3. Suppose that labor is the only input used by a perfectly competitive firm. The firm’s production function is as follows:

<table>
<thead>
<tr>
<th>Days of labor</th>
<th>Units of output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
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<td>5</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td>7</td>
<td>29</td>
</tr>
</tbody>
</table>

a. Calculate the marginal product for each additional worker.

b. Each unit of output sells for $10. Calculate the value of the marginal product of each worker.

Compute the demand schedule showing the number of workers hired for all wages from zero to $100 a day.

d. Graph the firm’s demand curve.

e. What happens to this demand curve if the price of output rises from $10 to $12 per unit?

6. Suppose a freeze destroys part of the Florida orange crop.

a. Explain what happens to the price of oranges and the marginal product of orange pickers as a result of the freeze. Can you say what happens to the demand for orange pickers? Why or why not?

b. Suppose the price of oranges doubles and the marginal product falls by 30 percent. What happens to the equilibrium wage of orange pickers?

Suppose the price of oranges rises by 30 percent and the marginal product falls by 50 percent. What happens to the equilibrium wage of orange pickers?

This chapter discusses why different workers earn different wages.

There are several types of reasons:

1. Compensating Differentials
Workers differ from each other in many ways. Jobs also differ in their characteristics.

Compensating differentials are increases in wages that employers pay in order to get workers to take unpleasant or dangerous jobs. They arise from nonmonetary characteristics of the jobs.

If the education and required qualities of the worker are controlled for, the wages in unpleasant jobs tend to be higher than those in unpleasant jobs.

Examples: Coal workers are paid more than other workers with similar education levels. These higher wages compensate the dangerous, dirty nature of the work and the likelihood of miners having health problems due to mining.

Workers who take the night shift in factories have higher wages than similar workers who work the day shift. This is because most people do not want to sleep during the day and work at night.

Professors are paid less than lawyers and doctors who have similar amounts of education. It is assumed that the positive attributes of their job (flexible schedule, ability to think about abstract problems) compensate them for the lower wages.

2. Human capital

Human capital is the investment that has been made in a person. In this sense, it is similar to physical capital, though not tangible. But the difference is that human capital is tied to a specific person, can’t be easily transferred from one to another.

Education or acquired skills constitute human capital.

Workers with more human capital earn more on average than those with less human capital. In the United States college graduates earn on average twice as much as those with just a high school education. This difference tends to be even larger in less developed countries (where highly educated workers are scarce).

Firms are willing to pay more for highly educated workers than for less educated workers because highly educated workers have a higher marginal product of labor. Workers are willing to become educated only if they get a higher wage because of it.
The increasing value of skills

In recent times in the United States and other countries, the rich have gotten richer and the poor have gotten poorer. The earnings gap between highly skilled workers and less skilled workers has increased over the last 20 years.

In 1980 a man with a college degree earned on average 44 percent more than a man without one. In 2003 this difference was 82 percent.

For a woman the difference between a college degree and no college degree rose from 35 percent to 71 percent.

Possible explanations for the rise in earnings gap:

a. International trade. The amount of trade between the US and other countries increased over the same period that the gap between earnings of skilled and unskilled widened. Imports as a percentage of US production have risen from 5 percent in 1970 to 16 percent in 2003; exports have risen from 5 percent in 1970 to 10 percent in 2003.

The US has tended to export goods produced with skilled labor (because US has a comparative advantage in those goods) and imports goods produced with unskilled labor. Because many other countries have large numbers of unskilled workers.

When international trade opens up or is increased, demand for domestic skilled labor increases and demand for domestic unskilled labor decreases.

b. Changes in technology. The technology that had been introduced in the last 20 years, for instance computers, has tended to replace unskilled workers and work with skilled workers.

Thus the demand for skilled workers increased as their marginal product of labor increased, and the demand for unskilled workers decreased as their marginal product of labor decreased.

Example: Companies use computer databases instead of filing cabinets. Need computer programmers to manage the databases, but no longer filing clerks.

