1 Search Labor Model

1.1 McCall (1970) Model

Risk-neutral agent searches for job:

\[ E_0 \sum_{t=0}^{\infty} \beta^t x_t \]

\( x_t = w \) if employed, \( x_t = z \) if unemployed

Job offers i.i.d. draw from \( F(w) \).

Recursive formulation: state \( s_t \in \{ W, U \} \), control: accept, reject offer

Value of employed worker

\[ W(w) = E_0 \sum_{t=0}^{\infty} \beta^t x_t, \text{ s.t. } x_t = w \]

\[ = \frac{w}{1 - \beta} \]

Value of unemployed worker:

\[ U = z + \beta \int_0^{\infty} \max_{\text{acc, rej}} \left\{ U, \frac{w}{1 - \beta} \right\} dF(w) \]

Reservation wage \( w_R \):

\[ W(w_R) = U = \frac{w_R}{1 - \beta} \]
Characterize reservation wage:

\[ w_R - z = \frac{\beta}{1 - \beta} \int_{w_R}^{\infty} (w - w_R) dF(w) \]

Another characterization:

\[ w_R - z = \beta(E[w] - z) + \beta \int_{0}^{w_R} F(w) dw \]

Factors affecting reservation wage:

- value of unemployment \( z \)
- distribution of offers \( F \)

### 1.2 Adding Separations and Imperfect Job Finding

Population \( N_t \), grows at \( n \)

Number of unemployed \( U_t \), unemployment rate \( u_t = U_t / N_t \).

job finding rate \( e \), separation \( s \)

\[ U_t = (1 - e)U_{t-1} + s(N_{t-1} - U_{t-1}) \]

or:

\[ u_t = \frac{1 - e - s}{1 + n} u_{t-1} + \frac{s}{1 + n} \]

steady state (“natural rate”)

\[ u^* = \frac{s}{n + e + s} \]
Now employed worker value:

\[ W(w) = w + \beta [sU + (1 - s)W(w)] \]

\[ = \frac{w + \beta sU}{1 - \beta (1 - s)} \]

Unemployed worker finds job with probability \( p \):

\[ U = z + \beta p \int_0^\infty \max_{\text{acc, rej}} \{ U, W(w) \} \, dF(w) + (1 - p)U \]

Find reservation wage as before:

\[ w_R - z = \frac{\beta p}{1 - \beta (1 - s)} \int_{w_R}^\infty (w - w_R) \, dF(w) \]

Influence of separations, job offer probability

1.3 Determination of Unemployment Rate

Job finding probability:

\[ p \int_{w_R}^\infty dF(w) = p(1 - F(w_R)) \]

Job finding and loss balance:

\[ up(1 - F(w_R)) = s(1 - u) \]

Influence of \( z, p, s \) on unemployment rate (may differ from impact on \( w_R \))