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QF600 – Asset Pricing

Homework 1

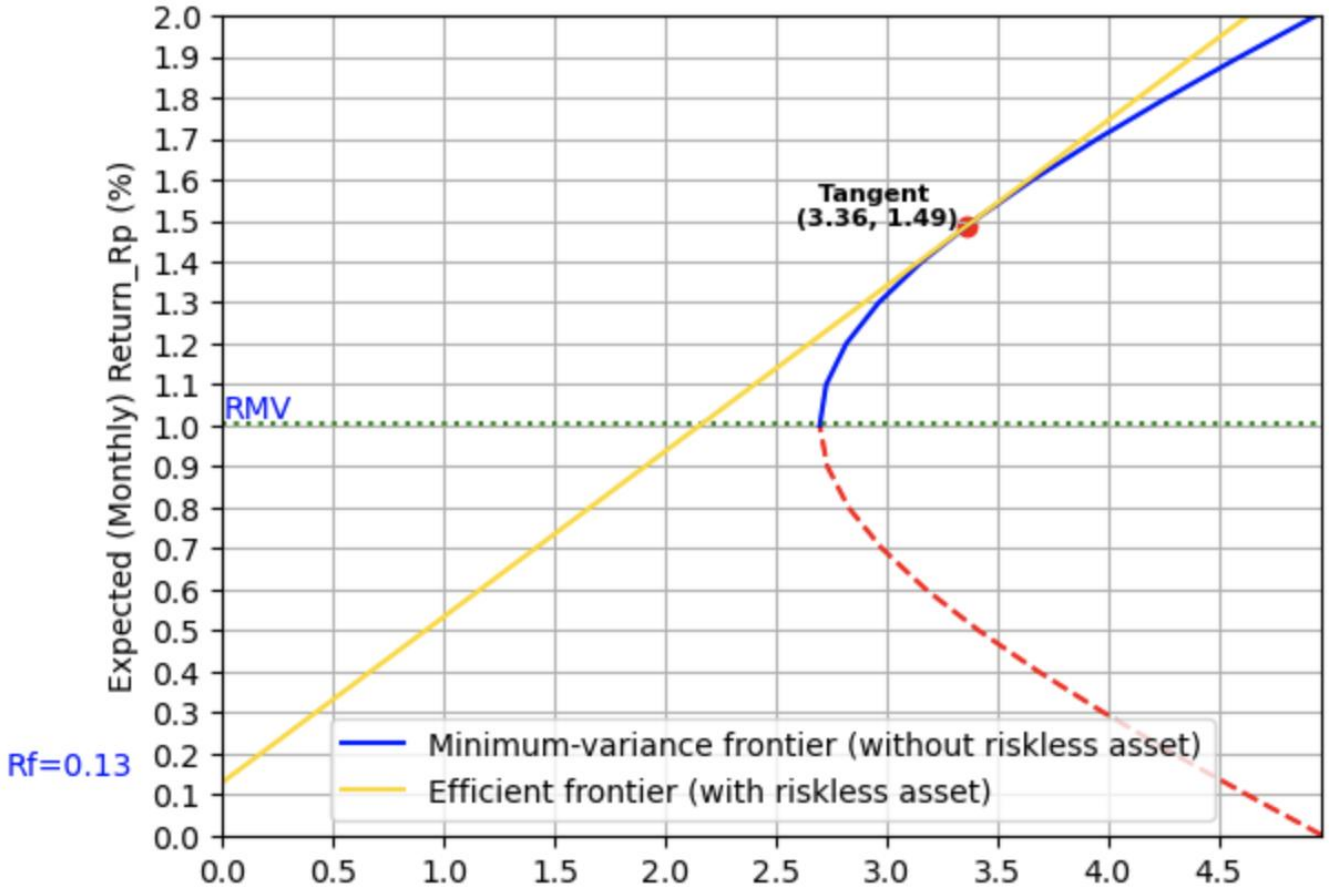
Table showing mean return, standard deviation, and tangency portfolio weights for the ten industry portfolios

	Industry_Portfolios	Mean Return	Standard Deviation	Porftolio Weight
1	NoDur	0.902833	3.345657	0.567972
2	Durbl	0.733333	8.361852	-0.214073
3	Manuf	1.012833	5.310270	0.714105
4	Enrgy	1.231167	6.081524	0.104087
5	HiTec	0.766250	5.381191	-0.363438
6	Telcm	0.881417	4.448284	-0.095463
7	Shops	0.916333	4.093786	0.991647
8	Hlth	0.783833	3.787172	0.075570
9	Utils	0.907167	3.701763	0.132643
10	Other	0.489083	5.582452	-0.913051

Table for covariance matrix for the ten industry portfolios

	NoDur	Durbl	Manuf	Enrgy	HiTec	Telcm	Shops	Hlth	Utils	Other
NoDur	11.193422	18.449666	14.104907	10.531341	12.922949	11.968078	10.170832	9.953112	7.866653	14.438409
Durbl	18.449666	69.920577	39.178097	27.019794	35.466652	27.490543	27.444731	16.824003	12.746136	39.361987
Manuf	14.104907	39.178097	28.198970	23.145380	24.618739	19.550150	17.622867	13.596447	11.440612	26.313423
Enrgy	10.531341	27.019794	23.145380	36.984933	19.267276	15.366817	11.297800	9.630327	14.027168	18.320469
HiTec	12.922949	35.466652	24.618739	19.267276	28.957220	18.708273	17.837115	13.254064	10.304187	23.855470
Telcm	11.968078	27.490543	19.550150	15.366817	18.708273	19.787227	14.169356	11.506599	10.991596	19.610836
Shops	10.170832	27.444731	17.622867	11.297800	17.837115	14.169356	16.759084	10.178849	6.694350	19.226524
Hlth	9.953112	16.824003	13.596447	9.630327	13.254064	11.506599	10.178849	14.342669	7.475036	14.864553
Utils	7.866653	12.746136	11.440612	14.027168	10.304187	10.991596	6.694350	7.475036	13.703052	9.992960
Other	14.438409	39.361987	26.313423	18.320469	23.855470	19.610836	19.226524	14.864553	9.992960	31.163771

Plot the minimum-variance frontier (without the riskless asset) and the efficient frontier (with the riskless asset) generated by the ten industry portfolios



Calculate the Sharpe ratio for the tangency portfolio
Sharpe ratio = 0.4035655993495088

Briefly explain the economic significance and relevance of the minimum-variance frontier to an investor.
The minimum variance frontier consists of portfolios with the lowest amount of risk, for different values of Rp. Investors will not want to hold a portfolio below the minimum variance point, as they will always get higher returns along the positively sloped portion of the minimum-variance frontier.

Briefly explain the economic significance and relevance of the efficient frontier to an investor.
The efficient frontier consists of portfolios with the highest mean return for a given amount of risk. This tool helps investors analyze the risk and returns associated with an investment portfolio, and helps the investor adjust their asset allocation accordingly. It can also help an investor determine if he should pull his funds from an investment with a certain amount of risk and return for a similar investment with the same return but with less risk.

Briefly explain the economic significance and relevance of the tangency portfolio to an investor.
Tangency portfolio is unique risky portfolio where Capital allocation line (CAL) is tangent to existing top half frontier generated by n risky assets. The tangency portfolio must have the highest Sharpe ratio out of all possible risky portfolios. It indicates the optimal mix of assets that maximise an investor's risk-adjusted returns.