The following is a review of the Financial Statement Analysis principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

ANALYSIS OF INCOME TAXES

Study Session 10

EXAM FOCUS

Legally, companies are permitted to keep two sets of financial records in the U.S.—one for financial reporting and one for tax reporting. Candidates should be aware of the terminology that relates to each set of records, notably taxes payable, which are the taxes actually due to the government; and income tax expense, which is reported on the income statement and reflects taxes payable plus any deferred income tax expense. Because tax reporting uses a modified cash basis and financial reporting uses accrual accounting according to Generally Accepted Accounting Principles, differences in income can result. This leads to the creation of deferred tax liabilities, which the company may have to pay in the future, or deferred tax assets, which may provide benefits in the future. For the exam, you should know that some differences between taxable and pretax income are temporary, while some are permanent and will never reverse. Be prepared to calculate taxes payable, tax expense, deferred tax liabilities and assets, and be able to adjust financial statements for permanent income differences.

LOS 44.a: Discuss the key terms (e.g., deferred tax asset, valuation allowance, deferred tax liability, taxes payable, income tax expense, temporary difference, permanent difference, etc.) used in income tax accounting, explain why and how deferred tax liabilities and assets are created, and describe the liability method of accounting for deferred taxes.

Professor's Note: Accounting definitions are not usually included directly in an LOS. You should expect to see questions involving tax terminology and definitions on the exam. To understand the material, pay particular attention to the difference between the definitions of taxable income (on the tax return) and pretax income (on the income statement) and the difference between the definitions of taxes payable (on the tax return) and income tax expense (on the income statement).

Tax Return Terminology

- **Taxable income.** Income subject to tax based on the tax return.
- **Taxes payable.** The tax liability on the balance sheet caused by taxable income. This is also known as current tax expense, but do not confuse this with income tax expense (see below).
- **Income tax paid.** Actual cash flow for income taxes, including payments or refunds for other years.
- **Tax loss carryforward.** The current net taxable loss that is used to reduce taxable income (thus, taxes payable) in future years and can generate a deferred tax asset.

Financial Reporting Terminology

- **Pretax income.** Income before income tax expense.
- **Income tax expense.** The expense recognized on the income statement that includes taxes payable and deferred income tax expense. It is extremely important to note that income tax expense is composed of taxes payable plus noncash items such as changes in deferred tax assets and liabilities (DTA and DTL).

  Income tax expense = taxes payable + ΔDTL – ΔDTA
- **Deferred tax expense.** The difference between taxes payable and income tax expense. This results from changes in deferred tax assets and liabilities.

- **Deferred tax asset.** Balance sheet amounts that result from an excess of taxes payable over income tax expense that are expected to be recovered from future operations.
- **Deferred tax liability.** Balance sheet amounts that result from an excess of income tax expense over taxes payable that are expected to result in future cash outflows. Deferred tax liabilities are created when more expense is applied to the tax return relative to the income statement (e.g., more depreciation). This results in lower taxable income and lower taxes payable on the tax return relative to the pretax income and tax expense that are shown on the income statement.
- **Valuation allowance.** Reserve against deferred tax assets based on the likelihood that those assets will not be realized.
- **Timing difference.** The difference between the treatment of expenditures on the tax return and for financial reporting.
- **Temporary difference.** The differences between tax and financial reporting that will reverse in the future and will affect taxable income when they reverse, including the differences in the carrying cost of depreciable assets on tax and accounting records.
- **Permanent difference.** The differences between tax and financial reporting that are not expected to reverse in the future.

Why and How Deferred Tax Liabilities and Assets are Created

A *deferred tax liability* is created when an income or expense item is treated differently on financial statements than it is on the company's tax returns, and that difference results in greater tax expense on the financial statements than taxes payable on the tax return.

Deferred tax liabilities are accounted for because the differences arising from unique accounting treatments for tax and financial reporting purposes are expected to reverse themselves (i.e., they are temporary differences) and they result in future cash outflows related to the payment of taxes.

The most common way that deferred taxes are created is when different depreciation methods are used on the tax return and income statement.

Let's look at how a DTL is created.

Situation: Asset cost $600,000, 3-year life, zero salvage value

Tax return depreciation is sum of years' digits (SYD), Year 1 $300,000, Year 2 $200,000, Year 3 $100,000.

Income statement depreciation is straight line (SL), $200,000 each year.

EBITDA is $500,000 each year.

Figure 1: Tax Return (40% Rate, SYD Depreciation)

	Year 1	*Year 2*	*Year 3*	*Total 1-3*
EBITDA	$500,000	$500,000	$500,000	1,500,000
Dep	–300,000	–200,000	–100,000	600,000
Taxable income	$200,000	$300,000	$400,000	$900,000
Tax Rate	× 0.40	× 0.40	× 0.40	× 0.40
Tax Payable	$80,000	$120,000	$160,000	$360,000

Figure 2: Income Statement (40% Tax Rate, SL Depreciation)

	Year 1	*Year 2*	*Year 3*	*Total 1-3*
EBITDA	$500,000	$500,000	$500,000	1,500,000
Depreciation	–200,000	–200,000	–200,000	600,000
Pre-Tax Income	$300,000	$300,000	$300,000	$900,000
Tax Rate	× 0.40	× 0.40	× 0.40	× 0.40
Income Tax Expense	$120,000	$120,000	$120,000	$360,000

In year 1, taxes payable = $80,000 and income tax expense is $120,000, so $40,000 of the tax expense is deferred to a future period by using an accelerated depreciation method for tax purposes. We note this on the balance sheet by creating a deferred tax liability of $40,000, and income tax expense = taxes payable + change in DTL ($120,000 = $80,000 + $40,000).

In year 2, depreciation is equal for tax and income statements, taxable income equals pretax income, and there is no change in the deferred tax liability. DTL remains at $40,000.

In year 3, depreciation for tax purposes ($100,000) is less than depreciation on the income statement ($200,000); taxable income is greater than pretax income; and the DTL is reduced from $40,000 to zero. Income tax expense = taxes payable + change in DTL [$120,000 = $160,000 + (–$40,000)].

Note that over the useful life of the asset, total depreciation, total taxable (and pre-tax) income, and total taxes payable (income tax expense) are all equal. By using accelerated depreciation for tax purposes we *deferred* $40,000 of taxes from year 1 to year 3.

A *deferred tax asset* is created when an income or expense item is treated differently on financial statements than it is on the company's tax returns, and that difference results in lower taxes payable on the financial statements than on the tax return.

Similar to deferred tax liabilities, deferred tax assets are expected to reverse themselves through future operations and provide tax savings and, therefore, are accounted for on the balance sheet.

Warranty expenses and *tax-loss carry forwards* are typical causes of deferred tax assets.

The Liability Method of Accounting for Deferred Taxes

The liability method of accounting for deferred taxes starts from the premise that differences between taxes calculated on the income statement [Generally Accepted Accounting Principles (GAAP) accounting] and taxes from the income tax return (determined by the Internal Revenue Code) will be reversed at some future date. When income tax expense based on GAAP is greater than taxes payable on the income tax return, a deferred tax liability in the amount of the difference is entered on the balance sheet. Activities in the current period have caused the company to incur a tax liability that must be paid in a future period.

If a company has an expense item (e.g., estimated warranty expense) on its financial statements that is not deductible for tax purposes currently, a deferred tax asset will be created. This represents the future tax savings that will result when the deduction is taken (e.g., when warranty expense is actually paid).

Both deferred tax assets and liabilities are adjusted for changes in the tax rate expected for the period(s) in which the deferred tax asset/liability is expected to be reversed (usually the current tax rate). Additionally, deferred tax assets are adjusted for the probability that they will actually be realized in future periods. This adjustment is

made by creating or adjusting a "valuation allowance" on the balance sheet. This item serves to reduce the DTA to reflect the probability that the DTA will not actually be realized in future periods.

LOS 44.b: Discuss the implications of a valuation allowance for deferred tax assets (i.e., when it is required, what impact it has on the financial statements, and how it might affect an analyst's view of a company).

Deferred tax assets can have a **valuation allowance**, which is a contra account (offset) against deferred tax assets based on the likelihood that these assets will not be realized.

For deferred tax assets to be beneficial, the firm must have future taxable income. If it is more likely than not (> 50% probability) that a portion of deferred tax assets will not be realized (insufficient future taxable income to take advantage of the tax asset), then the deferred tax asset must be reduced by a valuation allowance.

It is up to management to defend the recognition of all deferred tax assets. If a company has order backlogs or existing contracts which are expected to generate future taxable income, a valuation allowance would not be necessary. However, if a company has cumulative losses over the past few years or a history of an inability to use tax credit carryforwards, then the company would need to use a valuation allowance to reflect the likelihood that the deferred tax asset would never be realized.

A valuation allowance reduces income from continuing operations. Because an increase (decrease) in the valuation allowance will serve to decrease (increase) operating income, changes in the valuation allowance are a common means of managing or manipulating earnings.

Whenever a company reports substantial deferred tax assets, an analyst should review the company's financial performance to determine the likelihood that those assets will be realized. Analysts should also scrutinize changes in the valuation allowance to determine whether those changes are economically justified.

Professor's Note: The valuation allowance applies exclusively to deferred tax assets.

LOS 44.c: Explain the factors that determine whether a company's deferred tax liabilities should be treated as a liability or as equity for purposes of financial analysis.

If deferred tax liabilities are expected to reverse in the future, then they are best classified as liabilities. If, however, they are not expected to reverse in the future, they are best classified as equity. The key question is, "when or will the total deferred tax liability be reversed in the future?" In practice, the treatment of deferred taxes for analytical purposes varies. An analyst must decide on the appropriate treatment on a *case-by-case basis*. Some guidelines follow:

- In many cases, it may be unlikely that deferred tax liabilities will be paid. For example, if a company has deferred tax liabilities occurring solely because of the use of accelerated depreciation for tax purposes and the company's capital expenditures are expected to continue to grow in the foreseeable future, the deferred tax liability will not reverse and should be considered as equity. However, if growth is expected to stop or slow considerably, the liability will reverse and it should be considered as a true liability.
- If it is determined that deferred taxes are not a liability (i.e., non-reversal is certain), then the analyst should reduce the deferred tax liability and increase stockholders' equity by the same amount. This decreases the debt-to-equity ratio, sometimes significantly.
- Sometimes, instead of reclassifying deferred liabilities as stockholders' equity, the analyst might just ignore deferred taxes altogether. This is done if non-reversal is uncertain or financial statement depreciation is deemed inadequate and it is therefore difficult to justify an increase in stockholders' equity. Some creditors, notably banks, simply ignore deferred taxes.

Let's work through an example of the impact of growth on deferred tax liabilities using the following assumptions:

- A firm purchases an asset each year for three years: Asset 1 in the first year, Asset 2 in the second year, and Asset 3 in the third year.
- The cost of each of these assets is $3,000 with no salvage value and a 3-year life.
- Double-declining balance (DDB) method is used on tax returns and SL for financial statements.
- The tax rate is 30%.

Figures 3 through 5 reveal total tax deduction and total depreciation expense for these assets purchased in each of the first three years.

Figure 3: Tax Return Calculations—Double-Declining Balance (tax deduction)

	Year 1	*Year 2*	*Year 3*
Asset 1	$2,000	$667	$333
Asset 2	0	2,000	667
Asset 3	0	0	2,000
Total DDB depreciation	$2,000	$2,667	$3,000

Figure 4: Financial Statement Calculations—Straight line (financial statements)

	Year 1	*Year 2*	*Year 3*
Asset 1	$1,000	$1,000	$1,000
Asset 2	0	1,000	1,000
Asset 3	0	0	1,000
SL depreciation	$1,000	$2,000	$3,000

Figure 5: Cumulative Deferred Tax Liability

	Year 1	*Year 2*	*Year 3*
Deferred liability	$300	$500	$500

In year 1, the change in deferred tax liability is (2,000 – 1,000)(0.30) = +$300. In year 2, the change is (2,667 – 2,000)(0.30) = +$200.

Note: There is no reversal of the deferred liability. The cumulative deferred liability will continue to increase as long as the firm continues to grow.

LOS 44.d: Distinguish between temporary and permanent items in pretax financial income and taxable income.

Temporary differences are differences in taxable and pretax incomes that will reverse in future years. That is, current lower (higher) taxes payable will mean future higher (lower) taxes payable. These differences result in

deferred tax assets or liabilities. Various examples and how they are classified on the financial statements are as follows:

- *Current liabilities.* The temporary difference that results from using the installment sales method for taxes and the sales method for pretax income. Recall that the installment sales and sales basis methods are used in revenue recognition.
- *Long-term liabilities.* The long-term tax liability that results from using the declining balance depreciation for the tax returns and SL depreciation for the financial statements.
- *Current assets.* The deferred tax assets created when warranty expenses are accrued on the financial statements but are not deductible on the tax returns until the warranty claims are paid.
- *Long-term assets.* The deferred tax asset created when post-retirement benefits expense in pretax income exceeds that allowed for a deduction on tax returns.
- *Stockholders' equity.* The gains or losses from carrying marketable securities at market value are deferred tax adjustments to stockholders' equity.

Permanent differences are differences in taxable and pretax incomes that will not reverse.

- Tax-exempt interest income and the proceeds from life insurance on key employees are not taxable but are recognized as *revenue* on the financial statements.
- Tax-exempt interest expense, premiums paid on life insurance of key employees, and goodwill amortization (under International Accounting Standards, or IAS) are examples of *expenses* on the financial statements, but they are not deductions on the tax returns. Remember that goodwill amortization is no longer permitted under U.S. GAAP.
- Tax credits for some expenditures directly reduce taxes and, unlike accelerated recognition of expenses for tax purposes, will not reverse in the future.

Permanent differences do not result in deferred tax liabilities or assets. Permanent differences between taxable income and pretax income are reflected in a difference between a firm's effective tax rate and its statutory tax rate.

A firm's *reported* effective tax rate is simply $\frac{\text{income tax expense}}{\text{pretax income}}$.

The statutory tax rate is the marginal tax rate in the jurisdiction in which the firm operates. Income recognized on the financial statements (e.g., tax-exempt interest income) that is not included in taxable income, will result in an effective tax rate lower than the statutory rate. Expenses recognized on the income statement that are not deductible for tax purposes (e.g., premiums paid on key employee life insurance) will tend to increase the effective tax rate relative to the statutory tax rate. Differences between the statutory rate and the effective rate can also arise when a firm's operations are in different geographic locations and subject to different tax laws. Sometimes the income of a foreign subsidiary is reinvested in the subsidiary and not remitted to the parent company, postponing taxation at the statutory rate. Remitting accumulated subsidiary income from prior periods would, of course, have an opposite effect on the difference between statutory and effective rates.

Indefinite reversals. There is uncertainty about whether some differences will reverse in the future. The most common of these differences is the undistributed earnings of unconsolidated subsidiaries or joint ventures. If income is earned but not distributed back to the parent company in the form of dividends, the income will be reflected on the income statement as pretax income but will not appear on the tax return. The parent may consider this income to be permanently reinvested in the subsidiary. In that case, the difference will never be reversed. The company can treat this difference as permanent if the parent controls the subsidiary or joint venture.

LOS 44.e: Determine income tax expense, income taxes payable, deferred tax assets, and deferred tax liabilities, and calculate and interpret the adjustment to the financial statements related to a change in the tax rate.

Calculations of deferred taxes require going through the tax returns and the income statement and noting the differences between taxable income on the tax return and pretax income on the income statement.

Example: Deferred tax liabilities

An asset costs $200,000, has a depreciable life of four years, and has zero salvage value. It is expected to produce $150,000 in annual revenue. It is depreciated by the DDB method for tax purposes and by SL for financial reporting purposes. The firm has a tax rate of 40%. Calculate the deferred tax liability stemming from the asset at the end of each of the next four years.

Answer:

Using the DDB method, depreciation will be $100,000, $50,000, $25,000, and $25,000 in each of the next four years. Year 1 = $100,000 = ($200,000 – 0)(2/4); Year 2 = $50,000 = ($200,000 – $100,000)(2/4); Year 3 = $25,000 = ($200,000 – $150,000) (2/4); Year 4 depreciation is the remaining $25,000 of book value.

