

Microeconomics

**Chapter 11  
Markets for  
Factors of  
Production**

Acemoglu Laibson List

Modified by Joseph Tao-yi Wang

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**Chapter Outline**

- 11.1. The Competitive Labor Market
- 11.2. The Supply of Labor:  
Your Labor-Leisure Tradeoff
- 11.3. Wage Inequality
- 11.4. The Market for Other Factors of  
Production: Physical Capital and Land

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**Key Ideas**

1. The three main factors of production are **labor**, **physical capital**, and **land**.
2. Firms derive the **demand for labor** by determining the value of marginal product of labor (**VMPL**).

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**Key Ideas**

3. The **supply of labor** is determined by trading off the **marginal benefit (MB)** from labor given by earnings against the **marginal cost (MC)**, the value of foregone leisure.

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**Key Ideas**

4. **Wage inequality** can be attributed to differences in **human capital**, differences in **compensating wages**, and **discrimination** in the job market.
5. In addition to labor, a producer must derive the **demand for physical capital and land** to achieve its production objectives.

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**Evidence-Based Economics Example**

Is there **discrimination** in the labor market?



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## Markets for Factors of Production

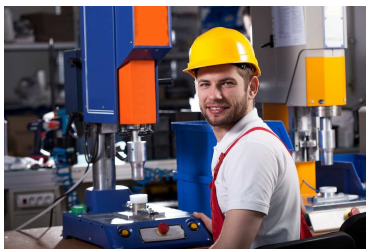
Why do tickets to professional sporting events cost so much money?



## The Competitive Labor Market The Demand for Labor



## The Competitive Labor Market The Demand for Labor



Why does a firm hire labor?

## The Competitive Labor Market The Demand for Labor

(1) Output per Day	(2) Number of Workers Employed	(3) Marginal Product	(4) VMPL = MPL × P = Column (3) × \$2
0	0		
100	1	100	\$ 200
207	2	107	\$ 214
321	3	114	\$ 228
444	4	123	\$ 246
558	5	114	\$ 228
664	6	106	\$ 212
762	7	98	\$ 196
854	8	92	\$ 184
939	9	85	\$ 170
1,019	10	80	\$ 160
1,092	11	73	\$ 146
1,161	12	69	\$ 138
1,225	13	64	\$ 128
1,284	14	59	\$ 118
1,339	15	55	\$ 110
1,390	16	51	\$ 102
1,438	17	48	\$ 96
.	.	.	.
.	.	.	.
1,934	38	10	\$ 20
1,834	39	-100	\$ -200

Exhibit 11.2  
Production Data for The Wisconsin Cheeseman

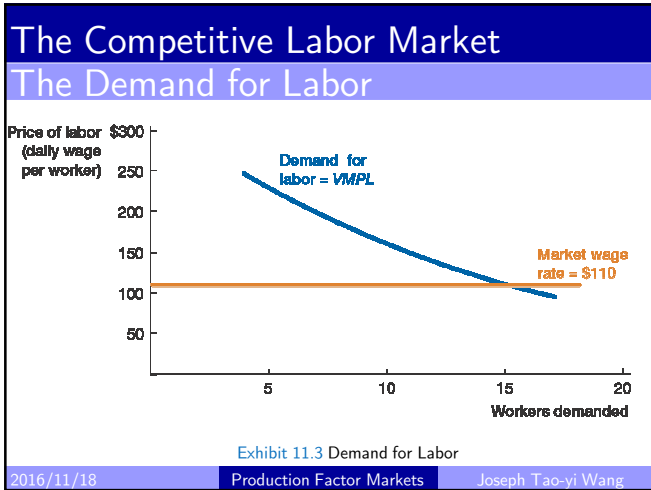
## The Competitive Labor Market The Demand for Labor

- ▶ Value of marginal product of labor (VMPL)
  - ▶ How much each worker contributes to revenue.
  - ▶ The contribution of an additional worker to a firm's revenues.
- ▶ Equal to MP × output price

## The Competitive Labor Market The Demand for Labor

(1) Output per Day	(2) Number of Workers Employed	(3) Marginal Product	(4) VMPL = MPL × P = Column (3) × \$2
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Exhibit 11.2  
Production Data for The Wisconsin Cheeseman



