



Chapter 14

Markets for Factor Inputs



Competitive Factor Markets

- Characteristics
 1. Large number of sellers of the factor of production
 2. Large number of buyers of the factor of production
 3. The buyers and sellers of the factor of production are price takers



Competitive Factor Markets

- Demand for a factor input when only one input is variable:
 - Factor demands are derived demand
 - Demand for an input that depends on, and is derived from, both the firm's level of output and the cost of inputs
 - Demand for computer programmers is derived from how much software Microsoft expects to sell



Factor Input Demand – One Variable Input

- Assume firm produces output using two inputs:
 - Capital (K) and Labor (L)
 - Hired at prices r (rental cost of capital) and w (wage rate)
 - K is fixed (short run analysis) and L is variable
 - Firm must decide how much labor to hire



Factor Input Demand – One Variable Input

- How does a firm decide if it is profitable to hire another worker?
 - If the additional revenue from the output of hiring another worker is greater than its cost
 - Marginal Revenue Product of Labor (MPR_L)
 - Additional revenue resulting from the sale of output created by the use of one additional unit of an input



Factor Input Demand – One Variable Input

- The incremental cost of a unit of labor is the wage rate, w
- Profitable to hire more labor if the MRP_L is at least as large as the wage rate, w
- Must measure the MRP_L



Factor Input Demand – One Variable Input

- MRP_L is the additional output obtained from an additional unit of labor, multiplied by the additional revenue from an extra unit of output
- Additional output is given by MP_L and additional revenue is MR



Factor Input Demand – One Variable Input

$$MRP_L = \frac{\Delta R}{\Delta L} \text{ where } R \text{ is revenue and } L \text{ is labor}$$

$$MP_L = \frac{\Delta Q}{\Delta L} \text{ and } MR = \frac{\Delta R}{\Delta Q}$$

$$\frac{\Delta R}{\Delta L} = \frac{\Delta R}{\Delta Q} \left(\frac{\Delta Q}{\Delta L} \right)$$

$$MRP_L = (MP_L)(MR)$$



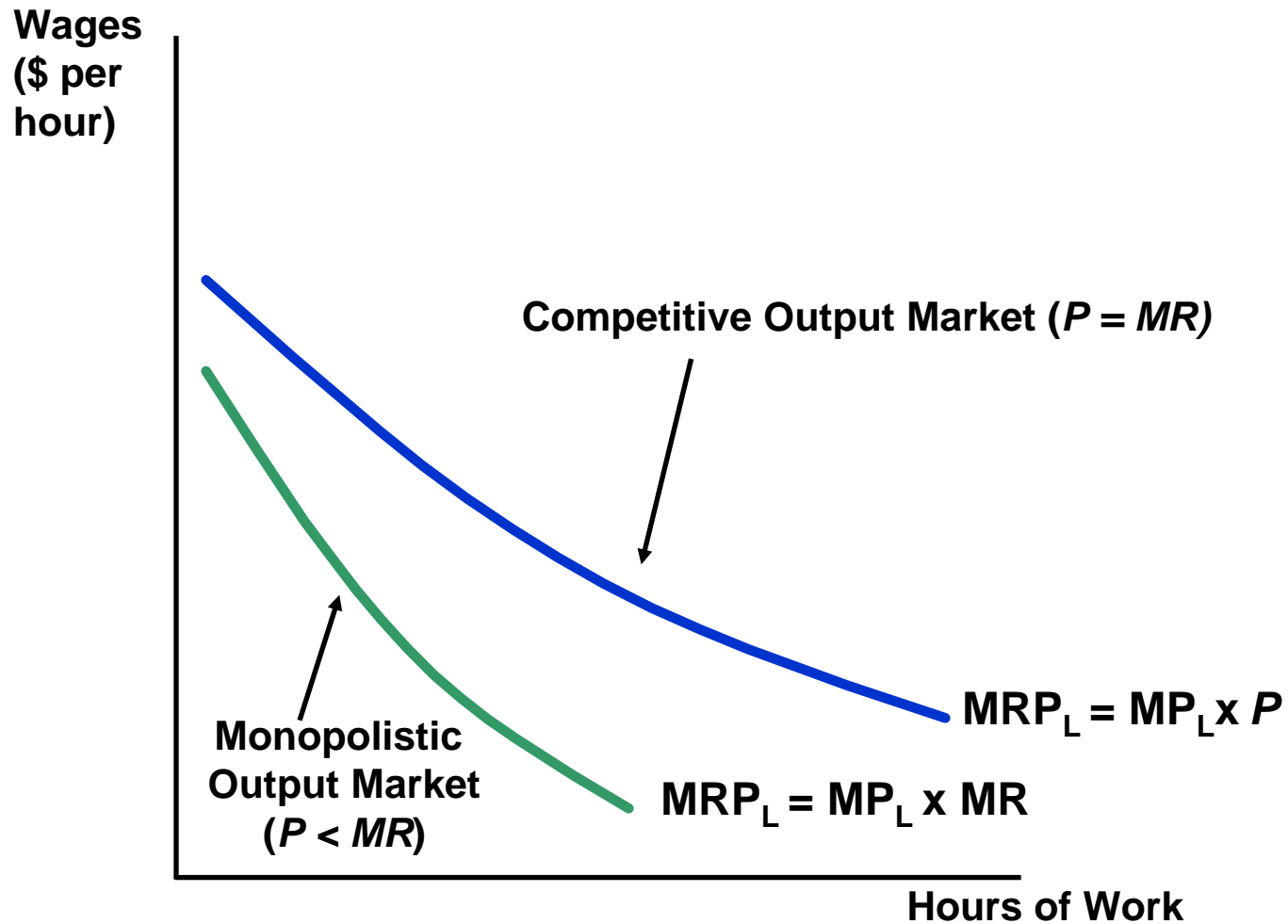
Factor Input Demand – One Variable Input

