

EC111 Class 19

Question 1.

The aggregate production function is Cobb Douglas, such that:

$$Y = TK^{0.5}L^{0.5}$$

Where Y is real national income T is an overall efficiency (or technology) term, K is the stock of capital and L is the stock of labour.

- Show that this production function exhibits constant returns to scale.
- Show that output per worker can be expressed as: $y = Tk^{0.5}$ where y is output per worker, Y/L, and k is capital per worker, K/L.
- Show that the change in capital per worker can be written as:

$$\Delta k = \frac{\Delta K}{L} - \frac{\Delta L}{L} k$$

- Now suppose that saving is a constant proportion, 0.2, of income. Express the change in capital per worker, $\Delta K/L$, as a function of T and k. There is no depreciation.
- Use the expression provided in (c) and the one you have derived in (d) to obtain the fundamental neoclassical growth equation, when the rate of growth of the labour force $\Delta L/L$ is 0.02 (i.e.2 percent).
- Using the expression you have derived in (e) and assuming $T = 1$, find Δk when $k = 64$. Interpret your result using a diagram.
- Using the expression you have derived in (e) find the level of capital per worker in the steady state when $T = 1$.
- Is the savings rate in this economy the one that maximises consumption per worker in the steady state; in other words is this economy at the *golden rule* in (g) above?

Question 2.

- Have incomes per capita in developed nations converged since 1950?
- How could we use the Solow model to explain that convergence?