10

ANALYSIS OF FINANCING LIABILITIES

CHAPTER OUTLINE

INTRODUCTION

BALANCE SHEET DEBT
Current Liabilities
Long-Term Debt
Financial Statement Effects
Zero-Coupon Debt
Variable-Rate Debt
Fixed- versus Variable-Rate Debt and Interest Rate Swaps
Debt Denominated in a Foreign Currency
Project Debt
Debt with Equity Features
Convertible Bonds and Warrants
Commodity Bonds
Perpetual Debt
Preferred Stock

Effects of Changes in Interest Rates
Debt: Market or Book Value?
Debt of Firms in Distress
Accounting for Restructured and Impaired Debt
Retirement of Debt Prior to Maturity
Accounting for Debt Retirement
Callable Bonds
Defeasance

BOND COVENANTS
Nature of Covenants

SUMMARY

CHAPTER OBJECTIVES

This chapter concerns debt obligations that are recognized on the firm's balance sheet. The objectives of Chapter 10 are to:

1. Discuss the difference between operating and financing liabilities.
2. Describe the effect on reported financial statements, including the carrying amount, the pattern of expense recognition, and reported cash flows, of:
   • Debt issued at a premium or discount
   • Zero-coupon debt
   • Fixed- and variable-rate debt
   • Net debt denominated in foreign currencies
   • Debt with equity features, such as convertible and exchangeable debt
3. Compare the effects of changes in interest rates on both the interest payments and market value of fixed- and variable-rate debt.
4. Estimate the market value of debt and discuss its usefulness.
5. Explain how interest rate swaps change the firm's risk exposure to changing interest rates
6. Describe the circumstances under which preferred stock should be treated as debt, or debt as equity for financial analysis.
7. Differentiate between the economic and accounting effects (often different) of debt retirement or refinancing.
8. Explain the role of debt covenants in protecting creditors by limiting the firm's freedom to invest, pay dividends, or make other operating and strategic decisions.
INTRODUCTION

The assessment of a firm's liabilities is crucial to the analysis of its long-run viability and growth. A firm can incur obligations in myriad ways; some are a consequence of the firm's operating activities, whereas others result from its financing decisions. The former are characterized by exchanges of goods and services for the later payment of cash (or vice versa), whereas debt arising from financing decisions generally involves current receipts of cash in exchange for later payments of cash. Both forms of debt are generally reported on balance sheet, and our focus in this chapter is on their measurement, interpretation, and analysis.

More complex arrangements, often based on contracts rather than immediate cash exchanges, involve promises to purchase (or use) products, services, or distribution systems in return for specified future payments of cash or equivalent resources. Such contractual arrangements are usually not recorded on the firm's balance sheet but may receive footnote disclosure. A thorough analysis of the firm's financial structure requires recognition of these liabilities as well. Such "off-balance-sheet" debt must first be identified, then measured, interpreted, and analyzed.

The analysis of a firm's short-term liquidity and long-term solvency position requires evaluation of both on- and off-balance-sheet debt. Debt-to-equity and interest coverage ratios based on reported financial data, for example, are affected by the form of transactions (rather than their substance), which determines whether they are recognized and how they are accounted for. This analysis must also consider incentives for management decisions regarding the proportion of on- versus off-balance-sheet debt.

An additional focus of analysis is debt covenants, used by creditors to protect themselves. These restrictions limit the firm's operations, its distributions to shareholders, and the amount of additional debt or leverage the firm can assume. Firms may alter their operating and financing activities and change accounting policies in an effort to operate within the confines of these covenants.

This chapter is the first of a series of chapters that deal with these issues. It primarily examines liabilities resulting from financing activities, the nature of various debt instruments, the impact of market rate (and credit) changes on reported and economic liabilities, and the nature and effect of covenants imposed by creditors. Liabilities arising from contractual obligations such as leases (a combined financing and investment activity) and other off-balance-sheet debt, debt guarantees, and obligations of the firm's affiliates are the subject of Chapter 11. Chapter 12 covers pensions and other postemployment benefits that arise from dealings between a firm and its employees. The effects of hedging or speculative activities in options, futures, and other derivatives on a firm's liability position are included in Chapter 16.

BALANCE SHEET DEBT

The liability amount reported on the balance sheet does not equal the total cash outflow required to satisfy the debt. Only the principal portion, that is, the present value of the future cash flow, is recorded. For example, if a firm borrows $100 at an interest rate of 10%, the actual amount payable at year-end is $110. The balance sheet liability equals the present value of the future payment or $100.

Current Liabilities

Current liabilities are defined as those due within one year or one operating cycle; they result from both operating and financing activities. Analysis must distinguish among different types of current operating and financing liabilities:

Consequences of Operating Activities

1. Operating and trade liabilities, the most frequent type, are the result of credit granted to the company by its suppliers and employees.
2. Advances from customers arise when customers pay in advance for services to be rendered by the company. The firm is obligated to render the service and/or deliver a product to the customer in the near future.

Consequences of Financing Activities

3. Short-term debt represents amounts borrowed from banks or the credit markets that are expected to be repaid within one year or less.

4. Current portion of long-term debt identifies the portion of long-term debt that is payable within the next year; it is excluded from the long-term liability section of the balance sheet.

Operating and trade debt is reported at the expected (undiscounted) cash flow and is an important exception to the rule that liabilities are recorded at present value. A purchase of goods for $100 on credit, to be paid for within the normal operating cycle of the firm, is recorded at $100 even though its present value is lower. This treatment is justified by the short period between the incurrence of the debt and its payment, rendering the adjustment to present value immaterial.

When analyzing a firm’s liquidity, advances from customers should be distinguished from other payables. Payables require a future outlay of cash. Advances from customers, on the other hand, are satisfied by delivery of goods or services, requiring a cash outlay lower than the advances recorded; otherwise, the firm would be selling below cost. Increases in advances should be viewed favorably as advances are a prediction of future revenues rather than of cash outflows.

Short-term debt and the current portion of long-term debt are the result of prior financing cash inflows. They indicate the firm’s need for either cash or a means of refinancing the debt. The inability to repay short-term credit is a sign of financial distress.

It is important to monitor the relative levels of debt from operating as compared to financing activities. The former arise from the normal course of business activities and represent the required operating capital for a given level of production and sales: A shift from operating to financing liabilities may signal the beginning of a liquidity crisis, as reduced access to trade credit results in increased reliance on borrowings.

Example: Warnaco

The following data for Warnaco Group, a major clothing manufacturer, illustrates this point:

<table>
<thead>
<tr>
<th>Warnaco Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amounts in $000</td>
</tr>
<tr>
<td>Accounts payable</td>
</tr>
<tr>
<td>Total debt</td>
</tr>
</tbody>
</table>

Over one year Warnaco’s trade credit fell 31%, requiring borrowing that increased the company’s already-large debt burden. The company filed for bankruptcy on June 11, 2001.

---

1. The firm will have a cash obligation only if the goods and services are not delivered. Thus, the primary liability does not require cash.

2. This is especially true in industries with high fixed/lower variable cost structures (e.g., airlines). The marginal cost for any individual customer is low relative to the selling cost. Problem 10-3 is based on airline customer advances.
Long-Term Debt

Firms obtain long-term debt financing from public issuance; from private placements with insurance companies, pension plans, and other institutional investors; or from long-term bank credit agreements. Creditors may receive a claim on specific assets pledged as security for the debt (e.g., mortgages), or they may have only general claims on the assets of the firm. Some debt, known as project financing, is repaid solely from the operations of a particular activity (e.g., a coal mine or office building). Some creditor claims are subordinated, in that they rank below those of senior creditors, whose claims have priority.

Long-term liabilities are interest-bearing in nature, but the structure of interest and principal payments varies widely. The different payment terms are, however, conceptually identical. As the subtleties of the financing equation(s) can be overwhelming and obscure the sight of the forest for the trees, we suggest that the reader keep two basic principles in mind:

1. Debt equals the present value of the remaining future stream of (interest and principal) payments. The book value reported in the financial statements uses the discount rate (market interest rate) in effect when the debt was incurred. Market value measurements use the current market interest rate.

2. Interest expense is the amount paid by the debtor to the creditor in excess of the amount borrowed. Even when the total amount of interest paid over time is known, its allocation to individual time periods (both cash outflows and accrual of expense in periodic income statements) may vary with the form of the debt.

These points seem simplistic but reference to them from time to time may help focus the discussions that follow.

Although bonds are only part of the debt universe, they are used for convenience to illustrate the accounting and analysis issues.

A bond is a "contract" or written agreement that obligates the borrower (bond issuer) to make certain payments to the lender (bondholder) over the life of the bond. A typical bond promises two types of payments: periodic interest payments (usually semiannual in the United States but annual in other countries) and a lump-sum payment when the bond matures.

The face value of the bond is the lump-sum payment due at maturity. The coupon rate is the stated cash interest rate (but not necessarily the actual rate of return).

\[
\text{Periodic Payment} = \text{"Coupon Rate" \times Face Value}
\]

The coupon rate is in quotation marks because it is stated on an annual basis, whereas payments are made semiannually. The coupon rate (CR) used for the payment calculation is therefore equal to one-half the stated coupon rate.

The example in Exhibit 10-1 is based on a three-year bond with the following terms:

<table>
<thead>
<tr>
<th>Face Value (FV)</th>
<th>$100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupon</td>
<td>10%</td>
</tr>
<tr>
<td>Interest Payment</td>
<td>Semiannual</td>
</tr>
</tbody>
</table>

The purchaser of the bond expects six payments of interest (each payment is $5,000) and a final principal payment of $100,000 for a total of $130,000. Note that this stream of payments does not uniquely determine the principal amount borrowed by the bond issuer. The amount borrowed (the proceeds received on issuance) depends on the market rate of interest for bonds of a similar maturity and risk as well as the payment stream.

The market rate may be less than, equal to, or greater than the coupon rate. It is the current market interest rate that allocates payments between interest and principal.

---

1 Bonds issued for periods of 10 years or less are usually called notes. There is no analytical distinction, and we call all debt issues bonds for convenience.
## EXHIBIT 10-1
Comparison of Bond Issued at Par, Premium, and Discount

### Face Value (FV) of bond = $100,000
Coupon (CR) = 5% (semiannual payment; 10% annual rate)
Maturity = 3 years
Semiannual payments of $5,000 (0.5 × 10% × $100,000)

### A. Bond Issued at Par: Market Rate = 10% (MR = 5%)

<table>
<thead>
<tr>
<th>Period Ending</th>
<th>Liability Opening</th>
<th>Interest Expense</th>
<th>FV × CR</th>
<th>Change in Liability</th>
<th>Liability Closing</th>
<th>FV Value of Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/01</td>
<td>Proceeds (see below)</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$0</td>
<td>$100,000</td>
</tr>
<tr>
<td>06/30/01</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>12/31/01</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>06/30/02</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>12/31/02</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>06/30/03</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>12/31/03</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>$20,000</td>
<td>$30,000</td>
<td></td>
<td></td>
<td>$100,000</td>
</tr>
</tbody>
</table>

### Calculation of Proceeds
Present value of annuity of $5,000 for 6 periods, discounted at 5%:
$5,000 × 5.0756 = $25,378
Present value of $100,000 in 6 periods, discounted at 5%:
$100,000 × 0.74622 = 74,622
Total $100,000

### B. Bond Issued at Premium: Market Rate = 8% (MR = 4%)

<table>
<thead>
<tr>
<th>Period Ending</th>
<th>Liability Opening</th>
<th>Interest Expense</th>
<th>FV × CR</th>
<th>Change in Liability</th>
<th>Liability Closing</th>
<th>FV Value of Bond</th>
<th>Closing Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/01</td>
<td>Proceeds (see below)</td>
<td>$4,210</td>
<td>$5,000</td>
<td>($790)</td>
<td>105,242</td>
<td>$100,000</td>
<td>5,242</td>
</tr>
<tr>
<td>06/30/01</td>
<td>104,452</td>
<td>4,178</td>
<td>5,000</td>
<td>($822)</td>
<td>104,452</td>
<td>100,000</td>
<td>4,452</td>
</tr>
<tr>
<td>12/31/01</td>
<td>103,630</td>
<td>4,145</td>
<td>5,000</td>
<td>($855)</td>
<td>103,630</td>
<td>100,000</td>
<td>3,630</td>
</tr>
<tr>
<td>06/30/02</td>
<td>102,775</td>
<td>4,111</td>
<td>5,000</td>
<td>($889)</td>
<td>102,775</td>
<td>100,000</td>
<td>2,775</td>
</tr>
<tr>
<td>12/31/02</td>
<td>101,886</td>
<td>4,075</td>
<td>5,000</td>
<td>($925)</td>
<td>101,886</td>
<td>100,000</td>
<td>1,886</td>
</tr>
<tr>
<td>06/30/03</td>
<td>100,961</td>
<td>4,039</td>
<td>5,000</td>
<td>($961)</td>
<td>100,961</td>
<td>100,000</td>
<td>961</td>
</tr>
<tr>
<td>12/31/03</td>
<td></td>
<td>$24,758</td>
<td>$30,000</td>
<td>($5,242)</td>
<td></td>
<td>100,000</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Calculation of Proceeds
Present value of annuity of $5,000 for 6 periods, discounted at 4%:
$5,000 × 5.2421 = $26,211
Present value of $100,000 in 6 periods, discounted at 4%:
$100,000 × 0.79031 = 79,031
Total $105,242
### EXHIBIT 10-1 (continued)

#### C. Bond Issued at Discount: Market Rate = 12% (MR = 6%)

<table>
<thead>
<tr>
<th>Period Ending</th>
<th>Liability Opening</th>
<th>(1) Interest Expense</th>
<th>(2) × MR</th>
<th>(3) FV × CR</th>
<th>(4) (2) – (3)</th>
<th>(5) (1 + 4)</th>
<th>(6) Face Value</th>
<th>(7) Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/01</td>
<td>Proceeds (see below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/30/01</td>
<td>$95,083</td>
<td>$5,705</td>
<td>$5,000</td>
<td>$705</td>
<td></td>
<td>$95,083</td>
<td>$100,000</td>
<td>$(4,917)</td>
</tr>
<tr>
<td>12/31/01</td>
<td>95,788</td>
<td>5,747</td>
<td>5,000</td>
<td>747</td>
<td></td>
<td>95,788</td>
<td>100,000</td>
<td>(4,212)</td>
</tr>
<tr>
<td>06/30/02</td>
<td>96,555</td>
<td>5,792</td>
<td>5,000</td>
<td>792</td>
<td></td>
<td>96,555</td>
<td>100,000</td>
<td>(3,465)</td>
</tr>
<tr>
<td>12/31/02</td>
<td>97,327</td>
<td>5,846</td>
<td>5,000</td>
<td>840</td>
<td></td>
<td>97,327</td>
<td>100,000</td>
<td>(2,673)</td>
</tr>
<tr>
<td>06/30/03</td>
<td>98,167</td>
<td>5,890</td>
<td>5,000</td>
<td>890</td>
<td></td>
<td>98,167</td>
<td>100,000</td>
<td>(1,833)</td>
</tr>
<tr>
<td>12/31/03</td>
<td>99,007</td>
<td>5,943</td>
<td>5,000</td>
<td>943</td>
<td></td>
<td>99,007</td>
<td>100,000</td>
<td>(943)</td>
</tr>
<tr>
<td>Totals</td>
<td>$34,917</td>
<td>$30,000</td>
<td></td>
<td>$19,817</td>
<td></td>
<td>$34,917</td>
<td>$100,000</td>
<td>0</td>
</tr>
</tbody>
</table>

### Calculation of Proceeds

- Present value of annuity of $5,000 for 6 periods, discounted at 6%:
  \[
  \text{Present value} = 5,000 \times 4.9173 = 24,587
  \]

- Present value of $100,000 in 6 periods, discounted at 6%:
  \[
  \text{Present value} = 100,000 \times 0.70496 = 70,496
  \]

- Total: $34,917

---

**Exhibit 10-1**, parts A through C, shows how the economics of the bond and the accounting treatment of the payments are affected by the relationship between the market and coupon rates. The following points should be noted:

1. The initial liability is the amount paid to the issuer by the creditor (present value of the stream of payments discounted at the market rate), not necessarily the face value of the debt.
2. The effective interest rate on the bond is the market (not the coupon) rate at the time of issuance, and interest expense is that market rate times the bond liability.
3. The coupon rate and face value determine the actual cash flows (stream of payments from the issuer).
4. Total interest expense is equal to the payments by the issuer to the creditor in excess of the amount received. (Thus, total interest expense = $130,000 − initial liability.)
5. The balance sheet liability over time is a function of (a) the initial liability and the relationship of (b) periodic interest expense to (c) the actual cash payments.
6. The balance sheet liability at any point in time is equal to the present value of the remaining payments, discounted at the market rate in effect at the time of the issuance of the bonds.