The firm will report the following *for tax reporting:*

Figure 6: Tax Reporting—Deferred Tax Liability

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Total*
Revenue	$150,000	$150,000	$150,000	$150,000	$600,000
Depreciation	$100,000	$50,000	$25,000	$25,000	$200,000
Taxable income	$50,000	$100,000	$125,000	$125,000	$400,000
Taxes payable	$20,000	$40,000	$50,000	$50,000	$160,000
Net income	$30,000	$60,000	$75,000	$75,000	$240,000

Depreciation using SL will be $50,000 per year.

The tax expense is calculated as the tax rate times pretax income, so for *financial reporting:*

Figure 7: Financial Reporting—Deferred Tax Liability

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Total*
Revenue	$150,000	$150,000	$150,000	$150,000	$600,000
Depreciation	$50,000	$50,000	$50,000	$50,000	$200,000
Pretax income	$100,000	$100,000	$100,000	$100,000	$400,000
Tax expense	$40,000	$40,000	$40,000	$40,000	$160,000
Net income	$60,000	$60,000	$60,000	$60,000	$240,000

Total tax ($160,000) and total net income ($240,000) are the same for tax and financial reporting.

This approach to reporting taxes is based on an **income statement approach**. Income taxes are treated as a cost of operations and the matching principle implies tax expenses should be based on pretax income. The accelerated

depreciation allowed for tax purposes results in lower taxes in the early years that are then reversed (or paid off) in later years.

The difference between pretax income on the financial statements and taxable income on the tax return is attributable to the different accounting treatments. For example, in year 1 the difference between tax expense and taxes payable is $40,000 – $20,000 = $20,000. Because the differences are expected to reverse, a *balance sheet perspective* recognizes a *liability* in the early years equal to the amount of tax that must eventually be paid back in later years. Note that the differences accrue over the life of the asset.

The firm will report the following deferred tax liabilities (represented as the cumulative figure) on the balance sheet shown in Figure 8.

Figure 8: Deferred Tax Calculation—Deferred Tax Liability

	Year 1	*Year 2*	*Year 3*	*Year 4*
Tax expense	$40,000	$40,000	$40,000	$40,000
Taxes payable	$20,000	$40,000	$50,000	$50,000
Annual deferred taxes	$20,000	$0	–$10,000	–$10,000
Deferred taxes (cumulative)	$20,000	$20,000	$10,000	$0

Example: Deferred tax assets

Consider warranty guarantees and associated expenses. Pretax income (financial reporting) includes an accrual for warranty expense, but warranty cost is not deductible for taxable income until the firm has made actual expenditures to meet warranty claims. Suppose:

- A firm has sales of $5,000 for each of two years.
- The firm estimates that warranty expense will be 2% of annual sales ($100).
- The actual expenditure of $200 to meet all warranty claims was not made until the second year.
- Assume a tax rate of 40%.

For tax reporting, taxable income and taxes payable for two years are:

Figure 9: Tax Reporting—Deferred Tax Asset

	Year 1	*Year 2*
Revenue	$5,000	$5,000
Warranty expense	0	200
Taxable income	$5,000	$4,800
Taxes payable	2,000	1,920
Net income	$3,000	$2,880

For financial reporting, pretax income and tax expense are:

Figure 10: Financial Reporting—Deferred Tax Asset

	Year 1	*Year 2*
Revenue	$5,000	$5,000
Warranty expense	100	100
Pretax Income	$4,900	$4,900
Tax expense	1,960	1,960
Net Income	$2,940	$2,940

In this example, year 1 and year 2 tax expense (on financial statements) is $1,960. Year 1 and year 2 taxes payable are $2,000 and $1,920. The year 1 difference of $40 (taxes paid greater than tax expense) is a deferred tax asset. In the second year, the temporary difference associated with warranties is reversed when tax expense of $1,960 is $40 more than taxes payable of $1,920.

Professor's Note: To summarize deferred tax asset and liability creation, if taxable income (on the tax return) is less than pretax income (on the income statement) and the cause of this difference is expected to reverse in future years, then a deferred tax liability is created; and if taxable income is more than pretax income and the difference is expected to reverse in future years, then a deferred tax asset results.

Adjustment to the Financial Statements Related to a Change in the Tax Rate

Besides the impact on current period taxes payable and income tax expense, under the liability method, *all balance sheet deferred tax assets and liabilities are revalued* when the tax rate the firm will face in the future changes. An increase (decrease) in the tax rate increases (decreases) both deferred tax assets and liabilities.

If the *tax rate increases*, the increase in deferred tax liabilities increases the income tax expense, and the increase in deferred tax assets decreases the income tax expense. As long as deferred tax liabilities exceed deferred tax assets (the most common occurrence), the net impact of the increase in the tax rate will be to increase tax expense, which will cause net income and stockholders' equity to decline.

If the *tax rate decreases*, the decrease in deferred tax liabilities decreases income tax expense, and the decrease in deferred tax assets increases income tax expense. As long as deferred tax liabilities exceed deferred tax assets (the most common occurrence), the net impact of the decrease in the tax rate will be to decrease the tax expense, which will cause net income and stockholders' equity to rise. The basic equation is:

$$\text{income tax expense} = \text{taxes payable} + \Delta\text{DTL} - \Delta\text{DTA}$$

Let's work through an example of financial statements and a change in tax rates:

Consider a firm that has a DTL of $16,000 and a DTA of $4,000 on the balance sheet at year-end, based on a tax rate of 40%. For the current year, accelerated depreciation used on the tax return is $20,000 more than straight line (income statement) depreciation, *and* warranty expense on the tax return is $5,000 less than warranty expense shown on the income statement. During the year the firm's tax rate is reduced from 40% to 30%.

Initially ignoring the balance sheet amounts, the current year calculations are:

	Tax Return	*Income Statement*	
Taxable income before dep. & warranty expense	$100,000	$100,000	
–Depreciation	–30,000	–10,000	adds 0.3 × 20,000 = +6,000 to DTL
–Warranty expense	–5,000	–10,000	adds 0.3 × 5,000 = +1,500 to DTA
	Taxable inc 65,000	Pretax inc 80,000	
	× 0.3	× 0.3	
	Tax payable 19,500	Tax expense 24,000	ΔDTL – ΔDTA = $4,500

Income tax expense = tax payable + ΔDTL – ΔDTA

$24,000 = $19,500 + $6,000 – $1,500

There are additional effects, however, from the adjustments to the DTL and DTA already on the balance sheet at the beginning of the year. The existing DTL of $16,000 must be reduced to $12,000 because the tax rate has decreased by 25%, from 40% to 30% $\left(\frac{0.30}{0.40} \times \$16{,}000 = \$12{,}000\right)$. The existing DTA is reduced to $\frac{0.30}{0.40} \times \$4{,}000 = \$3{,}000$. So the change in tax rate requires changes to existing balance sheet amounts:

ΔDTL = –$4,000 and ΔDTA = –$1,000

The calculation of income tax expense for the year will take all these effects into account.

For the current year we had income tax expense = taxes payable + ΔDTL – ΔDTA which was $24,000. When we also adjust income tax expense for the changes in existing balance sheet DTL and DTA amounts as computed above, we have:

$24,000 – $4,000 – (–$1,000) = $21,000

The net effect of the change in balance sheet deferred taxes on income tax expense is –($4,000 – $1,000) = –$3,000. Since the DTL was greater than the DTA, the decrease in the tax rate reduced the liability by more than it reduced the asset, resulting in a decrease in the current year income tax expense.

LOS 44.f: Analyze disclosures relating to deferred tax items and the effective tax rate reconciliation and discuss how information included in these disclosures affects a company's financial statements and financial ratios.

LOS 44.g: Compare and contrast a company's deferred tax items and effective tax rate reconciliation between reporting periods and/or to other companies.

The disclosure requirements of SFAS 109 include separate disclosure of the following information:

- Deferred tax liabilities, deferred tax assets, any valuation allowance, and the net change in the valuation allowance over the period.
- Any unrecognized deferred tax liability for undistributed earnings of subsidiaries and joint ventures.

- Current-year tax effect of each type of temporary difference.
- Components of income tax expense.
- Reconciliation of reported income tax expense and the tax expense based on the statutory rate.
- Tax loss carryforwards and credits.

Analyzing Effective Tax Rates

The firm's effective tax rate is an important input to valuation models because the forecast of future after-tax cash flows depends on the tax rate applied to those cash flows. The reported effective tax rate uses income tax expense and pretax income from the firm's financial statements (f/s):

$$\text{reported effective tax rate} = \frac{\text{income tax expense (from the f/s)}}{\text{pretax income (from the f/s)}}$$

There are two alternatives to this measure, however, which use items in the numerator derived from the firm's tax returns: taxes payable or income tax paid. Taxes payable is the tax liability on the balance sheet caused by taxable income. Income tax paid is the actual cash flow for income taxes, including payments or refunds from other years. These measures may be more useful for analysis because they are less affected by management's choice of accounting methods.

$$\text{effective tax rate measure \#1} = \frac{\text{taxes payable (from the tax return)}}{\text{pretax income (from the f/s)}}$$

$$\text{effective tax rate measure \#2} = \frac{\text{income tax paid (from the tax return)}}{\text{pretax income (from the f/s)}}$$

Low effective tax rates according to either of these measures (relative to effective tax rates of comparable companies) are a potential red flag indicating possible earnings manipulation.

When analyzing the firm's income tax disclosures, watch for these other warning signals:

- Companies that generate significant pretax income on their financial statements while reporting low taxes payable (i.e., low effective tax rates as measured with the alternative definitions previously discussed) are likely to be employing aggressive accounting methods and have low-quality earnings.
- A decrease in capital spending may signal a reversal of past temporary differences related to depreciation methods, resulting in higher taxes payable.
- Restructuring charges typically have no tax cash flow effects in the year they are recorded but may have significant effects in future years as the restructured operations and impaired assets are sold.
- Temporary differences may reverse because of changes in tax law, causing higher taxes payable.

Analyzing the Effective Rate Reconciliation

Some firms' reported income tax expense differs from the amount based on the statutory income tax rate. This is referred to as the difference between the effective tax rate and the statutory rate. The differences are generally the result of:

- Different tax rates in different tax jurisdictions (countries).
- Permanent tax differences: tax credits, tax-exempt income, nondeductible expenses, and tax differences between capital gains and operating income.
- Changes in tax rates and legislation.
- Deferred taxes provided on the reinvested earnings of foreign and unconsolidated domestic affiliates.

- Tax holidays in some countries (watch for special conditions such as termination dates for the holiday or a requirement to pay the accumulated taxes at some point in the future).

Accounting standards require a disclosure reconciling the difference between reported income tax expense and the amount based on the statutory income tax rate. Understanding this difference will enable the analyst to better estimate future earnings and cash flow.

When estimating future earnings and cash flows, the analyst should understand each element of the reconciliation, including its relative impacts, how each has changed with time, and how each is likely to change in the future. Often the analyst will need additional information from management to determine the future direction of each element.

In analyzing trends in tax rates, it is important to only include reconciliation items that are continuous in nature rather than those that are sporadic. There are no general rules for the kinds of items that are continuous or sporadic. The disclosures of each financial statement should be reviewed based on the footnotes and management discussion and analysis.

Nevertheless, items including different rates in different countries, tax-exempt income, and non-deductible expenses tend to be continuous. Others items are almost always sporadic, such as the occurrence of large dollar amounts of asset sales and tax holiday savings.

Example: Analyzing the tax rate reconciliation

Novelty Distribution Company (NDC) does business in the United States and abroad. The company's reconciliation between effective and statutory tax rates for three years is provided in Figure 11.

Figure 11: Statutory U.S. Federal Income Tax Rate Reconciliation

	2003	*2004*	*2005*
Statutory U.S. federal income tax rate	35.0%	35.0%	35.0%
State income taxes, net of related federal income tax benefit	2.1%	2.2%	2.3%
Benefits and taxes related to foreign operations	(6.5%)	(6.3%)	(2.7%)
Tax rate changes	0.0%	0.0%	(2.0%)
Capital gains on sale of assets	0.0%	(3.0%)	0.0%
Special items	(1.6%)	8.7%	2.5%
Other, net	0.8%	0.7%	(1.4%)
Effective income tax rates	29.8%	37.3%	33.7%

	2003	*2004*	*2005*
Taxable income	$2,330.00	$1,660.00	$2,350.00
Statutory U.S. federal income tax	815.50	581.00	822.50
State income taxes, net of related federal income tax benefit	48.93	36.52	54.05
Benefits and taxes related to foreign operations	(151.45)	(104.58)	(63.45)
Tax rate changes	–	–	(47.00)
Capital gains on sale of assets	–	(49.80)	–
Special items	(37.28)	144.42	58.75
Other, net	18.64	11.62	(32.90)
Effective income taxes	$694.34	$619.18	$791.95

Analyze the trend in effective tax rates over the three years shown.

Answer:

For some trend analysis, the analyst may want to convert the reconciliation from percentages to absolute numbers. However, for this example, the trends can be analyzed simply by using the percentages. Nevertheless, both percentages and the absolute numbers are provided.

The effective tax rate is upward trending over the 3-year period. Contributing to the upward trend is an increase in the state income tax rate and the loss of benefits related to taxes on foreign income. In 2003, a loss related to the sale of assets partially offset an increase in taxes created by special items. In 2003 and 2005, the special items and the other items also offset each other. The fact that the special items and other items are so volatile over the 3-year period suggests that it will be difficult for an analyst to forecast the effective tax rate for NDC for the foreseeable future without additional information. This volatility also reduces comparability with other firms.

Analyzing Disclosures About Deferred Tax Items

Companies are required to disclose details on the source of the temporary differences that cause the deferred tax assets and liabilities reported on the balance sheet. Changes in those balance sheet accounts are reflected in deferred income tax expense on the income statement. Here are some common examples of temporary differences you may encounter on the exam.

- A long-term deferred tax liability results from using the MACRS *depreciation* schedule for the tax returns and straight-line depreciation for the financial statements. The analyst should consider the firm's growth rate and capital spending levels when determining whether the difference will actually reverse.
- *Impairments* generally result in a deferred tax asset since the writedown of assets is recognized immediately for financial reporting, but not for tax purposes until the asset is sold.
- *Restructuring* generates a deferred tax asset because, for financial reporting purposes, the costs are recognized when restructuring is completed, but not expensed for tax purposes until actually paid. Note that restructuring usually results in significant cash outflows (net of the tax savings) in the years following when the restructuring costs are reported.
- In the U.S., firms that choose to use LIFO for financial statement purposes are required to use LIFO for tax purposes, so no temporary differences result. However, in countries for which this is not a requirement, temporary differences can result from the *choice of inventory accounting method.*
- *Post-employment benefits* and *deferred compensation* are both recognized when earned by the employee for book purposes but not expensed for tax purposes until actually paid. This will result in a current deferred tax asset or liability.
- A deferred tax adjustment is made to stockholder's equity to reflect gains or losses from carrying *available-for-sale marketable securities* at market value.

Example: Analyzing deferred tax item disclosures

WCCO Inc.'s income tax expense has consistently been larger than taxes payable over the last three years. WCCO disclosed in the footnotes to its 2005 financial statements the major items recorded as deferred tax assets and liabilities (in millions of dollars), as shown in Figure 12.

Figure 12: Deferred Tax Disclosures in Footnotes to WCCO Inc. Financial Statements

	2005	2004	2003
Employee benefits	$278	$310	$290
International tax loss carryforwards	101	93	115
Subtotal	379	403	405
Valuation allowance	(24)	(57)	(64)
Deferred tax asset	355	346	341
Property, plant and equipment	452	361	320
Unrealized gains on available-for-sale securities	67	44	23
Deferred tax liability	519	405	343
Deferred income taxes	$164	$59	$2

Use Figure 12 to explain why income tax expense has exceeded taxes payable over the last three years. Also explain the effect of the change in the valuation allowance on WCCO's earnings for 2005.

Answer:

The company's deferred tax asset balance results from international tax loss carryforwards and employee benefits (most likely pension and other post-retirement benefits) offset by a valuation allowance. The company's deferred tax liability balance results from property, plant, and equipment (most likely from using accelerated depreciation methods for tax purposes and straight-line on the financial statements) and unrealized gains on securities classified as available-for-sale (because the unrealized gain is not taxable until realized).

