

**Achievement of Market-Friendly Initiatives and Results Program
(AMIR 2.0 Program)**

Funded by U.S. Agency for International Development

Equity Analysis, Portfolio Management, and Real Estate

Practice Quizzes and Solutions

By
Ronald E. Copley, Ph.D., CFA
President
Copley Investment Management

Contract No. 278-C-00-02-00210-00

2003

Carefully review these practice quizzes the week prior to taking the exam

1. Graphically show the historical relationship between the business cycle and the stock market. **Explain** how you would use this relationship to construct a market timing model.

Solution

You could construct a market timing model using this relationship assuming you have accurate information regarding where we are at any point in the cycle. You would also have to assume that the relationship will continue in the future. If these assumptions hold, you would sell stocks as the economy strengthens and buy stocks after it has already weakened. You would watch interest rates and inflation closely in order to determine the correct timing of your transactions (see notes for graph)

2. Define and briefly explain the 4 components of return to a real estate investment.

Solution

Tax Shelter
Cash Flow
Appreciation
Equity Buildup

3. Briefly explain how a RE investment can be profitable even though it has negative before tax cash flow.

Solution

Tax Shelter provides tax savings

4. Briefly explain the risks of a variable rate mortgage. Of a fixed rate mortgage.

Solution

Variable--interest rates could go up
Fixed--interest rates could go down

5. At the end of 1991, Shanghai Fello Shareholding Co., Ltd., had a price/earnings ratio of 538.7. Discuss and justify 2 possible reasons for this occurrence.

Solution

1. the market was betting on very high growth of the company's earnings
2. investors were playing the "bigger fools" game

6. You bought a stock for \$100. At the end of year one, the stock was selling for \$60 and at the end of year two it was selling for \$120. Calculate both the arithmetic and the geometric rates of return on this stock if you sold it at the end of year two. **Justify** one of your calculations assuming you wish to evaluate the performance of the investment.

Solution

Arithmetic:

Yr 0	100	-40%
1	60	
2	120	+100%

$60\%/2 = 30\%$ (arithmetic)

Geometric

$FV_2 = 120 = 100(1+i)^2$
 $= (120/100)^{.5} - 1$
 $= 1.095 - 1 = 9.5\%$ (geometric)

7. You wish to construct a 2-stock portfolio where the standard deviation of stock 1 = .3 and the standard deviation of stock 2 = .4. By investing 50% of your money in each stock, you estimate the standard deviation of the portfolio will equal .20. **Explain** (without calculations) and **graphically demonstrate** how this could happen.

Solution

Because the correlation between the two stocks is less than +1, the portfolio standard deviation will be less than the weighted average of the standard deviations of the 2 stocks (see notes for graph).

8. Given the following information:

Total Assets (t=0) = 120
Equity (t=0) = 100
E(Sales, t=1) = 200, which represents an increase of 30% over current year.
E(NPM, t=1) = 10%
E(Payout Ratio, t=1) = 40%

Assuming assets must increase in proportion with sales and that the firm is operating at maximum capacity, **calculate** the amount of new debt the firm must incur in order to finance the higher projected sales (**show** calculations). **Construct** a pro forma balance sheet at the end of year 1.

Solution

LHS: TA will increase by 30% from 120 to 156
NI will equal 20 (10% x 200)
Retained earnings will equal 60%, or 12
RHS must equal LHS of 156, an increase of 36 from the current 120
(Eqty) will increase by 12 from 100 to 112 due to increase in RE
Therefore, debt must increase by 24 (36 - 12)

<u>t = 1</u>			
TA	156	Debt (D)	44 (20 + 24)
		Equity (E)	112 (100 + 12)
TA	156	Tot D & E	156

9. Your firm wishes to raise additional capital to support growth of its product market share. You wish to purchase several new delivery trucks. You have discussed this matter with your banker and he has expressed serious doubts as to whether the loan committee would approve your request. **List and briefly discuss** 3 reasonable alternative courses of action you may take.

Solution

1. raise new equity capital
2. reduce dividend payout ratio
3. curb growth
4. speed collection of receivables
5. slow or stretch payables

10. **List and briefly explain** three assumptions implied about the financial policies of the firm when estimating sustainable growth.

Solution

1. ATO
2. payout ratio
3. profit margin
4. capital structure

11. Given the following information:

Sales = 200
Net Profit Margin = 9%
Asset Turnover = 2
Equity Multiplier (TA/EQ) = 4

Calculate ROE.

Solution

Because we know $ATO = 2$ and $Sales = 200$, AT must equal 100.
We also know that $TA/EQ = 4$; EQ must equal 25.
 $NI = 9\% \times 200 = 18$
Therefore, $ROE = NI/Equity = 18/25 = 72\%$

12. Given the following information:

Sales = 200
Net profit margin = 9%
Payout ratio = $33 \frac{1}{3}\%$
Debt/Equity = 3
Debt = 75

Calculate g (show work).

