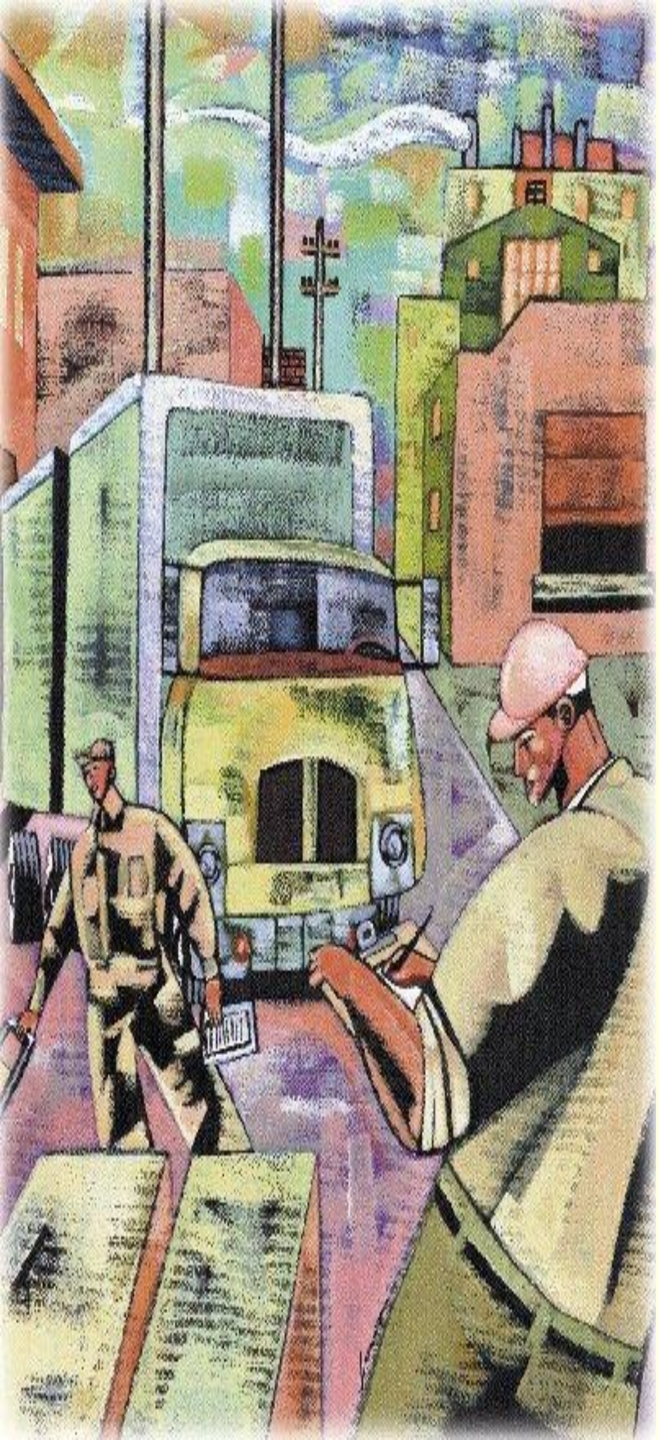


The Economics of Labor Markets

Chapter 18

Factors of Production

Factors of production are the inputs used to produce goods and services.

The Market for the Factors of Production

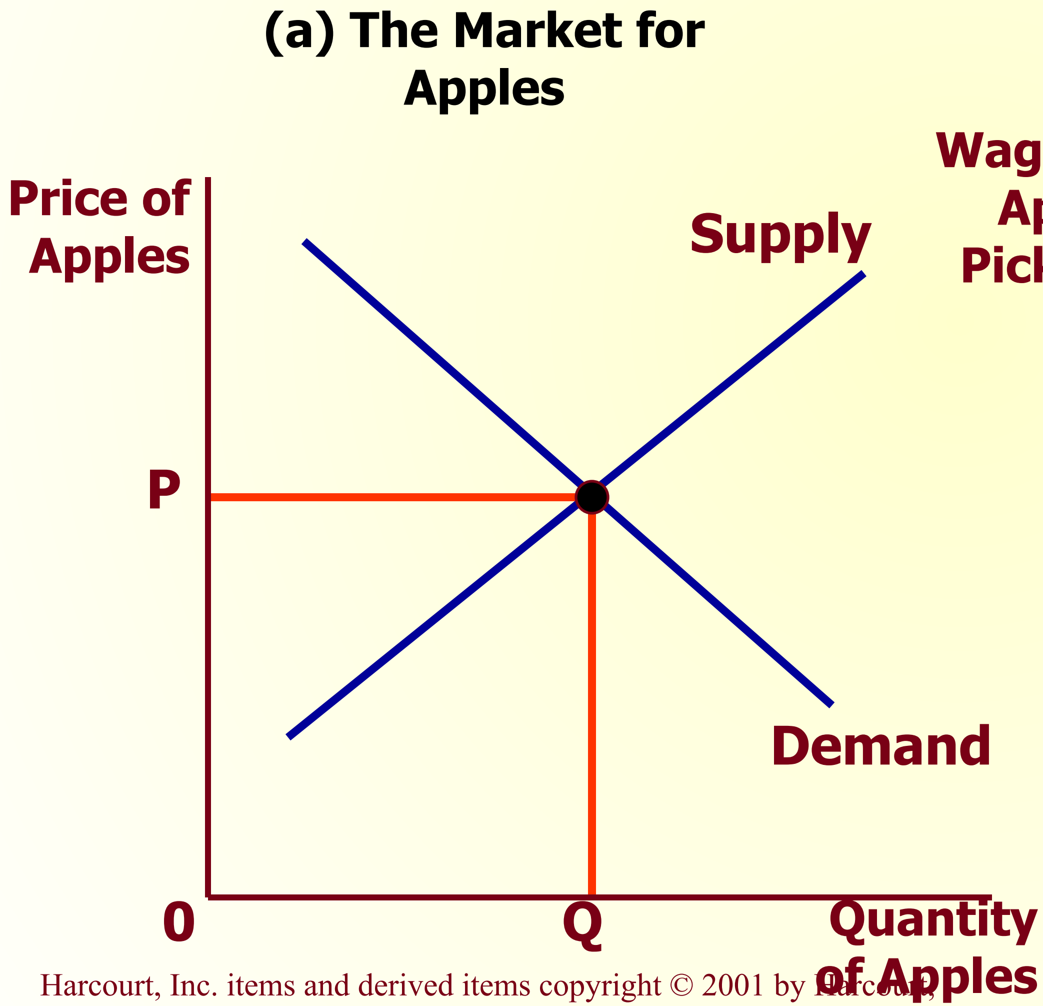
The demand for a factor of production is a **derived demand.**

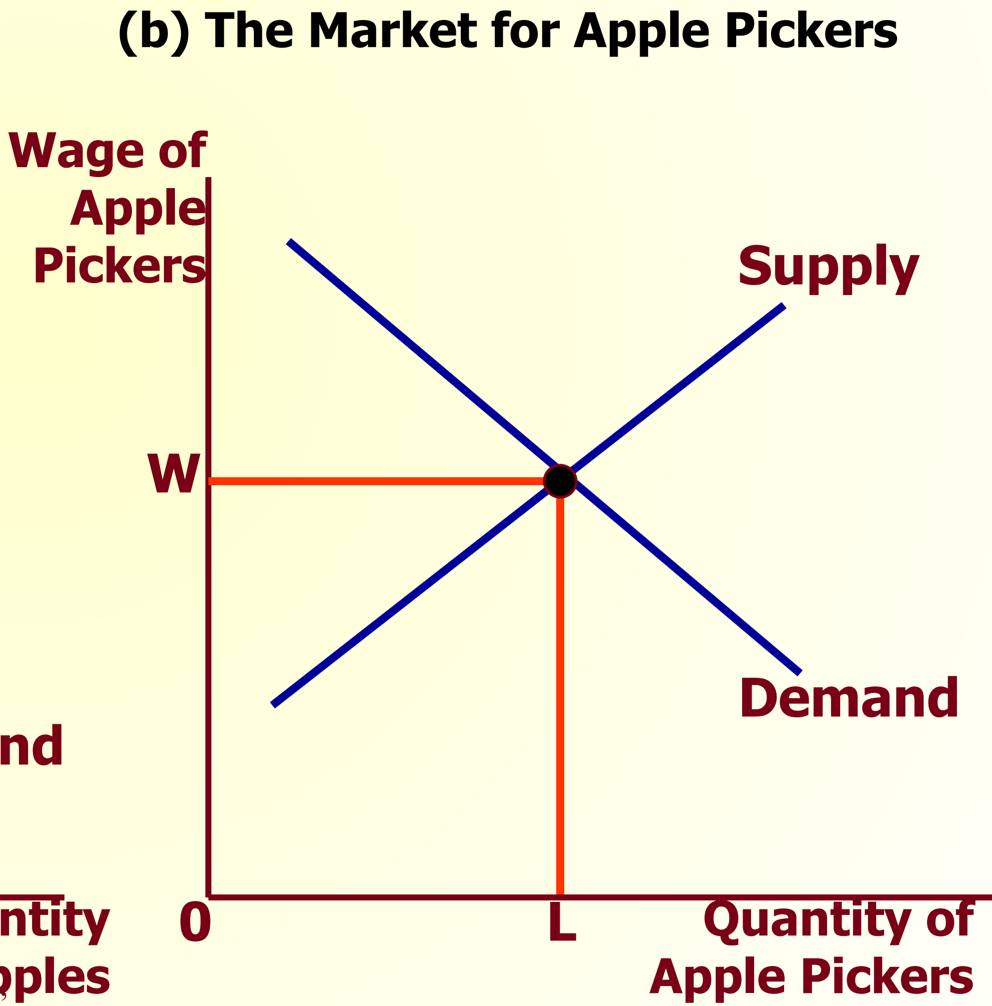
- A firm's demand for a factor of production is *derived* from its decision to supply a good in another market.

