Labor-Demand Policies

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Active labor market policies — Policies to reduce un-employment (when u is too high)

① Wage policies — minimum wage, wage tax

② Public employment

Passive labor market policies — Policies to improve situation of unemployed workers

③ Unemployment insurance

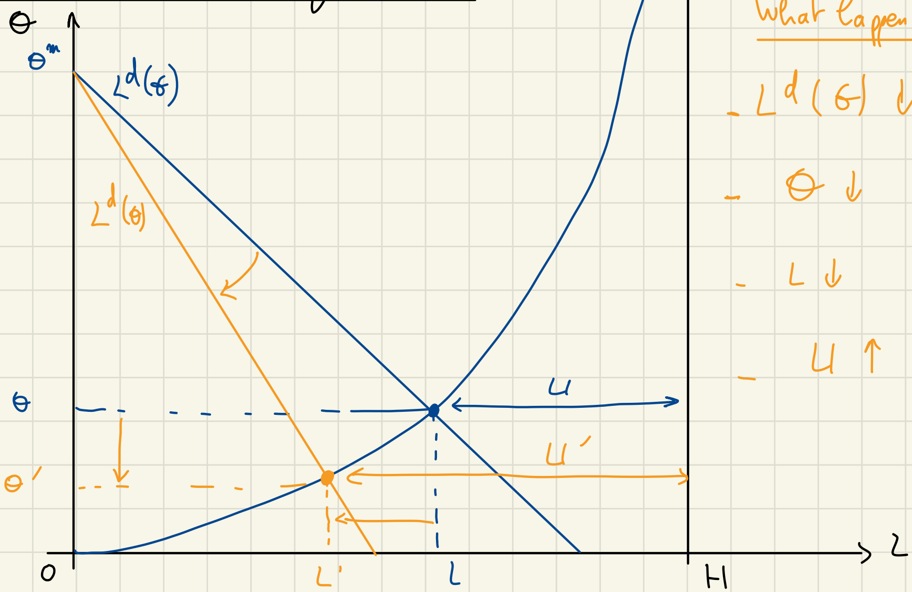
Minimum wage — Assume all workers are paid at minimum wage W. What happens when minimum wage goes up?

Use matching model w/ job rationing.

- Wage function W
- Production function. $y = a N^{\alpha}, \ 0 < \alpha < 1$

- Labor supply $L^s(\theta)$ unaffected by minimum wage
- Labor demand $L^d(\theta) = \left[\dfrac{\alpha \, a}{W \cdot [1 + \tau(\theta)]^{\alpha}} \right]^{1/1-\alpha}$

Increase in minimum wage W



What happens if $W\uparrow$?

- $L^d(\theta)\downarrow$
- $\theta\downarrow$
- $L\downarrow$
- $U\uparrow$

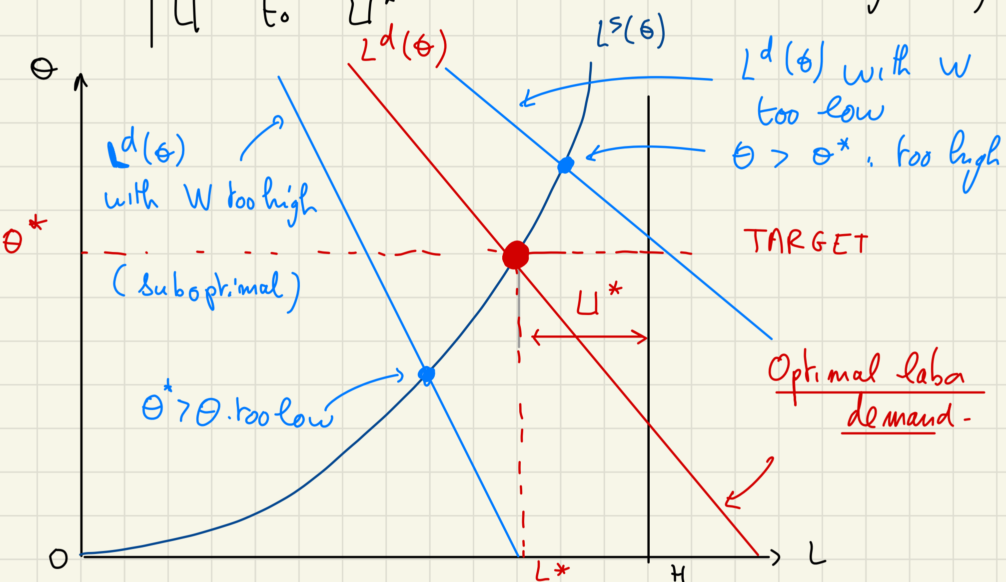
Optimal minimum wage

Minimum wage that maximizes social welfare

minimum wage that brings | θ to θ^* (efficient labor market tightness)
| U to U^*

