

# Chapter 6: The labor market

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- Learning objectives

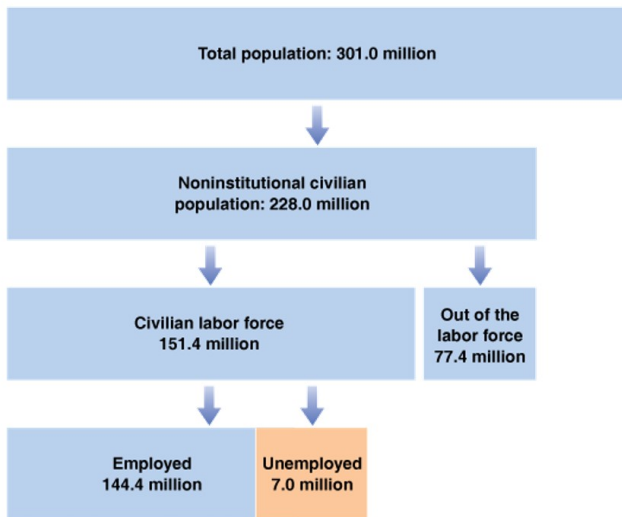
- 1 6.1 A tour of the labor market
- 2 6.2 Movements in unemployment
- 3 6.3 How are wages set
- 4 6.4 How is price determined
- 5 6.5 The natural rate of unemployment
- 6 6.6 The way forward

## Learning objectives chapter 6

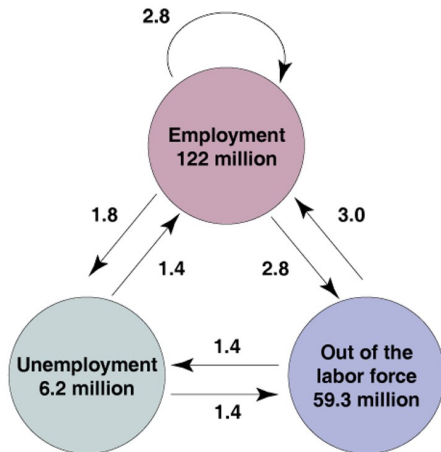
After you worked through this chapter, you should know

- a) the definition of reservation wage and efficiency wage,
- b) why companies have an incentive to pay a higher wage rate compared to the reservation wage and the impact of the incentive on the labor demand and unemployment rate
- c) which factors affect the price setting and wage setting behavior,
- d) how the real wage rate and the level of unemployment are derived in a simple labor market model,
- e) how different shocks influence the equilibrium value of the real wage rate and the unemployment rate.

# Population, Labor Force, Employment, and Unemployment in the United States (in millions), 2006

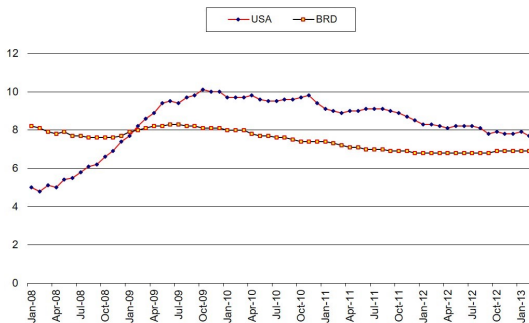


# Average Monthly Flows Between Employment, Unemployment, and Non-participation in the United States, 1996–2003



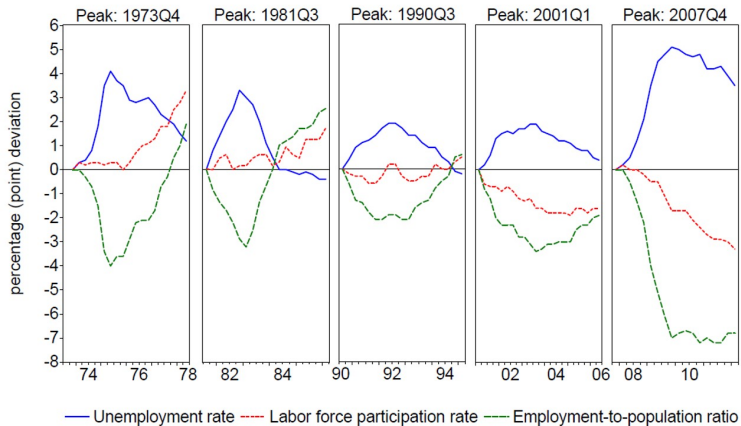
- Airport example: Unemployment rates do not display the dynamics
- USA: Proportion of workers that start or terminate an employment is high, 3/4 employees terminate, not the employer
- USA: Proportion of workers who are laid off or hired are high compared to the number of unemployed
- Proportion of workers that become unemployed
  - in USA 1.2 %
  - in Germany 0.39 %
- USA: Duration of unemployment low
- Average duration of unemployment
  - USA 2.3 month
  - Germany 8 month

