following equations (amounts in \$thousands):

$$I: \quad \$390/(\$200 + \$100p) > 1.80 \text{ where } p = P/\$1,000,000$$

$$II: \quad \$2,000 + \$1,100 (1-p) / \$6,000 < 0.50$$

These reduce to the following constraints:

$$I: \quad .167 > p$$

$$II: \quad p > .091$$

Thus, $.167 > p > .091$

One possibility would be to issue 85% zero coupon bonds and 15% preferred (p = 15):

CFO = \$390 (neither issue reduces CFO)

Interest paid = \$200 (neither issue creates interest payments)

Preferred dividends = \$15 (\$150 x 10%)

Long-term debt = \$2,935 [$\$2,000 + (\$1,100 \times .85)$]

Tangible fixed assets = \$6,000 (same for both choices)

Times interest earned ($\$390/\200) = 1.95

Fixed charge coverage ($\$390/\215) = 1.81

Debt to tangible fixed assets ($\$2,935/\$6,000$) = .489

Another possibility would be 90% zero coupon bonds and 10% preferred (p = .10):

CFO = \$390

Interest paid = \$200

Preferred dividends = \$10 ($\$100 \times 10\%$)

Long-term debt = \$2,990 [$\$2,000 + (\$1,100 \times .90)$]

Tangible fixed assets = \$6,000 (same for both choices)

Times interest earned ($\$390/\200) = 1.95

Fixed charge coverage ($\$390/\210) = 1.86

Debt to tangible fixed assets ($\$2,990/\$6,000$) = .498

Thus there is a tradeoff between the two ratios. As p increases, Sleepman reduces

its debt ratio but also its coverage ratio. At the extremes ($p = .167$ and $p = .091$), the firm will be right on the edge of violating one covenant. The decision would be based on management's view of which ratio has the lower risk of being violated (or which ratio the lender considers more significant). Note, however, the zero coupon bond increases in amount as interest accrues and (all other things being equal) puts increasing pressure on the debt-to-fixed-assets ratio over time.

25.a. The calculated dividend capacity equals:

Minimum shareholders' equity, 12/31/93	\$650.0
50% of 1994 net income of \$48 million	24.0
Minimum shareholders' equity, 12/31/94	\$674.0
Actual shareholders' equity, 12/31/94	717.3
Unrestricted amount	\$ 43.3

b. Without any increase in income, the current dividend can be maintained for only two years:

	1995	1996	1997
Estimated Stockholders' Equity (\$millions)			
Opening	\$717.3	\$723.3	\$729.3
Income	48.0	48.0	48.0
Dividend	(42.0)	(42.0)	(42.0)
Closing	\$723.3	\$729.3	\$735.3*

*Below minimum stockholders' equity required.

Minimum Stockholders' Equity (\$millions)			
Opening	\$674.0	\$698.0	\$722.0
Addition (50% of income)	24.0	24.0	24.0
Closing \$	698.0	\$722.0	\$746.0

As the table above shows, in 1997 the minimum equity requirement will be violated.

c. To maintain dividend payments at the 1994 level through 1998, income

would have to increase. The required income for 1997 and 1998 is \$69.4 million and \$84.0 million respectively.¹ These amounts result in the following table for those years:

1997	1998
Estimated Stockholders' Equity (\$millions)	
Opening	\$729.3 \$756.7
Income	69.4 84.0
Dividend	(42.0) (42.0)
Closing	\$756.7 \$798.7
Minimum Stockholders' Equity (\$millions)	
Opening	\$722.0 \$756.7
50% of income	34.7 42.0
Closing	\$756.7 \$798.7

¹ These amounts can be calculated as follows:

$$\begin{aligned}
 \text{1997: Increase} &= 2 \times \text{shortfall in equity} = 2 \times (\$746.0 - 735.3) \\
 &= 2 \times \$10.7 = \$21.4 \text{ million}
 \end{aligned}$$

1998: Income must equal \$84 million, twice the dividend, to maintain equity at the required level.

d. The answer would depend on the shareholder's view of the market price of NorAm's shares. Issuance of new shares to maintain the current dividend makes no sense given finance theory, which states that the two are equivalent. In an imperfect world, however, NorAm's shares may have been fully valued but the shareholder may not have wished to sell and incur capital gains taxes. If NorAm had attractive investment opportunities not reflected in its stock price, then issuing new shares to increase the firm's borrowing capacity would have been desirable.