Formula:

$$\theta^* = \frac{1-z}{\varepsilon \ r}$$



W^* optimal minimum wage $\rightarrow$ maximizes welfare

- θ^* efficient tightness $\rightarrow$ θ^* given by formula

- $\underline{L}^* = L^s(\theta^*) = \dfrac{f(\theta^*)}{s + f(\theta^*)} \cdot H$

- $U^* = H - L^*$

- w^* is such that $L^d(\theta^*) = L^*$

$$\left[\frac{a \quad \alpha}{W^* \quad (1 + \tau(\theta^*))^\alpha}\right]^{1/1-\alpha} = L^*$$

$$\left[\frac{W^* \quad (1 + \tau(\theta^*))^\alpha}{a \quad \alpha}\right]^{1/1-\alpha} = \frac{1}{L^*}$$

$$\frac{w^* \quad (1 + \tau(\theta^*))^\alpha}{a \quad \alpha} = (L^*)^{\alpha - 1}$$

$$\boxed{W^* = \frac{a \quad \alpha \quad (L^*)^{\alpha - 1}}{[1 + \tau(\theta^*)]^\alpha}}$$

- If currently $\begin{cases} \theta < \theta^* \\ U > U^* \end{cases}$ then need reduce W to W^*

- If currently $\begin{cases} \theta > \theta^* \\ U < U^* \end{cases}$, then need increase W to W^*

<u>Empirical evidence on minimum wage</u>

Empirical literature is divided in 2 camps

Minimum wage reduces employment — Consistent with our model

Minimum wage has no effect on employment / unemployment.

Not consistent with our matching model → modify / improve the model to explain this fact. Need to introduce new elements such that minimum wage dos not depress labor demand

① Efficiency-wage element: labor productivity increases w/ wage: $a = a(w)$ w/ $a'(w) > 0$

In labor demand $\frac{a}{w} = \frac{a(w)}{w}$

If $a(w)/w \sim$ constant → w dos not affect $L^d(\theta)$ → minimum wage dos not reduce employment.

⚠ can we still explain business cycles?

② Aggregate-demand element: $w \uparrow$ ⇒ disposable income ↑ ⇒ spending ↑ ⇒ sales ↑ ⇒ "effective productivity" ↑ ⇒ $a \uparrow$

Could introduce $a(w)$ w/ $a'(w) > 0$

Tax / subsidy on wage (~ change in payroll tax)

- W wage received by workers (wage net of tax)
- t payroll tax US. $t \approx 7\%$, to fund UI system

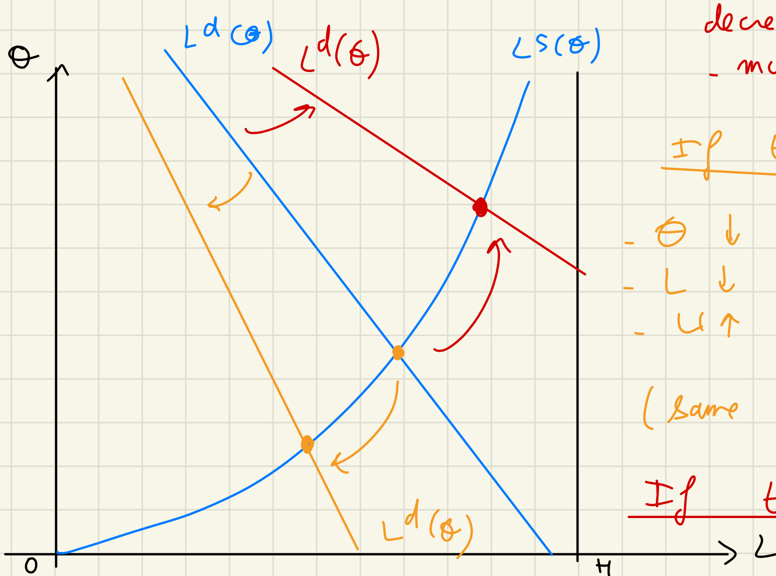
Assume that firms pay payroll tax

- wage paid by firms : $(1+t) \cdot W > W$

- labor demand is modified by payroll tax

$$L^d(\theta) = \left[\frac{a \quad \alpha}{(1+t) \; W \; [1+\tau(\theta)]^{\alpha}}\right]^{1/1-\alpha}$$