# USA versus Germany: Unemployment rate (seasonally adjusted)



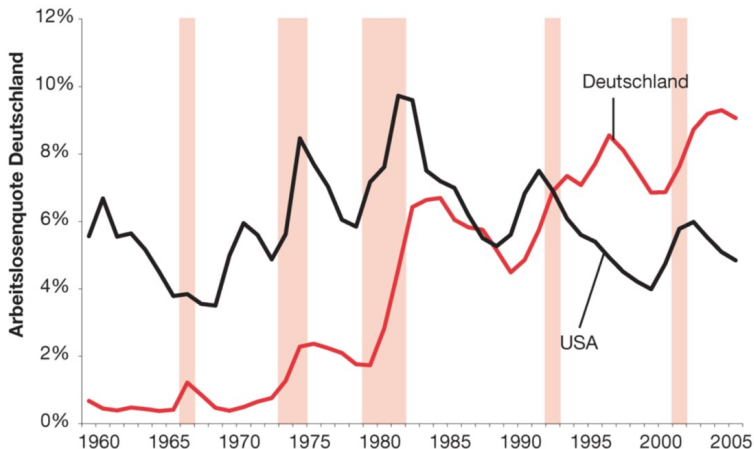
- Deutschland: Bundesagentur für Arbeit: Der Arbeits- und Ausbildungsmarkt in Deutschland.
- USA: US Bureau of Labor Statistics: A-10. Unemployment rates by age, sex, and marital status, seasonally adjusted <http://www.bls.gov/cps/tables.htm>

## Berger/Vierke (2012, P. 21): USA





The development of the average of the yearly unemployment rate in Germany and the US, 1960-2005,  
Source: OECD.



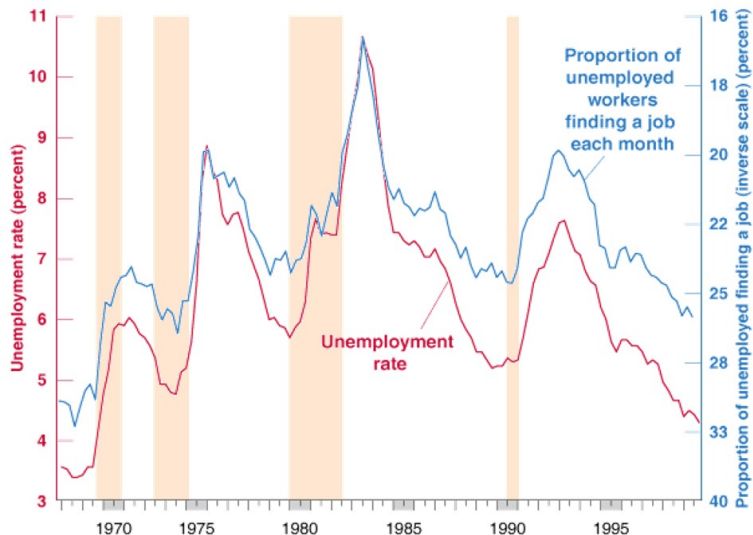
# Movements in unemployment

1. Before the mid of 80ies  $ur^{USA} > ur^{BRD}$
2. Since the mid 80ies  $ur^{USA} \downarrow$  and  $ur^{BRD} \uparrow$
3. During a recession:  $ur \uparrow$  and during a boom:  $ur \downarrow$

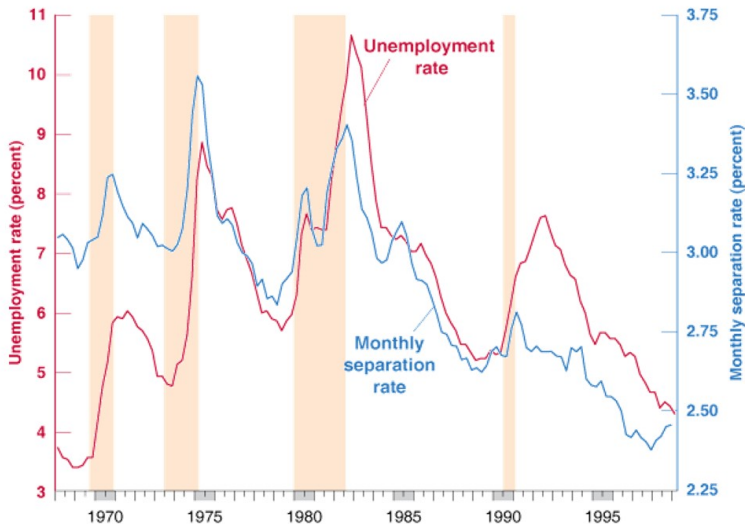
## Effects of a lower demand for labor

- Less hiring activities  $\Rightarrow$  Drop of open positions  $\Rightarrow$  high unemployment rates  $\Rightarrow$  low probability to find a new job
- Companies terminate employment: risk of getting fired increases

