- We can estimate terminal value in multistage DCF models using price multiples based on comparables. The expression for terminal value is (using P/E as an example)

$$V_n = \text{Benchmark value of trailing } P/E \times E_n$$

or

$$V_n = \text{Benchmark value of leading } P/E \times E_{n+1}$$

- Book value per share attempts to represent the investment that common shareholders have made in the company, on a per-share basis. Inflation, technological change, and accounting distortions, however, can impair book value for this purpose.
- Book value is calculated as common shareholders' equity divided by the number of shares outstanding. Analysts adjust book value to more accurately reflect the value of shareholders' investment and to make P/B more useful for comparing different stocks.
- The fundamental drivers of P/B are ROE and the required rate of return. The justified P/B based on fundamentals bears a positive relationship to the first factor and an inverse relationship to the second factor.
- An important rationale for the price-to-sales ratio (P/S) is that sales, as the top line in an income statement, are generally less subject to distortion or manipulation than other fundamentals such as EPS or book value. Sales are also more stable than earnings and never negative.
- P/S fails to take into account differences in cost structure between businesses, may not properly reflect the situation of companies losing money, and can be subject to manipulation through revenue recognition practices.
- The fundamental drivers of P/S are profit margin, growth rate, and the required rate of return. The justified P/S based on fundamentals bears a positive relationship to the first two factors and an inverse relationship to the third factor.
- A key idea behind the use of price-to-cash-flow ratios is that cash flow is less subject to manipulation than are earnings. Price to cash flow are often more stable than P/E. Some common approximations to cash flow from operations have limitations, however, because they ignore items that may be subject to manipulation.
- The major cash flow and related concepts used in multiples are earnings-plus-noncash charges (CF), cash flow from operations (CFO), free cash flow to equity (FCFE), and earnings before interest, taxes, depreciation, and amortization (EBITDA).
- In calculating price to cash flow, the earnings-plus-noncash charges concept is traditionally used, although the FCFE has the strongest link to financial theory.
- CF and EBITDA are not strictly cash flow numbers because they do not account for noncash revenue and net changes in working capital.
- The fundamental drivers of price to cash flow, however defined, are the expected growth rates of future cash flows and the required rate of return. The justified price to cash flow based on fundamentals bears a positive relationship to the first factor and an inverse relationship to the second.
- Enterprise value (EV) is total company value (the market value of debt, common equity, and preferred equity) minus the value of cash and investments.
- EV/EBITDA is preferred to P/EBITDA because EBITDA as a pre-interest number is a flow to all providers of capital.
- EV/EBITDA may be more appropriate than P/E for comparing companies with different amounts of financial leverage (debt).
- EV/EBITDA is frequently used in the valuation of capital-intensive businesses.
- The fundamental drivers of EV/EBITDA are the expected growth rate in free cash flow to the firm and the weighted-average cost of capital. The justified EV/EBITDA based on fundamentals bears a positive relationship to the first factor and an inverse relationship to the second.
- Dividend yield has been used as a valuation indicator because it is a component of total return, and is less risky than capital appreciation. However, investors trade off future earnings growth to receive higher current dividends.
- Trailing dividend yield is calculated as four times the most recent quarterly per-share dividend divided by the current market price.
- The fundamental drivers of dividend yield are the expected growth rate in dividends and the required rate of return.
- Comparing companies across borders frequently involves accounting method differences, cultural differences, economic differences, and resulting differences in risk and growth opportunities.
- Momentum valuation indicators include earnings surprise, standardized unexpected earnings, and relative strength.
- Unexpected earnings (or earnings surprise) equals the difference between reported earnings and expected earnings.
- Standardized unexpected earnings (SUE) is unexpected earnings divided by the standard deviation in past unexpected earnings.
- Relative-strength indicators compare a stock's performance during a period either with its own past performance (first type) or with the performance of some group of stocks (second type). The rationale behind using relative strength is the thesis of patterns of persistence or reversal in returns.
- Screening is the application of a set of criteria to reduce an investment universe to a smaller set of investments and is a part of many stock selection disciplines. In general, limitations of such screens include the lack of control over the calculation of important inputs and the absence of qualitative factors.