The Demand for Labor

Labor markets, like other markets in the economy, are governed by the forces of supply and demand.

The Versatility of Supply and Demand...





The Demand For Labor

Most labor services, rather than being final goods ready to be enjoyed by consumers, are inputs into the production of other goods.

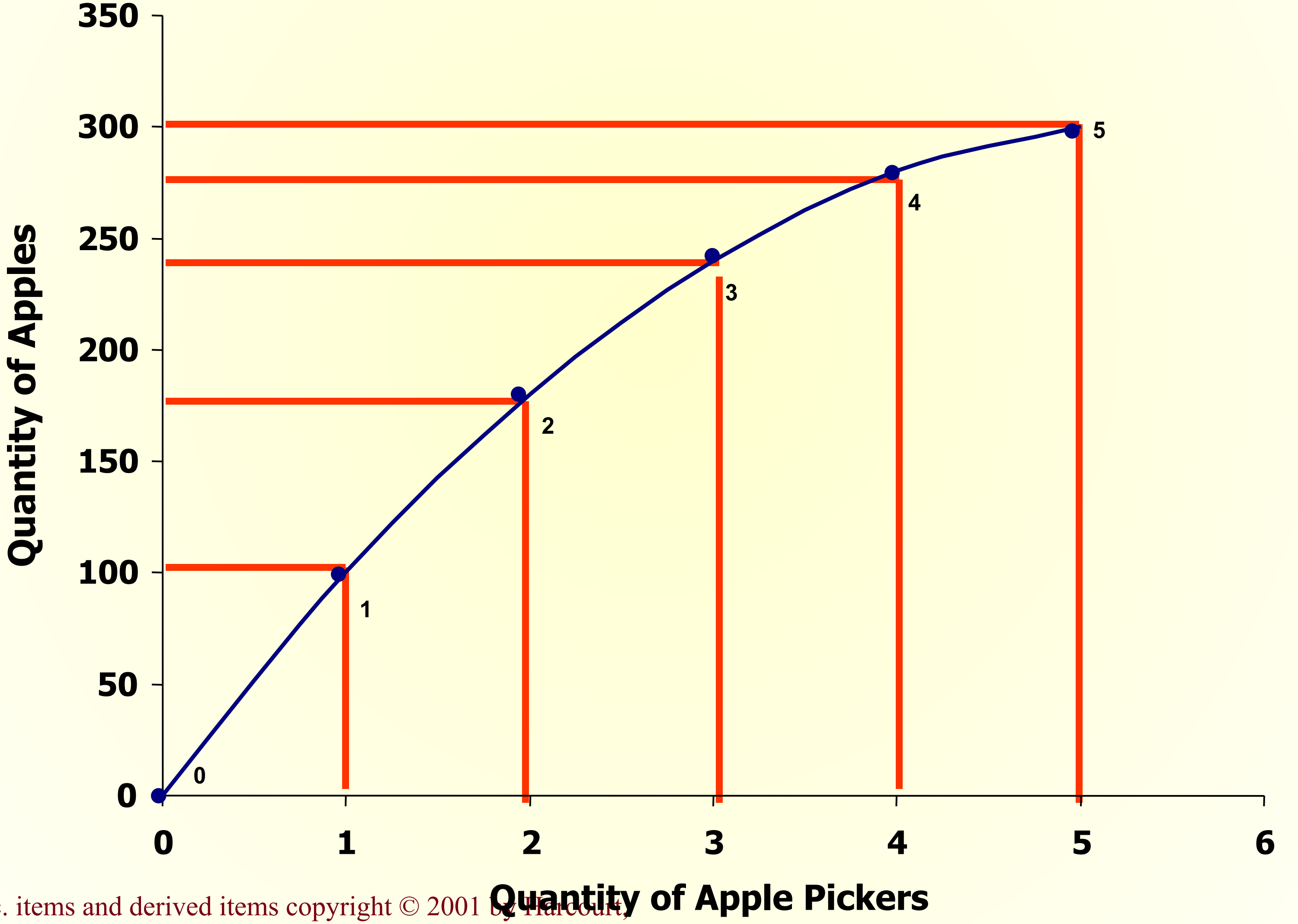
The Production Function and The Marginal Product of Labor

The *production function* illustrates the relationship between the quantity of inputs used and the quantity of output of a good.

How the Competitive Firm Decides How Much Labor to Hire

Labor L	Output Q	Marginal Product of Labor MPL $MPL = \Delta Q / \Delta L$	Value of the Marginal Product of Labor VMPL=PxMPL	Wage W	Marginal Profit $\Delta Profit = VMPL - W$
0	0				
1	100	100	$1,000	$500	$500
2	180	80	$800	$500	$300
3	240	60	$600	$500	$100
4	280	40	$400	$500	-$100
5	300	20	$200	$500	-$300

The Production Function...



The Production Function and The Marginal Product of Labor

The marginal product of labor is the increase in the amount of output from an additional unit of labor.

$$MPL = \Delta Q / \Delta L$$

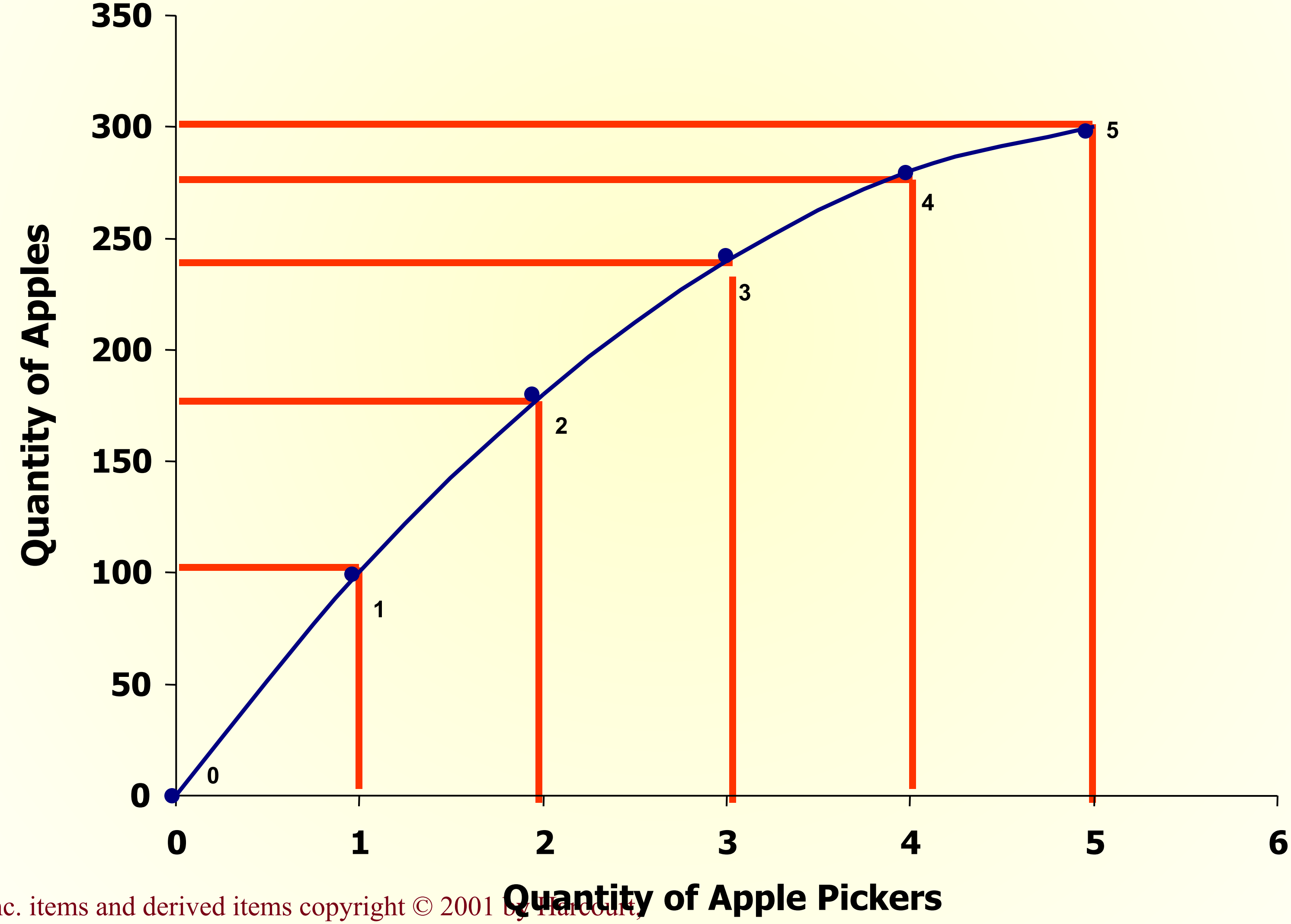
$$MPL = (Q2 - Q1)/(L2 - L1)$$

Diminishing Marginal Product of Labor

- As the number of workers increases, the marginal product of labor declines.
- As more and more workers are hired, each additional worker contributes less to production than the prior one.
- The production function becomes flatter as the number of workers rises.

This property is called diminishing marginal product.

The Production Function...



The Value of the Marginal Product of Labor

- **The value of the marginal product is the marginal product of the input multiplied by the market price of the output.**

$$VMPL = MPL \times P$$

The Value of the Marginal Product of Labor

- The value of the marginal product is measured in dollars.
- It diminishes as the number of workers rises because the market price of the good is constant.

