THE UNIVERSITY OF MELBOURNE

FNCE10002 Principles of Finance
Semester 1, 2019

Modern Portfolio Theory and Asset Pricing II
Suggested Answers to Tutorial Questions for Week 7

Note that detailed answers to tutorial questions from Part II will only be provided in tutorials. The following abridged answers are intended as a guide to those detailed answers. This policy is in place to ensure that you attend your tutorial regularly and receive timely feedback from your tutor. If you are unsure of your answers you should check with your tutor, a pit stop tutor, online tutor or me.

While detailed answers to Part I appear below, if you are not sure of the answers to these questions please ask your tutor in the following week's tutorial.

Part I – Answers Submitted to Your Tutor

A. Problems

A1. a) Yes, this is possible. A stock with a high beta might have a higher or lower standard deviation than a stock with a low beta. The standard deviation measures total risk which is made up of both systematic and unsystematic risk, whereas beta measures only systematic risk. Stock A has a high beta and a relatively low standard deviation, but this might simply reflect that most of its risk is systematic. On the other hand, stock B has a higher standard deviation, but if most of this risk is unsystematic this stock will have a lower beta.

b) Yes, this is possible. Security X is the riskfree security with a 4% return and zero standard deviation. Security Y is risky because its standard deviation is positive, but it offers a return below the riskfree security's return. This is possible if the security's beta is negative.

c) No. The security may have a high (low) degree of diversifiable risk, which is part of its standard deviation, but is not part of its beta. Because the security has both systematic and unsystematic risk and because its systematic risk is equal to that of the market portfolio (which has only systematic risk), the security's standard deviation will probably be greater than that of the market portfolio.

A2. All parts of this problem use the CAPM model: $E(r_j) = r_f + [E(r_m) - r_f]\beta_j$.

a) $E(r_j) = 0.03 + (0.06)1.1 = 9.6\%$.

b) $E(r_j) = 0.06 + (0.12 - 0.06)0.7 = 10.2\%$.

c) $E(r_j) = 0.14 = r_f + (0.10 - r_f)1.5$.

$0.14 = r_f + 0.15 - 1.5r_f$.

$r_f = (0.14 - 0.15)/(1 - 1.5)$.

So, $r_f = 2\%$.

d) $E(r_j) = 0.10 = 0.04 + [E(r_m) - 0.04]0.75$.

$0.10 = 0.04 + 0.75E(r_m) - 0.03$.

$0.09 = 0.75E(r_m)$.

So, $E(r_m) = 12\%$.

A3. a) Based on the CAPM, the firm's required return is:

$E(r) = 0.05 + (0.12 - 0.05)1.1 = 12.7\%$.

b) As the equilibrium return of 12.7% is lower than the expected return of 14.0% the latter will fall to this equilibrium level as its price rises. So, the stock is underpriced right now.

Part II – Submission of Answers Not Required

B. Short Answer Questions

B1. Items (a), (c), and (e) are systematic risks and items (b) and (d) are primarily unsystematic risks.

B2. Firm A has higher systematic risk and most of firm B's risk is unsystematic.

C. Multiple Choice Questions

C1. B is correct. Using the CAPM we can calculate the market risk premium as 10%.

C2. B is correct. To invest in a portfolio with an expected return higher than the expected market return you would need to borrow funds and leverage your portfolio. The expected return of a portfolio comprised of the riskfree security and the market portfolio is given as 20%. Using this information, we can calculate the weights in the riskfree security and the market portfolio as –0.5 and 1.5 respectively. So, you would invest $1.5 \times 5000 = \$7{,}500$ in the market portfolio and you would have to borrow $0.5 \times 5000 = \$2{,}500$ at the riskfree rate to do so.

C3. B is correct.

C4. A is correct. Using the SML, the required return is 13.0%. The current stock price is $10.00.

C5. A is correct. The required return changes to 14.6%. The stock price changes to $7.58 and the percent price change is –24.2%.

D. Problems

D1. a) The required return using the SML is 11.5% and the expected return based on the information given 10.0%. You would not purchase the stock.

b) A fairly priced stock would have a price today that would result in an expected return equal to the required return of 11.5%, which is $29.60.