PROBLEMS

1. As of February 2002, you are researching Smith International (NYSE: SII), an oil field services company subject to cyclical demand for its services. You believe the 1997-2000 period reasonably captures average profitability. SII closed at $57.98 on 2 February 2002.

	2001	2000	1999	1998	1997
EPS	E$3.03	$1.45	$0.23	$2.13	$2.55
BVPS	E$19.20	16.21	14.52	13.17	11.84
ROE	E16%	8.90%	1.60%	16.30%	21.80%

A. Define normal EPS.
B. Calculate a normal EPS for SII based on the method of historical average EPS, and then calculate the PIE based on that estimate of normal EPS.
C. Calculate a normal EPS for SII based on the method of average ROE and the P/E based on that estimate of normal EPS.

2. An analyst plans to use PIE and the method of comparables as a basis for recommending one of two peer group companies in the personal digital assistant business. Data on the companies' prices, trailing EPS, and expected growth rates in sales (five-year compounded rate) are given in the table below. Neither business has been profitable to date, and neither is anticipated to have positive EPS over the next year.

	Price	Trailing EPS	P/E	Expected Growth (Sales)
Hand	$22	-$2.20	NM	45%
Somersault	$10	-$1.25	NM	40%

Unfortunately, because the earnings for both companies were negative, the P/Es were not meaningful. On the basis of the above information, answer the following questions.
A. State how the analyst might make a relative valuation in this case.
B. Which stock should the analyst recommend?

3. May Stewart, CFA, a retail analyst, is performing a P/E-based comparison of two jewelry stores as of early 2001. She has the following data for Hallwhite Stores (HS) and Ruffany (RUF).
- HS is priced at $44. RUF is priced at $22.50.
- HS has a simple capital structure, earned $2.00 per share in 2000, and is expected to earn $2.20 in 2001.
- RUF has a complex capital structure as a result of its outstanding stock options.
- Moreover, it had several unusual items that reduced its basic EPS in 2000 to $0.50 (versus the $0.75 that it earned in 1999).
- For 2001, Stewart expects RUF to achieve net income of $30 million. RUF has 30 million shares outstanding and options outstanding for an additional 3,333,333 shares.

A. Which PIE (trailing or leading) should Stewart use to compare the two companies' valuation?
B. Which of the two stocks is relatively more attractively valued on the basis of P/Es (assuming that all other factors are approximately the same for both stock)?

4. You are researching the valuation of the stock of a company in the food processing industry. Suppose you intend to use the mean value of the leading P!ES for the food processing industry stocks as the benchmark value of the multiple. That mean P/E is 18.0. The leading or expected EPS for the next year for the stock you are studying is $2.00. You calculate 18.0 X $2.00 = $36, which you take to be the intrinsic value of the stock based only on the information given above. Comparing $36 with the stock's current market price of $30, you conclude the stock is undervalued.
A. Give two reasons why your conclusion that the stock is undervalued may be in error.
B. What additional information about the stock and the peer group would support your original conclusion?

5. **A.** Identify two significant differences between Yardeni's model of stock market valuation and the Fed model.
B. Suppose an analyst uses an equity index as a comparison asset in valuing a stock. Which price multiple(s) would cause concern about the impact of potential overvaluation of the equity index on a decision to recommend purchase of an individual stock?

6. (Adapted from 2000 CFA Level II exam) Christie Johnson, CFA, has been assigned to analyze Sundanci. Johnson assumes that Sundanci's earnings and dividends will grow at a constant rate of 13 percent. Exhibits 1 and 2 provide financial statements and other information for Sundanci:

TABLE 4-25 Sundanci Actual 1999 and 2000 Financial Statements For Fiscal Years Ending 31 May (in millions, except per-share data)		
Income Statement	**1999**	**2000**
Revenue	474	598
Depreciation	20	23
Other operating costs	368	460
Income before taxes	86	115
Taxes	26	35
Net income	60	80
Dividends	18	24
Earnings per share	$0.714	$0.952
Dividends per share	$0.214	$0.286
Common shares outstanding	84	84
Balance Sheet	**1999**	**2000**
Current assets	201	326
Net property, plant, and equipment	474	489
Total assets	**675**	**815**
Current liabilities	57	141
Long-term debt	0	0
Total liabilities	**57**	**141**
Shareholders' equity	618	674
Total liabilities and equity	**675**	**815**
Capital expenditures	34	38
TABLE 4-26 Selected Financial Information		
Required rate of return on equity		14%
Growth rate of industry		13%
Industry P/E		26

