FINM3093 Investments

Lecture 5 Exercises

Solutions

1. Equation 10.11 applies here:

   $E(r_p) = r_f + \beta_{P1}\,[E(r_1) - r_f] + \beta_{P2}\,[E(r_2) - r_f]$

   We need to find the risk premium (*RP*) for each of the two factors:

   $RP_1 = [E(r_1) - r_f]$ and $RP_2 = [E(r_2) - r_f]$

   In order to do so, we solve the following system of two equations with two unknowns:

   $.31 = .06 + (1.5 \times RP_1) + (2.0 \times RP_2)$

   $.27 = .06 + (2.2 \times RP_1) + [(-0.2) \times RP_2]$

   The solution to this set of equations is

   $RP_1 = 10\%$ and $RP_2 = 5\%$

   Thus, the expected return-beta relationship is

   $E(r_P) = 6\% + (\beta_{P1} \times 10\%) + (\beta_{P2} \times 5\%)$

2. The expected return for portfolio *F* equals the risk-free rate since its beta equals 0.

   For portfolio *A*, the ratio of risk premium to beta is $(12 - 6)/1.2 = 5$

   For portfolio *E*, the ratio is lower at $(8 - 6)/0.6 = 3.33$

   This implies that an arbitrage opportunity exists. For instance, you can create a portfolio *G* with beta equal to 0.6 (the same as *E*'s) by combining portfolio A and portfolio *F* in equal weights. The expected return and beta for portfolio G are then:

   $E(r_G) = (0.5 \times 12\%) + (0.5 \times 6\%) = 9\%$

   $\beta_G = (0.5 \times 1.2) + (0.5 \times 0\%) = 0.6$

   Comparing portfolio *G* to portfolio *E*, *G* has the same beta and higher return. Therefore, an arbitrage opportunity exists by buying portfolio *G* and selling an equal amount of portfolio

E. The profit for this arbitrage will be

$$r_G - r_E = [9\% + (0.6 \times F)] - [8\% + (0.6 \times F)] = 1\%$$

That is, 1% of the funds (long or short) in each portfolio.

3. a. $E(r) = 6\% + (1.2 \times 6\%) + (0.5 \times 8\%) + (0.3 \times 3\%) = 18.1\%$

   b. Surprises in the macroeconomic factors will result in surprises in the return of the stock:

   Unexpected return from macro factors =

   $$[1.2 \times (4\% - 5\%)] + [0.5 \times (6\% - 3\%)] + [0.3 \times (0\% - 2\%)] = -0.3\%$$

   $$E(r) = 18.1\% - 0.3\% = 17.8\%$$

4. a. Though stock prices follow a random walk and intraday price changes do appear to be a random walk, over the long run there is compensation for bearing market risk and for the time value of money. Investing differs from a casino in that in the long-run, an investor is compensated for these risks, while a player at a casino faces less than fair-game odds.

   b. In an efficient market, any predictable future prospects of a company have already been priced into the current value of the stock. Thus, a stock share price can still follow a random walk.

   c. While the random nature of dart board selection seems to follow naturally from efficient markets, the role of rational portfolio management still exists. It exists to ensure a well-diversified portfolio, to assess the risk-tolerance of the investor, and to take into account tax code issues.

5. a. Consistent. Based on pure luck, half of all managers should beat the market in any year.

   b. Inconsistent. This would be the basis of an "easy money" rule: simply invest with last year's best managers.

   c. Consistent. In contrast to predictable returns, predictable *volatility* does not convey a means to earn abnormal returns.

   d. Inconsistent. The abnormal performance ought to occur in January when earnings are announced.

6. a. $E(r_M) = 12\%$, $r_f = 4\%$ and $\beta = 0.5$

Therefore, the expected rate of return is:

$$4\% + 0.5 \times (12\% - 4\%) = 8\%$$

If the stock is fairly priced, then $E(r) = 8\%$.

b. If r_M falls short of your expectation by 2% (that is, 10% – 12%) then you would expect the return for Changing Fortunes Industries to fall short of your original expectation by: $\beta \times 2\% = 1\%$
Therefore, you would forecast a revised expectation for Changing Fortunes of: 8% – 1% = 7%

c. Given a market return of 10%, you would forecast a return for Changing Fortunes of 7%. The actual return is 10%. Therefore, the surprise due to firm-specific factors is 10% – 7% = 3%, which we attribute to the settlement. Because the firm is initially worth $100 million, the surprise amount of the settlement is 3% of $100 million, or $3 million, implying that the prior expectation for the settlement was only $2 million.