- ### The Competitive Labor Market
- #### The Demand for Labor
- ▶ Assumptions:
    1. Perfect competition in the **output** market
    2. Perfect competition in the **labor** market
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- ### The Competitive Labor Market
- #### The Demand for Labor
- ▶ Maximizing Profit:
    1. In choice of how much to produce  
 $MR = MC$
    2. In choice of how many workers to hire  
 $MP \times P = W$  or  $VMPL = W$
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- ### The Supply of Labor:
- #### Your Labor-Leisure Tradeoff
- ▶ How much work vs. how much leisure...  
 $Marginal\ benefit\ of\ leisure = Wage$
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## The Supply of Labor: Your Labor-Leisure Tradeoff

Wage Rate (per 8-hour day)	Alice	Tom
\$ 50	50	0
\$ 75	100	0
\$100	125	50
\$125	150	50
\$150	175	50
\$175	200	50
\$200	225	100
\$225	250	100
\$250	275	150
\$275	300	150
\$300	350	200
\$400	350	300

Exhibit 11.4 Total Days of Labor Supplied per Year for Alice and Tom

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## The Supply of Labor: Your Labor-Leisure Tradeoff

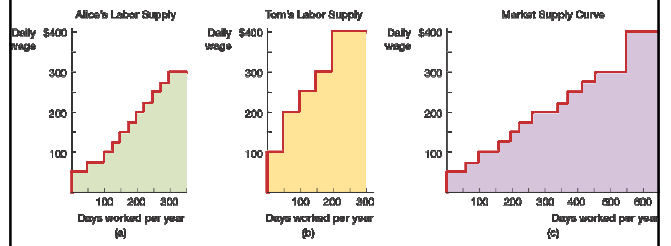


Exhibit 11.5 Individual Labor Supply Curves

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## Labor Market Equilibrium: Supply Meets Demand

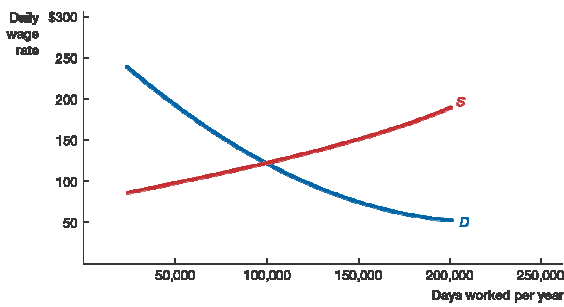


Exhibit 11.6 Labor Market Equilibrium

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## Labor Market Equilibrium: Labor Demand Shifters

Shifts of the labor demand curve:

1. Price of the good the firm produces
2. Technology used in production

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## Labor Market Equilibrium: Labor Demand Shifters

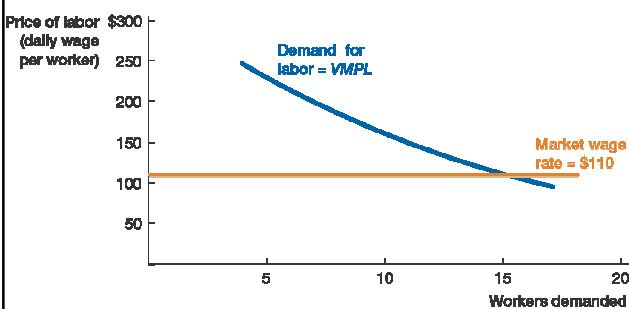


Exhibit 11.3 Demand for Labor

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## Labor Market Equilibrium: Labor Demand Shifters

1. Price of the good the firm produces
  - ▶ If the price of the output increases, each worker is worth more to the firm.

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## Labor Market Equilibrium: Labor Demand Shifters

- ▶ Example:
- ▶ If Tom's marginal product is 5 units of output, and

Price of output = \$10	Price of output = \$12
VMPL = \$50 (5 × \$10)	VMPL = \$60 (5 × \$12)

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## Labor Market Equilibrium: Labor Demand Shifters

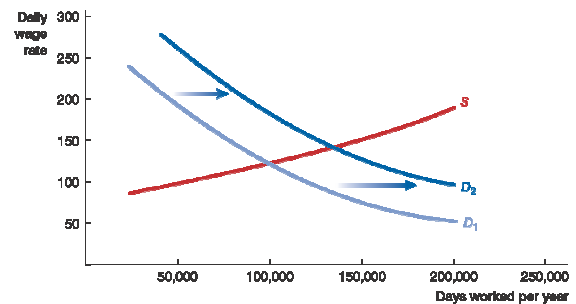


Exhibit 11.7 A Rightward Shift in the Labor Demand Curve

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## Markets for Factors of Production

Why do tickets to professional sporting events cost so much money?



