Fiscal Macroeconomics
Class Exercise 1

1.1

- Consider a two-period economy in which the government keeps a balanced budget with a level of public investment equal to g. At time $t = 0$ the government makes an additional investment in infrastructure ε, financed with one-period bonds paying an interest of R, and taxes households at $t = 1$ to fully repay debt.
- Prices are fully rigid, so output at $t = 0$ is fully demand-determined.
- Consumer demand, income and disposable income in period 0 are given as follows:

$$\begin{aligned} c &= \beta_0 + 0.9 \cdot y_{\text{disp}} \\ y_{\text{disp}} &= (1 - 0.3)y \\ y &= c + (g + \varepsilon) \end{aligned}$$

where y_{disp} is disposable income. Total demand consists solely of private consumption and the government investment, there is no private investment, and no government consumption. The government collects proportional taxes at the flat rate of 30 per cent.

Questions

1. Evaluate the "normal" level of public investment g before the "shock" ε
2. Evaluate the impact on output of the government investment in infrastructure (the fiscal multiplier)
3. What is the extra tax revenue needed by the government in period 1 to be solvent ?

1.2
Consider the case of an optimizing consumer who lives fives period and optimizes consumption under the intertemporal budget constraint.
Given that the dynamics of consumer's wealth can be represented as follows

$$W_t = (1 + r^W)W_{t-1} + (Y_t - T_t - C_t)$$

where W_t, is consumer's wealth at time t, $Y_t - T_t$ is net income at time t, and C_t is consumption.

Questions

1. Illustrate under which conditions the optimal consumption is

$$C_t = \frac{1}{\sum_{j=1}^{5} \frac{1}{(1+r^W)^{j-1}}} \left(\sum_{j=1}^{5} \frac{Y_j - T_j}{(1 + r^W)^{j-1}} + (1 + r^W)W_0 - \frac{W_5}{(1 + r^W)^4} \right) \quad \forall \quad t = 1, .., 5$$

2. Given the following path for net labour income $Y_1 - T_1 = 100, Y_2 - T_2 = 200, Y_3 - T_3 = 300, Y_4 - T_4 = 200, Y_5 - T_5 = 150$, $r^W = 0.02$, and an inital value of wealth, $W_0 = 200$ construct a table with three lines reporting disposable income, consumption and wealth

   - for a consumer who sets $(1 + r^W)W_0 - \frac{W_5}{(1+r^W)^4} = 0$
   - for a consumer who sets $W_5 = 0$

3. Think of a situation in which $Y_5 = 0$ so $Y_5 - T_5 = 150$ implies that a pension is paid to the consumer in the old age 5, the conditions under which the pension system is in equilibrium ?

4. Think now of a situation in which r^W increases from 0.02 to 0.04. What happens to net labour income, consumption and wealth ?

Solution Tables for Question 2

Case 1: $(1 + r^W)W_0 - \frac{W_5}{(1+r^W)^4} = 0$

Year	0	1	2	3	4	5
r^W		0.02	0.02	0.02	0.02	0.02
$Y - T$		100	200	300	200	150
C						
W	200					

Table 1: Consumption and Wealth for Case 1

Case 2: $W_5 = 0$

Year	0	1	2	3	4	5
r^W		0.02	0.02	0.02	0.02	0.02
$Y - T$		100	200	300	200	150
C						
W	200					

Table 2: Consumption and Wealth for Case 2