A. Calculate a justified PIE based on information in Exhibits **1** and **2** and on Johnson's assumptions for Sundanci. Show your work.
B. Identify, within the context of the constant dividend growth model, how each of the fundamental factors shown below would affect the PIE.

i. The risk (beta) of Sundanci increases substantially.
ii. The estimated growth rate of Sundanci's earnings and dividends increases.
iii. The market risk premium increases.
Note: A change in a fundamental factor is assumed to happen in isolation; interactive effects between factors are ignored. Every other item of the company is unchanged.

7. At a meeting of your company's investment policy committee, Bill Yu presents a recommendation based on a P/E analysis. He presents the case for Connie's Sporting Goods (CSG), a small chain of retail stores that receives almost no coverage by analysts. Yu begins by noting that CSG appeared to be fairly valued compared with its peers on a PIE basis. CSG's **10-Q** filing revealed, however, that an initiative at CSG to offer sports instruction (e.g., golf lessons) along with equipment should immediately raise the earnings growth rate at the company from **5** percent to **6** percent. Yu thus expects the company's trailing PIE to rise from **10.5** to **13.25**, a **26** percent increase, as soon as the investment community recognizes this development. The computations supporting his analysis follow.
Currently the justified P/E based on fundamentals is

$$\frac{P_0}{E_0} = \frac{(1-b)(1+g)}{(r-g)} = \frac{(1-0.5)(1.05)}{0.10-0.05} = 10.5$$

He points out that when *g* rises to 0.06, the trailing PIE should increase to 13.25, providing investors with appreciation in excess of 20 percent. When asked if he expects CSG's ROE to improve with the initiative, Yu indicated that it would likely be flat for the first several years. A colleague argues that because of the flat ROE, CSG's justified PIE will not increase to 13.25 because b must increase to be consistent with the sustainable growth rate expression for g. Only companies with at least 20 percent near term appreciation potential are candidates for inclusion on your company's focus list of stocks.

A. How would you expect the new initiative to affect the trailing PIE accorded to CSG's stock, assuming Yu's assumptions are correct? (Growth will increase as indicated above and ROE will be steady.)
B. Is CSG a good candidate for your company's focus list?

8. Tom Smithfield is valuing the stock of a food processing business. He has projected earnings and dividends to four years (to t = 4). Other information and estimates are

- Required rate of return = 0.09
- Average dividend payout rate for mature companies in the market = 0.45
- Industry average ROE = 0.10
- E_3 = $3.00
- Industry average P/E = 12

On the basis of the above, answer the following questions:
A. Compute terminal value based on comparables.
B. Contrast your answer in Part A to an estimate of terminal value using the Gordon growth model.

9. Discuss three types of stocks or investment problems for which an analyst could appropriately use PB in valuation.

10. Avtech is a multinational distributor of semiconductor chips and related products to businesses. Its leading competitor around the world is Target Electronics. Avtech has a current market price of $10,20 million shares outstanding, annual sales of $1 billion, and a 5 percent profit margin. Target has a market price of $20,30 million shares outstanding, annual sales of $1.6 billion, and a profit margin of 4.9 percent. Based on the information given, answer the following questions:
A. Which of the two companies has a more attractive valuation based on P/S?
B. Identify and explain one advantage of P/S over P/E as a valuation tool.

11. Wilhelm Miller, CFA, has organized the selected data on four food companies that appear below (TTM stands for trailing 12 months):

	Hormel Foods	Tyson Foods	IBP Corp	Smithfield Foods
Stock price	$25.70	$11.77	$23.65	$24.61
Shares out (1,000s)	136,923	230,662	108,170	103,803
Market cap ($ mil)	3,570	2,597	2,558	2,523
Sales ($ mil)	4,124	10,751	17,388	6,354
Net income ($ mil)	182	88	122	252
TTM EPS	$1.30	$0.40	$1.14	$2.31
Return on equity	19.20%	4.10%	6.40%	23.00%
Net profit margin	4.41%	0.82%	0.70%	3.99%

On the basis of the data given, answer the following questions:
A. Calculate the trailing PIE and PIS for each company.
B. Explain on the basis of fundamentals why these stocks have different P/S's.

