

The Supply and Demand for Productive Resources

Full Length Text — Part: 5 Chapter: 24
Micro Only Text — Part: 3 Chapter: 12

To Accompany “Economics: Private and Public Choice 11th ed.”
James Gwartney, Richard Stroup, Russell Sobel, & David Macpherson
Slides authored and animated by:
James Gwartney, David Macpherson, & Charles Skipton

[Next page](#) ➔


Copyright ©2006 Thomson Business and Economics. All rights reserved.



An Overview of Resource Markets

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.



Introduction

- Productive assets are bought and sold in **resource markets**.
- These markets help determine what is produced, how it is produced, and the distribution of income.

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Market for Resources

- Thus far we have focused on **product markets**, where households demand goods and are services supplied by firms (*upper loop*).
- We now turn to the **resource markets**, where firms demand factors of production which are supplied by households in exchange for income (*bottom loop*).
- In **resource markets**, firms are buyers and households are sellers – just the reverse of the case for the product markets.

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Human and Non-Human Resources

- There two classes of productive resources:
 - **Non-human resources:**
 - Physical capital
 - Land
 - Natural resources
 - **Human resources:**
 - Composed of the skills, knowledge, and experience of workers.

◀ [Jump to first page](#) ▶


Copyright ©2006 Thomson Business and Economics. All rights reserved.

Human and Non-Human Resources

- **Investment in human capital** refers to activities that increase the human capital and productivity of individuals.
 - *Examples:* education, training, experience.
- Human resources differ from non-human resources in a few key ways:
 - Human capital is embodied in the individual.
 - Human resources can't be bought or sold.
 - Only their labor services can be sold.

◀ [Jump to first page](#) ▶


Copyright ©2006 Thomson Business and Economics. All rights reserved.



The Demand for Resources

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.




The Demand for Resources

- The ***demand for resources*** is derived from the demand for the products that the resources help produce.
- ***Example:***
A service station hires mechanics because of their customers' demand for repair services.

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.



The Demand for Resources

- The quantity demanded of a resource is negatively related to its price for two reasons:
 - ***Substitution in production:***
 - If one resource input becomes more expensive, producers will shift to lower-cost substitute inputs.
 - The better the substitute inputs, the more elastic the demand for the resource.
 - ***Substitution in consumption:***
 - A higher resource price will raise the product price and consumers will substitute toward other goods.
 - The more elastic the product's demand, the more elastic is the demand for the resource.

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Demand for Resources

- As a resource price increases, producers that use the resource intensively will:
 - use substitute resources, and/or
 - face higher costs
- Both of these will lead to higher prices and a reduction in output.
- At the lower rate of output, firms use less of the resource that increased in price.
- Both of these factors contribute to the inverse relationship between the price and quantity demanded of a resource.

Resource price

Quantity

P_2 P_1

Q_2 Q_1

D

Jump to first page

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Time and the Demand for Resources

- With time, the demand for a resource becomes more elastic ($D_{sr} \rightarrow D_{lr}$):
 - in the long run, firms will be better able to switch to substitute inputs.
 - in the long run the demand for a product is more elastic, hence, the demand for the resources to produce the product will also be more elastic.
 - Thus, in the long-run the demand for a resource is almost always more elastic than in the short-run.

Resource price

Quantity

P_2 P_1

Q_3 Q_2 Q_1

D_{lr} D_{sr}

Jump to first page


Copyright ©2006 Thomson Business and Economics. All rights reserved.

Factors Shifting Resource Demand

- A change in **product demand** will cause the demand for the resources used to produce the product to change in the same direction.
- A change in the **productivity of a resource** will alter resource demand.
 - If productivity of a resource rises, the demand for the resource will rise.
- A change in the **price of related inputs** will alter the demand for a resource.
 - The following will **increase** resource demand:
 - an increase in a substitute input price
 - a decrease in a complimentary input price
 - The following will **decrease** resource demand:
 - a decrease in a substitute input price
 - an increase in a complimentary input price


Jump to first page

Copyright ©2006 Thomson Business and Economics. All rights reserved.



Marginal Productivity and the Firm's Hiring Decision

[← Jump to first page](#)
Copyright ©2006 Thomson Business and Economics. All rights reserved.



