

THEORY OF INTERTEMPORAL CHOICE

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PROBLEMS

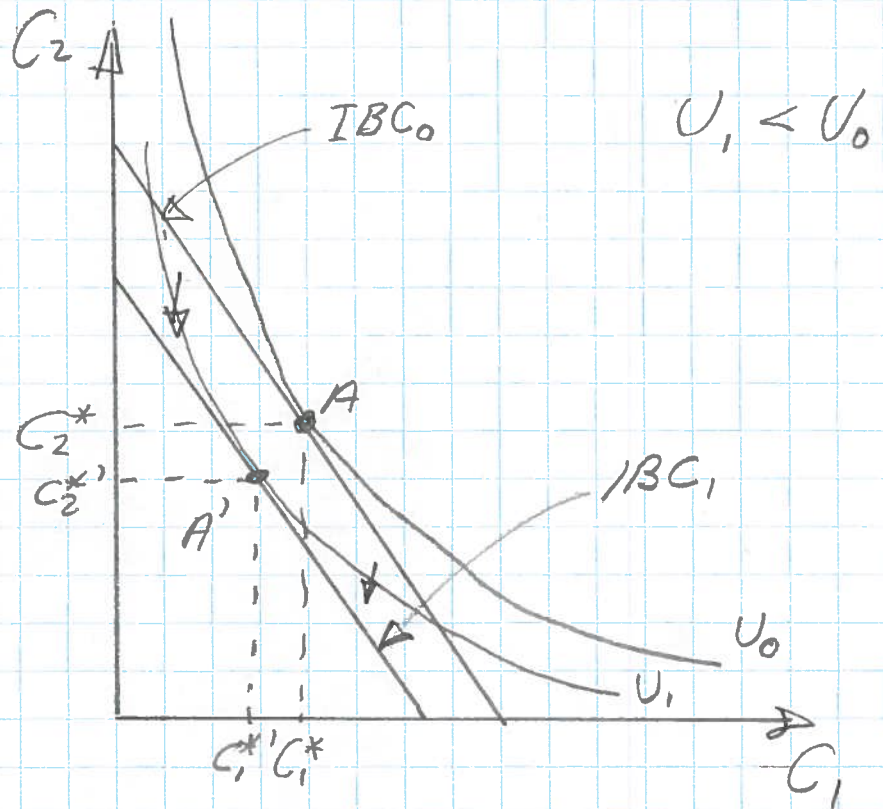
a) A drop in period 2 disposable income:

The intertemporal budget constraint is given by:

$$C_2 = (1+r)(W_1 + Y_{1d} - C_1) + Y_{2d} \quad [IBC]$$

Given the convex indifference curves, the following graph illustrates the initial equilibrium at point A.

N.B. The slope of the IBC line is $-(1+r)$. It is not affected by the change in Y_{2d} .