12. (Adapted from 2001 CFA Level II exam) John Jones, CFA, is head of the research department at Peninsular Research. Peninsular has a client who has inquired about the valuation method best suited for comparison of companies in an industry with the following characteristics:

- Principal competitors within the industry are located in the United States, France, Japan, and Brazil.
- The industry is currently operating at a cyclical low, with many companies reporting losses.

Jones recommends that the client consider the following valuation ratios:
1. P/E
2. P/B
3. P/S

Determine which one of the three valuation ratios is most appropriate for comparing companies in this industry. Support your answer with one reason that makes that ratio superior to either of the other two ratios in this case.

13. General Electric (NYSE: GE) is currently selling for $38.50, with trailing 12-month earnings and dividends of $1.36 and $0.64, respectively. P/E is 28.3, P/B is 7.1, and P/S is 2.9. The return on equity is 27.0 percent, and the profit margin on sales is 10.9 percent. The Treasury bond rate is 4.9 percent, the equity risk premium is 5.5 percent, and GE's beta is 1.2.

A. What is GE's required rate of return, based on the capital asset pricing model?
B. Assume that the dividend and earnings growth rates are 9 percent. What P/E's, P/B's, and P/S's would be justified given the required rate of return in Part A and current values of the dividend payout ratio, ROE, and profit margin?
C. Given that the assumptions and constant growth model are appropriate, state whether GE appears to be fairly valued, overvalued, or undervalued based on fundamentals.

14. Jorge Zaldys, CFA, is researching the relative valuation of two companies in the aerospaceldefense industry, NCI Heavy Industries (NCI) and Relay Group International (RGI). He has gathered relevant information on the companies in the following table.

EBITDA Comparisons		
(In Euro millions except for per share)		
Company	**RGI**	**NCI**
Price per share	150	100
Shares outstanding	5 million	2 million
Market value of debt	50	100
Book value of debt	52	112
Cash and investments	5	2
Net income	49.5	12
Net income from continuing operations	49.5	8
Interest expense	3	5
Depreciation and amortization	8	4
Taxes	2	3

Using the information in the above table, answer the following questions:
A. Calculate P/EBITDA for NCI and RGI.
B. Calculate EV/EBITDA for NCI and RGI.
C. Select NCI or RGI for recommendation as relatively undervalued. Justify your selection.

15. Define the major alternative cash flow concepts, and state one limitation of each.

16. Data for two hypothetical companies in the pharmaceutical industry, DriveMed and MAT Technology, are given in the table below. For both companies, expenditures in fixed capital and working capital during the previous year reflected anticipated average expenditures over the foreseeable horizon.

	Drive Med	**Mat Tech**
Current price	$46.00	$78.00
Trailing CF per share	$3.60	$6.00
PICF	12.8	13.00
Trailing FCFE per share	$1.00	$5.00
PIFCFE	46.00	15.00
Consensus five-year growth forecast	15%	20%
Beta	1.25	1.25

On the basis of the information supplied, discuss the valuation of MAT Technology relative to DriveMed. Justify your conclusion.

17. Your value-oriented investment management company recently hired a new analyst, Bob Westard, because of his expertise in the life sciences and biotechnology areas. At the company's weekly meeting, during which each analyst proposes a stock idea for inclusion on the company's approved list, Westard recommends Human Cloning International (HCI). He bases his recommendation to the Investment Committee on two considerations. First, HCI has pending patent applications but a P/E that he judges to be low given the potential earnings from the patented products. Second, HCI has had high relative strength versus the **S&P 500** over the past month.

A. Explain the difference between price multiples and relative strength approaches.
B. State which, if any, of the bases for Westard's recommendation is consistent with the investment orientation of your company.

