

Assignment 7 (Due May 8th, in class before 11.20 am)

Intertemporal consumption choice: Consumption-Saving model

Chapter 9 Williamson (2018 edition)

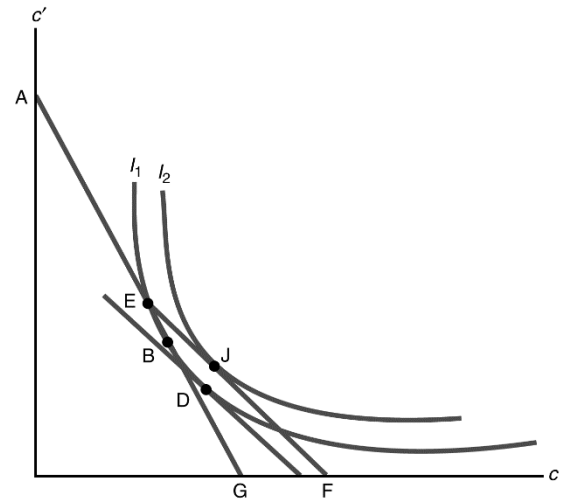
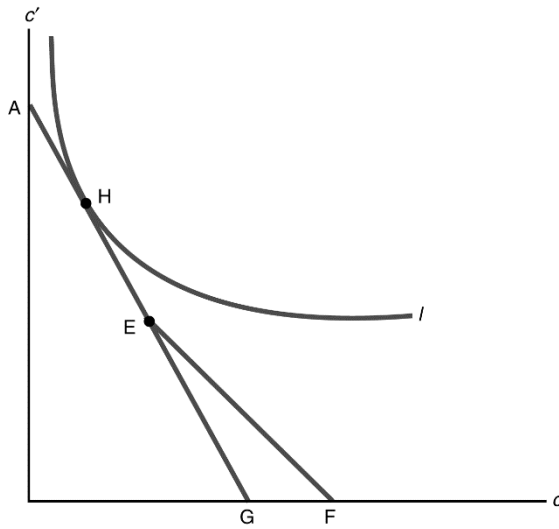
Question 2, 4, 5, 6, 12

Question 2

This problem involves a firm's offer to provide an interest-free advance on the consumer's income. If the consumer takes the advance, then his lifetime wealth is given by:

$$we = y + \frac{y'}{1+r} + x \left(1 - \frac{1}{1+r} \right)$$

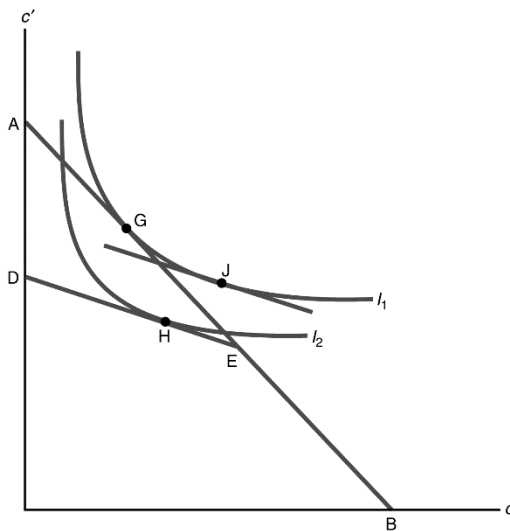
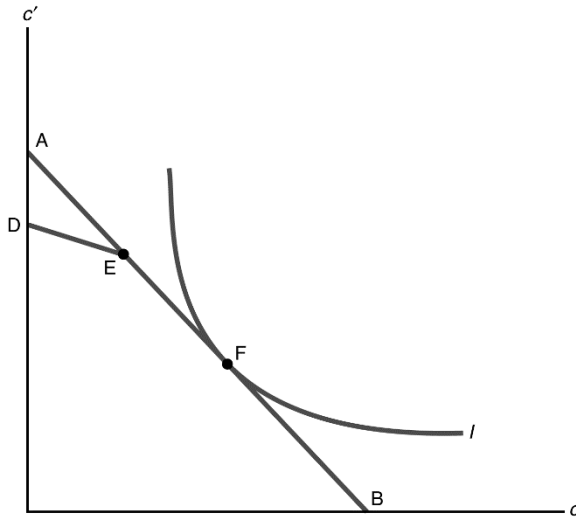
Therefore, provided that $r > 0$, the consumer should take the advance, as any increase in his lifetime wealth makes him better off.



Question 4

A tax on interest income.

