

ECO5002 Introduction to Economics

Quiz 3

(Total Points: 40, Due on August 15th, 2025)

Consider a consumption-saving model with periods from 0 to T :

$$\begin{aligned} & \max_{\{\{c_t\}_{t=0}^T, \{b_{t+1}\}_{t=0}^{T-1}\}} \sum_{t=0}^T \beta^t \ln c_t \\ \text{s.t. } & c_t + \frac{b_{t+1}}{R} \leq b_t + \bar{w}, \quad t \in \{0, 1, \dots, T-1\} \\ & c_T \leq b_T + \bar{w} \end{aligned}$$

where c denotes consumption, and b denotes saving (or borrowing). β , R , and \bar{w} are parameters, and the initial value of saving b_0 is exogenously given.

1. **(30pts)** Solve for an explicit expression of c_0 as a function of β , R , \bar{w} , and b_0 .
2. **(10pts)** If there is a constraint: $b_T \geq \bar{b} > 0$, where \bar{b} is very large and makes this constraint always bind, i.e., $b_T = \bar{b}$. Re-compute the optimal consumption level at time 0 (denoted by c_0^*) and show that $c_0^* < c_0$.