18. Kirstin Kruse, a portfolio manager, has an important client who wants to alter the composition of her equity portfolio, which is currently a diversified portfolio of 60 global common stocks. The client wants a portfolio that meets the following criteria:

- Stocks must be in the Dow Jones Industrial Average, Transportation Average, or Utilities Average.
- Stocks must have a dividend yield of at least **5.0** percent.
- Stocks must have a P/E no greater than **20.**
- Stocks must have a total market capitalization of at least **$2.0** billion.

The table below shows how many stocks satisfied each screen, which was run in November 2001

Screen	**Number Satisfying**
In Dow Jones Industrial Average, Transportation Average, or Utilities Average	65
Dividend yield of at least 5.0%	10
P/E less than 20	27
Total market cap of at least $2.0 billion	52
Satisfies all four screens	6

Other facts are:

- In total, there are 65 stocks in these three indexes (30 in the Industrial Average, 20 in the Transportation Average, and 15 in the Utilities Average).
- The stocks meeting all four screens were Southern Co. (utility), TXU Corporation (utility), Eastman Kodak Co. (consumer goods), Public Service Enterprise Group (utility), Reliant Energy (utility), and Consolidated Edison (utility).

A. Which valuation indicator or fundamental in Kruse's screen is most restrictive?
B. Critique the construction of the screen.
C. Do these screens identify an appropriate

Chapter 4 – Market-Based Valuation: Price Multiples

Solutions

1. A. Normal EPS is the level of earnings per share that the company could currently achieve under mid-cyclical conditions.

   B. Averaging EPS over the 1997–2000 period, we find that ($2.55 + $2.13 + $0.23 + $1.45)/4 = $1.59. According to the method of historical average EPS, SH's normal EPS is $1.59. The P/E based on this estimate is $57.98/1.59 = 36.5.

   C. Averaging ROE over the 1997–2000 period, we find that (0.218 + 0.163 + 0.016 + 0.089)/4 = 0.1215. For current BVPS, we use the estimated value of $19.20. According to the method of average ROE, we have 0.1215 × $19.20 = $2.33 as normal EPS. The P/E based on this estimate is $57.98/$2.33 = 24.9.

2. A. The analyst can rank the two stocks by earnings yield (E/P). Whether EPS is positive or negative, a lower E/P reflects a richer valuation and a ranking from high to low E/P has a meaningful interpretation.

   In some cases, an analyst might handle negative EPS by using normal EPS in its place. Neither business, however, has a history of profitability. When year-ahead EPS is expected to be positive, leading P/E is positive. Thus the use of leading P/Es sometimes addresses the problem of trailing negative EPS. Leading P/E is not meaningful in this case, however, because next year's earnings are expected to be negative.

   B. Hand has an E/P of –0.100, and Somersault has an E/P of –0.125. A higher earnings yield has a similar interpretation to a lower P/E, and Hand appears to be relatively undervalued. The difference in earnings yield cannot be explained by differences in sales growth forecasts. In fact, Hand has a higher expected sales growth rate than Somersault. Therefore, the analyst should recommend Hand.

3. A. Because investing looks to the future, analysts often feature leading P/E when earnings forecasts are available, as they are here. But a specific reason to use leading P/Es based on the facts given is that RUF had some unusual items affecting EPS for 2000. The data to make appropriate adjustments to RUF's 2000 EPS are not given. In summary, Stewart should use leading P/Es.

B. Because RUF has a complex capital structure, the P/Es of the two companies must be compared on the basis of diluted EPS.

For HS: leading P/E = \$44/2.20 = 20

For RUF: leading P/E per diluted share = \$22.50/(30,000,000/33,333,333) = 25

Therefore, HS has the more attractive valuation at present.

The problem illustrates some of the considerations that should be taken into account in using the P/Es and the method of comparables.

4. A. Your conclusion may be in error because of the following:

- The peer group stocks themselves may be overvalued. Stated another way, the mean P/E of 18 may be too high in terms of intrinsic value. If that is the case, using 18 as a multiplier of the stocks expected EPS will lead to an estimate of stock value in excess of intrinsic value.
- The stock's fundamentals may differ from those of the mean food processing industry stock. For example, if the stocks expected growth rate is lower than the mean industry growth rate and its risk is higher than the mean, the stock may deserve a lower P/E than the mean.

