**Advanced Macroeconomics: Coursework**

Consider a deterministic DGE model for an economy populated by a large number *N* of identical individuals, each receiving an endowment of income in every period. The preferences of the representative individual are described by the intertemporal utility function $U\_{0}=\sum\_{t=0}^{1}β^{t}u\left(c\_{t}\right)$, with $β={1}/{\left(1+ρ\right)}.$ In every period the representative individual faces the budget constraint $c\_{t}+a\_{t}=y\_{t}+\left(1+r\right)a\_{t-1}$. The initial asset holding is given by $a\_{t-1}=0.$ All variables and parameters have standard interpretation.

**Question 1**

Let $ρ=r$; $y\_{t}=y\_{L}$ when $t=0$ and $y\_{t}=y\_{H} $when $t=1$; with $y\_{H}>y\_{L}$. Derive the equilibrium allocation and provide its economic interpretation. Explain how the equilibrium allocation changes if instead $y\_{t}=y\_{H}$ when $t=0$ and $y\_{t}=y\_{L}$ when $t=1$.

**Question 2**

Suppose that the financial market is contemplating the introduction of three alternative types of financial sanction. The first is: $a\_{t}\geq 0$ for $t=0, 1$. The second is: $a\_{t}=0$ for $t=0, 1$. The third is to set the rate of interest to $r^{'}>r$ for $t=0, 1$ [Hint: in the third case you can assume that utility is logarithmic and $ρ=r=0$, so that $r^{'}>0$]. Provide an economic interpretation of each type of sanction. Explain how the two equilibrium allocations derived in question 1 would change under each type of financial sanction.

**Question 3**

Suppose now that instead of all individuals in the economy being identical, there are two types in equal proportion. These two types differ only for their lifetime income allocation. The first type receives $y\_{t}=y\_{L}$ when $t=0$ and $y\_{t}=y\_{H} $when $t=1$. The second type receives $y\_{t}=y\_{L}$ when $t=0, 1$. As above $y\_{H}>y\_{L}$. Derive the equilibrium and provide its economic interpretation. Consider now how fiscal policy can be used to achieve income equality among the two types in each period *t* and what are the macroeconomic implications of this type of policy [Hint: To this end you can assume that the government uses a proportional tax on income and derive the ‘optimal’ tax rate].