The Value of the Marginal Product and the Demand for Labor

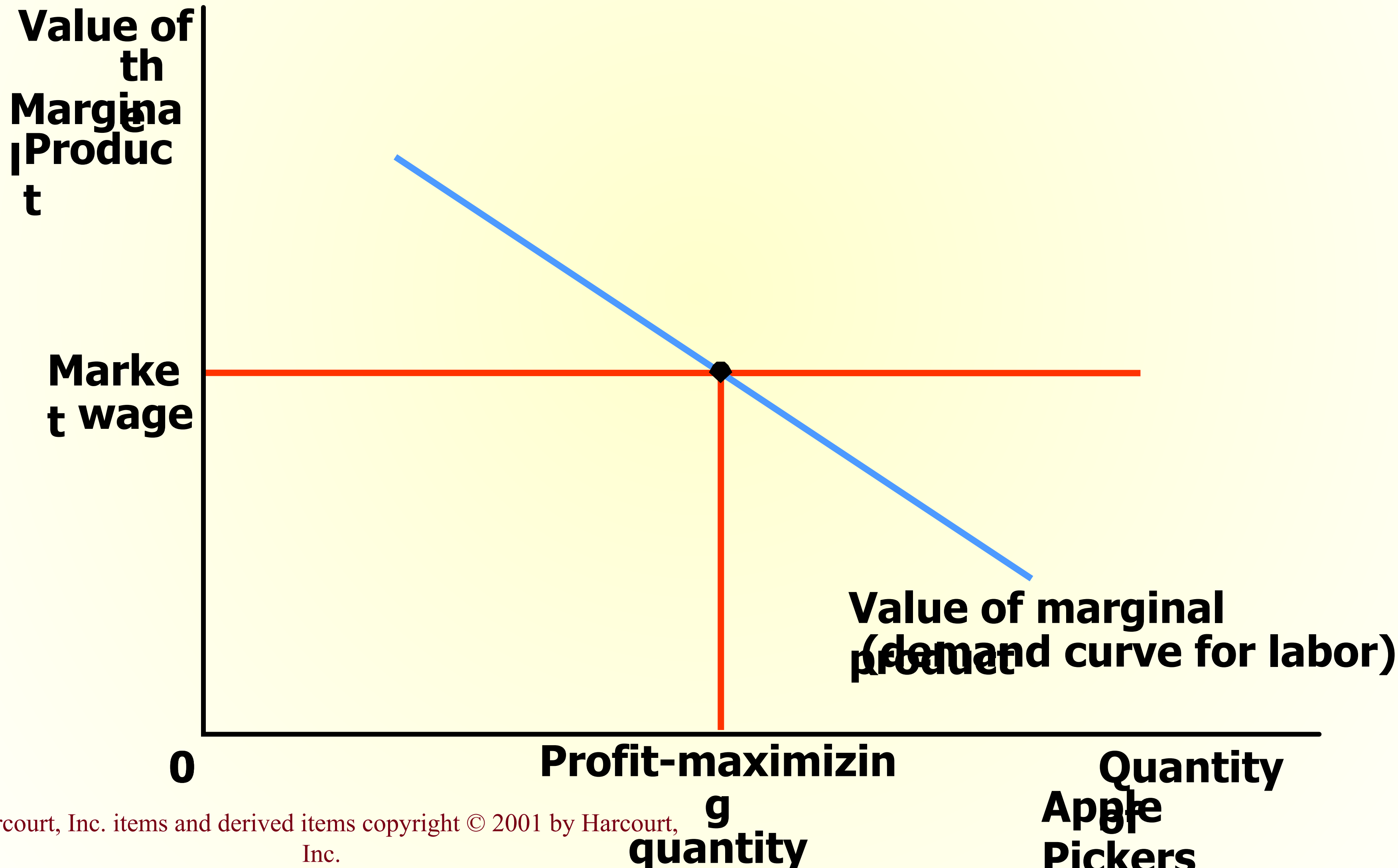
- To maximize profit, the competitive, profit-maximizing firm hires workers up to the point where the value of marginal product of labor equals the wage.

VMPL = Wage

The Value of the Marginal Product and the Demand for Labor

The value-of-marginal-product curve is the labor demand curve for a competitive, profit-maximizing firm.

The Value of the Marginal Product of Labor...



Input Demand and Output Supply

When a competitive firm hires labor up to the point at which the value of the marginal product equals the wage, it also produces up to the point at which the price equals the marginal cost.

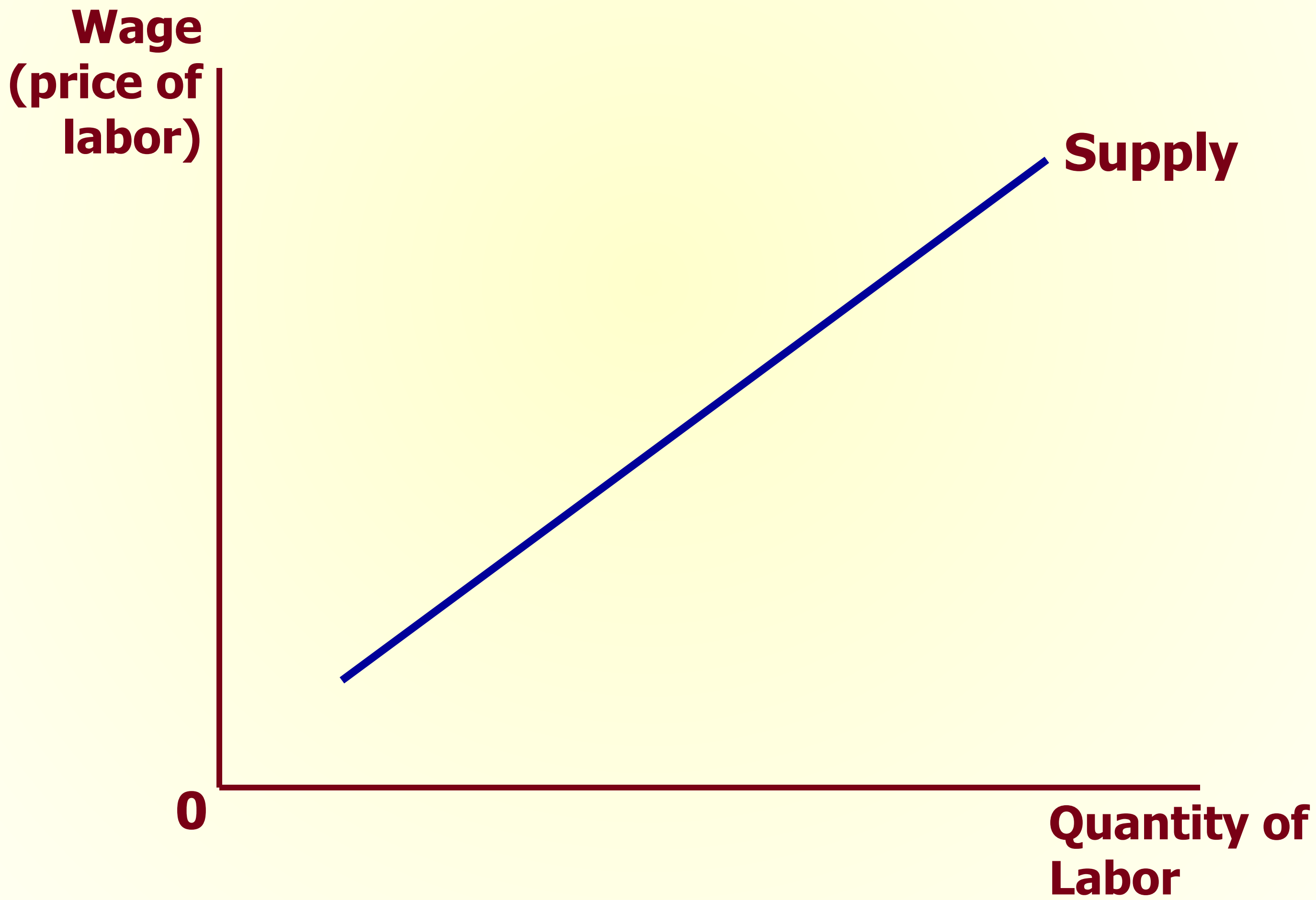
What Causes the Labor Demand Curve to Shift?

- Output Price
- Technological Change
- Supply of Other factors

The Labor Supply Curve

- The labor supply curve reflects how workers’ decisions about the labor-leisure tradeoff respond to changes in opportunity cost.
- An upward-sloping labor supply curve means that an increase in the wages induces workers to increase the quantity of labor they supply.