In addition, mean P/E may be influenced by outliers.

B. The following evidence supports the original conclusion:

- Evidence that stocks in the industry are at least on average fairly valued (that stock prices reflect fundamentals).
- Evidence that no significant differences exist in the fundamental drivers of P/E for comparing the stock with the average industry stock.

5. A. Yardeni's model uses corporate, rather than U.S. government, bond yields and incorporates an estimate of earnings growth to arrive at an estimate of the fair value of stock market.

B. In principle, the use of any of this chapter's price multiples for valuation is vulnerable to this problem in comparing a company's characteristics to the overall market. If the stock market is overvalued, an asset that appears to be comparably valued may also be overvalued.

6. A. The formula for calculating P/E for a stable-growth company is the payout ratio divided by the difference between the required rate of return and the growth rate of dividends. If the P/E is being calculated on trailing earnings (Year 0), the payout ratio is increased by the growth rate.

P/E based on trailing earnings:

$$P/E = [\text{Payout ratio} \times (1+g)]/(r-g)$$
$$= (0.30 \times 1.13)/(0.14 - 0.13) = 33.9$$

P/E based on next year's earnings:

$$P/E = \text{Payout ratio}/(r-g)$$
$$= 0.30/(0.14 - 0.13) = 30$$

B.

Fundamental Factor	Effect on P/E	Explanation (not required in question)
The risk (beta) of Sundanci increases substantially.	Decrease	P/E is a decreasing function of risk—as risk increases, the P/E decreases. Increases in the risk of Sundanci stock would be expected to lower the P/E.
The estimated growth rate of Sundanci's earnings and dividends increases.	Increase	P/E is an increasing function of the growth rate of the company—the higher the expected growth the higher the P/E. Sundanci would command a higher P/E if analysts increase the expected growth rate.
The market risk premium increases.	Decrease	P/E is a decreasing function of the market risk premium. An increased market risk premium would increase the required rate of return, lowering the price of a stock relative to its earnings. A higher market risk premium would be expected to lower Sundanci's P/E.

7. A. We would expect the trailing P/E accorded to CSG to increase to 13.25 as anticipated by Yu. The colleague is referring to the sustainable growth rate expression $g = b \times \text{ROE}$. The colleague's argument is that if ROE is level over the next several years, b will need to increase (dividend payout will need to decrease) to support a higher (6 percent) growth rate. The idea is that if b increases when growth becomes 6 percent, the P/E does not increase to 13.25. The argument concerning a change in dividend payout is incorrect. Any of the following arguments may be made:
   - Although ROE is expected to be flat only for several years, long-term ROE is the proper value to use in the sustainable growth rate expression.
   - If b actually increases, g will increase above 6 percent, offsetting the effect of b.
   - The sustainable growth rate expression assumes no external equity financing and keeping the capital structure constant (see Section 6.1 of Chapter 2). CSG can borrow, either short term while ROE is flat or even long term (possibly increasing debt's weight in the capital structure) to fund this growth. The company can also issue new stock. The sustainable growth rate formula cannot realistically serve as a basis to predict a cut in dividends.
   - Dividend payout, which is a discretionary decision of the board of directors, is not an economic fundamental. Investors look to the underlying cash flow of the business in valuation.

   B. Because Yu is correct, CSG should be added to the focus list.

8. A. V_n = Benchmark value of P/E × E_n = 12× $3.00 = $36.0

B. In the sustainable growth rate expression $g = b \times \text{ROE}$, we can use (1 – 0.45) = 0.55 = b, and ROE = 0.10 (the industry average), obtaining 0.55 × 0.10 = 0.055. Given the required rate of return of 0.09, we obtain the estimate $3.00(0.45)(1.055)/(0.09 – 0.055) = $40.69. In this case, the Gordon growth model estimate of terminal value is higher than the estimate based on multiples. The two estimates may differ for a number of reasons, including the sensitivity of the Gordon growth model to the values of inputs.

