Causes of shifts in labor demand curve

The labor demand curve shows the value of the marginal product of labor as a function of quantity of labor hired. Using this fact, it can be seen that the following changes shift the labor demand curve:

The output price. When output price rises, the labor demand curve shifts to the right – more labor is demanded at each wage. When output price falls, less labor is demanded at each wage.

Technological change causes the $MPL$ function to change, generally to increase at each level of $L$. This shifts the labor demand curve to the right.

For instance between 1960 and 2000 the average hourly output produced by US workers rose by 140 percent.

However, it is also possible for technological change to shift labor demand to the left. If for instance a cheap industrial robot is installed in the production process for some industrial good, the marginal product of labor could decrease because the robot can replace labor. Such a technological change is called labor-saving.

Most technological change seems to be labor-augmenting – it raises the marginal product of labor. This can explain the fact that employment has risen historically along with wages. Inflation-adjusted wage increased by 131 percent from 1960-2000, and firms also increased amount of labor employed by 80 percent.

Supply of other factors

The quantity available of other factors of production can affect the marginal product of labor. For example, if the supply of ladders falls, the marginal product of apple pickers will decrease.

Labor Supply

People face a tradeoff between work and leisure. Assume that leisure is enjoyable but work is not.

Leisure has a cost. This is the cost of the work given up to enjoy the leisure. So the cost of 1 hour of leisure is the person’s hourly wage.

The labor supply curve shows how amount of labor supplied responds to
wage. That is, it shows how people’s decisions over leisure and labor change as the opportunity cost of leisure changes.

If the labor supply curve is upward-sloping over some range of wages, it means that a higher opportunity cost of leisure induces people to take less leisure and work more. (This is due to the substitution effect, labor is substituted for leisure when leisure becomes more expensive).

But the labor supply curve need not be upward-sloping. Over some range of wages, it could slope downwards, meaning that a person might supply less labor when wages are higher (This is due to the income effect, a richer person can afford more leisure and may tend to prefer leisure more over labor than a poorer person).

Causes of shifts in the labor supply curve

Changes in tastes (attitudes towards work): The number of women employed in paid jobs or looking for work rose from 34 percent in 1950 to 60 percent in 2000. Some of this change can be explained by changing attitudes towards women working. It was considered less acceptable for women to work outside the home in 1950 than in 2000.

Changes in alternative opportunities: The supply of labor in one market depends on the wage available in other markets. If the wage in alternative markets rises, workers will switch to the alternative markets, and supply of labor in the first market will shift to the left.

Immigration, population growth: As the population grows or shrinks, the labor supply will tend to shift to the right or to the left.

Equilibrium in the labor market

In a competitive labor market, the wage has two properties:

1. It adjusts to make supply and demand for labor equal.

2. It equals the value of the marginal product of labor.

Thus, the value of the marginal product of labor must adjust to make supply and demand for labor equal.

Any event that changes the supply and demand for labor must change the
equilibrium wage and the value of the marginal product by the same amount (because these have to be always equal).

Shifts in labor supply

Suppose immigration increases the number of workers willing to pick apples. The supply of labor shifts to the right.

At the initial wage $W_1$ the quantity of labor supplied exceeds the quantity of labor demanded. The wage falls from $W_1$ to $W_2$.

As the wage falls, it becomes profitable for firms to hire more workers. As the firm hires more workers, the marginal product of a worker decreases, so value of marginal product decreases.

In the new equilibrium wage equals value of marginal product of labor and both are lower than before.

Example from Israel: How a shift in labor supply changes the equilibrium wages.

In the 1980s many Palestinians commuted from their homes in West Bank or Gaza strip to work in Israel (often in construction, agriculture).

In 1988, due to Intifada, Israel imposed curfews, checked work permits more thoroughly, ban of Palestinians staying overnight in Israel enforced.

Number of Palestinians with jobs in Israel decreased by half. Palestinians who kept jobs in Israel had 50 percent wage increases. With fewer Palestinian workers in Israel, each worker’s value of marginal product was higher.

Shifts in labor demand

Suppose apples become more popular → demand shifts to the right → price of apples rises.

The marginal product of labor ($MPL$) has not changed. But value of marginal product of labor ($P \times MPL$) has increased.
The higher price of apples makes it profitable to hire more apple pickers. Demand for labor shifts to the right. Equilibrium wage rises and equilibrium employment rises, as in the graph:

Prosperity of firms in an industry often connected to prosperity of workers in the industry (though it is not the only determinant of prosperity of workers in the industry).

When price of apples rises, apple producers make more profit and the employment and wage of apple pickers rises. When the price of apples falls, apple producers make less profit and the employment and wage of apple pickers falls.