Income tax expense is equal to taxes payable plus deferred income tax expense. Because the deferred tax liabilities have been growing faster than the deferred tax assets, deferred income tax expense has been positive, resulting in income tax expense being higher than taxes payable.

Management decreased the valuation allowance by $33 million in 2005. This resulted in a reduction in deferred income tax expense and an increase in reported earnings for 2005.

Estimating Taxable Income from Deferred Tax Expense

Recall that deferred tax expense results from the difference between taxable income on the tax returns and pretax income on the financial statements. We can use the deferred tax expense and the statutory tax rate to estimate the difference between taxable income and pretax income attributable to specific temporary differences:

$$(\text{pretax income} - \text{taxable income}) = \frac{\text{deferred tax expense}}{\text{statutory tax rate}}$$

Example:

In 2005 WCCO reported depreciation expense on the statement of cash flows of $426 million. The deferred tax liability related to depreciation increased from $361 million in 2004 to $452 million in 2005. Assuming a statutory tax rate of 35%, compute the tax basis depreciation for 2005 and the cumulative financial reporting tax difference for net property, plant, and equipment as of fiscal year end 2005.

Answer:

The additional depreciation expense under tax reporting is equal to the change in the deferred tax liability divided by the statutory rate: ($452 – $361) / 0.35 = $260. Total tax basis depreciation for 2005 was $426 + $260 = $686.

The reporting difference in accumulated depreciation is approximately $1,291 ($452 / 0.35). The tax basis for property, plant, and equipment is $1,291 million less than the net amount reported on the balance sheet.

Effect of Disclosures on Financial Statements and Ratios

If the deferred tax liability or asset is expected to reverse, it is valued for accounting purposes at its undiscounted value. Because the payments may occur far into the future, an analyst should revalue the liability or asset at its present value. The difference between the stated value and the present value of deferred taxes should be treated as equity.

Example: Adjusting deferred taxes

Company A and Company B each have debt of $1,000,000, deferred tax liabilities of $200,000, and equity of $2,000,000. The deferred tax liabilities were created as a result of depreciation for tax purposes being greater than depreciation for financial reporting purposes. For Company A, there is no slowdown in capital

expenditures expected, while for Company B, the growth in capital expenditures will stop. Therefore, it is reasonable to expect $75,000 of Company B's deferred tax liabilities to reverse. These deferred tax liabilities have a present value of $50,000.

Analyze the effect of the deferred liabilities on the financial statements and debt-to-equity ratio for both Company A and Company B.

Answer:

Analysis of Company A:

The unadjusted debt-to-equity ratio for Company A is:

$$\text{unadjusted debt-to-equity for Company A} = \frac{\$1,000,000 + \$200,000}{\$2,000,000} = 0.60$$

Since the deferred tax liabilities are not expected to reverse, they should be treated as equity. Therefore, the revised debt-to-equity ratio is:

$$\text{adjusted debt-to-equity for Company A} = \frac{\$1,000,000}{\$2,000,000 + \$200,000} = 0.45$$

This is a significant improvement over the unadjusted debt-to-equity ratio.

The right-hand side of the balance sheet (liabilities plus equity) stays constant. There is no additional wealth created or lost, and there has only been a reclassification between liabilities and equity.

Analysis of Company B:

The initial debt-to-equity ratio for Company B is also 0.60. Since some of the deferred tax liabilities are expected to reverse, the portion expected to reverse will be treated as a liability and the remaining amount treated as equity. Therefore, $50,000 of the deferred tax liability will remain as a liability, and $150,000 will be reclassified as equity. The revised debt-to-equity ratio is:

$$\text{adjusted debt-to-equity for Company B} = \frac{\$1,000,000 + \$50,000}{\$2,000,000 + \$125,000 + \$25,000} = 0.49$$

As with Company A, there is no change to the total value of the right-hand side of Company B's balance sheet because it still has to equal the total value of the assets. However, the reclassification of the deferred tax liabilities under present value assumptions means that the analyst has to increase the value of the equity by the amount of deferred tax liabilities that are not expected to reverse plus the difference between the absolute value and the present value of the deferred tax liabilities that are expected to reverse. Therefore, the value of equity is $2,000,000 + $125,000 + ($75,000 – $50,000) = $2,150,000.

Generally, if a company's deferred tax liabilities are not expected to reverse (and are therefore reclassified as equity), there will be a corresponding reduction in the firm's debt-to-equity ratio.

KEY CONCEPTS

1. Taxable income on the tax return is equivalent to pretax income on the income statement; taxes payable on the tax return is equivalent to tax expense on the income statement.
2. Deferred tax assets are balance sheet amounts that result from an excess of taxes payable over income tax expense that are expected to be recovered from future operations. Deferred tax liabilities are balance sheet amounts that result from an excess of income tax expense over taxes payable that are expected to result in future cash outflows.
3. Deferred tax assets and liabilities are calculated using the liability method, in which the assets and liabilities are calculated at any one time to reflect the current tax rate.
4. A valuation allowance reduces the value of a deferred tax asset when its eventual recoverability is in doubt.
5. Deferred tax liabilities that are expected never to reverse, typically because of expected growth in capital expenditures, should be treated for analytical purposes as equity. If deferred tax liabilities are expected to reverse, they should be treated for analytical purposes as liabilities, but calculated at their present value.
6. Permanent differences between taxable income and pretax income should not create a deferred asset or liability but should be used to adjust the effective tax rate.
7. If the tax rate increases, the increase in deferred tax liabilities increases the income tax expense, and the increase in deferred tax assets decreases the income tax expense. A tax rate decrease has the opposite effect.
8. Firms are required to disclose a reconciliation between a company's effective income tax rate and the applicable statutory rate in the country where the business is domiciled. Looking at the trend of the individual items of the reconciliation can aid in understanding past earnings trends and in predicting future tax rates. Where adequate data is provided, they can also be helpful in predicting future earnings, cash flows, and in adjusting financial ratios.

CONCEPT CHECKERS: ANALYSIS OF INCOME TAXES

1. Which of the following statements is TRUE? The difference between taxes payable for the period and the tax expense recognized on the financial statements results from differences:
   A. in management control.
   B. between basic and diluted earnings.
   C. between financial and tax accounting.
   D. between state and federal tax policies.

2. Which of the following tax definitions is FALSE?
   A. Taxable income is income based upon IRS rules.
   B. Taxes payable is the amount due to the government.
   C. Pretax income is income tax expense divided by one minus the statutory tax rate.
   D. Income tax expense is the amount listed on the firm's financial statements.

Use the following data to answer Questions 3 through 10.

- A firm acquires an asset for $120,000 with a 4-year useful life and no salvage value.
- The asset will generate $50,000 of cash flow for all four years.
- The tax rate is 40% each year.
- The firm will depreciate the asset over three years on a straight-line (SL) basis for tax purposes and over all four years on a SL basis for financial reporting purposes.

3. Taxable income in year 1 is:
   A. $6,000.
   B. $10,000.
   C. $20,000.
   D. $50,000.

4. Taxes payable in year 1 are:
   A. $4,000.
   B. $6,000.
   C. $8,000.
   D. $20,000.

5. Pretax income in year 4 is:
   A. $6,000.
   B. $10,000.
   C. $20,000.
   D. $50,000.

6. Income tax expense in year 4 is:
   A. $4,000.
   B. $6,000.
   C. $8,000.
   D. $20,000.

7. Taxes payable in year 4 are:
   A. $4,000.
   B. $6,000.
   C. $8,000.
   D. $20,000.

8. At the end of year 2, the firm's balance sheet will report a deferred tax:
   A. asset of $4,000.
   B. asset of $8,000.
   C. liability of $4,000.
   D. liability of $8,000.

9. Suppose tax rates rise during year 2 to 50%. At the end of year 2, the firm's balance sheet will show a deferred tax liability of:
   A. $5,000.
   B. $6,000.
   C. $8,000.
   D. $10,000.

10. Suppose tax rates rise during year 2 to 50%. What will be the income tax expense in year 2?
   A. $5,000.
   B. $8,000.
   C. $10,000.
   D. $11,000.

11. In its first year of operations, a firm produces taxable income of –$10,000. The prevailing tax rate is 40%. The firm's balance sheet will report a deferred tax:
   A. asset of $4,000.
   B. asset of $10,000.
   C. liability of $4,000.
   D. liability of $10,000.

12. An analyst is comparing a firm to its competitors. The firm has a deferred tax liability and is expected to continue to grow in the foreseeable future. How should the liability be treated for analysis purposes?
   A. It should be treated as equity at its full value.
   B. It should be treated as a liability at its full value.
   C. The present value should be treated as a liability with the remainder being treated as equity.
   D. It should be considered neither a liability nor equity.

13. An analyst is comparing a firm to its competitors. The firm has a deferred tax liability and is expected to have capital expenditures decline in the future. How should the liability be treated for analysis purposes?
   A. It should be treated as equity at its full value.
   B. It should be treated as a liability at its full value.
   C. The present value should be treated as a liability with the remainder being treated as equity.
   D. It should be considered neither a liability nor equity.

14. Which one of the following statements is TRUE? Under the liability method of accounting for deferred taxes, a decrease in the tax rate at the beginning of the accounting period will:
   A. increase taxable income in the current period.
   B. reduce income tax expense for the current period.
   C. reduce the deferred tax liability.
   D. increase the beginning-of-period deferred tax asset.

15. An analyst gathered the following information about a company:
    - Taxable income is $40,000.
    - Pretax income is $50,000.
    - Current tax rate is 50%.
    - Tax rate when the reversal occurs will be 40%.

    What is the company's deferred tax liability at the end of year 1?
    A. $3,500.
    B. $4,000.
    C. $4,500.
    D. $5,000.

16. While reviewing a company, an analyst identifies a permanent difference between taxable income and pretax income. Which of the following statements identifies the CORRECT financial statement adjustment?
    A. The amount of the tax implications of the difference should be added to the deferred tax liabilities.
    B. The present value of the amount of the tax implications of the difference should be added to the deferred tax liabilities.
    C. The effective tax rate for calculating tax expense should be adjusted.
    D. Taxes payable should be reduced.

17. An analyst is reviewing a company with a large deferred tax asset on its balance sheet. In reviewing the company's performance over the last few years, the analyst has determined that the firm has had cumulative losses for the last three years and has a large amount of inventory that can only be sold at sharply reduced prices. Which of the following adjustments should the analyst make to account for the deferred tax assets?
    A. Record a deferred tax liability to offset the effect of the deferred tax asset on the firm's balance sheet.
    B. Recognize a valuation allowance to reflect the fact that the deferred tax asset is unlikely to be realized.
    C. Do nothing. The difference between taxable and pretax income that caused the deferred tax asset is likely to reverse in the future.
    D. Decrease tax expense by the amount of the deferred tax asset unlikely to be realized.

ANSWERS – CONCEPT CHECKERS: ANALYSIS OF INCOME TAXES

1. C The difference between taxes payable for the period and the tax expense recognized on the financial statements results from differences between financial and tax accounting.

2. C Pretax income and income tax expense are not always linked because of temporary and permanent differences.

3. B Annual depreciation expense for taxes is ($120,000 – 0) / 3 = $40,000. Taxable income is $50,000 – $40,000 = $10,000.

4. A Taxes payable is taxable income × tax rate = $10,000 × 40% = $4,000. (The $10,000 was calculated in question #3).

5. C Annual depreciation expense for financial income is ($120,000 – 0)/ 4 = $30,000. Pretax income is $50,000 – $30,000 = $20,000.

6. C Because there has been no change in the tax rate, income tax expense is pretax income × tax rate = $20,000 × 40% = $8,000. (The $20,000 was calculated in question #5).

7. D Note that the asset has been fully depreciated for tax purposes after year 3, so taxable income is $50,000. Taxes payable for year 4 = taxable income × tax rate = $50,000 × 40% = $20,000.

8. D The difference between pretax income (calculated in question #5) and taxable income (calculated in question #3) each year is $20,000 – $10,000 = $10,000. The cumulative difference after two years is (2 × $10,000) = $20,000. The deferred tax liability is $20,000 × 40% = $8,000. It is a liability because pretax income exceeds taxable income.

9. D The deferred tax liability is now $20,000 × 50% = $10,000. (Multiply the cumulative income difference by the new tax rate.)

10. D Taxes payable in year 2 is now taxable income × 50% = $10,000 × 50% = $5000. The deferred tax liability at the end of year 1 was $4,000 (before restatement under the new tax rates). Tax expense = taxes payable + increase in deferred taxes = $5,000 + ($10,000 – $4,000) = $11,000.

11. A Tax loss carryforwards are deferred tax assets and would be equal to the loss multiplied by the tax rate.

12. A The firm has a deferred tax liability and is expected to continue to grow in the foreseeable future. The liability should be treated as equity at its full value.

13. C The firm has a deferred tax liability and is expected to have capital expenditures decline in the future. The present value should be treated as a liability with the remainder being treated as equity.

14. C If the tax rate falls, balance sheet DTL and DTA are both reduced. Taxable income is unaffected. Income tax expense could increase if the balance sheet DTA is greater than the DTL.

15. B The tax rate that should be used is the expected tax rate when the liability reverses. The deferred tax liability will be $10,000 × 40% = $4,000.

16. C If a permanent difference between taxable income and pretax income is identifiable, the effective tax rate for calculating tax expense should be adjusted.

17. B A valuation allowance is used to offset deferred tax assets if it is unlikely that those assets will be realized. Because the company has a history of losses and inventory that is unlikely to generate future profits, it is unlikely the company will realize its deferred tax assets in full.

The following is a review of the Financial Statement Analysis principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

ANALYSIS OF FINANCING LIABILITIES

Study Session 10

EXAM FOCUS

One crucial point in this topic review is that when a company issues a bond, the initial liability posted to the balance sheet is the amount received, not the par amount, and the effective interest rate is the market rate, not the coupon rate. The discount or premium is amortized over the bond's life so that the liability is equal to par at maturity. Candidates should understand the difference between cash interest costs and interest expense, how cash flow from operations is distorted by discount/premium bonds, and why market values of debt are more appropriate than book values for calculating leverage and for valuation purposes. Some advantages of various types of debt would be good to know, as would the balance sheet treatment of convertible bonds and bonds with attached warrants.

BOND TERMINOLOGY

The various forms of debt and financing activities are important aspects of the analysis of a firm's short-term liquidity and long-term solvency.

This review emphasizes balance sheet debt, including current liabilities, long-term liabilities from financing activities, the various debt instruments, and the effect of interest rate changes.

- The **face value** is also known as the bond's maturity value, or par value. This is the value of the bond if market interest rates equal the coupon rate on the date of bond issuance.
- The **coupon rate** is multiplied by the face value to calculate the periodic *coupon payments* to be made to investors.
- The **market rate of interest** is used to value debt obligations. Do not confuse the market rate of interest, which is the compensation required by financial markets for default risk, liquidity, the time value of money, etc., with the coupon rate, which is the rate of interest stated on the debt contract. For fixed-rate debt, the coupon rate does not change over the life of the contract. However, the market rate changes every day and will cause differences between the book value of the debt and the market value of the debt. This concept is explained in greater detail later in this topic review.

TYPES OF BALANCE SHEET DEBT

Current liabilities are defined as those liabilities due within one year or operating cycle.

Current liabilities are reported on the balance sheet according to their (1) order by maturity, (2) descending order by amount, or (3) order in the event of liquidation. Current liabilities are reported at their full maturity value. Current liabilities may result from operating activities (e.g., trade credit) or from financing activities (e.g., current portion of long-term debt):

- Operating and trade liabilities—these are the result of credit granted to the company by its suppliers.
- Advances from customers—these occur when customers pay in advance and when the firm must deliver the service or good in the future. These should be considered a prediction of future revenues rather than a prediction of future cash outflows.
- Short-term debt from the credit markets.

- Current portion of long-term debt payable within the year.

