**Quiz 1: Date: April 19, 2022 from 11.00-12.30**

**Question 1 (10 Points)** Score.....

Consider the one-period model of consumption and portfolio choice. Let an individual in this economy has the utility function as follow:

$$U(C) = ln(C)$$

Also, let $\frac{C_1}{C_0}$ is distributed as log-normal with mean equals $\mu_c$ and its variance is $\sigma_c$.
**Please read and answer the following questions carefully and completely.**

Score.....

**Question 1.1 ( 10 marks)** Calculate the risk free rate $R_f$ in terms of the individual's consumption, $C_0$ and $C_1$. Then,explain the relationship between the level of consumption and the risk free rate in this economy.

$R_f = \frac{1}{\sigma}\left(\frac{C_1}{C_0}\right)^{1-\gamma}$

Risk free rate are more sensitive to consumption growth if parameter $\gamma$ is less. I utility is highly the investa must care more about consumption and willing less to rearrange consumption response to interest rate thus that it take larger interest to change a consumption growth

Score.....

**Question 1.2 ( 10 marks)** Calculate the elasticity of intertemporal substitution in this setting. If in the next year, the interest rate is falling, Will the individual's consumption level increase or decrease? Why? To support your answer, use the concepts of income effect and substitution effect.

$$\epsilon = \frac{R_f}{\frac{C_1}{C_0}} \frac{\partial \frac{C_1}{C_0}}{\partial R_f} = \frac{\partial \ln(C_1/C_0)}{\partial \ln(R_f)} = \frac{1}{1-\gamma}$$

when $0 < \gamma < 1$ lower interest rate will lower second period consumption

but if $\gamma < 0$ then $\epsilon < 1$ lower interest rate, lower second period less than one for one imply to increase initial saving

SE lower the return from tranforming current consumption into future consumption providing an incentive to save more

IE from lower return on a given a mount of saving make the individual less income so in would lower consuntion in both period

Score.....

**Question 1.3 ( 10 marks)** Solve for the pricing kernel $P_i$ of any risky asset i in this economy. Then explain the meaning of this pricing kernel.

$$P_i = E\left[\frac{\delta u'(c_1) x_i}{u'(c_0)}\right]$$

$$= E[m_{01} x_i]$$

Score.....

**Question 1.4 (10 marks)** Calculate Hansen-Jaganathan Bound and explain the meaning.