**Exhibit 10-1A: Market Rate = Coupon Rate**. When the market rate equals the coupon rate of 10% (compounded semiannually), the bond is issued at par; that is, the proceeds equal the face value. The creditor is willing to pay $100,000, the present value of the stream of payments and the face value of the bond. In this case, the initial liability equals the face value.

Since the debt has been issued at a market rate of 10% (equal to the coupon rate), periodic interest expense (Exhibit 10-1A, column 2) equals the periodic cash payments (column 3). The liability remains $100,000 (column 5) throughout the life of the bond.

**Exhibit 10-1B: Market Rate < Coupon Rate**. When the market rate is less than the coupon rate, the creditor is willing to pay (and the bond issuer will demand) a premium

---

*We ignore, for simplicity, the underwriting costs and expenses associated with the bond issuance. These costs are generally capitalized and amortized over the life of the bond issue.*
above the face value of $100,000. If we assume a market rate of 8%, the proceeds and initial liability (Exhibit 10-1B) equal $105,242 (face value of $100,000 plus premium of $5,242).

After six months, the bondholder earns interest of $4,210 (4% × $105,242) but receives a payment of $5,000 (coupon rate times face value). This $5,000 payment includes interest expense of $4,210 and a $790 principal payment, reducing the liability to $104,452. For the second period, interest expense is $4,178 (4% × $104,452), lower than the first period expense since the liability has been reduced. After the second payment of $5,000, the liability is further reduced. This process is continued until the bond matures. At that time, as shown in Exhibit 10-1B, the liability is reduced to $100,000, the face value of the bond, which is repaid at maturity.

The process by which a bond premium (or discount) is amortized over the life of the bond is known as the effective interest method. This process, which results in a constant rate of interest over the life of the obligation, is widely used in financial reporting.

Exhibit 10-1C: Market Rate > Coupon Rate. When the market rate exceeds the coupon rate, the bond buyer is unwilling to pay the full face value of the bond. At a market rate of 12%, the bond would be issued at a discount of $4,917, and the proceeds and initial liability equal $95,083.

Interest expense for the first six months is $5,705 (6% × $95,083), but cash interest paid is only $5,000; the shortfall of $705 is added to the balance sheet liability. As a result, a higher liability is used to calculate interest expense for the second period, increasing interest expense, increasing the shortfall, and further increasing the liability. This cycle is repeated for all remaining periods until the bond matures. At that point, the initial principal of $95,083 plus the accumulated (unpaid) interest of $4,917 equals $100,000, the face value payment that retires the debt. The zero-coupon bond, discussed shortly, is the extreme case; all interest is unpaid until the bond matures.

Financial Statement Effects

Interest expense reported in the income statement (column 2 of Exhibit 10-1) is the effective interest on the loan based on the market rate in effect at issuance times the balance sheet liability at the beginning of the period. The actual cash payments (column 3) may not equal interest expense, but do equal the reduction in cash from operations (CFO). The balance sheet liability is shown in column 5. The initial cash received and the final face value payment of $100,000 are both treated as cash from financing (CFF). The financial statement effects on an annual basis (if we assume a December fiscal year-end) are summarized in Exhibit 10-2. Note that for bonds issued at a premium (discount), the interest expense decreases (increases) over time. This is a direct function of the declining (rising) balance sheet liability; for each period, interest expense is the product of the beginning liability and the effective interest rate. At any point in time, the balance sheet liability equals the present value of the remaining payments discounted at the effective interest rate at the issuance date.

The reported cash flows for each period over the life of the bond (Exhibit 10-2) are identical across all three scenarios; the $100,000 face value payment is treated as cash from fi-

---

5 Assuming a market interest rate of 8%, the bond issuer could find an investor willing to lend $100,000 in exchange for a semianual annuity stream of $4,000 (4% × $100,000) in addition to the lump-sum payment at maturity. For the borrower to obligate itself to pay the higher annuity of $5,000 requires additional proceeds above the face value.

6 The bondholder can purchase a 12% bond and receive periodic payments of $8,000. The periodic payments from this bond are only $5,000. Thus, an investor would only purchase this bond at a discount.

7 To illustrate this property, compute the balance sheet liability of $96,535 at December 31, 2001, for the bond issued at a discount. The present value of the remaining four periodic payments and lump-sum payment equals:

Present value of annuity of $5,000 for 4 periods discounted at 6%: $5,000 × 3.46511 = $17,326
Present value of $100,000 for 4 periods discounted at 6%: $100,000 × 0.79209 = $79,209
$86,535

8 The market value of the debt, however, is equal to the present value of all remaining payments discounted at the current market interest rate.
nancing, and the periodic cash payments of $5,000 are reported as reductions in CFO. For bonds issued at a premium or discount, however, these cash flows incorrectly describe the economics of the bond transaction.

The misclassification of cash flows results from reporting the coupon payments rather than interest expense as CFO. For bonds sold at a premium, part of the coupon payment is a reduction of principal and should be treated as a financing cash (out)flow. CFO is understated and financing cash flow is overstated by an equal amount. Similarly, when bonds are issued at a discount, part of the discount amortization represents additional interest expense. Consequently, CFO is overstated and financing cash flow is understated by that amount.

In summary, the cash flow classification of the debt payments depends on the coupon rates, not the effective interest rate. When these differ, CFO is misstated.

Exhibit 10-3 presents two cash flow reclassifications. The first correctly allocates cash outflows based on interest expense. After reallocation, the cash flows reflect the economics of the debt rather than the coupon payments alone.

The second reclassification, however, goes much further. In Chapter 3, we argue that all debt-related cash flows should be separated from operating cash flows. The "functional" reclassification in Exhibit 10-3 makes that separation so CFO is unaffected by borrowing. All debt-related cash flows are included in financing cash flow regardless of the coupon or effective interest rates.

Most debt is issued at or close to par (face value), making the distortion from bond premium or discount immaterial. However, when the discount is large, for example, with zero-coupon bonds, the difference between coupon and effective interest rates leads to the significant distortion of reported cash flows.

**Zero-Coupon Debt**

A zero-coupon bond has no periodic payments (coupon = 0). For that reason, it must be issued at a deep discount to face value. The lump-sum payment at maturity includes all unpaid interest (equal to the face value minus the proceeds) from the time of issuance.

---

1. Under the indirect method, net income is adjusted by the change in bond discount/premium (the periodic amortization of the bond/discount premium) to derive CFO. Thus for the first year, the cash flow statement will show an addback of $1,612 in the premium case and a deduction of $1,452 in the discount case.
2. The following discussion also applies to bonds sold at deep discounts, that is, with coupons that are far below market interest rates, and to bonds issued with attached warrants that generate debt discount (discussed later in the chapter).
EXHIBIT 10-3
Reclassification of Cash Flows for Bonds in Exhibits 10-1 and 10-2

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Cash Flow</th>
<th>SFAS 95 Cash Flow for All Bonds</th>
<th>Reclassification Based on Interest Expense</th>
<th>Functional Reclassification For All Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$10,000</td>
<td>$10,000</td>
<td>0</td>
<td>$8,388</td>
</tr>
<tr>
<td>2002</td>
<td>10,000</td>
<td>10,000</td>
<td>0</td>
<td>8,256</td>
</tr>
<tr>
<td>2003</td>
<td>110,000</td>
<td>10,000</td>
<td>100,000</td>
<td>8,114</td>
</tr>
<tr>
<td>Totals</td>
<td>$130,000</td>
<td>$30,000</td>
<td>$100,000</td>
<td>$24,728</td>
</tr>
</tbody>
</table>

SFAS 95 requires that cash flows be allocated between operations and financing based on the coupon interest rate.

The first reclassification allocates cash outflows based on interest expense. In 2001, for the premium case, $8,388 is shown as operating cash flow and the balance of $1,612 ($10,000 - $8,388) as financing. The interest expense reported for the discount issue, $11,452, is shown as operating cash flow and the excess over interest paid $1,452 ($11,452 - $10,000) is reported as a financing cash inflow. The 2003 financing cash flow for the discount issue, therefore, equals the outflow of $100,000 to repay the debt less $1,833 (interest expense in excess of interest paid).

The second reclassification is based on the authors’ view that financing cash flow should include both principal and interest paid. Regardless of whether debt is issued at par, premium, or discount, financing cash flow reflects all payments made in the year of the actual payments.

The proceeds at issuance equal the present value of the face amount, discounted at the market interest rate. Thus, at a market rate of 10%, a $100,000 face value zero-coupon bond payable in three years will be issued at $74,622.

Exhibit 10-4 shows the income statement, cash flow, and balance sheet effects for this bond. Note that the repayment of $100,000 includes $25,378 of interest that is never reported.

EXHIBIT 10-4
Zero-Coupon Bond Analysis

<table>
<thead>
<tr>
<th>(1) Liability Opening</th>
<th>(2) Interest Expense</th>
<th>(3) FV × CR Payment</th>
<th>(4) Change in Liability Closing</th>
<th>(5) Liability Closing</th>
<th>(6) FV of Bond</th>
<th>(7) Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/01 Proceeds</td>
<td>$74,622</td>
<td>$3,731</td>
<td>$0</td>
<td>$3,731</td>
<td>$74,622</td>
<td>$100,000</td>
</tr>
<tr>
<td>06/30/01</td>
<td>78,353</td>
<td>3,917</td>
<td>0</td>
<td>3,917</td>
<td>82,270</td>
<td>100,000</td>
</tr>
<tr>
<td>12/31/01</td>
<td>82,270</td>
<td>4,114</td>
<td>0</td>
<td>4,114</td>
<td>86,384</td>
<td>100,000</td>
</tr>
<tr>
<td>06/30/02</td>
<td>86,384</td>
<td>4,319</td>
<td>0</td>
<td>4,319</td>
<td>90,703</td>
<td>100,000</td>
</tr>
<tr>
<td>06/30/03</td>
<td>90,703</td>
<td>4,535</td>
<td>0</td>
<td>4,535</td>
<td>95,238</td>
<td>100,000</td>
</tr>
<tr>
<td>12/31/03</td>
<td>95,238</td>
<td>4,762</td>
<td>0</td>
<td>4,762</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Totals</td>
<td>$25,378</td>
<td>$0</td>
<td>$25,378</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculation of Proceeds

Present value of $100,000 in 6 periods, discounted at 5%: $100,000 × 0.74622 = $74,622

Cash flow from operations: Zero in all periods

Cash flow from financing: $74,622 inflow at 1/1/01; $100,000 outflow at 12/31/03
EXHIBIT 10-5. EQK REALTY
Zero Coupon Financing, Financial Statement Excerpts

<table>
<thead>
<tr>
<th>Balance Sheet</th>
<th>1991</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortgage note payable, net of debt discount of $392</td>
<td>—</td>
<td>$75,324</td>
</tr>
<tr>
<td>Zero-coupon mortgage notes, net of unamortized discount of $9,574</td>
<td></td>
<td>$89,410</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement of Cash Flows</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Ended December 31</td>
<td></td>
</tr>
<tr>
<td>Cash flows from operating activities</td>
<td></td>
</tr>
<tr>
<td>Net loss</td>
<td>$ (8,850)</td>
</tr>
<tr>
<td>Adjustments to reconcile net loss to net cash provided by operating activities</td>
<td></td>
</tr>
<tr>
<td>Amortization of discount on zero-coupon mortgage notes</td>
<td>9,344</td>
</tr>
<tr>
<td>Other adjustments</td>
<td>7,574</td>
</tr>
<tr>
<td>Net cash provided by operating activities</td>
<td>$8,068</td>
</tr>
<tr>
<td>Cash flows from financing activities</td>
<td></td>
</tr>
<tr>
<td>Prepayment of zero-coupon note</td>
<td>$(23,038)</td>
</tr>
<tr>
<td>Other adjustments</td>
<td>1,572</td>
</tr>
<tr>
<td>Net cash provided by (used in) financing activities</td>
<td>$(21,466)</td>
</tr>
</tbody>
</table>

Note 2: Debt Restructuring

In December 1992, the Company refinanced $75,689,000 representing the balance of its zero-coupon mortgage note that remained after reducing this indebtedness with the proceeds from the sale of properties. The new financing, which is collateralized by first mortgage liens, matures in December 1995.


as CFO; the full $100,000 payment is treated as cash from financing. The contrast with the bond issued at par (Exhibit 10-1A) is striking.

The interest on a zero-coupon bond never reduces operating cash flow. This surprising result has important analytic consequences. One is that reported CFO is systematically overstated when a zero-coupon (or deep discount) bond is issued. Furthermore, solvency ratios, such as cash-basis interest coverage, are improved relative to the issuance of par bonds. Finally, the cash eventually required to repay the obligation may become a significant burden. 11

EQK Realty Investors (EQK), a real estate investment trust, illustrates this phenomenon. The company issued zero-coupon mortgage notes in 1985 and 1988. Adjustment of reported cash flow for the effect of interest on these zero-coupon bonds results in a quite different CFO trend.


11 In fact, interest expense increases cash flow by generating income tax deductions. (Zero-coupon bond interest expense is tax-deductible even though it is not paid.) This result can have real-world consequences. When valuing a company for leveraged buyout (LBO) purposes, the use of zero-coupon or low-coupon debt (issued at a discount) can result in the following anomaly: The higher the interest rate, the higher the cash flow, mistakenly resulting in a higher price for the company. An investment banker connected to one of the authors that this factor contributed to overpricing in the late 1990s. Of course, when the zero-coupon bond comes due, the cash must be found to repay the (much higher) face amount.
Given the opening (January 1, 1992) balance of $89,410 on the zero-coupon bond and the issuance of a mortgage bond having a face value of $75,716 ($75,324 + $392 debt discount), the cash required to retire the bond should have been $13,694 ($89,410 − $75,716). Why then did EQK report a cash payment of $23,038, an excess of $9,344, as cash from financing?

The answer can be found in the cash flows from operating activities section of the statement of cash flows. "Amortization of discount on zero-coupon mortgage notes" of $9,344 appears as an addback to net income, thereby removing it from CFO; $9,344 is the amount of interest that accrued on the zero-coupon bond from January 1992 through its retirement in December 1992. This interest, paid in 1992, was treated as a financing rather than an operating cash outflow. The impact of this misclassification on CFO is significant. Reclassifying the interest expense as CFO turns a positive cash flow of over $8 million into a negative $1.276 million:

| Reported CFO | $8,068 |
| Reclassify 1992 interest portion | (9,344) |
| Adjusted CFO | ($1,276) |

Similar reclassification can be extended to previous years, when the company accrued (but did not pay) interest cost (amortization of discount) on these notes. Reported CFO obscured the fact that at some point the accrued interest must be repaid. As the maturity of the debt approached, the company faced a liquidity crisis.12

The table below presents reported and adjusted CFO for the period 1989 to 1994. The treatment of the interest on the zero-coupon bond causes significant distortions both prior to and following the 1992 refinancing.13

| EQK Realty Investors |
| Adjustment of Operating Cash Flow (CFO), Years Ending December 31, 1989 to 1994 (in Thousands) |
| Reported CFO | $10,458 | $9,795 | $5,728 | $8,068 | $4,087 | $2,184 |
| Less: zero-coupon interest | 7,486 | 8,318 | 9,229 | 9,344 | 0 | 0 |
| Adjusted CFO | $2,972 | $1,477 | $(3,501) | $(1,276) | $4,087 | $2,184 |

After adjustment, the 1989 to 1991 deterioration in CFO is even more striking as 1991 CFO is negative.14 The 1992 recovery is less impressive as adjusted CFO remains negative. In 1993, CFO rises despite the burden of full-coupon debt; the unadjusted data obscure this improvement. The adjusted CFO data provide better information regarding the operating cash flow trend.

**Variable-Rate Debt**

Some debt issues do not have a fixed coupon payment; the periodic interest payment varies with the level of interest rates. Such debt instruments are generally designed to trade at their face value. To achieve this objective, the interest rate "floats" above the rate on a specified-maturity U.S. Treasury obligation or some other benchmark rate such as the prime rate or LIBOR (London InterBank Offered Rate). The "spread" above the benchmark depends on the credit rating of the issuer.

---

12In 1991 EQK's auditors issued a "going concern qualification" due to the impending maturity of the zero-coupon bond.

13The adjustment ignores small amounts of amortization of other discount notes.

14Note the increasing trend of interest expense on the zero-coupon debt, similar to the trend in Exhibit 10-4.
Fixed- versus Variable-Rate Debt and Interest Rate Swaps

Borrowers can issue fixed-rate or variable-rate debt directly; alternatively, they can enter into interest rate swap agreements that convert a fixed-rate obligation to a floating-rate obligation or vice versa.

