Learning Objectives

1. Understand the relationship between wages and the marginal productivity of workers
2. Analyze how wages and employment are determined in competitive labor markets
3. Compare and contrast the various hypotheses economists have proposed to explain earnings differences
4. Discuss recent trends in U.S. income inequality and justifications for income redistribution
5. Describe and analyze some methods used to reduce poverty in the U.S.
The Economic Value of Work

- Individual income vary widely
  - Comparable skills seem to earn different incomes
- Economics analysis applies to labor markets
  - Equilibrium wage and quantity are determined by supply of and demand for a each category of labor
- Labor categories include unskilled, skilled, managers, and so on
  - Changes in supply and demand will change the equilibrium wage and quantity
Mackintosh Pottery Works

• Pottery uses free clay and labor
  – Selling price is $1.10 per piece
    • Handling costs are $0.10 per piece
• Rennie and Laura each work full time at potting
  – Rennie delivers 100 pots per week and Laura delivers 120
    • Renni earns $100 and Laura earns $120 per week
• If Mackintosh paid less than $1 per pot
  – Another pottery company could afford to pay more
  – Rennie and Laura leave to earn more

One reason for different earnings is differences in output per person
The Labor Market

• **Marginal product of labor (MP)**
  – The additional output a firm gets by employing one additional unit of labor

• **Value of marginal product of labor (VMP)**
  – The dollar value of the additional output a firm gets by employing one additional unit of labor

• In a competitive market,
  
  \[ \text{wage} = \text{VMP} \]

  – Mackintosh Pottery Works example
Potters' Production

• Value of Marginal Product
  – Marginal product of labor multiplied times the net price of each unit sold ($1)
    • Rennie’s VMP is $100
    • Laura’s VMP is $120
  – In a competitive market each worker is paid the value of his marginal product
Hiring At The Adirondack Woodworking Company

- Makes cutting boards from free scrap wood
  - Price of a cutting board is $20
- Going wage is $350 per week

<table>
<thead>
<tr>
<th># of Workers</th>
<th>Output</th>
<th>MP</th>
<th>VMP</th>
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<tr>
<td>0</td>
<td>0</td>
<td>30</td>
<td>$600</td>
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<tr>
<td>1</td>
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<td>25</td>
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<tr>
<td>2</td>
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<td>21</td>
<td>420</td>
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<tr>
<td>3</td>
<td>76</td>
<td>18</td>
<td>360</td>
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<tr>
<td>4</td>
<td>94</td>
<td>14</td>
<td>280</td>
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<tr>
<td>5</td>
<td>108</td>
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</table>
Hiring At The Adirondack Woodworking Company

• The company will hire workers until the value of the marginal product of the last worker is equal to the wage
  – Cost-Benefit Principle
  – Workers earn $350 per week

• Adirondack will hire four workers
  – The fifth worker costs more ($350) than the benefits he delivers ($280)

<table>
<thead>
<tr>
<th># of Workers</th>
<th>VMP</th>
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<tbody>
<tr>
<td>1</td>
<td>$600</td>
</tr>
<tr>
<td>2</td>
<td>500</td>
</tr>
<tr>
<td>3</td>
<td>420</td>
</tr>
<tr>
<td>4</td>
<td>360</td>
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<tr>
<td>5</td>
<td>280</td>
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</tbody>
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Demand for Labor

Firm 1

$D_1 = VMP_1$

Firm 2

$D_2 = VMP_2$

Market

$D = VMP_1 + VMP_2$
Individual Labor Supply

• Individuals trade-off income and leisure
  – More work hours means more income AND less leisure

• Suppose the wage increases
  – Substitution effect: work more
    • Leisure is more expensive
  – Income effect: work less
    • Purchasing power increases for a given work schedule
  – A higher wage may increase or decrease the quantity of labor supplied by the individual
Labor Supply of Programmers

• Labor supply for a single profession has a positive slope
  – Higher wages attract workers from other careers

• An increase in wages from $W_1$ to $W_2$ increases quantity of labor supplied from $L_1$ to $L_2$
  – Movement along the labor supply curve
Increase in the Demand for Programmers

