

EE431/438 Economics of Financial Markets and Institutions

Exercise 1: Intertemporal Choice

1. Suppose your production opportunity set in a world of perfect certainty consists of the following possibilities

Project	Investment Outlay	Rate of return
A	1,000,000	8%
B	1,000,000	20%
C	2,000,000	4%
D	3,000,000	30%

- (a) Graph the production opportunity set in a C_0, C_1 framework.
- (b) If the market rate of return is 10%, draw the capital market line for the optimal investment decision
2. Jane has £100 today and will receive another £100 tomorrow. She can borrow or lend at a fixed interest rate of 10%. In this situation she chooses to borrow.
- (a) Illustrate this choice using an appropriate diagram.
- (b) Now, suppose that the interest rate rises to 20%. By decomposing the effect of the rise in the interest rate into a substitution effect and an income effect, discuss whether Jane will now choose to borrow more or less than in the previous case. Is it possible that she will now choose to lend? Explain.
- (c) Jack also has £100 today and will receive another £100 tomorrow. When the interest rate is 10%, he chooses neither to lend nor to borrow. Explain and illustrate whether he will choose to borrow or to lend when the interest rate rises to 20%.
3. An individual cares about present consumption C_1 and future consumption C_2 (subscript denotes time indicator). Her tastes are represented by the following utility function:

$$U(C_1, C_2) = U(C_1) + \beta U(C_2),$$

where $0 < \beta < 1$, $U'(C) > 0$, $U''(C) < 0$. The individual receives an income of Y_1 at period 1 and Y_2 at period 2. She can borrow or lend unlimited amount at a market determined rate of interest, r .

- (a) Calculate marginal rate of substitution between present consumption and future consumption.
- (b) Show the utility maximizing condition.
- (c) If $\beta = \frac{1}{1+r}$, $C_1 = C_2$. True or false? Explain.
- (d) If $\beta \neq \frac{1}{1+r}$, how does the individual allocate her consumption over time? What do you infer from a large value of β ? (e.g. the individual is patient or impatient.)