

Chapter 17 Lecture - The Markets for Labor and Other Factors of Production



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“Bring Your Child To Work Day was a success, so I'd like to try another special theme: Leave Your Bad Attitude At Home Day.”

The Demand for Labor

Labor is one of the **factors of production**: labor, capital, natural resources, and other inputs used to produce goods and services.

- Labor markets are important to understand; labor income is the most important source of income for most of us, and labor is the most important input for most firms.

In labor markets, firms are buyers, and workers are sellers.

- Does this make much of a difference?
- Do workers behave just like other sellers?
- Can we explain why different workers are paid different amounts?

In this chapter, we will explore these questions and more.

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Apple's Demand for Workers

Suppose Apple wants to hire some workers to make iPhones.

- It does this not because it has a *preference* for hiring workers, but because it *seeks to maximize profit* by hiring the right number of workers.
- Apple's demand for workers is a **derived demand**: like the demand for other factors of production, it depends on the demand for the good the factor produces.

Apple's demand for workers depends on:

1. How many additional iPhones Apple can produce if it hires an extra worker
2. The additional revenue Apple receives from selling the additional iPhones

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Figure 17.1 The Marginal Revenue Product of Labor and the Demand for Labor (1 of 2)

Number of Workers	Output of iPhones per Week	Marginal Product of Labor (iPhones per week)	Product Price	Marginal Revenue Product of Labor (dollars per week)	Wage (dollars per week)	Additional Profit from Hiring One More Worker (dollars per week)
L	Q	MP	P	$MRP = P \times MP$	W	$MRP - W$
0	0	—	\$200	—	\$600	—
1	6	6	200	\$1,200	600	\$600
2	11	5	200	1,000	600	400
3	15	4	200	800	600	200
4	18	3	200	600	600	0
5	20	2	200	400	600	-200
6	21	1	200	200	600	-400

Assume that Apple is a price-taker in the market for labor, (plausible) and in the market for smart phones (less so).

Then as Apple increases the number of workers:

1. Apple sells more iPhones.
2. Apple receives more revenue (\$200 per phone).
3. Apple's wage bill goes up.
4. Profit goes up or down, depending on whether 2. or 3. is greater.

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Figure 17.1 The Marginal Revenue Product of Labor and the Demand for Labor (2 of 2)

Number of Workers	Output of iPhones per Week	Marginal Product of Labor (iPhones per week)	Product Price	Marginal Revenue Product of Labor (dollars per week)	Wage (dollars per week)	Additional Profit from Hiring One More Worker (dollars per week)
L	Q	MP	P	$MRP = P \times MP$	W	$MRP - W$
0	0	—	\$200	—	\$600	—
1	6	6	200	\$1,200	600	\$600
2	11	5	200	1,000	600	400
3	15	4	200	800	600	200
4	18	3	200	600	600	0
5	20	2	200	400	600	-200
6	21	1	200	200	600	-400

Marginal product of labor: The additional output a firm produces as a result of hiring one more worker.

Ultimately, the firm cares about the money it will receive, so it calculates the change in its revenue from hiring an additional worker: the **marginal revenue product of labor (MRP)**.

Apple is selling each additional iPhone for the same price, so

$$MRP = P \times MP$$

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Table 17.1 The Relationship between Marginal Revenue Product of Labor and the Wage

When ...	the firm ...
$MRP > W$,	should hire more workers to increase profits.
$MRP < W$,	should hire fewer workers to increase profits.
$MRP = W$,	is hiring the optimal number of workers and is maximizing profits.

The previous slide suggested hiring 4 workers would maximize profits. We can see this by:

- Looking at the additional profit from hiring one more worker, or
- Using the $MC=MR$ rule for maximizing profit; for labor, this becomes $W=MRP$.

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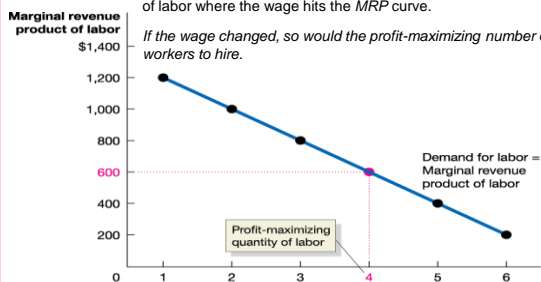
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Figure 17.1 The Marginal Revenue Product of Labor and the Demand for Labor

We can graph the MRP : it is the firm's demand curve for labor.

The profit-maximizing number of workers comes at the quantity of labor where the wage hits the MRP curve.