Solution

$NI = 9\% \times 200 = 18$
Because $Debt = 75$ and $D/E = 3$, equity must equal 25.
Also, $Retention Rate = 1 - \text{payout ratio} = 1 - 33 \frac{1}{3}\% = 66 \frac{2}{3}\%$
Therefore,
 $g = ROE \times RR$
 $= 18/25 \times 2/3$
 $= .72 \times 2/3 = 48\%$

13. Given the following information:

Equity = 250
Sales = 500
Profit Margin = 8%
Payout ratio = 25%
Prior year's RE = 120

Calculate this year's Retained Earnings.

Solution

this year's RE = last year's RE + increase in RE from profits
 $= 120 + [(1 - 25\%) \times (8\% \times 500)]$
 $= 120 + 30$
 $= 150$

14. Given the following information:

$P_0 = \$50$
 $E_0 = \$5$

Expected growth rate = 20%
Expected (P/E) = 10
Expected Dividend = \$2

Calculate the expected holding period return.

Solution

$$\begin{aligned} \text{Expected price} &= 10 \times (5 \times 1.2) = 60 \\ E(\text{HPR}) &= (60 - 50) / 50 + (2/50) \\ &= 20\% + 4\% = 24\% \end{aligned}$$

15. Given the following information:

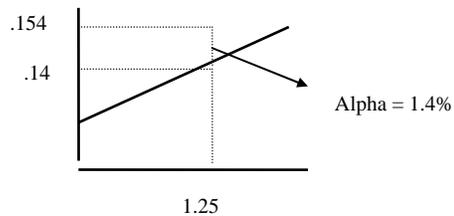
1 year from now you expect the price of the stock to equal = 30
The firm has no intention of paying any dividends in the near future
The current price of the stock is 26
You expect the market to generate a 12% return over the next 12 months
You expect the risk-free rate to equal 4% over the next 12 months
The stock has a beta of 1.25

Calculate alpha and graph your results .

Solution

$$\begin{aligned} E(\text{HPR}) &= (30/26) - 1 = 15.4\% \\ \text{Required rate of return} = k &= .04 + 1.25 (.12 - .04) \\ &= 14\% \end{aligned}$$

$$\text{Thus, alpha} = 15.4\% - 14\% = 1.4\%$$



16. Given the following information:

$D_0 = \$4.50$
 $E(\text{DPS}) = \$5$ (next yr.)
Required rate of return = $k = 25\%$

Using the constant growth dividend discount model, **calculate** the intrinsic value of the stock at ($t = 0$) and ($t = 1$). Assuming you bought the stock today and held it for 1 year, **calculate** your expected holding period return. (**Show** all work). **Explain** your calculations.

Solution

$$\begin{aligned} P_0 &= 5 / (.25 - .20) \\ &= 100 \end{aligned}$$

$$\begin{aligned} P_1 &= 5(1 + .2) / (.25 - .20) \\ &= 6 / .05 \\ &= 120 \end{aligned}$$

$$\begin{aligned} E(\text{HPR}) &= (120 + 5) / 100 - 1 \\ &= 25\% \text{ (dividend yield} = 5\%, \text{ capital appreciation} = 20\%) \end{aligned}$$

Your expected HPR equals 25% of which 20% is capital appreciation, the same as g .

17. Graphically show and discuss diversification in terms of correlation.

Solution

Diversification depends on correlation. The lower the correlation, the greater the diversification benefits and the more the efficient frontier bows up and to the left. This means that the portfolio is becoming more efficient: it is providing the same expected return with less risk or greater expected return with the same risk (see notes for graph).

18. Define 3 variables necessary for construction of the efficient frontier. Explain when diversification provides positive benefits and when it does not. Criticize diversification as an investment strategy.

Solution

1. expected standard deviations
2. expected returns
3. expected correlations or covariances

Diversification provides positive benefits when correlation is less than +1.0. It provides no benefits when correlation equals 1.0 since the two securities act as one. Diversification can reduce risk, but it also reduce expected return. It is a good strategy for the risk averse investor, but not a good strategy for the risk taker.

19. Calculate dividend yield and P/E ratio given the following information:

	1994
Sales	\$1 million
Total Assets	\$1 million
Net profit margin	10%
Shares outstanding	200,000
Price per share	\$15
Payout ratio	40%
Debt/Equity	25%

Solution

$$\text{Dividend yield} = \text{Dps} / \text{MPS} = (\$1 \text{ mil} \times 10\% \times .4) / 200,000 \\ = \$0.20 / \$15 = 1.33\%$$

$$\text{P/E} = \$15 / (100,000 / 200,000) = 30$$

20. Calculate sustainable growth given the above information

Solution

$$g^* = \text{ROE} \times \text{Retention rate} = (\$100,000 / \text{Equity}) \times (1 - .4)$$

equity = \$1 million (TA) - debt, where debt = 20% x \$1 million since D/E = 25%, we know D/TA = 1/5 or 20%; thus, debt = .2 x 1,000,000 = \$200,000

now, equity = \$800,000

$$\text{ROE} = \$100,000 / \$800,000 = 12.5\% \text{ and } g = .125 \times .6 = 7.5\%$$

21. List and briefly discuss 4 alternative courses of action to fund future growth of an old, large company listed on the NYSE with an ATO ratio equal to 4:1 in an industry where the average ATO equals 5:1.

