

Tutorial Assignment 6 Due 13 September at 10:00am (Start of Week 8) - Multi-factor Models

Started: Sep 12 at 17:08

Quiz Instructions

Please note: this is marked by a computer program. I have built in an allowance for rounding, but it is not a big allowance. It is safest to NOT round intermediate results and do all rounding at the very end.

This tutorial assignment is marked and worth 1.25 marks toward your final mark in this subject. There are 12 questions and you will be awarded $\frac{1.25}{12} = 0.10417$ marks toward your final mark for EACH question.

Please note that your tutorial assignment consists of 2 parts -

Part A is unmarked - you can download the questions as a PDF from the first question of the quiz.

Part B is marked by Canvas - it is the on-line quiz you are about to take now. Please print a pdf or take a screen shot of your answers to the computer-based quiz (Part B) at the end. This is insurance in case you write something that the program thinks is an error, but it is not really an error. **Your only time limit is the due date and time. Please note, that only your last attempt of the Quiz is saved and marked.**

Q: What if I do not have time to finish in one sitting?

A: You are permitted multiple attempts, but your **last** attempt before the due date and time is the one that is marked. Canvas, appears to save your answers after you enter them, but you might want to make note of them just in case of a computer glitch.

Part A - the unmarked portion of your tutorial assignment, to be discussed in your tutorials during the week of 13 Sept.

[Assignment6_MultiFactorModels_PartA.pdf](#)

Part B is below.

For Questions 1 through 5

Consider the following data for a single-factor economy

All portfolios are well diversified.

Portfolio	$E[r]$	β
<i>market</i> A	10%	1
B	9%	$\frac{2}{3}$ <i>EH = $\frac{2}{3} \times 6\% + 4\% = 8\%$</i>
<i>rf</i> F	4%	0 <i>$\alpha = 1\%$</i>

$\alpha = 5\% - \frac{2}{3} \times 6\% = 1\%$

Question 1**1 pts**

Does an arbitrage opportunity exist?

☒ Yes, and my answers to Question 2, prove it

☐ I don't know, but if there isn't, then this isn't a very interesting question.

☐ No, and my answers to Question 2, prove it

Question 2**1 pts**

Relative to Assets A and F, Asset B is

☒ Underpriced

☐ Overpriced

- ☐ Correctly Priced
- ☐ Insufficient Information to Tell

For Questions 3 - 5

Create a strategy that takes advantage of the mispricing that exists (oops! This answers Question 1). Create your strategy your strategy so that it goes either long or short \$1 invested in the risk-free rate. (*Note: the correct strategy only be either long or short the risk-free, it cannot be both or either. You need to solve for the for the strategy and then decide whether the risk-free should be long (investing/lending) or short (borrowing)*).

Question 3**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in a risk free asset, what should the amount invested in the risk-free asset be? (*use + for long and - for short*)

- ☐ Go short \$1 in the risk-free, $w_F = -1$
- ☐ Go long \$1 in the risk-free, $w_F = 1$

Question 4**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in a risk free asset, what should the the amount invested in Asset A be? (*use + for long and - for short*)

Question 5

1 pts

Following on from the above: with a strategy that goes either long or short \$1 in a risk free asset, what should the the amount invested in Asset B be? (use + for long and - for short)

+3.

Question 6

A = market

1 pts

This question is separate from questions 1 through 6 above.

There are two well diversified and correctly priced portfolios, A and B, with $E[r_A] = 14\%$ and $E[r_B] = 14.8\%$. If the economy has only one factor and $\beta_A = 1$ and $\beta_B = 1.1$, what must be the risk-free rate?

6%.

$$14\% - r_f = F - r_f$$

$$14.8\% - r_f = 1.1(F - r_f)$$

$$14.8\% - r_f = 1.1(14\% - r_f)$$

$$14.8\% - r_f = 15.4\% - 1.1r_f$$

$$r_f = 6\%$$

For Questions 7 through 12

(Big HINT: Follow slides 21-25 in this week's lecture). Assume that you are using a two-factor APT model, with factors P and Q, to find the fair (model-) expected return on a well-diversified portfolio Z that has an actual expected return of 20%. Portfolio Z's factor loadings (i.e., Z's betas on each of the two factors) and the factors' risk premiums are shown in the table below. Portfolios for factors P and Q are tradable (i.e., you can take long or short positions in them). Assume that the factor loading of P on Q is 0 (and the factor loading of Q on P is also, by extension, 0 too). The risk-free rate is 4%.

$$20\% - 4\% = 1.5 \times 12\% + 0.6 \times (-3\%) + \alpha$$

$$\alpha = -0.2\% = -0.002$$

Factor	Z's factor loading (Beta)	Factor Risk Premium
P	1.5	12.0%

Q

0.6

-3%

There is an arbitrage opportunity.

Question 7**1 pts**

What is the alpha of Portfolio Z?

Please answer in decimal form, not percent.

For questions 8-12

Create a strategy that takes advantage of the mispricing that exists. Create your strategy your strategy so that it goes either long or short \$1 invested in Portfolio Z.

Question 8**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in Portfolio Z, what should the amount invested in Portfolio Z be? (*use + for long and - for short*)

Question 9**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in Portfolio Z, what should the amount invested in the risk-free asset be? (use + for long and - for short)

-1.1

Question 10**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in Portfolio Z, what should the amount invested in Factor Portfolio P be? (use + for long and - for short)

+1.5

Question 11**1 pts**

Following on from the above: with a strategy that goes either long or short \$1 in Portfolio Z, what should the amount invested in Factor Portfolio Q be? (use + for long and - for short)

+0.6

Question 12**1 pts**

What is the arbitrage return (in %) per dollar bought/sold of Portfolio Z.

Please answer in decimal form, not percent.

calculate return → use Eur) not premium

No new data to save. Last checked at 17:16

Submit Quiz