- (a) Initially, AB in the first figure below depicts the consumer's budget constraint. The introduction of the tax results in a kink in the budget constraint, since the interest rate at which the consumer can lend, $r(1-t)$, is now smaller than the interest rate at which the consumer borrows, r . The kink occurs at the endowment, E .

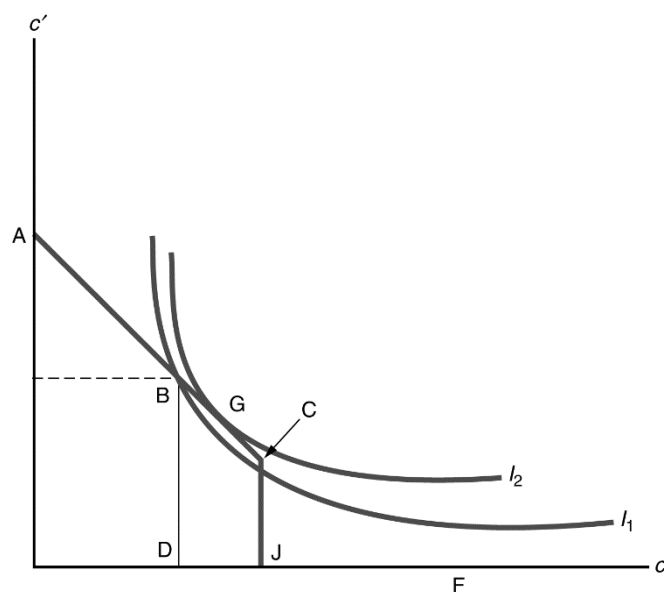
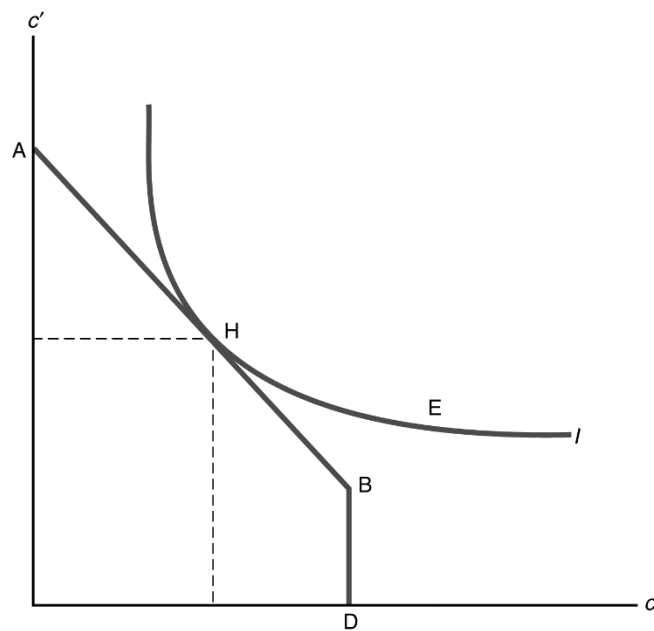


- (b) The first figure above shows the case of a consumer who was a borrower before the imposition of the tax. This consumer is unaffected by the introduction of the tax. The second figure above shows the case of a consumer who was a lender before the imposition of the tax. Initially the consumer chooses point G, and then chooses point H after the imposition of the tax. There is a substitution effect that results in an increase in first-period consumption and a reduction in second-period consumption, and moves the consumer from point G to point J. Savings also fall from point G to point J. The income effect is the movement from point D to point B, and the income effect reduces both first-period and second-period consumption, and increases savings. On net, consumption must fall in period 2, but in period 1, consumption may rise or fall. The figures above show the case in which first-period consumption increases, which is a case where the substitution effect dominates.

Question 5

The consumer faces a borrowing constraint that places a ceiling on the level of current consumption. The consumer may consume more than the current endowment, $y - t$, but less than the amount of the lifetime endowment, $w\ell$. The consumer's budget line is as in the first figure below. The budget line becomes vertical at $c = x$. An example of such a budget line is depicted in the two panels of the figure as ABD. As one possibility, the constraint is nonbinding as in the figure below. The consumer chooses point H. A change in the level of x has no effect on such a consumer.