Solution

1. sell stock

2. increase debt
3. decrease dividends
4. decrease costs
5. sell inefficient assets

22. **Calculate** the external funds needed given the following information:

	<u>1994</u>	<u>1995 (projected)</u>
Sales	\$1 million	\$1.1 million
Total Assets	\$1 million	
Net Income	\$100,000	
Payout ratio	40%	
Debt/Equity	25%	

Solution

Assume assets and debt increase proportionally with sales, and a constant profit margin.

Additional assets needed = \$100,000

increase in equity (RE) = (\$1.1 mil x .1) (1 - .4) = \$66k

increase in debt = \$20k (1994 debt = \$200k since we know that D / TA = 20%)

Thus, external funds needed = \$100k - \$66k - \$20k = \$14k

23. Dividend growth and stock valuation: The Bozok company has just paid a cash dividend of \$2 per share. Investors require a 16 percent return from investments such as this. If the dividend is expected to grow at a steady 8 percent per year. **Calculate** the current value of stock **Calculate** the worth in five years.

Solution

The last dividend, was \$2. The dividend is expected to grow steadily at 8 percent. The required return is 16 percent. Based on the dividend growth model, the current price is:

$$\begin{aligned}
 P_0 &= D_1 / (r - g) = D_0 \times (1 + g) / (r - g) \\
 &= \$2 \times (1.08) / (.16 - .08) \\
 &= \$2.16 / (.08) \\
 &= \$27
 \end{aligned}$$

We could calculate the price in five years by calculating the dividend in five years and then using the growth model again. Alternatively, we could recognize that the stock price will increase by 8 percent per year and calculate the future price directly. We'll do both. First, the dividend in five years will be:

$$\begin{aligned}
 D_5 &= D_0 \times (1 + g)^5 \\
 &= \$2 \times 1.08^5 \\
 &= \$2.9387
 \end{aligned}$$

The price in five years would therefore be:

$$\begin{aligned}
 P_5 &= D_5 \times (1 + g) / (r - g) \\
 &= \$2.9387 \times (1.08) / .08 \\
 &= \$3.1738 / .08 \\
 &= \$39.67
 \end{aligned}$$

Once we understand the dividend model, however, it's easier to notice that:

$$\begin{aligned}
 P_5 &= P_0 \times (1 + g)^5 \\
 &= \$27 \times 1.08^5 \\
 &= \$27 \times 1.4693 \\
 &= \$39.67
 \end{aligned}$$

Notice that both approaches yield the same price in five years.

24. EBIT and EPS: Suppose the Bozok Corporation has decided in favor of a capital restructuring that involves increasing its existing \$5 million in debt to \$25 million. The interest rate on the debt is 12 percent and is not

expected to change. The firm currently has 1 million shares outstanding, and the price per share is \$40. If the restructuring is expected to increase the ROE, **calculate** the minimum level for EBIT that Bozok's management must be expecting. Ignore taxes in your answers

Solution

To answer, we can calculate the break-even EBIT. At any EBIT above this, the increased financial leverage will increase EPS. Under the old capital structure, the interest bill is \$5 million \times .12 = \$600,000. There are 1 million shares of stock, so, ignoring taxes; EPS is $(\text{EBIT} - \$600,000) / 1$ million.

Under the new capital structure, the interest expense will be \$25 million \times .12 = \$3 million. Furthermore, the debt rises by \$20 million. This amount is sufficient to repurchase \$20 million / \$40 = 500,000 shares of stock, leaving 500,000 outstanding. EPS is thus $(\text{EBIT} - \$3 \text{ million}) / 500,000$

Now that we know how to calculate EPS under both scenarios, we set them equal to each other and solve for the break even EBIT:

$$(\text{EBIT} - \$600,000) / 1 \text{ million} = (\text{EBIT} - \$3 \text{ million}) / 500,000$$

$$(\text{EBIT} - \$600,000) = 2 \times (\text{EBIT} - \$3 \text{ million})$$

$$\text{EBIT} = \$5,400,000$$

Check that, in either case, EPS is \$4.80 when EBIT is \$5.4 million.

25. Dividends and taxes: Bozok, Inc. has declared a \$1.50 per share dividend. Suppose capital gains are not taxed, but dividends are taxed at 28 percent. New IRS regulations require that taxes be withheld at the time the dividend is paid. Bozok sells for \$30 per share and the stock is about to go ex dividend. Calculate the ex-dividend price.

Solution

$$\text{After-tax dividend} = 1.5 \times (1 - 0.28) = \$1.08$$

$$\text{Ex-dividend price} = 30 - 1.08 = \$28.92$$