# Market Finance Exam 2016-17 (Session 2)

May 4, 2017

Duration: 1h

## 1 Factor models (6 points)

Write down the Fama-French 3-factor model, explain each variable in the formula, and briefly describe how the model disproves the CAPM empirically.

## 2 True or False (6 points)

1. If a utility function indicates constant relative risk aversion (CRRA), it must indicate increasing absolute risk aversion (IARA).
2. If the law of one price is not satisfied, there exists no stochastic discount factor that can be used to price all assets.
3. If the mimicking portfolio is not strictly positive, the no arbitrage condition is violated.

## 3 CAPM (8 points)

Suppose the risk-free rate is $r_f = 2\%$, the expected market return is $E(r_M) = 12\%$, and the market volatility $\sigma_M = 30\%$.

1. Suppose a stock A has a volatility of $\sigma_A = 60\%$ and a correlation with the market portfolio of $\rho_{AM} = 0.25$. What is its beta $\beta_A$? According to the CAPM, what is its expected return $E(r_A)$?
2. Suppose a stock B has a beta of $\beta_B = 0.9$, and a volatility of $\sigma_B = 30\%$. According to the CAPM, what is its expected return $E(r_B)$?
3. Which stock has more total risk? Which stock has more market risk?
4. What is the Sharpe Ratio of the market portfolio?

5. What is the Sharpe Ratio of the stock A, if the investor holds a single stock A and nothing else?

6. What is the Sharpe Ratio of the stock B, if the investor holds a well diversified portfolio?

7. What is the expected return of an equally weighted portfolio of these two stocks $0.5A + 0.5B$?

8. What is the beta of this equally weighted portfolio of the two stocks $0.5A + 0.5B$?