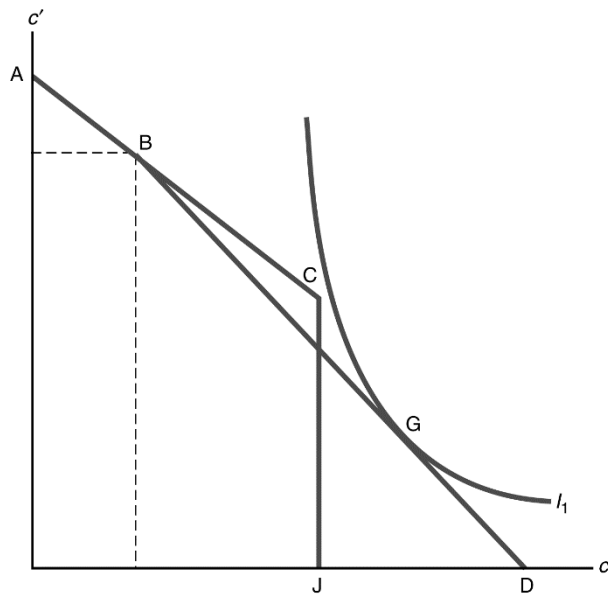
Alternatively, the consumer depicted in the second figure below originally chooses the corner solution, point B. The consumer achieves the level of utility corresponding to indifference curve, I_1 . An increase in x produces the new budget line, ACJ. This consumer now chooses point G. She increases current consumption and decreases both current saving and future consumption. This consumer is able to improve her level of utility to that corresponding to indifference curve, I_2 .

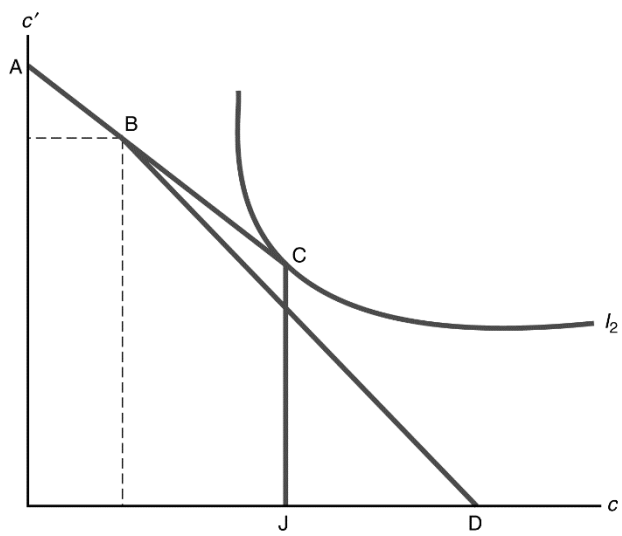


Question 6

This problem contrasts two alternative forms of credit market imperfections. As one possibility, consumers may either borrow or lend at the same real interest rate, but face a maximum amount of borrowing. The alternative possibility allows unlimited borrowing, but the interest rate paid on borrowing exceeds the interest rate earned from lending. Clearly, consumers who choose to be lenders are unaffected by such constraints. We therefore only need to be concerned about the behavior of borrowers. In the two figures below, the point B represents the endowment point. The first type of constraint imposes a maximum amount of borrowing. This constraint is depicted as budget line ABCJ in the figures. The second type of constraint imposes a higher interest rate on borrowing. This constraint is depicted as budget line ABD in the figures.

The first figure below depicts the case of a consumer who prefers to pay the higher interest rate on borrowing. This consumer picks point G, a point that is preferred to any of the points along ACJ. The second figure below depicts the case of a consumer who prefers the maximum borrowing constraint. This consumer picks point C (or alternatively a point along segment BC). Clearly the second consumer prefers point C to any of the points along BD.





Question 12

Government loan program.

- (a) There is no government spending in either period. In the first period, the government must collect lump-sum taxes so that $T = L$. In the second period, a lump-sum rebate is given so that $T' = -(1 + r^*)L$, where r^* is the market rate of interest.
- (b) The present-value government budget is therefore:

$$T + \frac{T'}{(1 + r^*)} = 0$$

- (c) The consumers' budget constraint is rewritten as follows.

$$s = y + \ell - c - t$$
$$c' = (1 + r)(s + y' - t' - \ell)$$

where ℓ represents the size of the loan that the individual consumer takes from the loan program. Combining, we obtain:

$$c + \frac{c'}{(1 + r)} = y + \frac{y'}{(1 + r)} - t - \frac{t'}{(1 + r)}$$
$$= y + \frac{y'}{(1 + r)} - \frac{1}{n} \left(T + \frac{T'}{(1 + r)} \right)$$

- (d) The size, L , of the loan program, does not change the fact that the present value of tax collections must equal zero. If a consumer originally chose $c = \hat{c}$ and $c' = \hat{c}'$ at r^* , the consumer will continue to choose $c = \hat{c}$ and $c' = \hat{c}'$. Therefore, if $r = r^*$ was originally a competitive equilibrium, it will continue to be a competitive equilibrium.