5| LABOR MARKETS

Purpose: To show the determinants of wages in a simple market for labor. To show the effects of imposing an effective minimum wage in a labor market. To show how equilibrium wages change in response to changes in output prices, and labor productivity.

Computer file: **labor98.xls**

Instructions and background information:

The previous exercise showed how equilibrium price was determined in the market for a good. Economists claim that the markets for labor can also be described using a model of supply and demand. In particular, the equilibrium wage rate, which is the price of labor services, is determined in a labor market.

But there are important differences between the markets for goods, such as spaghetti, and the markets for inputs, such as labor. One is that the roles of consumers and firms in input markets are reversed from what we saw in goods markets. This is because consumers are at the same time both the suppliers of labor and the demanders of goods, while firms have the dual role of suppliers of goods and demanders of labor.

Open the Excel file **labor98.xls**. What you see are some data on the market for unskilled labor in Flint, Michigan, including the wage rate for that labor, the price of bread (the food of the working classes), the price firms must pay for capital inputs, an index of labor productivity, quantity supplied, quantity demanded, and excess demand at the currently selected wage. Quantities of labor are measured as the number of workers employed, assuming each worker labors for 8 hours a day. The wage rate is the hourly wage. To find the daily wage just multiply the wage rate by 8.

Firms produce automobiles that sell for $18,000 each. On the labor supply side, the workers have the chance to be employed either in the automobile industry at the going wage, or join the army and receive, on average, the wage of a corporal.

You should experiment by trying some different values for the selected wage, and each of the demand and supply variables. The factors listed under DEMAND DATA and SUPPLY DATA cause the respective curve to shift. Be sure you understand the reasoning behind the shifts. For example, an increase in the index of labor productivity (perhaps because workers get extra training) results in an increase in labor demand. Be sure you can explain why labor demand changes at all in this case, and why the change in demand for labor is an increase and not a decrease. Why does it cause the demand curve to shift, compared to moving along the curve?

In questions 7-10 you're asked to explore the effects on labor markets of increases in the prices of goods that consumers buy. To understand these questions you need to know the difference between the money wage and the real wage workers are paid. The money wage is simply the number of dollars per hour that workers get paid. The real wage is the wage in terms of goods -- the amount of goods workers earn per hour. For example, the *real wage* of unskilled workers *in terms of bread* is the number of loaves of bread the worker earns per hour. You compute the real wage by dividing the money wage by the price of goods. In this example the real wage is the money wage divided by the price of bread.

Here are some things to watch for and learn as you do the problems:

1)   Labor markets can achieve equilibrium through changes in the money wage.

2)   An effective minimum wage will cause some unemployment, but may also raise the incomes of employed workers as a group. The effect on incomes depends on the elasticity of demand for labor.

3)   An increase in the price of the output sold by the firm will ultimately increase the money and real wages of workers.

4)   Higher wages in other occupations such as the army have effects on the wages of unskilled labor.

Here are some hints:

1)   The spreadsheet is not sensitive to the units of measurement, such a dollars, when you enter answers. You can always omit dollar signs ($), for example, and still get the right answer. But the spreadsheet is sensitive to sign (+ or -), so be careful on that account.

2)   If you use trial and error, rather than Goal Seek, to get an answer, remember that you usually have to be accurate to within about one-tenth of one percent of the exact answer. Sometimes, however, being accurate within five percent (plus or minus) will be ok.

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MATH MAVEN'S CORNER: The demand function for labor is given by $D(L) = (A)w^a T^b p_c^c$, where w is the money wage for unskilled labor, p_c is the price of capital, and T is the technology index for labor. The supply function for labor is given by $S(L) = (M)(w-t)^n p_{bread}^f w_c^f$, where w is the wage rate, p_{bread} is the price of bread, w_c is the corporal's wage, and t is a tax per hour of labor. The values of all of the parameters are randomly assigned.

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Questions

Set all variables to their baseline values.
1)   What is the equilibrium hourly wage for unskilled labor in this market?
2)   What is the equilibrium level of employment?

Set all variables to their baseline values, and set the wage to its equilibrium level. The price of output (automobiles) rises to $23,000.

3)   What's the new equilibrium wage?
4)   What's the new level of equilibrium employment level?

Set all variables at their baseline values, including the price of automobiles. You are a consultant to the auto industry in Flint, Michigan, and have been asked by your bosses to advise them on the effects of a recent Pentagon proposal. The proposal is to change the military pay scale so the average wage for a corporal in the army will rise to $12 per hour.
5)   What's the new equilibrium wage in the unskilled labor market?

For the proposal in the last question to raise corporals' wages to $12 per hour,
6)   What's the new level of employment in the market for unskilled labor?

Set all variables to their baseline values. The price of bread rises to $4.00 per loaf.
7)   What's the new equilibrium wage rate?
8)   What's the new equilibrium level of employment?

Set all variables to their baseline values.
9)   What's the real wage (in terms of bread) of unskilled labor in the baseline equilibrium?

When the price of bread rises to $4 per loaf, and the market for unskilled labor adjusts to its new equilibrium,
10)   What's the new real wage of unskilled labor?

11)   With all variables at their baseline values, and the labor market in equilibrium, what's the TOTAL HOURLY INCOME FROM WAGES of unskilled workers as a group?

Set all variables to their baseline values. Your task is to pick a value for an effective minimum wage. [Choose a wage less than $20, so it shows on the graph.]
12)   What wage rate do you choose?

13)   For the minimum wage you chose in the last question, did the incomes of unskilled workers increase or decrease compared to the market equilibrium wage

Set all variables to their baseline values, and set the wage to its equilibrium level. The
government imposes a tax of $2 per hour worked.
14)   What's the new hourly take-home wage of workers?