The first two categories (operating and trade liabilities, and advances) are consequences of operating decisions and arise in the normal course of business. The last two categories (short-term debt and current portion of long-term debt) are consequences of financing decisions and indicate a future need for cash or refinancing. It is necessary to monitor the relative levels of these two categories. A shift from operating to financing sources may indicate the beginning of a liquidity crisis, and the inability to repay short-term credit is a sign of financial distress.

Long-term debt contracts are obligations that are not payable within one year or one operating cycle, whichever is longer. Long-term debt may be obtained from many sources and may differ in the structure of interest and principal payments and the claims creditors have on the assets of the firm. Some creditors may have a claim on specific assets and other creditors may have only a general claim. Some creditors may have claims that rank below (are *subordinated* to) the claims of other creditors whose claims have priority (are *senior* to the other claims).

- Debt is equal to the present value of the future interest and principal payments. For *book values*, the discount rate is the interest rate in effect when the debt was incurred. For *market values*, the rate is the current market interest rate.
- Interest expense is the amount paid to the creditor in excess of the amount received. Although the total amount of interest to be paid is known, the allocation to specific time periods may be uncertain.

Bonds are a contract between the borrower and the lender that obligates the bond issuer to make payments to the bondholder over the life of the bond. Two types of payments are involved:

- Periodic payment of interest [affects cash flows from operations (CFO)].
- Repayment of principal at maturity [affects cash flow from financing (CFF)].

Interest expense each period = interest rate at issuance × balance sheet liability

The interest expense of bonds issued at a discount rises over time because of the increasing value of the liability. The interest expense of bonds issued at a premium will fall over time because of the decreasing value of the liability, and the interest expense of par bonds will remain constant.

The **balance sheet liability** is the present value of the remaining cash payments using the market rate when the bonds were issued. At maturity, the value of the liability will equal the par value of the bond.

The bond contract does not determine the amount the borrower receives or the allocation between interest and principal. That depends on the current market rate of interest. The market interest rate depends on the maturity and risk of the bond and may be equal to, less than, or greater than the coupon rate on the date of issue.

- When the market rate equals the coupon rate, the bond is called a *par* bond.
- When the market rate is greater than the coupon rate, the bond is called a *discount* bond.
- When the market rate is less than the coupon rate, the bond is called a *premium* bond.

LOS 45.a: Compute the effects of debt issuance and amortization of bond discounts and premiums on the financial statements and ratios, and discuss the effect on the financial statements from issuing zero-coupon debt.

Bonds Issued at Par

When a bond is issued at par, its effects on the financial statements are very straightforward.

- **Balance sheet impact.** Bonds are always initially listed as liabilities equal to the amount of the proceeds received at issuance. For a par bond the proceeds are equal to face value, so the bond liability remains at face value over the life of the bond.
- **Interest expense.** Interest expense is always equal to the book value of the bonds at the beginning of the period multiplied by the market rate of interest *at issuance*. In the case of par value bonds, this is the same as the coupon rate of the bond.
- **Cash flow.** CFO includes a deduction for interest expense. For bonds issued at par, the interest expense is equal to the coupon payment. CFF is increased by the amount received. Upon repayment of the bond at maturity, CFF is reduced by the bond's par value.

Bonds Issued at a Premium or Discount

When the market rate of interest is not equal to the coupon rate, the present value of the coupon payments plus the present value of the face value is not equal to par value, and a *premium* or *discount* occurs. The premium or discount is usually relatively small for coupon bonds.

If the market rate of interest is less than the coupon rate, the proceeds received will be greater than face value, and a premium results. Recall from our basic bond valuation that if the market rate of interest is less than the coupon rate, investors will *pay more* to obtain the higher coupon payment attached to the bond in question. Hence, the bond will sell at a premium.

If the market rate of interest is greater than the coupon rate, the proceeds received will be less than the face value, and a discount results. Here, the coupon rate is low relative to bonds that are being issued at par value. Hence, individuals will *pay less* than face value for bonds with low coupons relative to the current market rate. These are called discount bonds.

Balance sheet impact

- Bonds are always initially listed as liabilities based on the proceeds received from the bonds, which is the present value of all future payments. At any point in time, the book value of the bonds can be calculated as the present value of all future payments at the market rate of interest.

Professor's Note: The rate of interest used in all calculations for book values is the market rate at the time the bonds were issued. This is an extremely important point.

- Bonds that were originally sold at a premium will always be shown at a premium on the balance sheet. This premium will be amortized toward zero over the life of the bond.
- Bonds that were originally sold at a discount will always be recorded on the balance sheet at a discount. This discount will be amortized toward zero over the life of the bond. Hence, the book value of both premium and discount bonds will *converge* to the bonds' par or face values at maturity.

Interest expense

- Interest expense is always equal to the book value of the bonds at the beginning of the period multiplied by the market rate of interest. *Market rate of interest* refers to the rate in effect when the bonds are issued.
- In the case of premium bonds, the interest expense will be lower than the coupon. The amortization of the bond's premium will serve to *reduce* the interest expense that is shown on the income statement. In general, interest expense will equal the coupon payment less the premium amortization.
- In the case of discount bonds, the interest expense will be higher than the coupon. Here, the amortization of the bond's discount will serve to *increase* the interest expense that is reported on the

income statement. In general, interest expense will equal the coupon payment plus the discount amortization.

Professor's Note: In the case of a discount bond, the coupon is too low relative to the market's required rate of return. The purpose of amortizing the discount is to (1) increase the bond's book value over time and (2) increase interest expense so that the coupon + discount amortization is approximately equal to the interest expense that would have prevailed had the bond been issued at par with a higher coupon. This argument is easily reversed for premium bonds.

Cash flow

- The coupon represents the cash flow component of the bond and is the amount deducted in calculating CFO for accounting purposes. However, from an analytical perspective, the interest expense and the amortization of the premium or discount should be separated. Amortization should be included in CFF, not CFO.
- *For premium bonds*, the cash coupon is higher than interest expense; consequently, CFO is understated and CFF is overstated relative to a company that does not have premium bonds in its capital structure.
- *For discount bonds*, the cash coupon is lower than interest expense; consequently, CFO is overstated and CFF is understated relative to a company that does not have discount bonds.
- Analysts can make adjustments to CFO by correcting for the difference between the coupon payment and the interest expense—this adjustment will be positive for premium bonds and negative for discount bonds.
- Upon issuance, CFF is increased by the amount of the proceeds, and upon repayment at maturity, CFF is reduced by the par value or payoff amount.
- In our review of the statement of cash flows, it is argued that all debt-related cash flow should be excluded from CFO and included in CFF. This takes the adjustments just discussed one step further. From an economic perspective, this approach is desirable because it separates investment decisions from financing decisions and gives a more clear picture of the profitability of operations.

Example: Book values and cash flows

On December 31, 2002, a company issued a 3-year, 10% annual coupon bond with a face value of $100,000.

Part A: Calculate the book value of the bond at year-end 2002, 2003, and 2004, and the interest expense for 2003, 2004, and 2005, assuming the bond was issued at a market rate of interest of (1) 10%, (2) 9%, and (3) 11%.

Part B: The financial statements for 2003 show that cash flow from operations was $50,000. Assuming that the market rate of interest was 9% when the bond was issued, how should this cash flow be analyzed when comparing it to other companies?

Answer: Part A

Bond issued at par. If the market rate of interest at issuance is 10%, the book value of the bonds will always be $100,000, and the interest expense will always be $10,000, which is equal to the coupon payment of 0.10 × $100,000. There is no discount or premium to amortize.

Premium bonds. If the market rate of interest is 9%, the present value of the cash payments (a 3-year annuity of $10,000 and a payment in three years of $100,000) is $102,531.

N = 3; PMT = 10,000; FV = 100,000; I/Y = 9; CPT → PV = $102,531

Professor's Note: The present value computed in this manner will have a minus sign.

Figure 1 shows the interest expense (IE) and book value (BV) at the end of each year.

Figure 1: Interest Expenses and Book Value for a Premium Bond

Year	*(1) Beginning Book Value*	*(2) Interest Expense (1) × 9%*	*(3) Coupon*	*(4) Ending Book Value (1) + (2) – (3)*
2003	$102,531	$9,228	$10,000	$101,759
2004	101,759	9,158	10,000	100,917
2005	100,917	9,083	10,000	100,000

The premium amortization for 2003 is 10,000 – 9,228 = $772. For 2004, the amortization is 10,000 – 9,158 = $842. Finally, for 2005, premium amortization is $917. Note that the premium has been fully amortized upon maturity such that the book value of the bond equals par value.

Discount bonds. If the market rate of interest is 11%, the present value of the cash payments (a 3-year annuity of $10,000 and a payment in three years of $100,000) is $97,556.

- N = 3; PMT = 10,000; FV = 100,000; I/Y = 11; CPT → PV = $97,556

Figure 2 shows the interest expense and book value at the end of each year.

Figure 2: Interest Expense and Book Value for a Discount Bond

Year	*(1) Beginning Book Value*	*(2) Interest Expense (1) × 11%*	*(3) Coupon*	*(4) Ending Book Value (1) + (2) – (3)*
2003	$97,556	$10,731	$10,000	$98,287
2004	98,287	10,812	10,000	99,099
2005	99,099	10,901	10,000	100,000

Again, the pattern of discount amortization is such that the discount is fully amortized upon maturity, when the book value of the bond equals par value.

Answer: Part B

For the premium bond (9% market rate at issuance), the cash component of interest expense was overstated. CFO was understated in 2003 because CFO is reduced by the coupon of $10,000 instead of by the true interest expense of $9,228. For analysis, cash flow from operations should be adjusted by adding $772 ($10,000 – $9,228). Note that since CFO is understated, CFF will be overstated over the life of a premium bond. While the proceeds of issuance are a positive CFF (+$102,531), the negative CFF at maturity is only the face value ($100,000). Over the life of the bond, net CFF (+2,531) is positive, by the same amount that CFO is understated.

Summary of Financial Statement Effects of Issuing a Bond

Statement of Cash Flows

Figure 3: Cash Flow Impact of Issuing a Bond

	Cash Flow from Financing	*Cash Flow from Operations*
Issuance of debt	Increased by cash received (Present value of the bond at the market interest rate)	No effect
Periodic interest payments	No effect	Decreased by interest paid [(coupon rate) × (face or par value)]
Payment at maturity	Decreased by face (par) value	No effect

Figure 4: Economic or Analytic Perspective of Interest Payments

	Cash Flow from Financing	*Cash Flow from Operations*
Premium bonds	Overstated	Understated
Discount bonds	Understated	Overstated

Income Statement

$$\text{Interest expense} = \begin{pmatrix}\text{the market rate}\\ \text{at issue}\end{pmatrix} \times \begin{pmatrix}\text{the balance sheet value}\\ \text{of the liability at}\\ \text{the beginning of the period}\end{pmatrix}$$

Figure 5: Income Statement Impact of Issuing a Bond

Issued at Par	*Issued at a Premium*	*Issued at a Discount*
Market rate = coupon rate Interest expense = coupon rate × face value = cash paid	Market rate < coupon rate Interest expense = cash paid – amortization of premium	Market rate > coupon rate Interest expense = cash paid + amortization of discount
Interest expense is constant	Interest decreases over time	Interest increases over time

Balance Sheet

Long-term debt is carried at the present value of the remaining cash payments discounted at the market rate existing when the debt was issued.

Figure 6: Balance Sheet Impact of Issuing a Bond

Issued at Par	*Issued at a Premium*	*Issued at a Discount*
Carried at face value	Carried at face value plus premium The liability decreases as the premium is amortized to interest expense	Carried at face value less discount The liability increases as the discount is amortized to interest expense

The Effect on Reported Cash Flows of Issuing Zero-Coupon Debt

Zero-coupon debt is debt issued with no periodic payments of interest and principal is paid back with one lump sum payment upon maturity. Zero-coupon bonds are also known as *pure discount* instruments because they are issued at a discount from par value, and their annual interest expense is *implied*. Actual interest is all paid at maturity when the bonds are paid off (at their par value). The effects of zero-coupon debt on financial statements are qualitatively the same as those of discount debt—only the impact is larger because the discount is larger.

For discount bonds, the coupon understates the cash component of interest expense and CFO is overstated. With zero-coupon bonds, there is no coupon, so for operating cash flow purposes there is no interest expense deducted. This *severely overstates CFO*. The difference shows up at maturity when the zero-coupon bond is paid off. The cash flow when the bond is paid off is charged to CFF, and for discount debt this negative cash flow is greater than the positive CFF at issuance. Thus CFF is understated over the life of the bond.

Example: Effect of zero-coupon debt on CFO

Two companies have an identical value for cash sales less cash inputs and cash operating expenses of $50,000. The only difference between the two companies is their financing. At the beginning of this year, Company A sold $1,000,000 of face value zero-coupon bonds maturing in three years. Company B sold $750,000 of 10% coupon bonds maturing in three years. Assume the market rate of interest on these bonds is 10%.

- How much did Company A receive for its bonds?
- What would interest expense be for Company A over the three years of the bond's life?
- Compute the cash flow from operations for Company A and Company B for year 1 (ignore taxes).

Assume that both bonds are *annual pay* and are valued using annual pay assumptions.

Professor's Note: For the exam, know that most zero-coupon bonds in the U.S. are valued using a semiannual pay convention.

Answer:

The present value of $1,000,000 in three years is $1,000,000 / $(1.1)^3$ = 751,315.

N = 3; I/Y = 10; FV = 1,000,000; PMT = 0; CPT→ PV = $751,315

Interest expense in year 1 is $751,315 × 10% = $75,131.

Book value in year 1 is $751,315 + $75,131 = $826,446.

Interest expense in year 2 is $826,446 × 10% = $82,645.

Book value in year 2 is $826,446 + $82,645 = $909,091.

Interest expense in year 3 is $909,091 × 10% = $90,909.

Book value at the end of year 3 = $909,091 + $90,909 = $1,000,000.

Note that the "interest expense" for Company A is entirely composed of *discount amortization*. There is no cash interest component to Company A's interest expense.

CFO for Company A = $50,000 because there is no cash interest expense.

CFO for Company B = $50,000 – $75,000 = –$25,000. Company B's cash coupon payment reduces CFO significantly.

- Without any adjustments, Company A's CFO appears significantly higher than Company B's CFO. An analyst should either adjust B's cash flow upward or A's downward when comparing the companies. Note that at issuance CFF is approximately +$750,000 for both A and B (A was issued for $751,315), but at maturity CFF is –$750,000 for Company B and –$1,000,000 for Company A.

LOS 45.b: Determine the appropriate classification for debt with equity features and calculate the effect of issuance of such instruments on the debt to total capital ratio.

Convertible Bonds

When convertible bonds are issued, under U.S. Generally Accepted Accounting Principals (U.S. GAAP), they are recorded on the balance sheet as if there were no conversion feature, and interest expense is recorded exactly as it is for option-free bonds. A change in this treatment is currently under consideration.

From an analytic perspective, however, the equity feature of convertible bonds can be an important distinction. In general, when the stock price is significantly above the conversion price, it should be treated like equity for the purposes of calculating the debt ratios. Such treatment will decrease debt to equity and debt to total capital. At the other extreme, when the stock price is significantly lower than the conversion price, convertible debt should be treated like debt in calculating ratios.

When the stock price is close to the conversion price, the classification is not as clear and the effect on the debt to total capital ratio is uncertain. The analyst should compute debt ratios treating the convertible bonds alternatively as debt and as equity to gauge the impact of the assumption used. Choosing one treatment over the other should depend on the purpose of the analysis and the analyst's estimate of the probability of conversion over the relevant time horizon.

Bonds With Warrants

When bonds are issued with warrants attached, the proceeds are allocated between the two components. The bond portion is recognized (at a discount) as a liability at fair market value and the discount is amortized over the life of the issue. The warrants are recognized as equity at fair market value, and the cash received when the warrants are exercised is added to equity capital. Overall, debt ratios will be increased less by the issuance of bonds with warrants attached than by the issuance of convertible bonds.

Non-convertible preferred shares are treated by the analyst as equity unless they are redeemable by the holder, in which case they should be treated as debt and the dividends treated as interest. This treatment is required by International Accounting Standards (IAS) and under consideration by the Financial Accounting Standards Board (FASB).