- Demand for programmers increases from $D_1$ to $D_2$
  - Initial impact is a shortage of programmers at $W_1$
  - In the short-run, wages are bid up to $W_3$
- In the long run
  - Movement up the supply curve and down the demand curve
  - Quantity of labor supplied increases from $L_1$ to $L_2$
  - Wages settle at $W_2$
Explaining Differences in Earnings

- When labor markets are competitive, differences in wages are determined by differences in VMP
  - Michael Jordan earned less playing baseball than playing basketball
  - Patent attorneys earn more than property attorneys
  - Surgeons earn more than family practitioners

- Earnings differences are mainly due to differences in

<table>
<thead>
<tr>
<th>Education</th>
<th>Experience</th>
<th>Training</th>
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<tbody>
<tr>
<td>Intelligence</td>
<td>Energy</td>
<td>Work Habits</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>Initiative</td>
<td>Political Skills</td>
</tr>
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</table>
Human Capital and Differences in Earnings

• **Human capital** is the accumulated education, training, work habits and other assets that affect and individual's value of marginal product (VMP)
  – Individuals make decisions about acquiring human capital

• **Human capital theory** holds that a worker's wage is proportional to his human capital
  – Some jobs require more human capital
    • These jobs pay more
  – Demand for specific kinds of human capital also cause earnings differences
Labor Unions and Differences in Earnings

• A labor union is a group of workers who bargain collectively with employers for better wages and working conditions
  – Entry to the union is restricted

• Unions restrict the supply of labor and raise wages
  – Similar to a cartel
  – Unions increase the supply of labor to the non-union companies
    • Wages in non-union companies go down
Market Equilibrium Without Unions

**Market 1**
- \( D_1 = VMP_1 \)
- Wage ($/hour): 9
- Employment: 75

**Market 2**
- \( D_2 = VMP_2 \)
- Wage ($/hour): 9

**Total Market**
- \( D = VMP_1 + VMP_2 \)
- Wage ($/hour): 9
- Total employment (workers/day): 200

**Graphs**
- **Wage ($/hour)**
  - \( D_1 \)
  - \( D_2 \)
  - Total Market

**Equation**
- \( S_0 \)
Market 1 Is Unionized

• Workers in market 1 unionize
  – Negotiate a wage of $12
  – 25 workers out of work
• In market 2, labor increases by 25 workers from market 1
  – Wage decreases to $6
  – Employment increases to 100
• Net welfare loss to society
  – Move workers from low VMP to high VMP and increase total surplus
Size of the Union Wage Advantage

• Our analysis of two markets resulted in union workers earning twice the non-union wage
  – Suggest unionized firms have a cost disadvantage

• Unionized firms remain competitive
  – Unions attract most productive workers
    • Union worker are more skilled and experienced
    • Wage gap is ±10% for comparable human capital
  – Unions increase productivity
    • Improved communications and motivation
    • Lower labor turnover means lower costs
Compensating Wage Differentials

- **Compensating wage differentials** describe the difference in wage rates from differences in working conditions
  - Wages depend on VMP and working conditions
  - Workers have preferences about their work schedule, environment and other conditions
    - Working in less desirable conditions increases wage
- Safety and work schedule are conditions that matter to workers
Discrimination in the Labor Market

- Wage differentials not based on differences in $VMP$ leave cash on the table
  - On average, women and minorities receive lower wages than white males
    - Pattern holds even if we compare people with similar human capital levels
- One way to explain differential is that some human capital differences are not measured
- Another view attributes the differential to discrimination
Employer Discrimination

- **Employer discrimination** is an arbitrary preference by an employer for one group of workers over another.

- Assumptions
  - Productivity is distributed the same for men and women
    - Average productivity is the same
  - One employer prefers to hire male employees
### Employer Discrimination

- Two firms each hire four employees
  - Employees like both firms the same
  - Non-discriminatory wage is $125
- Discriminator wants pick of the market, so offers $130 per day
  - Hires 4 men
- Competitor hires the 4 women, VMP of last worker is $125
  - Wage is $125

<table>
<thead>
<tr>
<th>Labor Supply</th>
<th>Men</th>
<th>Women</th>
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<tbody>
<tr>
<td>VMP</td>
<td>$200</td>
<td>$200</td>
</tr>
<tr>
<td></td>
<td>$175</td>
<td>$175</td>
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<tr>
<td></td>
<td>$150</td>
<td>$150</td>
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<tr>
<td></td>
<td>$125</td>
<td>$125</td>
</tr>
</tbody>
</table>
Employer Discrimination