Whether a firm prefers to incur fixed-rate or variable-rate debt depends on a number of factors. Variable-rate debt exposes the firm’s interest expense, cash flows, and related ratios to higher volatility due to interest rate changes. On the other hand, when the firm’s operating cash flows are correlated with movements in interest rates, variable-rate debt minimizes risk. The common notion that fixed rates minimize risk by reducing the volatility of a firm’s income and cash flows is, thus, only a half-truth.

Financial intermediaries (banks, finance companies) generally issue a high proportion of variable-rate debt, as their assets tend to be variable-rate in nature. Thus, they match the variability of their assets and liabilities (see the detailed discussion of hedging in Chapter 16).

However, a nonfinancial firm may also view variable-rate debt as hedging variable operating cash flows. For example, the 1996 financial statements of AMR (American Airlines) state:

Because American’s operating results tend to be better in economic cycles with relatively high interest rates and its capital instruments tend to be financed with long-term fixed-rate instruments, interest rate swaps in which American pays the floating rate and receives the fixed rate are used to reduce the impact of economic cycles on American’s net income.

Alternatively, a firm may prefer to issue variable-rate debt because management believes that interest rates will fall or short-term rates (the usual basis for variable debt) will remain below long-term rates charged on fixed-rate loans. The analysis of a firm’s debt should include a consideration of whether management’s choice of financing alternatives is based on the inherent economics of the business or management speculation on future interest rate changes.

Debtors use interest rate swaps to manage the fixed- and variable-rate mix of total borrowings. Box 10-1 presents the mechanics of interest rate swaps.

Example: Nash-Finch

Nash-Finch [NAFC] is a food wholesaler with annual sales exceeding $4 billion. The company’s debt at December 31, 1998 and 1999 was $300 million and $315 million, respectively. For both years, the variable-rate debt was approximately 42% of the total debt ($128 million in 1998 and $132 million in 1999).

The company engaged in interest rate swaps, converting variable-rate to fixed-rate debt. The company disclosed the following information regarding interest rate swaps outstanding at the 1998 and 1999 year-ends (amounts in $1,000s):

<table>
<thead>
<tr>
<th>Years Ended December 31</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive variable/pay fixed</td>
<td>$90,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Average receive rate</td>
<td>5.5%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Average pay rate</td>
<td>6.5%</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

Note that Nash remains liable for the original principal and interest payments on the fixed-rate debt (see Box 10-1). At the inception of the swap, no accounting recognition.

---

15The impact of interest rate changes can, of course, be either positive or negative.
16The investor point of view, however, is different. Variable-rate debt has low price risk; interest rate changes should have minimal impact on its market price. Significant market fluctuation should result only from perceived changes in credit quality. However, the variability of income is higher than for fixed-rate debt.
Interest Rate Swaps

Firms use interest rate swaps* to exchange variable- (floating-) rate debt for obligations with fixed interest rates or, alternatively, to exchange fixed-rate debt for obligations with variable rates.

Swaps are contractual obligations that supplement existing debt agreements. Each firm remains liable for its original debt, makes all payments on that debt, and carries that debt on its books. The firm with variable-rate debt agrees to pay, at specified intervals, amounts equal to a fixed rate times the notional principal amount. In return, the counterparty pays variable amounts equal to the variable interest rate (pegged to a specified rate or index) times that same notional principal amount.

Because firms wish to minimize credit risk, they do not engage in swaps with other industrial firms, even when a swap would meet the objectives of both parties. The counterparty is normally a bank or other financial institution with a high credit rating. Money center banks, as a result, have large portfolios of swaps.

Given that some firms prefer variable-rate debt and others fixed-rate debt, why do they not arrange their preferred form of financing directly with their creditors? Why incur the additional costs and/or risks of swaps? Frictions in the credit markets and/or the institutional setting of the firm may result in differential borrowing costs that make it cheaper to borrow in the nonpreferred mode and swap into the preferred mode of borrowing rather than borrowing directly in the preferred mode. For example, some “household name” American firms can borrow at very low rates in certain foreign markets. A second factor leading to swaps is that preferences change over time. This is especially true of firms that use swaps to “match” assets and liabilities (see Chapter 16 for a discussion of hedging activities).

Illustration

The Triple A and Triple B companies each want to borrow $100 million. Assume that the Triple A company prefers variable-rate debt, whereas the Triple B company prefers fixed-rate debt. The companies’ respective borrowing rates and preferences are:

<table>
<thead>
<tr>
<th>Company</th>
<th>Fixed-Rate</th>
<th>Variable-Rate</th>
<th>Preferred Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple A</td>
<td>8%</td>
<td>Prime</td>
<td>Variable</td>
</tr>
<tr>
<td>Triple B</td>
<td>10%</td>
<td>Prime + 1%</td>
<td>Fixed</td>
</tr>
</tbody>
</table>

The Triple-A company is considered to be more creditworthy than the Triple B company and, hence, is offered more favorable borrowing terms. Note that the rate differential on fixed-rate debt (2%) is greater than the differential (1%) on floating-rate debt. This discrepancy makes it profitable for firms to enter into swaps.

Based on these rates, we demonstrate that the combined borrowing cost for the two firms is 1% lower when each company borrows in its nonpreferred mode. This 1% difference is independent of changes in the prime rate.

The two firms are both better off borrowing in their nonpreferred mode, “swapping” the debt and splitting the 1% savings. The swap agreement requires the following payments:

- The Triple A company pays the Triple B company the prime rate (times the notional amount of $100 million).
- The Triple B company pays the Triple A company 8.5% (times the notional amount of $100 million).

The cost of the original borrowing and the swap for each company is:

<table>
<thead>
<tr>
<th>Company</th>
<th>Borrow</th>
<th>Preferred Mode</th>
<th>Borrow</th>
<th>Nonpreferred Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple A</td>
<td>Prime</td>
<td>8%</td>
<td>Prime</td>
<td>8%</td>
</tr>
<tr>
<td>Triple B</td>
<td>10%</td>
<td>Prime + 1%</td>
<td>Prime</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>To Swap</th>
<th>From Swap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>Counterparty</td>
<td>Counterparty</td>
</tr>
<tr>
<td>Triple A</td>
<td>8% Prime</td>
<td>(8.5%) Prime - 0.5%</td>
</tr>
<tr>
<td>Triple B</td>
<td>Prime + 1%</td>
<td>8.5% Prime</td>
</tr>
</tbody>
</table>

Each company has obtained debt in its preferred mode at a rate one-half percent below the rate available on its preferred mode of borrowing.

Economic Effects of the Swap

Assume that the swap illustrated has a five-year term, the prime rate is 6% at inception, payments are made semiannually, and adjustments for changes in the prime rate are also semiannual. The first semiannual assessment results in a net payment of $1.25 million [0.5 x (8.5% - 6%) x $100 million] from Triple B to Triple A. If, for the second semiannual period, the prime rate increases to 7%, then the second scheduled payment will be $0.75 million [0.5 x (8.5% - 7%) x $100 million]. Although Triple B has borrowed at a variable rate, increases in that rate are passed on to Triple A as Triple B’s payments decline. Thus, Triple B’s economic cost is the fixed rate of 9.5%. Conversely, Triple A is exposed to rising interest rates although it has incurred only fixed-rate debt. The swap has changed the economic position of both firms.

Economic Effects of Termination

Now assume that Triple A, expecting increases in interest rates, wishes to terminate the swap agreement after the first payment. How much should Triple A pay to do so? The required payment...

---


1 See Chapter 16 for further discussion of derivatives held by financial institutions.
should equal the fair value of the swap agreement, calculated as follows.¹

Triple B is liable for 9 semiannual payments of $4.25 million (0.5 × 8.5% × $100 million). If Triple B enters into another swap agreement, it would be based on current interest rates. If the fixed rate has increased by 0.5% (while the prime rate has increased by 1%), Triple B would have to make 9 payments of $4.5 million (0.5 × 9% × $100 million), an increase of $250 thousand. The present value of the increase discounted at the new rate of 9% is equal to approximately $1.8 million. Thus, to terminate the swap, Triple A must pay Triple B that amount.

¹In our simplified example, we assume that the swap is terminated at the same time when the floating rate is reset. Were this not the case, then a similar calculation would have to be made for the variable-rate bond to compensate for the fact that if Triple B entered into a new swap agreement, while it is true that it would pay a higher fixed rate, it would receive immediately floating-rate payments based on the higher floating rate and not have to wait for the next adjustment date. This calculation, however, is usually not very material; it is for only one payment and the discounting period is less than six months (from the termination date to the interest rate adjustment date).

is required although Nash has altered its debt obligation. Presumably at that time, the swap was "fair," that is, the net present value of the swap payments was zero. The transaction is an off-balance-sheet contract.

The effect of the swap was to reduce the sensitivity of Nash to changes in interest rates:

<table>
<thead>
<tr>
<th>Effect of Swap on Debt Structure (amounts in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Fixed</td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>% Variable</td>
</tr>
</tbody>
</table>

The swap has also affected Nash’s interest expense as the required payments (fixed) exceeded the amounts received (based on variable rates):

<table>
<thead>
<tr>
<th>Years Ended December 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
</tr>
<tr>
<td>Swap</td>
</tr>
<tr>
<td>Interest received</td>
</tr>
<tr>
<td>Interest paid</td>
</tr>
<tr>
<td>Net payment</td>
</tr>
<tr>
<td>Interest expense:</td>
</tr>
<tr>
<td>Reported</td>
</tr>
<tr>
<td>Ex-swap</td>
</tr>
<tr>
<td>Increase due to swap</td>
</tr>
</tbody>
</table>

What conclusions can we draw from these data?

1. Nash entered into the swaps to reduce its vulnerability to higher interest rates. It did not replace swaps expiring in 1999, thus increasing its exposure. Yet total debt (and variable debt) increased from 1998 to 1999.

2. The swaps increased Nash’s interest expense as the fixed-rate payments exceeded the variable rate payments. The net payments can be viewed as the cost of insurance against the effect of higher interest rates.
3. While the fair value of the swaps at inception (net present value) can be assumed to be zero, the fair value will fluctuate over the swap term. If the changes are favorable, Nash-Finch will have an unrealized gain; if unfavorable there will be an unrealized loss.\footnote{See Chapter 16 for discussion of when and how gains and losses from derivatives must be recognized in the financial statements.}

4. Nash also assumed counterparty risk, the risk that the other party will default. When Nash must make net payments (as in 1998 and 1999) there is no risk. If variable rates rose sharply, resulting in payments to Nash, then default risk would be present.\footnote{When the fair value of the swap changes so that Nash-Finch has an unrealized gain, realization of that gain depends on the creditworthiness of the counterparty.} When a company enters into swaps that are material to its financial position, the analyst should ensure that the counterparties are sufficiently strong so that the likelihood of default is insignificant.\footnote{If we assume that the counterparty is a highly rated financial institution, it would not provide collateral to protect Nash against default.}

These conclusions result in questions that the analyst may want to pursue by discussing them with management. Especially in the first case, the answer might yield useful insights regarding management's strategy regarding interest rate risk.

**Debt Denominated in a Foreign Currency**

Companies sometimes issue debt for which all interest and principal payments are made in a foreign currency. There are three motivations for such issuance:

1. More favorable terms in foreign markets than domestic ones.\footnote{For example, in July 1998, PepsiCo issued one-year notes in Japan (to retail investors) and swapped the fixed-rate obligation for floating rate U.S. dollar payments. The company stated that its net borrowing cost was comfortably below one-month LIBOR.}

2. Assets denominated in the foreign currency and debt denominated in that currency can hedge\footnote{If the parent currency strengthens relative to the foreign currency, then the carrying amount of assets denominated in foreign currencies decreases. This decrease is offset by the decrease (in the parent currency) of the debt to be repaid.} against exchange rate movements.

3. Need for foreign currency for a particular investment or other transaction.

The carrying value of foreign currency debt is adjusted for changes in exchange rates.

For example, Note 24 of the 2000 financial statements of Roche reports debt in Japanese yen and U.S. dollars as well as Roche's parent currency of Swiss francs. Note that the carrying amounts for the yen and U.S. dollar bonds\footnote{The rise in the carrying amount of the zero coupon U.S. dollar obligations is due to accretion of discount as well as the appreciation of the U.S. dollar.} rose in 2000 due to appreciation of those currencies against the Swiss franc.\footnote{See the financial review (p. 51 of the Roche annual report) for foreign currency data.}

This adjustment for exchange rate changes is distinct from any adjustment to current market value. Market value adjustments are based on changes in interest rates.\footnote{In theory, exchange rates are also affected by interest rates. However, that influence is based on the difference in interest rate levels between the two countries, not the level of interest rates.} The market value of this debt in local currencies may have increased if interest rates declined since the debt was issued; this change is not reflected on the balance sheet. Thus, the balance sheet liability has been adjusted for exchange rate changes but not interest rate changes.

**Project Debt**

Some debt is issued to finance a single project, such as a factory, pipeline, or real estate. In these cases, the debt terms are tailored to the expected cash flows generated by the project. Project debt may be nonrecourse, meaning that the lender will be paid only from project cash...
flows and cannot demand payment from the debtor if the project is unsuccessful. Mortgages on real estate are the major example of nonrecourse debt. Even though such debt is shown on the debtor’s balance sheet, the debt is a claim only against the project cash flows and assets. Some project debt is incurred by joint ventures, discussed in Chapter 11.

**Example: Forest City Enterprises**

Forest City [FCE], a U.S. developer of commercial and residential real estate, finances most of its projects with non recourse mortgage debt. The company’s capital structure at January 31, 2000 was (in $millions):

<table>
<thead>
<tr>
<th>Debt Category</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgage debt, nonrecourse</td>
<td>$2,382.4</td>
<td>74.5%</td>
</tr>
<tr>
<td>Recourse debt</td>
<td>429.9</td>
<td>13.4%</td>
</tr>
<tr>
<td>Shareholders’ equity</td>
<td>386.5</td>
<td>12.1%</td>
</tr>
<tr>
<td><strong>Total capital</strong></td>
<td>$3,198.8</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The large proportion of nonrecourse debt protects the company from adversity. The effects of one poorly performing project cannot jeopardize others, as the company cannot lose more than its total investment in that project.

**Debt with Equity Features**

*Convertible Bonds and Warrants*

To reduce borrowing costs, many companies issue debt convertible into their common shares or issue a combination of bonds and warrants to purchase common shares. Although conceptually these two types of “equity-linked” debt are identical, their accounting consequences may differ.\(^2\)

*Convertible Bonds.* Under APB 14 (1969), the conversion feature of a bond is completely ignored when the bond is issued. Thus, the entire proceeds of the bond are recorded as a liability, and interest expense is recorded as if the bond were nonconvertible. However, the conversion feature lowers interest expense. When the bondholder converts the convertible bond into common stock, the entire proceeds are reclassified from debt to equity. As discussed in Box 10-2, however, the FASB issued an exposure draft that would change the accounting for convertible debt.

From an analytic perspective, however, recognition should be given to the equity feature prior to the conversion. When the stock price is (significantly) greater than the conversion price, it is likely that the debt will not have to be repaid, and the convertible bond should be treated as equity rather than debt when calculating solvency ratios such as debt-to-equity. When the stock price is significantly below the conversion price, the bond should be treated as debt. At levels close to the conversion price, the instrument has both debt and equity features, and its treatment becomes a more difficult issue.

One possibility is to separate the debt and equity values of the convertible bond, using option pricing models. This analysis is complex, however, and beyond the scope of this book. IAS 32 (2000) requires issuers to split compound instruments into their component parts. The FASB ED would require such separation. Alternatively, the analyst can examine the sensitivity of key ratios to bond classification, first treating the bond as debt and then as

---

\(^2\)A convertible bond can be disaggregated into a bond plus an option to convert the bond into common shares. An important difference between a convertible and a debt-plus-warrant issue is that, in the former case, the bond must be surrendered to exercise the option, whereas in the latter case, the bond and warrant are not linked. Thus, the issuer can use the proceeds of exercised warrants for purposes other than the retirement of the associated debt. Another difference is their impact on earnings-per-share calculations. The interest expense on the convertible issue is eliminated when diluted earnings per share are computed (Chapter 4), whereas the interest on the debt component of the bond-plus-option alternative will never affect earnings-per-share calculations (however, there is an adjustment for the exercise of dilutive warrants).
BOX 10-2
FASB Exposure Draft: Accounting for Financial Instruments with Characteristics of Liabilities, Equity, or Both

On October 27, 2006, the Board issued an exposure draft (ED) that would change the accounting for:

- Convertible debt
- Redeemable preferred shares

In general, the ED would classify as equity all financial instruments components that establish an ownership relationship with the issuer. A component establishes an ownership relationship if it

1. Is an outstanding equity share not subject to redemption, or
2. Is an obligation that can or must be settled by the issuance of equity shares, and all changes in the monetary value of the obligation are attributable to, equal to, and in the same direction as the change in the fair value of the issuer’s equity shares.