The liability recorded for conventional bonds and convertible bonds is greater than for an equivalent amount of bonds with warrants attached. Because a portion of the proceeds of a bond with attached warrants is classified as equity, both debt-to-equity and debt-to-total capital will be *lower* than if conventional or convertible debt were issued.

LOS 45.c Describe the disclosures relating to financing liabilities, and discuss the advantages/disadvantages to the company of selecting a given instrument and the effect of the selection on a company's financial statements and ratios.

There are various disclosures related to financing liabilities that will aid an analyst.

- On the balance sheet, we will find the present value of the promised future liability payments, discounted at the rate in effect at issuance.
- On the income statement, or in a footnote, we will find interest expense for the period.

- On the cash flow statement, we will find cash interest expense and we can compare this to interest expense to see the effect of the issuance of zero-coupon or discount debt.
- For a publicly-traded firm, filings with the SEC will detail all outstanding securities and their relevant terms.
- For off-balance-sheet liabilities, such as leases, take-or-pay contracts, and other material financial obligations of the firm, we will find details of each liability in the footnotes to the financial statements.

When raising funds, the firm must decide which instrument it will use among a wide variety of security types. Each instrument has advantages and disadvantages. Which is most advantageous for the firm will depend on the specific circumstances of the firm. Some key points will help you to understand which instrument would be the best choice, given the firm's circumstances.

As noted previously, *zero-coupon debt* reduces the firm's cash interest costs and may be advantageous when near-term cash flow is low or quite uncertain. If the firm faces restrictions on its cash interest coverage ratio or has financing costs tied to this ratio, zero coupon debt could offer the most advantages.

Variable-rate debt (also called floating-rate debt) carries an interest rate that is periodically reset to market rates. This typically has the effect of keeping the market value of the debt close to its par value. If a firm has operating cash flows that tend to go up (down) when short-term interest rates increase (decrease), then issuing variable-rate debt can reduce stress on net cash flows. On the other hand, when this is not the case, issuing variable-rate debt can increase the variability of net cash flows as interest rates rise and fall.

When management believes that interest rates will fall in the future, the issuance of variable-rate debt may be based on speculation. If management is right, the variable-rate debt can be replaced with fixed-rate debt in the future after rates have fallen. Thus we can draw a distinction between managements that issue variable-rate debt for valid business purposes and those that issue for speculative reasons.

One final advantage can arise when short-term interest rates are significantly lower than longer term rates. If this situation persists, the firm can reduce total interest costs over the planning horizon by issuing variable-rate debt, since the variable rate is typically a short-term rate. Be aware, however, that the firm will be accepting cash interest variability along with a potential reduction in total interest costs and that often, higher long-term rates may be an indication that short-term rates will be significantly higher in the future.

Firms can issue **debt denominated in a foreign currency**. This type of liability can be advantageous if the firm has future cash flows in that currency. By matching the currency of this cash flow to future liabilities, the firm may hedge (reduce) some currency risk that they would otherwise have. If a firm, for some reason, has a lower borrowing cost in foreign markets, this could make the issuance of debt denominated in a foreign currency attractive.

Each of the types of debt securities with equity features discussed previously has its own potential advantages. Issuing **convertible debt** will decrease borrowing costs, reducing both interest expense and cash interest expense. The trade-off here is simply the value of the option to convert into common stock that is included in the security. There are no specific balance sheet differences between issuing convertible debt and issuing an equivalent amount of non-convertible debt.

Issuing **bonds with warrants attached** can also reduce interest costs relative to conventional corporate bonds but, given the balance sheet treatment of the liability, interest expense will be greater than for equivalent convertible bonds. When warrants are attached, the value attributed to the warrants is treated as a bond discount at issuance and is amortized over the term of the bond. The balance sheet liability is less than both a conventional and convertible bond for this same reason. This will, of course, affect related debt ratios. Assuming the stated coupon rate is the same for a convertible bond and an equivalent bond with warrants attached, the cash interest will be the same for both, and less than the cash interest costs for a conventional bond.

Debt convertible into the shares of a company other than the issuing company is referred to as **exchangeable debt**. There are several potential advantages to issuing exchangeable debt. As with convertible debt, the exchange option will decrease the required yield, and therefore interest expense, of the borrowing. At the same time, the exchange price will typically be some premium over the current market value of the shares. A holding of the shares of the other company may, at the same time, offer some strategic business advantage. If there is a significant capital gain in the shares, the firm may be avoiding significant tax consequences of selling the position and at the same time realizing its value. If the block of exchangeable shares is relatively large, the firm can reduce the market impact of a sale of the entire block by calling the exchangeable debt periodically, releasing shares to the market in a piecemeal manner.

Commodity-linked bonds may reduce (hedge) cash flow risk for producers of the commodity. Consider an oil company that issues bonds with a coupon rate tied to the price of oil. Presumably, when oil prices are high, operating cash flows are relatively high and more cash is available to pay interest costs. More importantly, cash interest expense would fall when oil prices are low. In this case, the times interest earned and cash interest coverage ratios will tend to be more stable over an economic cycle than if conventional debt were issued.

The issuance of **perpetual debt** or conventional bonds with very long maturities (e.g. 100 years) issued at par will not have balance sheet, income statement, or cash flow effects appreciably different from those of conventional fixed-rate bonds with more typical maturities. The analyst, however, may choose to treat these securities more like equity, given their similarity to a preferred stock. The idea here is that perpetual debt is more similar to permanent capital than to conventional debt. Just as issuing variable-rate debt has a potential advantage over fixed rate debt if rates subsequently decrease, issuing perpetual debt has a potential advantage if it is timed to coincide with low market interest rates.

Conventional **preferred shares** have no set maturity and pay a dividend than can be omitted without forcing bankruptcy, so they are treated as equity. However, the distinction between debt and equity securities is often not clear in the case of preferred stock. Just as perpetual debt has characteristics similar to equity, some preferred shares have characteristics more similar to debt than to equity. When preferred shares are redeemable by the shareholder or required to be redeemed by a sinking fund provision, their value should be treated like debt. Also, preferred shares that pay an adjustable short-term interest rate (so called adjustable-rate or market-rate preferred) have the characteristics of short-term debt and should be treated as such by the analyst.

LOS 45.d: Determine the effects of changing interest rates on the market value of debt and on financial statements and ratios.

Under U.S. GAAP, balance sheet values for outstanding debt must be based on the market rate on the date of issuance.

Changes in market interest rates lead to changes in the market values of debt. *Increases (decreases) in the market rate of interest decrease (increase) the market value of debt.* These gains (from the decrease in market value of debt) or losses (from the increase in market value of debt) are not reflected in the financial statements. Hence, the book value of debt will not equal the market value.

With variable-rate debt, neither balance sheet values nor market values of the debt change with market rates, but interest expense does. Rising market rates increase interest expense on variable-rate debt and decrease net income.

For purposes of analysis, market values may be more appropriate than book values. For example, firms that issue debt when interest rates are low are relatively better off when interest rates increase. This increase should be reflected in a higher value of equity and a lower value of debt. Adjusting the firm's debt down to market value will reduce it to the amount the firm would currently have to pay to retire the debt, and will decrease the debt-to-equity ratio. If interest rates decrease, adjusting the debt to market value will have the opposite effects.

SFAS 107 requires disclosures about the fair value of outstanding debt based on year-end or quarter-end prices. These disclosures are made in the notes to the financial statements.

Note: Market value disclosures are not required for non-U.S. firms.

Estimating market values for publicly traded debt is easy. For debt that is not publicly traded, we can find the present value of the future cash flows. Typically, these cash flows are disclosed by the company. The relevant market rate for finding the present values can be found by considering the maturity and other terms of the debt and then using:

- Other similar issues of the company which are publicly traded.
- Rates on publicly traded debt of similar companies.
- A risk premium added to the U.S. bond rate for that maturity.

LOS 45.e: Explain the role of debt covenants in protecting creditors by limiting a company's freedom to invest, pay dividends, or make other operating and strategic decisions.

Debt covenants are restrictions imposed by the bondholders on the issuer in order to protect the bondholders' position. The bondholder can demand repayment of the bonds after a violation of one of the covenants (this is called a technical default). An analysis of the bond covenants is a necessary component of the credit analysis of a bond. Bond covenants are typically disclosed in the footnotes.

Examples of covenants include restrictions on:

- Dividend payments and share repurchases.
- Mergers and acquisitions, and sale, leaseback, and disposal of certain assets.
- Issuance of new debt.
- Repayment patterns (e.g., sinking fund agreements and priority of claims).

Other covenants require the firm to maintain ratios or financial statement items, such as equity, net working capital, current ratio, or debt-to-equity ratio at certain levels. Covenants will specify whether GAAP is to be used when calculating the ratios or whether some adjustment is required. Covenants protect bondholders from actions the firm may take that would negatively affect the value of the bondholders' claims to firm assets and earnings (i.e. decrease credit quality). To the extent that covenants restrict, for example, the firm's ability to invest, take on additional debt, or pay dividends, an analysis of covenants can be important in valuing the firm's equity (especially involving its growth prospects) as well as in analyzing and valuing its debt securities.

KEY CONCEPTS

1. Issuance of discount bonds will lead to an understatement of CFF and an overstatement of CFO, and issuance of premium bonds will have the opposite effect because coupon interest (cash) payments are not equal to interest expense.
2. The amortization of bond premiums and discounts will provide the correct interest expense for the period since the coupon payment does so only for bonds issued at par.
3. The issuance of zero-coupon (pure discount) bonds causes the most severe overstatement of CFO and eventual understatement of CFF.
4. Debt with equity features should be treated for analytical purposes as having both a debt and equity component.

5. The following table summarizes the key issues related to financing liabilities in this topic review.

Financing Liability	*Advantages (from the perspective of the issuer)*	*Analyst Treatment*
Discount/zero-coupon debt	• CFO overstated • Cash interest reduced	• Increase interest expense and decrease CFO by amount of discount amortization
Convertible debt	Versus conventional debt: • Lower interest expense • Higher operating cash flow • Same balance sheet liability	• Treat as equity if stock price > conversion price • Treat as debt if stock price < conversion price
Exchangeable debt	• Lower interest expense • Generate cash without selling investment • Reduce market impact of selling investment • Delay tax impact of gain and control timing of gain	• Similar to convertible
Bonds with warrants	Versus conventional debt: • Lower interest expense • Higher operating cash flow • Lower balance sheet liability	• Classify bond value as debt, warrant value as equity
Commodity bonds	• Converts interest expense from fixed to variable cost • Can reduce interest coverage variability	• May reduce risk compared to conventional debt
Perpetual debt	• Lock in long-term rates when rates are low	• Treat as equity
Preferred stock	• Create a debt/equity hybrid security	• Classify redeemable preferred shares as debt and dividends as interest • Classify variable-rate shares as short-term liabilities

6. Market values of fixed-rate debt change as interest rates change, but reported book values do not. Use market values for analysis and valuation purposes, with the offsetting adjustment to equity.
7. Evaluation of a firm's credit risk and growth prospects should include an analysis of bond covenants.

CONCEPT CHECKERS: ANALYSIS OF FINANCING LIABILITIES

1. The book value of debt equals the present value of interest:
   A. payments at the current discount rate.
   B. payments using the discount rate at the time of issue.
   C. and principal payments using the current discount rate.
   D. and principal payments using the discount rate at the time of issue.

2. Annual interest expense is the:
   A. sum of the annual coupon payments.
   B. amount paid to creditors in excess of par.
   C. book value of the debt times the current interest rate.
   D. book value of the debt times the market interest rate when it was issued.

Use the following data to answer Questions 3 through 10.

A firm issues a $10 million bond with a 6% coupon rate, 4-year maturity, and annual interest payments when market interest rates are 7%.

3. The bond can be classified as a:
   A. discount bond.
   B. zero-coupon bond.
   C. par bond.
   D. premium bond.

4. The annual coupon payments will each be:
   A. $600,000.
   B. $676,290.
   C. $700,000.
   D. $723,710.

5. Total cash payment due the bondholders is:
   A. $12,400,000.
   B. $12,738,721.
   C. $12,800,000.
   D. $13,107,960.

6. The initial book value of the bonds is:
   A. $9,400,000.
   B. $9,661,279.
   C. $10,000,000.
   D. $10,338,721.

7. For the first period the interest expense is:
   A. $600,000.
   B. $676,290.
   C. $700,000.
   D. $723,710.

8. If the market rate changes to 8%, the book value of the bonds at the end of the first period will be:
   A. $9,484,581.
   B. $9,661,279.
   C. $9,737,568.
   D. $9,745,959.

9. The total interest expense reported by the issuer over the life of the bond will be:
   A. $2,400,000.
   B. $2,738,721.
   C. $2,800,000.
   D. $3,107,960.

10. How much will cash flow from operations (CFO) in year 1 be understated or overstated by these bonds?
   A. Overstated by $76,290.
   B. Overstated by $100,000.
   C. Understated by $76,290.
   D. Understated by $100,000.

11. Interest expense reported on the income statement is based on the:
   A. market rate at issuance.
   B. coupon payment.
   C. current market rate.
   D. unamortized discount.

12. The actual coupon payment on a bond is:
   A. reported as an operating cash outflow.
   B. reported as a financing cash outflow.
   C. reported as a financing cash inflow and operating cash outflow.
   D. not reported since only the interest expense is reported.

13. A 2-year bond is carried on the books at a premium because it was issued at a coupon rate of 0.25% higher than the market rate. After one year, market rates have gone down by 0.5%. The bond will now be listed on the books as having:
   A. the same premium it had when originally issued.
   B. a lower premium than when it was originally issued.
   C. par value.
   D. a discount.

14. Wolfe Inc. had a capital structure consisting of $10 million of liabilities and $15 million of equity. Wolfe then issued $0.7 million of preferred shares and $1.0 million of bonds with warrants attached (debt component comprises 80% of the value) for total cash proceeds of $1.7 million. Which of the following amounts is the *revised* debt to total capital ratio upon the issuance of the two new financial instruments?
   A. 0.404.
   B. 0.431.
   C. 0.679.
   D. 0.757.

15. A company has convertible bonds on its books with a conversion price of $20 per share. The stock price is currently $40 per share. For analytical purposes, the bonds should be treated as:
   A. debt.
   B. preferred stock.
   C. equity.
   D. a hybrid of debt and common stock.

16. The relative effects on interest expense and operating cash flow from issuing convertible bonds versus conventional bonds are:

	Interest Expense	Operating Cash Flow
A.	Lower	Lower
B.	Lower	Higher
C.	Higher	Higher
D.	Higher	Lower

17. Which of the following is *least likely* a motivation for issuing exchangeable debt?
A. The issuing firm reports an immediate gain when the debt is issued.
B. Interest expense is lower than issuing conventional debt.
C. The market impact of selling the underlying shares all at once is mitigated.
D. The issuing firm generates cash while retaining control of the underlying shares.

ANSWERS – CONCEPT CHECKERS: ANALYSIS OF FINANCING LIABILITIES

1. D The book value of debt is equal to the present value of interest and principal payments. Book value is based on the market interest rate in effect at the time the debt was issued.

2. D Annual interest expense is the book value of the debt times the interest rate at the time of issuance.

3. A This bond is issued at a discount since the coupon rate < market rate.

4. A Coupon payment = (coupon rate × face value of bond) = 6% × $10,000,000 = $600,000

5. A Four coupon payments and the face value = $600,000 × 4 + $10,000,000 = $12,400,000

6. B The present value of a 4-year annuity of $600,000 plus a 4-year lump sum of $10 million, all valued at a discount rate of 7%, equals $9,661,279. C and D can be eliminated because the bond is selling at a discount.

7. B Market interest rate × book value = 7% × $9,661,279 = $676,290

8. C The change in interest rates is ignored. The new book value = beginning book value + interest expense – coupon payment = $9,661,279 + $676,290 – $600,000 = $9,737,569. The interest expense was calculated in Question 7. Alternatively, changing N from 4 to 3 and calculating the PV will yield the same result.

9. B Coupon payments + amortized interest = coupon payments + (face value – issue value) = $2,400,000 + ($10,000,000 – $9,661,279) = $2,738,721

10. A The true interest expense is $676,290, while the coupon being deducted to calculate CFO is only $600,000. This means CFO is overstated by the difference of $76,290.