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## Labor Market Equilibrium: Labor Demand Shifters

2. Technology used in production
  - ▶ The other component is worker productivity.
  - ▶ Technology could make workers more productive...

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## Labor Market Equilibrium: Labor Demand Shifters

- ▶ Example:
- ▶ If the price of the output is \$10, and

Tom's MP = 5 units	Tom's MP = 7 units
VMPL = \$50 (5 × \$10)	VMPL = \$70 (7 × \$10)

- ▶ If labor and technology are complements, the labor demand curve shifts to the right.

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## Labor Market Equilibrium: Labor Demand Shifters

- ▶ Labor and technology could also be substitutes,
  - ▶ as technology could replace workers,
  - ▶ so the labor demand curve shifts to the left.

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## Labor Market Equilibrium: Labor Supply Shifters

Shifts of the labor supply curve

1. **Population** changes
2. Changes in worker **preferences and tastes**
3. **Opportunity costs**

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## Labor Market Equilibrium: Labor Supply Shifters

1. **Population** changes

▶ The more people there are, the greater the supply of labor, so the labor supply curve shifts to the right.

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## Labor Market Equilibrium: Labor Supply Shifters

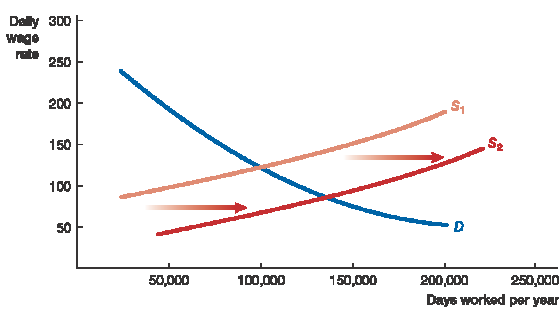


Exhibit 11.8 A Shift in the Labor Supply Curve

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## Labor Market Equilibrium: Labor Supply Shifters

2. Changes in worker **Preferences and Tastes**

Examples:

- ▶ Greater proportion of women in the labor force
- ▶ Greater proportion of older workers wanting to continue working rather than retire

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## Labor Market Equilibrium: Labor Supply Shifters

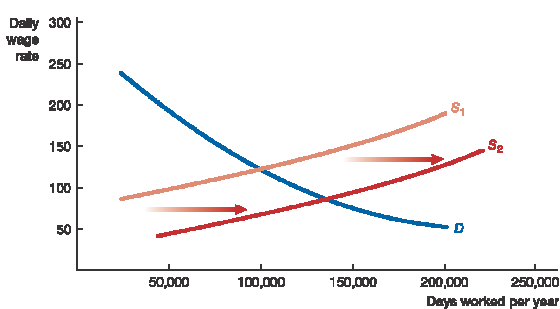


Exhibit 11.8 A Shift in the Labor Supply Curve

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## Labor Market Equilibrium: Labor Supply Shifters

3. **Opportunity Costs**

▶ If the alternatives to working change overall, or for a particular industry or firm, the labor supply curve will shift.

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## Labor Market Equilibrium: Labor Supply Shifters

### 3. Opportunity Costs

Example:

- ▶ The Affordable Care Act could cause some workers to leave the labor force
- ▶ because they can get insurance coverage outside of employment.

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## Wage Inequality

Not really one equilibrium wage

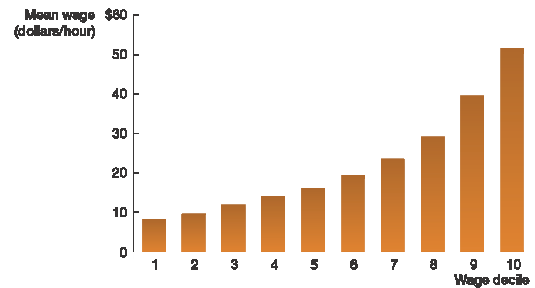


Exhibit 11.9 U.S. Hourly Wage Distribution (2012)

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## Wage Inequality

Why are wages different?

1. Differences in **human capital**
2. Differences in **compensating wages**
3. The nature and extent of **discrimination** in the job market
4. **Superstar Effect**

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## Wage Inequality

### Differences in Human Capital

1. Differences in **Human Capital**
  - ▶ **Human Capital**
    - ▶ Each person's **investment** in themselves, leading to the ability to be more productive
    - ▶ Examples: education, job training, health

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## Wage Inequality

### Differences in Human Capital

- ▶ **Job Training**
  - ▶ **Industry-specific** training increases productivity within an entire industry.
  - ▶ **Firm-specific** training increases productivity for just the hiring firm.

