1. Unemployment

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Job destruction, and employment protection. I

- So far, only creation decision. Clearly both creation and destruction margins. So endogenize job destruction.
- Can then look at implications of employment protection: from legally imposed severance payments to administrative costs.

  Natural environment to look insider/outsider models, and implications of dual employment protection systems.
- Implications for unemployment, reallocation, growth. Implications for Europe.

Basic model

Start with the same model as before. But relax the assumption of constant productivity:

- Matches start with pty $\bar{y}$. Then, with Poisson parameter, new draw from cdf $G(y)$, on $[0\ 1]$ for notational simplicity.

- Firm/worker can separate. The worker becomes unemployed and searches for another job. The firm can post a new vacancy, and search for another worker, with match starting at $\bar{y}$.

- Could/should distinguish between shocks to matches (machine remains productive) or shocks to jobs (machine becomes unproductive). Does not matter if capital is rented.

- No aggregate uncertainty, so constant aggregates. So, rule y^*: If $y < y^*$, separate. If $y \geq y^*$, continue.
- For the moment, no cost of separation, no severance payments. Easier on notation, and easier to introduce later. (For simplicity, stay close to Pissarides, with some variations)

Follow same approach as before:

- Dynamics of unemployment
- Value functions and wage bargaining.
- Job creation and job destruction.
- Characterization of the equilibrium.

Dynamics of unemployment

- Job creation: $h = m(u,v) = \theta q(\theta) u \quad (h = u(h/v)(v/u) = uq(\theta)\theta)$
- Job destruction: $\lambda G(y^*)(1-u)$
- Unemployment dynamics are given by:

$$\dot{u} = \lambda G(y^*)(1-u) - \theta q(\theta) u$$

- Equilibrium unemployment. Depends on y^* and θ (flows, and duration):

$$u = \frac{\lambda G(y^*)}{\lambda G(y^*) + \theta q(\theta)}$$

- Effects of EP: presumably lower y^*, so lower destruction. and lower θ, longer unemployment duration.

Wage determination

Guess that wages take form $w(y)$. Equations for the different value functions. Need to index E and J by y. Ignore the time derivative

$$rV = -c + q(\theta)(J(\bar{y}) - V)$$

$$rJ(y) = (y - w(y)) + \lambda[G(y^*)V + \int_{y^*}^{1} J(y')dG(y') - J(y)]$$

$$rU = b + \theta q(\theta)(E(\bar{y}) - U)$$

$$rE(y) = w(y) + \lambda[G(y^*)U + \int_{y^*}^{1} E(y')dG(y') - E(y)]$$

Interpretation.

- Continuous Nash bargaining. We saw the effect of β before. So, for simplicity, put $\beta = 1/2$, so:

$$(J(y) - V) = (E(y) - U)$$

- Free entry condition (same discussion as in previous model, not an attractive assumption in SR).

$$V = 0$$

Solving for the wage:

- From free entry condition:

$$V = 0 \;\Rightarrow\; J(\bar{y}) = c/q(\theta)$$

- From equation for U and Nash bargaining equation:

$$rU = b + \theta q(\theta)(E(\bar{y}) - U) = b + \theta q(\theta)(J(\bar{y}) - 0) = b + c\theta$$

- From the equations for $J(y)$ and $E(y)$, $(J(y) - E(y))$ is given by:

$$(r+\lambda)(J(y)-E(y)) = y-2w(y)+\lambda[G(y^*)(V-U)+\int_{y^*}^{1}(J(y')-E(y'))dG(y')]$$

- From Nash bargaining, replace $(J(y) - E(y))$ by $(V - U)$ to get:

$$w(y) = \frac{1}{2}(y - r(V - U))$$

- Using $V = 0$ and the expression for U above:

$$w(y) = \frac{1}{2}(y + b + c\theta)$$

Interpretation.