The Labor Supply Curve



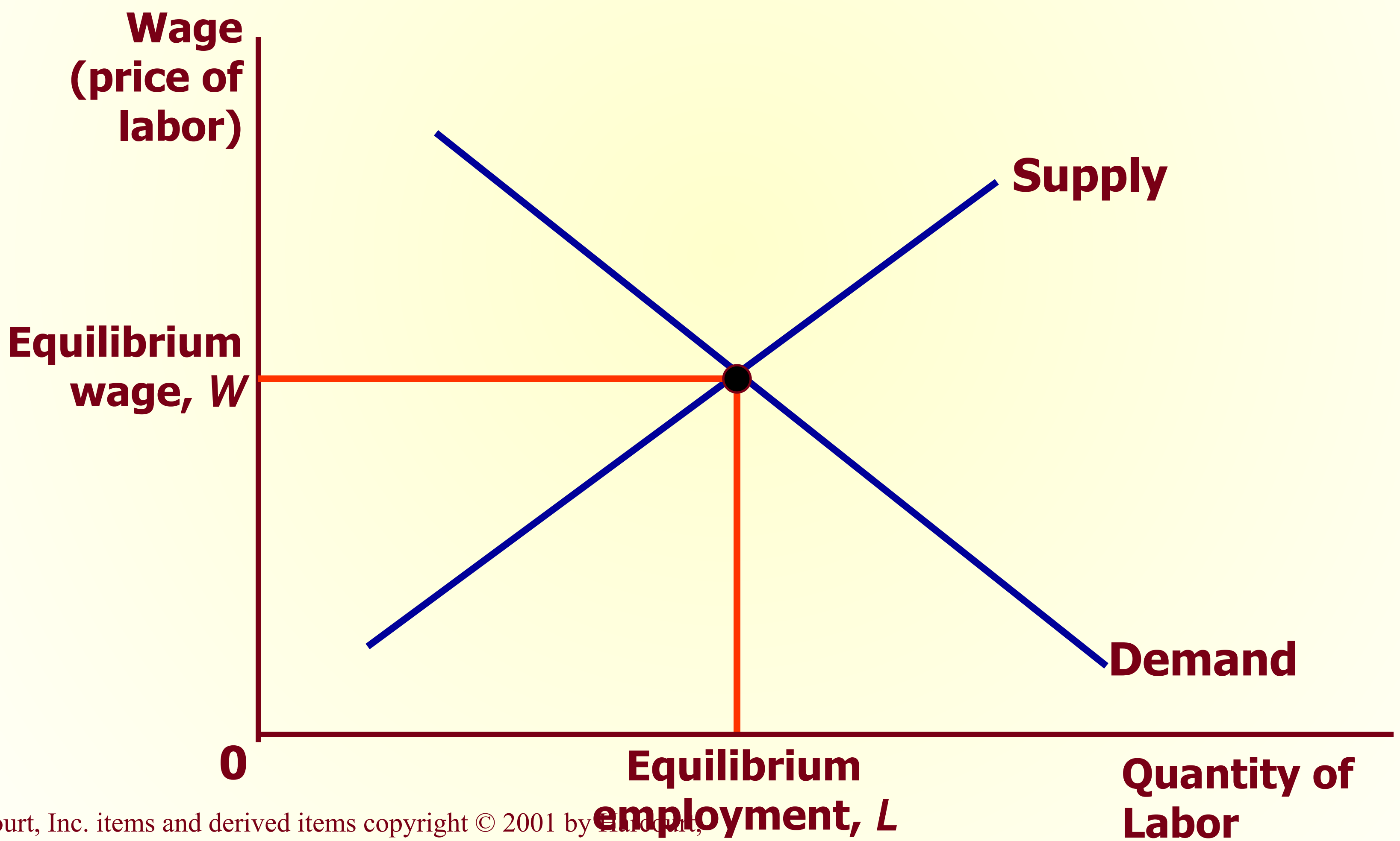
What Causes the Labor Supply Curve to Shift?

- Changes in Tastes
- Changes in Alternative Opportunities
- Immigration

Equilibrium in the Labor Market

- The wage adjusts to balance the supply and demand for labor.
- The wage equals the value of the marginal product of labor.

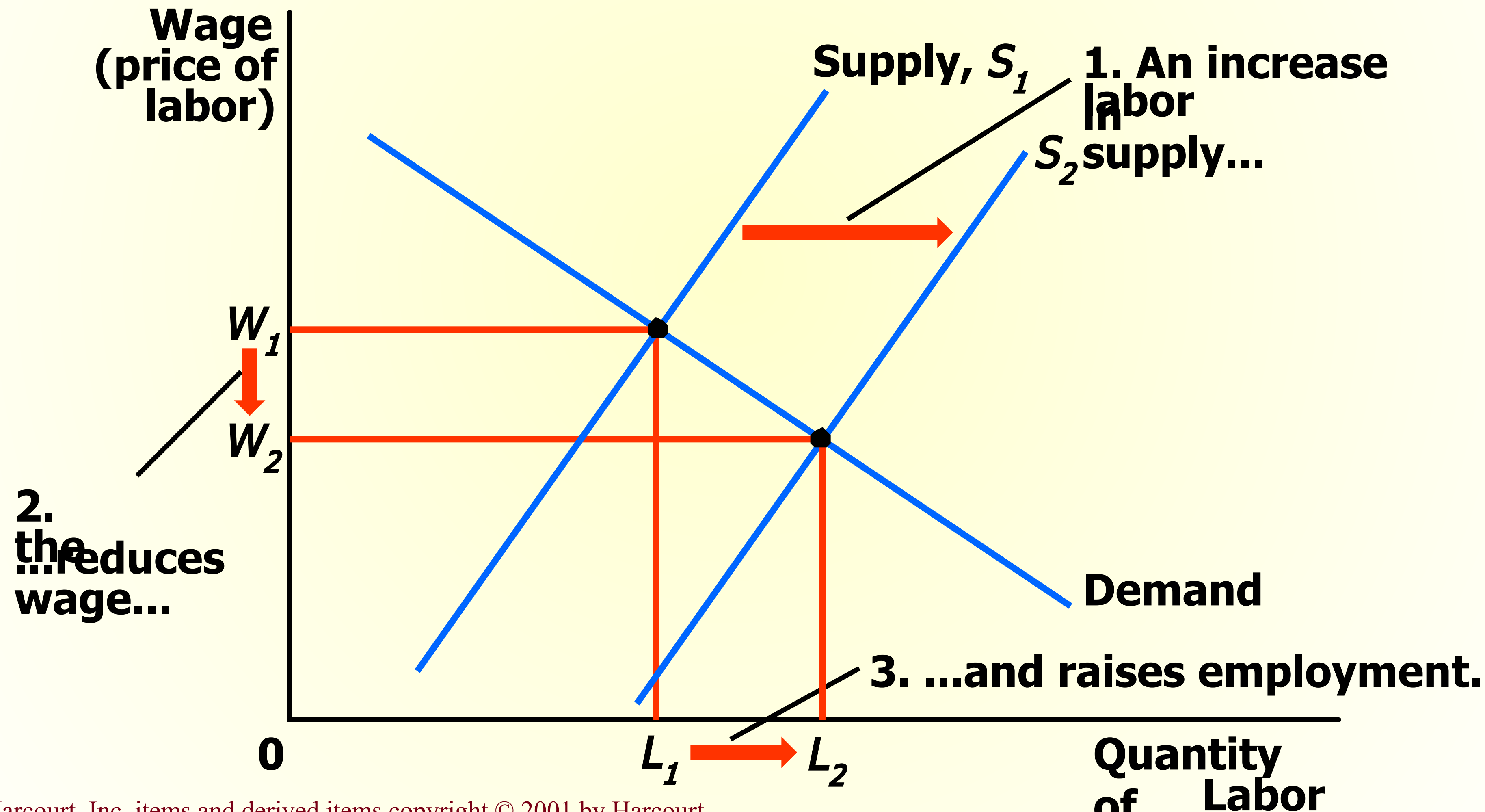
Equilibrium in the Labor Market...



Equilibrium in the Labor Market

- Labor supply and labor demand determine the equilibrium wage.
- Shifts in the supply or demand curve for labor cause the equilibrium wage to change.

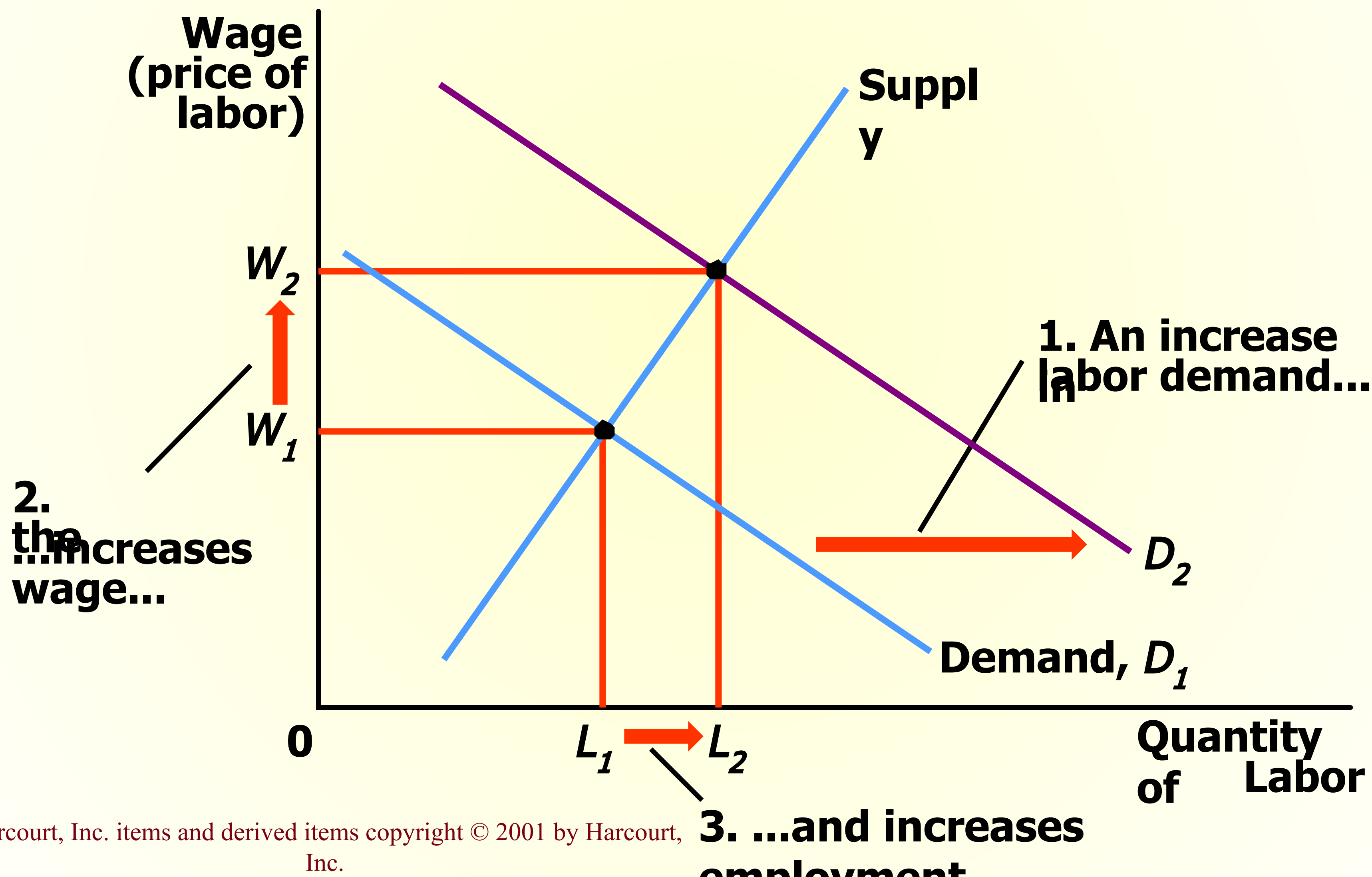
A Shift in Labor Supply...



