Introduction

• Factors of production and factor markets
• Factor income
• Derived demand for factors of production
• Productivity theory and factor markets
  – Marginal revenue product
  – Marginal resource cost
  – Profit maximization
Introduction

• Productivity theory and factor markets
  – Effect of imperfect competition in product markets
  – Effect of imperfect competition in labor markets
  – Monopsony
• Problems with productivity theory in factor markets
• Government intervention in factor markets: minimum wage
Factors of Production

- Any resource used to produce goods and services
  - Labor
  - Land and other natural resources
  - Capital (physical and human)
- Factors of production earn income from the ongoing selling of their services
- **Factor markets** = markets where factors of production are traded
  - Households are suppliers
  - Firms are demanders
Importance of Factor Markets

• Determine prices of resources

• Allocate productive resources to producers

• Help ensure resources are used efficiently
Factor Income

• Sale of factors of production usually generates largest share of most people’s incomes

• **Factor distribution of income** = how total income in the economy is divided among labor, land, and capital
Factor Distribution of Income, 2014

- Compensation of Employees: 60.2
- Proprietors' Income: 13.5
- Interest: 13.1
- Corporate Profits: 4.1
- Rents: 9.1

Source: Bureau of Economic Analysis
Derived Demand for Factors of Production

- Demand for a factor of production is derived from demand for the good/service produced from that resource

- Distinguishes factor markets from goods markets
Productivity Theory and Factor Markets

• Initially assume product market and resource market are both perfectly competitive

• Use labor market as example

• **Marginal revenue product (MRP)** = change in total revenue resulting from a change in the quantity of labor
  – Also called value of marginal product (VMP)
Marginal Revenue Product

- \( MRP = \frac{\Delta TR}{\Delta Q_L} = \frac{TR_{\text{new}} - TR_{\text{old}}}{Q_{L_{\text{new}}} - Q_{L_{\text{old}}}} \)

- If factor market is competitive, \( MRP = MPL \times P \) (product price)

- \( MRP \) curve represents a firm’s demand for labor
  - Downward sloping due to diminishing returns to labor
# MRP Example

<table>
<thead>
<tr>
<th>Q_L</th>
<th>TP (output)</th>
<th>MPL</th>
<th>P</th>
<th>TR</th>
<th>MRP</th>
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</table>
• MRP affected by diminishing returns to labor
Marginal Resource Cost

- **Marginal resource cost** (MRC) = change in total cost resulting from a change in the quantity of labor

\[
MRC = \frac{\Delta TC}{\Delta Q_L} = \frac{(T_{C_{\text{new}}} - T_{C_{\text{old}}})}{(Q_{L_{\text{new}}} - Q_{L_{\text{old}}})}
\]

- If factor market is competitive, MRC = wage (w)
Profit-maximizing Quantity of Labor

• Similar to determining profit-maximizing quantity of output
  – MR = MC

• Maximizing rule: MRP = MRC

• If factor market is competitive, MRP = w
### Profit-maximizing Example

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</tbody>
</table>

- If wage = $60, profit-maximizing quantity of labor is 3 workers
- If wage = $40, profit-maximizing quantity of labor is 5 workers
Demand and Supply Model

[Graph showing supply (S) and demand (D) curves with price ranging from $0 to $80 and quantity ranging from 2 to 6.]
Demand and Supply Model

![Graph showing the demand and supply model. The supply curve (S) and the demand curve (D) intersect at a price point.]
### Effect of Imperfectly Competitive Product Markets

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- If wage = $60, profit-maximizing quantity of labor is 2 workers
- If wage = $40, profit-maximizing quantity of labor is 4 workers
Effect of Imperfectly Competitive Labor Markets

- Case of monopsony
  - **Monopsony** = single demander of labor
  - Classic example: one-company town
  - Other examples:
    - local fire department (one employer demands workers with certain skills)
    - Major league baseball (reserve clause limited player mobility)

- To hire more workers, business must offer higher wage
  - MRC curve is upward sloping
Profit Maximization in Monopsony

• Monopsony still maximizes profits when hiring at $\text{MRP} = \text{MRC}$

• For monopsony, $\text{MRC} > w$
  – $\text{MRP} = w$ does not apply for monopsony as in perfect competition
Monopsony Model

\[ Q_m \]

\[ Q_L \]

\[ w \]

\[ w_m \]

\[ Q_m^* \]

\[ Q_L \]

\[ MRP \]

\[ MRC \]

\[ S \]
Monopsony vs. Perfect Competition

Monopsonistic exploitation

$w_{pc}$

$w_{m}$

$Q_m$

$Q_{pc}$

$Q_L$
Problems with Productivity Theory in Factor Markets

• In real world, substantial differences exist between prices of factors that likely have similar MRP
  – Wage gaps by gender and race
• In real world, some resources are not fully employed and may receive prices higher than their MRP or market-clearing levels
## Median Weekly Earnings by Gender and Race, 2014

<table>
<thead>
<tr>
<th></th>
<th>White Men</th>
<th>Women (all races/ethnicities)</th>
<th>African American (men and women)</th>
<th>Hispanic (men and women)</th>
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<td>$948</td>
<td>$754</td>
<td>$682</td>
<td>$651</td>
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</table>

*For those aged 25 and over
Source: Bureau of Labor Statistics
Causes of Wage Differentials and High Wages

• Wage differences may result from compensating for “unattractive” jobs, differences in innate talents, and differences in human capital
  – Productivity theory can account for these issues

• Market power
  – Unionization can push wages above market-clearing levels and above wages in non-unionized sectors
Causes of Wage Differentials and High Wages

• Efficiency wages
  – In jobs where workers cannot be supervised easily, wages are above equilibrium to promote higher productivity of workers, which can create wage dispersion and unemployment

• Discrimination
  – Some workers may be discriminated against, which lowers their wages relative to other workers and their employment opportunities
Government Intervention: Minimum Wage

• Purpose: increase earnings of low-income workers

• Predicted simple outcome: increase in wage above equilibrium causes unemployment for some and higher wages for those still employed

• Negative effect depends in part on elasticity of demand for labor and structure of labor market
  – More inelastic, less unemployment
  – Perfectly competitive vs. monopsonistic
Minimum Wage in Perfect Competition

Covered Sector

Unemployment

Uncovered Sector
Minimum Wage in Monopsony

- $w$: Wage
- $Q$: Quantity
- $w^*$: Wage
- $w_{\text{min}}$: Minimum wage
- $Q^*_m$: Quantity supplied
- $Q_{\text{min}}$: Quantity demanded
- $Q_L$: Quantity of labor
- $MRC$: Marginal Revenue Cost
- $S$: Supply
- $MRP$: Marginal Revenue Product
Wrap Up

Questions?

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