Final Exam: Empirical Asset Pricing
Paris Dauphine University

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Answer the questions only in the spaces provided. Please write legibly. Manage your time properly.

Student Code: _____

1. (4 Points) In Eugene F. Fama and James D. Macbeth (1973) Risk, Return, and Equilibrium: Empirical Tests. The Journal of Political Economy. The authors propose a methodology to empirically test the predictions of the CAPM. Explain in what consists their methodology, what econometric problems do they try to address, and describe how it can be used to test for the CAPM predictions (use mathematical notation to develop your answer).

2. (4 Points) Consider a model in which a representative investor has marginal utility that depends on consumption and wealth as follows $u'(C, W) = (C^{-\gamma})/(W^{-\theta})$. If the investor has a subjective discount rate of δ what is the stochastic discount factor in this economy? Log linearize the model and relate expected log-returns with consumption and wealth growth. What is the risk free rate in this economy? If you were to estimate this model using GMM, write the moment conditions you would use to estimate the model. What type of data would you use to estimate it? Comment on the sign of the parameters in the model.

3. (2 Points) Consider a one period model in which gross returns are $R_{t+1} = D_{t+1}/P_t$ where D is the dividend and P is the price of any asset. How can you log-linearly relate ex-ante and ex-post prices and dividends today with expected dividend growth and expected returns tomorrow?

4. (2 Points) If you run regressions using the log dividend yield today to predict returns and dividend growth tomorrow, how will the coefficients in both regressions be related to each other? Use this relation to show that the dividend price ratio should have some predictive ability.

5. (4 Points) Explain in detail the main differences and similarities between consumption based asset pricing and production based asset pricing. Comment on their ability to explain asset pricing puzzles, the cross-section, and the time series of asset returns.

6. (4 Points) Consider a two period model of investment where capital has a 100 percent depreciation rate in which managers choose tomorrow's capital to maximize the value of the firm or

$$\underbrace{z_t k_t}_{\text{Output}} - \underbrace{k_{t+1}}_{\text{Capital}} - \underbrace{\frac{a}{2}\left(\frac{k_{t+1}}{k_t}\right)^2 k_t}_{\text{Adjustment costs}} + \mathbb{E}_t\Big[M_{t+1} \quad \underbrace{z_{t+1}k_{t+1}}_{\text{Output tomorrow}} \quad \Big]$$

where z is a random productivity shock, M is the stochastic discount factor, a is an adjustment cost parameter, and k is capital. Use the first order condition of optimal investment to relate expected returns with investment and expected profitability. If you were to use these relations to create a linear multifactor asset pricing model and take it to the data, how would you create the factors? Give details on how you would create the time-series of these factors.

Helpful identities

If X is lognormal

$$\log \mathbb{E}[X] = \mathbb{E}[\log(X)] + \frac{1}{2} Var(\log(X))$$