Economics 222
Assignment 2
due February 4th at 5pm

1. Real interest rates are affected by the fact that nominal interest income is taxable. Suppose that interest income is taxed at rate $t = 0.50$ for all savers.

(a) If inflationary expectations on the financial market are: $\pi^e = 4\%$ and nominal bonds yield: $i = 10\%$, what is the expected after-tax real interest rate?

(b) Consider a real return bond (a bond that guarantees a constant before-tax real interest rate). If $r = 6\%$, what is the expected after-tax real interest rate?

(c) Which type of bond does relatively better when the inflation rate is lower than expected?

2. The Norwegian production function is given by: $Y = AK^{\alpha}N^{\beta}E^{1-\alpha-\beta}$, where E stands for energy. The supply of energy is given by: $E = P_e^2$, where P_e is the energy price. You can also assume that the capital supply is: $K = 16$ and that the labor supply is: $N = 16$. The technology is: $A = 0.5$ and the technical coefficients are: $\alpha = \beta = 0.25$. (Hint: $16^{0.25} = 2$, $16^{0.5} = 4$, $16^{0.75} = 8$)

(a) Find the demand for energy in Norway.

(b) What are the equilibrium price and quantity for energy in Norway?

(c) What is the real wage?

3. It is well-known that frictional unemployment in Greenland is a severe problem: the likelihood of a mismatch between jobs and workers is rather high across this large geographical region. For the sake of simplicity, assume that frictional unemployment is the only source of unemployment and that the unemployment rate is constant over time. All you know is that in any given month 5% of the employed people lose their jobs, while 15% of the currently unemployed find a job.

(a) What percentage of the unemployment spells last longer than a year?

(b) What is the unemployment rate in Greenland?

4. Suppose that the Nigerian economy must respect the following intertemporal budget constraint:

$$C_1 + G_1 + \frac{C_2 + G_2}{1+r} = Y_1 + \frac{Y_2}{1+r}$$

The Nigerian government has planned the following fiscal activities: $G_1 = T_1 = G_2 = T_2 = 100$. The citizens of Nigeria want to have perfect consumption smoothing over the course of their lives. Suppose that: $r = 0.10$, $Y_1 = 900$ and $Y_2 = 1110$.

(a) What will the consumption and the current account be in Nigeria for each period?

(b) Suppose that the government announces a tax cut: $T_1 = 50$. Assume that Ricardian equivalence holds. What will the consumption and the current account be in each period?

(c) Instead of the tax cut, the world real interest rate rises at the beginning of the first period: $r = 0.15$. Will the Nigerian current account be higher or lower in the first period (relative to what you found in part (a)) ?

5. The Australian economy can be represented by the following equations:

$$\begin{aligned} \bar{Y} &= 100 \\ C^d &= 11 + 0.7(Y - T) \\ I^d &= 20 - 200r \\ G &= T = 30 \end{aligned}$$

(a) Find the full-employment equilibrium values of C, I and r.

(b) The government decides to built a gigantic spaceship (so that $G = 35$ now) in order to win the next election. What are the consequences for C, I and r? Interpret using a Saving-Investment diagram.

(c) Forget about (b). The government has just been re-elected. It says that the citizens tax burden is too high and that we need to downsize the public sector. Now if both G and T equal 10, what are the equilibrium values of C, I and r? Interpret using a Saving-Investment diagram.