

38 | COMPETITIVE LABOR MARKETS

Purposes: To explain the workings of competitive labor markets in the face of changes in technology and government policy.

Computer file: **labcomp298.xls**.

Discussion:

You are a consultant to the Red Apple Orchard, a firm that is a perfect competitor in the market for apples and in the market for labor, its only variable input. This means that Red Apple must take as given both the price of apples and the wage rate of labor.

Here is what you need to know in order help out the owners of Red Apple Orchard. The wage rate is determined by supply and demand in the market for labor. The market demand for labor includes the demands on the part of apple firms as well as firms in other industries who use the same kind of relatively unskilled labor. Because a *firm's* demand curve for labor depends on technology and the price of output, the market demand curve will be dependent on these factors also. In the model here, the market supply of labor depends on the money wage, with higher wages leading to more workers offering their services. The supply of labor also depends on taxes that may be placed on the employment of workers. The tax that we consider here is a percentage tax on wages, not unlike the so-called FICA or Social Security taxes workers pay in the real world.

Firms want to maximize profits, and as competitors take the market determined money wage as given. They hire workers up to the point where the value of the marginal product of labor is equal to the money wage.

You are in luck because the owners of Red Apple have all of the information you need about market supply and demand conditions, as well as their own labor productivity data.

Hints and tips:

1) Finding the equilibrium money wage means finding the wage where the excess demand for workers is zero. Use Goal Seek to make the excess demand for labor equal to zero by changing the money wage.

2) Once the market equilibrium wage is known, you should then find the firm's demand for labor. Use Goal Seek to make the difference between the VMP and money wage equal to zero by changing the level of labor.

3) Note carefully the effects of the policy experiments you are asked to conduct. Though very straight forward, they provide important insights into how real world labor markets respond to change. An increase in the output price increases the demand for labor, ultimately raising wages and employment. An increase in a wage tax affects the supply of workers. Employment falls. While the market wage, which is the before-tax compensation of workers, rises due to the tax, the take home pay of workers certainly falls.

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Questions

Set all variables to their baseline values.

- 1) What is the market equilibrium money wage?
- 2) What is the equilibrium level of employment in the market?
- 3) Continuing on from the last question, when the labor market is in equilibrium what is the firm's demand for labor?

[THE POINT: The answers to questions 1 to 3 are the baseline equilibrium amounts for comparison to the effects of some policy changes.]

- 4) Start from the equilibrium you found in questions 1 to 3. A university research group invents a new way to harvest apples that raises the technology index to 1.30 in all apple firms. Does the change affect demand or supply? [Enter "demand" or "supply".]
- 5) Continuing on from the last question, what is the new equilibrium wage?
- 6) Continuing on from the last question, what is the new equilibrium level of market employment?
- 7) Continuing on from the last question, what is the firm's employment level?

[THE POINT: Improvements in technology raise wages and increase employment.]

- 8) Set all variables to their baseline values, and go back to the equilibrium wage and employment levels for questions 1 to 3.

People find out that eating apples is good for their health. The resulting increase in demand for apples raises apple prices to \$12 per bushel. Does the increase in the price of apples change the demand or the supply of labor? [Enter "demand" or "supply".]

- 9) Continuing on from the last question, what is the new equilibrium wage?
- 10) Continuing on from the last question, what is the new level of market employment?
- 11) Continuing on from the last question, what is the new level of employment in the typical apple firm?

[THE POINT: An increase in the output price increases the demand for labor and so will raise wages and increase the level of employment in both the firm and in the labor market.]

12) Set all variables to their baseline values, and return to the equilibrium values of questions 1 to 3.

The federal government, in its wisdom, decides to impose a tax of 20 percent on wages. Does the tax affect the demand or supply of labor? [Enter "demand" or "supply".]

[NOTICE: Because the tax is a percentage tax, the market supply curve of labor shifts up more at higher wages than at lower wages.]

13) Continuing on from the last question, what is the new market wage after the tax?

14) Continuing on from the last question, what is the new after-tax wage rate? (The after-tax wage is sometimes called the "take home" pay.)

15) Continuing on from the last question, what is the market level employment after the tax?

[THE POINT: A percentage tax on wages will raise market wages, lower employment, and lower the take-home pay of workers.]

16) Continuing on from the last question, what is the government's total tax revenue from the typical firm as a result of the 20 percent wage tax?

[HINT: The tax per worker is .20 times W^* , where W^* is the market equilibrium wage after the tax is imposed. The total tax is the tax per worker times the level of employment in the firm.]