9. Although the measurement of book value has a number of widely recognized shortcomings, it can still be applied fruitfully in several categories of circumstances:

- The company is not expected to continue as a going concern. When a company is likely to be liquidated (so that ongoing earnings and cash flow are not relevant), the value of its assets less its liabilities is of utmost importance. Naturally, the analyst must establish the fair value of these assets.
- The company is composed mainly of liquid assets, such as finance, investment, insurance, and banking institutions.
- The company's EPS is highly variable or negative.

10. A. Avtech: P/S = ($10 price per share)/[($1 billion sales)/(20 million shares)] = $10/($1,000,000,000/20,000,000) = 0.2
Target: P/S = ($20 price per share)/[($1.6 billion sales)/(30 million shares)] = $20/($1,600,000,000/$30,000,000) = 0.375
Avtech has a more attractive valuation based on its lower P/S but comparable profit margins.

B. One advantage of P/S over P/E is that companies' accounting decisions can have a much greater impact on reported earnings than they are likely to have on reported sales. Although companies are able to make a number of legitimate business and accounting decisions that affect earnings, their discretion over reported sales (revenue recognition) is more limited.

11. A. The P/Es are

Hormel	25.70/1.30 = 19.8
Tyson	11.77/0.40 = 29.4
IBP	23.65/1.14 = 20.7
Smithfield	24.61/2.31 = 10.7

Sales per share are found by dividing sales by shares outstanding. Dividing this into the share price gives the P/Ss:

Hormel	25.70/(4,124/138.923) = 25.70/29.69 = 0.866
Tyson	11.77/(10,751/220.662) = 11.77/48.72 = 0.242
IBP	23.65/(17,388/108.170) = 23.65/160.75 = 0.147
Smithfield	24.61/(6,354/103.803) = 24.61/61.21 = 0.402

B. If we rank the stocks by P/S from highest to lowest, we have

	P/S	Profit Margin
Hormel	0.866	4.41%
Smithfield	0.402	3.99%
Tyson	0.242	0.82%
IBP	0.147	0.70%

The differences in P/S appear to be explained, at least in part, by differences in cost structure as measured by profit margin.

12. For companies in the industry described, P/S would be superior to either of the other two ratios. Among other considerations, P/S is
- more useful in valuing companies with negative earnings.
- better able to compare companies in different countries that are likely to use different accounting standards (a consequence of the multinational nature of the industry).
- less subject to manipulation (i.e., managing earnings by management, a frequent consequence when companies are in a cyclical low and likely to report losses).
- not as volatile as P/E multiples and hence may be more reliable for use in valuation.

13. A. Using the CAPM, the required rate of return is 4.9% + 1.2 × 5.5% = 11.5%.

B. The dividend payout ratio is \$0.64/\$1.36 = 0.47. The justified values for the three valuation ratios should be

$$\frac{P_0}{E_0} = \frac{(1-b)\times(1+g)}{r-g} = \frac{0.47\times 1.09}{0.115-0.09} = \frac{0.5123}{0.025} = 20.5$$

$$\frac{P_0}{B_0} = \frac{ROE-g}{r-g} = \frac{0.27-0.09}{0.115-0.09} = \frac{0.18}{0.025} = 7.2$$

$$\frac{P_0}{S_0} = \frac{PM\times(1-b)\times(1+g)}{r-g} = \frac{0.109\times 0.47\times 1.09}{0.115-0.09} = \frac{0.05584}{0.025} = 2.2$$

C. The justified P/E is lower than the trailing P/E (20.5 versus 28.3), the justified P/B is higher than actual P/B (7.2 versus 7.1), and the justified P/S is lower than the actual P/S (2.2 versus 2.9). Therefore, based on P/E and P/S, GE appears to be overvalued but, based on P/B, appears to be slightly undervalued.