The new standard would require that proceeds of issuance of securities with both liability and equity components be allocated between the value of the liability component and that of the equity component. The most important example is the issuance of convertible debt, which would be accounted for as if the company sold a combination of debt and warrants.

When a company issued convertible debt, it would be required to allocate the proceeds (net of underwriting fees and other direct costs of issuance) between the debt (liability) component and the warrant (equity) component using their relative fair values. If the warrant could not be valued, the issuer would estimate the fair value of the debt component, and allocate the remaining proceeds to the equity component.

Further, if the debt is repurchased or converted, the issuer must recognize gain or loss equal to the difference between the fair value of the debt component and the carrying amount of the liability.

There would also be a gain or loss on the equity component at the date of repurchase or conversion. This gain or loss would be excluded from income but would affect stockholders’ equity.

The accounting change would have the following effects:

1. The difference between the fair value of the debt component and its face value would be amortized over the life of the debt, using the effective interest method. This would result in higher interest expense and lower income than under current accounting.
2. Only the debt component would be shown as a liability; the equity component would be recorded in stockholders’ equity. As a result, the debt-to-equity ratio would be lower than under the current accounting method.
3. At redemption or conversion, the company would recognize a gain or loss on the liability component. In general, companies would recognize a loss when interest rates were lower at the time of repurchase or conversion than when the debt was issued. In the case of conversion, the fair value of the liability component would be added to equity, rather than the carrying amount under current accounting.
4. At redemption or conversion, stockholders’ equity would reflect the change in value of the equity component. When the underlying shares have risen in value, equity would rise, reducing the debt-to-equity ratio. Under current accounting, the market value at redemption or conversion date has no effect on the balance sheet.

The ED would also change the classification of redeemable preferred shares (and similar instruments such as Trust Preferreds) by requiring that they be recorded as debt in the issuer’s balance sheet. Similarly, the “dividends” paid on such shares would be included in interest expense.

The effect of this change would be to increase the reported debt-equity ratio and reduce the interest coverage ratio of affected firms.

A final standard was expected to be issued prior to the end of 2002. It is likely that affected companies would be required to restate their financial statements for the accounting change.

**Example: Holmen**

Note 18 of Holmen's annual report shows that in 1998, the company issued debt of SKr 361 million, convertible into class B common shares in 2004 at a price of SKr 148.10. As the market price of Holmen’s class B shares was SKr 307 at December 31, 1999,

---

27 For example, in takeover analysis, the intended purchase price will determine whether convertible bonds will be converted to common or remain outstanding debt.
these bonds should be considered equity. The reclassification decreases the debt/total capital ratio:

<table>
<thead>
<tr>
<th>Holmen Capital Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 31, 1999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Reported</th>
<th>Reclassification</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKr millions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial liabilities</td>
<td>6,845</td>
<td>(361)</td>
<td>6,484</td>
</tr>
<tr>
<td>Equity</td>
<td>15,883</td>
<td>361</td>
<td>16,244</td>
</tr>
<tr>
<td>Total capital</td>
<td>22,728</td>
<td></td>
<td>22,728</td>
</tr>
<tr>
<td>Financial liabilities</td>
<td>30.1%</td>
<td></td>
<td>28.5%</td>
</tr>
<tr>
<td>Equity</td>
<td>69.9%</td>
<td></td>
<td>71.5%</td>
</tr>
</tbody>
</table>

*Exchangeable Bonds.* Some bond issues are convertible into shares of another firm rather than those of the issuing firm. The analysis of such issues is more complex than the analysis of convertible debt. Exercise of the conversion privilege results in:

- Extinguishment of the debt
- Elimination of the investment in the underlying shares
- Recognition of gain or loss from the “sale” (via debt conversion) of the underlying shares

The motivation for such debt issues may include:

1. The desire to obtain cash while retaining the underlying shares for strategic reasons.
2. Minimizing the market effect of sales; the underlying shares are sold over time as bonds are exchanged.
3. Financial benefits: The interest rate on the exchangeable bonds will be lower (because of the exchange feature) than on straight debt, and the exercise price will contain a premium over the current market price.
4. Delayed recognition of a large unrealized gain; recognition is postponed until the exchange privilege is exercised. This delays the income tax recognition of the gain and may permit management some control over the timing of the gain (it can call the bonds, forcing exchange, when it wishes to report the gain).
5. Hedging the investment. As discussed in Chapter 16, SFAS 133 changed the accounting for such hedges.

**Example: Times Mirror**

In March 1996, Times Mirror (TMC) sold 1.3 million shares of Premium Equity Participating Securities (PEPS) redeemable for shares of Netscape. TMC had purchased Netscape shares less than one year earlier, before Netscape's initial public offering, at a price of $2.25 per share. TMC's Netscape shares were restricted from public sale. The PEPS were sold at a price of $39.25 with a 4.25% coupon and a March 15, 2001 maturity. At that date, each PEPS was redeemable for the cash equivalent of:

- One Netscape share if that share's price was below $39.25
- .87 Netscape share if its price was $45.15 or higher
- $39.25 cash if Netscape's share price was between $45.15 and $39.25

The advantages to TMC of offering PEPS were that TMC:

1. Received the fair market value of its Netscape shares, at a low interest rate of 4.25%, despite the fact that the shares could not be legally sold.
2. Hedged its investment; if Netscape shares declined, the PEPS holders would receive smaller payments at maturity.
3. Maintained part of the upside potential given the reduced conversion rate if Netscape shares exceeded $45.15 in price at maturity.
4. Postponed capital gains tax until the actual sale of Netscape shares was effected through conversion of the PEPS.
5. Enabled TMC to control the timing of its realization of the large gain on the Netscape investment.

The last two advantages are illustrated by events in 1998 and 1999:

- In 1998, TMC sold part of its Netscape holding, redeemed a corresponding portion of the PEPS, and realized a pretax gain of $16 million.\(^{23}\)
- In 1999, TMC sold shares of AOL (which had acquired Netscape) and redeemed additional PEPS, reporting a pretax gain of nearly $17 million.

*Bonds with Warrants.* When warrants and bonds are issued together, the accounting treatment differs from that of convertible bonds. The proceeds must be allocated between the two financial instruments.\(^{29}\) The fair value of the bond portion is the recorded liability. As a result, the bond is issued at a discount, and interest expense includes amortization of that discount. The fair value of the warrants is included in equity and has no income statement impact. When warrants are exercised, the additional cash increases equity capital.

Roche has made extensive use of bonds with equity features (see Note 24 and pages 99–101 of the Roche annual report). Problem 10-11 describes one of these issues and explores its accounting and analytical consequences.

*Comparison of Convertible Bonds and Bonds with Warrants.* As bonds with warrants are accounted for as if they were issued at a discount, the reported liability is lower (but increases as the discount is amortized) as compared to that of a convertible bond. However, reported interest expense is higher.\(^{30}\) As discussed earlier in this chapter, reported cash flow from operations is the same, equal to the coupon interest.

These differences are summarized in the list below, which also includes a comparison with a conventional bond. Note that issuing debt with equity features:

- Lowers interest expense
- Increases operating cash flows
- Results in a balance sheet liability equal to or below that of a conventional bond

In all respects, such debt appears less costly.

<table>
<thead>
<tr>
<th>Interest Expense</th>
<th>Balance Sheet Liability</th>
<th>Operating Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional bond greater than</td>
<td>Conventional bond equal to</td>
<td>Conventional bond less than</td>
</tr>
<tr>
<td>Bond with warrants greater than</td>
<td>Convertible bond greater than</td>
<td>Convertible bond equal to</td>
</tr>
<tr>
<td>Convertible bond</td>
<td>Bond with warrants</td>
<td>Bond with warrants</td>
</tr>
</tbody>
</table>

*However, the financial statement effects are misleading as the cost of the equity feature is ignored.* When convertible debt is issued, there is a systematic understatement of interest expense.\(^{31}\)

---

\(^{23}\)This gain was previously reflected in equity as TMC carried its investment in Netscape at market value (see Chapter 13 for effects of such accounting).

\(^{29}\)As discussed in Box 10-2, the FASB has proposed extending this accounting treatment to convertible bonds as well.

\(^{30}\)Because of the accounting difference, American companies rarely issue debt/warrant combinations. However, such issues are common outside of the United States.

\(^{31}\)Moreover, the impact of equity-linked bonds on earnings per share must always be taken into consideration (see Chapter 4).
Commodity Bonds

The interest and principal payments on bond issues are sometimes tied to the price of a commodity, such as gold, silver, or oil. Firms producing the commodity, as part of a hedge strategy, may issue such bonds: A higher commodity price increases the payments to bondholders but is offset by higher operating profitability. These bonds, therefore, convert interest from a fixed to a variable cost. Such bonds were issued during time periods when commodity prices were rising, making the bonds attractive to purchasers. A recent variation on this theme is the issuance of bonds whose payoff depends on losses due to insurance losses resulting from natural catastrophes. Problem 10-15 is based on one such “catastrophe bond.”

Perpetual Debt

Some debt issues have no stated maturity. When debt does not have a maturity date, it may be considered preferred equity rather than a liability for analytic purposes. An exception would be cases where debt covenants are likely to force repayment or refinancing of the debt.

Example: SAS

In 1986, SAS (Scandinavian Airlines) issued a perpetual 200 million Swiss franc-denominated subordinated loan, with the interest rate fixed for 10 years and reset every 10 years. While there is no set maturity date, SAS has the exclusive right to terminate the loan once every five years.

In 1994, SAS repurchased SFR 55.35 million at a price of 72. This repurchase shows that perpetual notes are not the same as equity, as changes in market conditions may lead the issuer to refinance them. However, given management control over the refinancing decision, treatment as preferred equity is appropriate absent evidence of refinancing intent.

When long-term interest rates were at low levels, some firms issued debt with a maturity of 100 years. Although such issues are technically debt, their long maturity suggests that, for all practical purposes, they represent permanent capital and should be treated as equity when computing the debt-to-equity ratio. For example, Walt Disney issued 100-year bonds in 1993.32

Preferred Stock

Many companies issue more than one class of shares. Preferred (or preference) shares have priority over common shares with respect to dividends and entitlement to the proceeds of sale or liquidation. In exchange for this privileged position, preferred shareholders usually give up their right to participate fully in the success of the company.

Preferred shares generally have a fixed dividend payment and a fixed preference on liquidation. Dividend payments are almost always cumulative; if not paid when due, they remain a liability (but one that is not recorded). Dividend arrears must be paid before any dividend can be paid to common shareholders. When calculating the net worth of a company with preferred shares outstanding, the analyst should:

1. Subtract the liquidating value of the preferred, not the par or stated value, which may be lower.
2. Subtract any cumulative dividends that are in arrears.

Some preferred shares have a variable interest rate. “Auction rate” preferred shares have interest rates that change frequently, making them attractive to buyers seeking “money-market”-type investments.33 From an analytical perspective, these preferred shares function as

32 These bonds have a fixed interest rate of 7.55%, protecting Disney against future interest rate increases. As the bonds are not callable until 2023, the buyers were protected against lower interest rates for 30 years.
33 For U.S. corporate buyers, preferred dividends are 70% tax-free when ownership is below 20%, making these issues more attractive on an after-tax basis than many other short-term investments. The exclusion is 80% for ownership of 20% but below 80%. 
short-term liabilities and should be treated as such. They are often called when market conditions change, making them a less permanent source of funds.

Preferred shares are almost always callable by the issuer. Many issues are, however, redeemable by the preferred shareholder, often over a period of years.34 Because of these "sinking fund" provisions, redeemable preferreds should be treated as debt for analysis; they should be included as debt in solvency ratios, and dividend payments should be treated as interest. The FASB has issued an exposure draft (see Box 10-2) that would require redeemable preferred shares to be reported as debt, and the "dividends" on such shares included in interest expense, as required by IAS 32 (2000).

Consistent with this view, the SEC requires that redeemable preferred shares be excluded from stockholders’ equity. However, at the same time, the SEC does not require their classification as debt. The argument against debt classification is that, ultimately, firms cannot be forced to pay the dividends or redeem the preferred shares. Unlike creditors, preferred shareholders do not have the power to force the firm into bankruptcy for noncompliance with the terms of the agreement.35 Often, when dividends are in arrears, they do gain representation on the board of directors.

The ambiguity as to whether these shares are debt or equity was shown in two studies by Kimmell and Warfield (1993, 1995). They found that only 60% of redeemable preferred shares are actually redeemed; the other 40% are eventually converted to common shares, arguing against treating these hybrids as debt. Furthermore, as a firm’s systematic risk (its beta) is related to a firm’s debt-to-equity ratio (as discussed in Chapter 18), they tested whether the relationship had a better “fit” with the redeemables treated as debt or equity. They found that they did not fit into either category unless the redeemables had voting rights and were convertible. Only when these attributes were present did the securities exhibit equity-like qualities. Thus, on average, one cannot generalize as to the nature of these hybrid securities.

The line between debt and equity has become increasingly blurred in recent years. Companies prefer to issue securities that minimize the after-tax cost of financing yet provide maximum flexibility.36 Some issues are designated preferreds but are really debt; others are called debt but are functionally equity. Although help from accounting standards setters is on the way, analysts must evaluate such instruments on a case-by-case basis and decide whether to treat them as debt or equity.

Effects of Changes in Interest Rates

Debt reported on the balance sheet is equal to the present value of future cash payments discounted at the market rate on the date of issuance. Increases (decreases) in the current market rate decrease (increase) the market value of the debt. A company that issues fixed-rate debt prior to an increase (decrease) in market rates experiences an economic gain (loss) as a result of the rate change. This economic gain or loss is not reflected in either the income statement or balance sheet.

For some analytical purposes, however, the market value of a company’s debt may be more relevant than its book value. It better reflects the firm’s economic position and is as important as the current market values of a firm’s assets. Analysis of a firm’s absolute and relative level of debt and borrowing capacity should be based on current market conditions. Consider two firms reporting the same book value of debt. One firm issued the debt

---

34These provisions provide preferred shareholders with a guaranteed future value for the shares.
35In many states, a firm cannot pay dividends or redeem shares if such payments will jeopardize the company’s survival.
36Thus Preferred Securities (TPSs) are an example of such securities. For tax purposes, they are treated as debt. While they cannot be classified as equity, they are not reported as debt but rather as preferred shares or minority interest. Similarly, "dividend" payments are reported as preferred dividends or minority interest. Frischmann, Kimmell, and Warfield (1999) refer to TPSs as the "Holy Grail" of financial instruments and report that, since their introduction in 1993, they have become the primary mode of new issues of preferred shares.
when interest rates were low; the other at higher current interest rates. Debt-to-equity ratios based on book values may be the same. However, the firm that issued the bonds at the lower interest rate has higher borrowing capacity as the economic value of its debt is lower.\textsuperscript{37} Ratios calculated using the market value of debt would reflect the stronger solvency position.

Furthermore, in valuation models that deduct the value of debt from the value of the firm (or of its assets), that debt should be measured at market value rather than book value.\textsuperscript{38} Firms that issued debt at lower rates are relatively better off when interest rates increase, and this advantage should increase the equity value of the firm.

In the United States, SFAS 107, Disclosures about Fair Value of Financial Instruments, requires that firms report the fair value of outstanding debt. IAS 32 (1998) has similar requirements. Box 10-3 restates the debt of Westvaco from book to market value. This exercise is useful for several reasons.

First, financial statement disclosures are based on year-end (or quarter) prices. When interest rates have changed significantly since the last report date, the analyst may need to re-calculate the market value of the firm’s debt. Second, most non-U.S. firms, and firms in the United States that are not subject to FASB disclosure requirements, do not provide market value disclosures; analysts must know how to estimate the market value of debt for such firms. Finally, market valuation requires assumptions and (especially for firms with complex financial instruments) often there are competing valuation methods. In some cases, analysts may want to perform their own market value calculations. To do so, they must disaggregate management’s aggregate fair value disclosure; this requires an understanding of how market values are estimated.

\textbf{Example: Westvaco}

The book value of Westvaco’s long-term debt was $1,477 million at October 31, 1999; its market value was $1,494 million, or 1\% higher. The October 31, 1998 book value was $1,557 million, its market value was $1,636 million, or 5\% higher. Thus, during the 1999 fiscal year, market value relative to book value declined 4\%. This decline reflected the rise in interest rates (see Box 10-3), which reduced the fair value. The decline reflects the structure of Westvaco’s debt, which is mostly fixed-rate debt with long maturities.

The Westvaco example above is not unique. The market value of the long-term debt of Mead [MEA] was 6.6\% higher than book value at December 31, 1998 (Mead was on a calendar year). One year later, the market value was 2.9\% below the book value; during calendar 1999, therefore, market value relative to book value declined by 9.5\% as interest rates rose.

Mead, which merged with Westvaco early in 2002, had a similar debt structure, mostly fixed rate debt with long maturities.

