The Supply of Labor

- Supply of labor is determined by individuals:
  - Aggregate labor supply is the sum of individuals’ labor supply.
  - The labor supply of individuals depends on their labor-leisure choices.

The Supply of Labor

- The income-leisure trade-off:
  - Utility depends on consumption and leisure.
  - Compare costs & benefits of working another day.
    - Costs: Loss of leisure time.
    - Benefits: More consumption because of higher income.
  - Utility maximizing individuals will:
    - Work another day if the benefits exceed the costs and
    - Keep working additional days until benefits equal costs.

Agenda

- The Supply of Labor
- Labor Market Equilibrium
- Unemployment
- Okun’s Law
The Supply of Labor

• Real wages and labor supply:

  ➢ An increase in the real wage has 2 effects:

    • A substitution effect: A higher real wage increases the reward for working is higher so more labor is supplied.

    • An income effect: A higher real wage increases income for same amount of work time so a person can afford more leisure and will supply less labor.

The Supply of Labor

• Real wages and labor supply:

  ➢ A pure substitution effect: a one-day rise in the real wage.

    • A temporary real wage increase has a pure substitution effect because the effect on wealth is negligible.

    • Consequently, an increase in labor supply.

The Supply of Labor

• Real wages and labor supply:

  ➢ A pure income effect: winning the lottery.

    • Winning the lottery doesn’t have a substitution effect, because it doesn’t affect the reward for working.

    • But it makes a person wealthier, so a person will both consume more goods and take more leisure.

    • Consequently, a reduction in labor supply.

The Supply of Labor

• Real wages and labor supply:

  ➢ The substitution effect and the income effect together: a long-term increase in the real wage.

    • The reward to working is greater so there is a substitution effect toward more work.

    • With higher wage, a person doesn’t need to work as much to consume the same basket of goods and services so there is an income effect toward less work.
The Supply of Labor

- Real wages and labor supply:
  - The substitution effect and the income effect together: a long-term increase in the real wage.
    - The longer the high wage is expected to last, the stronger the income effect.
    - Thus labor supply will increase by less (or decrease by more) than for a temporary reduction in the real wage.

The Labor Supply Curve

- N: Quantity of labor supplied
- W: Real wage

The Supply of Labor

- Real wages and labor supply:
  - Labor supply increases with a temporary rise in the real wage.
  - Labor supply decreases with a permanent rise in the real wage.

The Labor Supply Curve

- N: Quantity of labor supplied
- W: Real wage
The Supply of Labor

• Factors that shift the labor supply curve:

  ➢ Wealth: Higher wealth reduces labor supply, i.e., shifts the labor supply curve to the left.

  ➢ Expected future real wage: Higher expected future real wage is like an increase in wealth and reduces labor supply, i.e., shifts the labor supply curve to the left.

An increase in wealth on labor supply

Labor Market Equilibrium

• The labor market will be in equilibrium when labor supply equals labor demand.

  ➢ Determines the full-employment level of employment, \( \bar{N} \), and the market-clearing real wage, \( \bar{w} \).
Labor Market Equilibrium

• Full-employment output:
  - **Full-employment output** is the level of output when the labor market is in equilibrium.
  - Also called **potential output**.

\[
\bar{Y} = AF(K, N)
\]

Factors that change full-employment output:

- **Shifts** in the demand for labor and/or supply of labor that affects the full-employment level of employment.
- **Shifts** in the production function from supply or productivity shocks.
  - Which will also shift the demand for labor.
Unemployment

• Measuring unemployment:
  ➢ Three Categories:
    • Employed,
    • Unemployed, or
    • Not in the labor force.
  ➢ Labor Force = Employed + Unemployed

• Measuring unemployment:
  ➢ Unemployment Rate = Unemployed/Labor Force
  ➢ Participation Rate = Labor Force/Adult Population
  ➢ Employment Ratio = Employed/Adult Population

<table>
<thead>
<tr>
<th>Category</th>
<th>Number (millions)</th>
<th>Share of labor force (percent)</th>
<th>Share of adult population (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed workers</td>
<td>144.0</td>
<td>95.4</td>
<td>63.2</td>
</tr>
<tr>
<td>Unemployed workers</td>
<td>7.0</td>
<td>4.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Labor force (employed + unemployed workers)</td>
<td>151.0</td>
<td>100.0</td>
<td>66.1</td>
</tr>
<tr>
<td>Not in labor force</td>
<td>77.4</td>
<td></td>
<td>33.9</td>
</tr>
<tr>
<td>Adult population</td>
<td>228.4</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Notes: Figures may not add up because of rounding.
Source: The Employment Situation, May 2006, Table A.

