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# EE431 Economics of Financial Markets and Institutions
# Problem Set 5: Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT)

Please submit at the BE office, 5th floor department of Economics building.

Deadline of submission : Tuesday 7 April, 2015, before 15.00 hrs.

1. Assume that all assumptions of CAPM hold.

| Assets | Standard Deviation (%) |
|---|---|
| Security 1 | 4 |
| Security 2 | 7 |
| Security 3 | 9 |
| Security 4 | 10 |
| Security 5 | 14 |

Expected return on the market portfolio ($E(R_m)$) is equal to 0.08 and standard deviation of the market portfolio is equal to 0.10. The risk-free rate ($R_f$) is equal to 0.02.

(a) Write down CML equation.

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(b) Suppose an investor wants 6% expected rate of return, how should the investor allocate his or her fund between the market portfolio and risk fee asset? What is the standard deviation of the portfolio?

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(c) "According to CAPM, the price of security 5 must be higher than the price of security 3 because security 5 has a higher risk than security 3." Is the statement true? Is the given information sufficient? If not, specify what piece of information you need.

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2. Assume that stock returns are generated by a one-factor model, the returns on two stocks, A and B are given by the following representations:

   $\mathrm{E}R_A = 0.09 + 2F_1$

   $ER_B = 0.05 + F_1$

   Assuming that the conditions of Arbitrage Pricing Theory (APT) hold.

   (a) Write down the general formula for one-factor model.

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   (b) Suppose $ER_c = 0.01$. How to make an arbitrage profit?

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3. Assume that stock returns are generated by a two-factor model, the returns on two stocks, A and B are given by the following representations:

   $\mathrm{E}R_A = 0.01$

   $ER_B = 0.06 + F_1$

   $ER_C = 0.05 + F_2$

   Assuming that the conditions of Arbitrage Pricing Theory (APT) hold.

   Write down the general formula for two-factor model.

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