Bent Sørensen

Practice Questions in Obstfeld-Rogoff material

1. (16% of Core 1, 2004) Consider the case of the 2 agents, 2 periods, 2 states-of-the-world model of Obstfeld-Rogoff Chapter 5.2 (where agents can trade using a full set of Arrow securities). Assume that both agents have CRRA utility functions $U(C_0) + E_0 U(C_1)$, where $U(C_t) = -\frac{1}{2} C_t^{-2}$.
Assume that the endowment of the first agent is $y_0 = 3, y_1 = 3$ and that the endowment of the second agent in period 0 is $y_0^* = 3$ and in period 1 his or her endowment is $y_1^* = 6$ in the "good state" g. In the "bad state" b the endowment of the second agent is $y_1^* = 0$. Assume that the good state happens with probability 0.5.
In the following questions you need to be precise in economic terms about "why" effects are what they are. You can argue the answer to each of the questions using words or you can use the appropriate formula that is derived in the book (we are not asking you to prove formulas in this question). If you use the appropriate formula correctly you will get half of the points for that and the other half for explaining properly. You can get full points for detailed explanations without writing formulas.
a) Would the rate of interest be positive or negative and why?
b) If the endowments of both agents doubled in period 0, what would happen to the interest rate relatively to the initial situation?
c) If the endowment of the first agent in period 1 now is $y_1 = 0$ in state g and $y_1 = 6$ in state b, while the endowments of the second agent remains as in the initial case, what would happen to the interest rate compared to the initial situation?
d) In the initial situation explain if agent 1 will have higher or lower consumption than agent 2 in each of period 0, period 1 (state g), and period 1 (state b).

2. (21% of core 2, 2004) Consider the case of 2 agents, each living for 3 periods. Output is deterministically given in periods 1 and 3, while there are 2 states-of-the-world (a and b) in period 2. We will refer to one agent as "home" and one as "foreign" and mark the variables for "foreign" with a star. Assume that both agents have quadratic utility functions $U(C_0) + E_0 U(C_1) + E_0 U(C_2)$, where $U(C_t) = 10 * C_t - \frac{1}{2} C_t^2$.
Assume that the deterministic endowments of the first agent are $y_0 = 4, y_2 = 7$ and that of the second agent are $y_0^* = 2$ and $y_2^* = 4$. In period 1, "home" endowment is $y_1^a = 4$ in state a and $y_1^b = 2$ in state b. The values for foreign are $y_1^{*a} = 2$ in state a and $y_1^{*b} = 4$ in state b. Assume that state a happens with probability 0.5.
Assume that home and foreign constitute the whole world and that output cannot be stored. Assume that agents in period 0 can trade a safe bond that pays net interest r. The bond pays out in period 1. No asset can be traded that pays out in period 2.

a) Find the rate of interest.
b) Find the optimal values C_0, C_1, C_2 and C_0^*, C_1^*, C_2^* for consumption.
c) Does the "PIH-relation" $E_0(C_1) = C_0$ hold? (E_t denotes the conditional expectation at period t.) Also explain if $E_0(C_2) = C_0$ and if $E_1(C_2) = C_1$. [If you get it wrong, you will get partial points for a clear discussion of under which conditions these relations will hold. So make sure to add some comments.]