Equations

- $Y = \overline{A}K^{1/3}L^{2/3}$
- $r = \frac{1}{3}\frac{Y}{K}$
- $w = \frac{2}{3}\frac{Y}{L}$
- $K = \overline{K}$
- $L = \overline{L}$

Unknowns

- Y
- K
- L
- r
- w

We want to solve for these variables using only values we know, which are variables that have bars over them.

Solution of the Production Model

- $K^* = \overline{K}$
- $L^* = \overline{L}$
- $Y^* = \overline{AK}^{1/3}\overline{L}^{2/3}$
- $r^* = \frac{1}{3}\frac{Y^*}{K^*} = \frac{1}{3}\overline{A}\left(\frac{\overline{L}}{\overline{K}}\right)^{2/3}$
- $w^* = \frac{2}{3}\frac{Y^*}{L^*} = \frac{2}{3}\overline{A}\left(\frac{\overline{K}}{\overline{L}}\right)^{1/3}$

Insights

- We can gain a lot of insight from the production function about what makes a country rich or poor.
- We know that Y is dependent on $\overline{A}$, or Total Factor Productivity, $\overline{K}$, or capital stock, and $\overline{L}$, or labor.
- We care primarily about output per worker as a measure of wealth — this is found as $y^* := Y^*/L^* = \overline{A}\left(\frac{\overline{K}}{\overline{L}}\right)^{1/3} = \overline{A}k^{1/3}$ where $k := \overline{K}/\overline{L}$, or capital per worker.
- We can then find that some countries are richer than others either when they have more capital per worker or they have a higher value of total factor productivity.