11. A Interest expense reported on the income statement is based on the market rate at issuance and reflects the coupon rate plus or minus the amortization of the discount or premium.

12. A The actual coupon payment on a bond is reported as operating cash outflow.

13. B The premium will be lower because of the amortization of the premium over time. The change in interest rates has no impact.

14. A The $0.7 million of preferred shares are treated as equity. For the warrants, $0.8 million would be treated as debt and $0.2 million as equity.

    Liabilities = $10 million + $0.8 million = $10.8 million

    Equity = $15 million + $0.7 million + $0.2 million = $15.9 million

    Debt to total capital ratio = liabilities / (liabilities + equity) = $10.8 million / ($10.8 million + $15.9 million) = 0.404.

15. C The bonds should be treated as equity for analytical purposes because the stock price is significantly above the conversion price.

16. B Issuing convertible bonds instead of conventional bonds reduces interest expense (because convertibles carry lower yields, all else equal) and increases operating cash flow.

17. A One of the advantages of issuing exchangeable debt is to *delay the income tax impact of a potential gain* from selling the shares until the investors exchange the shares. The other three choices are motivations for issuing exchangeable debt.

The following is a review of the Financial Statement Analysis principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

LEASES AND OFF-BALANCE-SHEET DEBT

Study Session 10

EXAM FOCUS

The key to this topic review is differentiating between an operating lease and a capital lease. With an operating lease, there is no recognition of an asset or liability on the balance sheet. The lease payment is charged to the income statement as rent expense and reduces cash flow from operations. With a capital lease, a depreciable asset and a liability are reported on the balance sheet, much as if the asset were purchased and financed with debt. Each lease payment is composed of interest expense and amortization of the lease liability. For the Level 1 exam, be prepared for questions asking for the differences in financial statements and ratios depending on whether an operating lease or a capital lease is used. You should also be able to make lease accounting calculations. Finally, expect questions about how off-balance-sheet financing activities, such as take-or-pay contracts, throughput arrangements, and sales of receivables, affect the financial statements.

LOS 46.a: Discuss the motivations for leasing assets instead of purchasing them and the incentives for reporting the leases as operating leases rather than capital leases.

Leases are classified as either capital leases or operating leases. A lessee must classify a lease as a **capital lease** if *any one* of the following criteria is met:

- The title to the leased asset is transferred to the lessee at the end of the lease period.
- A bargain purchase option exists. A bargain purchase option is a provision that permits the lessee to purchase the leased asset for a price that is significantly lower than the fair market value of the asset on the date that the purchase option becomes exercisable.
- The lease period is at least 75% of the asset's economic life.
- The present value of the lease payments is equal to or greater than 90% of the fair value of the leased asset. The interest rate used to discount the lease payments is the *lower of* the lessee's incremental borrowing rate or the interest rate implicit in the lease.

Professor's Note: The implicit interest rate in the lease is the discount rate that the lessor used to determine the lease payments. It is the lease's internal rate of return because it is the interest rate that equates the present value of lease payments to the fair value of the leased asset. Using the lower of the two discount rates increases the present value of the lease payments and increases the likelihood that the lease will satisfy the 90% criterion and therefore be classified as a capital lease.

A lease not meeting any of these criteria is classified as an **operating lease**.

To have the use of assets in production a firm can buy the asset, rent it for a short term, or lease it for a longer term. There are two different accounting treatments for leases, one for operating leases and one for capital leases. We will address these different treatments shortly, but first let's look at some reasons for leasing rather than purchasing an asset that are not related to the differences in accounting treatment. The **lessee** is the firm that is leasing the asset for use. The **lessor** is the firm from which they are leasing the asset.

Reasons for leasing rather than purchasing an asset include:

- The period of use is short relative to the asset's useful life. For example, a construction company may lease some equipment for the duration of a 1- or 2-year construction project.

- The lessor may be better able to resell the asset. For example, a lessor of copy machines may be well equipped to refurbish and sell a used machine.
- The lessee may not want the risk of resale (the uncertainty about the value of the asset at the end of the period of use, when it will be sold). For example, with high technology equipment, whether it will still be the best technology at the end of the lease period can have a large effect on its resale value.
- If the lessor has market power, the lessor may maximize profits through leasing the asset and maintaining more control of its use. For example, the sole manufacturer of specialized machinery may want to set lease terms based on the intensity of use of the machine, which it could not control or charge for under an outright sale.
- Assets less specialized to the firm are more likely to be leased. For example, office space is often leased.
- There may be risk reduction benefits, especially to privately held firms, from leasing when firm assets have highly correlated values over time. Some of the risk of changes in asset value are effectively borne by the lessor who, in effect, retains ownership of the asset.

Capital Versus Operating Leases

As we will discuss in more detail shortly, an operating lease is accounted for like a rental—no asset or liability is shown on the firm's balance sheet and the periodic lease payments are simply an expense in the current period. In contrast, a capital lease is treated like a purchase of the asset, with the present value of future minimum lease payments treated as a balance sheet liability and the (equal) value of the asset for the lease period shown as an asset on the balance sheet.

Professor's Note: Most of the "incentives" below favor the operating lease. There are very few (if any) incentives for the lessee to classify a lease as a capital lease.

The **incentives for structuring a lease as an operating lease** are:

- If the lessor is in a higher marginal tax bracket than the lessee, the lease should be structured as an operating lease so that the lessor can take advantage of the depreciation of the leased equipment to reduce its taxable income and, thereby, the taxes it pays.
- An operating lease avoids recognition of an asset and a liability on the lessee's balance sheet. Relative to a company that uses capital leases, the operating lease company will have higher profitability ratios (e.g., return on assets) and lower leverage ratios. The lessee may have bond covenants governing its financial policies (e.g., a maximum debt-to-equity ratio).
- Management compensation can be linked to returns on invested capital and operating leases will result in lower invested capital than capital leases.

Capital leases involve the effective transfer of all the risk and benefits of the property to the lessee. Capital leases are economically equivalent to sales (i.e., to a purchase with a transfer of title) and for accounting purposes are treated as sales. Advantages of a capital lease (to the lessee) include the following:

- In the early years of the lease, total expense is greater, potentially leading to tax savings.
- Operating cash flow is higher under a capital lease relative to an operating lease.

LOS 46.b: Determine the effects of capital and operating leases on the financial statements and ratios of the lessees and lessors.

Reporting by Lessee

Operating lease: At the inception of the lease, no entry is made. During the term of the lease, *rent expense*, the lease payment, is charged to income and to *cash flow from operations*. Footnote disclosure of the lease payments for each of the next five fiscal years is required.

Capital lease: At the inception of the lease, the *present value* of minimum lease payments is recognized as an asset and as a liability on the lessee's balance sheet. During the term of the lease, the leased asset is *depreciated* on the income statement. (The depreciation period is the lease period if there is no title transfer or bargain purchase option; if there *is* a title transfer or bargain purchase option, the leased asset is depreciated over its estimated economic life).

- The lease payment is separated into *interest expense* (the discount rate times the lease liability at the beginning of the period) and *principal payment* on the lease liability (the lease payment less the interest expense).
- *Cash flow from operations* is reduced by the interest expense and *cash flow from financing* is reduced by the principal payment on the lease liability.

Example: Effects of a capital lease

Affordable Leasing Company leases a machine for its own use for four years with annual payments of $10,000. At the end of the lease, the lessor regains possession of the asset, which will be sold for scrap value. The lessor's implicit rate on the lease is 6%, and Affordable Leasing's incremental borrowing rate is 7%. Calculate the impact of the lease on Affordable Leasing's balance sheet and income statement for each of the four years, including the immediate impact. Affordable Leasing depreciates all assets on a straight-line (SL) basis. Assume the lease payments are made at the end of the year.

Answer:

The lease is classified as a capital lease because the asset is being leased for at least 75% of its useful life (we know this because at the end of the lease term, the asset will be sold for scrap). The discount rate that should be used to value the lease is 6%, which is the lower of the lessor's implicit rate on the lease and Affordable Leasing's incremental borrowing rate. The present value of the lease payments at 6% is $34,651.

N = 4; I/Y = 6; PMT = 10,000; FV = 0; CPT → PV = $34,651

This amount is immediately recorded as both an asset and a liability.

Over the next four years, depreciation will be $34,651 / 4 = $8,663 per year.

The asset value will decline each year by the depreciation amount and will be: $25,988; $17,326; $8,663; and $0 at the end of each of the next four years, respectively.

The interest expense and liability values are shown in Figure 1. Note that the *principal repayment* equals the lease payment minus interest expense.

Figure 1: Affordable Leasing Example: Capitalized Lease Calculations

Year	*(1) Beginning Leasehold Value*	*(2) Interest Expense (1) × 6%*	*(3) Lease Payment*	*(4) Ending Leasehold Value (1) + (2) – (3)*	*(5) Book Value of the Asset*
0				$34,651	$34,651
1	$34,651	$2,079	10,000	26,730	25,988
2	26,730	1,604	10,000	18,334	17,326
3	18,334	1,100	10,000	9,434	8,663
4	9,434	566	10,000	0	0

Column 5 contains the annual book value of the asset. Notice that because the asset is being depreciated at a rate that is different from the rate of amortization for the liability, the two values are equal only at the inception and termination of the lease.

Financial Statement and Ratio Effects of Operating and Capital Leases

Balance sheet. Capital leases create an asset and a liability. Consequently, turnover ratios that use total or fixed assets in their denominator will appear lower for capital leases relative to operating leases. Return on assets will also be lower for capital leases. Most importantly, leverage ratios such as the debt-to-assets ratio and the debt-to-equity ratio will be higher with capital leases because of the recorded liability. The next lease payment is recognized as a current liability on the lessee's balance sheet. This reduces the lessee's current ratio and its working capital (current assets minus current liabilities).

Since operating leases do not affect the lessee's liabilities, they are sometimes referred to as *off-balance-sheet financing.*

Income statement. *All else held constant, operating income* will be higher for companies that use capital leases relative to companies that use operating leases. This is because the depreciation expense for a capital lease is lower than the lease payment. Interest expense is not included in the calculation of operating income.

Let's assume Affordable Leasing can treat the lease as either an operating or a capital lease. The table in Figure 2 compares the income statement (IS) effects for operating and capital leases.

Figure 2: Affordable Leasing: Leasing Decision Impact on Cash Flow

	Operating Lease	*Capital Lease*		
	Operating Expense = Total Expense	*Operating Expense*	*Nonoperating Expense*	
Year	Rent	Depreciation	Interest	Total Expense
1	$10,000	$8,663	$2,079	$10,742
2	10,000	8,663	1,604	10,267
3	10,000	8,663	1,100	9,763
4	10,000	8,663	566	9,229
Total	40,000			40,000

Total expense over the life of the lease will be the same for operating and capital leases because the sum of the depreciation plus the interest expense will equal the total of the lease payments. However, although the lease payments and depreciation are constant, the interest expense is higher in the first few years (this behavior of interest expense is typical of an amortizing loan). Consequently, net income in the first few years of the lease will be lower for capital leases because the sum of depreciation and interest expense exceeds the lease payment early in the lease's life.

Cash flow. Total cash flow is unaffected by the accounting treatment of a lease as either a capital or operating lease. In our example, total cash outflow is $10,000 per year. However, if the lease is an *operating lease* (rent expense = $10,000), then the *total cash payment* reduces cash flow from *operations.* If the lease is a *capital lease,* then *only* the portion of the lease payment that is considered *interest expense* reduces cash flow from operations. The part of the lease payment considered *payment on principal* reduces cash flow from *financing* activities. The

data in Figure 3 illustrate that if a lease is a capital lease, there is greater cash flow from operations (CFO) and less cash flow from financing (CFF).

Figure 3: Affordable Leasing: Leasing Decision Impact on Cash Flow

	Capital Lease		*Operating Lease*
Year	CF Operations	CF Financing	CF Operations
1	–$2,079	–$7,921	–$10,000
2	–1,604	–8,396	–10,000
3	–1,100	–8,900	–10,000
4	–566	–9,434	–10,000

For example, assume that Affordable Leasing reports CFO of $15,000. If it reports the lease as a capital lease, CFO equals $12,921 (15,000 – 2,079). If it reports the lease as an operating lease, CFO equals $5,000 (15,000 – 10,000). Hence, companies with capital leases will show higher levels of CFO relative to firms that use operating leases (all else the same).

The tables in Figure 4 and Figure 5 summarize the differences between the effects of capital leases and operating leases on the financial statements of the lessee.

Figure 4: Financial Statement Impact of Lease Accounting

Financial Statement Totals	*Capital Lease*	*Operating Lease*
Assets	Higher	Lower
Liabilities (current and long term)	Higher	Lower
Net income (in the early years)	Lower	Higher
Net income (later years)	Higher	Lower
Total net income	Same	Same
EBIT (operating income)	Higher	Lower
Cash flow from operations	Higher	Lower
Cash flow from financing	Lower	Higher
Total cash flow	Same	Same

Figure 5: Ratio Impact of Lease Accounting

Ratios	*Capital Lease*	*Operating Lease*
Current ratio (CA/CL)	Lower	Higher
Working capital (CA – CL)	Lower	Higher
Asset turnover (Sales/TA)	Lower	Higher
Return on assets* (EAT/TA)	Lower	Higher
Return on equity* (EAT/E)	Lower	Higher
Debt/assets	Higher	Lower
Debt/equity	Higher	Lower

* in the early years of the lease

In sum, all the ratios in Figure 5 are worse when the lease is capitalized. The only improvements in financial statement items and ratios from capitalization are an improvement in EBIT (because interest is not subtracted), an increase in CFO (because principal reduction is CFF), and higher net income in the later years of a lease (because interest plus depreciation is less than the lease payment in the later years).

Professor's Note: For the lessor, a lease can be classified as an operating lease or a capital lease. If it is a capital lease it can be classified as a sales-type lease or as a direct financing lease. The effects on the financial statements of the lessor of these various classifications are covered in the final LOS of this review.

LOS 46.c: Describe the types and economic consequences of off-balance-sheet financing and determine how take-or-pay contracts, throughput arrangements, and the sale of receivables affect selected financial ratios.

Professor's Note: Operating leases are the most prevalent type of off-balance-sheet financing.

Operating leases are just one example of contractual obligations that are not recognized as liabilities on the balance sheet. All financial statements should be adjusted to reflect the economic reality of the following off-balance-sheet financing activities.

Under a **take-or-pay contract** or **throughput arrangement**, the purchasing firm commits to buy a minimum quantity of an input (usually a raw material) over a specified period of time. Prices may be fixed or related to market prices. Neither the asset nor any borrowings used to secure the commitment are recognized on the balance sheet. However, the purchaser must disclose the nature and minimum required payments in the footnotes to the financial statements.

For analysis purposes, the present value of the assets and debt commitments should be added to the balance sheet assets and debt to compute leverage ratios.

Under a **sale of receivables with recourse**, a firm may sell its accounts receivable to unrelated parties, but the firm continues to service the original receivables and transfers any collections to the new owner of those receivables. Although such transactions are recorded as a sale, thereby decreasing accounts receivable and increasing operating cash flow, the buyer usually has limited exposure (the risk of not collecting a receivable is borne by the seller). Therefore, the transaction is nothing more than a collateralized borrowing.

For analysis purposes, accounts receivable and current liabilities should be increased by the amount of receivables that were sold before computing ratios (e.g., the current ratio, receivables turnover, and leverage ratios). Also, cash flow from operations should be adjusted by classifying the sale of the receivables as cash from financing instead of cash from operations.

Although all majority-owned subsidiaries must be consolidated (their assets and liabilities added to the parent's balance sheet), **financial subsidiaries** for which the parent owns less than 50% are not consolidated. For example, if a firm owns 49% of a financial company, the investment in that company on the parent's balance sheet represents 49% of the subsidiary's assets and liabilities. But those liabilities (and an equal amount of assets) are not recognized on the parent's balance sheet.

For analysis purposes, the proportionate share of receivables and liabilities in the subsidiary should be added back to the parent's accounts when computing consolidated debt-to-equity, receivables turnover, and interest coverage ratios. You'll learn more about proportionate consolidations at Level 2.

