

11. Economic Growth

Exercise 11.1. The Fundamental Equation of the Solow Model

The accumulation of the capital stock in the Solow model is given by:

$$\Delta K = sY - \delta K$$

- Briefly explain the different components of this equation.
- Does a positive saving rate, s , mean that the capital stock always grows over time?

Exercise 11.2.

Consider an economy with aggregate production function

$$Y = K^\alpha L^{1-\alpha}$$

We assume that $\Delta L / L = n$ and that capital depreciates at rate δ . We also assume that the government taxes, and then destroys, a constant fraction t of each period's output. Finally, we assume that households consume a constant fraction c of disposable (i.e. after-tax) income.

Answer the following questions:

- Define $k = K/L$. Write down an expression for the law of motion of k , Δk , involving only k and the exogenous parameters.
- What is the long-run growth rate of y ?
- What is the long-run value of y ?
- Imagine that the government cuts taxes from t to $t' < t$. How does that change the long-run values and growth rates of y ?
- How does that change the short- and medium-run values and growth rates of y ? Show the qualitative time path of y before and after the tax change, in a graph with time on the horizontal axis and y (or, if it is easier, $\log(y)$) on the vertical axis.