Lesson 4: Job Search

Contents

0.1 Key Terms

- U - Number of unemployed persons
- E - Number of employed persons
- V - Number of vacancies (job openings)
- u - Unemployment rate ($u = \frac{U}{LF} * 100$)
- LF - Labor force ($LF = E + U$)
- θ - market tightness ($\theta = \frac{V}{U}$)
- Hires - Unemployed workers who become employed
- Separations - Employed workers who become unemployed
- Filled - Vacancies that become someone who is employed
- Separations - Employed workers who turn into a vacancy

1 Matching Function

The flow of hires in an economy can be defined by a matching function $H(U, V)$ where an increase in unemployed or an increase in vacancies increases the number of hires (positively correlated).

Example:
$$H(U, V) = \gamma \sqrt{U} \sqrt{V}$$

where γ is a coefficient that determines the matching efficiency.

1.1 Job-Finding Rate (f)

The job-finding rate is defined as the probability that you find a job.

$$f = \frac{H(U,V)}{U}$$

Let us use our example:

$$f = \frac{\gamma\sqrt{U}\sqrt{V}}{U}$$

$$f = \frac{\gamma U^{1/2}V^{1/2}}{U} = \gamma U^{-1/2}V^{1/2} = \gamma\frac{V^{1/2}}{U^{1/2}} = \gamma\sqrt{\theta}$$

1.2 Vacancy-Filling rate (q)

The vacancy-filling rate is defined as the probability that a vacancy is filled by a firm within a given period.

$$q = \frac{H(U,V)}{V}$$

Let us use our example:

$$q = \frac{\gamma U^{1/2}V^{1/2}}{V^{1/2}} = \gamma U^{1/2}V^{-1/2} = \gamma(\frac{U}{V})^{1/2} = \gamma\frac{1}{\sqrt{\theta}} = \gamma(\theta)^{-1/2}$$

1.3 A look at f and q

Recall that θ is a measure of market tightness ($\frac{U}{V}$), so as θ increases the labor market becomes "tighter" (The ratio of vacancies to unemployed increases). If the labor market is tight:

1. It is easy for unemployed workers to find a job.
2. It is difficult for a firm to fill a vacancy

The two ways this can happen is either an increase in vacancies or a decrease in unemployed workers.

1.3.1 Averages

- $\frac{1}{f}$ = Average duration of unemployment
- $\frac{1}{q}$ = Average time it takes to fill a vacancy
- $s = /fracseparationsE$ - separation rate
- $\frac{1}{s}$ = Average duration of employment

1.4 Steady-State

Let's look back at the relationships between unemployment and employment:

1. Number of hires can be defined as $f * U$

    - $H(U,V) = f * U$

2. Number of separations can be defined as $s * E$

Steady-state of unemployment would be considered the natural rate of unemployement:

$$f * U = s * E$$

We can solve for the natural rate of unemployment $u*$:

