Optimal Savings and Taxation

You are asked to re-evaluate the costs and benefits of various consumption and income tax proposals prepared by a government tax panel. To do so, you consider a 2 period model where individuals earn labor income Y from working in period 1 and do not work in period 2 (retirement). Individuals choose how much to consume in each period. Savings in period 1 earn an interest rate $r \geq 0$. Let C_1 denote the quantity of consumption in period 1 and C_2 denote the quantity of consumption in period 2. Prices of consumption for both periods is normalized to one, so it is $p_{C_1} = p_{C_2} = 1$.

a) Write the individual's budget constraint in an economy without taxes.

b) Write the budget constraint where both labour and capital incomes are taxed at rate t

c) Write the budget constraint with just a consumption-tax of rate τ

d) The tax panel claims that exempting capital-income from the income-tax while retaining the income-tax on labour-income is equivalent to shifting to a consumption tax system. Prove this algebraically. (**Hint: look closely at b) and c**).

e) Suppose that individuals have a utility function $U(C_1, C_2) = (C_1)^{0.5} + \delta(\frac{C_2}{1+r})^{0.5}$. Show that a consumption tax rate (τ) does not distort consumption choices. (**Hint: See notebook_01_optimization_review for an illustration of optimization techniques and notebook_02_optimal_saving for an example of how to solve an optimal intertemporal saving problem.**
Choices are not distorted when the ratio of consumption C_2/C_1 is equal in the two settings: with the consumption tax, with no taxes at all)