

Idle Capacity

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

Household

- Exact # service sold by household has Binomial distribution w/ parameters $f(x)$ [proba of success] and h [# of tries]
- 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 \times F(capital, labor)

↑ measured ↑ residual ↑ measured

output = utilization \times productive capacity

(y) ($f(x)$) (z)

[function of capital & labor]

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

Properties of $f(x)$ $f(x) = [1 + x^{-r}]^{-1/r}$

$$f(0) = 0$$

$$f(+\infty) = 1$$

$$f'(x) > 0$$

$$f(x) \text{ is concave b/c } f''(x) < 0$$

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

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

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

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

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