Unemployment

- Changes in employment status:
  - Flows between categories.
    - Discouraged workers are people who have become so discouraged by lack of success at finding a job that they stop searching.
      - They are in “not in the labor force.”

Average monthly changes in employment status

Unemployment

- How long are people unemployed?
  - Most unemployment spells are of short duration.
    - An unemployment spell is the period of time an individual is continuously unemployed.
    - Duration is the length of an unemployment spell.
  - However, on any given date, most unemployed people are experiencing unemployment spells of long duration.
Unemployment

• How long are people unemployed? Example:
  ➢ Labor force = 100.
  ➢ On the first day of every month, 2 workers become unemployed for one month each.
  ➢ On the first day of every year, 4 workers become unemployed for one year each.

Unemployment

• How long are people unemployed? Example:
  ➢ 28 spells of unemployment during a year.
    • 24 short spells of one month each and
    • 4 long spells of one year each.
  ➢ Most spells of unemployment are short.

Unemployment

• How long are people unemployed? Example:
  ➢ On any given date, 6 people will be unemployed.
    • 4 have long spells of one year each.
    • 2 have short spells of one month each.
  ➢ Most unemployed people on a given date have long spells of unemployment.

Unemployment

• Why there are always unemployed people?
  ➢ Frictional unemployment:
    • Search activity of firms and workers due to heterogeneity of positions and workers.
    • Matching process can be time consuming and costly.
Unemployment

- Why there are always unemployed people?

  ➢ **Structural unemployment:**
    - Structural unemployment is the long-term and chronic unemployment that exists even when the economy is not in a recession.
    - **Chronically unemployed:** workers who are unemployed a large part of the time.

- The **natural rate of unemployment** ($\bar{u}$):
  - The natural rate of unemployment is the level of unemployment that exists even when output and employment are at their full-employment levels.
  - The sum of frictional and structural unemployment.

- **Cyclical unemployment:**
  - Cyclical unemployment is difference between actual unemployment rate and natural rate of unemployment and is given by:
    $$ u - \bar{u} $$
Unemployment

- Labor market data:
  - BLS Employment Situation report:
    - Household survey: unemployment, employment.
    - Establishment survey: jobs

Okun’s Law

- Okun’s Law is the relationship between output (relative to full-employment output) and cyclical unemployment and is given by:

\[
\frac{\bar{Y} - Y}{\bar{Y}} = 2(u - \bar{u})
\]

- Why is the Okun’s Law coefficient 2, not 1?
  - When cyclical unemployment rises:
    - The labor force falls,
    - Hours of work per worker decline, and
    - Average productivity of labor generally declines.

  - The result is a 2% reduction in output (relative to potential output) for even 1 percentage point increase in the unemployment rate.

- If the economy’s average growth rate of full-employment output is 3%, then:

\[
\frac{\Delta Y}{Y} = 3 - 2\Delta u
\]
Okun’s Law

\[ \Delta Y/Y \]

\[ \Delta u \]

Key Diagram #2b: Supply of Labor

\[ W \]

\[ N_s \]

\[ N \]

Figure 3.15 Okun’s Law in the U. S.

Key Diagram #2b

- Factors that Shift the Supply of Labor:
  - Increases in wealth reduce labor supply and shift \( N_s \) left.
  - Increases in expected future real wages reduce labor supply and shift \( N_s \) left.
Factors that Shift the Supply of Labor:

- Increases in the working-age population increase labor supply and shift $N_s$ right.
- Increases in the labor force participation rate increase labor supply and shift $N_s$ right.

Key Diagram #2: Labor Market Equilibrium

Next Time

- Consumption, Saving, and Investment
  - Consumption and Saving
  - Investment