- When $t \uparrow$ $L^d(\theta) \downarrow$ → same as increase in minimum wage
- When $t \downarrow$: $L^d(\theta) \uparrow$ → same as decrease in minimum wage



If $t \uparrow$

- $\theta \downarrow$
- $L \downarrow$
- $u \uparrow$

(same as $w \uparrow$)

If $t \downarrow$

Optimal payroll tax t^* (to maximize welfare $\to$ reach θ^*)

efficiency θ^*, $L^* = L^S(\theta^*)$, $U^* = H - L^*$

Optimal payroll tax such that $L^d(\theta^*) = L^S(\theta^*) = L^*$

Solve $L^d(\theta^*) = L^*$

$$\Rightarrow \left[\frac{a \quad \alpha}{(1+t^*)\, w\, (1+\tau(\theta^*))^\alpha}\right]^{1/1-\alpha} = L^*$$

$$\Rightarrow \frac{(1+t^*)\, w\, [1+\tau(\theta^*)]^\alpha}{a \quad \alpha} = (L^*)^{\alpha-1}$$

$$\Rightarrow \boxed{1 + t^* = \frac{a\ \alpha\, (L^*)^{\alpha-1}}{[1+\tau(\theta^*)]^\alpha\, w}}$$

t^* could be >0 or <0.

⚠ If payroll tax paid by firms (incidence of tax is on firms): payroll is effective tool

But if payroll tax paid by workers (incidence of tax is on workers): firms & labor demand are unaffected by tax $\to$ tax is completely ineffective.

Public employment

US
- # workers in public sector = 17% of # workers in economy
- spending on public workers = 63% of government spending
- stimulus packages often raise public employment Example US New Deal

Introducing public employment in matching model

- Matching process. public & private workers are part of same labor market
  - V : # vacancies from firms + # vacancies from government
  - $\theta = V/U$
  - s job-separation rate applies both to private firms & government
  - $m(U, V)$ gives # matches on aggregate labor market (firms + government)

workers apply indiscriminately to public & private jobs

government & private firms recruit workers indiscriminately

- Laba supply not affected by public employment.

$$\boxed{L^S(\theta) = \frac{f(\theta)}{s + f(\theta)} \quad H}$$

private employment + public employment | aggregate employment

Laba demand is modified by public employment.

Aggregate laba demand

= Private laba demand (by firms) + public laba demand (by government)

$$= L^d(\theta) + G$$

$$= \left[\frac{\alpha \cdot a^{1-\gamma}}{\omega \quad [1 + \tau(\theta)]^\alpha} \right]^{1/1-\alpha} + G$$

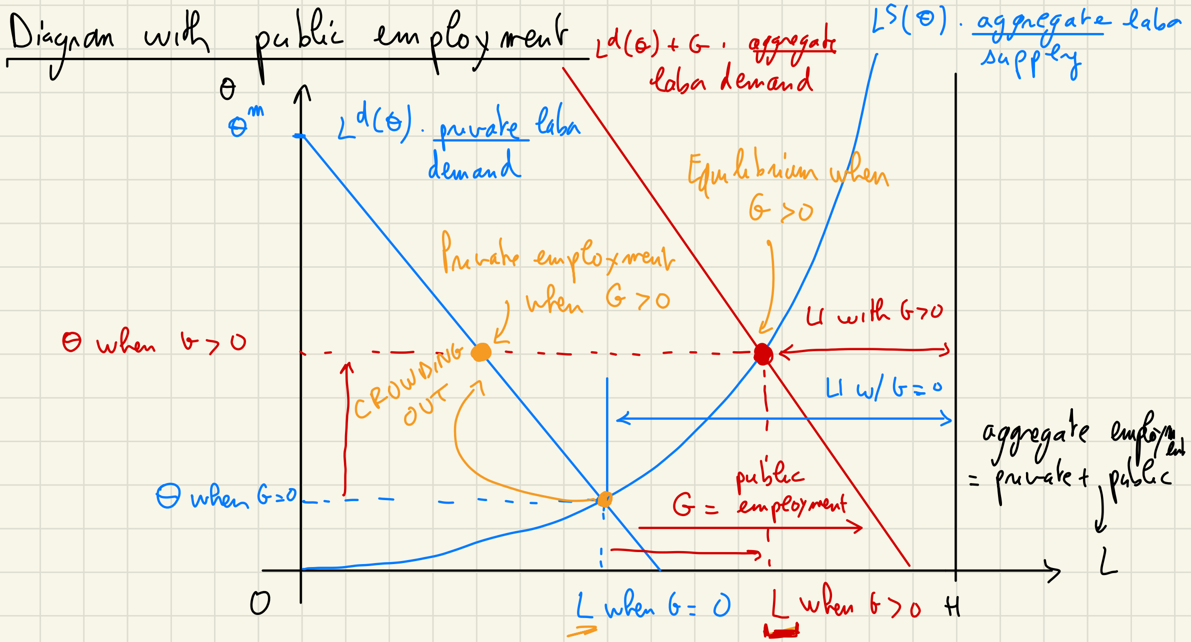
- Production function is concave,
  $Y = a \cdot N^\alpha \quad 0 < \alpha < 1$