A Shift in Labor Supply

- An increase in the supply of labor :
  - Results in a surplus of labor.
  - Puts downward pressure on wages.
  - Makes it profitable for firms to hire more workers.
  - Results in diminishing marginal product.
  - Lowers the value of the marginal product.
  - Gives a new equilibrium.

A Shift in Labor Demand...



Shifts in Labor Demand

- An increase in the demand for labor :
  - Makes it profitable for firms to hire more workers.
  - Puts upward pressure on wages.
  - Raises the value of the marginal product.
  - Gives a new equilibrium.

Three Determinants of Productivity

- **Physical Capital**
  - When workers work with a larger quantity of equipment and structures, they produce more.
- **Human Capital**
  - When workers are more educated, they produce more.
- **Technological Knowledge**
  - When workers have access to more sophisticated technologies, they produce more.

Productivity and Wage Growth in the United States

Time Period	Growth Rate of Productivity	Growth Rate of Wages
1959 - 1997	1.8	1.7
1959 - 1973	2.9	2.9
1973 - 1997	1.1	1.0

Productivity and Wage Growth around the World

Country	Growth Rate of Productivity	Growth Rate of Real Wages
South Korea	8.5	7.9
Hong Kong	5.5	4.9
Singapore	5.3	5.0
Indonesia	4.0	4.4
Japan	3.6	2.0
India	3.1	3.4
United Kingdom	2.4	2.4
United States	1.7	0.5
Brazil	0.4	-2.4
Mexico	-0.2	-3.0
Argentina	-0.9	-1.3
Iran	-1.4	-7.9

Other Factors of Production: Land and Capital

- **Capital** refers to the stock of equipment and structures used for production.
  - The economy's capital represents the accumulation of goods produced in the past that are being used in the present to produce new goods and services.

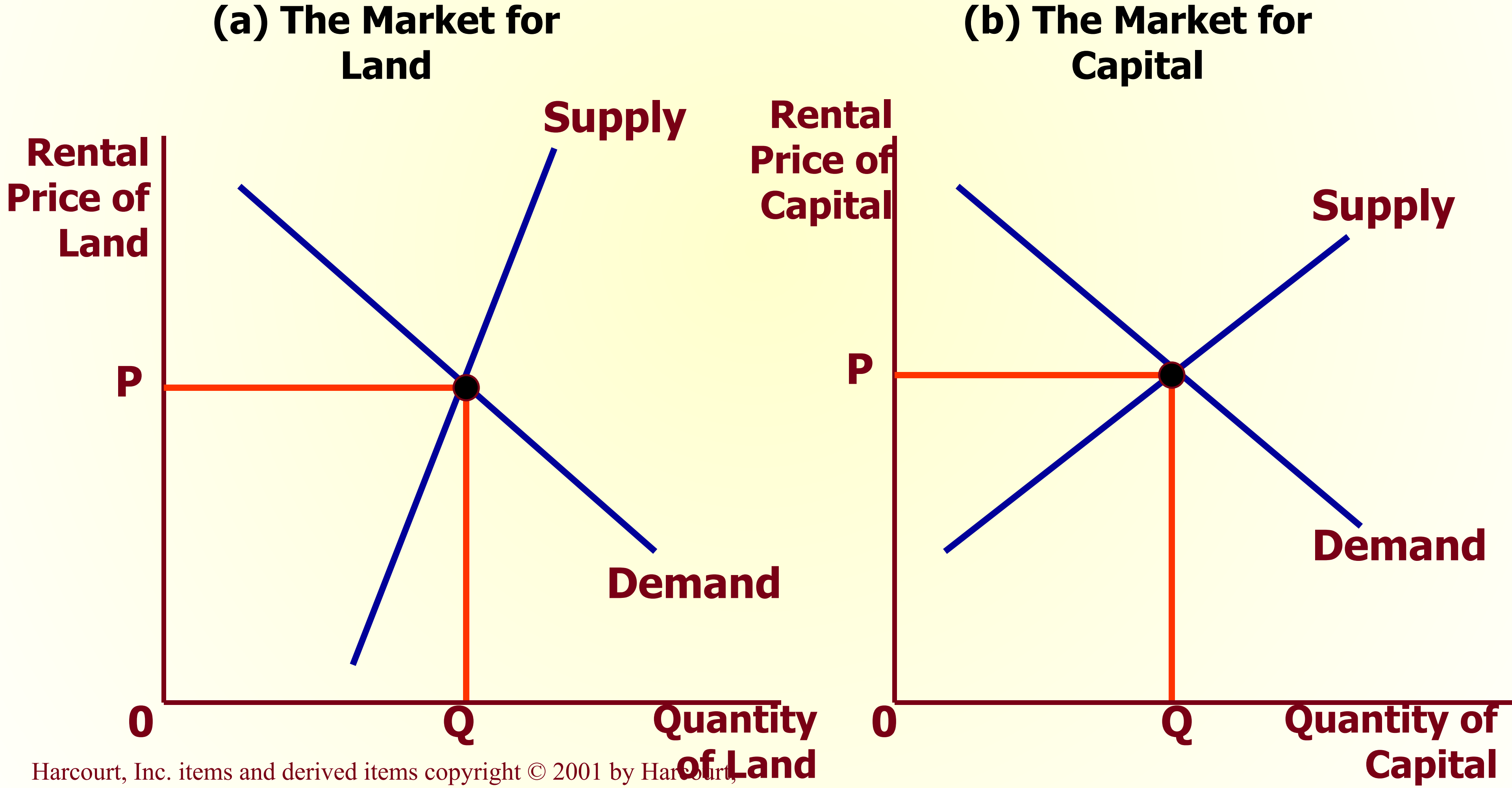
Prices of Land and Capital

- The **purchase price** is what a person pays to own a factor of production indefinitely.
- The **rental price** is what a person pays to use a factor of production for a limited period of time.

Equilibrium in Markets for Land and Capital

- **The rental price of land and the rental price of capital are determined by supply and demand.**
  - **The firm increases the quantity hired until the value of the factor's marginal product equals the factor's price.**

The Markets for Land and Capital...



Equilibrium in Markets for Land and Capital

- Each factor's rental price must equal the value of their marginal product.
- They each earn the value of their marginal contribution to the production process.

Linkages Among the Factors of Production

Factors of production are used together.

- **The marginal product of any one factor depends on the quantities of all factors that are available.**

Linkages Among the Factors of Production

A change in the supply of one factor alters the earnings of all the factors.

Linkages Among the Factors of Production

A change in earnings of any factor can be found by analyzing the impact of the event on the value of the marginal product of that factor.

Summary

- The three most important factors of production are labor, land, and capital.
- The demand for factors, such as labor, is a derived demand that comes from firms that use the factors to produce goods and services.
- Competitive, profit-maximizing firms hire each factor up to the point at which the value of the marginal product of the factor equals its price.

Summary

- The supply of labor arises from individuals' tradeoff between work and leisure.
- An upward-sloping labor supply curve means that people respond to an increase in the wage by enjoying less leisure and working more hours.