Job creation condition

Replace wage in equation for $J(y)$:

$$(r+\lambda)J(y) = \frac{1}{2}(y - b - c\theta) + \lambda \int_{y^*}^{1} J(y')dG(y')$$

Write it for two different values of y and take the difference:

$$(r+\lambda)(J(y_1) - J(y_2)) = \frac{1}{2}(y_1 - y_2)$$

Apply it now to $y_1 = \bar{y}$ (starting productivity) and for $y_2 = y^*$ (threshold productivity)

$$(r+\lambda)(J(\bar{y} - J(y^*)) = \frac{1}{2}(\bar{y} - y^*)$$

Note that, by definition of y^*, $J(y^*) = 0$, and $J(\bar{y})$ is given from the free entry condition above, so this gives us a first relation between tightness and threshold:

$$\frac{c}{q(\theta)} = \frac{1}{2(r+\lambda)}\ (\bar{y} - y^*)$$

Interpretation

Job destruction condition

From above, for any y

$$J(y) - J(y^*) = \frac{1}{2(r+\lambda)}(y - y^*)$$

and from the definition of y^*

$$J(y^*) = 0 \quad \text{so} \quad J(y) = \frac{1}{2(r+\lambda)}(y - y^*)$$

Go back to the equation for $J(y)$ and evaluate it at $y = y^*$:

$$(r+\lambda)J(y^*) = (1/2)(y^* - b - c\theta) + \frac{\lambda}{2(r+\lambda)}\int_{y^*}^{1}(y' - y^*)dG(y')$$

As $J(y^*) = 0$, this gives us the reservation threshold:

$$y^* = b + c\theta - \frac{\lambda}{(r+\lambda)} \int_{y^*}^{1} (y' - y^*) dG(y')$$

- Interpretation.
- Compare y^* to $rU = b + c\theta$. Explanation. Option value.
- Note that $J(y^*) = 0$ and Nash bargaining implies $E(y^*) - U = 0$ (and $S(y^*) = 0$).

  While the firm is taking the decision, the worker agrees with the decision, as the surplus from match is zero.

  Quits versus layoffs in this context. Makes sense?

Equilibrium, comparative statics. (Dynamics?)

- Job creation:

$$\frac{c}{q(\theta)} = \frac{1}{2(r+\lambda)} \; (\bar{y} - y^*)$$

Downward sloping in θ, y^* space. Higher y^*: lower surplus, less incentive to create, needs a less tight labor market.

- Job destruction

$$y^* = b + c\theta - \frac{\lambda}{(r+\lambda)} \int_{y^*}^{1} (y' - y^*) dG(y')$$

Upward sloping. Tighter labor market increases the threshold level of productivity.

