Cobb-Douglas Matching Function

Pascal Michaillat
https://www.pascalmichaillat.org/t5.html

M = # trades

S = # sellers

B = # buyers

$$M = \omega S^{\eta} \cdot B^{1-\eta}$$

- $m(0, B) = m(S, 0) = 0$
- $\frac{\partial m}{\partial S} > 0 \qquad \frac{\partial m}{\partial B} > 0$
- Constant returns to scale

$$m(\lambda S, \lambda B) = \omega \cdot (\lambda S)^{\eta} (\lambda B)^{1-\eta}$$

$$= \omega \lambda^{\eta} \lambda^{1-\eta} S^{\eta} B^{1-\eta}$$

$$= \lambda \omega S^{\eta} B^{1-\eta}$$

$$m(\lambda S, \lambda B) = \lambda \, m(S, B)$$

Cobb-Douglas function can be calibrated

ω · matching efficacy

η matching elasticity

(exponent on # of sellers

1 Trading probabilities are simple.

$f(\theta)$ = selling proba = $\frac{M}{S} = \omega S^{\eta-1} B^{1-\eta}$

$= \omega \left(\frac{B}{S}\right)^{1-\eta}$

$$f(\theta) = \omega \theta^{1-\eta}$$

$q(\theta)$ = buying proba = $\frac{M}{B} = \omega S^{\eta} B^{-\eta}$

$q(\theta) = \omega \left(\frac{S}{B}\right)^{\eta}$

$$q(\theta) = \omega \cdot \theta^{-\eta}$$

$\theta = B/S$

2. Cobb Douglas is realistic matching function (Petrongolo & Pissarides 2001)

$0.5 \leq \eta \leq 0.7$ → common to calibrate $\eta = 0.5$