$$u = \frac{U}{LF}$$

$$LF = E + U$$

$$f * U = E * s$$

$$f * U = (LF - U) * s$$

$$f * U = sLF - sU$$

$$sU + fU = sLF$$

$$\frac{(s + f)U}{LF} = s$$

$$u* = \frac{s}{(s + f)}$$

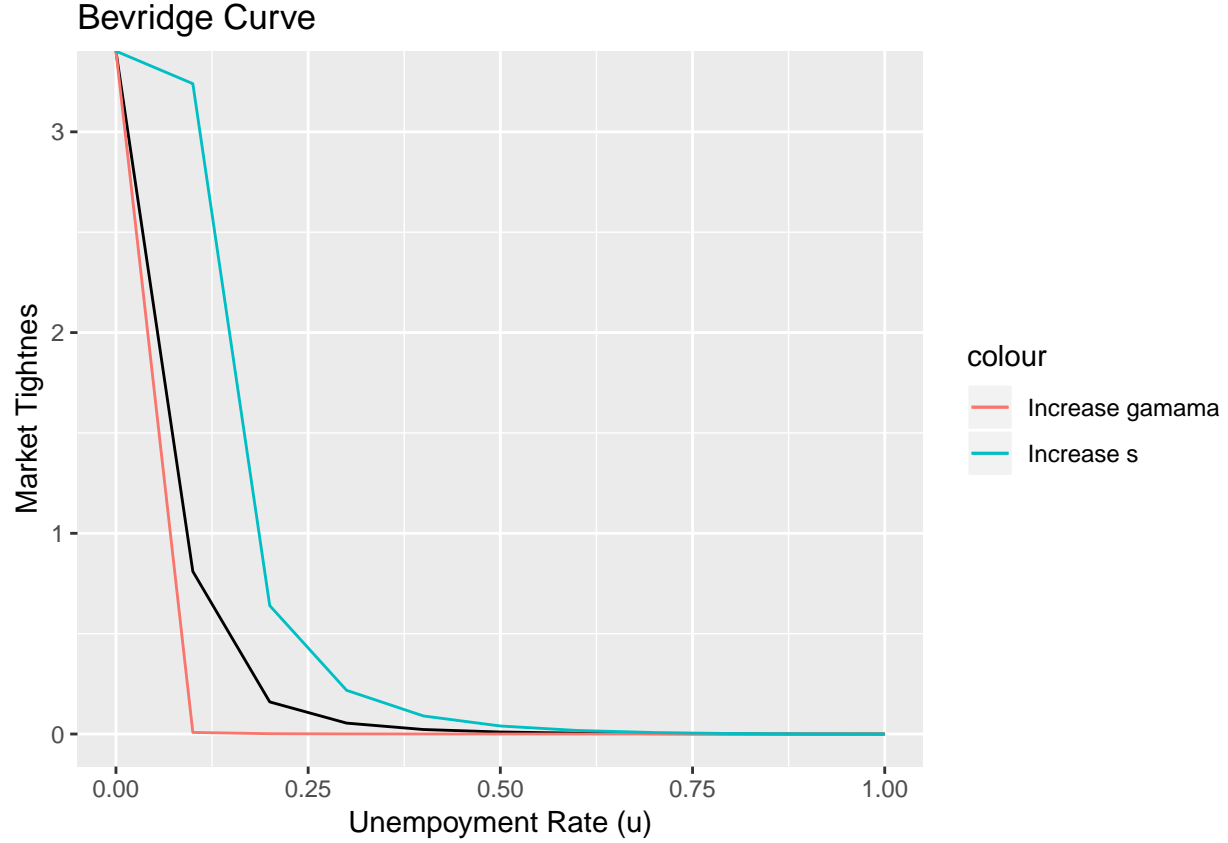Since we solved the job-finding rate for theta we can write:

$$u* = \frac{s}{(s + f(\theta))}$$

Which can be used to plot the a Bevridge curve:

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Bevridge Curve

Market Tightnes vs Unempoyment Rate (u)

colour
— Increase gamama
— Increase s

2 Supply of Vacancies

A firm will open a vacancy if the marginal benefit of opening that vacancy is greater than or equal to the marginal cost of opening that vacancy. The firm earns a profit off a vacancy due to the output of the person they hire. The profit that the firm earns is $\pi = y - w$ where y is the output of the worker (MPL) and w is their wage (in each period).

If we recall $\frac{1}{s}$ is the average duration of a job and q is the probability of filling a vacancy (vacancy filling rate). This results in:

$$MB = q * (y - w) * \frac{1}{s}$$

Let us denote the cost of opening a vacancy (marginal cost) k. This means that any given firm will continue to open vacancies until:

$$k = q * (y - w) * \frac{1}{s}$$

This is called the vacancy supply condition (free-entry condition).