Hiring Decision

- Profit-maximizing firms will hire additional units of a resource up to the point where the **marginal revenue product** of the resource equals its price.
- Marginal revenue product (MRP):**
Change in total revenue from the employment of an additional unit of a resource.

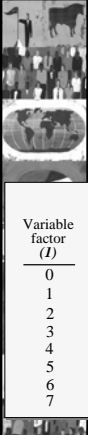
$$MRP = \text{Marginal product} \times \text{Marginal revenue}$$

Remember –

$$\text{Marginal product} = \frac{\text{change in output}}{\text{change in variable input}}$$

$$\text{Marginal revenue} = \frac{\text{change in revenue}}{\text{change in output}}$$

[← Jump to first page](#)
Copyright ©2006 Thomson Business and Economics. All rights reserved.



Short-Run Demand Schedule of a Firm

- In this example, a computerized marketing firm uses both technology and data-entry operators to provide services. For each unit provided to the client, the firm receives \$200 (4).
- The **marginal product (3)** shows how output *changes* as new data-entry operators are hired (*given a fixed capital level*).
- The **marginal revenue product (6)** shows how hiring an additional data-entry operator affects the firm's total revenue.

Variable factor (1)	Output (per week) (2)	Marginal Product	Price (per unit) (4)	Total Revenue	MRP
		= change in (2) / change in (1) (3)		= (2) x (4) (5)	= (3) x (4) (6)
0	0.0	-----	\$200	\$ 0	----
1	5.0	5.0	\$200	\$1,000	1000
2	9.0	4.0	\$200	\$1,800	800
3	12.0	3.0	\$200	\$2,400	600
4	14.0	2.0	\$200	\$2,800	400
5	15.5	1.5	\$200	\$3,100	300
6	16.5	1.0	\$200	\$3,300	200
7	17.0	0.5	\$200	\$3,400	100

[← Jump to first page](#)
Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Demand for Resources

- As a profit-maximizing firm will use an additional unit of input if and only if that unit of input adds more to revenues than to costs, the **MRP** curve is the firm's short run demand curve for the resource.
- In the short-run, it will slope downward because the marginal product of the resource falls as more of it is used with a fixed amount of other resources.
- The location of the **MRP** curve will depend on these factors:
 - the product's price,
 - the productivity of the resource,
 - the quantity of other factors working with the resource.

Variable factor	MRP
0	---
1	1000
2	800
3	600
4	400
5	300
6	200
7	100

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Multiple Inputs

- With multiple inputs, firms will expand their usage of each until the marginal product divided by price is equal across inputs.

$$\frac{MP \text{ of skilled labor}}{\text{Price of skilled labor}} = \frac{MP \text{ of unskilled labor}}{\text{Price of unskilled labor}} = \frac{MP \text{ of machine}}{\text{Price (rental value) of machine}}$$

- Wage differentials reflect skill differentials.
 - If a high-skill worker is twice as productive as a low-skill worker, the high-skill worker will have twice the wage rate.
- When real world decision makers minimize per unit costs, the outcome will be as if they followed these mathematical procedures.

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Questions for Thought:

- Why is the employment of a resource inversely related to its price?
- Is high productivity the primary source of high wages? Why or why not?
- “Firms will hire a resource only if they can make money by doing so.”
-- Is this statement *true*, *false*, or *uncertain*?
- President George W. Bush's 2002 steel policy (which placed a tariff of approximately 25% on steel imports)
 - raised the price of American-made cars.
 - decreased the number of workers in the U.S. auto industry.

Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Supply of Resources

◀ [Jump to first page](#) ▶ Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Supply of Resources

- The amount of a resource supplied is positively related to its price.
- The short-run supply elasticity of a resource is determined by how easily the resource can be transferred from one use to another, or **resource mobility**.
 - If resources are highly mobile then the supply curve will be elastic, even in the short run.
- The supply of a resource will be more elastic in the long run than the short run.
- In the long run, investment can increase the supply of both physical and human resources.

◀ [Jump to first page](#) ▶ Copyright ©2006 Thomson Business and Economics. All rights reserved.

