CHAPTER 15
Factor Markets and Vertical Integration

CHAPTER OUTLINE

15.1 Competitive Factor Market
   - Short-Run Factor Demand of a firm
   - Long-Run Factor Demand
   - Factor-Market Demand
   - Competitive Factor-Market Equilibrium
15.2 Effect of Monopolies on Factor Markets
   - Market Structure and Factor Demands
   - A Model of Market Power in Input and Output Markets
15.3 Monopsony
   - Monopsony Profit Maximization
   - Welfare Effects of Monopsony
   - Monopsony Price Discrimination
15.4 Vertical Integration
   - Stages of Production
   - Degree of Vertical Integration
   - Produce or Buy

TEACHING TIPS

Chapter 15 can be covered any time after Chapter 11. Section 15.1 on competitive factor markets can be covered any time after Chapter 8. You might consider this option if your primary goal is to give maximum exposure to the competitive model. If you are focusing more on policy-related matters, or have more of an IO focus, the section on vertical integration will be valuable material to include.

Students typically don’t have much trouble with competitive factor markets. It makes intuitive sense that as long as a worker adds more value in output than their wage, they should be hired. The only point that may require clarification is the difference between the marginal worker and the infra-marginal workers. Students may need to be reminded of diminishing returns that cause $MP_L$ to fall, and that only the last worker’s marginal revenue product is equal to the wage.

Factor markets in monopolized industries and monopsony follow fairly easily from the competitive model, and can be covered in a single class session. The most straightforward presentation is to simply compare factor demands when the output market is competitive versus when the output market is a monopoly.

The section on vertical integration is likely to be of great interest to the class, and presents an opportunity to create active discussion. Over the last twenty-five years, U.S. corporations have changed course on integration and mergers in general. Many industries have decided to follow the example of the mini-mills in the steel industry, by getting away from attempts to substantially vertically integrate, instead moving toward specialized production and outsourcing. It is likely that at least one person in the class (or a parent) will have been laid off due to outsourcing. A good counter example is the entertainment industry, as the Disney example in the text points out.

The text contains a discussion of the basic factors that drive the make or buy decision. This is a great opportunity to re-introduce transaction costs, and to discuss their importance in the decisionmaking process. As an exercise, you might ask the class for a list of firms or industries in which vertical integration would increase profits, and others for which integration is likely to increase costs. Once you have the list, try to get the class to identify common features of the industries or firms on each list. Although not
discussed at length in the text, you may want to introduce the difference between forward integration and backward integration as part of this exercise. Alternatively, you can provide the class with a list of industries such as those given below, and ask them to consider the merits of integrating forward toward retail and backward to materials production from the production stage. In any case, be sure that students understand that vertical integration is a substitute for use of the market, and that forgoing the opportunity to exert the pressure of the market on a supplier may be more costly than it is worth.

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<thead>
<tr>
<th>Tires</th>
<th>Liquor</th>
<th>Sausage</th>
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<tr>
<td>Computers</td>
<td>Tuna Fish</td>
<td>Shirts</td>
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<tr>
<td>Bread</td>
<td>Motorcycles</td>
<td>Processed Chicken</td>
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**ADDITIONAL APPLICATIONS**

**A Temporary Fix for Restrictive Labor Law in Europe**

For decades, European firms have struggled with very strict labor laws and union agreements that made laying off unneeded workers nearly impossible. The inability to trim the labor force when necessary made many firms reluctant to add new workers. Recent changes in labor laws, combined with an increased willingness to accept flexible arrangements by local unions, have made for big changes in the labor markets in France, Sweden, and Spain. As part of the change in hiring policies, firms are making much greater use of temporary employees, who can be laid off without severance, than ever before. This gives the firms the flexibility to add new workers when needed, without having to make long-term commitments. In Sweden, several large industrial employers, including Ericsson, Saab, and ABB, have a pool of “shared” workers, a solution that pleases the firms as well as many of the workers. Niclas Arkstal, a technician who has assembled air conditioners and telephones for separate companies, likes the new system: “It’s so flexible . . . I don’t worry about boredom anymore.”