If the wage changed, so would the profit-maximizing number of workers to hire.



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The Market Demand Curve for Labor

At each wage, we can determine the number of workers firms want to hire; summing across firms gives the market quantity of labor demanded at that wage.

- Doing this for each wage in turn will reveal the market labor demand curve.

In forming this curve, we must keep all other variables (price of output, abilities of workers, etc.) constant; changes in these would cause the entire labor demand curve to move.

- We will examine these changes over the next two slides, thinking about each effect *in isolation*.

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Factors That Shift the Market Demand Curve for Labor (1 of 2)

1. Increases in human capital

Human capital is the accumulated training and skills that workers acquire from formal training and education or from life experiences.

Better workers produce more, increasing their MRP and increasing demand for workers.

2. Changes in technology

Improvements in technology allow workers to be more productive, shifting the labor demand curve to the right.

3. Changes in the price of the product

A higher price increases MRP, shifting labor demand to the right; a lower price decreases MRP, shifting labor demand to the left.

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Factors That Shift the Market Demand Curve for Labor (2 of 2)

4. Changes in the quantity of other inputs

Workers can typically produce more if they have more machinery and other inputs available to them.

Increases in the quantity of these inputs tend to increase the productivity of workers, increasing the demand for labor.

5. Changes in the number of firms in the market

Increasing the number of firms increases the demand for labor; decreasing the number of firms decreases the demand for labor.

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The Supply of Labor

We explain how people choose the quantity of labor to supply.

Labor supply refers to the decisions of individuals about how much to work.

- Individuals have a limited amount of time.
- Labor economists assume they divide that time between labor (working) and leisure (not working).

How would an increase in hourly wage affect how much you wanted to work?

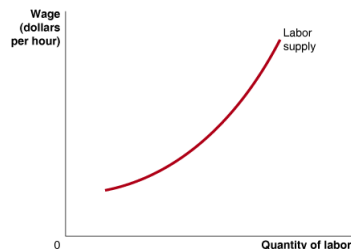
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Figure 17.2 The Labor Supply Curve

As the wage rate increases, leisure becomes expensive relative to consumption, so individuals consume less leisure—that is, they work more.

This is related to the *substitution effect* from chapter 3.



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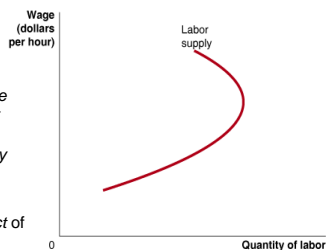
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Figure 17.3 A Backward-Bending Labor Supply Curve

If the wage gets very high, increases in the wage may cause an individual to work *less* instead of more.

Example: If a musician can make \$5,000 per concert, she may perform 50 concerts per year. But if she can make \$50,000 per concert, she may choose to perform fewer concerts—say, 20.

In this case, the *income effect* of the wage rate change is stronger than the *substitution effect*.



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The Market Supply Curve of Labor

While individual labor supply curves might bend backward, we will assume that market labor supply curves do not.

Why? We are usually examining single labor markets, like the market for fast food workers.

- As the wage paid to fast food workers rises, more people want to work in fast food, compared with the alternatives (not working, or working in a comparable industry).

Factors That Shift the Market Supply Curve of Labor

- Changes in population** - Increases or decreases in the number of available workers (due to changes in birth/death rates, or immigration/emigration).
- Changing demographics** - Aging populations change the number of people available for work. Similarly, the role of women in the labor force has changed significantly over the last century: 21 percent of women were in the labor force in the U.S. in 1900; today, the figure is 60 percent.
- Changing alternatives** - People have alternatives to working. A change in how attractive they are changes the supply of labor, such as changing wage rates in alternative jobs, or availability of unemployment benefits.

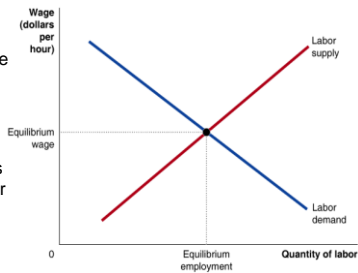
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Figure 17.4 Equilibrium in the Labor Market

As in other markets, equilibrium in the labor market occurs where the demand curve for labor and the supply curve of labor intersect.

Keep in mind that this is usually a particular labor market, like the market for economics tutors or the market for fast food workers.



