

Problem Set 5

1. Suppose that an economy can be modelled with the Solow growth model. The production technology is

$$Y(t) = K(t)^\alpha L(t)^\beta,$$

where Y is output, K is the stock of capital, and L is effective labor. Also, note that $\alpha + \beta = 1$. Effective labor is

$$L(t) = A(t)N(t)$$

with $\dot{A} = gA$ and $\dot{N} = nN$.

- a) Find the steady state value of $k = K/L$.
- b) Find the growth rate of output and consumption. Do they differ from the growth rate of per capita output and per capita consumption?
- c) Show how growth accounting could be used to learn the value of g .
- d) Analyze the effects of an unanticipated permanent reduction in g on the real wage rate and the real interest rate.

2. Suppose that a developing economy can be modelled with the Solow growth model. The production technology is

$$Y(t) = K(t)^\alpha N(t)^\beta,$$

with $\alpha = 1/3$ and $\beta = 2/3$. Assume that there is a 10 percent depreciation rate, a 20 percent constant savings rate, and a 5 percent constant population growth rate.

- a) Find the steady state value of per capita output and per capita capital.
- b) Find the steady state value of the real wage rate and the real interest rate.
- c) Is this economy dynamically efficient?
- d) Assume that a rich neighbor country is willing to supply any additional capital necessary to move the economy to the golden rule equilibrium. How much is needed?