These factors (confirmed by empirical results discussed in Box 10-4) suggest the conditions to be considered before deciding whether the restatement of debt to market value is a useful exercise. All of the following factors should be considered.

\textit{Debt: Market or Book Value?}

Given the effort and assumptions required to estimate market values when they are not provided, we now turn to a discussion of the factors that determine whether the adjustment from book value to market value is a useful exercise. Empirical results with respect to these factors are discussed in Box 10-4.

\textsuperscript{37}Theoretically, it could refinance its current debt at the same interest rate as the other firm, lowering the book value of debt.

\textsuperscript{38}Similarly (as discussed in Chapter 19), in discounted cash flow valuation analysis, the calculation of a firm’s (weighted-average) cost of capital is based on market rather than book values of debt (and equity).
BOX 10-3
Estimating the Market Value of Debt

In many cases, the replacement of book value with market value is simple. For publicly traded debt, market values are readily available. If the debt is not publicly traded, its present value can be calculated by applying the current market rate to the original debt terms. The maturity, coupon rate, and other terms of long-term debt are generally disclosed for each debt security issued.

The appropriate current market rate can be obtained from:

1. Other publicly traded debt of the company having approximately the same maturity; estimate the rate used by the market to discount that debt.
2. Publicly traded debt of equivalent companies in the same industry; estimate the rate used to discount that debt.
3. Estimating the risk premium over the rate on government debt of the same maturity. The risk premium depends on the bond-rating “risk” class of the company's bonds.

Calculating the Market Value of Debt

Footnote J in Westvaco's financial statements shows notes payable and long-term obligations at October 31, 1999. The company reports the fair value as required by SFAS 107. The book and fair values for the three years ended October 31, 2000 are (in Thousands):

<table>
<thead>
<tr>
<th>October 31</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book value</td>
<td>$1,557,677</td>
<td>$1,477,162</td>
<td>$2,716,772</td>
</tr>
<tr>
<td>Fair value</td>
<td>1,636,093</td>
<td>1,494,299</td>
<td>2,627,696</td>
</tr>
<tr>
<td>Difference</td>
<td>$ 78,416</td>
<td>$17,128</td>
<td>$(89,076)</td>
</tr>
</tbody>
</table>


The maturities, coupon rates, and carrying amounts for most obligations are listed in footnote J. Some obligations are publicly traded while others are not.

As Westvaco discloses the fair (market) value of its debt, we forgo the laborious task of calculating the estimated market value for each issue. The following comments are intended as a guide for use when such calculations are required.

Most of Westvaco's debt at October 31, 1999 consists of fixed-rate long-term debentures, some of which have sinking funds. Because the rate is fixed and the duration is long, the fair value of these bonds fluctuates with interest rates.

Example:

In 1999 Westvaco, which was A rated, issued $100 million of 9.75% bonds due June 15, 2020. At the issue date, the yield was 130 basis points (1.3%) above the yield on the U.S. Treasury 8.75% bonds due in May 2020. The price and yield to maturity of the U.S. Treasury 8.75% issue at October 31, 1998–2001 was reported by Bloomberg as follows:

<table>
<thead>
<tr>
<th>October 31</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>142-11*</td>
<td>124-30</td>
<td>131-4</td>
<td>145-11</td>
</tr>
<tr>
<td>Yield-to-maturity</td>
<td>5.40%</td>
<td>6.55%</td>
<td>6.02%</td>
<td>4.98%</td>
</tr>
</tbody>
</table>

*US government securities with maturities longer than one year are quoted as a % of face value in 32nds. Thus 142-11 means 142 11/32% of face value or $1,423.44 per $1,000 bond.

Source: Price and yield data from Bloomberg.

Estimation of the fair value of the Westvaco 9 1/4% bonds requires an estimate of the spread over the U.S. Treasury bond. That spread is a function of the rating of the corporate issuer (Westvaco) and the spread between bonds of different ratings classes. Bond quality spreads are variable over time, tending to compress when the economy is strong (and concerns about credit quality are low) and to widen when economic conditions weaken.

Westvaco was A rated by Standard & Poor's at October 31, 1997 and A rated at October 31, 1998. Standard & Poor's data show little change in quality spreads in 1998 and 1999. Thus, our calculations assume that the Westvaco bonds had a yield to maturity of 130 basis points for both years.

Extending this analysis to 2000 and 2001, we find two changes:

1. Westvaco's S&P rating was reduced from A- to BB+ in May 2000 and further reduced to BBD in June 2001. These rating reductions reflected Westvaco's higher leverage.
2. Quality spreads started to widen in 2000 and 2001 as concerns grew about the economic outlook and the possible effect of recession on corporate credit quality. The September 11, 2001 terrorist attacks accelerated this trend.

Thus our estimated yield spread for the Westvaco bonds is 180 basis points at October 31, 2000 and 220 basis points at October 31, 2001.

The following table shows the results of these assumptions and the calculated fair value of the Westvaco bonds. These fair value estimates differ from the actual market value reported in Bloomberg by less than 2% each year.

*Sources include rating service publications (such as Standard & Poor's Bond Guide), newspapers, and electronic quotation services.

The book value does not match the total of current and noncurrent obligations in footnote J. The company has apparently excluded some long-term obligations that it considers not to be financial instruments.

Throughout this box, yield means yield-to-maturity.

See Chapter 18 for discussion of bond ratings.
<table>
<thead>
<tr>
<th>October 31</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield on U.S. 8.75% bond</td>
<td>5.40%</td>
<td>6.53%</td>
<td>6.02%</td>
<td>4.98%</td>
</tr>
<tr>
<td>Assumed spread</td>
<td>1.30%</td>
<td>1.50%</td>
<td>1.80%</td>
<td>2.20%</td>
</tr>
<tr>
<td><strong>Assumed yield on Westvaco 9.75% bond</strong></td>
<td>6.70%</td>
<td>7.83%</td>
<td>7.82%</td>
<td>7.18%</td>
</tr>
<tr>
<td>Calculated value of Westvaco bond</td>
<td>$1,344.85</td>
<td>$1,194.43</td>
<td>$1,191.50</td>
<td>$1,260.38</td>
</tr>
<tr>
<td>Bloomberg value of Westvaco bond</td>
<td>1,369.80</td>
<td>1,217.40</td>
<td>1,169.30</td>
<td>1,245.60</td>
</tr>
<tr>
<td>Difference</td>
<td>-1.8%</td>
<td>-1.9%</td>
<td>1.9%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

*Source: Price and yield data from Bloomberg.*

### Complexities in Market Value Estimation

Because of the conventional nature of Westvaco’s debt, the calculation of its market value is straightforward. Westvaco’s debt is virtually all fixed rate and dollar denominated. Simple debt structures, however, are becoming the exception rather than the rule for large companies, given globalization and the increased sophistication of financial markets.

Some complexities make the calculation of market values almost impossible as the requisite information is lacking. A few of the complexities summarized below have been discussed earlier, others will be addressed in later sections of this text, and some remain beyond the scope of our book.

### Convertible Bonds

Market prices are readily available for most convertible debt issues. However, these prices incorporate both the debt and equity features of the security. Only the debt component of the market value should be included as part of debt.

### Variable-Rate Debt

Variable-rate debt usually requires no market value adjustment. Because of the continuous adjustment of the interest rate on the debt, market value approximates book value.

### Debt Denominated in a Foreign Currency

For debt denominated in a foreign currency, the present value calculations should be based on current interest rates for the currency in which the debt is denominated.

---

**Hedges and Derivatives**

Firms can protect themselves against changes in interest rates and/or currency exchange rates using instruments such as options or forward contracts (including swap agreements). We defer a discussion of the accounting treatment and economic impact of these instruments on the value of a firm’s debt, for the most part, to Chapter 16. In this chapter we confine ourselves to a discussion of interest rate swaps.

As previously discussed, the original debt instrument with its original parameters remains in effect and is reported in the firm’s financial statements; if publicly traded, market prices are available. However, the estimated market value of the underlying debt instrument must reflect any interest rate swap.

When fixed-rate debt has been converted to floating-rate debt with an interest rate swap covering its full term, no adjustment to market value is required. If a swap does not cover the full term of fixed-rate debt, changes in interest rates after the end of the swap term will affect market values. Thus, it is important to discern the terms of any swaps by careful reading of footnotes.

When a swap converts floating-rate debt to fixed-rate debt, however, the market value is exposed to changes in interest rates. Even though the market value of the original obligation does not change, the fair value of the effective (because of the swap) obligation does and should be calculated.

---

**Debt Maturities.** The effect of interest rate changes on the market value of debt increases with the maturity of the debt. If a firm’s debt is mostly short-term, changes in interest rates will not appreciably affect its market value.\(^{39}\)

**Interest Rates on Debt.** For adjustable-rate debt, whose interest rate varies with the market rate of interest, book value approximates market value and no adjustment is required. On the other hand, the market value of fixed-rate debt issues does change with interest rates. This is especially true of zero-coupon and other discount debt, due to their longer duration relative to debt of the same maturity issued at par.

\(^{39}\)This, even if its long-term debt is adjusted by 10%, total debt will only be affected by 10% times the percentage of long-term debt. The lower the percentage of long-term debt, the smaller the overall adjustment.
BOX 10-4
Market or Book Values: Empirical Evidence

Bowman (1980) examined the relationship between firms’ market betas and the debt-to-equity ratio. Finance theory predicts (see Chapter 18) that the higher a firm’s debt-to-equity ratio (using market values), the higher the firm’s beta.

Letting the superscripts M and B refer to the market and book value, respectively, Bowman examined which of the following four measures of the debt-to-equity ratio, $D^M/E^M$, $D^B/E^B$, $D^M/E^B$, and $D^B/E^M$, were more closely associated with the firm’s beta.

Bowman obtained the best results when he used the market value of equity in the denominator. Whether debt was measured on a market basis or book basis made little difference as the ratios $D^M/E^M$ and $D^B/E^M$ yielded similar results. The pure book value ratio $D^B/E^B$ did not perform as well; the measure of the market value of the debt-to-book value of equity ($D^B/E^B$) performed the poorest.

These results can be partly attributable to the fact that for close to 60% of the debt in Bowman’s sample, book value and market value were equivalent. Furthermore, the correlation between the market value of debt and the book value of debt was close to 100%. As the study ranked debtors by relative rather than absolute levels of debt, changes in the market rates of interest shifted debt valuations without changing ranks.

Mulford (1986) replicated Bowman’s study by using a later time period. Bowman’s analysis was based on 1973 data, predating the dramatic rise in market interest rates of the late 1970s. Mulford, referring to Bowman’s study, noted:

His failure to find evidence of superior performance for a debt-to-equity ratio based on market values of debt may have been due to small differences between the book and market values of debt which accompanied the general level of interest rates at that time.∗

To remedy this deficiency, Mulford focused on 1980, when market rates of interest were historically high. In addition, to alleviate potential measurement problems arising from the conversion of book to market values, he examined the performance of portfolios of firms in addition to individual firms. Mulford’s results were more in line with theory, but only on a portfolio basis. No matter which variation was used to measure the relationship between beta and debt-to-equity, the market-based debt-to-equity ratio was always the most closely associated with beta on a portfolio basis. On an individual basis, $D^B/E^M$ did not always perform as well, but the differences between it and the best performing ratio were minimal.

These results suggest, not surprisingly, that the market value of debt is not superior to book value when the difference between the stated and market rates of interest is small; the additional cost of obtaining market values is not worthwhile.∗ Adjustment is necessary only when the gap between the historic and market rates of interest is large. Even then, potential measurement problems∗ in estimating market values may offset any benefits from the adjustment process.


∗Given the high correlation between market and book values of debt, this is especially true for analyses that focus on relative rather than absolute debt burdens.

∗The issue of a measurement problem also calls into question the results of both Bowman and Mulford from a different perspective. They adjusted only on-balance-sheet debt, ignoring any “off-balance-sheet” debt. As Chapter 11 will make clear, the latter can be significant.

When a firm has swapped its fixed debt for floating-rate debt, there should be no adjustment, as the value of that debt is no longer exposed to interest rate changes. Conversely, when a firm swaps variable rates for fixed rates, the market value of that portion of its debt will vary with interest rates and adjustment is required.

Changes in Market Interest Rates. The adjustment to market value depends on changes in the market rate of interest. As long as there is no long-term trend, fluctuations in market value tend to offset, leaving the difference between book and market values small. However, when rates rise or fall greatly over several years, the differences between book and market value can be significant.

Embedded Interest Rate. Westvaco issued debt at various times and its (weighted) average outstanding coupon rate (embedded rate) was approximately 8.39%,* within the range of interest rates over the late 1990s. The adjustment from book value does not depend

\[ \frac{\$132,428}{(\$1,552,777 + \$1,605,415) / 2} = 8.39\% \]

*Calculated as interest incurred (from Westvaco footnote F) divided by the average debt level. For 1999, the calculation is
on the change in interest rates itself, but rate changes relative to the embedded rate. As interest rates were below the embedded rate for both 1998 and 1999, the fair value exceeds book value.

Unless there are limits on the firm’s ability to refinance (noncallable debt or deterioration in credit quality), the embedded rate should decline (with some lag) as interest rates fall. The reverse is not true: firms with long-term fixed-rate debt can enjoy low interest costs for many years even though interest rates in general have risen.

Debt of Firms in Distress

When the credit quality of a firm changes significantly (in either direction), the market price of debt will follow, independent of interest rate trends. When credit quality and the market value of debt decline, there appears to be a gain to the firm, yet it is difficult to argue that shareholders are better off. This apparent paradox reflects simultaneous changes in the value of assets as credit quality changes. It is reasonable to assume that some assets of such troubled companies are impaired (see the discussion in Chapter 8). Case 10-1 discusses the convertible debt of Read-Rite, a troubled debtor, the exchange of that debt for a new debt issue, and the ultimate conversion of that new issue into equity.

Accounting for Restructured and Impaired Debt

When a debtor is in financial difficulty, creditors may agree to accept assets in payment of the debt or to "restructure" the obligation by modifying its terms (e.g., reducing the interest rate or deferring principal payments). When debt is extinguished, both the debtor and creditor will recognize gain or loss measured as the difference between the fair value of the assets (cash or other assets) used to repay the debt and its carrying amount. This accounting treatment raises neither accounting nor analysis issues.

When the obligation is restructured, however, different accounting rules apply to creditors and debtors. Creditors adhere to SFAS 114 (1993), as amended by SFAS 118 (1994), whereas debtors use SFAS 15 (1977) to account for these transactions.

Under SFAS 114, the creditor must recognize a loss equal to the difference between the carrying value of the loan and the present value of the restructured payment stream discounted at the original discount rate (effective interest rate). Thus, if a 12% coupon loan with a face value of $100,000 and three years remaining to maturity is restructured by reducing the interest rate to 8%, the creditor recognizes a loss of $9,610 as the new carrying value of the loan is $90,390.41 The loan impairment may also be measured using the observable market price of the loan or the fair value of collateral when the loan is collateral dependent.42

The FASB was reluctant, however, to allow debtors to record gains resulting from financial distress. SFAS 15 provides that the debtor’s carrying amount of the debt be compared with the undiscouted gross cash flows (principal and interest) due after restructuring. As long as the gross cash flows exceed the carrying amount, the debtor recognizes no gain. In our example, the future payments are $(100,000 + 3 \times 8,000) = $124,000. No gain is recognized.43

However, the present value of the cash flows has been reduced; in economic terms, the debtor has gained at the expense of the creditor. The accounting mandated by SFAS 15 recognizes this transfer only over the life of the loan as payments are made; the debtor

41If we assume annual payments, the present value of a three-year annuity of $8,000 discounted at 12% present value of $100,000 in three years discounted at 12% equals $90,390.
42SFAS 118 amended SFAS 114 to allow creditors to continue income-recognitation methods for impaired loans that had been used prior to the adoption of SFAS 114. For example, cost-recovery or cash-basis methods report investments in impaired loans at less than the present value of expected future cash flows. In these cases, no additional impairment needs to be recognized under SFAS 118. SFAS 114 was also amended to require additional disclosures regarding the investment in certain impaired loans and the recognition of interest income on those loans.
43If the payments do not exceed the carrying value, then the gain is limited to the difference between those amounts; the debt is discounted at an implicit interest rate of zero.
will show lower interest expense as the loan is amortized at the implicit interest rate of
the loan. In our example, interest expense is now calculated at an interest rate of 8% rather than 12%.

A similar approach is mandated by the FASB for loans considered to be "impaired." Creditors are required to recognize the probable loss, but recognition of gains by debtors is not allowed. Under SFAS 114, creditors are required to carry impaired loans at the present
value of cash flows expected after modification of the loan terms, discounted at the original
effective interest rate. For the debtor, however, no gain recognition is permitted.

For purposes of analysis, however, both impaired and restructured debt should be re-
statement of fair market value using a current market interest rate to discount the cash flows re-
quired by the (actual or expected) restructured obligation. However, as noted earlier, debtor "gains" should be viewed warily; gains resulting from an inability to repay loans are almost certainly offset by asset impairment.

