ECO325: Lecture Notes
Macroeconomic Theory

Tianyu Du

September 6, 2018

Contents

1 Lecture 1. September 6. 2018

A **growth miracle** are episodes where thee growth in a country far exceeds the world average over a extended period of time. Result the country experiencing the miracle moves up the wold income distribution.

A **growth disaster** is an episodes where the growth in a country falls short at the world average for an extended period of time. Result the country moves down in the world income distribution.

Facts Data from the 20^{th} century suggest that

1. Real output grows at a (more or less) constant rate.
2. Stock of real capital grows at a (more or less) constant rate (but it grows faster than labor input).
3. Growth rates of real output and the stock of capital are about the same.
4. The rate of growth of output per capita varies greatly across countries.

1.1 Solow Growth Model (continuous time version)

Solow growth model decomposes the growth in output per capita into portions accounted for by increase in inputs and the portion contributed to increases in productivity.

In the baseline model we denote K as capital, L as labor and A as technology.

1.1.1 Production Function

Remark 1.1. Harrod-neutral technology here, refer to Uzawa's theorem.

The **effective labor input** is defined as $A(t)L(t)$
The production function is defined as

$$Y(t) = F(K(t), A(t)L(t))$$

Typically Cobb-Douglas form is taken

$$Y(t) = K(t)^{\alpha}(A(t)L(t))^{1-\alpha},\ \alpha \in (0,1)$$

Properties on production function.

1. CRS in K and AL: $Y(cK, cAL) = cY(K, AL),\ \forall c \geq 0$ implies
   - All gains from specialization have been exhausted.
   - Inputs other than K and AL are unimportant.

Define $c := \frac{1}{AL}$, the **intensive form** of production function is

$$y = \frac{Y}{AL} = f(k)$$

where $y := \frac{Y}{AL}$ denotes the **output per unit of effective labor** and $k := \frac{K}{AL}$ denote the capital stock per unit of effective labor.