Summary

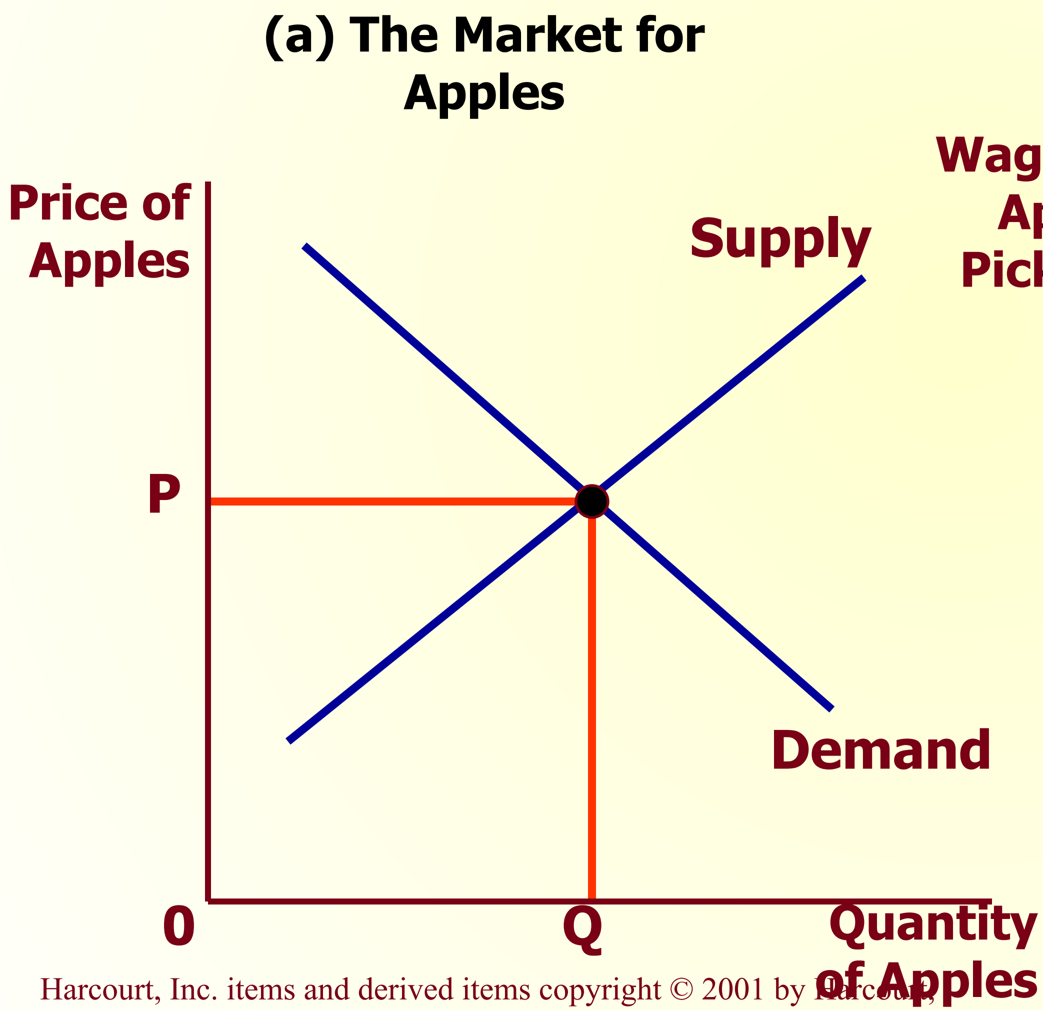
- The price paid to each factor adjusts to balance the supply and demand for that factor.
- Because factor demand reflects the value of the marginal product of that factor, in equilibrium each factor is compensated according to its marginal contribution to the production of goods and services.

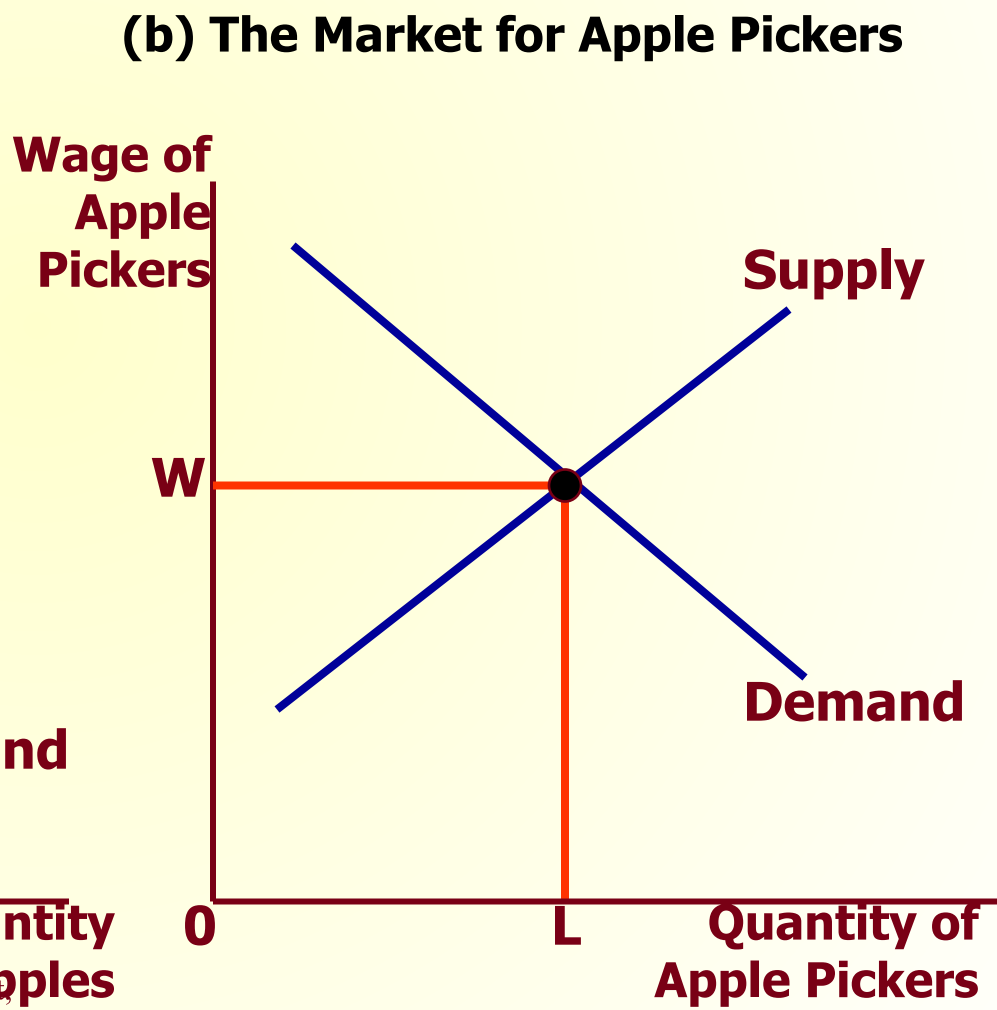
Summary

- Because factors of production are used together, the marginal product of any one factor depends on the quantities of all factors that are available.
- As a result, a change in the supply of one factor alters the equilibrium earnings of all the factors.

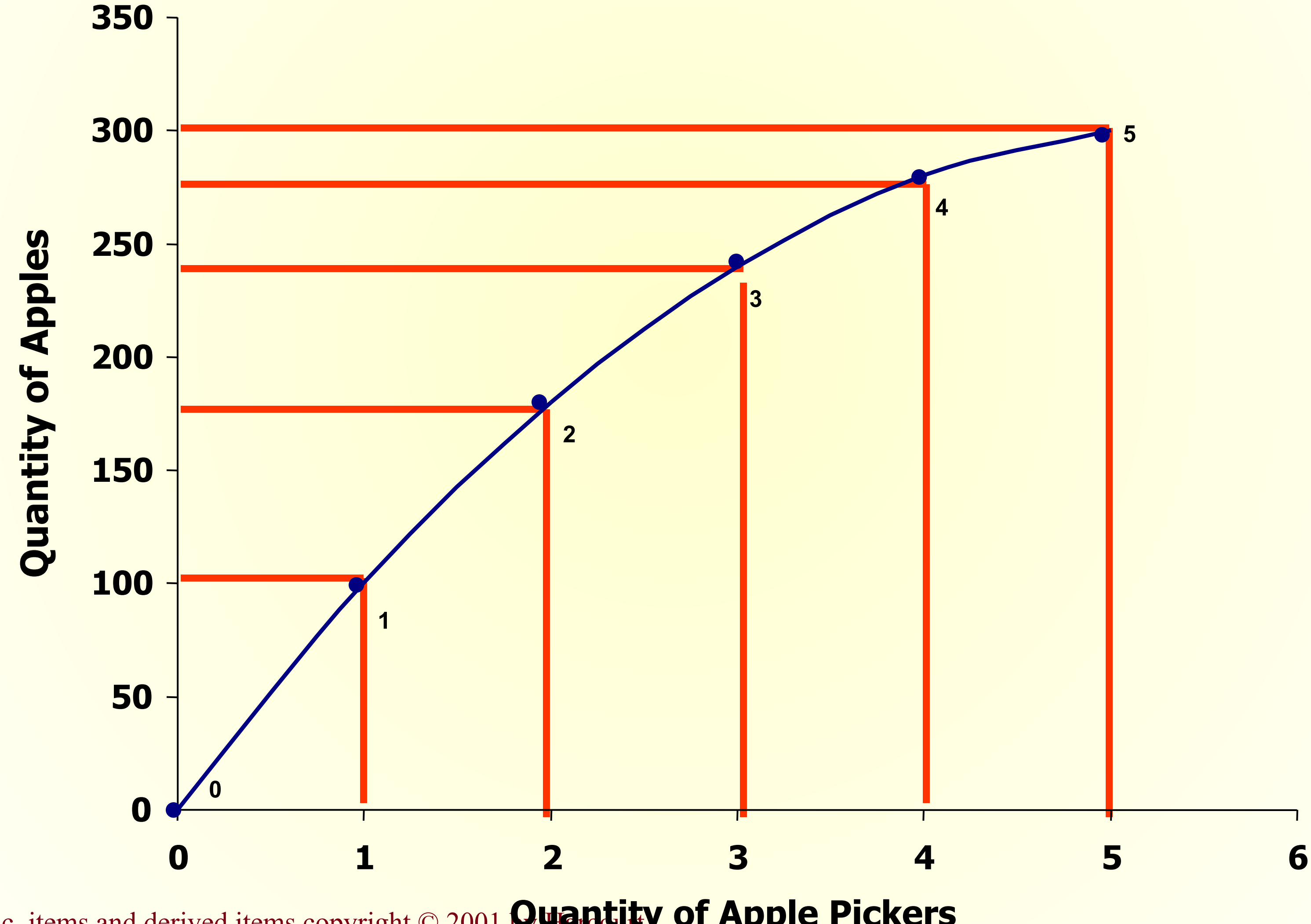
Graphical Review

The Versatility of Supply and Demand...