Retirement of Debt Prior to Maturity

Firms generally choose the initial debt maturity of their obligations based on such consider-
ations as cost and investment horizon (when projects funded with debt are expected to gen-
erate cash flows). Subsequently, conditions may change and a firm may wish to refinance or reti-
re debt prior to the original maturity. Examples include:

- Declining interest rates permit the reduction of interest cost.
- Increasing cash from operations permits debt retirement earlier than expected.
- Sale of assets or additional equity generates funds and the firm decides to reduce fi-
nancial leverage.

In such cases, the firm can reduce bank debt, commercial paper, and other short-term debt quickly and at small expense. For longer-maturity debt, the firm may exercise call provi-
sions, tender offers, or in-substance defeasance. We examine the economic and accounting
effects of these choices shortly.

Accounting for Debt Retirement

When firms retire debt prior to maturity, the gain or loss (difference between the book value of
the liability and the amount paid at retirement) is treated as a component of continuing
operations. 46

Using the par bond example in Exhibit 10-1A (see p. 326), assume that on December 31,
2001, the market interest rate for the firm is 12%. As a result, the market price of the bonds
should be $96,535. 48 If the firm paid $96,535 to retire the bond, the resulting gain on the
bond retirement is $3,465 since the book value is $100,000. 46 While this gain must be in-
cluded in income from continuing operations, there are two reasons why an analyst should
consider treating it as a nonoperating item:

- In reality, the firm is no better off as a result of the refinancing. To finance the retirement
  of the bond, it must issue new debt 47 bearing at least the same effective interest rate (and
  must incur transaction costs). Effectively, over the remaining life of the original bond,
  the net borrowing cost would be identical; the company has simply replaced 10%

46SFAS 145 (2002) rescinded both SFAS 4 (1975), which mandated extraordinary item treatment for these gains and
losses, and SFAS 64 (1982), which provided an exemption from extraordinary item reporting for gains and losses on
normal sinking fund repurchases. Under SFAS 145, gains and losses on retirement of debt are reported as extraor-
dinary items only if they meet APB 30 criteria (see page 54 of text).
47This can be seen from Exhibit 10-1C as the carrying amount of the discount bond is the present value at the (origi-
nal) 12% interest rate.
48We have ignored unamortized debt issuance costs. When bonds are retired, the firm must write off these costs that
were capitalized when the bonds were issued. This write-off becomes a component of the gain or loss on retirement.
49Even if it did not issue new debt to retire the bond but rather used internal funds, the firm would experience an op-
portunity cost equal to the forgone interest revenue.
coupon debt with 12% coupon debt. In economic terms, the gain took place as interest rates rose, not when the refinancing took place. Because of the use of historical cost as a measure of the bond liability, however, only refinancing results in a recognized gain.48

- The decision to refinance is a function of the change in market interest rates. The analyst should evaluate the transaction to determine whether the gain or loss should be considered as part of normal operations or treated analytically as an extraordinary item.

In the early 1970s, interest rates rose sharply at the same time the U.S. economy entered recession. Firms found their outstanding low-coupon bonds selling at deep discounts. Many of these firms had poor operating profitability, but were able to increase reported income by retiring bonds. The issuance of SFAS 4 in 1975 was partially a response to this income manipulation activity.

In the late 1990s, lower interest rates resulted in the refinancing of higher coupon debt, resulting in a recognized loss. That loss should be viewed, however, as a signal of lower future interest expense, as high-coupon debt is replaced by lower-coupon debt (also see the following discussion of callable bonds).

- Example: DaimlerChrysler

In 1990, predecessor Chrysler had issued $1.1 billion of 12% debt, due in 2020. The high interest rate was due to the higher level of interest rates and Chrysler’s poor debt rating. As a result of lower interest rates and improved financial condition, the bonds sold at a large premium in the late 1990s. Late in 1996, Chrysler repurchased half of the issue, recording an extraordinary pretax loss of $309 million. In 1998, DaimlerChrysler repurchased an additional $300 million of the bonds, recording an extraordinary pretax loss of $230 million ($203 million). The company replaced this high-cost debt with lower coupon debt, reducing interest expense significantly. The combined effect of the extraordinary loss from debt retirement (decreasing equity) and reduced future interest expense (increasing earnings) is a higher reported future return on equity.

- Our discussion of discretionary debt retirements indicates that the amounts and timing of the accounting gain and the economic gain from debt retirement are quite different. This especially applies to callable bonds, whose retirement may give rise to economic profit but may generate a loss for accounting purposes.

Callable Bonds

When a bond is callable, the issuer has the option to buy back (call) the bond from bondholders at predetermined dates and prices. This differs from the case in which the issuer retires the old bond at a market price equal to the present value of the future payment stream. The call price is usually set at a premium over the face value of the bond, but is independent of the present value of the payment stream at the time the call is made. However, the actual exercise does depend on the relationship of the call price to that present value.

Exhibit 10-6 contains an analysis of a callable bond. The decline in interest rates constitutes an economic loss at the time of the rate change, as the market value of the bond rises. In the absence of the call provision, a decision to refinance would not impact Cole, which would incur new debt equal to $106,624 to refinance the debt at market rates. However, the call provision permits the firm to retire the bonds for only $102,000; the economic gain is the difference.49

---

48If the gain or loss is recognized at all, it should be in the period in which interest rates change, not in the year in which the refinancing takes place. In our example, the year is the same, but that coincidence is rare in practice.

49When bonds are issued, the call provisions are often an important ingredient in the market reception. As call provisions benefit only the issuer, bond buyers will bargain against them. Option-adjusted bond analysis is now routine. See, for example, Frank J. Fabozzi, Fixed Income Analysis for the Chartered Financial Analyst Program, New Hope, Pennsylvania; Frank J. Fabozzi Associates, 2006 (pp. 347ff). Many shorter-term issues are noncallable.
EXHIBIT 10-6
Analysis of Callable Bond

On January 1, 2001, Cole issues the following bond:

- Face value: $100,000
- Coupon: 10% (annual payments assumed for simplicity)
- Maturity: 5 years
- Call provision: Callable at any time after one year at 102

If the market interest rate applicable to Cole is 10%, then the bonds will be issued at par.

\[
\text{Reported Liability} = \text{\$100,000} \\
\text{Annual Interest Expense} = \text{\$10,000} (10\% \times \text{\$100,000})
\]

Assume that, on December 31, 2001, the market rate applicable to Cole has declined to 8%. The rate change has no accounting impact on the company. However, the present value of the cash flows associated with the debt rises to $106,624 (discounted at 8%). Absent the call provision, the expected market price of the bonds is 106.624.

By calling the bonds at a price of 102, Cole realizes an economic gain of $4,624 \(\left(\frac{106,624 - 102}{100,000}\right)\).

However, the call results in an accounting loss of $2,000 \(\left(\frac{100 - 102}{100,000}\right)\).

Economically, it is beneficial to refinance the debt, but the income statement reports a loss. One can only speculate as to how many firms have not refinanced under such conditions because of the financial statement impact. This is yet another reason why analysis should ignore gains and losses from the retirement of debt.

Defeasance

In some cases, the firm wishes to retire debt but is unable to do so because the debt is non-callable. In-substance defeasance involves setting aside riskless securities sufficient to pay all remaining installments of principal and interest. The cash flow characteristics of the securities used must match those of the debt being defeased and must be placed in a trust fund restricted for that purpose.

Although the original debt remained outstanding, U.S. GAAP permitted debtor firms to derecognize the defeased obligations through December 31, 1996. However, SFAS 125 (1996) disallows in-substance defeasance and debt may be extinguished only on repayment or when the debtor is legally released from being the primary obligor. IAS 32 (2000) disallowed defeasance for firms following IAS GAAP.

BOND COVENANTS

Creditors use debt covenants in lending agreements to protect their interests by restricting activities of the debtor that could jeopardize the creditor’s position. Auditors and management must certify that the firm has not violated the covenants. If any covenant is violated, the firm is in technical default of its lending agreement, and the creditor can demand repayment of the debt after the stated grace period. Generally, however, as we shall see, the terms are renegotiated but at a cost to the debtor as the lender demands concessions. The analysis of a firm’s debt position must therefore take into consideration the nature of these covenants and the risk that the firm may violate them.

Information on debt covenants is important both to evaluate the firm’s credit risk as well as to understand the implications of such restrictions for the firm’s dividend and growth (in-
investment) prospects. In addition, to the extent these covenants are accounting-based, they may affect the choice of accounting policies.

Nature of Covenants

Smith and Warner (1979) characterize debt covenants as placing limits on one or more of the following activities:

1. Payment of dividends (includes share repurchases)
2. Production and investment (includes mergers and acquisitions, sale and leaseback, or outright disposal of certain assets)
3. Issuance of new debt (or incurrence of other liabilities)
4. Payoff patterns (includes sinking fund requirements and the priorities of claims on assets)

In addition to direct restrictions on activities, covenants may require maintenance of certain levels of such accounting-based financial variables as stockholders' equity (or retained earnings), working capital, interest coverage, and debt-to-equity ratios. These levels are often related to the four types of activities listed above by restricting a certain activity if the accounting variable violates the specified target level. In some cases, the violation itself may signal a breach of the covenant even without any subsequent firm activity.

Bond covenants may also require that interest rates depend on certain financial ratios.

Example: Luby's

Based in Texas, Luby's [LUB] operates cafeterias. It entered into a credit agreement with a group of banks early in 1996. That agreement was subsequently amended four times:

1. January 24, 1997
2. July 3, 1997
3. October 27, 2000
4. June 29, 2001

The second and third amendments are of particular interest. The second amendment increased the credit line from $100 million to $125 million but added the following provision with respect to the spread over the LIBOR rate ("applicable margin"):

*Applicable margin* means the following per-annum percentages, applicable in the following situations:

<table>
<thead>
<tr>
<th>Applicability If the leverage is:</th>
<th>LIBOR Basis for Advances of One, Two, Three, or Six Months</th>
<th>LIBOR Basis for Advances of Seven to Fourteen Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>not less than 2 to 1</td>
<td>0.225</td>
<td>0.325</td>
</tr>
<tr>
<td>less than 2 to 1</td>
<td>0.200</td>
<td>0.300</td>
</tr>
<tr>
<td>Difference</td>
<td>0.025</td>
<td>0.025</td>
</tr>
</tbody>
</table>

This provision gives the lender an additional margin over LIBOR of 2.5 basis points (.025%) if the leverage ratio (debt-to-equity ratio as defined in the original credit agreement) exceeds 2.0. This additional margin was presumably intended to compensate the lender for the additional risk.

The third amendment, adopted when Luby's earnings had fallen sharply, changed the applicable margin as follows:
This amendment increased the lending spread to reflect the higher leverage ratio, and provided a sliding scale under which the spread increases and decreases with the leverage ratio (a measure of risk).

Additionally, as detailed in Exhibit 10-7, the third amendment introduced a covenant based on the fixed-charge coverage ratio as well as imposing restrictions on net worth (stockholders' equity) and the leverage ratio. Note the extent to which the ratios as well as their components are defined by the agreement.

These provisions had several effects:

1. To restrict the ability of Luby's to incur additional debt that would dilute the interest of the creditors.
2. To require Luby's to maintain stockholders' equity, limiting its ability to pay dividends (it eliminated its dividend in October 2000) or buy back stock, either of which would reduce cash and the equity cushion.
3. To reward creditors for the level of risk by increasing the interest rate margin as the leverage ratio increases.

Luby's provides an example of bond covenants. Additional discussion regarding the nature of accounting-based debt covenants can be found in Box 10-5.

EXHIBIT 10-7
Excerpts from Luby's Bond Covenants

<table>
<thead>
<tr>
<th>Fixed Charge Coverage Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Earnings Available for Fixed Charges&quot; means, for any period, calculated for the Borrower and its Subsidiaries on a consolidated basis in accordance with GAAP, the sum of (a) EBITDA, plus (b) all lease and rental expense pursuant to Operating Leases, minus (c) cash taxes paid, minus (d) Capital Expenditures.</td>
</tr>
</tbody>
</table>

| "Fixed Charges Coverage Ratio" means, for any date of determination, the ratio of (a) Earnings Available for Fixed Charges for the period of four consecutive fiscal quarters ending on such date to (b) Fixed Charges for the period of four consecutive fiscal quarters ending on such date. |

The Borrower covenants and agrees that it will not allow the Fixed Charges Coverage Ratio to be less than 1.20 to 1 at the fiscal quarter ending November 30, 2000 or at the end of any fiscal quarter thereafter.

Net Worth Provision

The Borrower covenants and agrees that it will not allow its Net Worth at any time to be less than the sum of (i) $150,000,000 plus (ii) 50% of Consolidated Net Income (excluding Consolidated Net Income for any fiscal quarter in which Consolidated Net Income was a negative number) earned on or after September 1, 2000, plus (iii) 75% of the Net Cash Proceeds of any equity issues of the Borrower's Capital Stock in an underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, after September 1, 2000.

Leverage Ratio Provision

The Borrower covenants and agrees that it will not allow the Leverage Ratio to be greater than (a) 3.00 to 1 at the fiscal quarters ending November 30, 2000, February 28, 2001 and May 31, 2001, (b) 2.60 to 1 at the fiscal quarter ending August 31, 2001 and (c) 2.50 to 1 at the fiscal quarter ending November 30, 2001 and each fiscal quarter thereafter.

BOX 10-5
Accounting-Based Debt Covenants

Exhibit 10-8 contains a summary of the nature of accounting-based debt covenant restrictions, adapted from Duke and Hunt (1990). Restricted retained earnings as a constraint on dividend payments, one of the most common forms used, is outlined in Exhibit 10-9. The Luby's covenants discussed in the text are examples of these restrictions.

Information regarding these covenants was obtained by Smith and Warner (1979) and Duke and Hunt (1990) from the American Bar Foundation's Commentaries on Debentures, which summarizes typical covenants found in lending agreements. A cursory examination of these restrictions makes it clear that creditors seek to limit the firm's ability to transfer assets to themselves (dividend restrictions), new shareholders (merger and acquisition restrictions), or new creditors (debt restrictions).

The best source of information on specific covenants (and other terms of the bond issue) for publicly issued bonds is the bond indenture, the legal document created when the bond is issued and filed with the registration statement filed with the SEC. The trustee (normally a bank) will have a copy of the indenture and is responsible for the enforcement of its terms. The bond prospectus should contain a good summary of these terms. Bank credit agreements entered into by public companies are filed with SEC annual (10-K) or quarterly (10-Q) reports.

For all debt issues, summarized data can be found in:

- Services such as Moody's Industrial Manual
- Annual reports
- SEC filings by debtors

Press and Weintrop (1990 and 1991) contend that information obtained from annual reports and Moody's is not comprehensive, especially with respect to covenants relating to privately placed debt, and that in these cases, it is necessary to access the original SEC filings.

**Calculation of Accounting-Based Constraints**

Each type of constraint is defined in the covenants. In addition, the covenants specify:

- Whether GAAP definitions are to be used or GAAP is to be modified. Leftwich (1983) noted that such modifications are most often associated with private rather than public debt indentures.
- Whether GAAP in effect at the time of the debt issuance are maintained throughout the life of the bond ("frozen" GAAP), or calculations in subsequent years are to be based on GAAP in effect at the date of the calculation ("rolling" GAAP). This is important when important new GAAP standards are adopted.

Mohrman (1996) examined a sample of 174 lending agreements that contained covenants based on financial statement information. She found that over half (90) the covenants were based on fixed GAAP specified in the agreements. That is, the covenants were not affected by voluntary or FASB-mandated accounting changes, nor were they originally designed to mimic GAAP in effect at the time the contract was signed. Additionally, she found that contracts that contained more accounting-based covenants were more likely to specify fixed GAAP provisions and the use of such provisions in contracts was increasing over time.