It has been difficult for economists to empirically test the validity of these
3. Ability, Effort, Chance

Major league baseball players are paid more than minor league players. This is not due to major league players having more experience or education or a more unpleasant job, but only because their ability is better.

Some people have attributes that make them better suited for a particular job than others. These attributes, and the job they fit, are a determinant of the wages a person earns.

The effort a person puts into their job may determine their wages as well. Many firms reward their workers based on their level of output, which is linked to the effort level. Those who put in more effort would tend to earn more.

Also, people who put in more effort would be more likely to be recommended by previous employers or teachers and to get a desirable job in the first place.

Chance – for instance the chance that the skill one has learned does not become obsolete after one has invested in it – is another determinant of wages.

Ability, effort and chance difficult to measure, so hard to determine exact effect of these on wages. But when wages regressed on years of schooling, experience, age, job characteristics, those variables account for less than half the variation in wages ($R^2$). This shows that there is some variation that must be accounted for by these other factors.

The economic benefits of beauty

How much more money do good-looking people make? Labor economists Hamermesh and Biddle conducted a study to answer this. Interviewers asked to rate each respondent’s physical appearance. Hamermesh and Biddle then ran a regression of wages on education, experience, other standard determinants, and physical appearance.

They found that people thought to be more attractive than average earn 5 percent more than people of average looks, who earn 5 to 10 percent more than people considered of less than average looks. Similar results for men and women.

Interpretations: Good looks useful in jobs where workers present themselves to the public – acting, selling, waiting on tables. Firms willing to pay more to attractive workers due to customers’ willingness to pay more for the attractive
waiter/actor/salesclerk.

Reported beauty may be indirect measure of other types of ability – person who takes care of their appearance may be talented at other things as well.

Beauty premium a type of discrimination.

Signaling

We have discussed the human-capital theory of education: More education augments worker’s human capital. Workers with more human capital are paid more because they are more productive.

Another view of education: A signaling device to firms that a worker is of high ability. It is easier for high-ability people to get education than for low-ability people. Thus if a person has more education, it is likelier that they are of high ability. This theory gives a rationale for getting education even if education does not raise productivity levels.

The two views of education have different implication for policies aimed at raising education level of population. If human-capital theory is true, raising all workers’ education levels will increase their productivity and thus their wage. But if the signaling theory is true, raising all workers’ education levels may not affect wages.

If all workers’ education levels are raised to the same level, the wage of the low-ability types will increase, but the wage of the high-ability types will decrease.

The true effect of education is probably some combination of human capital augmentation and signaling.

Superstar Phenomenon

Why do some jobs, like acting or tennis-playing, have workers who earn millions of dollars while other jobs, like plumbing, do not?

The jobs in which superstars arise have two characteristics:

– Every customer in the market wants to consume the good supplied by the best producer.
It is possible for the best producer to supply every customer at a low cost.

Plumbers can provide their services only to a small amount of people. Actors can provide theirs to a much larger set of people. Even before TV and DVDs, there were superstar actors – many people could go to the theater and many more could hear about them.

With TV and DVDs, it is even easier for the abilities of superstar actors or superstar tennis players to be broadcast to a large number of people at low cost.

Also, people want to see the movie or the tennis game with the best actor or player.

Above-Equilibrium Wages: Minimum-wage laws, unions and efficiency wages

It is not always the case that wages are set at the equilibrium level, where labor supply equals labor demand. For some workers, wages are above that level.

Reasons: a. Minimum-wage laws. Most workers not affected by them because their equilibrium wages above the minimum wage. Affect least skilled and very young workers.

b. Unions are organizations of workers that bargain with employers over wages and working conditions. They may raise wages above equilibrium level. Studies show unionized workers earn 10 to 20 percent more than similar nonunion workers.

c. Efficiency wages. Paying higher than equilibrium wages may increase workers’ productivity. The idea is: when all firms pay equilibrium wages, there is no unemployment, so workers who are caught shirking (not working on the job) and fired can easily find another job at equilibrium wage.