- Wage is rigid
  $W = \omega \quad a^\gamma \quad 0 \leq \gamma < 1$

Laba market equilibrium

$$\underbrace{L^d(\theta) + G}_{\text{aggregate laba demand}} = \underbrace{L^S(\theta)}_{\text{aggregate laba supply}}$$

Diagram with public employment



Introduction of public employment $G>0$ leads to

- Aggregate employment L ↑
- Tightness θ ↑
- Unemployment U ↓
- Private employment $L^d(\theta)$ ↓

→ there is crowding out of private employment by public employment

Public-employment multiplier λ

Definition additional # of workers employed when 1 worker is hired in public sector

$$\boxed{\lambda = \frac{dL}{dG}}$$

Computation of λ $\quad$ $G=0$ $\quad L^d(\theta) = L^s(\theta)$

$G>0$ $\quad L^d(\theta) + G = L^s(\theta)$

Implicitely, θ is a function of G through equilibrium condition.

Increase public employment by $dG > 0$

- Employment changes by dL
- Tightness change by $d\theta$

① Compute $d\theta$

② Infer $dL \rightarrow \lambda = dL/dG$

$$\underbrace{L^d(\theta) + G}_{\text{LHS}} = \underbrace{L^s(\theta)}_{\text{RHS}}$$

$dG \rightarrow dLHS$ & $dRHS$

Since equilibrium condition is valid before & after change dG, then $dLHS = dRHS$

- $dRHS = \frac{dL^s}{d\theta} \cdot d\theta$

- $dLHS = \frac{dL^d}{d\theta} \cdot d\theta + dG$

Hence $\frac{dL^d}{d\theta} \, d\theta + dG = \frac{dL^s}{d\theta} \, d\theta$

$$\left[\frac{dL^s}{d\theta} - \frac{dL^d}{d\theta}\right] d\theta = dG$$

$$\left[\frac{dL^s}{d\theta} - \frac{dL^d}{d\theta}\right] \frac{d\theta}{dG} = 1$$

$$\frac{d\theta}{dG} = \frac{1}{\frac{dL^s}{d\theta} - \frac{dL^d}{d\theta}}$$

Assumption Cobb-Douglas matching function

Recall from "Unemployment fluctuations"

- $\varepsilon_\theta^{L^s} = (1-\eta) \cdot u(\theta)$

$$\varepsilon_\theta^{L^s} = \frac{d \ln L^s}{d \ln \theta} = \frac{\theta}{L^s} \frac{dL^s}{d\theta}$$

$$\Rightarrow \frac{dL^s}{d\theta} = \frac{\overbrace{L^s}^{= L}}{\theta} \cdot \varepsilon_\theta^{L^s} = \frac{L}{\theta} \cdot \varepsilon_\theta^{L^s}$$

$$\boxed{\frac{dL^s}{d\theta} = \frac{L}{\theta} (1-\eta) \, u}$$

$$\bullet\ \varepsilon^{L^d}_\theta = -\frac{\alpha}{1-\alpha}\,\eta\,\tau$$

$$\varepsilon^{L^d}_\theta = \frac{d\ln L^d}{d\ln\theta} = \frac{\theta}{L^d}\,\frac{dL^d}{d\theta}$$

$$\Rightarrow \frac{dL^d}{d\theta} = \frac{\overset{L-G}{L^d}}{\theta}\cdot\varepsilon^{L^d}_\theta = \frac{L-G}{\theta}\cdot\varepsilon^{L^d}_\theta$$

$$\Rightarrow \boxed{\frac{dL^d}{d\theta} = -\frac{\alpha}{1-\alpha}\cdot\eta\,\tau\,\frac{(L-G)}{\theta}}$$

Thus $$\boxed{\frac{d\theta}{dG} = \frac{1}{\frac{L}{\theta}(1-\eta)\,u + \frac{\alpha}{1-\alpha}\,\eta\,\tau\,\frac{(L-G)}{\theta}} > 0}$$