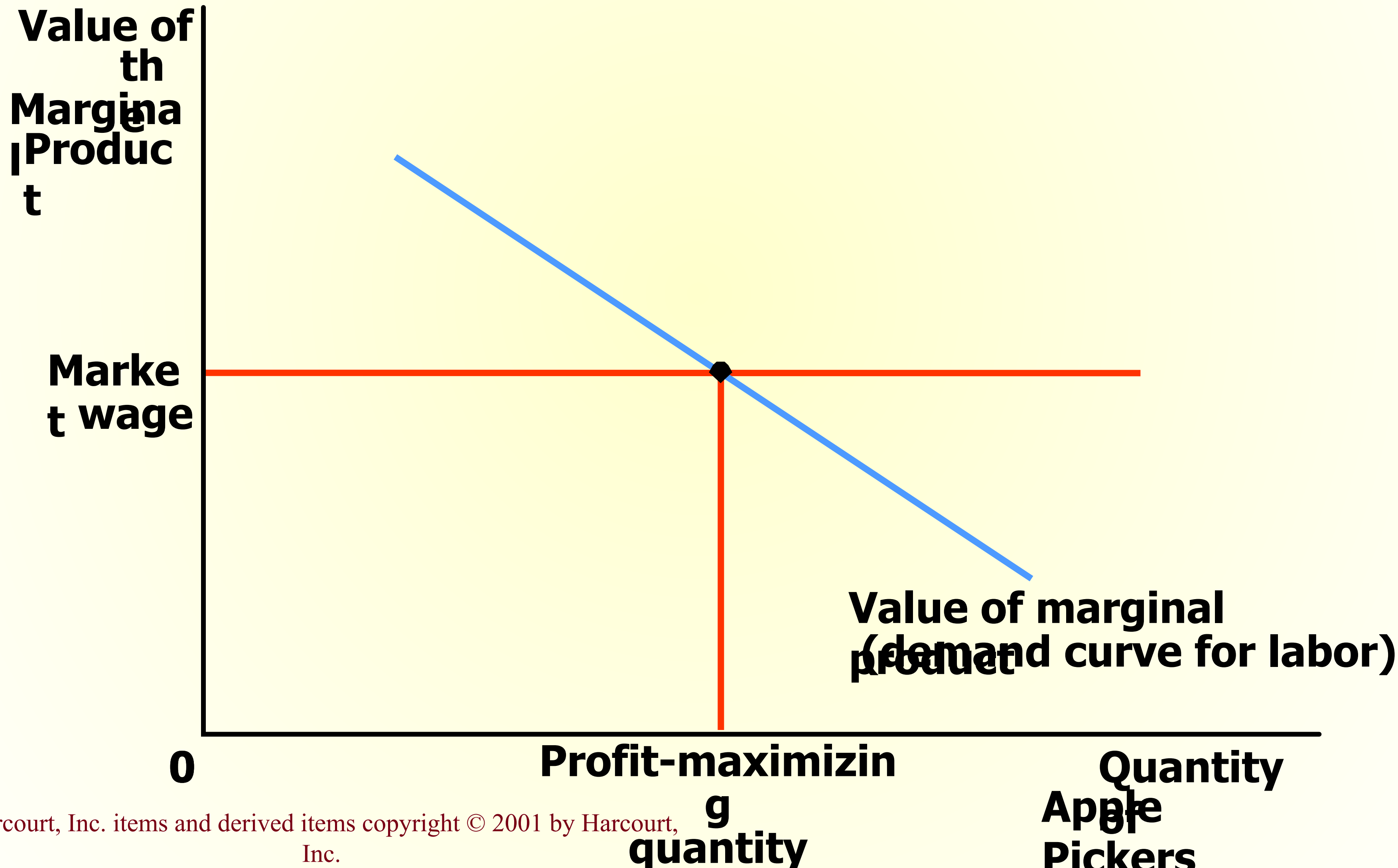




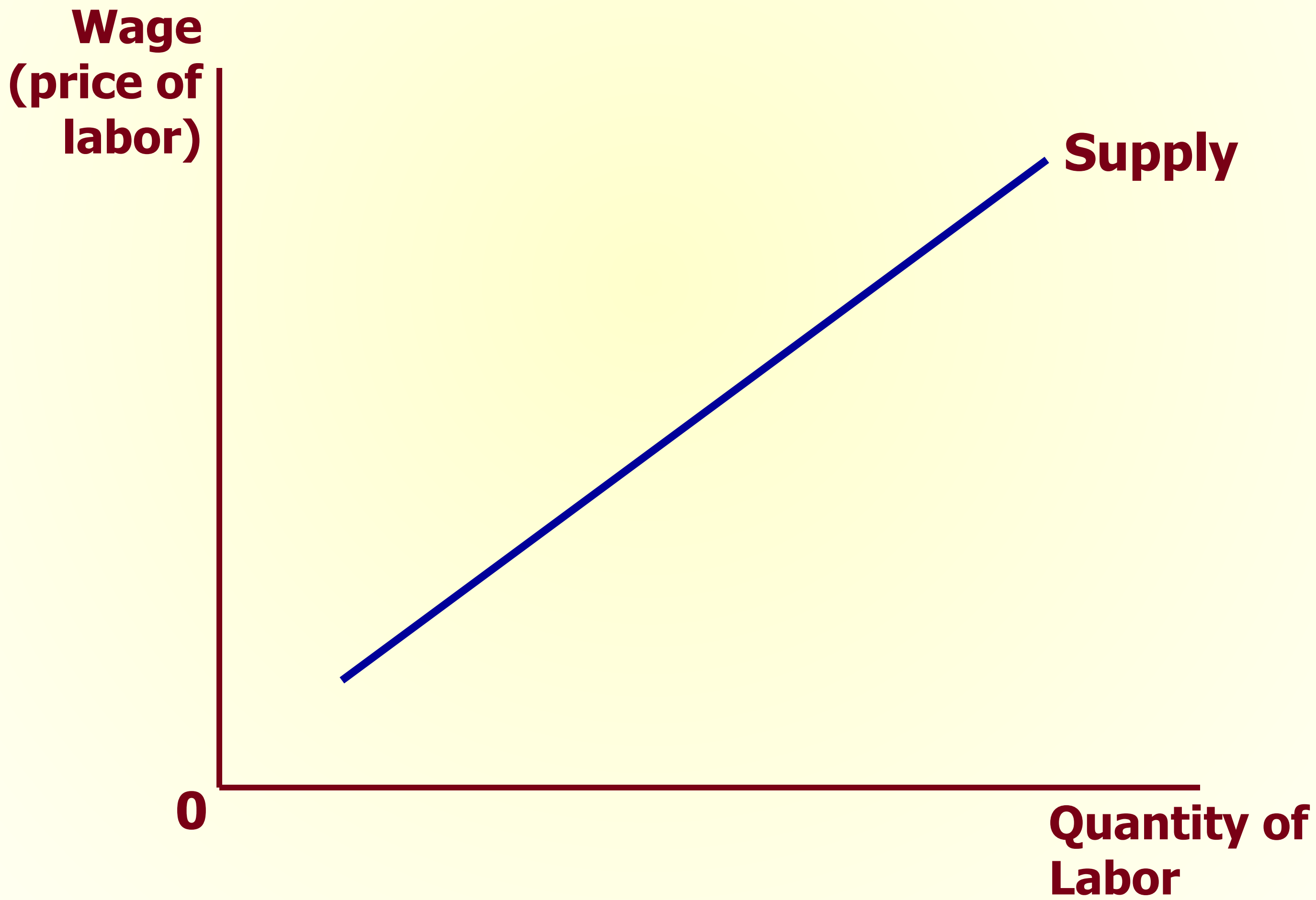
The Production Function...



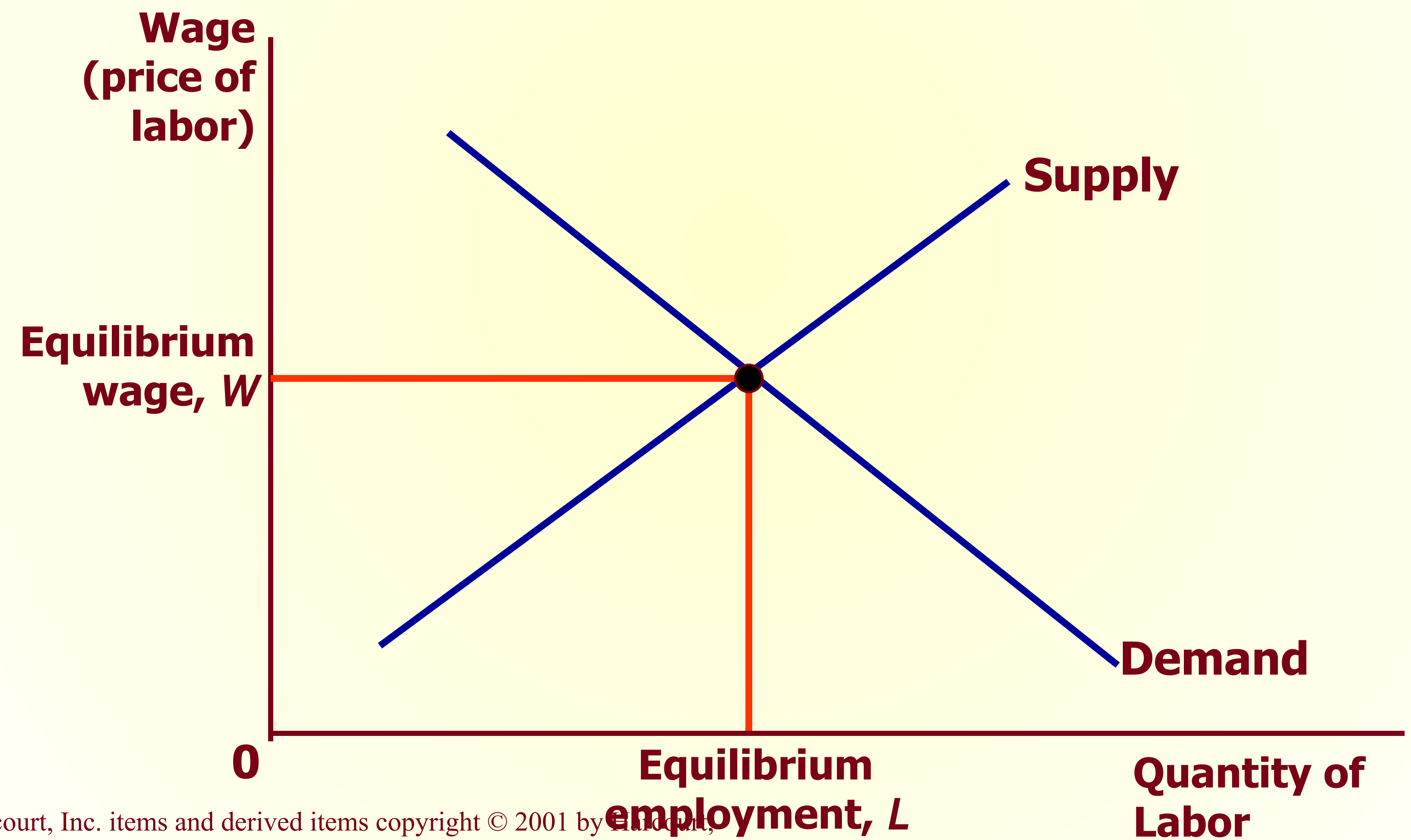
The Value of the Marginal Product of Labor...