Firms may obtain operating capacity through **investments in affiliated firms** (suppliers and end users). **Joint ventures** may provide economies of scale and disperse risks. Financing is frequently acquired through take-or-pay or throughput contracts. Direct or indirect debt guarantees may also be present in joint ventures. These guarantees will be disclosed in footnotes to the financial statements.

For analysis, the debt guarantees should be added to the debt of the company. If there are no guarantees, the proportionate share of the debt of the joint venture or affiliate should be added to the debt of the company.

Off-Balance-Sheet Financing and Financial Ratios

Because the debt on take-or-pay contracts and throughput arrangements is off-balance-sheet, it has the effect of lowering leverage ratios such as the debt ratio and the debt-to-equity ratio. That is why, for analytical purposes, the present value of the minimum purchase obligation should be added to both long-term liabilities and long-term assets before calculating leverage ratios.

The sale of receivables artificially reduces the receivables balance and short-term borrowings. Consequently, leverage ratios are too low, receivables turnover is too high, and the current ratio (assuming it is greater than 1.0) is too low. That is why, for analytical purposes, the receivables and short-term debt should be added back to the book value balances and the ratios should be calculated with these restated values.

Let's work through an example of the sale of receivables. Assume that a firm reports selling $170,000 of receivables, and footnote disclosures reveal the sale has not transferred the risk (i.e., the receivables were sold with recourse). In addition, the reported debt is $1,300,000, the reported equity is $580,000, and the interest rate associated with the receivables sale is 9%.

For purposes of analysis we should *treat the sale as a borrowing, reinstate the receivables, and treat the proceeds of the sale as debt.* We can adjust the end-of-period balance sheet as shown in Figure 6.

Figure 6: Balance Sheet Adjustments

	As Reported	*Adjusted*
Debt	$1,300,000	$1,470,000
Equity	$580,000	$580,000
Debt-to-equity ratio	2.24	2.53

We also need to make an adjustment to the income statement to show the change in interest. We add interest on the receivables to both income and expense. (Assuming a 9% interest rate, interest expense would be $15,300.) Hence, net income will not be affected, but the coverage ratios will be lower than reported. EBIT increases because the discount (implicit interest) on the sale of the receivables is taken as an operating loss.

Figure 7: Income Statement Adjustments

	As Reported	*Adjusted*
EBIT	$265,000	$280,300
Interest expense	$102,000	$117,300
Coverage ratio	2.60	2.39

The cash flow statements also need to be adjusted by reducing the cash flow from operations and increasing the cash flow from financing by the amount of the receivables sold. CFI and total cash flows are not affected.

LOS 46.d: Distinguish between a sales-type lease and a direct financing lease and determine the effects on the financial statements and ratios of the lessors.

A lessor must classify a lease as a capital lease if any of the four criteria used for a lessee hold and the following two criteria hold:

- The collectiblity of lease payments is predictable.

- There are no significant uncertainties about the amount of unreimbursable costs yet to be incurred by the lessor.

The incentive for structuring a lease as a capital lease is that the *lessor* will have earlier recognition of revenue and income by reporting a completed sale even though the substance of the transaction is similar to an installment sale or financing. The lessor will have higher profitability and turnover ratios.

Sales-Type and Direct-Financing Leases

If the lease is a capital lease and the lessor is a dealer or seller of the leased equipment, then the lease is a **sales-type lease** on the books of the lessor. This means that the implicit interest rate is such that the present value of the minimum lease payments is the *selling price* of the leased asset. Thus, *at the time of the lease's inception, the lessor recognizes a gross profit* equal to the present value of the minimum lease payments (MLPs) less the cost of the leased asset. Interest revenue is equal to the implicit interest rate times the net lease receivable at the beginning of the period.

If the lease is a capital lease and the lessor is not a dealer in the leased asset (e.g., a finance company), then the lease is a **direct financing lease**. *No gross profit is recognized at lease inception*, and all profit is interest revenue. The implicit rate is such that the present value of the minimum lease payments equals the *cost* of the leased asset. Interest revenue equals the implicit interest rate times the net lease receivable at the beginning of the period.

Professor's Note: The lessor always uses the implicit rate on the lease to calculate the interest revenue and determine the net investment in the lease. The lessee uses the lower of the lessor's implicit rate and the lessee's incremental borrowing rate.

Accounting for Sales-Type Leases

Accounting at sale. When the sale is made, two transactions are set up.

- First, the sale is recorded as the present value of the lease payments, with the cost of goods sold being equal to the net difference between the cost of the asset being leased and the present value of the estimated future salvage value of the asset (its terminal value). The profit shows up on the income statement. That same amount is reported as an operating cash inflow and an investment cash outflow, so net cash flow is zero.
- The second transaction sets up an asset account called the *net investment in the lease*, which is the present value of all future lease payments and the estimated salvage value.

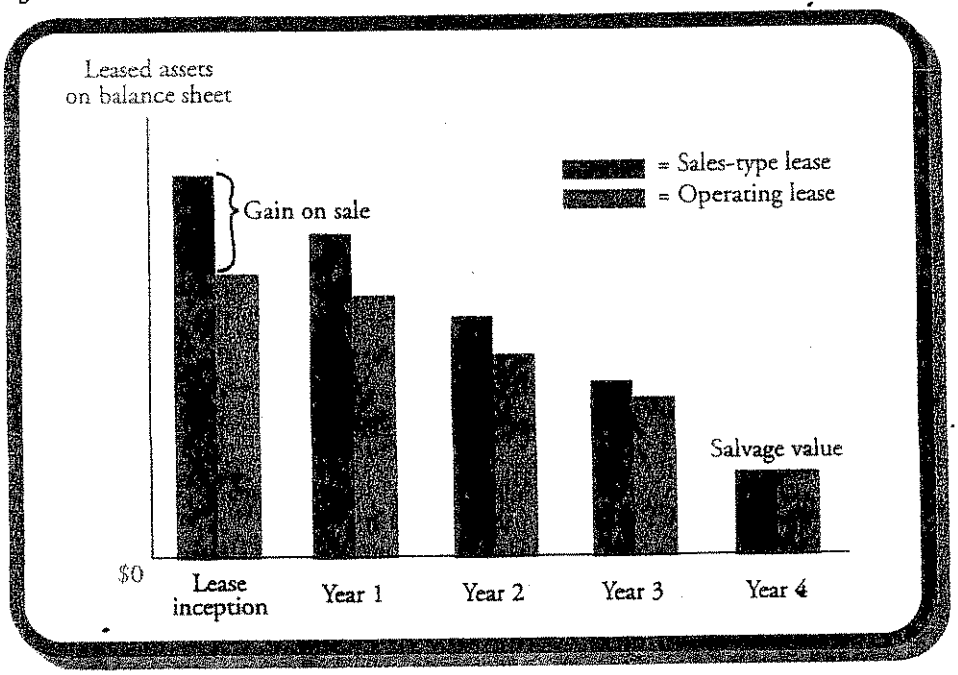
Periodic transactions. Interest income is calculated each year by multiplying the year's beginning value of the net investment in the lease by the discount rate on the lease. The interest income affects both the income statement and cash flow from operations. The net investment in the lease at the end of each year is calculated by subtracting the difference between the lease payment and interest income from the beginning net investment balance. The reduction in net investment on the lease is an investing cash flow, not an operating cash flow.

Ending balance. After the lease is completed, the salvage value remains as an asset. If the asset is sold, this cash inflow is an investing cash flow.

Sales-Type vs. Operating Lease

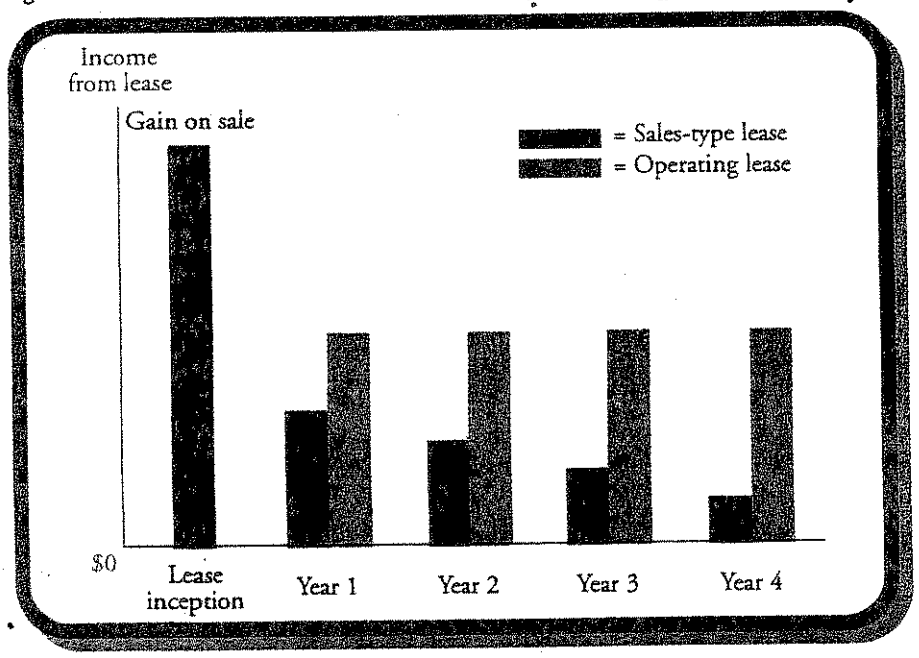
Balance sheet effect. As shown in Figure 8 (assuming a 4-year lease), leased assets are larger at lease inception (by the amount of the gross profit on sale), under a sales-type lease compared to an operating lease, but at the end of the lease both methods report the asset at its salvage value.

Figure 8: Balance Sheet Effect of Sales-Type Versus Operating Lease



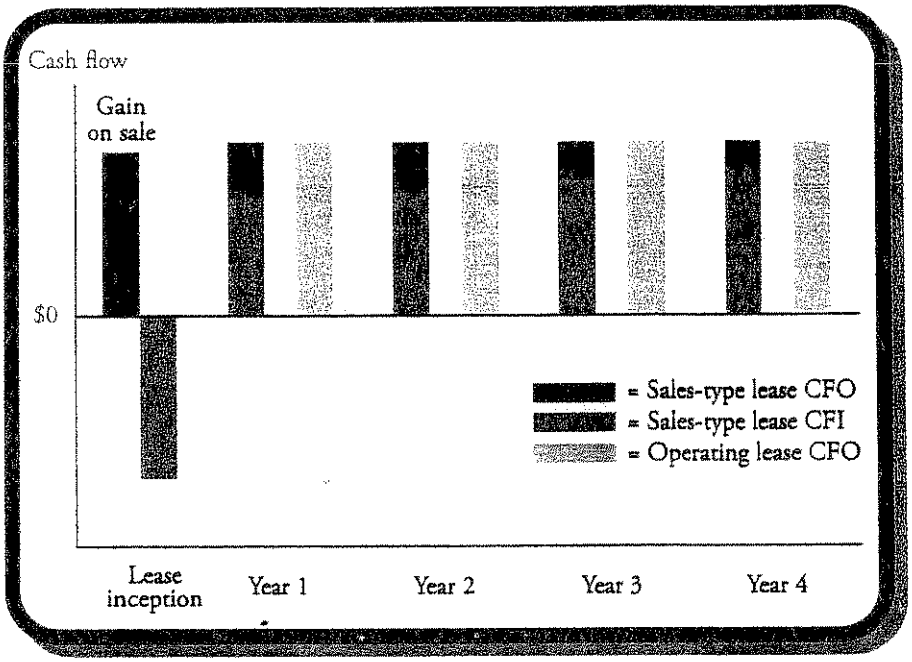
Income statement effect. As shown in Figure 9 (assuming a 4-year lease), total income over the life of the lease will be the same under both methods, but income will be "front-loaded" under the sales-type lease because the gain on sale will be reported at the inception of the lease. After the inception, only interest expense is reported under the sales-type lease. Under the operating lease, income each year is rental revenue less depreciation.

Figure 9: Income Statement Effects of Sales-Type Versus Operating Lease



Cash flow statement effect. As shown in Figure 10 (assuming a 4-year lease), total cash flow over the life of the lease will be the same under both methods, but cash flow from operations (CFO) will be "front-loaded" under the sales-type lease because the gain on sale is reported at the inception of the lease but offset by an outflow classified as cash flow from investing (CFI).

Figure 10: Cash Flow Statement Effects of Sales-Type Versus Operating Lease



In the detailed example that follows, we will demonstrate these effects, but keep the big-picture perspective and don't get lost in the details of the calculations.

Example: Analyzing the financial statement effects on lessor

Silvio Leasing Company leases a machine to an oil company. The lease is for the oil company's own use for four years with annual payments of $10,000. It cost Silvio $30,000 to produce the machine. Silvio estimates it will be able to sell the machine in four years for $6,000. At the end of the lease, Silvio regains possession of the asset, which will be sold for scrap value. The collectiblity of the lease payments is predictable, and there are no significant uncertainties about Silvio's unreimbursable costs. The implicit discount rate on the lease is 6%. Assume the lease payments are made at the end of the year.

- Determine whether the lease should be classified by Silvio as a sales-type capital lease or an operating lease.
- Analyze the effects on Silvio's financial statements of classifying the lease as a sales-type capital lease versus an operating lease.

Answer:

The lease should be classified by Silvio as a sales-type capital lease because the asset is being leased for at least 75% of its useful life (we know this because at the end of the lease term the asset will be sold for scrap) and because it meets the other two criteria for a sales-type capital lease.

The present value of the lease payments at 6% is $34,651.

N = 4; I/Y = 6; PMT = 10,000; FV = 0; CPT → PV = $34,651

The present value of the salvage value is $4,753.

N = 4; I/Y = 6; PMT = 0; FV = 6,000; CPT → PV = $4,753

The cost of goods sold is then $30,000 – $4,753 = $25,247.

The profit on the sale is $34,651 – $25,247 = $9,404.

The net investment in the lease is $34,651 + $4,753 = $39,404.

The lease amortization schedule is shown in Figure 11 (remember that Silvio is the *lessor*).

Figure 11: Silvio Lease Amortization Schedule

Year	*Payment*	*Interest income*	*Reduction in net investment*	*Net investment in lease*
0				$39,404
1	$10,000	$2,364	$7,636	$31,768
2	$10,000	$1,906	$8,094	$23,674
3	$10,000	$1,420	$8,580	$15,094
4	$10,000	$906	$9,094	$6,000
Total	$40,000	$6,596	$33,404	

The effects on Silvio's balance sheet, income statement, and cash flow statement are shown in Figures 12, 13, and 14.

Figure 12: Effect on Silvio's Balance Sheet

	Sales-Type Capital Lease			*Operating Lease*		
	Net Investment In Lease:			*Assets under lease*	*Accumulated depreciation*	*Net assets under lease*
Year	*Current*	*Long-term*	*Total*			
0	$7,636	$31,768	$39,404	$30,000	$0	$30,000
1	$8,094	$23,674	$31,768	$30,000	$6,000	$24,000
2	$8,580	$15,094	$23,674	$30,000	$12,000	$18,000
3	$9,094	$6,000	$15,094	$30,000	$18,000	$12,000
4	$6,000	$0	$6,000	$30,000	$24,000	$6,000

Let's assume that the company owned the asset prior to the lease and reported it on the balance sheet at a cost of $30,000. In that case, if the lease is categorized as a sales-type capital lease, it is reported on the balance sheet at $39,404, and total assets increase by $9,404. If it's recorded as an operating lease, the asset remains at $30,000 and total assets don't change. Prior to the termination of the lease, assets are higher with the sales-type capital lease versus the operating lease.

Figure 13: Effect on Silvio's Income Statement

	Sales-Type Capital Lease		*Operating Lease*		
Year		*Income*	*Revenue*	*Depreciation*	*Income*
0	Gain on sale	$9,404			
1	Interest	$2,364	$10,000	$6,000	$4,000
2	Interest	$1,906	$10,000	$6,000	$4,000
3	Interest	$1,420	$10,000	$6,000	$4,000
4	Interest	$906	$10,000	$6,000	$4,000
Total		$16,000	$40,000	$24,000	$16,000

Total income over the life of the lease ($16,000) will be the same for operating and capital leases. However, recognition of much of the income for a capital lease will be reported immediately at the initiation of the lease as a gain on sale ($9,404). Income will be recognized earlier for the sales-type capital lease than for the operating lease, but in this example net income is higher under the operating lease in years 1 through 4.

