

CHAPTER 11

SECURITY VALUATION PRINCIPLES

Answers to Questions

1. The top-down valuation process begins by examining the influence of the general economy on all firms and the security markets. The next step is to analyze the various industries in light of the economic environment. The final step is to select and analyze the individual firms within the superior industries and the common stocks of these firms. The top-down approach thus assumes that the first two steps (economy-market and industry) have a significant influence on the individual firm and its stock (the third step). In contrast, the bottom-up approach assumes that it is possible to select investments (i.e. firms) without considering the aggregate market and industry influences.
2. It is intuitively logical that aggregate market analysis precede industry and company analysis because the government and federal agencies can exert influence on the aggregate economy via fiscal (changes in government spending, taxes, etc.) and monetary (changing money supply, interest rates, etc.) policy. Further, inflation, another aggregate economic variable, must be considered because of its major impact on interest rates and the spending and saving/investment of consumers and corporations. Therefore, a major division is the asset allocation among countries based upon the differential economic outlook including exchange rates (the outlook for the currency).

Again, industry analysis should precede individual security analysis since there are several factors that are generally national in scope but have a pervasive effect on some industries - e.g., industry-wide strikes, import/ export quotas, etc. In addition, alternative industries feel the impact of economic change at different points in the business cycle - e.g., industries may lead or lag an expansion. Further, some industries are cyclical (e.g., steel, auto), some are stable (utilities, food chains, etc.). Fluctuating exchange rates will affect some industries more than others.

The thrust of the argument is that very few, if any, industries perform well in a recession, and a “good” company in a “poor” industry may be difficult to find.

3. All industries would not react identically to changes in the economy simply because of the different nature of business. The auto industry for instance tends to do much better than the economy during expansions but also tends to do far worse during contractions as consumers’ consumption patterns change. In contrast, the earnings of utilities undergo modest changes during either expansion or recession since they serve a necessity and thus their sales are somewhat immune to fluctuations. Also, some industries “lead” the economy while others only react late in the cycle (e.g., construction).
4. Estimating the value for a bond is easier than estimating the value for common stock since the size and the time pattern of returns from the bond over its life are known

amounts. Specifically, a bond promises to make interest payments during the life of the bond (usually every 6 months) plus payment of principal on the bond's maturity date. With common stock, there are no such guarantees. In addition, the required return on a bond is based upon factors such as time to maturity and credit rating. Using financial market data an investor can determine what the appropriate yield to maturity should be on a bond under consideration for purchase. The common stock it is much more difficult to estimate required return.

5. The required rate of return on an investment is primarily determined by three major factors: (1) the economy's real risk-free rate (RRFR), (2) the expected rate of inflation (I), and (3) a risk premium (RP). While this basic framework will apply no matter what country you choose to invest in, there will be significant differences in these factors among different countries over time. Among the specific reasons why an investor may have different required returns for U.S. and Japanese stocks are:

The real risk-free rate: For all countries, this rate should be an approximation of the economy's real growth rate. However, the real growth rate among countries might be significantly different due to differences in the growth rate of the labor force, growth rate in the average number of hours worked, and differences in the growth rate of labor productivity.

The expected rate of inflation: Again, there are differences between the U.S. and Japanese inflation rate that are bound to imply a difference between the required return between the two countries. They may be in different stages of the business cycle and/or their central banks may be following different monetary policies.

The risk premium: The risk premium is derived from business risk, financial risk, liquidity risk, exchange rate risk, and country risk. Each of these components is influenced by differences in general economic variability, political conditions, trade relations, and operating leverage employed within the countries. It is necessary to evaluate these differences in risk factors and assign a unique risk premium for each country.

6. The nominal risk-free rate (NRFR) is composed of two factors: (1) real risk-free rate (RRFR) and (2) expected rate of inflation $E(I)$. As mentioned in the answer to question #5, the real risk-free rate for all countries is an approximation of the economy's real growth rate. It is highly unlikely that two countries will have the same real risk-free rate due to differences in the growth rates. Also, the expected rate of inflation will vary from country to country. Taking these factors into account, one would not expect the U.S. nominal risk-free rate to be the same as that in Germany. As Exhibits 11.6 illustrates, Germany's nominal risk-free rate is expected to be lower than that of the U.S. in 2008.
7. No, the Indonesian and United Kingdom stocks should have significantly different risk premiums. Specifically, Indonesian stocks should have much larger risk premiums because they are relatively new securities, lack liquidity, and in many cases the underlying firms are involved in highly risky ventures (i.e. business risk). On the other

hand, United Kingdom stocks typically are issued by established firms, quite liquid, and the underlying firms are typically engaged in less speculative activities.

