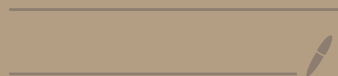


Cobb-Douglas Matching Function

Pascal Michailat

<https://www.pascalmichailat.org/t5.html>



$M = \# \text{ trades}$

$S = \# \text{ sellers}$

$B = \# \text{ buyers}$

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

• $m(0, B) = m(S, 0) = 0$

• $\frac{\partial m}{\partial S} > 0 \quad \frac{\partial m}{\partial B} > 0$

• Constant returns to scale

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

Cobb-Douglas function can be calibrated

ω matching efficacy

η matching elasticity

(exponent on $\#$ of sellers)

1. Trading probabilities are simple.

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

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

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

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

$$\theta = B/S$$

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

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

$$0.5 \leq \eta \leq 0.7$$

→ common to calibrate
 $\eta = 0.5$