<table>
<thead>
<tr>
<th>Attribute:</th>
<th>Retained earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured as:</td>
<td>Restricted retained earnings</td>
</tr>
<tr>
<td>Limits:</td>
<td>Payments of dividends or stock repurchase below minimum level of restricted retained earnings</td>
</tr>
<tr>
<td>Attribute:</td>
<td>Net assets</td>
</tr>
<tr>
<td>Measured as:</td>
<td>Net tangible assets or net assets</td>
</tr>
<tr>
<td>Limits:</td>
<td>Investments, dividend payments, and new debt issues if net assets fall below a certain level</td>
</tr>
<tr>
<td>Attribute:</td>
<td>Working capital</td>
</tr>
<tr>
<td>Measured as:</td>
<td>Minimum working capital or current ratio</td>
</tr>
<tr>
<td>Limits:</td>
<td>Mergers and acquisitions, dividend payments, and new debt issues if the working capital or the current ratio fall below a certain level</td>
</tr>
<tr>
<td>Attribute:</td>
<td>Debt-to-equity</td>
</tr>
<tr>
<td>Measured as:</td>
<td>Debt divided by net tangible assets or debt divided by net assets</td>
</tr>
<tr>
<td>Limits:</td>
<td>Issuance of additional debt</td>
</tr>
</tbody>
</table>

EXHIBIT 10-9
Unrestricted Retained Earnings: Inventory of Payable Funds

The most frequent accounting-based restriction specified is the dividend constraint. Dividends cannot be paid out of restricted retained earnings. Only unrestricted retained earnings, often referred to as the inventory of payable funds (IPF), are available for dividends. The general formulation of IPF is defined (see Smith and Warner, 1979) as the sum of:

1. A specified percentage $k$ of earnings $E_t$ from the date of the debt issuance to the present period, plus
2. Proceeds from the sale of common shares $CS_t$ from the date of the debt issuance to the present period, plus
3. A prespecified constant $F$, less
4. The sum of dividends $DV_t$ and stock repurchases from the date of the debt issuance to the present period

Algebraically, this is equal to

$$\text{IPF}_t = k \sum_{i=0}^{t} E_i + \sum_{i=0}^{t} CS_i + F - \sum_{i=0}^{t} DV_i$$

where period 0 represents the date of the debt issuance and period $t$ refers to the current date. The prespecified constant $F$ is usually set at approximately one year’s earnings.* This builds some slack into the system in the event the firm has a loss.

*See Smith and Warner (1979), Note 36.

Costs and Effects of Covenant Violations

Although creditors have a right to demand immediate payment when an accounting-based debt covenant is violated, they do not usually do so. This does not mean that violating such covenants is costless. Waivers of such violations often come with strings attached. Creditors may renegotiate the terms of the debt to demand:

- Accelerated principal payments
- An increased interest rate
- Liens on assets (such as accounts receivable)
- New covenants increasing restrictions on the firm’s investing, borrowing, and dividend-paying ability

Chen and Wei (1993) examined a sample of 128 companies that disclosed violations of their accounting-based debt covenants. For 71 of these firms, the creditors did not waive the violation but demanded accelerated payments or higher interest rates. Beneish and Press (1993) found that the median interest rate increase to be 80 basis points; they estimated that the overall cost of such renegotiations averaged from 1 to 2% of the market value of the firm’s equity or 4 to 7% of the balance on the loan.

When waivers were granted, not surprisingly, they were more often granted for secured debt and for smaller-size loans. Similarly, waivers were more likely to be granted to “healthier” firms considered less likely to become bankrupt. When waivers were granted, they were often (24 of the 57 companies) given only for a limited time period.

Successful renegotiation of the debt terms or receipt of a waiver may not be the last word. Chen and Wei found that by the following year creditors demanded payment of the debt for 39 companies (30% of the sample), forcing 13 companies into bankruptcy.

Beneish and Press found that accounting-based covenants were often relaxed as a result of renegotiation. However, they were supplemented with more direct covenants restricting capital expenditures, mergers, assets sales, stock repurchases, and future borrowings.

These results indicate the importance of monitoring debt covenants to ensure that the firm is not close to violating them. Such violations can expose the firm to higher borrowing costs and/or limit the scope of a firm’s investing and financing choices.*

*Given these costs, one can understand why DeFond and Jianzhalvo (1994) reported that managements engage in (accounting) manipulations in an effort to satisfy the covenants.

SUMMARY

In this chapter, we have examined the different forms that debt financing can take. The choice of debt issue can have significant effects on the pattern of reported income, cash flows, and financial position. In addition, different debt instruments respond differently to changes in interest rates. The reader should now have an understanding of the following issues:

1. The effects of zero-coupon or low-coupon debt, variable rate debt, and foreign currency debt on the firm’s financial statements.
2. The economic and financial statement effects of interest rate swaps.
3. The implications for financial analysis of variable-rate debt versus fixed-rate debt.
4. The economic and accounting effects of debt with equity features.
5. The analyst’s need to classify between debt and equity based on the essence of the financial instrument rather than its form.
6. The effect of changes in interest rates on the market value of debt and when the market value should be used instead of carrying value.
7. The accounting effects of debt retirement and analytical adjustments required.
8. The importance of debt covenants to the analysis of the firm.

Debt can also take forms that do not require recognition on the balance sheet. Such off-balance-sheet debt is the subject of the next chapter.

Chapter 10

Problems

1. [Zero-coupon debt; CFA® adapted] Compare the effect of issuing zero-coupon debt with that of issuing full-coupon debt with the same effective interest rate on a company’s:

   a. Cash flow from operations over the life of the debt
   b. Cash flow from financing in the year of issuance, the year of maturity, and over the life of the debt
   c. Cash flow from investing over the life of the debt
   d. Trend of net income over the life of the debt

2. [Variable- vs. fixed-rate debt; CFA® adapted] Assuming that a firm has variable-rate debt and interest rates rise, describe the effect of the rise on:
   (i) Net income
   (ii) The market value of the firm’s debt

EXHIBIT 10P-1
Selected Balance Sheet Data, December 31, 1998 and 1999 (in Smillions)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and short-term investments</td>
<td>$2,073</td>
<td>$1,791</td>
<td>$1,210</td>
<td>$870</td>
</tr>
<tr>
<td>Net receivables</td>
<td>1,543</td>
<td>1,134</td>
<td>355</td>
<td>387</td>
</tr>
<tr>
<td>Inventories</td>
<td>596</td>
<td>708</td>
<td>228</td>
<td>226</td>
</tr>
<tr>
<td>Other current assets</td>
<td>663</td>
<td>791</td>
<td>571</td>
<td>613</td>
</tr>
<tr>
<td>Current assets</td>
<td>$4,875</td>
<td>$4,424</td>
<td>$2,364</td>
<td>$2,096</td>
</tr>
<tr>
<td>Accounts payable</td>
<td>1,152</td>
<td>1,113</td>
<td>430</td>
<td>474</td>
</tr>
<tr>
<td>Accrued liabilities</td>
<td>2,122</td>
<td>1,956</td>
<td>1,016</td>
<td>1,276</td>
</tr>
<tr>
<td>Air traffic liability</td>
<td>2,163</td>
<td>2,255</td>
<td>752</td>
<td>635</td>
</tr>
<tr>
<td>Notes payable and current portion long-term debt</td>
<td>202</td>
<td>538</td>
<td>71</td>
<td>116</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>$5,639</td>
<td>$5,864</td>
<td>$2,269</td>
<td>$2,301</td>
</tr>
</tbody>
</table>

Source: AMR Corp. and US Airways, 1999 annual reports.


   a. Calculate AMR’s reported working capital and its current, quick, and cash ratios for both years.
   b. The air traffic liability primarily reflects tickets sold in advance. Discuss any differences between the air traffic liability and other liabilities.
   c. Eliminate the air traffic liability and recompute the ratios in part a. Discuss any differences from the ratios calculated in part a.
   d. Compare US Airways short-term liquidity position with that of AMR at December 31, 1999 both as reported and after elimination of the air traffic liability.
   e. The chapter states that accounts such as the air traffic liability may be better viewed as indicators of future profitability than as liabilities. Discuss that view using the data in Exhibit 10P-1.

4. [Zero-coupon bonds] The Null Company issued a zero-coupon bond on January 1, 2000, due December 31, 2004. The face value of the bond was $100,000. The bond was issued at an effective rate of 12% (compounded annually).

   a. Calculate the cash proceeds of the bond issue.
   b. Complete the following table on a pretax basis, assuming that all interest is paid in the year it is due:

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before interest and taxes</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Cash flow from operations before interest and taxes</td>
<td>60,000</td>
<td>60,000</td>
<td>60,000</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Times interest earned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times interest earned (cash basis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
c. Assume that Null had raised the same cash proceeds with a conventional bond issued at par, paying interest annually and the principal at maturity. Complete the following table, under the assumptions in part b:

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>interest and taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash flow from</td>
<td>50,000</td>
<td>60,000</td>
<td>60,000</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>operations before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>interest and taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash flow from</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>earned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>earned (cash basis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d. Using the results of parts b and c, discuss the impact on reported cash flow from operations and interest coverage of Null’s choice of bond.

e. Explain how consideration of income taxes would change your answers to parts b through d.

5. [Zero-coupon bond; foreign currency debt] Roche has outstanding zero-coupon U.S. dollar notes, with a $2.15 billion face value due 2010, that were issued with a 7% yield to maturity. They are carried at the following amounts:

<table>
<thead>
<tr>
<th></th>
<th>12-31-98</th>
<th>12-31-99</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrying amount (CHF millions)</td>
<td>1.282</td>
<td>1.618</td>
</tr>
<tr>
<td>Exchange rate (CHF/dollar)</td>
<td>1.37</td>
<td>1.60</td>
</tr>
</tbody>
</table>

a. Compute the carrying amount of the bonds in U.S. at December 31, 1998.

b. Explain the difference between your answer to part a and the $2.15 billion face amounts of the notes.

c. Estimate the interest expense (in CHF) for these notes for 1999.

d. Using your answer for part c and the December 31, 1998 carrying value, estimate the carrying amount of the notes (in CHF) at December 31, 1999.

e. Provide two possible explanations for the difference between your answer to part d and the actual carrying amount in Swiss francs at December 31, 1999.

f. Describe the effect of issuing these notes, instead of full coupon notes, on Roche’s:
   (i) Cash from operations
   (ii) Trend of interest expense

g. Describe the effect of the change in the value of the dollar during 1999 on Roche’s interest expense on these notes.

6. [Understanding bond relationships; coupon versus effective interest] The Walk & Field Co. has outstanding bonds originally issued at a discount. During 2000, the unamortized bond discount decreased from $8,652 to $7,290. Annual interest paid was $7,290. The market rate of interest was 12% when the bond was issued.

Using the data provided, calculate:
(i) Interest expense for 2000
(ii) The face value of the bond
(iii) The coupon rate of the bond

(Note: You do not need present value calculations or tables to solve this problem.)

7. [Fixed-rate versus variable-rate debt; effect of interest rate swap] Financial Federal [FIF] finances industrial and commercial equipment through installment sales and leasing programs. FIF obtains funds from bank loans and bonds, which have the following interest rate characteristics (amounts in $ thousands):

<table>
<thead>
<tr>
<th>Bank Loans</th>
<th>Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>July 31</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed rate</td>
<td>$513,447</td>
</tr>
<tr>
<td>Variable rate</td>
<td>111,362</td>
</tr>
<tr>
<td>Totals</td>
<td>$624,809</td>
</tr>
<tr>
<td>Fixed rate % of total</td>
<td>81.4%</td>
</tr>
<tr>
<td>Direct financing leases</td>
<td>$317,918</td>
</tr>
<tr>
<td>Total finance receivables</td>
<td>948,727</td>
</tr>
</tbody>
</table>

(Note: Assume that the direct financing leases have fixed interest rates.)

a. Discuss the effect of a rise in interest rates on the market value of FIF bonds (using the July 31, 2000 amounts).

b. Discuss the effect of a rise in interest rates on FIF’s interest expense.

c. Considering your answers to parts a and b, discuss why FIF has increased its fixed-rate debt from 17% at the end of fiscal 1996 to nearly 50% at the end of fiscal 2000.

d. FIF states that, because of the variety and complexity of its finance receivables, it is not practical to estimate fair value. Given this statement, discuss the usefulness of the disclosure of the fair value of FIF debt.

8. [Interest rate swaps—extension of Problem 10-7] FIF’s fiscal 2000 annual report also discloses the following information regarding interest rate swaps:

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notional amount</td>
<td>$25,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Weighted-average receive rate</td>
<td>5.5%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Weighted-average pay rate</td>
<td>5.2%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Weighted-average remaining term (in months)</td>
<td>17</td>
<td>5</td>
</tr>
</tbody>
</table>
a. From the data shown, describe the swaps.

b. Compute the effect of the swaps on FIF's interest expense each year.

c. Explain how the swaps altered FIF's sensitivity to changes in interest rates.

9. [Foreign currency debt] Bristol-Myers [BMY] reported the following components of its long-term debt (in $Millions):

<table>
<thead>
<tr>
<th>December 31</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.14% yen notes, due 2005</td>
<td>555</td>
<td>362</td>
</tr>
<tr>
<td>1.73% yen notes, due 2003</td>
<td>54</td>
<td>62</td>
</tr>
</tbody>
</table>


b. Compute the percentage change in the outstanding debt in yen during 1999 for both issues.

c. Assuming that no new bonds were issued, state one conclusion that can be drawn from your answers to parts a and b.

d. State two possible motivations for Bristol-Myers, an American company, to issue debt in Japanese yen.

10. [Convertible debt] Note 5 of Takeda's annual report states that the company had convertible bonds outstanding at March 31, 1998 but none outstanding at March 31, 1999. From the statement of stockholders' equity and cash flow statement we can deduce that most of the bonds (more than 22 billion yen) were converted into approximately 11 million shares, implying a conversion price of approximately 2,000 yen per share. The market price of Takeda shares exceeded 3,000 yen during all of calendar 1998.

<table>
<thead>
<tr>
<th>Years Ended March 31</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>As reported in millions yen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank loans</td>
<td>9,509</td>
<td>9,361</td>
</tr>
<tr>
<td>Current debt</td>
<td>24,077</td>
<td>2,119</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>10,896</td>
<td>9,858</td>
</tr>
<tr>
<td>Total debt</td>
<td>44,482</td>
<td>21,338</td>
</tr>
<tr>
<td>Equity</td>
<td>929,381</td>
<td>907,373</td>
</tr>
<tr>
<td>Total capital</td>
<td>873,863</td>
<td>928,711</td>
</tr>
</tbody>
</table>

a. Describe the advantages to Takeda of having issued these convertible notes rather than nonconvertible notes. State one disadvantage.

b. Compute Takeda's debt-to-total capital ratio at March 31, 1998 and March 31, 1999. State the factor that accounted for most of the change in that ratio.

c. State the appropriate classification for the convertible notes at March 31, 1998 (debt or equity) and justify your choice.

11. [Foreign currency convertible debt] In April 2000, Roche issued nearly $1.05 billion of debt, convertible into Roche shares. The coupon was .25% with a maturity of 2005. The issue price was 96.4% of par value (face amount). The conversion price was set at a premium of 25% above the market price of Roche shares at the issue date.

a. Describe the benefits to Roche of issuing these bonds rather than full-coupon nonconvertible debt.

b. Describe how you would compute the interest expense for 2000 and the carrying amount of the bond (in yen) at December 31, 2000.

c. Describe the effect of changes in the exchange rate between the Japanese yen and Swiss franc on:
   (i) The carrying amount of the debt at each balance sheet date
   (ii) Interest expense on the debt

d. Discuss whether the bonds should be considered debt or equity at the issue date.

12. [Zero-coupon convertible debt with put option] In February 1998, Network Associates (NET) issued $885 million principal amount of zero-coupon bonds, with a maturity of 2018. The bonds were issued at a price of 39.106 (percent of par) to yield 4.75% to maturity. The holders of the bonds have the right to "put" the bonds to the company at the original purchase price plus accrued original issue discount at five-year intervals after the date of issue. Additionally, the bonds were convertible (valued at their principal amount) into NET shares at $45.80 per share, a 29% premium over the market price of NET at the issue date.

a. Discuss the advantages to NET of issuing these bonds rather than full-coupon nonconvertible bonds.

b. NET's cash flow statement shows a component of cash flows from operating activities of $17,332 million for 1999 as a result of the zero-coupon bond. Explain what this amount represents.

c. At December 31, 1998, NET shares closed at a price of $66.25. State whether these bonds should be considered debt or equity on that date and justify your choice.

d. At December 31, 2000, NET shares closed at a price of $4. State whether these bonds should be considered debt or equity on that date and justify your choice.

e. State the advantage and disadvantage to NET of issuing bonds with the embedded put option.

13. [Exchangeable debt] In May 2000, Munich Re [MUV2] issued €1.15 billion of exchangeable notes due in 2005. Investors received an interest rate of 1% and the right to receive shares of Allianz instead of cash at maturity. The initial conversion premium was 28%. The Financial Times reported that:

Last month, the German re-insurer Munich Re divested itself of part of its holding of ... Allianz. ... But it did not do so by selling its shares in Allianz. Instead, it issued €1.15 billion of convertible bonds that investors will later be able to exchange for Allianz shares.

The issue could save Munich Re millions. If it had simply sold the Allianz shares now it would have attracted capital gains tax of as much as 50%.
This way the issuer will not be taxed until the bonds are exchanged, by which time things may have changed. German companies are hoping that new legislation will slash capital gains tax to zero by the end of next year.52

Describe the advantages and disadvantages to Munich Re of issuing these notes rather than
(i) Selling shares of Allianz
(ii) Issuing bonds without the exchange feature

Your answer should address the effect on interest expense as well as the capital gains tax considerations.