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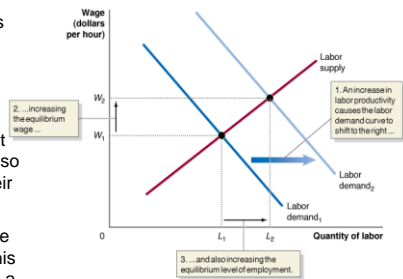
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Figure 17.5 The Effect of an Increase in Labor Demand

Suppose workers become more productive.

Firms find that hiring workers is more profitable at any given wage, so they increase their labor demand.

The result is more employment in this labor market and a higher wage.



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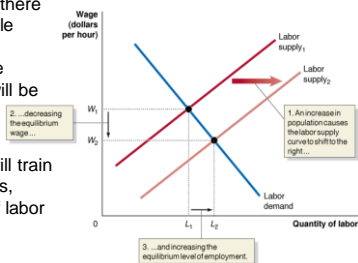
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Figure 17.6 The Effect of an Increase in the Labor Supply

Suppose that currently, there are not very many people qualified to be software engineers relative to the demand; so the wage will be very high.

With the wage being so high, many people will train to be software engineers, increasing the supply of labor in this market.

Over time, the wage of software engineers will decrease, and employment will increase.



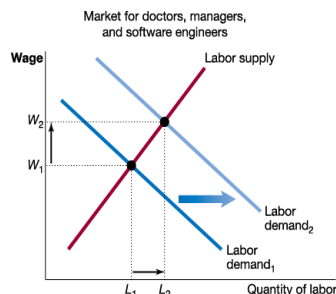
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Making the Connection: Should You Fear the Effect of Robots on the Labor Market? (1 of 3)

Capital and labor have a complicated relationship.

New technologies can be *complements* for labor, improving worker productivity and hence labor demand and wages.



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Making the Connection: Should You Fear the Effect of Robots on the Labor Market? (2 of 3)

But new technologies can also be substitutes for workers, resulting in a decrease in the demand for those workers and hence a decrease in wage.



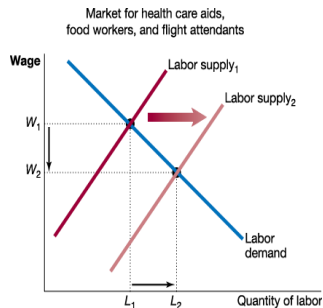
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Making the Connection: Should You Fear the Effect of Robots on the Labor Market? (3 of 3)

Low-skill jobs are often minimally affected by technological progress; we still need cleaners and line cooks, etc.

But as people are displaced from middle-skill jobs, they enter other industries, increasing labor supply and hence decreasing the wage.



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Explaining Differences in Wages

We can use demand and supply analysis to explain how compensating differentials, discrimination

We know there are large differences in wages. Can you think of some?

Demand and supply analysis can help to explain these differences.

But there may be other, more subtle, reasons why different workers receive different wages.

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Compensating Differentials

If a job is unpleasant or dangerous, employers will generally have to pay workers more. This is a **compensating differential**: a higher wage that compensates workers for unpleasant aspects of a job.

Example: Dynamite factory vs. semiconductor factory

Assuming that workers are rational and aware of the risks, compensating differentials fully compensate them for the additional risks they take on.

So occupational health and safety regulations would not make workers better off; in fact, they might be worse off, since forcing firms to decrease risks to workers will also result in them offering a lower wage.

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Table 17.2 Why Do White Males Earn More Than Other Groups? (1 of 2)

Groups	Weekly Earnings
White males	\$969
White females	776
Black males	731
Hispanic males	656
Black females	654
Hispanic females	580

Note: The values are median weekly earnings for full-time wage and salary workers, aged 25 and older. Persons of Hispanic origin can be of any race.
Source: U.S. Bureau of Labor Statistics, "Usual Weekly Earnings of Wage and Salary Workers, First Quarter 2015," April 21, 2015.

It is well known that men earn more than women, on average.

- Also, whites earn more than blacks, who in turn earn more than Hispanics.
- Are these wage differentials due to *economic discrimination*?

Economic discrimination: Paying a person a lower wage or excluding a person from an occupation on the basis of an irrelevant characteristic like race or gender.

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Table 17.2 Why Do White Males Earn More Than Other Groups? (2 of 2)

Groups	Weekly Earnings
White males	\$969
White females	776
Black males	731
Hispanic males	656
Black females	654
Hispanic females	580

Note: The values are median weekly earnings for full-time wage and salary workers, aged 25 and older. Persons of Hispanic origin can be of any race.
Source: U.S. Bureau of Labor Statistics, "Usual Weekly Earnings of Wage and Salary Workers, First Quarter 2015," April 21, 2015.

