Problem Set 3: Saving and Consumption
Answer Keys

Econ 105C, Spring 2008

1. (d).
As every dollar borrowed by a private person in an isolated economy without government must equal a dollar loaned by another private person in this economy, the total value of bonds must be equal to zero.

2. $c_1$ and $c_2$ (for given money holdings and given levels of labor supply) are determined by the present value of labor income in periods 1 and 2, by the interest rate, and by the real levels of the bond holdings in periods 1 and 2.
The optimal choice occurs where the budget line is tangent to an indifference curve because the slope of the budget line shows the trade-off between $c_1$ and $c_2$ that the individual must make, while the slope of the indifference curve reveals the trade-off that the individual is willing to make. If the slopes differ, the individual is willing to accept a trade-off different than what the market requires, and so the individual can improve his or her situation by changing his or her choices of $c_1$ and $c_2$.

(a) Total sources of funds:
\[
y_1 + \frac{y_2}{1 + R} + \text{initial wealth} = 90 + \frac{110}{1 + .1} + 20 = 210. \tag{1}
\]

(b) Budget constraint:
\[
210 = c_1 + \frac{c_2}{1 + .1}. \tag{2}
\]

(c) We have $c = c_1 = c_2$. Substituting this into the budget constraint (2), we obtain $c = 110$. Savings:
\[
s_1 = y_1 + \text{initial wealth} - c_1 = 0. \tag{3}
\]

(d) Budget constraint:
\[
101 + \frac{110}{1 + .1} + 20 = c_1 + \frac{c_2}{1 + .1}. \tag{4}
\]
We have $c = c_1 = c_2$. Substituting this into the budget constraint (4), we obtain $c = 115.76$. Savings:
\[
s_1 = y_1 + \text{initial wealth} - c_1 = 5.24. \tag{5}
\]
(e) Budget constraint:

\[ 90 + \frac{121}{1+.1} + 20 = c_1 + \frac{c_2}{1+.1}. \]  

We have \( c = c_1 = c_2 \). Substituting this into the budget constraint (4), we obtain \( c = 115.24 \). Savings:

\[ s_1 = y_1 + \text{initial wealth} - c_1 = -5.24. \]  

(f) Budget constraint:

\[ 90 + \frac{110}{1+.1} + 31 = c_1 + \frac{c_2}{1+.1}. \]  

We have \( c = c_1 = c_2 \). Substituting this into the budget constraint (4), we obtain \( c = 115.76 \). Savings:

\[ s_1 = y_1 + \text{initial wealth} - c_1 = 5.24. \]

(a) Budget constraint:

\[ 12,000 + \frac{12,000}{1+.2} + 2,000 = c_1 + \frac{c_2}{1+.2}. \]  

(b) Budget constraint:

\[ 12,000 + \frac{12,000}{1+.5} + 2,000 = c_1 + \frac{c_2}{1+.5}. \]  

(c) Initial savings:

\[ s_1 = y_1 + \text{initial wealth} - c_1 = 2,000. \]  

Substitution effect: \( c_1 \downarrow, c_2 \uparrow \). Wealth Effect: \( c_1 \uparrow, c_2 \uparrow \) (because Rudy is a lender initially). The net effect on \( c_1 \) and thus also on \( s_1 \) is ambiguous. (In the figure below, the case where \( c_1 \) decreases is depicted.)
(d) Initial savings:

\[ s_1 = y_1 + \text{initial wealth} - c_1 = -2,000. \]  

Substitution effect: \( c_1 \downarrow, c_2 \uparrow \). Wealth Effect: \( c_1 \downarrow, c_2 \downarrow \) (because Rudy is a borrower initially). Thus \( c_1 \downarrow \) and \( s_1 \uparrow \).