Structural Econometrics in Labour and IO Job Search II - Equilibrium Job Search

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Organisation

Some organizational points:

- **Exam** on Thursday 14th July, 2-5pm (if you must)
- please bring pen & paper (maybe a crayon for figures?)
- Please **evaluate your teachers**
  Evaluation forms will be made available on github.
  Email Juliane - JMetzner@diw.de
  (Evaluation is **anonymous** as far as possible.)

Outline

Motivation of Burdett-Mortensen Model

What can Burdett & Mortensen explain?

Motivation of Burdett-Mortensen Model

What can Burdett & Mortensen explain?

1. **Wage inequality** despite equal characteristics
2. **involuntary unemployment**
3. the "**firm-size effect**" in wages
4. the "**experience effect**" in wages
5. the "**firm effect**" in wage

Motivation of Burdett-Mortensen Model

(1) Wage inequality despite

- (ex ante) homogeneous workers
- (ex ante) homogeneous firms

(2) Good & bad **luck** in **stochastic labour market**

- why people are **happy to get job**
- **search unemployment** is involuntary & random

Motivation of Burdett-Mortensen II

(3) "firmsize effect" in wages

- what is this?

(4) "experience effect" in wages

(5) "firm effect" in wages

Assumptions of Burdett & Mortensen

Characterize the assumptions made by Burdett & Mortensen.

Assumptions of Burdett & Mortensen

Assumptions

- **homogeneous** workers & firms
- wage **posting - no bargaining**
- job offers arrive for unemployed at Poisson rate λ_0
- **on-the-job search**: offers arrive at rate λ_1
- jobs destroyed at Poisson rate δ
- **constant benefits** in unemplyment wages & (Why ?)

Alternative assumptions

Who is competing in the labour market in Burdett & Mortensen?

Alternative assumptions

How does Burdett & Mortensen relate to models with **more** / **less competition**?

Alternative assumptions II

Perfect Competition & Monopsony **nested in B-M**

- Monopsony: $\lambda_1 = 0$
- Perfect competition: $\lambda_1 = \infty$

What happens in the B-M framework if we set $\lambda_1 = 0$?

Diamond paradox

Without **on-the-job search** ($\lambda_1 = 0$)...

firms set $w = w^R$ - despite frictions.

Why?

Diamond paradox II

Why do firms set **monopsony wage despite search**?

Firms have **no benefit of higher wage**

- Cannot attract more individuals.
- $l(w) = l$

What might induce firms to set higher wages?

Diamond paradox III

Rationale: **Reservation wage heterogeneity**

- among unemployed (Albrecht-Axell 1984)
- by on-the-job search (Burdett-Mortensen)

Alternative solutions?

Diamond paradox III

Rationale: **Reservation wage heterogeneity**

- among unemployed
- by on-the-job search

Alternative solutions for supra-w^R wages?

- Efficiency wages (Lazear, Akerlof, Stiglitz)

Outline

Equilibrium in BM model

What does it mean that BM is an "**equilibrium model**"?

Equilibrium in BM model

Equilibrium between workers' and firms' **strategies**

1. workers **choose res-wage** given wage distribution
2. firm set wages given (i) workers' (ii) other firms' strategies

Steady state conditions?

(Q1.1) Lowest wage on market

Distinguish equilibrium wage ($\geq w^R$) from other wage strategies.

(Q1.2) Briefly describe workers' strategies

What is unemployed workers' **strategy** ?

Unemployed workers' strategy

Strategy in stationary infinite horizon...

- To find w^R, evaluate **value functions**... (how ?)
- using $\overline{F} \equiv 1 - F$ find:

$$w^R = b + (\lambda_0 - \lambda_1) \int_{w^R} \frac{\overline{F}(w')}{r + \delta + \lambda_1 \overline{F}(w')} dw'$$

- What is the **intuition** for this expression?
- Why is $w^R = b$ if $\lambda_0 = \lambda_1$?

(Q1.2) Employed Workers' strategy

What is employed workers' **strategy** ?

Employed Workers' strategy II

What is workers' **strategy** ?

- Workers' **reservation wage** is current wage.
- Why?

(Q1.3) Duration in a job

How long do people stay in a job?

(Q1.3) Duration in a job

Depends on the wage...

$$\frac{1}{\delta + \lambda_1 \left(1 - F(w)\right)} \tag{1}$$

(Q1.4) What is population wage density ?

Strategies to transform offer to population distribution:

Strategy 1: Consider flows of **workers earning** w

$$\left[\delta + \lambda_1 \overline{F}(w)\right] \; g(w) \; (1-u) = u \; \lambda_0 \; f(w) + (1-u) \; G(w) \; \lambda_1 \; f(w)$$

then use flows of workers earning up to w

$$u \; \lambda_0 \; F(w) = (1-u) \; G(w) \; \left[\delta + \lambda_1 \; \overline{F}(w)\right] G(w) \quad = \frac{F(w)}{(1 + \frac{\lambda_1}{\delta} \; \overline{F}(w))}$$

using $u = \frac{\delta}{\delta + \lambda_0}$.

Strategy 2: Use expression of $G(w)$ and differentiate. (1. or 2.)

find:

$$g(w) = \frac{f(w)}{\left[1 + \kappa_1 \; \overline{F}(w)\right]^2}$$

Pop'n w-density to get profits

Now have $l(w)$ as function of **observables**

- firm may see $g(w)$ (statistics / market research)
- can get $f(w)$ from $g(w)$ and transitional dynamics

=> Now **have** π as function of observables

Which wage level maximizes profits?

Wage inequality

Wage dispersion with equal profits: margin vs. volume:

1. high wage-firms Π_a
   - **more employees**
   - **less profits per employee**
2. low wage-firms Π_b
   - **fewer employees**
   - **higher profits per employee**

Explains **true** wage **inequality** Explains correlates of wages:

- firm, firm-size, experience effects

Logic. Is it **realistic?**

Wage dispersion

Firms w diff. strategies appears realistic

- Large firms **pay & retain**
- small firms **exploit & let go**.
- worker density increasing on support of $F(.)$

Random matching of workers maybe less realistic

What about the "**tenure effects**" in wages? What about counter-offers?

(Q1.5) What if counter-offers possible?

Search model with **counter-offers** (Postel-Vinay & Robin 2002)

- no incentive to pay above-w^R
- still get wage inequality - what will it depend on?

(Q1.5) What if counter-offers possible?

Search model with **counter-offers** (Postel-Vinay & Robin 2002)

- no incentive to pay above-w^R:
  can now wait until firm with higher wage comes
- still get wage inequality - what will it depend on? wages rise with tenure - why?

Problem set

Any questions on theory part of problem set?

Pausa

10 min break

Outline

Identification

What is **identification**?

Identification of BM model

What **data do we need to identify** the model ?

Identification from cross-sectional data

In the problem set, you simulated **observed wages and unemployment durations**.

Can we recover all **model primitives from the simulated data**?

Identification from cross-sectional data

Can we identify the model from the simulated data?

- **Not non-parametrically**, unless we observe all wages sampled from F (Flinn and Heckman, 1982)
- **Parametrically, yes**. We have to assume that F belongs to some parametric family (e.g. Normal distribution).