

Simple endogenous growth model - The AK model

Consider no exogenous tech progress $\frac{\dot{A}}{A} = 0$

However modify production function so that $\alpha = 1$.

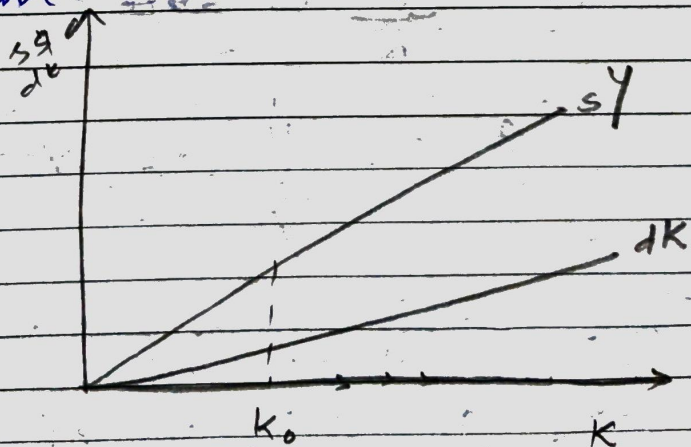
$$\rightarrow Y = AK \quad \left(\begin{array}{l} \text{where we add } A \text{ as a constant} \\ \text{per convention} \end{array} \right)$$

- We know $\dot{K} = sY - dK$

Assume no pop'n growth for simplicity so that we can interpret upper case letters as per capita variables.

$\therefore \alpha = 1 \quad Y = AK$ (unlike sK^α in the Solow model)
Hence sY curve'll be a linear line.

Solow diagram



consider an economy that starts at K_0 .
In this economy before total unit is

larger than depreciation, cpl stock grows. To keep right of K_0 total instnt is larger than depreciation. Growth in this model never stops.

In the basic Solow model $\alpha < 1$ and hence capital accumulation exhibited DRS.

Each addl capital unit was added with a slightly less productivity than previous unit of H_0 .

However in this case it's CRS with MPK always being A .

$$\text{we know } \frac{\dot{K}}{K} = s \frac{Y}{K} - d$$

$$\text{we know } Y = AK$$

$$\Rightarrow A = \frac{Y}{K}$$

$$\Rightarrow \frac{\dot{K}}{K} = sA - d$$

$$g_Y \equiv \frac{\dot{Y}}{Y} = sA - d$$

Thus in this model, we need not assume that anything in the model grows at some exogenous rate in order to generate per capita growth - neither technology nor population.