Portfolio Management

TD5. CAPM and SML

We consider d risky assets $S^1, \dots, S^d$ one risk-free asset S^0 and two instants 0 and T. We note R^i the return of asset i, $M^i := \mathbb{E}[R^i]$ and $\Sigma := \left(\sigma_{ij} = cov(R^i, R^j)\right)_{1 \leq i,j \leq d}$ for $i, j = 1, \dots, d$. The risky allocation between the risky assets is noted $\pi \in \mathbb{R}^d$.

Exercise 1 We assume that for the tangent portfolio $m_T = 20\%$ and $\sigma_T = 25\%$ and that for the risk-free asset $r_0 = 7\%$
1. if E is an efficient portfolio with $m_E = 30\%$ what is σ_E ? what is the correlation between R_{π_E} and R_{π_T} ?
2. if we consider a portfolio Q such that $m_Q = 35\%$ and $\sigma_Q = 65\%$ what are the systematic risk and specific risk of this portfolio ?

Exercise 2 Discuss the feasibility of the following situations.

	Portfolio	expected return	beta
Situation 1	A	.20	1.4
	B	.25	1.2
	Portfolio	expected return	standard deviation
Situation 2	A	.30	0.35
	B	.45	.25
	Portfolio	expected return	standard deviation
Situation 3	risk-free	.10	0
	tangent	.18	.24
	A	.20	.22
	Portfolio	expected return	standard deviation
Situation 4	risk-free	.10	0
	tangent	.18	.24
	A	.16	.12

Exercise 3 Knowing that $r_0 = 4\%$ complete the following table :

Asset	Expected Return	Standard Deviation	β	Specific Risk
A	5%		1.0	.3
B	6%			.2
C		.10	.5	0