The countries where there have been changes in work rules have experienced better job growth than countries that have been slow to embrace flexibility. Since 1994, job growth is up 6.2% in Spain, 6.9% in the Netherlands, and 4% in Britain. In contrast, Germany experienced a 3.3% decrease in employment between 1994 and 1997. With the large increases in temporary employment, temp agencies are among the fastest growing firms in Europe. Italy was the last to legalize temporary employment agencies. Manpower Inc., a U.S.-based firm with offices throughout the recently deregulated countries in Europe, plans to open 35 offices there this year.

In many cases, the use of temps has restored firms to profitability. Moulinex, a French household appliances maker, after five straight years of losses, reduced its 11,300 employee work force by 2,700 and reduced work hours from 39 to 33 per week for the remaining workers. They also employ as many as 1,000 temps at any given time to keep up with production. As a result, the company earned a profit of $5.5 million in 1997 and expects to be profitable again in 1998. Chairman Pierre Blayou noted, “In France, we are afraid of hiring full time workers. Once you feel that you have readjusted the company, you are cautious. You think, ‘If I lose an order, I have to start the whole process over again.’ We don’t want to do this every six months.”

1. Are there certain types of employees that a firm would not want to lay off and try to rehire frequently? What factors would cause a firm to keep such a worker for extended periods of slack demand?
2. If temporary employees are in competition with full time union employees, what do you predict will happen to wage rates in the full time sector?

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DISCUSSION QUESTIONS

1. Sports stars are paid many times more than school teachers. Is that desirable from a social standpoint?
2. Comparable worth proponents call for wages to be set by the social value of the job rather than the value of the work to the employer. How would such an approach affect our economy? What are the social advantages and disadvantages of this approach?
3. U.S. law allows labor unions to organize entire industries. How would a union’s market power change if it had to organize each firm individually?
4. How many monopsonies can you identify? In which markets do they operate?
5. Suppose there is only one firm in a town that hires workers. Under what conditions is the firm a monopsonist?
6. Are successful or unsuccessful firms more likely to vertically integrate, or is it impossible to predict based on this information alone?
7. Why might a firm vertically integrate for tax reasons?
8. Is it reasonable that antitrust agencies are more concerned about horizontal mergers (competing firms combining) than vertical mergers?
9. Under what conditions is it more likely that a producer of an intermediate good will integrate forward into the final product market?

ADDITIONAL QUESTIONS AND MATH PROBLEMS

1. In a competitive market, firms sell output at a price of $20. Marginal productivity per hour of the workers is described by the equation $MP_L = 40 - L$. What is the firm’s demand curve for labor? If the firm can hire labor from a competitive labor market at a wage of $5 per hour, how many workers should the firm hire?
2. If a firm produces using fixed proportions production, what is the effect on labor demand of an increase in the rental price of capital? How does your answer differ if the inputs are perfect substitutes instead?
3. If the demand for labor is perfectly inelastic and the supply is perfectly elastic, what is the incidence of a tax of $1 per hour on wage? Show the solution using a graph.
4. Demand for labor in a given market is $L_D = 100 - 2w$ and supply is $L_S = 2w$. Compare the competitive and monopsony equilibrium levels of employment and wage.
5. Suppose a firm produces according to the production function $Q = 2L^{0.6}K^{0.2}$, and faces wage rate $10, a rental cost of capital $5, and sells output at a price of $20. Compute the profit-maximizing factor demands. (Hint: see Appendix 15A.)
6. Show using a graph that if a monopolist in an input market faces a monopsonist in the same input market, that the equilibrium level of input use is indeterminate.
7. Major League Baseball has occasionally been troubled by extended strikes that have eroded fan interest in the game. Can you interpret the difficulties the players and owners have had in negotiating collective bargaining agreements in the context of the models in this chapter? Explain.
8. Under what circumstances might a paper manufacturer want to purchase its own forestlands? What are the possible negatives of such a decision?
9. Which type of merger do you think the government would oppose and why: a monopolist buying a supplier in a competitive market, or a competitive firm buying a monopoly supplier?
1. Calculate the marginal revenue product of labor, and set it equal to the wage to determine labor demand.