Workers in industries with volatile prices experience this volatility in wage. The wages of workers in oil fields, for example, rise and fall with the world oil price.

Productivity and wages

Standard of living depends on productivity of workers. This is true in market for workers: Wage equals value of marginal product of labor, thus is propor-
tional to marginal product of labor.

The more productive a worker is, the more they will be paid (keeping price of the good they produce constant).

This is why workers today generally make higher inflation-adjusted wages than workers in the past did. In the United States, from 1959 to 2003, productivity (measured by output per hour) grew by an average of 2.1 percent per year. Real wages grew at an average of 2 percent per year. Thus, productivity and real wages double approximately every 35 years.

<table>
<thead>
<tr>
<th>Time period</th>
<th>Prod. growth rate</th>
<th>Wages growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959-2003</td>
<td>2.1%</td>
<td>2.0%</td>
</tr>
<tr>
<td>1959-1973</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>1973-1995</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>1995-2003</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Productivity growth rate changes over time. Between 1973 and 1995 the rate of productivity growth was lower than from 1959 to 1973. Not well known why.

But wage growth as, predicted by theory, followed productivity growth.

Wage growth slowed from 2.8 to 1.2 percent per year in that period, as productivity growth was reduced from 2.9 to 3.0 percent per year.

When productivity growth began to increase again in 1995, it was accompanied by an increase in wage growth.

Monopsony

Up until now we have assumed labor market was competitive. This is not always the case in reality. In rare cases it can be that the labor market is dominated by a single firm.

When there is one buyer in a market, the market is called a monopsony. For example in a small town there may be one single employer (a mine, auto manufacturer, etc.)

Similarities to a monopoly: A monopsonist hires fewer workers and pays them a lower wage than the efficient amount. Thus is raises its profits above what they would be if the firm were hiring competitively.

Other factors of production: Land and capital
Three categories of factors of production: Land, labor and capital.

Firms must decide on how much of other inputs to hire at the same time as hiring workers. Apple orchard has to determine size of the orchard and number of ladders for workers.

Definition of capital may be tricky. Capital means the stock of equipment and structures used in production: Goods produced in the past that are being used to produce a new good.

For apple firm, capital is ladders, trucks for transporting apples, buildings used to store apples, trees.

Human capital

Equilibrium in the markets for land and capital

Distinguish between the purchase price and the rental price for land or capital.

Purchase price is price someone pays to own a factor as long as they choose. Rental price is price paid to use a factor for a limited period of time.

The theory of labor demand is similar to the theory of other factor rental demands: Wage is the rental rate of labor.

Rental price of land and rental price of capital are determined by supply and demand, similarly to the rental price of labor. For land, the firm rents until the value of marginal product of land equals the rental rate of land. For capital, the firm rents capital until the value of marginal product of capital equals the rental rate of capital. This determines the demand curves for land and for capital.

The intersections of the demand curves for the factors with the supply curves for the factors determine the amount of each factor hired.

Equilibrium purchase price of land and capital depends on the stream of rental income produced by the factor. Thus, the purchase price depends on both current value of the marginal product and expected future values of the marginal product.

Relationships between the factors of production
All factors have diminishing marginal product in the region where firms choose to hire. Because of this, when a factor is in abundant supply, it has low marginal product, therefore a low rental price. When a factor is in scarce supply, it has high marginal product and therefore a high rental price. When the supply of a factor decreases, its equilibrium factor price rises.

The change in supply of one factor also affects the markets for the other factors, since factors tend to be used together, like work, ladders, and apple trees.

Suppose a hurricane destroys many ladders used by workers to pick apples. Then the supply of ladders falls, so the equilibrium rental price of ladders increases, and the equilibrium amount of ladders used decreases. Also, the marginal product of labor will fall because workers are paired with fewer ladders – maybe they have to share ladders with others.

The decrease in supply of ladders causes the value of marginal product of labor to fall, thus causing the demand for apple pickers to decrease and the wage of apple pickers to fall.

The bubonic plague

The bubonic plague killed 1/3 of the population of 14th century Europe in a few years. One result of this reduction in population was to increase the marginal product of labor. Another result was to decrease the marginal product of land, since land could produce less when paired with lower amounts of labor.

Historical evidence shows that wages approximately doubled after the plague, and rent for land decreased by 50 percent or more. The peasant classes became more prosperous and the landed classes became less prosperous.

The theory that has been developed in this chapter can begin to answer the question: Why are some workers paid more than others?

For instance a gas station attendant earns less than a computer programmer in part because people are willing to pay more for computer software than to have their gas pumped. Thus the value of the marginal product of labor of a computer programmer is higher than that of a gas station attendant. Chapter 19 discusses in more detail the differences in wages among different jobs.