14. A. EBITDA = Net income (from continuing operations) + Interest expense + Taxes ÷ Depreciation + Amortization

EBITDA for RGI = €49.5 million + €3 million + €2 million + €8 million = €62.5 million
Per-share EBITDA = (€62.5 million)/(5 million shares) = €12.5
P/EBITDA for RGI = €150/€12.5 = 12

EBITDA for NCI = €8 million + €5 million + €3 million + €4 million = €20 million
Per-share EBITDA = (€20 million)/(2 million shares) = €10
P/EBITDA for NCI = €100/€10 = 10

B. Market value of equity for RGI = €150 × 5 million = €750 million
Market value of debt for RGI = €50
Total market value of RGI = €750 million + €50 = €800 million
Enterprise value (EV) = €800 million – €5 million (cash and investments) = €795 million

Now we divide EV by total (as opposed to per-share) EBITDA:
- EV/EBITDA for RGI = (€795 million)/(€62.5 million) = 12.72

Market value of equity for NCI = €100 × 2 million = €200 million
Market value of debt for NCI = €100
Total market value of NCI = €200 million + €100 = €300 million
Enterprise value (EV) = €300 million – €2 million (cash and investments) = €298 million

Now we divide EV by total (as opposed to per-share) EBITDA:
- EV/EBITDA for NCI = (€298 million)/(€20 million) = 14.9

C. Zaldys should select RGI as relatively undervalued.
First, it is correct that NCI *appears* to be relatively undervalued based on P/EBITDA, because NCI has a lower P/EBITDA multiple:
- P/EBITDA = €150/€12.5 = 12 for RGI
- P/EBITDA = €100/€10 = 10 for NCI

RGI is relatively undervalued based on EV/EBITDA, however, because RGI has the lower EV/EBITDA multiple:
- EV/EBITDA = (€795 million)/(€62.5 million) = 12.72 for RGI
- EV/EBITDA = (€298 million)/(€20 million) = 14.9 for NCI

EBITDA is a pre-interest flow; therefore, it is a flow to both debt and equity and the EV/EBITDA multiple is more appropriate than the P/EBITDA multiple. Zaldys would rely on EV/EBITDA to reach his decision when the two ratios conflicted. Note that P/EBITDA does not take into account differences in the use of financial leverage. Substantial differences in leverage exist in this case (NCI uses much more debt), so the preference for EV/EBITDA over P/EBITDA is increased.

15. The major concepts are as follows:
    - EPS plus per-share depreciation, amortization, and depletion (CF)
      Limitation: Ignores changes in working capital and noncash revenue. Not a free cash flow concept.
    - Cash flow from operations (CFO)
      Limitation: Not a free cash flow concept, so not directly linked to theory.
    - Free cash flow to equity (FCFE)
      Limitation: Often more variable and more frequently negative than other cash flow concepts.
    - Earnings before interest, taxes, depreciation, and amortization (EBITDA)
      Limitation: Ignores changes in working capital and noncash revenue. Not a free cash flow concept. Relative to its use in P/EBITDA, EBITDA is mismatched with the numerator because it is a pre-interest concept.

16. MAT Technology is relatively undervalued compared with DriveMed based on a P/FCFE multiple that is 34 percent the size of DriveMed's FCFE multiple (15.6/46 = 0.34, or 34%). The only comparison slightly in DriveMed's favor, or approximately equal, is that based on P/CF (12.8 for DriveMed versus 13.0 for MAT Technology). However, FCFE is more strongly grounded in valuation theory than P/CF. Because DriveMed and MAT Technology's expenditures in fixed capital and working capital during the previous year reflected anticipated average expenditures over the foreseeable horizon, we have additional confidence with the P/FCFE comparison.

17. A. Relative strength is based strictly on price movement (a technical indicator). As used by Westard, the comparison is between the returns on HCI and the returns on the S&P 500. In contrast, the price-multiple approaches are based on the relationship of current price not to past prices but to some measure of value such as EPS, book value, sales, or cash flow.

    B. Only the reference to the P/E in relationship to the pending patent applications in Westard's recommendation is consistent with the company's value orientation, because it addresses HCI's P/E in relationship to expected future earnings.

18. A. The most restrictive criterion as judged by the number of stocks meeting it is the dividend yield criterion, which results in only 10 eligible investments. The screen strongly emphasizes dividend yield as a valuation indicator.

    B. The screen may be too narrowly focused on dividend yield. It did not include variables related to expected growth, required rate of return or risk, or financial strength.

    C. The screen results in a very concentrated portfolio. Except for Eastman Kodak, the companies are all utilities, which typically pay high dividends.

They belong to a very small segment of the investment universe and would constitute a narrowly focused and non-diversified portfolio.