Multiplier, $\lambda = \frac{dL}{dG}$ and $L = L^S(\theta)$

$$\lambda = \frac{dL}{dG} = \frac{dL^S}{d\theta}\cdot\frac{d\theta}{dG}$$

$$\lambda = \frac{(L/\theta)(1-\eta)\,u}{(L/\theta)(1-\eta)\,u + \alpha/_{1-\alpha}\cdot\eta\cdot\tau\left(\frac{L-G}{\theta}\right)}$$

$$\lambda = \frac{1}{1 + \underbrace{\frac{\alpha}{1-\alpha}}_{\text{shape of production function}}\ \underbrace{\frac{\eta}{1-\eta}}_{\text{shape of matching function}}\ \frac{\tau}{u}\left(\underbrace{1-\frac{G}{L}}_{\text{share of workers in private sector } \sigma}\right)}$$

$$\boxed{\lambda = \frac{dL}{dG} = \frac{1}{1 + \frac{\alpha}{1-\alpha}\,\frac{\eta}{1-\eta}\,\frac{\tau(\theta)}{u(\theta)}\,\sigma}}$$

Properties of the public-employment multiplier

① $\lambda > 0$.

When public employment ↑, then $\begin{cases} \text{total employment} \uparrow \\ \text{unemployment} \downarrow \end{cases}$

② $\lambda < 1$.

Total employment increases less than public employment - Unemployment decreases by less than public employment increases.

This is b/c private employment is crowded out.

When public employment ↑, private employment ↓, so total employment ↑ by less than public employment.

→ crowding out b/c θ ↑ when G ↑.

③ λ is <u>countercyclical</u>. λ is large when θ (L) is low but λ is low when θ (L) is high.

Good times, low λ / Bad time high λ.

Proof

$$\lambda(\theta) = \frac{1}{1 + \frac{\alpha}{1-\alpha}\frac{\eta}{1-\eta} - \sigma \frac{\tau(\theta)}{u(\theta)}}$$

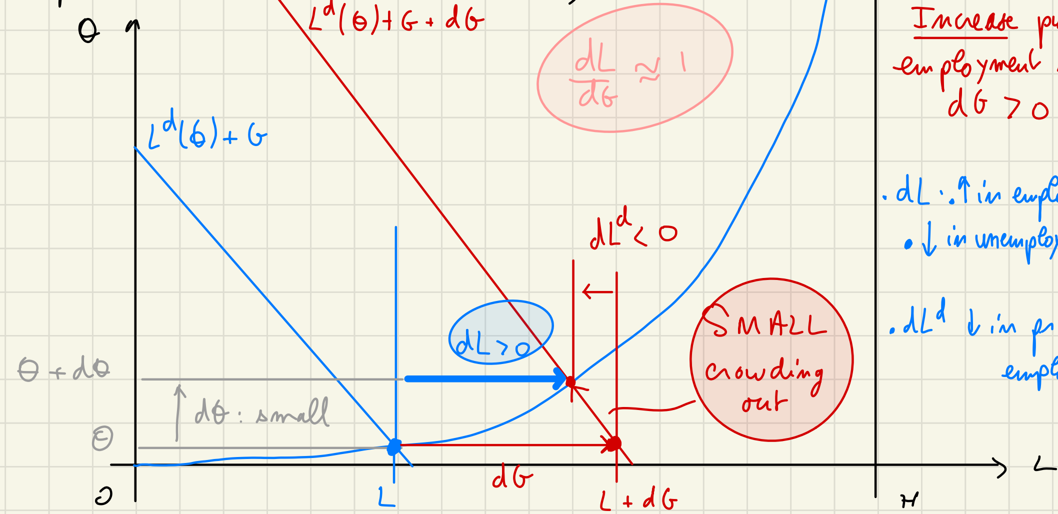
α, η, σ : same over the business cycle

good times (θ is high) $\quad u(\theta)$: low, $\tau(\theta)$ high $\Big\}$ $\frac{\tau(\theta)}{u(\theta)}$ is high $\Rightarrow$ $\boxed{\lambda(\theta) \text{ is low}}$

bad times (θ is low) $\quad u(\theta)$ high, $\tau(\theta)$ low $\Big\}$ $\frac{\tau(\theta)}{u(\theta)}$ is low $\Rightarrow$ $\boxed{\lambda(\theta) \text{ is high}}$

$\lambda'(\theta) < 0$ so multiplier is countercyclical

Slump (low laba demand)



Increase public employment by $dG > 0$

- dL : ↑ in employment
- ↓ in uneployment
- dL^d ↓ in private employment

Boom : (high labor demand)