# The Unemployment Rate and the Proportion of Unemployed Finding Jobs, 1968–1999



# Unemployment rate and the monthly separation rate from employment, USA, 1968-1999



## Summary Section 6.2

- If unemployment rate high  $\Rightarrow$  high probability to loose a job.
- If unemployment rate high  $\Rightarrow$  low probability for unemployed to find a new job  $\Rightarrow$  duration of unemployment increases

# Wage determination

1. Workers receive a wage that is higher than the reservation wage.
  - Definition reservation wage: Wage level where the worker would be indifferent between working and being unemployed
  - Utility (additional consumption)  $\sim$  Utility (leisure time)
  - Reservation wage the higher the higher the level of unemployment benefits
2. Wages the higher the lower the unemployment rate
  - Companies have problems to replace workers
  - Workers have more valuable outside options

# Reservation wage

## 1. $Wage > reservation\ wage$

- Bargaining power of the worker /labor unions (Qualification, labor market conditions)
- Even companies are interested to pay a higher wage than the reservation wage as an incentive to increase productivity
- Case Study Ford (p. 144):
  - Wage increase from 2.3 \$ / 9 hours to 5 \$ / 8 hours
  - Turnover rate decreases from 370 % (1913) towards 16 % (1915)
  - Layoff rate decreases
  - Absenteeism decreases

# Efficiency wages and asymmetric information

## Assumptions

- Workers can work hard or can be lazy
  - Ceteris paribus worker prefers being lazy
  - Asymmetric information with respect to effort
  - Employer can not observe effort (completely)
  - Worker balances the degree of lazy
1. Utility: Worker avoids working hard
  2. Cost: Probability of detection & being laid off multiplied by the cost of being unemployed



## Efficiency wages and asymmetric information

- Worker will only work hard if his cost of unemployment is high
- Company tries to increase the workers' cost associated with unemployment
- Company will pay a higher wage rate compared to reservation wage: the efficiency wage
- The danger of undesired misconduct (after the conclusion of a contract) as a result of asymmetric information is also known as moral hazard.

# Asymmetric information

## Assignment:

- Job applications have different qualification levels (high/low)
- Asymmetric information relationship between applicant and employer:  
The applicant knows his type
- Wage differentiation impossible
  - High qualification  $\Rightarrow$  high wage
  - Low qualification  $\Rightarrow$  low wage
- Average wage rate  $\Rightarrow$  Adverse selection
- Only workers with a low qualification will take the job offer
- Workers with above average qualification won't take the offer or will take the offer but will also keep on searching for a higher paid job  $\Rightarrow$  High turnover rate of high skilled workers
- Selections process  $\Rightarrow$  Lemons stay in the company!

# Nominal wage ( $W$ )

$$(1) \quad W = P^e F(u, z)$$

- Nominal wage  $W$  the larger, the larger the expected price level  $P^e$ .
- $W$  the lower, the higher the unemployment rate  $u$ .
- $W$  the higher the higher the value of the fundamental variable  $z$ .

$$(2) \quad W = P^e \cdot (z - u)$$

# Factors that impact the nominal wage ( $W$ )

## 1. Expected price level

- Nominal wages ( $\text{€}$ ) are fixed for some time period in the future
- Nominal wage not important but expected real wage ( $W/P^e$ )
- When wage contracts are settled the relevant price level has not materialized
- Actors have to build expectations about the price level  $P$  in the future  
 $\Rightarrow P^e$

## 2. Other factors ( $z$ )

- Level of unemployment benefits
- Duration of unemployment benefits

# The wage setting relation

Assumptions:

- Realized price level  $P$  is equal to expected price level  $P^e$

$$W = P^e \cdot F(u, z)$$

Taking into account  $P = P^e$ :

$$(3) \quad W = P \cdot F(u, z) \quad | : P$$

$$(4) \quad \frac{W}{P} = F(u, z)$$

- Negative relationship between real wage ( $W/P$ ) and unemployment rate ( $u$ ).
- Intuition: The larger  $u$  the lower the bargaining power of the workers and hence the real wage.

