

02/22

Output: $y_t = A_t L_{y,t}$

Idea production: $\Delta A_t = A_t \bar{z} L_{x,t}$

Resource constraints: $L_{x,t} + L_{y,t} = \bar{L}$

Allocation: $L_{x,t} = \bar{\ell} \bar{L}$

$$L_{y,t} = (1 - \bar{\ell}) \bar{L}$$

Solve for y_t :

$$\textcircled{1} \quad y_t = \frac{A_t (1 - \bar{\ell}) \bar{L}}{\bar{L}} = A_t (1 - \bar{\ell})$$

$$\textcircled{2} \quad g_A = \frac{\Delta A_t}{A_t} = \bar{z} \bar{\ell} \bar{L}$$

$$y_t = \bar{A}_0 (1 - \bar{\ell}) (1 + \bar{z} \bar{\ell} \bar{L})^t$$

We see that y_t grows over time at the rate of idea growth

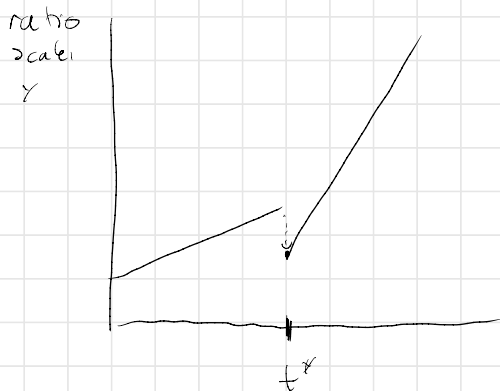
Change $\bar{L} \uparrow$
ratio
scale
 y



$$y = \bar{A}_0 (1 - \bar{e}) (1 + \bar{z} \bar{e} \bar{L})^t$$

- Level effect: change in y
- Growth effect: change in q_y

Suppose $\bar{L} \uparrow$



level effect: $y \downarrow$

growth effect: $q_y \uparrow$

Meta-idea: how we became rich

- patent laws spur technological progress

- Impact of printing press

Idea getting more difficult to find:

- Moore's law: more researchers, but same need for growth

- research productivity falling