The Supply of a Resource

• As the price of a resource increases, individuals have a greater incentive to supply it.
• Thus, a positive relationship will exist between a resource's price and the quantity supplied in the market.

◀ [Jump to first page](#) ▶ Copyright ©2006 Thomson Business and Economics. All rights reserved.

Time and Resource Supply Elasticity

- The supply of Certified Public Accountant (CPA) services is an example of a resource requiring a substantial period of time before the current investment is realized in the future expansion of supply.
- If CPA wages increase from P_1 to P_2 , the short-run response will be an increase in CPA services from Q_1 to Q_2 . Some CPAs work more and some come out of retirement.
- Given time, supply of the resource (CPAs) becomes more elastic. ($S_s \rightarrow S_{lr}$) as more individuals train to become CPAs.
- At the higher wage P_2 , Q_3 CPA services are supplied to the market.
- The long-run supply of a resource is almost always more elastic than the short-run supply.

Resource price

Quantity

P_2

P_1

Q_1 Q_2 Q_3

S

S_{lr}

A B C

◀ Jump to first page ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Supply, Demand, and Resource Prices

Supply, Demand, and Resource Prices

◀ Jump to first page ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Resource Prices

- The prices of resources are determined by supply and demand.
- Changes in the market prices of resources will influence the decisions of both users and suppliers.
 - Higher resource prices give users a greater incentive to turn to substitute inputs.
 - Higher resource prices give suppliers a greater incentive to provide more of the resource.

◀ Jump to first page ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Equilibrium in a Resource Market

- The **market demand** of a resource, such as engineering services, is a downward sloping curve, reflecting the declining **MRP** of the resource.
- The **market supply** curve of a resource slopes upward as higher resource prices (wages) induce individuals to supply more of a resource.
- The resource price P_1 brings the choices of buyers and sellers into harmony.
- At the equilibrium price P_1 , the **quantity demanded** will just equal the **quantity supplied**.

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Adjusting to Dynamic Change


- An increase in demand for housing (*product market*) ... leads to an increase in demand for electricians (*resource market*).
- In the product market, the equilibrium price and output of houses both rise (to P_2 and Q_2).
- In the resource market, the equilibrium price and output of electrician services will increase substantially (to P_2 and Q_2).

Copyright ©2006 Thomson Business and Economics. All rights reserved.

Adjusting to Dynamic Change

- This significant increase in price and modest increase in output reflects the highly inelastic nature of the short-run supply for the services of *skilled* electricians.
- The higher resource price will attract new human capital investments and, with time, the resource's supply curve will become more elastic, moderating the resource price (to P_3) and increasing its quantity supplied (to Q_3).


Copyright ©2006 Thomson Business and Economics. All rights reserved.



The Coordinating Function of Resource Prices

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.




The Coordinating Function of Resource Prices

- Changes in resource prices in response to changing market conditions are essential for efficient allocation of resources.
- Profit is a reward for entrepreneurs who are able to see and act on opportunities to put resources to higher valued uses.

◀ [Jump to first page](#) ▶

Copyright ©2006 Thomson Business and Economics. All rights reserved.




Questions for Thought:

1. "However desirable they might be from an equity viewpoint, programs designed to reduce wage differentials will necessarily reduce the incentive of people to act efficiently and use their productive abilities in those areas where demand is greatest relative to supply."
-- Do you *agree or disagree*?
2. Evaluate the following statement:
"The earnings of engineers, doctors, and lawyers are high because lots of education is necessary to practice in these fields."

◀ [Jump to first page](#) ▶


Copyright ©2006 Thomson Business and Economics. All rights reserved.



Questions for Thought:

3. Other things constant, what impact will a highly elastic demand for a product have on the elasticity of demand for the resources used to produce the product? Explain.
4. “If the demand for workers with doctorate degrees in economics increases, we would expect the wages of economists to decline in the short run and the number of economists employed to increase in the long run.”
-- Is this statement *true, false, or uncertain*?

◀ [Jump to first page](#) ▶ Copyright ©2006 Thomson Business and Economics. All rights reserved.



**End
Chapter 24**

◀ [Jump to first page](#) ▶ Copyright ©2006 Thomson Business and Economics. All rights reserved.