- In a competitive market, $MR = P$
- This means, for a competitive market

$$MRP_L = (MP_L)(P)$$

- Graphically, diminishing marginal returns, MP_L falls as L increases

Marginal Revenue Product

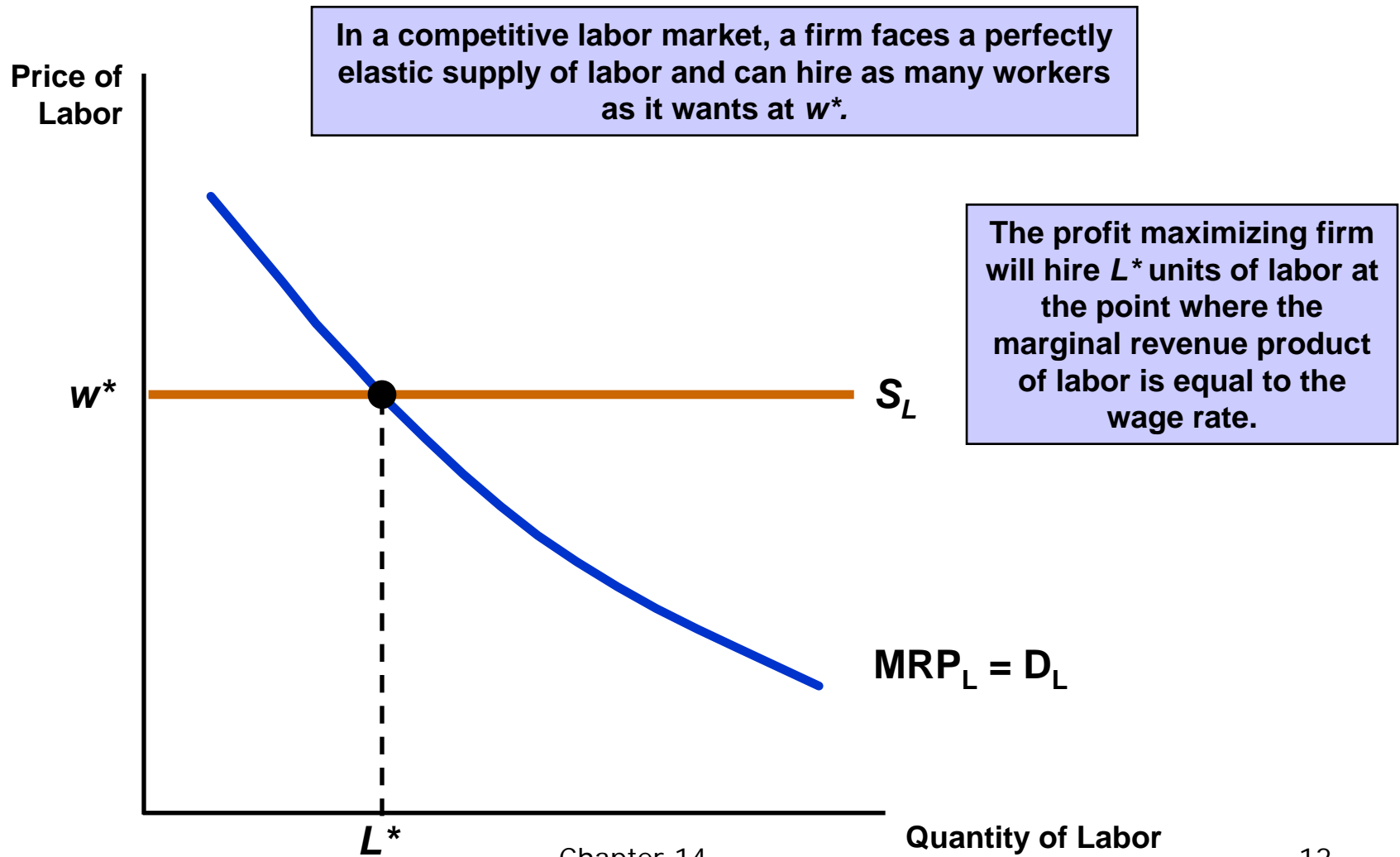




Factor Input Demand – One Variable Input

- Choosing the profit-maximizing amount of labor:
 - If $MRP_L > w$ (the marginal cost of hiring a worker): hire the worker
 - If $MRP_L < w$: hire less labor
 - If $MRP_L = w$: profit maximizing amount of labor