• Discriminating firm has higher costs than non-discriminator
  – Discriminating employers earn lower profits

• Non-discriminator has higher profits
  – Expands business
    • Eventually supply of women is exhausted
  – Bid up female wages

• *No Cash on the Table Principle* results in equal wages between discriminator and non-discriminator
Discrimination by Others

- **Customer discrimination** causes buyers to pay more for goods produced by favored group for the same product
  - Attorneys: Some groups more credible with juries and clients than others
    - Reduces incentives for non-favored groups to enter the profession
- Socialization within the family can affect individual's career choices and therefore the supply of labor
  - Traditional female roles: nurses, teachers, secretaries
Other Sources of the Wage Gap

- Basis for compensating wage differentials
  - Willingness to accept risk
    - Coal mining, entrepreneurs, construction, farming
  - Quality versus quantity of education
    - Difficult to measure
  - Courses taken and degrees pursued by sex and race
    - Wage gaps remain across industries and occupations
    - If one group disproportionately pursues higher-paid occupations, wage gap will persist
Winner-Take-All Markets

• Winner-take-all markets are ones in which small differences in human capital translate into large differences in pay
  – Technology plays a role
  – Some participants earn high salaries
    • Many more do not

• Examples

<table>
<thead>
<tr>
<th>Entertainment</th>
<th>Law</th>
<th>Consulting</th>
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</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>Investment Banking</td>
<td>CEOs</td>
</tr>
<tr>
<td>Publishing</td>
<td>Design, Fashion</td>
<td>Academia</td>
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## Trends in Inequality

- Market outcomes produce disparities in income

### Median Income by Quintile for US (2009 dollars)

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<tr>
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<tbody>
<tr>
<td>Bottom 20%</td>
<td>15,889</td>
<td>15,643</td>
<td>17,590</td>
<td>15,289</td>
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<tr>
<td>Second 20%</td>
<td>34,588</td>
<td>36,488</td>
<td>40,218</td>
<td>37,045</td>
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<tr>
<td>Middle 20%</td>
<td>52,251</td>
<td>56,194</td>
<td>63,208</td>
<td>59,907</td>
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<tr>
<td>Fourth 20%</td>
<td>72,492</td>
<td>80,813</td>
<td>93,156</td>
<td>90,962</td>
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<tr>
<td>Top 20%</td>
<td>122,054</td>
<td>150,188</td>
<td>195,451</td>
<td>189,486</td>
</tr>
<tr>
<td>Top 5%</td>
<td>173,510</td>
<td>235,652</td>
<td>346,342</td>
<td>325,023</td>
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</table>
U.S. Median Income by Quintile

Growing inequality

Bottom 20%
Second 20%
Middle 20%
Fourth 20%
Top 20%
Top 5%

1980
1990
2000
2009
Recent Trends in Inequality

- From WWII to the 1970s income growth was ± 3% per year for all groups.
- Between 1980 and 2009, growth rates increase from bottom quintile to top.
- Does not show mobility between groups.
  - Median income is not a measure of individual welfare.
- In 1980, CEOs earned 42 times salary of average worker.
  - By 2000, this multiple increased to more than 500 times.

### Median Income Growth 1980 - 2009

<table>
<thead>
<tr>
<th>Quintile</th>
<th>20%</th>
<th>7%</th>
<th>13%</th>
<th>25%</th>
<th>55%</th>
<th>87%</th>
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<tr>
<td>Second</td>
<td>7%</td>
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<td>Top 5%</td>
<td>87%</td>
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John Rawls and the Veil of Ignorance

- The "right" income distribution is a normative matter
- Rawls proposed a "fair" income distribution is one that people would accept *before* they know their position in the distribution
  - Equality of distribution is favored by the strongly risk averse
    - Strong disincentive to investing in human capital, taking risk, working
Acceptable Income Distributions

• If income is distributed equally, total output is smaller than in a country with earnings incentives

• Rawls argued that inequality would be acceptable if it increases total output by "enough"

• Rawls also argued that the market system produces more inequality than acceptable
  – Fear of being disadvantaged beats hope of being rich
  – Fairness requires some attempt to reduce income inequality produced by the market
The Challenge of Income Redistribution