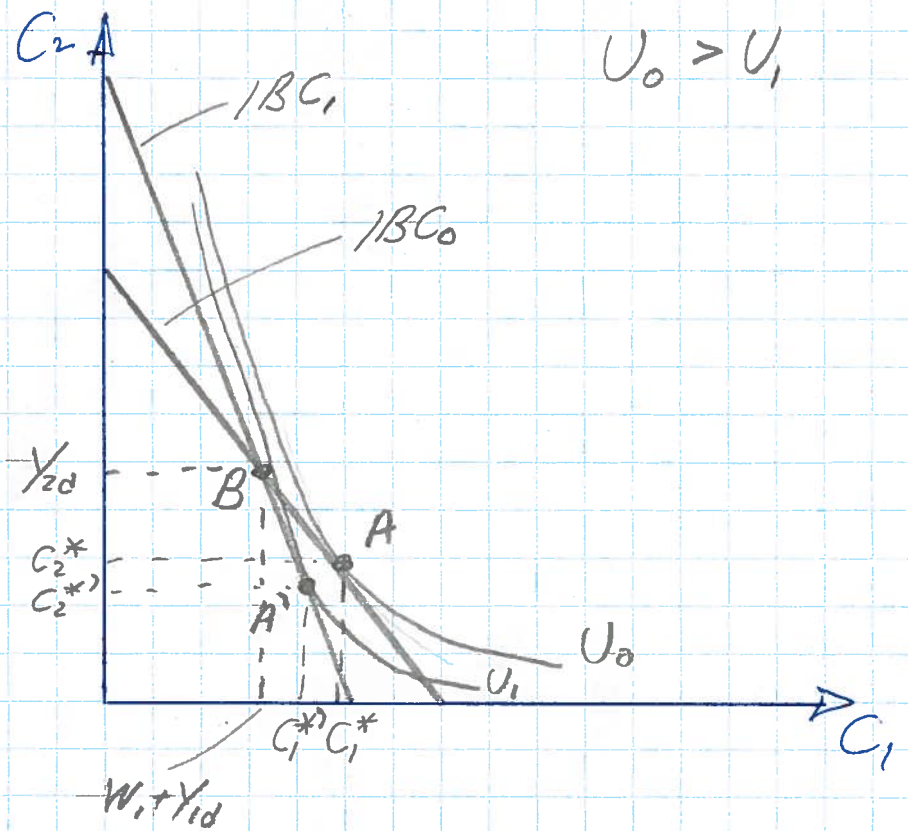


Suppose that period 2 disposable income drops to $Y_{2d}' < Y_{2d}$. We can see from [IBC] that this results in a downward shift of the IBC line to IBC_1 on the graph.

We therefore have a new equilibrium at point A, where both period 1 and 2 consumption levels have decreased. This is an instance of consumption smoothing; a drop in income in period 2 only leads to a drop in consumption in both periods.

The welfare level drops from U_0 to U_1 .

b) A higher interest rate for a net borrower:



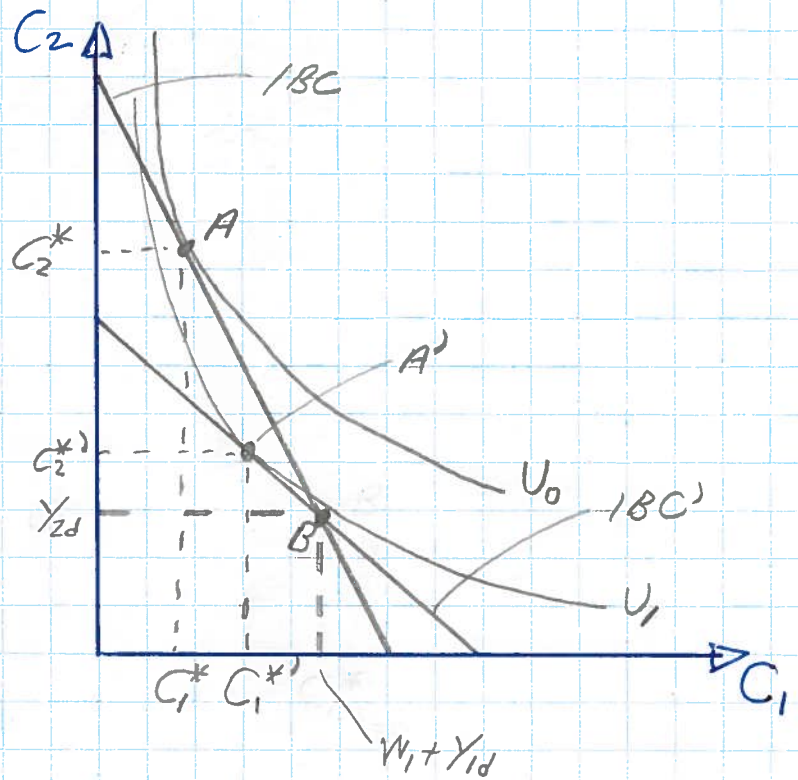
A higher interest rate $r' > r$ causes the slope of the IBC line to become steeper from $-(1+r)$ to $-(1+r')$. Both IBC lines must pass thru point B which corresponds to the no-borrowing, no-savings consumption levels.

The initial consumption levels are given at point A where $C_1^* > W_1 + Y_{1d}$ implies that he is a net borrower.

The new equilibrium at point A' implies that consumption has decreased at both periods following an increase in interest rate.

This is another example of a smoothing out of the effect of a lower IBC line for a net borrower facing higher interest rates. The consumer's welfare level drops from U_0 to U_1 .

c) A lower interest rate for a net saver:



The lower interest rate means that the slope of the IBC line becomes less steep, as illustrated by new constraint IBC'.

The consumption equilibrium moves from point A to point A'. This corresponds to an increase in period 1 consumption and a decrease in period 2 consumption.

Seeing that savings yields a lower return, the consumer decides to save less. This concurs with the observations that consumers tend to save more when interest rates go up, and conversely. The substitution effect outweighs the wealth effect.

Note that we could also have illustrated a case where C_1 decreases with a lower interest rate, i.e., the wealth effect is stronger.

Either way, consumption in period 2 decreases and welfare is lower for a net saver when the interest rate goes down.