# Price determination

Assumption:

- Price is a function of the cost structure of the company
- Cost structure depends on the production function

$$(5) \quad Y = A \cdot N \quad \text{with} \quad A > 0$$

- A: labor productivity
- Innovation will lead to:  $A \uparrow$
- Assumption: A is constant and  $A = 1$

$$(6) \quad Y = N$$

# Price determination

$$(7) \quad Y = N$$

- Cost of one unit of additional output is equal to the cost of one additional unit of labor
- Cost of one additional unit of labor ( $N$ ) is equal to the wage rate ( $W$ ).
- Marginal cost of one additional unit of output is equal to the wage rate ( $W$ ).
- Price setting depends on the market structure:
- Market structure of perfect competition: Price = Marginal Cost ( $P = W$ ).

# Price determination

$$(8) \quad Y = N$$

- We do not have perfect competition.
- Price is larger than marginal cost.
- Companies charge a mark-up.
- Price level the higher the higher the market power.

$$(9) \quad P = (1 + \mu) \cdot W$$

- Market structure of perfect competition:  $\mu = 0$



## The price setting relation

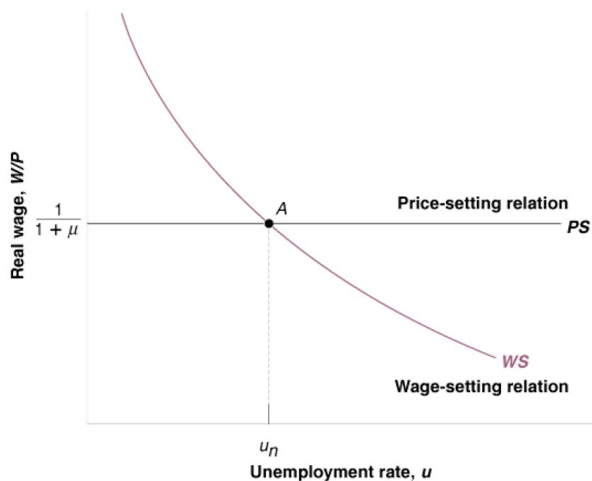
$$P = (1 + \mu) \cdot W$$

$$(10) \quad 1 = (1 + \mu) \cdot \frac{W}{P}$$

$$(11) \quad \frac{W}{P} = \frac{1}{(1 + \mu)}$$

- Price setting behavior influences real wage.
- The larger the mark-up the larger the price level and hence the lower the real wage.
- Price-setting does not depend on the unemployment rate.
- Price-setting curve  $\Rightarrow$  Horizontal line in a real wage-unemployment-diagram.

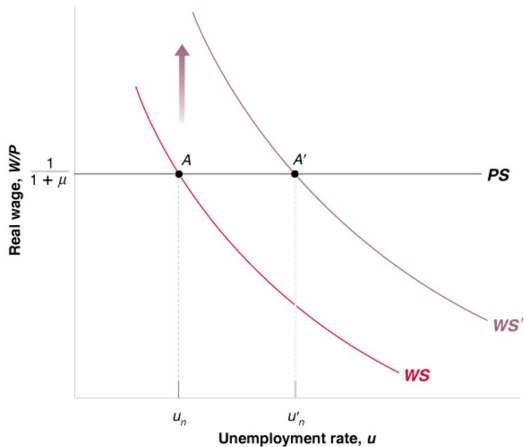
# Wages, Prices, and the Natural Rate of Unemployment



# The natural rate of unemployment

- Equilibrium unemployment rate is labeled as the natural rate of unemployment
- Natural rate of unemployment not exogenously given, but can be influenced by economic policy
- Better: Structural rate of unemployment

# Unemployment Benefits and the Natural Rate of Unemployment



# Effects of an increase in the unemployment benefits

Intuition:

- An increase of the unemployment benefits ( $z \uparrow$ ) lead, at a given level of the natural rate of unemployment ( $u_n$ ), to a higher reservation wage  $\Rightarrow$  workers demand a higher real wage  $\Rightarrow$  WS curve shifts upwards.
- Companies are not willing to increase real wage and lay off workers.
- Unemployment rate increases.
- Bargaining power of workers is reduced and workers are afraid for unemployment.
- Real wage rate is reduced again, but natural rate of unemployment has increased ( $u'_n$ ).

## From employment to output

- Number of unemployed  $U$
- Number of employed  $N$
- Labor force  $L$

$$(12) \quad u = \frac{U}{L}$$

$$(13) \quad u = \frac{L - N}{L} \quad \Rightarrow \quad u = 1 - \frac{N}{L}$$

$$(14) \quad 1 - u = \frac{N}{L} \quad \Rightarrow \quad N = L \cdot (1 - u)$$

$$(15) \quad N_n = L \cdot (1 - u_n)$$

# From employment to output

$$(16) \quad Y = N$$

$$(17) \quad Y_n = N_n$$

Taking into account  $N_n = L \cdot (1 - u_n)$ :

$$(18) \quad Y_n = L \cdot (1 - u_n)$$