- Raising incomes of the needy reduce incentives to work
  - Difficulty distinguishing between needy and others
    - Risk takers may appear "needy"
    - People who prefer not to work ineligible
    - Hurricane victims
- No perfect solution
  - Choose among imperfect alternatives
Welfare Payments and In-kind Transfers

- **In-kind transfers** are direct transfers of goods or services
  - Food stamps, Medicaid, public housing, free school lunches

- From mid 1960s to 1996, Aid to Families with Dependent Children (AFDC) provided cash
  - Sometimes required no adult male in the household
    - Destabilizing for families
  - Created persistent dependence on AFDC
1996 Personal Responsibilities Act

- Cash grants from federal government to states
  - States determine distribution criteria
  - Five-year limit on benefits for each recipient
- Reduced welfare rolls and encouraged self-reliance
  - May aggravate the condition of the poorest
Means-Tested Benefit Programs

• A means-tested program decreases benefits as the recipient's other income increases
  – Intends to avoid paying benefits to those who can support themselves

• Administrative structure discourages work
  – If benefits are reduced by $1 for each $2 earned, participants in multiple programs may lose more benefits than the income they earn

• Administrative costs are high
  – Simplify the program and distribute the cost savings to the needy
The Negative Income Tax (NIT)

- **Negative income tax** is a tax credit for each person financed by tax on earned income.
- With no taxes, pre-tax income equals after-tax income.
- With NIT, low income families receive a cash transfer while high income families pay tax.
  - Family with no income would receive the federal *poverty threshold.*
Negative Income Tax

• Advantages
  – Incentive to work is greater than with welfare
  – Lower administrative cost

• Disadvantages
  – Creates and incentive not to work
  – The political cost is high
    • NIT guarantees income to all who do not work
Minimum Wage Legislation

- Minimum wage above equilibrium creates unemployment
  - Loss in total surplus
  - $L_1$ workers earn more
  - $(L_0 - L_1)$ are unemployed
  - Change in total earning depends on the elasticity of demand for labor
- Studies show little effect of minimum wage on employment
  - Loss in total surplus may be small
Earned Income Tax Credit (EITC)

- Earned-income tax credit is a policy under which low-income workers receive credits on their federal taxes.
- A family of four earns $15,000
  - EITC is $4,750
  - Federal taxes are reduced by $4,750
    - If taxes are less than EITC, a refund is issued
- EITC does not interfere with market incentives
  - Affects only people who work
  - Allows labor markets to reach equilibrium
Minimum Wages and Total Surplus

No Minimum Wage

- Employer surplus: $12.5K
- Worker surplus: $12.5K

Minimum Wage ($7)

- Employer surplus: ($4.5K)
- Total surplus lost: ($4K)
- Worker surplus: ($16.5K)
EITC Is a Better Option

- Market equilibrium reached with 5,000 work-hours and wage of $5
  - Minimum wage reduces worker surplus by $4,000/day
- Goal: restore worker surplus to its original level of $16,500/day
  - An earned-income tax credit of $0.80/hr for 5,000 person hours/day
  - Deadweight loss of minimum wage is translated into worker surplus
  - Finance with a $4,000/day tax on employers
Public Employment for the Poor

- Overcomes the shortcomings of the EITC and NIT
  - EITC does not help the unemployed
  - NIT reduces the incentive to work
- Government could employ the poor
  - If wages are the same as the private sector, some workers will prefer government jobs
    - Increases the cost of the program
  - Make-work programs are not productive
  - Increases size of government
A Combination of Methods

- Use a NIT with payment set below the poverty threshold
- Set the public service wage below the minimum wage
- Privatize the management of the public service employment program
Wrap-Up

• Labor Markets
  – Supply, demand, and value of marginal product
• Earnings Differentials

<table>
<thead>
<tr>
<th>Human Capital</th>
<th>Risk</th>
<th>Compensating Wage Differentials</th>
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</thead>
<tbody>
<tr>
<td>Discrimination</td>
<td>Labor Unions</td>
<td>Winner-Take-All-Markets</td>
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<td>Quality of Human Capital</td>
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• Income Inequality

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<th>Welfare and In-Kind Transfers</th>
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<tr>
<td>NIT</td>
<td>Minimum Wage</td>
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<td>EITC</td>
<td>Public Employment</td>
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<td>Combination of Methods</td>
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