8. No, the Singapore stock should be more risky than the United States stock based upon similar reasoning as presented in question #7.
9. Student Exercise: but the type of firm that is appropriate to use the reduced form (Gordon growth model or constant dividend growth model) is one that has relatively consistent dividend growth that is expected to continue in the future. Possible examples (which can change as business conditions change) include Walgreens and Coca-Cola as well as other “defensive” stocks.
Firms where the use of the reduced form is NOT appropriate include firms that are in the high-growth stage of an industry or product/firm life cycle—that is, firms whose dividends are sporadic or expected to be variable over time.
10. Student Exercise: but coming out of the Great Recession, a possible example may be auto manufacturers that filed for bankruptcy and/or received huge government bailouts. As they recover and repay taxpayer dollars, they may be able to enjoy a “supernormal” growth spurt in dividends.
11. The relative valuation ratios to evaluate a stock should be used in cases where:
 - (1) a good set of comparable entities (e.g., industries or similar companies) exists, or
 - (2) when the aggregate market is not at a valuation extreme (e.g., a seriously overvalued or undervalued market) or
 - (3) when a firm does not pay dividends.
12. The discounted cash-flow valuation approaches can be used for stocks that pay dividends, particularly in the case of a stable, mature firm where the assumption of relatively constant growth for the long term is appropriate.

The present value of operating cash flow technique can be used when comparing firms that have diverse capital structures.

The present value of free cash flow to equity is important to an equity holder since this approach measures the amount of cash flow available to the equity holder after debt payments and expenditures to maintain the firm’s asset base.
13. The two valuation approaches should **not** be considered to be competitive approaches; rather the text suggests that both approaches should be used in the valuation of common stock. The discounted cash flow techniques reflect how we describe value, that is, the present value of expected cash flows. However, these techniques could generate values that are substantially difference from the prevailing prices in the marketplace. On the other hand, the relative valuation techniques provide information on how the market is **currently** valuing the stock. These techniques should be used together in determining equity valuation, that is, the approaches should be considered complementary.

CHAPTER 11

Answers to Problems

1. Assume semiannual compounding:

Par value	\$10,000
Coupon Payment (every six months)	\$450
Number of periods	20
Required return	3.5%

Therefore,

Present value of interest payments	\$ 6,395.58
Present value of principal payment	<u>5,025.66</u>
Present value of bond	\$11,421.24

2. If the required return rises to 11 percent, then:

Number of periods	20
Required return	5.5%

Therefore,

Present value of interest payments	\$5,377.67
Present value of principal payment	<u>3,427.29</u>
	\$8,804.96

3. Annual dividend \$9.00
Required return 11%

Therefore, the value of the preferred stock = $\$9.00 / .11 = \81.82

At a market price of \$96.00, the promised yield would be $\$9.00 / \$96.00 = 9.375\%$, which is less than your required rate of return of 11%. Therefore, you would decide against a purchase at this price. The maximum price you will be willing to pay is \$81.82.

4. Earnings per share: last year \$10.00
Dividends per share: last year \$6.00
Estimated earnings per share: this year \$11.00
Required rate of return 12%
Expected sales price at end of year \$132.00

Since the last dividend payout ratio = $\$6.00 / \$10.00 = 60\%$, and assuming you maintain the same payout ratio, then dividends per share at the end of the year is:
EPS x Payout = $\$11.00 \times 60\% = \6.60 .

Therefore, the present value of BBC's share is:

$$\text{Value} = \frac{\$6.60}{(1+.12)} + \frac{\$132.00}{(1+.12)} = \$5.89 + \$117.86 = \$123.75$$

Thus \$123.75 is the maximum price you would be willing to pay for BBC's stock.

- | | | |
|----|--------------------------------|----------|
| 5. | Earnings per share: last year | \$10.00 |
| | Dividends per share: last year | \$6.00 |
| | Required rate of return | 8% |
| | Expected sell price | \$110.00 |

$$\text{Value} = \frac{\$6.60}{(1+.08)} + \frac{\$110.00}{(1+.08)} = \$6.11 + \$101.85 = \$107.96$$

Thus \$107.96 is the maximum price you would be willing to pay for BBC's stock.

- | | | |
|----|------------------------------------|---------------------|
| 6. | Dividends at the end of this year: | \$6 x 1.08 = \$6.48 |
| | Required rate of return | 11% |
| | Growth rate of dividends | 8% |

$$\text{Value} = \frac{\$6.48}{.11 - .08} = \$216.00$$

Thus, you would be willing to pay up to \$216.00 for BBC's stock.