Hiring by a Firm in the Labor Market

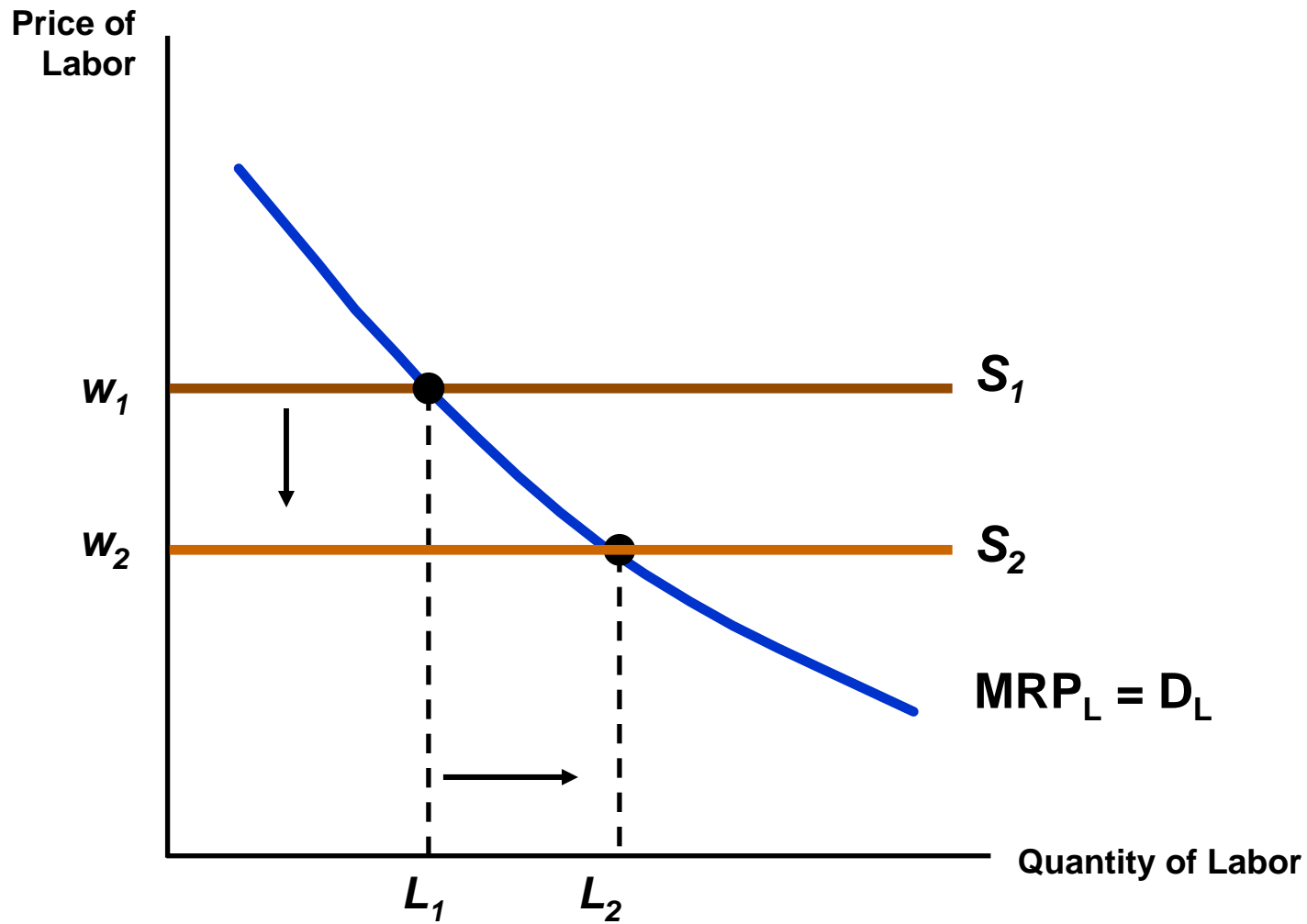




Factor Input Demand – One Variable Input

- Quantity of labor demand changes in response to the wage rate
- If the market supply of labor increases relative to demand (baby boomers or female entry), a surplus of labor will exist and the wage rate will fall

A Shift in the Supply of Labor





Factor Input Demand – One Variable Input

- Comparing Input and Output Markets

$$MRP_L = (MP_L)(MR)$$

and at profit maximizing
number of workers

$$MRP_L = w$$

$$(MP_L)(MR) = w$$

$$MR = w / MP_L$$

$$MC = w / MP_L$$



Factor Input Demand – One Variable Input

- Both the hiring and output choices of the firm follow the same rule
 - Inputs or outputs are chosen so that marginal revenue from the sale of output is equal to marginal cost from the purchase of inputs
 - True for both competitive and noncompetitive markets



Factor Input Demand – Many Inputs

- In choosing more than one variable input, a change in the price of one input changes the demand for the others
- Scenario
 - Producing farm equipment with two variable inputs:
 - Labor
 - Assembly-line machinery



Factor Input Demand – Many Inputs

- If the wage rate falls:
 - Profitable for firm to increase output (Scale Effect)
 - More labor will be demanded even if amount of machinery does not change
 - More labor will be demanded compared with machinery (Substitution Effect)
 - More machinery will be demanded to expand production due to scale effect.
 - Less machinery will be demanded due to substitution effect.
 - Gross Substitutes vs. Gross Complements



The Market Supply of Inputs

- The market supply for factor inputs is upward sloping
 - Examples: jet fuel, fabric, steel
- The market supply for labor may be upward sloping and backward bending



The Supply of Inputs to a Firm

- The Supply of Labor
 - The choice to supply labor is based on utility maximization
 - Leisure competes with income for utility
 - Wage rate measures the price of leisure
 - Higher wage rate causes the price of leisure to increase



