Search Theory

• Market wage (offer wage) is not given - as it is assumed in labor supply theory

• Instead offer wage is the outcome of an economic process/activity. Here, we analyze search process under labor market frictions (asymmetric information between unemployed and employers)

• There is no single market wage depending upon worker characteristics $z_i$ but instead wages may differ ex post between workers with the same characteristics $z_i$ because of the randomness ("luck") in the search process.

• Search theory models transitions between unemployment and employment (flow approach of the labor market)

→ see chapter by Mortensen/Pissarides in Handbook of Labor Economics

Search model:

Assumptions:

• Incomplete information

• Search costs
Unemployed receives a take-it-or-leave-it wage offer by a randomly contacted employer and has to decide whether to accept the offer (and take the job) or whether to continue search for a better job offer. This is an optimal stopping problem (see model for optimal schooling level).

**Reservation wage property**

Reservation wage: \( w^R \)

**Decision Rule:**

<table>
<thead>
<tr>
<th>Wage offer</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>( w \geq w^R )</td>
<td>accept job</td>
</tr>
<tr>
<td>( w &lt; w^R )</td>
<td>continue search</td>
</tr>
</tbody>
</table>

**Wage offer distribution:** Each period the unemployed receives a wage offer when unemployed continues search while incurring fixed per period search costs \( c \). This random wage offer is an i.i.d. draw from the wage offer distribution with pdf \( f(z, w) \).

\( f(z, w) \): density of offer wage \( w \) for unemployed with characteristics \( z \)

**Job acceptance probability** (≡ exit probability from unemployment to employment, job finding rate): 

\[
p(z, w^R) = \int_{w^R}^{\infty} f(z, w) \, dw
\]

- **Expected duration of unemployment:** \( \frac{1}{p(z, w^R)} \) in stable (stationary) environment

- **Decision rule of unemployed:** Choose reservation wage \( w^R \) such that intertemporal utility is maximized. This yields as optimality condition (determining \( w^R \)):

\[
\text{Marginal cost of continuing search} = \text{Return to continuing search}
\]
Graphical Analysis:

Optimality condition to determine $w^R$ ex ante:

- Expected wage when accepting wage offer

$$E[w|w \geq w^R] = \int_{w^R}^{\infty} w \frac{f(z,w)}{p(z,w^R)} dw$$

→ this is the conditional wage for wages above $w^R$ when the pdf $f(z,w)$ holds

- Costs of continuing search per period: $c$
• Optimality condition can be rewritten as

Marginal return to increase of $w^R = \text{Marginal costs due to increase of } w^R$

\[
\begin{align*}
\Downarrow & \quad \Downarrow \\
\text{Expected wage increases} & \quad \text{Acceptance probability falls} \\
\frac{\partial E(w|w \geq w^R)}{\partial w} & \geq 0 \\
\text{"better match"} & \quad \frac{\partial p(z,w^R)}{\partial w^R} \leq 0 \\
& \quad \text{which prolongs job search and increases search cost by } c \text{ per additional time needed to find job}
\end{align*}
\]

Results:

1) $w^R$ depends upon $z$ (i.e. non labor income, human capital), unemployment benefits $b$, search cost $c$

\[
\frac{\partial w^R}{\partial c} < 0, \quad \frac{\partial w^R}{\partial b} > 0, \quad \frac{\partial w^R}{\partial \text{Education}} > 0
\]

2) The decision rule $w \geq w^R$ leads to ex post wage differences among observationally equivalent workers (with fixed individual characteristics $z$) which can not be explained deterministically.

3) Model explains search unemployment: If $w < w^R$ then unemployed remains unemployed in period $t$. Share of $[1 - p(z, w^R)]$ remain in search unemployment.

4) Variables which reduce the individual (opportunity) costs of unemployment increase the reservation wage $w^R$, i.e. prolong unemployment and improve the match.

→ Unemployment benefits reduce search costs
→ Sanctioning/Monitoring of search effort increase search costs.