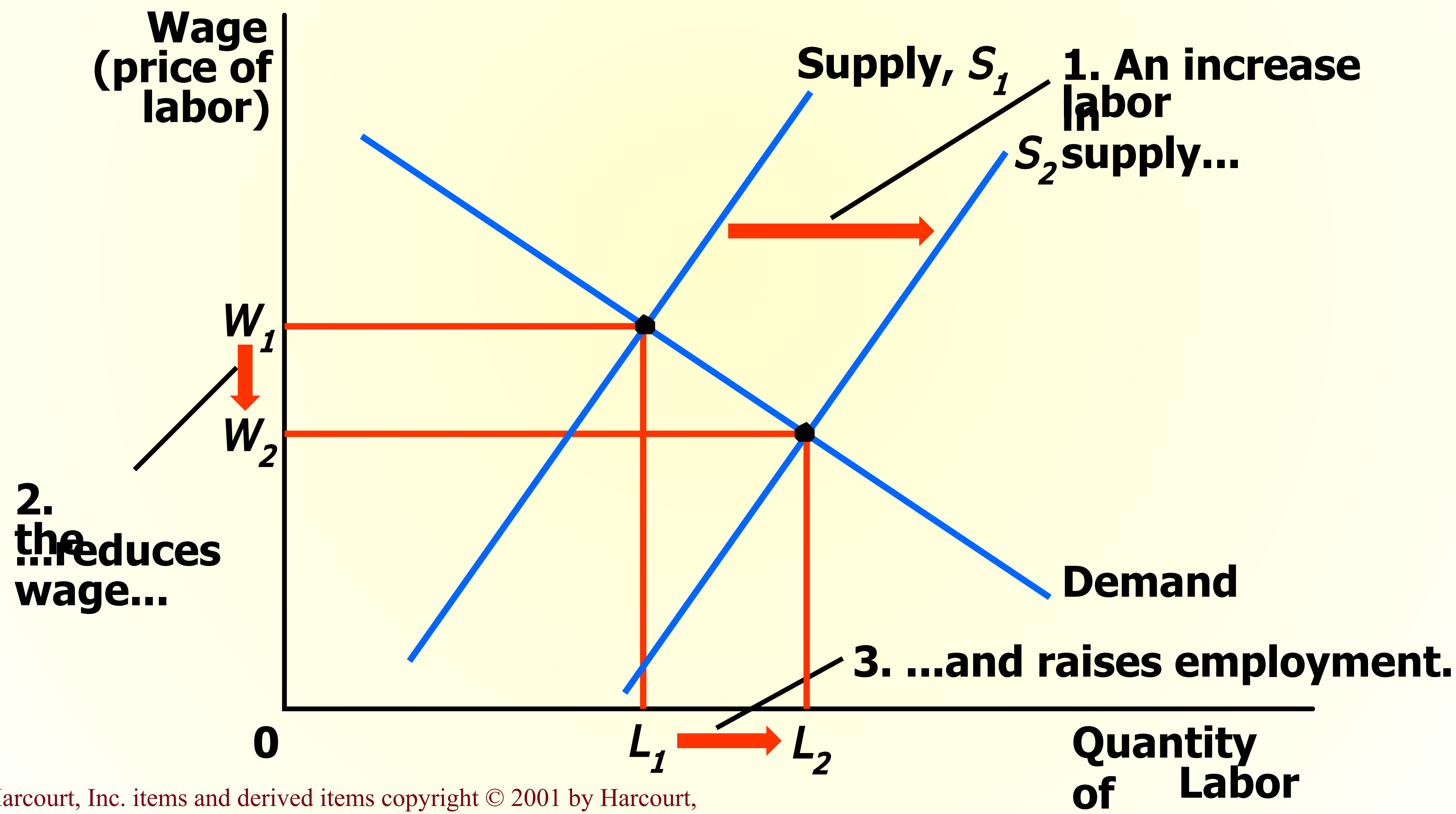
The Labor Supply Curve



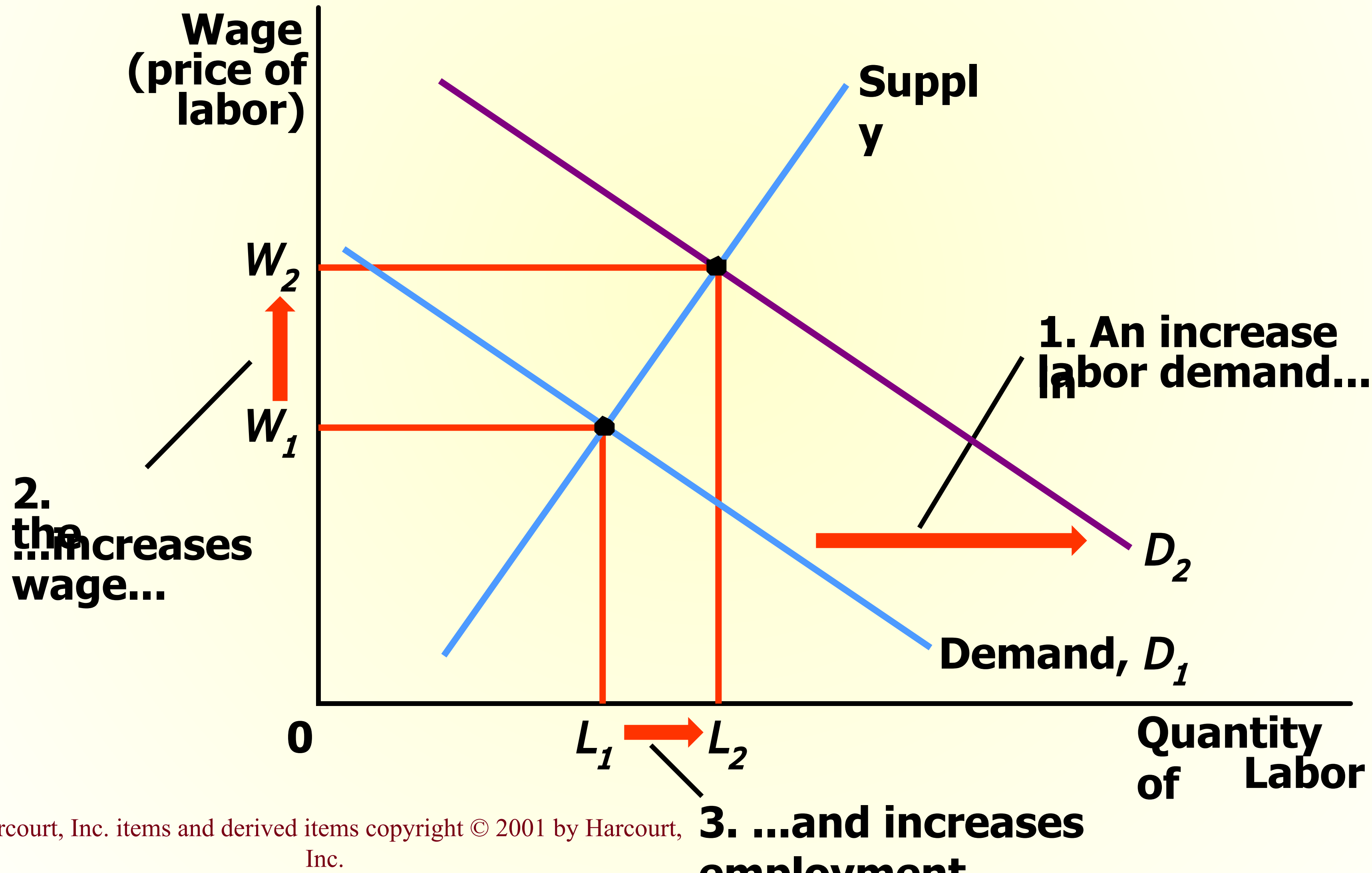
Equilibrium in the Labor Market...



A Shift in Labor Supply...



A Shift in Labor Demand...



The Markets for Land and Capital...