When a firm pays something higher than equilibrium wages, there is a cost to being caught shirking. Either the other firms’ wage is lower, or the other firms offer efficiency wages as well, in which case the worker may face a period of unemployment before finding another job.

Above equilibrium wages, for whatever reason, cause a surplus of labor, or unemployment.

Economics of discrimination

Discrimination is another reason for differences in wages.
Discrimination: Marketplace has different possibilities for different individuals, even though the individuals differ only by race, sex, or other personal characteristics.

To analyze how much discrimination affects earnings of different groups of workers, must control for all other factors that affect earnings.

Median African-American man in United States earns 22 percent less (2003 data) than median man of European origin.

Median African-American woman earns 13 percent less than median European-American woman.

Median European-American woman paid 24 percent less than the median European-American man. Median African-American woman earns 16 percent less than median African-American man.

But these numbers alone do not prove that employers discriminate against African-Americans and women. Do not control for other factors which determine wages.

Human capital – European-American men 75 percent more likely to have college degree than African-American men. European-American men and women equally likely to have a college degree, but men 11 percent more likely to have graduate or professional degree after college.

Also, African-Americans are more likely than European-Americans to live in areas where schools are poorly maintained, not funded, etc.

Schools have tended to direct girls away from math and science topics, which could lead them to make higher earnings.

By measuring both quality and quantity of education, differences among groups become larger.

Another explanation of differences in wages is differences in job experience. Women tend to have less job experience than men: Women’s labor force participation has increased over past decades. So there are fewer senior women as a percentage of women in the labor force than there are senior men as a percentage of the labor force. Experience accounts for a difference in wages.

Also, women may interrupt career to raise children and return to labor force
when children are older. This again makes their average experience lower than men’s.

Compensating differentials – women less likely to take physical and difficult jobs like truck driver.

Most economists think that some of the wage differences among African-Americans and European-Americans, between men and women, are due to discrimination. But this is difficult to prove because of the other factors linked to group.

Differences in human capital can be due to discrimination. For instance, lower quality education given to African Americans and women in schools due to discrimination.

To try to measure true amount of discrimination, Marianne Bertrand and Sendhil Mullainathan sent in 5000 fake resumes to 1300 help-wanted ads. Half the resumes had African-American sounding names and half had European-American sounding names. Job applicants with European-American names received 50 percent more calls back.

Discrimination by employers. Are employers responsible for discriminatory wage differences?

Economists believe that competitive market economies work against discrimination.

Suppose workers differentiated only by hair color. Blondes and brunettes have the same skills, experience and work ethic. But because of discrimination against blondes, firms prefer to hire brunettes.

Blondes’ wage is lower than brunettes’ wage. But from a firm’s point of view, since blondes have an equal marginal product and lower equilibrium wage, it is profitable then to hire blondes. The demand for blonde workers rises and the demand for brunette workers falls until the wage differential disappears. Firms who insist on hiring brunette workers will go out of business.

Discrimination by customers and governments

There are limits to the profit motive’s ability to correct discriminatory wage differentials.

Consider a restaurant that discriminates against blondes when hiring wait-
ers. If customers care only about quality, price of meals and service, the wage differential would disappear.

Now suppose customer prefer to be served by brunette waiters. Then the wage differential will persist. Customers willing to pay higher price to be served by brunette waiters.

Two kinds of restaurants would develop: Restaurants that hire blondes, have lower costs and charge lower prices, and restaurants that don’t hire blondes, have higher costs and charge higher prices.

Another way for discriminatory wage practices to persist: government mandates discriminatory practices. Segregated streetcars mandated by government, during apartheid in South Africa, Africans prohibited from working in some jobs.

7. When Alan Greenspan ran an economic consulting firm in the 1960s, he primarily hired female economists. He once told the New York Times, ”I always valued men and women equally, and I found that because others did not, good women economists were cheaper than men.” Is Greenspan’s behavior profit-maximizing? Is it admirable or despicable? If more employers were like Greenspan, what would happen to the wage differential between men and women? Why might other economic consulting firms at the time not have followed Greenspan’s business strategy?