- | | | |
|----|------------------------------|--------------------------|
| 7. | Estimated earnings per share | \$11.00 |
| | Dividend payout ratio | 60% |
| | Required rate of return | 11% (same as problem #6) |
| | Growth rate of dividends | 9% |

$$\text{P/E of BBC Company} = \frac{.60}{.11 - .09} = 30x$$

Thus, the maximum price you would be willing to pay for BBC's stock is:

$$30 \times \$11 = \$330.00$$

- | | | |
|----|-----------------------|-----|
| 8. | Dividend payout ratio | 40% |
| | Return on equity | 16% |

$$\begin{aligned} \text{Growth rate} &= (\text{Retention rate}) \times (\text{Return on equity}) \\ &= (1 - \text{payout ratio}) \times (\text{Return on equity}) \\ &= (1 - .40) \times (.16) \\ &= .60 \times .16 \\ &= 9.6\% \end{aligned}$$

9. Dividend payout ratio 40%
Dividend growth rate 9.6%
Required rate of return 13%

$$\text{P/E of SDC Company} = \frac{.40}{.13 - .096} = 11.76x$$

10. Dividend payout ratio 50%
Required rate of return 13%

$$\begin{aligned} \text{Growth rate} &= (1 - .50) \times (.16) \\ \text{(new)} &= .50 \times .16 \\ &= .08 \end{aligned}$$

$$\begin{aligned} \text{P/E of SDC Company} &= \frac{.50}{.13 - .08} = 10.00x \\ \text{(new)} & \end{aligned}$$

- 11.

$$\begin{aligned} \text{ROE} &= \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}} \\ &= \text{Profit Margin} \times \text{Total Asset Turnover} \times \text{Leverage} \end{aligned}$$

As the above equation illustrates, ROE can be increased through increases in profit margin, total asset turnover, or leverage. As an example of each, suppose ABC company saw an increase in demand for its product, knowing that they have a clearly superior product to others in the industry and their customers are extremely loyal, they will raise prices, thus generating more net income per sale, and have greater profit margin. As can be seen from the formula, holding other things constant, ABC will achieve a greater ROE.

Likewise, suppose demand for the product has increased on an industry wide basis. ABC knows if they raise its prices they may lose sales to the competition. As a result it decides to increase its leverage to increase ROE.

The final method of increasing ROE is by increasing overall efficiency and thus increasing the dollar value of sales to assets on hand.

The student should provide a numerical example of each of these effects.

12. Although grocery chains realize a very low profit margin because of heavy competition (around 1%), they do enjoy a very high asset turnover ratio. Combined with prudent use of leverage, it is indeed possible for them to achieve a ROE of about 12%.

13. Student Exercise

14. Required rate of return (k) 14%
 Return on equity (ROE) 30%
 Retention rate (RR) 90%
 Earnings per share (EPS) \$5.00

$$\begin{aligned} \text{Then growth rate} &= \text{RR} \times \text{ROE} \\ &= .90 \times .30 = .27 \end{aligned}$$

$$\text{P/E} = \frac{\text{D/E}}{\text{k} - \text{g}} = \frac{.10}{.14 - .27}$$

Since the required rate of return (k) is less than the growth rate (g), the earnings multiplier cannot be used (the answer is meaningless).

However, if ROE = .19 and RR = .60,
 then growth rate = .60 x .19 = .114

$$\text{P/E} = \frac{.40}{.14 - .114} = \frac{.40}{.026} = 15.38 = 15.38x$$

If next year's earnings are expected to be: $\$5.57 = \$5.00 \times (1 + .114)$

Applying the P/E: Price = (15.38) x (\$5.57) = \$85.69

Thus, you would be willing to pay up to \$85.69 for Madison Computer Company stock.

- 15(a). Projected dividends next 3 years:

$$\text{Year 1 } (\$1.25 \times 1.08) = \$1.35$$

$$\text{Year 2 } (\$1.35 \times 1.08) = \$1.46$$

$$\text{Year 3 } (\$1.46 \times 1.08) = \$1.58$$

Required rate of return 12%

Growth rate of dividends 8%

The present value of the stock is:

$$\begin{aligned} V &= \frac{1.35}{1.12} + \frac{1.46}{(1.12)^2} + \frac{1.58}{(1.12)^3} + \frac{40}{(1.12)^3} \\ &= \frac{1.35}{1.12} + \frac{1.46}{1.2544} + \frac{1.58}{1.4049} + \frac{40}{1.4049} \\ &= 1.21 + 1.16 + 1.12 + 28.47 = \$31.96 \end{aligned}$$

- 15(b). Growth rate 8%
Required rate of return 12%

$$V = \frac{1.35}{.12 - .08} = \frac{1.35}{.04} = \$33.75$$

- 15(c). Assuming all the above assumptions remain the same, the price at end of year 3 will be:

$$P_3 = \frac{D_4}{k - g} = \frac{1.25 \times (1.08)^4}{.12 - .08} = \frac{1.25 \times 1.3605}{.04} = \$42.52$$

16. Student Exercise