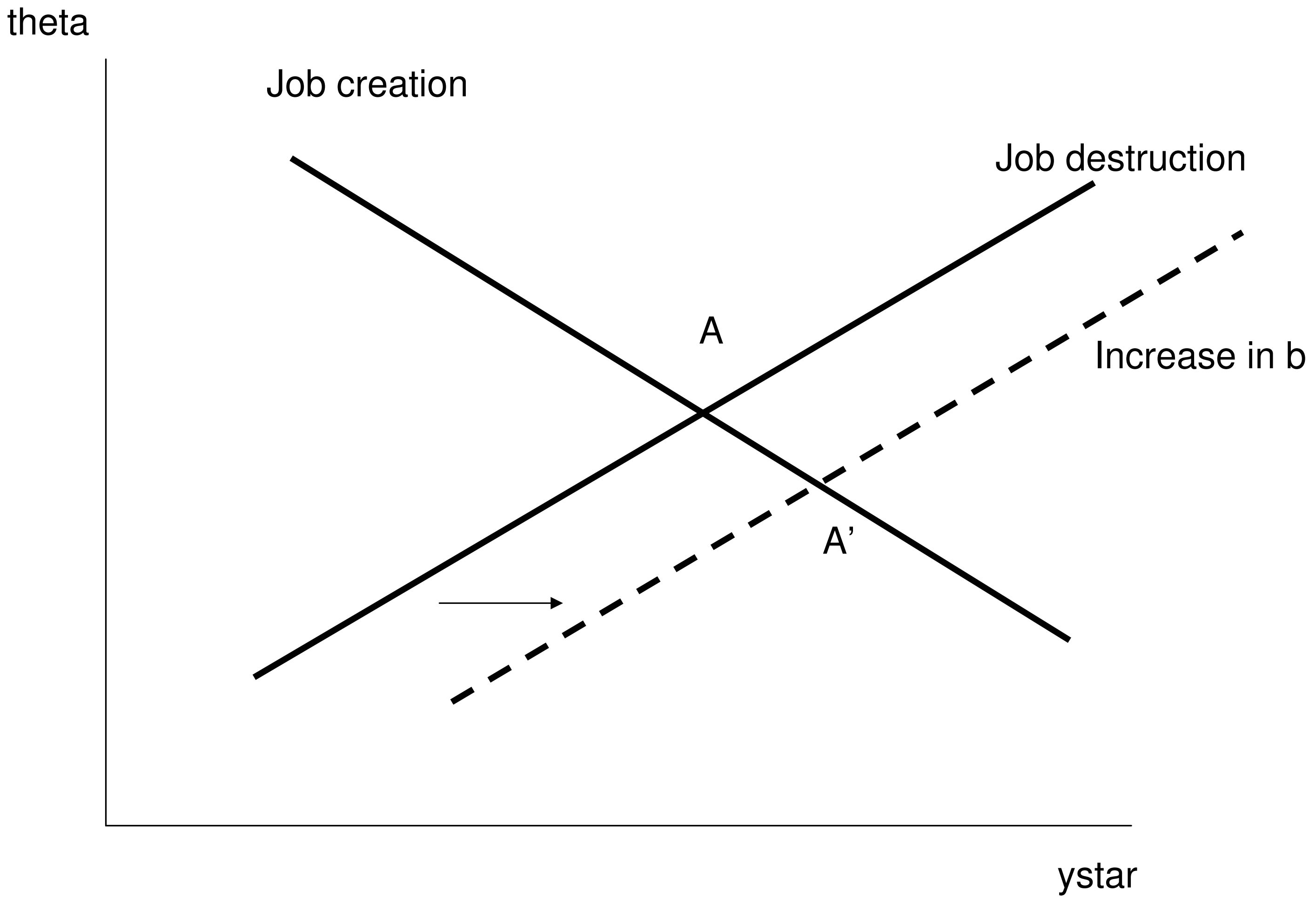
- Equilibrium at point A in Figure.

- Can do comparative statics.

The effects of an increase in unemployment benefits b:

- Shifts the job destruction locus right: θ decreases. y^* increases.
- Higher duration of unemployment, higher flows in and out of employment. Higher unemployment.
- Benefits have two effects: (1) through the reservation wage, and thus the cost of labor (2) through search intensity. The model has only the first channel. The second may be as important or more important.
- Can extend matching function to $m(su, v)$, where s is search intensity.
- Welfare? Can measure the effect on E, U, and $E - U$. (An increase in b decreases $E - U$ ($E - U = J = c/q(\theta)$). Effect on $U = b + c\theta$?) But not well equipped to discuss welfare: Taxes to finance benefits? Linear preferences.

Equilibrium job creation and job destruction



Can also look at equilibrium in Beveridge space:

- From the JC and JD conditions:

$$\frac{v}{u} = \theta(\bar{y}, b, \lambda, G(.), c)$$

  Ray from the origin.

- From the accumulation equation:

$$\lambda G(y^*(\frac{v}{u}, ...))(1-u) = m(u, v)$$

  Downward sloping? Not necessarily (why?), but likely.

- Effect of higher benefits. Clockwise rotation of the ray from the origin. Higher flows at any level of employment, so outwards shift of the second locus.

  Higher unemployment, higher duration, lower vacancies.

Unemployment benefits, unemployment and vacancies