



**Università Commerciale
Luigi Bocconi**

**MSc. Finance/CLEFIN
2018/2019 Edition**

THEORY OF FINANCE – PART 1

**Mock Question 3 (total 5 points)
Time Advised: 20-21 minutes (for this question)
Difficulty Level: MEDIUM-HIGH**

Question 3.A (3.75 points)

Provide a precise definition of mean-variance (MV) preferences, making sure to discuss whether it might make any difference whether such preferences were to relate to the central moments of terminal wealth vs. the first two moments of portfolio returns. What are the models/ assumptions supporting the adoption of a MV framework?

Question 3.B (0.75 points)

John and Mary are characterized by different mean-variance preferences, in terms of the first two moments of portfolio returns. In particular, John is risk-averse for all wealth levels although his risk aversion declines as (expected) wealth increases, but he (oddly) becomes satiated for very high levels of expected wealth (hence, expected portfolio returns, call it $\mu^* > E[R_T]$ where T is the tangency portfolio). Mary is instead non-satiated at all wealth levels, but while she is increasingly risk-averse for low risk (call it σ^*), she becomes decreasingly risk-averse above some volatility of portfolio returns (again, σ^*). Assume all other ingredients of optimal portfolio selection in a MV framework are typical, as seen in the lectures. First, plot in two distinct graphs the maps of indifference curves of John and Mary. Second, in the same plots locate—if it exists—the optimal portfolio that John and Mary ought to select. Carefully explain why you have plotted the indifference curves with the shapes you have selected and why the optimal portfolios exist or fail to exist.

Question 3.C (0.5 points)

John is a non-satiated, risk-averse investor (with increasing risk aversion as a function of wealth and the risk of wealth) that maximizes a standard mean-variance objective that depends on the moments of portfolio returns. You know that he invests 50% of his wealth in the riskless asset and 50% in the tangency portfolio so that *his optimal* portfolio is characterized by a standard deviation of 12%. Moreover, you know that in correspondence to John's optimal portfolio, the slope of the highest achievable indifference curve is equal to 0.5 and that the expected return of the tangency portfolio is 14%. Based on this data, compute the risk-free rate under which John is selecting his portfolio.