The Market Supply of Inputs

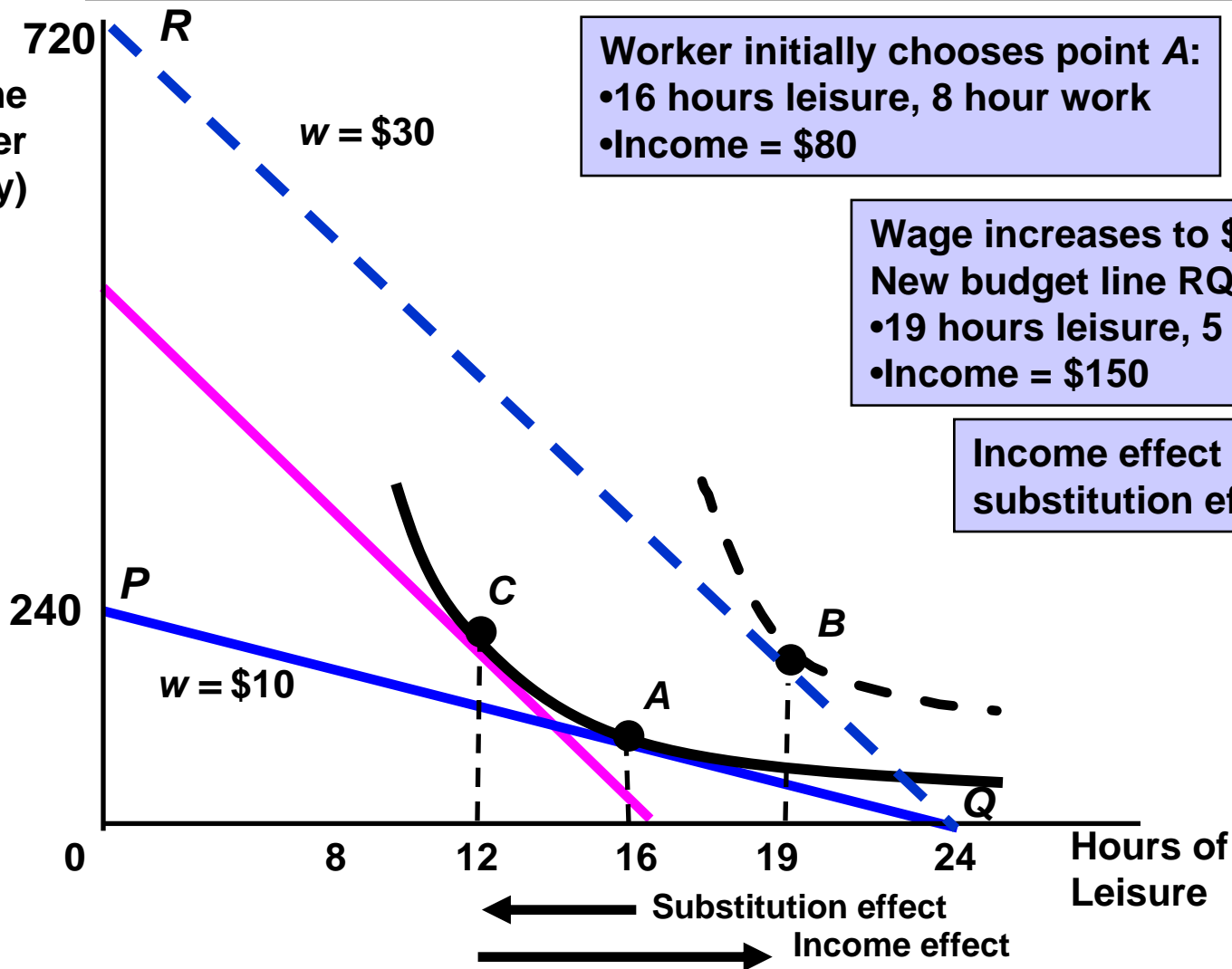
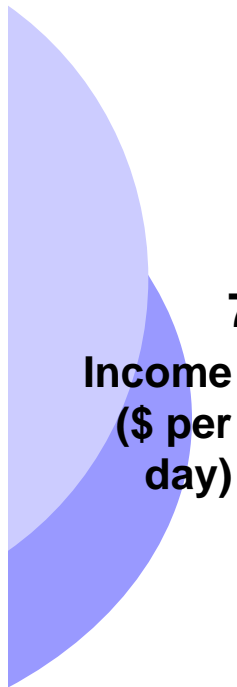
- The Supply of Labor
 - Higher wages encourage workers to substitute work for leisure
 - The substitution effect
 - Higher wages allow the worker to purchase more goods, including leisure, which reduces work hours
 - The income effect