Figure 14: Effect on Silvio's Cash Flow Statement

	Sales-Type Capital Lease			*Operating Lease*
Year	*CFO*	*Cash from investing*	*Total*	*CFO*
0	$9,404	($9,404)	$0	$0
1	$2,364	$7,636	$10,000	$10,000
2	$1,906	$8,094	$10,000	$10,000
3	$1,420	$8,580	$10,000	$10,000
4	$906	$9,094	$10,000	$10,000
Total	$16,000	$24,000	$40,000	$40,000

For a capital lease, only the gain on sale and interest income are reported as cash flow from operations, whereas all of the lease payments for an operating lease are considered operating cash flows. Total cash flow from operations over the life of the lease will be higher for an operating lease ($40,000) than a capital lease ($16,000), but total cash flows (including cash flows from investing of $24,000) will be the same under both methods ($40,000).

Accounting for Direct Financing-Type Leases

There is no sales or manufacturing profit in a direct financing-type lease, so the only profit element is interest income. Compared to a sales-type lease, a direct financing lease will result in lower net income, lower retained earnings, and lower equity by the amount of the profit on sale that is recorded for a sales-type lease.

Example: Direct financing type leases

Assume Johnson Company purchases an asset for $69,302 to lease to Carver, Inc. for four years with an annual lease payment of $20,000 at the end of each year. At the end of the lease, Carver will own the asset for no additional payment. The implied discount rate on the lease is therefore 6% (N = 4, PV = –69,302, PMT = 20,000, FV = 0, CPT → I/Y = 6). Determine how Johnson should account for the lease payments from Carver.

Answer:

Because ownership of the asset transfers for no additional payment at the end of the lease, Johnson (the lessor) treats this as a direct financing-type capital lease. Johnson would record an asset—net investment in the lease—in the amount of $69,302. The lease payments would be recorded as follows:

Figure 15: Accounting for Lease Payments to Lessor

Year	*(1) Beginning Investment in Lease*	*(2) Interest Income (1) × 6%*	*(3) Lease Payment*	*(4) Ending Investment in Lease (1) + (2) – (3)*
0				$69,302
1	$69,302	$4,158	$20,000	53,460
2	53,460	3,208	20,000	36,668
3	36,668	2,200	20,000	18,868
4	18,868	1,132	20,000	0

Interest income received each year would increase income and cash flow from operations as lease payments are received. The principal reduction amount (column 3 – column 2) reduces the asset net investment in lease and is treated as an inflow to CFI.

KEY CONCEPTS

1. A lease is classified as a capital lease by a lessee if any one of the following holds:
   - If the title is transferred to the lessee at the end of lease period.
   - A bargain purchase option exists.
   - The lease period is at least 75% of the asset's life.
   - The present value of the lease payments is at least 90% of the fair value of the asset.

   Otherwise, it is classified as an operating lease.
2. Capital leases are recorded on the lessee's financial statements as assets and liabilities—the assets are depreciated, and the lease payments are split into principal repayments and interest expense. The recorded liability is amortized over the life of the lease.
3. Relative to operating leases, capital leases provide a lessee with higher assets, higher liabilities, deferred net income, and higher operating cash flow.
4. Relative to operating leases, capital leases provide a lessor with earlier recognition of profit, larger assets, and lower cash flow from operations.
5. Various off-balance-sheet financing methods include take-or-pay and throughput arrangements, sales of receivables, finance subsidiaries, and joint ventures.
6. Off-balance-sheet financing methods make debt balances look artificially low, and receivables sales and finance subsidiaries make receivables look artificially low. For analytical purposes, the debt and receivables should be restated before calculating ratios.
7. Capital leases are sales-type leases if the lessor is a manufacturer or dealer of the asset being leased and allow the lessor to record the sale at the beginning of the lease, while operating leases force the lessor to wait until the lease payments are received to recognize revenue from the lease.

CONCEPT CHECKERS: LEASES AND OFF-BALANCE-SHEET DEBT

1. Compared to a capital lease, a firm with an equivalent operating lease will show *higher*:
   A. return on assets if a lessee and higher profitability ratios if a lessor.
   B. initial leverage ratios if a lessee and avoid recognition of debt on the balance sheet.
   C. profitability ratios if a lessee and avoid recognition of debt on the balance sheet, and higher cash flow from operations if a lessor.
   D. return on assets if a lessor, higher profitability ratios and initial leverage ratios if a lessee, and avoid recognition of debt on a lessee's balance sheet.

2. Which of the following statements about leases is FALSE?
   A. A lease is considered a capital lease if the lease period is at least 75% of the asset's economic life.
   B. In a capital lease, substantially all benefits and risks of ownership are transferred to the lessee.
   C. The lessee should book capital leases to the leased asset and lease obligation accounts, and then amortize the lease obligation and depreciate the leased assets.
   D. To record leased assets, the lessee determines the present value of the lease payments using the greater of the implicit rate in the lease or the lessee's incremental borrowing rate.

3. A firm leases a machine for ten years.
   - Lease payments are $3,500 per year at the end of each year.
   - The firm has an option to buy the machine for $15,000 at the end of the lease term.
   - The fair market value of the machine is $30,000.
   - The machine's economic life is 15 years.
   - There will be zero salvage value in 15 years.
   - The implicit rate in the lease is 8.25%.

   The firm should:
   A. treat the lease as an operating lease.
   B. capitalize the lease because it involves a bargain purchase.
   C. capitalize the lease because the lease term is less than 75% of the economic life of the asset.
   D. capitalize the lease because the present value of future lease payments exceeds 90% of fair market value.

4. For a lessee:

	Operating leases are accounted for like:	Operating lease payments are reported as:
A.	contracts	lease expense
B.	asset purchases	lease expense
C.	contracts	interest expense
D.	asset purchases	interest expense

5. For a lessee, a capital lease results in:
   A. an asset.
   B. a short-term liability.
   C. a long-term liability.
   D. all of the above.

6. For a company that has sold receivables but retained the credit risk, which of the following do NOT have to be adjusted?
   A. Accounts receivable.
   B. Inventory turnover.
   C. Current ratio.
   D. Debt-to-equity.

7. Which of the following is NOT an off-balance-sheet financing method?
   A. Sale of receivables.
   B. Finance subsidiaries.
   C. Throughput arrangements.
   D. Convertible bonds.

8. Which of the following statements about capital and operating leases is FALSE for a lessee?
   A. Total cash flows are not affected by the accounting treatment of the lease.
   B. When a capital lease is initiated, the present value of the leased asset is treated as a financing cash flow.
   C. As compared to an operating lease, a capital lease will report higher operating cash flows and lower financing cash flows.
   D. Over the life of a capital lease the total expenses will equal those of a similar operating lease; but the operating lease will have lower expenses in the earlier years, while the capital lease will have lower expenses in the later years.

9. A capital lease results in the following net income to a lessee compared to a comparable operating lease:

	Early Years	Later Years
A.	Lower	Lower
B.	Lower	Higher
C.	Higher	Lower
D.	Higher	Higher

10. For a lessee, capital lease interest expense is equal to the:
   A. interest rate multiplied by the beginning leasehold liability.
   B. interest rate multiplied by the lease payment.
   C. lease payment.
   D. depreciation expense.

11. Compared to an operating lease, the lessee's debt-to-equity ratio for a capital lease is:
   A. higher.
   B. lower.
   C. not affected.
   D. higher in the early years and lower in the later years.

12. For a lessee, an operating lease compared to a capital lease will *most likely* result in a:
   A. lower debt-to-equity ratio.
   B. higher financing cash flow.
   C. lower cash flow from operations.
   D. lower net income in the earlier years of the lease.

13. Which of the following statements concerning a lessee is FALSE?
    A. All else equal, when a lease is capitalized, income will rise over time.
    B. Lease capitalization increases a firm's operating cash flows and decreases the firm's financing cash flows relative to cash flows for an operating lease.
    C. In the first years of a capital lease, the firm's debt-to-equity ratio will be greater than if the firm had used an operating lease.
    D. In the first years of a capital lease, the firm's current ratio will be greater than it would have been had the firm used an operating lease.

Use the following data to answer Questions 14 through 18.

- A firm has just signed a 5-year lease on a new machine.
- Lease payments are $20,000 per year, payable at the end of the year.
- The machine has no salvage value at the end of the lease term.
- The machine has a 5-year useful life.
- The firm's incremental borrowing cost is 11%.
- The lessor's implicit rate on the lease is 10%.
- The lease is classified as a capital lease.

14. What will be the leasehold asset at the inception of the lease?
    A. $0.
    B. $20,000.
    C. $73,918.
    D. $75,816.

15. What will the firm report as interest expense in the first year?
    A. $7,582.
    B. $8,131.
    C. $12,418.
    D. $20,000.

16. What will be straight-line (SL) depreciation expense in the first year?
    A. $10,000.
    B. $12,418.
    C. $15,163.
    D. $20,000.

17. How much of the first-year lease payment will be deducted from cash flow from operations?
    A. $0.
    B. $7,582.
    C. $12,418.
    D. $20,000.

18. How much of the first-year lease payment will be deducted from cash flow from financing?
    A. $0.
    B. $7,582.
    C. $12,418.
    D. $20,000.

COMPREHENSIVE PROBLEMS: LEASES AND OFF-BALANCE-SHEET DEBT

1. Consider the effects on the following financial statement items and ratios of capitalizing a lease rather than treating it as an operating lease. Indicate the effect of capitalizing the lease on the following during the first year of the lease (circle one).

CFF	higher	lower	no change
CFO	higher	lower	no change
CFI	higher	lower	no change
total cash flow	higher	lower	no change
EBIT	higher	lower	no change
net income	higher	lower	no change
D/A	higher	lower	no change
D/E	higher	lower	no change
ROA	higher	lower	no change
ROE	higher	lower	no change
total asset turnover	higher	lower	no change

2. Babson Corp. sold $550,000 of receivables during the most recent period. Meg Jones, CFA, is adjusting balance sheet items and some ratios for this sale of receivables because significant credit risk on these remains with Babson. Indicate increase, decrease, or unchanged to reflect the effect of adjustment on the indicated items and ratios.

Debt	Cash	Current ratio (= 1)
Debt-to-equity	Receivables	Working capital
Receivables turnover	Cash conversion cycle	Interest coverage
CFO	CFF	CFI

3. Ed's Supply Corp. is examining the effects on the financial statements of classifying the lease of equipment to Excavations Inc. If Ed's (the lessor) classifies this 4-year lease as a sales-type capital lease rather than as an operating lease, the effects on the following in the first year and the third year of the lease are (indicate +, –, or = for no change):

	1st year of lease	3rd year of lease
Revenues		
Interest income		
Net income		
Retained earnings		
CFO		
CFI		
Assets		

ANSWERS – CONCEPT CHECKERS: LEASES AND OFF-BALANCE-SHEET DEBT

1. C Structuring a lease as an operating lease results in higher profitability ratios for the lessee and avoidance of recognition of debt on the lessee's balance sheet, and higher cash flow from operations for the lessor. The other statements each have an incorrect component. As compared to a capital lease, an operating lease results in lower profitability ratios for a lessor, lower initial leverage ratios for the lessee, and a lower return on assets for the lessor.

2. D Lease payments are valued using the *lower* of the implicit lease rate or lessee's incremental borrowing rate.

3. A The purchase option is not a bargain because it is one-half the original price when only one-third of the asset life remains; title is not transferred at the end of the lease term; lease period is only 2/3 of the asset's life; 90% of fair value is $27,000, while the present value of lease payments at the implicit rate is $23,222. Because none of the capital lease criteria hold, the lease is treated as an operating lease.

4. A Operating leases are accounted for like contracts (capital leases are like purchases), and operating lease payments are reported as lease expense.

5. D For a lessee recording a capital lease, both a long-term asset and long-term liability will be recognized, as well as a short-term liability being recognized for next year's lease payment.

6. B The inventory turnover ratio does not need to be adjusted.

7. D Convertible bonds are not an off-balance-sheet financing method.

8. B The accounting treatment of a lease affects the classification of cash flows but not the total cash flows. Also, a capital lease will report higher operating cash flows and lower financing cash flows than an operating lease. For a lessee there is typically no cash flow at initiation. The principal portion of each lease payment is treated as a cash flow from financing.

9. B In the early years, a capital lease results in lower net income because interest plus depreciation expense is greater than rent expense under an operating lease. This effect reverses in the later years of the lease.

10. A Interest expense is calculated each year by multiplying the year's beginning value of the leasehold liability by the discount rate on the lease. This *interest expense* is charged to income and operating cash flow.

11. A A capital lease will cause the debt-to-equity ratio to increase due to the ratio's denominator effect when adding assets and liabilities to the balance sheet. No debt is booked related to the operating lease.

12. D A capital lease results in lower net income in the early years of the lease due to the capital lease recognizing interest expense and depreciation expense. A capital lease will also have a *higher* operating cash flow due to payments being split between operating and financing cash flows.

13. D A firm's current ratio will be less when using a capital lease due to the next year's lease payment being classified as a current liability.

14. D The appropriate discount rate is the 10% rate implicit in the lease (it's less than the lessee's incremental borrowing rate of 11%). The present value of the lease payments at a 10% discount rate is $75,816. Using a financial calculator:

I/Y = 10; PMT = 20,000; N = 5; CPT → PV = $75,816

15. A Interest expense is the leasehold value multiplied by 10%, which is $7,582.

16. C Depreciation is the leasehold value divided by 5, or 75,816 / 5 = $15,163.

17. B Only the interest expense is deducted from CFO.

18. C The financing cash flow is the principal component of the lease, which is the lease payment of $20,000 less the interest component of $7,582.

ANSWERS – COMPREHENSIVE PROBLEMS: LEASES AND OFF-BALANCE-SHEET DEBT

1. With a capital lease:
   - CFF is lower.
   - CFO is higher.
   - CFI is unchanged.
   - Total cash flow is unchanged.
   - EBIT is higher.
   - Net income is lower in the early years.
   - D/A is higher.
   - D/E is higher.
   - ROA is lower.
   - ROE is lower.
   - Asset turnover is lower.

2. To adjust these items, we treat the sale of receivables as if it were a short-term borrowing and add back the amount of receivables sold. This will increase debt and the D/E ratio. Receivables increase and current liabilities increase by the same amounts so that working capital, the current ratio (because it's equal to 1), and cash position are unchanged by the adjustment. The receivables turnover is decreased by adding back AR so the cash conversion cycle is longer. The cash generated by the sale is CFF after adjustment rather than CFO, so CFF increases and CFO decreases. The increase in interest from adjusting debt upward will decrease the interest coverage ratio, assuming EBIT > interest expense. CFI is unaffected.

3.

	1st year of lease	3rd year of lease
revenues	+	–
interest income	+	+
net income	+	–
retained earnings	+	+
CFO	+	–
CFI	–	+
Assets	+	+

In the first year of the lease, capitalization of a sales-type lease increases revenues because it is reported as a sale. The profit on the sale increases net income and retained earnings. The recognition of the sale also increases CFO in the first year and decreases CFI by the investment in the lease. Assets are higher for the capitalized lease until the end of the lease term because of the recognition of the profit on the sale at lease inception. Interest income is recognized for the capital lease but not for the operating lease (payments are all rental income), so interest income is always higher for the capital lease.

Revenues are lower for the sales-type lease after the first year because only interest income is recognized and this is lower than the lease payment. Net income is lower in later years for the lessor with a sales-type lease. The income on the sales-type lease is CFI and CFO. For the operating lease, the entire rental payment is CFO. The interest portion of the sales-type lease is CFO, so it goes down each year and the difference between sales-type lease CFO and operating lease CFO is greater each year.

Retained earnings are higher for a sales-type lease in the initial year because of the profit recognition, and will remain higher until the end of the lease term, when total net income over the lease is equal for both treatments.