

Urban Labor Economics

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NOTATIONS

Latin Letters

NB: g and G are left for the network analysis

$A = \frac{1}{1+4s\tau(N-L)} > 0$, positive constant

a : Job acquisition rate

$B = \frac{\epsilon}{m}\delta L^C F''^C(L^C) + \frac{F''^R(L^{R*})}{r} \left[\frac{\epsilon}{m}\delta (N - L^{R*}) - (N - L^{C*} - L^{R*})^2 F''^C(L^{C*}) \right] < 0$, negative constant

$\mathbf{B}^{pi} = 1/2$ and $\mathbf{B}^{ii} = 1$

c : Cost of posting a vacancy or equivalently cost of entry for firms

$C(\cdot)$: General effort function

CBD : Central Business District

$d(\cdot)$: Matching function

e : Effort level provided by workers (could be for employed workers, meaning thus productivity or for unemployed workers, meaning then search effort).

es : Employment status; $es = U, L$

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E for expectation. For example, EW_L is the expected utility of the employed.

$\mathbf{E}(\cdot)$: Expenditure function

$f(\cdot)$: Production function in each firm

$F(\cdot)$: Aggregate production function

h : Land/housing consumption for households

H : Land/housing consumption for firms

\mathcal{H} : Hamiltonian function

$i = 1, \dots, N$ refers to workers; example $i = B, W$ (Blacks and Whites)

$I(\cdot)$: Expected lifetime utility functions (Bellman equations)

$j = 1, \dots, M$ refers to firms or employment location $j = CS$ (Center and Suburbs)

k : type of equilibrium; equilibrium $k = 1, 2$

L : Employment level in the economy

l : Employment rate in the economy, $l = L/N$

\bar{l} : Average employment in the economy, $\bar{l} = L/M$

M : Total mass of firms

m : Monitoring rate

N : Total mass of workers

n : number of people in a ring between x and $x + dx$ (circular city)

P : Markov transition matrix in Markov processes

p : price of product

Q : Total mass of firms

$q(\cdot)$: Rate at which firms fill their vacant jobs (as a function of θ)

$R(\cdot)$: Land rent

r : Interest rate

SBD : Suburban Business District

SC : Spatial costs

SW : Wage surplus to deter shirking

s : Search intensity of the unemployed, which can be defined as the number of trips to the job center.

t : Time for a dynamic model

T : Total time for a dynamic model, $t = 1, \dots, T$
 U : Unemployment level in the economy
 u : Unemployment rate in the economy, $u = U/N$
 V : Number of vacancies in the economy
 v : vacancy rate, $v = V/Q$
 $W(\cdot)$: Instantaneous *indirect* utility function
 WS : Wage setting curve
 w : Wages
 \mathcal{W} : Welfare function
 x : Distance to zero (CBD)
 \hat{x} : Critical value in non-monocentric cities
 Y : Production global of one sector or the economy
 y : production/productivity in a firm
 z : Composite good consumption

Greek Letters

NB: Alphabetic order of greek letters:

$\alpha\beta\psi(\Psi)\delta(\Delta)\varepsilon(\epsilon)\phi(\Phi)\gamma(\Gamma)\eta\iota(F)\varphi\kappa(\varkappa)\lambda(\Lambda)\mu\nu\pi(\Pi)\chi\rho(\varrho)\sigma(\Sigma)\tau(\varsigma)$
 $v(\Upsilon)\varpi\omega(\Omega)\xi\theta(\Theta)(\Xi)\zeta(\vartheta)$

What is left?

$\varepsilon(\epsilon)\nu(\varrho)(\Sigma)\varsigma\nu\varpi$

In parentheses, capital letters

α : First parameter of the Cobb-Douglas function (of the composite good consumption z)

β : bargaining power of workers.

$\psi(\cdot)$: Density of workers

$\Psi(\cdot)$: Workers' bid rent function

δ : Job destruction rate

Δ : employee tax on local firms

ΔSC : Spatial-cost differential between the employed and the unemployed

ϕ : Fraction of workers hired in each firm

$\Phi(\cdot)$: Firms' bid rent function
 γ : Fixed entry cost for firms
 $\Gamma(\cdot)$: Instantaneous utility function
 $\eta(\cdot)$: the elasticity of the matching function with respect to unemployment
 ι : Time cost of commuting per unit of distance
 F : Total number of working hours.
 φ : indicator function (equals 0 or 1) if the bid rents intersects.
 κ : the transaction cost per unit of distance between firms (non-monocentric cities).
 $\lambda(\cdot)$: Density of firms
 $\Lambda(\cdot)$: Denote a function in chapter 4 section 2.
 μ : parameter which is between 0 and 1 and define the relative share of housing consumption for the unemployed compared to the employed
 π : 3.1416
 Π : Profit level for each firm
 $\chi = [\alpha/(\alpha + \omega)]^\alpha [\omega/(\alpha + \omega)]^\omega$
 ρ : Population density
 σ : State of the economy in a Markov Process.
 τ : Pecuniary cost of commuting per unit of distance
 $\Upsilon = \frac{r+a_1+\delta}{r+a_1+a_2+\delta}$ function in the efficiency wage model in the ducentric city (chapter 6)
 ω : Second parameter of the Cobb-Douglas function (of the housing consumption h)
 $\Omega(\cdot)$: Instantaneous indirect utility function
 ξ : variable used to integrate the distance
 θ : Labor market tightness, $\theta = V/U$
 $\hat{\theta}$: Critical labor market tightness value in chapter 4, section 3.
 $\Theta(x)$: the total distance of transaction for a firm located at x (non-monocentric cities).
 $\Xi(x)$: land distribution in a city.
 ζ : leisure
 ϑ : co-state variable of the Hamiltonian in chapter 4 section 2.

Superscripts

av: Average

C: Cities

d: direct approach

e: full effort

$g = C, R$: location (cities vs rural areas)

H: Hicksian (demand)

ii: imperfect information case

k: type of equilibrium; equilibrium $k = 1, 2$

lr: Long-run unemployed

M: Marshallian (demand)

NS: Non-shirkers

pc: perfect competition

pi: perfect information case

R: Rural areas

sr: Short-run unemployed

S: Shirkers.

to: Total

— : this is a bar and indicate a fixed quantity but also high level

+, −: indicates a value on the right (+) and on the left (−)

* indicates equilibrium values

1: Equilibrium 1

2: Equilibrium 2

Subscripts

A: Agriculture

a: slope of the search intensity: s_a

B: Blacks

BW: Border between blacks and whites; example x_{BW}

b: Border in a city between the employed and the unemployed

c: Location of firms in non-monocentric cities

d: Critical value of distance in Chapter 5, section 4.3.

e : Size of the CBD for non-monocentric cities
 $es = U, L$, refers to employment status
 Ed : Another critical value of distance in Chapter 5, section 4.3.
 f : City fringe
 F : Filled job
 h : Migration condition
 $i = 1, \dots, N$ refers to workers
 $j = 1, \dots, M$ refers to firms
 k refers to cities $k = 1, 2$
 L : Employed workers
 m : minimum wage
 s : Border between shirkers and non-shirkers
 σ : space
 t : time in a dynamic model $t = 0, 1, 2, 3, \dots T$
 T : Total time in a dynamic model $t = 0, 1, 2, 3, \dots T$
 U : Unemployed workers
 V : Vacant job
 W : Whites
 w : Labor demand
 0 : Value at zero
 $-$: low level