\[ d_L = MRP_L = p \times MP = 20(40 - L) = 800 - 20L \]

\[ 800 - 20L = 5 \]

\[ L^* = 39.75 \]

2. When the firm produces using fixed proportions technology, it is unable to substitute away from the more expensive input. Thus, demand for both inputs falls. When the inputs are perfect substitutes, the firm will only purchase the less expensive input. If the inputs were priced equally before the price increase, the firm will increase demand for labor, and demand for capital will fall to zero.

3. If the demand is perfectly inelastic and supply is perfectly elastic, employers will pay the entire tax and the burden on workers will be zero. As shown in the graph, employment will remain unchanged, workers will receive \( w \), and employers will pay \( w + \tau \).

Figure 15.1

4. For the competitive market solution, set \( L_S = L_D \).

\[ 100 - 2w = 2w \]

\[ w^* = 25 \]

\[ L^* = 50 \]

For the monopsony solution, calculate \( ME_L \) and set it equal to demand for the employment level; then plug \( L^* \) into the supply curve to get the equilibrium wage. (See footnote 14 for the derivation of the marginal expenditure curve).

\[ ME_L = L \]

\[ L = 50 - .5L \]

\[ L^* = 33.3 \]

\[ w^* = 16.67 \]
5. To find the profit-maximizing labor demands, set up the profit function as shown in Appendix 15A. Differentiate with respect to \( L \) and \( K \), and solve.

\[
\max_{L,K} \pi = 20(2L^6K^{-2}) - 10L - 5K
\]

\[
\frac{\partial \pi}{\partial L} = 24L^6K^{-2} - 10 = 0
\]

\[
\frac{\partial \pi}{\partial K} = 8L^6K^{-2} - 5 = 0
\]

Solving simultaneously gives the following input demands

\[
L^* = 0.064 \cdot 0.04(40)^5 = 53.08
\]

\[
K^* = 0.063 \cdot 0.04^2(40)^5 = 35.39
\]

6. See Figure 15.2. When a monopolist faces a monopsonist, each attempts to exert their market power over the other. The monopolist uses the maximization rule \( MC = MR \), which would result in an output level of \( Q^* \) and price \( p^* \). The monopsonist attempts to set \( ME = D \), which results in an output level of \( Q^{**} \) and price \( p^{**} \). The resolution would have to be negotiated, and would lie somewhere between these values.

![Figure 15.2](image)

7. This situation is very similar to that of the previous question. The resolution of contract agreements between baseball team owners and the players’ association is difficult because each is attempting to exert market power over the other. At the aggregate level, baseball owners represent a monopsony (and have an antitrust exemption to protect this status). The players’ union, which covers all players, represents a monopoly. Thus, the final solution must be negotiated. At a more microeconomic level, the players’ association bargains for free agency, which pits owners against each other and makes each player a monopolist over his own services. For top players such as Mark McGuire and Ken Griffey, Jr., this creates enormous market power.
8. The paper manufacturer might want to purchase its own forestland to reduce the transaction costs of negotiating with suppliers, or to ensure a steady supply of quality lumber. Although less likely, the manufacturer may also want to eliminate market power of growers, or try to create additional market power through control of this key resource. Possible negatives are the inability to take advantage of price decreases at the raw material stage, and if no contingent supply is planned, the loss of supply in the event of a natural disaster such as a forest fire.

9. The government is much more likely to oppose the purchase of a monopoly supplier by a competitive firm because it could create a supply disruption to other firms in the same industry. By refusing to sell the input, or by selling it at increased prices to other competitors, the integrated firm can transfer the market power in the input industry forward to the output industry. If the input is essential to production, they can capture all profits from other competitors that must buy the input. The government would not be likely to oppose the monopolist’s purchase of an upstream supplier in a competitive market, especially if that market supplied other industries in addition to the downstream monopoly.