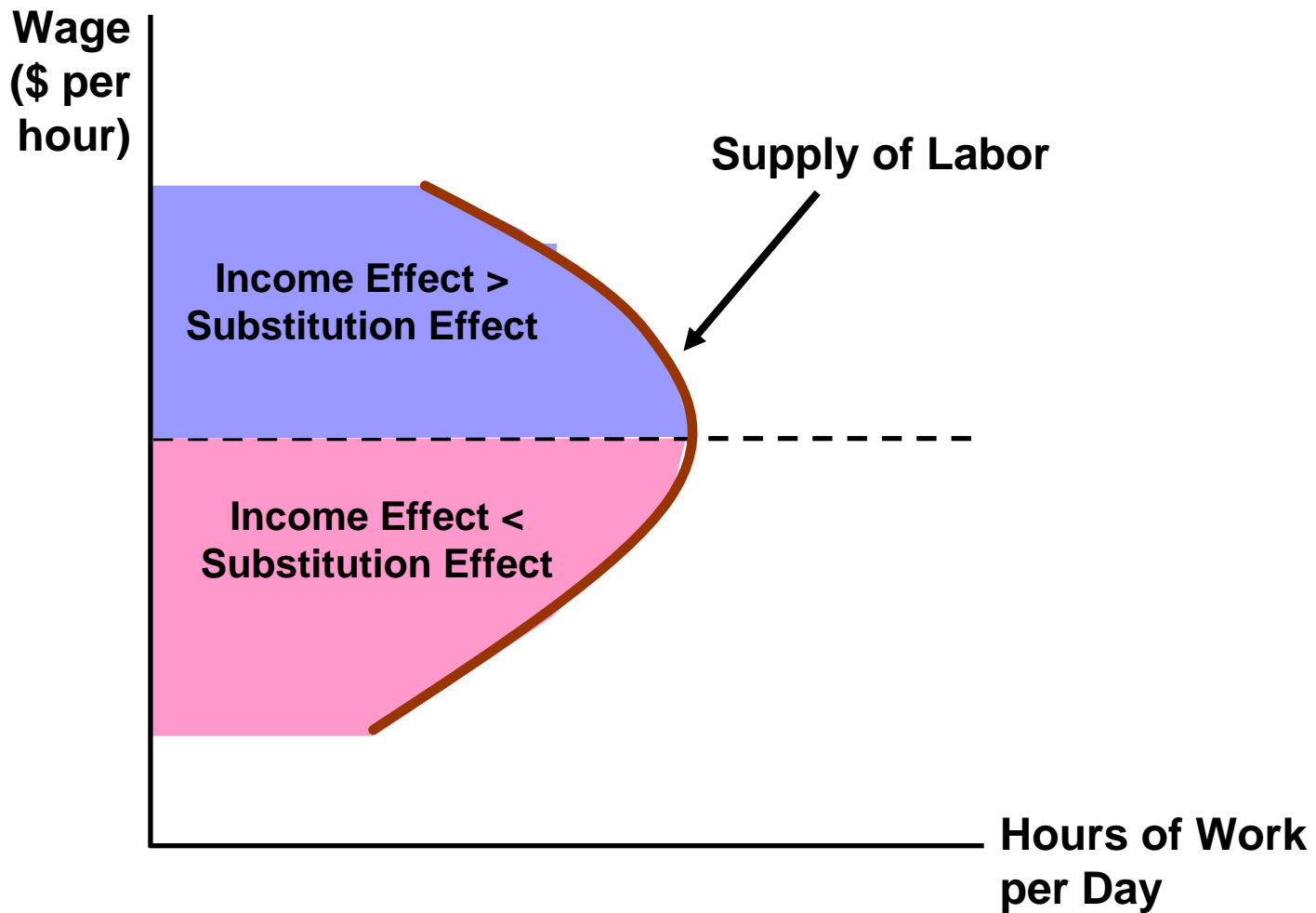
Competitive Factor Markets

- The Supply of Labor
 - If the income effect exceeds the substitution effect, the supply curve is backward bending
 - By using utility and budget line graph, we can show how the supply curve can be backward bending
 - Can show how the income effect can exceed the substitution effect