If we go back to our example we can plug in our value for q:

$$k = \gamma \frac{1}{\sqrt{\theta}} * (y - w) * \frac{1}{s}$$

2.1 Vacancy Supply curve

The vacancy supply curve is a function $\theta(w)$, which we can get by solving our MB = MC equation of vacancies for θ:

$$k = \gamma \frac{1}{\sqrt{\theta}} * (y - w) * \frac{1}{s}$$

$$\sqrt{\theta} = \gamma \frac{1}{k} * (y - w) * \frac{1}{s}$$

$$\theta(w) = (\frac{\gamma * (y - w)}{s * k})^2$$

Vacancy Supply Curve

2.2 Shifts in Vacancy Supply

Shifts can be seen within the vacancy supply function:
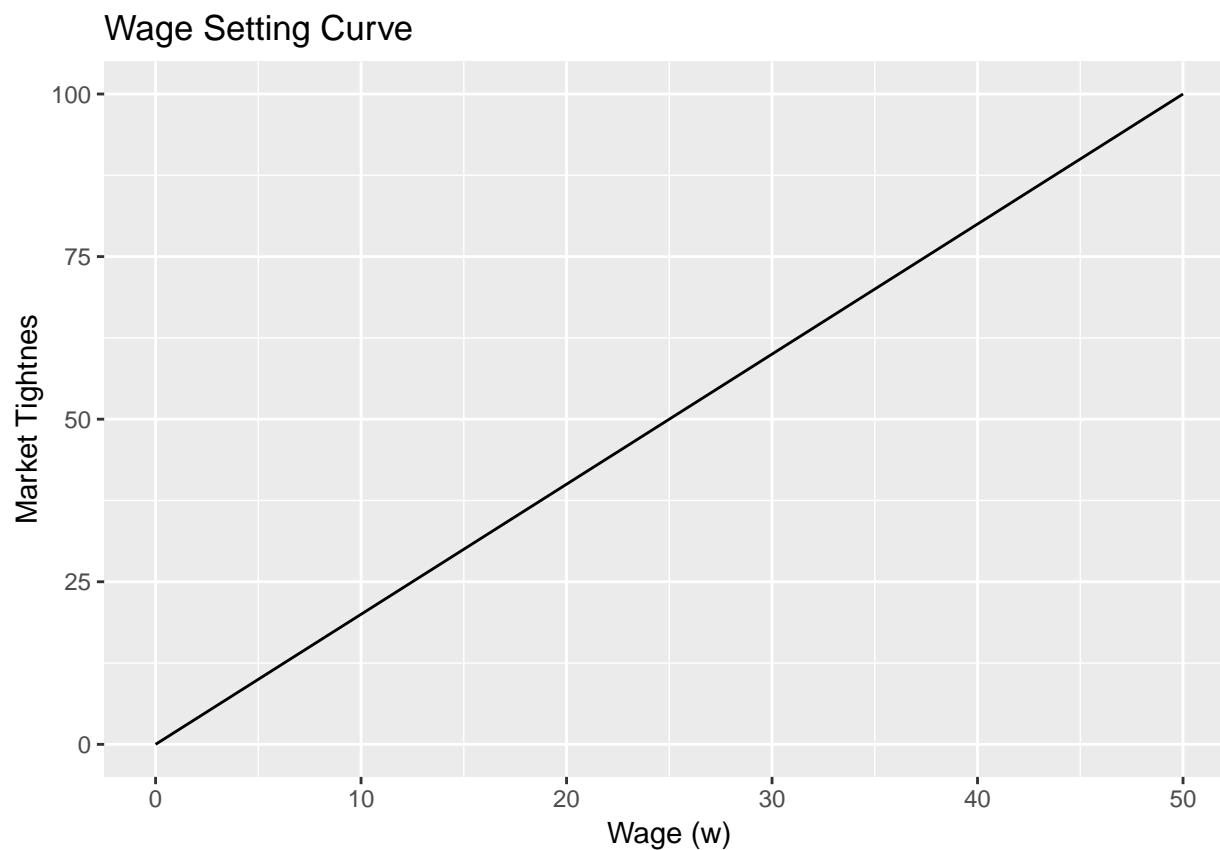
1. γ +
2. y +
3. s -
4. k -

