The agent’s maximization problem includes budget constraints.

(a) Write down the agent’s maximization problem, including the budget constraints.

(b) Solve for the agent’s consumption and saving functions ($C_1$, $C_2$, and $K_2$).

(c) Explain (graphically and in words) how the interest rate gets determined in this economy.

(d) Set $\alpha = 1$ and $\beta = 1$. Suppose everyone knows that in the future, capital will become more productive. Set $A = 1$ in the first period and $A = 2$ in the second period. What effect does this increase in productivity have on the equilibrium interest rate? How does this increased productivity affect the agent’s consumption and saving plans? Describe the income and substitution effects.

2. Consider the investment analysis in sections 4.2 and 4.3 from the textbook. How does a change in next period’s marginal product of capital affect this period’s desired investment schedule? Using a saving-investment diagram (i.e., a graph with a desired saving curve and a desired investment curve), show the effect of an increase in future MPK on equilibrium saving, investment and the real interest rate? How does your graphical answer compare to the mathematical answer to question 1 part (d)?