Such discrimination would be illegal, violating the Equal Pay Act (1963) and/or the Civil Rights Act (1964).

- Labor economists estimate that most, *but not all*, of these differentials can be explained by labor market characteristics.
- We will examine some of these characteristics next.

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What Explains the Wage Differentials?

1. Differences in experience

Women spend more time out of the labor force than do men, due to parenting. Such "career interruptions" mean that women often have less job experience than men of the same age.

2. Differing preferences for jobs

Women and men tend to select different jobs for themselves. This may be due to discrimination, but it may also be due to preferences, such as choosing jobs with more flexible hours, or jobs in which career interruptions are less likely to be punished.

3. Differences in education

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Why Do We Still Have Discrimination?

Discrimination originating from employers ought to eventually be eliminated by market forces. What might prevent this?

1. Worker discrimination

If white workers, for example, refuse to work with black workers, then black workers can never "get a foot in the door".

2. Customer discrimination

Some customers might have discriminatory preferences; catering to those preferences *increases* rather than decreases profit.

3. Negative feedback loops

If, say, a female lawyer would have a hard time finding a job due to discrimination, then few women would study law; but this would reinforce the men-only nature of the profession.

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Table 17.4 Union Workers Earn More Than Nonunion Workers

	Average Weekly Earnings
Union workers	\$970
Nonunion workers	763

Note: "Union workers" includes union members as well as workers who are represented by unions but who are not members of them.

Source: U.S. Bureau of Labor Statistics, "Union Members Summary," January 23, 2015.

Labor unions are organizations of employees that have a legal right to bargain with employers about wages and working conditions.

Considering average wages, union workers earn more than non-union workers. But unionized jobs may be different from non-unionized jobs.

To control for this, labor economists look at industries in which there are unionized and nonunionized labor.

- Such studies generally find that unions increase workers' wages by about 10 percent.

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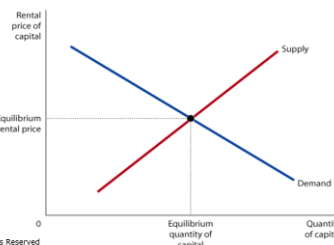
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The Markets for Capital and Natural Resources

Just like we can measure the marginal revenue product of labor, we can measure the *marginal revenue product of capital* and the *marginal revenue product of natural resources*.

Firms can use these to guide how much they ought to purchase of each of these factors of production.

- Diminishing returns will lead to the demand curve for capital being downward-sloping.
- We expect the equilibrium rental price of capital to be equal to its marginal revenue product, at least in the long run.



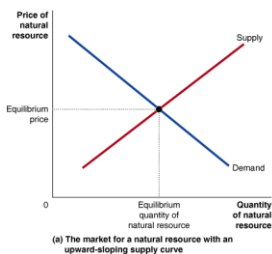
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Figure 17.12 Equilibrium in the Market for Natural Resources (1 of 2)

Again, diminishing returns will lead to a downward-sloping demand curve. But is the supply curve upward sloping?

Take oil, for example. In principle, there is a fixed supply of oil. However the "supply of oil" describes how much oil is available over some fixed time period, and this amount can adjust in response to the price.



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Figure 17.12 Equilibrium in the Market for Natural Resources (2 of 2)

Not all natural resources work this way.

- For example, there is a (mostly) fixed supply of land, especially considering only the short run.

The equilibrium price received for a factor of production that is in fixed supply is known as the **economic rent (or pure rent)** of the factor.



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Monopsony

Previously we examined the case of monopoly: a market with a single seller of a good or service. A market with a single *buyer* of a factor of production is known as a **monopsony**. We usually think of monopsony in remote labor markets.

Examples: A nineteenth-century West Virginia mining town
A small Hawaiian island with a pineapple plantation

Just like monopolists will use their market power to increase the price, monopsonists will use their market power to *decrease* the price: employing fewer workers at a lower wage.

- Labor unions might be able to offset this monopsony power; for example, in professional sports player markets, player unions negotiate with firms for a particular percentage of revenues to be distributed to players.

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Marginal Productivity Theory of the Income Distribution

How will the income within society be divided?

- According to the theories in this chapter, factors of production command their marginal revenue product as a price.
- Therefore each person will receive income according to the marginal revenue products of the factors of production that individual owns.

This idea is known as the **marginal productivity theory of income distribution**, and it implies that the key to receiving more income is to control access to more, and more valuable, factors of production—including your own labor, of course.

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