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## Wage Inequality

### Differences in Compensating Wage

2. Differences in **Compensating Wage Differentials**
  - ▶ **Compensating Wage Differentials**
    - ▶ **Wage premiums** necessary to attract workers into occupations that have **unattractive aspects**

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## Wage Inequality

### Differences in Compensating Wage

- ▶ Examples:
  1. Window washer
  2. Worker on Alaska pipeline
  3. Garbage collector

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## Wage Inequality

### Discrimination in the Job Market

3. **Discrimination** in the job market
  - ▶ **Taste-based discrimination**
    - ▶ Discrimination that arises due to people's prejudices against a group of people
  - ▶ **Statistical discrimination**
    - ▶ Discrimination that arises due to expectations about a group of people

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## Wage Inequality

### Discrimination in the Job Market

- ▶ Taste-based discrimination

- ▶ Can originate with
  1. employers,
  2. other employees, or
  3. customers

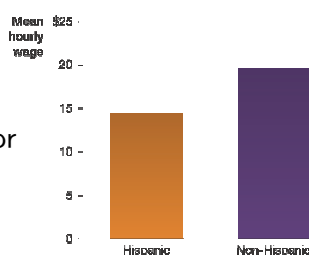


Exhibit 11.11 Mean Hourly Wage of Hispanic and Non-Hispanic Workers (2013)

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## Wage Inequality

### Discrimination in the Job Market

- ▶ **Statistical discrimination**
  - ▶ Employers cannot know a potential worker's productivity with certainty
  - ▶ Might use characteristics as a **proxy for productivity** (gender, race, etc.)

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## Wage Inequality

### Super Star Effect

- ▶ **Superstar Effect:**
  - ▶ In an industry where
    1. Everyone wants service from #1
    2. #1 has technology to serve everyone

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## Market for Other Factors of Production:

### Physical Capital and Land

- ▶ **Physical Capital**
  - ▶ Lasting input into the production process
- ▶ **Land**
  - ▶ Includes other natural resources

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## Market for Other Factors of Production: Physical Capital and Land

- ▶ Value of marginal product of capital (VMPK)
- ▶ How much each additional unit of capital contributes to the firm's revenues

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## Market for Other Factors of Production: Physical Capital and Land

(1) Output per Day	(2) Number of Machines	(3) Marginal Product	(4) VMPK = MPK × P = Column (3) × \$2
0	0		
50	1	50	\$100
104	2	54	\$108
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396	7	50	\$100
442	8	46	\$ 92
484	9	42	\$ 84
524	10	40	\$ 80
561	11	37	\$ 74
596	12	35	\$ 70
628	13	32	\$ 64
658	14	30	\$ 60
685	15	27	\$ 54
710	16	25	\$ 50
734	17	24	\$ 48

Exhibit 11.13  
Production Schedule for The Wisconsin Cheeseman

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## Market for Other Factors of Production: Physical Capital and Land

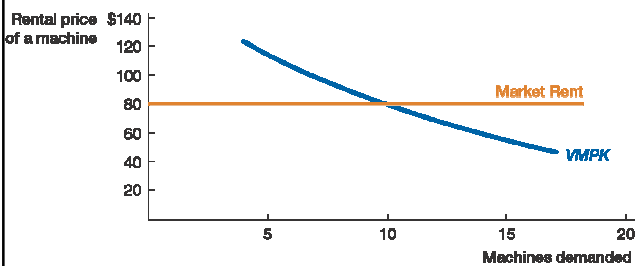


Exhibit 11.14 Demand for Physical Capital

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## Evidence-Based Economics Example

Is there **discrimination** in the labor market?



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## Homework

- ▶ ALL Chap.11, Problem 2, 4, 6, 9, 11, 12
- ▶ Challenge Questions (from Past Finals)
  - ▶ 2007 - Essay Q2, Q4
  - ▶ 2008 - Essay A (Multi-Choice Q9-Q13)
  - ▶ 2009 - Multi-Choice Q10, Q11
  - ▶ 2010 - Essay A (True/False Q4, Q6, Q10)
  - ▶ 2012 - Essay II-B, II-C

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