Lecture 18: Growth

- Facts
- Solow’s model

Growth

- Facts: Figure 10-1 / table 10-1 / fig 10-2
- Sources of growth (per/capita): Capital accumulation / Technological progress
- $Y = F(K,NA)$ h.d. 1
- $y = (Y/NA) = F(K/NA,1) = f(k)$
- figure 10-5

Solow's Growth Model

A = 1, N = 1

Y= y = f(k)

S = sY

I = S

K(t+1) = (1-d) K(t) + I(t)
=>
k(t+1) - k(t) = s f(k(t)) - d k(t)

Figures 11-1, 11-2

Steady State and the Saving Rate

In steady state: $k(t+1)=k(t)=k^*$

$k(t+1) - k(t) = s\, f(k(t)) - d\, k(t)$

=>

$sf(k^*) = d\, k^*$

$g\_y^* = 0$ (if $n>0$, $g\_y^*=0 \Rightarrow g\_Y=g\_K=n>0$)

In steady state, the saving rate does NOT matter for per-capita growth.

It does matter, however, for the level of per-capita output and transitional dynamics

Figures 11-3, 11-4

Some numbers

- $Y = (KN)^{0.5}$ => $y = (K/N)^{0.5} = k^{0.5}$
- $k(t+1)-k(t)= s\ k(t)^{0.5} - dk(t)$
- St.St: $k^*=(s/d)^2$; $y^*=(s/d)$
- s0=d=0.1; s1=0.2 =>
- k* goes from 1 to 4 and y* from 1 to 2.
- Higher saving=> need to maintain more capital
- $c^* = y^* - dk^*$
- The Golden Rule: Table 11-1

Dynamics

- Dynamics: $k(1) = 1+0.2-0.1 = 1.1>1$
- … and so on
- Figure 11-7