Idle Capacity

Pascal Michaillat
https://pascalmichaillat.org/c2/

Each service is sold w/ proba $f(x)$

Household:

- Exact # services sold by household has Binomial distribution w/ parameters $f(x)$ [proba of success] and h [# of trues]
- Expected # services sold $f(x)\,h$
- To simplify $f(x)\,h$ services sold, no randomness

- Workers are
  - busy: fraction $f(x)$ of time
  - idle: fraction $1-f(x)$ of time

- Rate of idleness in economy: $1-f(x)$

Share of time where workers are idle, waiting for customers

- $f(x)$, rate of utilization

output = TFP * F(capital, labor)

(output: measured; TFP: residual; F: production function; capital, labor: measured)

output (y) = utilization ($f(x)$) × productive capacity (z)

[function of capital & labor]

Changes in capacity utilization look like changes in measured TFP/productivity

Properties of $f(x)$

$$f(x) = [1 + x^{-\gamma}]^{-1/\gamma}$$

- $f(0) = 0$
- $f(+\infty) = 1$
- $f'(x) > 0$
- $f(x)$ is concave b/c $f''(x) < 0$

$$f'(x) = -\frac{1}{\gamma}[1 + x^{-\gamma}]^{-\frac{1}{\gamma}-1} * [-\gamma x^{-\gamma-1}]$$

$$= x^{-(\gamma+1)} [1 + x^{-\gamma}]^{-\frac{(\gamma+1)}{\gamma}}$$

$$= [x^{\gamma} + x^{\gamma} * x^{-\gamma}]^{-\frac{1+\gamma}{\gamma}}$$

$$= \left\{[1 + x^{\gamma}]^{-\frac{1}{\gamma}}\right\}^{1+\gamma} = q(x)$$

q is decreasing in $x \Rightarrow f'(x)$ is decreasing in x