Substitution and Income Effects of Wage Increase



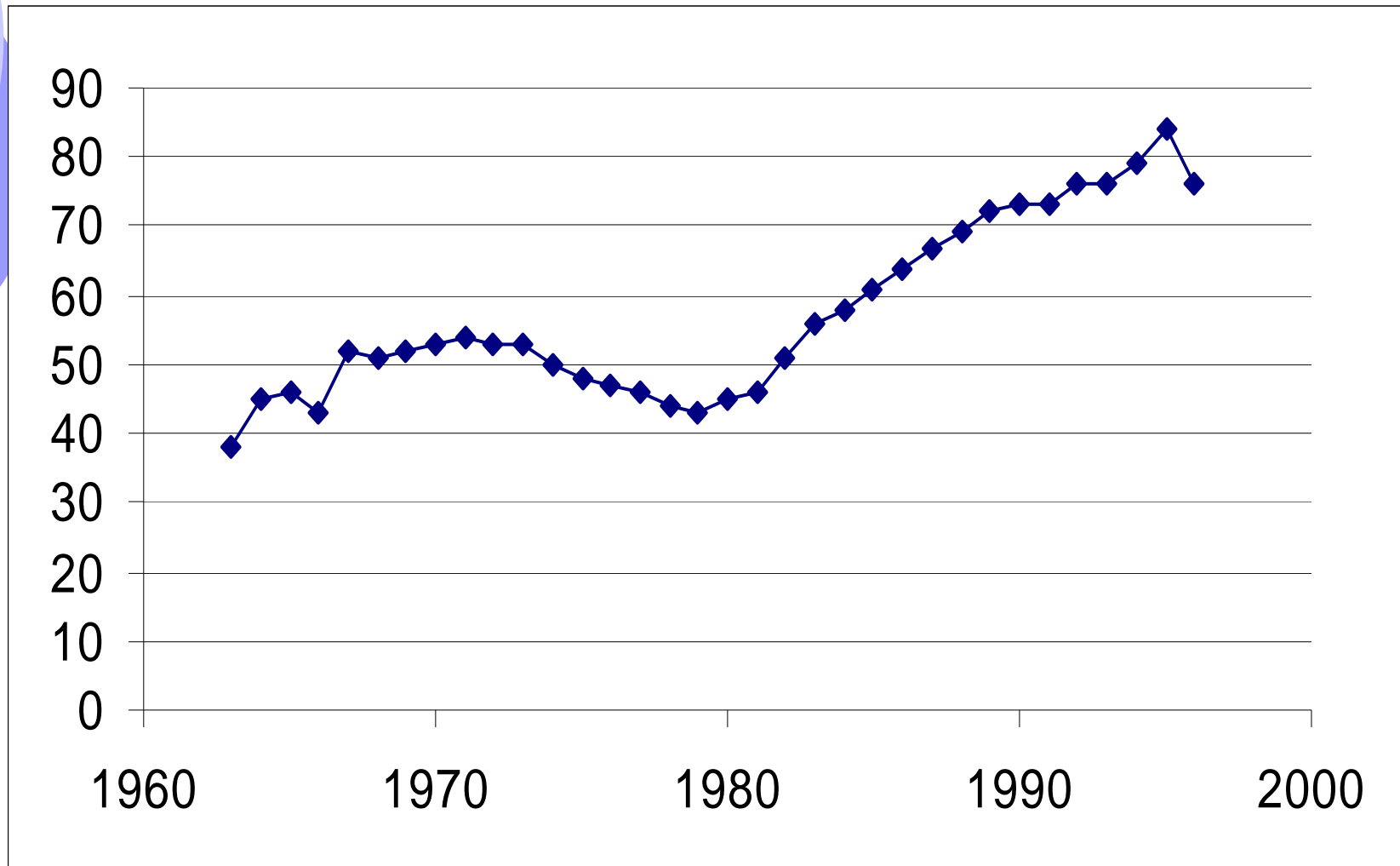
Backward-Bending Supply of Labor



Elasticities of Labor Supply (Hours Worked)

<i>Group</i>	<i>Head's Hours With Respect to Head's Wage</i>	<i>Spouse's Hours With Respect to Spouse's Wage</i>	<i>Head's Hours With Respect to Spouse's Wage</i>
Unmarried males, no children	.026		
Unmarried females, children	.106		
Unmarried females, no children	.011		
One-earner family, children	-.078		
One-earner family, no children	.007		
Two-earner family, children	-.002	-.086	-.004
Two-earner family, no children	-.107	-.028	-.059

Wage Differential between College/High School Graduates





Causes of growing inequality

- 1) Changes in supply: slowdown in the rate of growth of relative skill + increase in unskilled immigration
- 2) Institutional factors: decline in unionization, erosion of real value of minimum wage
- 3) Changes in demand: skill biased technological change
- 4) Role of globalization pressures: demand for less educated decreased



Wage Inequality – Have Computers Changed the Labor Market?

- 1950-1980
 - Relative wage of college graduates to high school graduates hardly changed
- 1980-1995
 - The relative wage grew rapidly



Wage Inequality – Have Computers Changed the Labor Market?

- Is this increase in the relative wages of skilled workers bad?
 - Although growing inequality can disadvantage low-wage workers, it can also motivate workers
 - Opportunities for upward mobility through high-wage jobs have never been better