



Financial Markets and Investments

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Computer Exam

Duration: 45min

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Name:

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Number:

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 You must hand-in your **EXCEL** file (named *20190111_FMI_StudentNumber_code.xlsx*). In the Excel file highlight final answers and briefly reproduce them below (using the available space).

GROUP IV (60 points)

Consider the assumptions of a single factor model (SFM), where for the common factor we have $\bar{R}_m = 15\%$, $\sigma_m = 20\%$. Furthermore, assume there exists a riskless asset that can be used to both lend and borrow with $R_f = 5\%$ and the following information about 6 risky assets.

	\bar{R}_i	β_i	σ_{ei}^2
1	25,1%	2	0,002
2	19,8%	1,5	0,003
3	17,0%	1,2	0,004
4	14,8%	1	0,005
5	12,8%	0,8	0,006
6	12,0%	0,7	0,007

1. Using the SFM parameters, find out the mean-variance theory (MVT) inputs – vector of expected returns and the variance-covariance matrix. [5p]

2. Consider shortselling is allowed without bounds.
 - (a) Represent in the mean-variance space (σ, \bar{R}) the efficient frontier:
 - (i) when we consider just combinations of risky assets..... [7.5p]
 - (ii) when we consider, in addition, the riskless asset. [7.5p]
 - (b) What can you conclude about the efficient of the 6 original risky assets? [5p]

3. Assume stock returns are approximately Gaussian.
- (a) Estimate the probability that the only combination of risky assets that is efficient has negative returns. [5p]
 - (b) Determine the combination of the 6 risky assets, that has the lowest possible probability of negative returns. [7.5p]
 - (c) Consider, in addition, also the riskless asset. Identify all efficient portfolios that have at most 25% probability of negative returns. Represent it graphically. [2.5p]
4. Consider the single factor used for the SFM model is a good proxy to the market portfolio of CAPM.
- (a) Verify which of the 6 basic risky assets are in equilibrium. [7.5p]
 - (b) Suppose Mr. Capm would like to invest in a portfolio:
 - * That uses only risky assets that are in equilibrium or underpriced, plus the riskless asset.
 - * That is efficient.
 - * That has a $\beta_p \leq 1.5$.
 - * That verifies $\Pr [R_{Mr.Capm} \leq 0\%] \leq 25\%$.
- What is your recommendation? Represent it in mean-variance space (σ, \bar{R}) [12.5p]