3 Wage Formation (Wage-Setting Curve)

There could be a variety of factors that set wages:

- taxes
- y (output per worker)
- education
- minimum wage
- β - bargaining power of unions
- b - unemployment benefits
- θ - market tightness

For us the Wage-Setting (WS) curve will be given. Example:

$$w = \beta y + \beta k \theta + (1 - \beta) b...$$
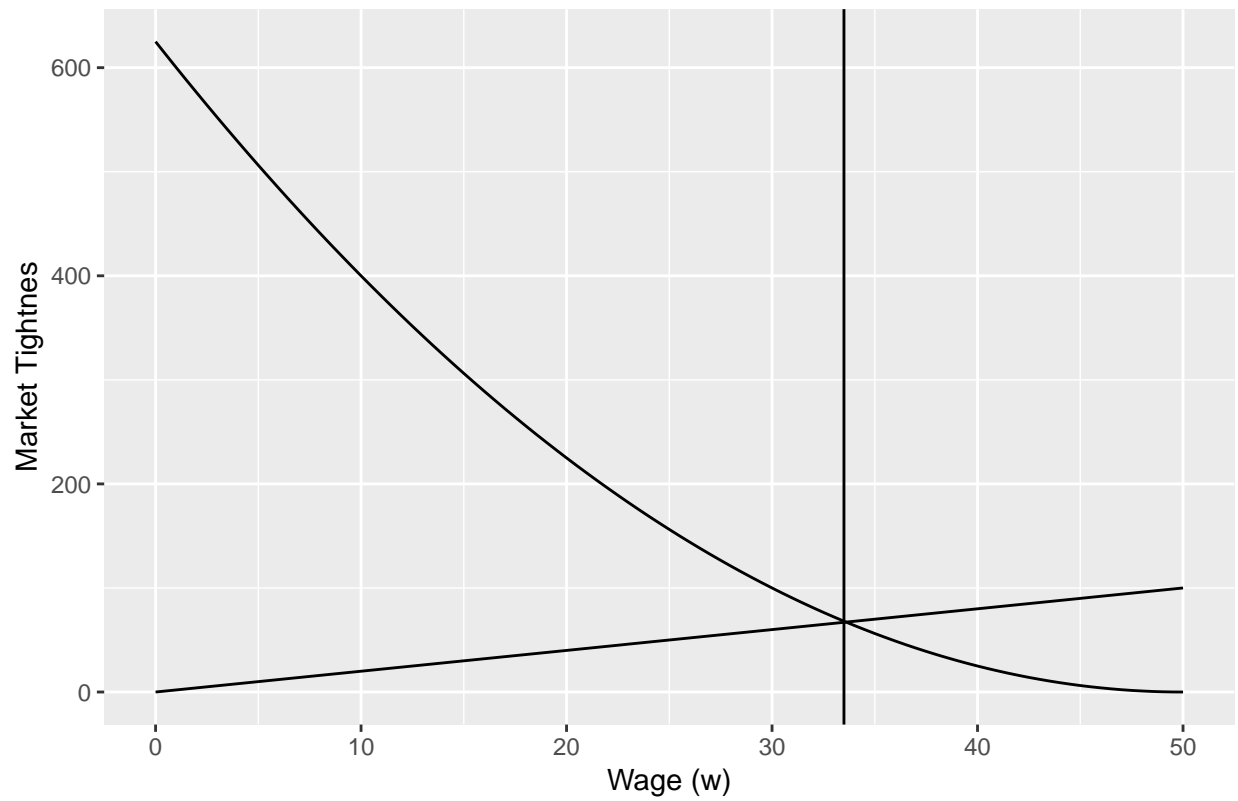
Wage Setting Curve

4 Summary

We have three curves:

1. $w(\theta)$ wage setting VS
2. $\theta(w)$ vacancy supply WS
3. $u(\theta)$ Beveridge curve BC

Wage Setting Curve vs Vacancy Supply

To find the unemployment rate associated with the equilbrium point, just find the unemployment rate on the BC with the same market tightness.