14. [Perpetual debt] In 1986, PepsiCo [PEP] issued 400 million Swiss franc bonds with no maturity date. At the end of each 10-year period, PepsiCo and the bondholders each have the right to cause redemption of the bonds. If not redeemed, the coupon rate is adjusted based on the yield of 10-year U.S. Treasury securities. Interest payments are made in U.S. dollars.

a. Discuss the conditions under which the bonds are likely to be redeemed. Be sure to consider both the PepsiCo and investor points of view.

In 1996, CHF 327.3 million of these bonds were put to the company, reducing the outstanding amount to CHF 72.7 million.

b. Discuss whether the remaining bonds should be classified as debt or equity when analyzing PepsiCo's capital structure.

15. [Catastrophe bonds] In March 2000, Atlas Re, an affiliate of the French insurance company SCOR [SCO] issued three classes of three-year "catastrophe bonds." The three classes have coupon rates ranging from 270 to 1400 basis points (2.7% to 14%) in excess of the LIBOR rate. However, in the event of certain defined insurance losses in Europe, Japan, and the United States, interest and the redemption amounts would be reduced.

a. Explain why an investor might find these bonds to be a worthwhile investment.

b. Describe the impact of these bonds on SCOR's reported income and interest coverage ratio in a time period with no insurance losses covered by these bonds.

c. Describe the impact of these bonds on SCOR's reported income and interest coverage ratio in a time period with large insurance losses covered by these bonds.

d. Explain the effect of these bonds on the variability of SCOR's reported income.

16. [Preferred shares] Texaco's December 31, 1999 balance sheet shows $300 million of preferred shares outstanding. The characteristics of these shares are reported in Note 13.

a. State the appropriate classification for the preferred shares (debt or equity) and justify your choice.

b. On page 26 of its 1999 annual report, Texaco reports "key financial indicators," including:

| Total debt/total capital | 37.5% |

Show how this ratio was arrived at and recalculate the ratio after making any appropriate adjustments.

17. [Interest rate sensitivity] Wal-Mart [WMT] is the largest retailer in the world. Its annual report for the year ended January 31, 2000 contains the following information about its debt.

<table>
<thead>
<tr>
<th>Amounts in $ millions</th>
<th>1-31-99</th>
<th>1-31-00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term, fixed-rate debt</td>
<td>$7,808</td>
<td>$13,636</td>
</tr>
<tr>
<td>Fair value of long-term debt</td>
<td>8,323</td>
<td>14,992</td>
</tr>
<tr>
<td>Average interest rate</td>
<td>7.2%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

a. Describe the inference about the change in interest rates during fiscal 2000 that you can draw from the comparison between the book value and fair (market) value of Wal-Mart debt at the two balance sheet dates.

b. Wal-Mart doubled its long-term debt during fiscal 2000 but reduced the average interest rate. Explain how this was possible given your answer to part a.

18. [Interest rate swaps; extension of Problem 10-17] Wal-Mart also entered into interest rate swaps under which it received fixed rates and paid variable rates.

a. Discuss the likely motivation for entering into these swaps.

b. Describe two risks that Wal-Mart assumed by entering into these swaps.

c. Under one of the interest rate swaps Wal-Mart receives a fixed rate of 5.7% and pays a variable rate on $500 million. The fair value of the swap was $10 million at January 31, 1999 and $(1) million at January 31, 2000. Explain the change in fair value. No calculations are required.


a. Based on the fair value data, state whether the long-term rates used to determine fair value rose or fell in 1999. Justify your choice.

b. State whether the interest rate used to determine the fair value of the $437 million "9.0%-10.20% debentures" (due through 2021) at December 31, 1999 was

(i) Below 10.20%  
(ii) Above 10.20%  

Justify your choice.

c. Explain why the fair value of the $86 million variable-rate indebtedness equals the carrying value for both years.

20. [Interest rate swaps; extension of Problem 10-19] Exhibit 10P-2 also describes interest rate swaps that AMR entered into.

a. Describe the effect of the interest rate swaps on AMR's interest expense for both 1998 and 1999.

b. Explain why the fair value of the swaps was positive in 1998 but negative in 1999. Elsewhere in its 1999 financial report, AMR states that market risk for fixed-rate long-term debt is estimated as the potential increase in fair value resulting from a hypothetical
EXHIBIT 10P-2. AMR CORP.
Amounts In $millions

6. Financial Instruments and Risk Management: Fair Values of Financial Instruments
The fair values of the Company’s long-term debt were estimated using quoted market prices where available. For long-term debt not actively traded, fair values were estimated using discounted cash flow analyses, based on the Company’s current incremental borrowing rates for similar types of borrowing arrangements. The carrying amounts and estimated fair values of the Company’s long-term debt, including current maturities, were (in millions):

<table>
<thead>
<tr>
<th></th>
<th>Carrying Value</th>
<th>Fair Value</th>
<th>Carrying Value</th>
<th>Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured variable and fixed-rate indebtedness</td>
<td>$2,651</td>
<td>$2,613</td>
<td>$800</td>
<td>$1,013</td>
</tr>
<tr>
<td>7.875% - 10.62% notes</td>
<td>1,014</td>
<td>1,024</td>
<td>875</td>
<td>793</td>
</tr>
<tr>
<td>9.0% - 10.20% debentures</td>
<td>437</td>
<td>469</td>
<td>437</td>
<td>531</td>
</tr>
<tr>
<td>6.0% - 7.10% bonds</td>
<td>176</td>
<td>174</td>
<td>176</td>
<td>189</td>
</tr>
<tr>
<td>Variable rate indebtedness</td>
<td>86</td>
<td>86</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>16</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$4,380</strong></td>
<td><strong>$4,382</strong></td>
<td><strong>$2,484</strong></td>
<td><strong>$2,812</strong></td>
</tr>
</tbody>
</table>

Interest Rate Risk Management
American enters into interest rate swap contracts to effectively convert a portion of its fixed-rate obligations to floating-rate obligations. These agreements involve the exchange of amounts based on a floating interest rate for amounts based on fixed interest rates over the life of the agreement without an exchange of the notional amount upon which the payments are based. The differential to be paid or received as interest rates change is accrued and recognized as an adjustment of interest expense related to the obligation. The related amount payable to or receivable from counterparties is included in current liabilities or assets. The fair values of the swap agreements are not recognized in the financial statements. Gains and losses on terminations of interest rate swap agreements are deferred as an adjustment to the carrying amount of the outstanding obligation and amortized as an adjustment to interest expense related to the obligation over the remaining term of the original contract life of the terminated swap agreement. In the event of the early extinguishment of a designated obligation, any realized or unrealized gain or loss from the swap would be recognized in income coincident with the extinguishment.

The following table indicates the notional amounts and fair values of the Company’s interest rate swap agreements (in millions):

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Notional Amount</strong></td>
<td><strong>Fair Value</strong></td>
<td><strong>Notional Amount</strong></td>
</tr>
<tr>
<td>Interest rate swap agreements</td>
<td>$696</td>
<td>$(9)</td>
</tr>
</tbody>
</table>

The fair values represent the amount the Company would pay or receive if the agreements were terminated at December 31, 1999 and 1998, respectively.

At December 31, 1999, the weighted-average remaining life of the interest rate swap agreements in effect was 5.1 years. The weighted-average floating rates and fixed rates on the contracts outstanding were:

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average floating rate</td>
<td>5.855%</td>
<td>5.599%</td>
</tr>
<tr>
<td>Average fixed rate</td>
<td>6.292%</td>
<td>6.277%</td>
</tr>
</tbody>
</table>

Floating rates are based primarily on LIBOR and may change significantly, affecting future cash flows.

EXHIBIT 10P-3. ARCO CORP.

ARCO ANNOUNCES INTENTION TO SETTLE ITS EXCHANGEABLE NOTES
3/24/97 17:13 (New York)

LOS ANGELES, March 24 /PRNewswire—ARCO (NYSE: ARC) today announced its present intention to settle all its 9% Exchangeable Notes due September 15, 1997 with Lyondell Petrochemical Company stock currently owned by ARCO.

"Our current intention to exchange out ARCO’s equity interest in Lyondell is consistent with ARCO’s priorities,” said ARCO Chairman and Chief Executive Officer Mike R. Bowlin. “While ARCO has enjoyed a successful relationship with Lyondell, we no longer consider Lyondell central to ARCO’s core business or part of our strategic growth objectives.”

If market conditions remain unchanged, ARCO would expect to realize a gain in excess of $300 million upon the exchange of its shares of Lyondell stock. The decision to settle the Notes with Lyondell shares can still be affected by a material change in market conditions.

ARCO currently owns 39.9 million shares, or 49.9% of the total outstanding shares, of Houston-based Lyondell (NYSE: LYO), a leading manufacturer and marketer of petrochemicals and, through its interest in LYONDELL-CITGO Refining Company, a manufacturer of refined petroleum products.

In a 1994 offering, ARCO sold $988 million of 3-year Exchangeable Notes carrying a 9.0% annual coupon. At maturity on September 15, 1997, the Notes are payable, at ARCO’s option, in shares of Lyondell Common Stock at a price determined in accordance with the terms of the Notes, or cash with an equal value.


10% decrease in interest rates, and amounts to approximately $1.56 million and $96 million as of December 31, 1999 and 1998, respectively.

e. Relate the increased market risk in 1999 to changes in both AMR’s debt and its interest rate swaps.

21. [Debt refinancing] On July 14, 2000, the Wall Street Journal reported on the earnings report by Fannie Mae [FNM], the largest mortgage lender in the United States. Fannie Mae has substantial outstanding debt and uses hedging techniques to manage its exposure to changing interest rates. Excerpts from that article follow:

Fannie Mae Posts 15% Earnings Gain for the Quarter
By Patrick Barta

Fannie Mae overcame a slowing housing market to report double-digit earnings growth for the second quarter...

However, some pointed out that the company’s results included a one-time after-tax gain of $22.7 million from the retirement of debt that helped compensate for a one-time trading loss. Typically, such gains are omitted when a company calculates its earnings-per-share results.

"In our mind, the gain should be excluded,” says Charles L. Hill, First Call’s director of research.

Fannie Mae says the company has long included retirement of debt in its earnings-per-share calculations, because it considers retirement of debt to be part of its continuing operations. The company notes that it reported gains and losses from debt retirement in its earnings-per-share calculations in 27 of the last 40 quarters. “It’s something we do on a regular basis,” says Mary Lou Christy, vice-president of investor relations.

At the heart of the debate was a one-time loss of about $90 million, attributed to a hedging strategy that lost money after interest rates for Fannie Mae debt rose unexpectedly.

The company was able to offset much of the loss by repurchasing debt at favorable rates, which produced the $22.7 million gain.57

22. [Debt refinancing and exchangeable debt] In March 1997, ARCO (Atlantic Richfield) issued the press release shown in Exhibit 10P-3. Use only this information to answer the following questions.

a. Present one reason why the loss from the hedging strategy should be considered part of Fannie Mae’s operating earnings and one reason why it should not.

c. Recommend the proper treatment for both items, from an analyst viewpoint, and justify your recommendation.

23. [Issue and repurchase of debt] On January 1, 2000, Derek Corporation issues $20 million (face value) bonds due January 1, 2010. Interest is payable semiannually on January 1 and July 1 at a coupon rate of 10%. The market (effective interest) rate on the date of issuance is 8%.


b. Calculate the gain or loss recorded by Derek if it repurchases the entire bond issue on July 1, 2003 at an effective interest rate of 10%.

c. Discuss whether this gain (loss) should be considered a component of continuing operating income.

d. Discuss two reasons why Derek might choose to refinance its 8% debt at a higher interest rate.

24. [Bond covenants and financing options] The Sleeman Company wishes to acquire plant and equipment worth $1 million. The purchase must be financed by issuing preferred shares
or debt (in any combination, including zero-coupon). The only constraint is that the company not violate any of the following bond covenants:

(i) Times interest earned (cash basis) calculated as
\[
\frac{\text{Cash from operations before interest}}{\text{Interest payments}} \text{ must be at least 1.8}
\]

(ii) Fixed charge coverage ratio (cash basis) calculated as
\[
\frac{\text{Cash from operations before interest}}{\text{Interest payments} + \text{preferred dividends}} \text{ must be at least 1.4}
\]

(iii) Debt to gross tangible assets calculated as
\[
\frac{\text{Long-term debt}}{\text{Gross tangible fixed assets}} \text{ must not exceed 0.50}
\]

Sleepman has made the following financial projections for the coming year:

| Interest expense (\(\equiv\) interest paid) | $200,000 |
| Preferred dividends | 0 |
| Cash flow from operations before interest | 390,000 |
| Long-term debt | 2,600,000 |
| Tangible fixed assets (gross) | 5,000,000 |

These amounts include the operating results generated by the new plant and equipment. They exclude, however, the accounting impacts of the purchase (depreciation and interest expense) as well as the assets and liabilities arising from the purchase.

For simplicity, assume that all financing is available at an interest rate of 10% with a maturity of 10 years. Similarly, any required depreciation or amortization should assume an asset life of 10 years using the straight-line method and zero residual value. Ignore income taxes.

a. Assume that there are three alternatives to finance the asset purchase:

(i) Issue preferred shares
(ii) Issue conventional (full-coupon) bonds
(iii) Issue zero-coupon bonds

Calculate the three ratios in the bond covenants for each alternative for the first year. Discuss which of the alternatives would permit Sleepman to acquire the assets without violating at least one of the covenants.

b. Assume that the assets are divisible (you can acquire any amount using any financing mode). Calculate a combination of financing modes that enables Sleepman to acquire the assets without violating any of the covenants.

EXHIBIT 10P-4. NORAM ENERGY CORP.
Stockholders’ Equity and Debt Covenants

<table>
<thead>
<tr>
<th>Condensed Shareholders’ Equity</th>
<th>1994</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Stock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred</td>
<td>$130,000</td>
<td>$130,000</td>
</tr>
<tr>
<td>Common stock including paid-in capital</td>
<td>944,870</td>
<td>944,118</td>
</tr>
<tr>
<td></td>
<td>$1,074,870</td>
<td>$1,074,118</td>
</tr>
<tr>
<td>Retained Deficit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance at beginning of year</td>
<td>(366,080)</td>
<td>(360,121)</td>
</tr>
<tr>
<td>Net income (loss)</td>
<td>48,066</td>
<td>36,087</td>
</tr>
<tr>
<td>Cash dividends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred stock, $3.00 per share</td>
<td>(7,800)</td>
<td>(7,800)</td>
</tr>
<tr>
<td>Common stock, $0.28 per share in 1994 and $0.28 per share in 1993</td>
<td>(34,265)</td>
<td>(34,246)</td>
</tr>
<tr>
<td>Balance at end of year</td>
<td>$ (360,079)</td>
<td>$ (366,080)</td>
</tr>
<tr>
<td>Unrealized gain on Lutron investment, net of tax</td>
<td>2,586</td>
<td></td>
</tr>
<tr>
<td>Total stockholders’ equity</td>
<td>$ 717,377</td>
<td>$ 708,037</td>
</tr>
</tbody>
</table>

Note 5: Restrictions on Stockholders’ Equity and Debt

Under the provisions of the Company’s revolving credit facility as described in Note 3, and under similar provisions in certain of the Company’s other financial arrangements, the Company’s total debt capacity is limited and it is required to maintain a minimum level of stockholders’ equity. The required minimum level of stockholders’ equity was initially set at $60.0 million at December 31, 1993, increasing annually thereafter by (1) 50% of positive consolidated net income and (2) 50% of the proceeds (in excess of the first $50 million) of any incremental equity offering made after June 30, 1994. The Company’s total debt is limited to $2,055 million. Based on these restrictions, the Company had incremental debt issuance and dividend capacity of $231.2 million and $43.3 million, respectively, at December 31, 1994. The Company’s revolving credit facility also contains a provision which limits the Company’s ability to reacquire, retire or otherwise prepay its long-term debt prior to its maturity to a total of $100 million.

imposed by its creditors. The covenants restrict new borrowings and dividend payments. The exhibit states that as of December 31, 1994 the company has dividend capacity equal to $43.3 million. This amount was computed after reflecting the annual dividend of $42 million declared in 1994.

a. Show how the dividend capacity of $43.3 million as of December 31, 1994 was computed.

b. State whether the debt covenants restrict NorAm's ability to maintain its annual dividend through 1998. Justify your answer by preparing a schedule for the years 1995–1998 showing NorAm's expected and minimum shareholders' equity given current income and dividend levels.

c. Compute the level of income that would be required to maintain current dividend levels through 1998.

d. In 1995, NorAm approached its shareholders with a proposal to issue new shares. Suggest why the company was motivated to make this proposal and whether you, as a shareholder, would have supported the proposal.