

# **THE SPECIFIC FACTOR MODEL**

Two goods: Cloth and Food  
Factors of production:  
Labor (L), Capital (K) and Land (T)

Cloth is produced using capital and labor  
Food can be produced using land and labor.

Labor is a mobile factor can be used in either sector.

Land and Capital are both specific factors that can  
be used only in the production of one good

# PRODUCTION FUNCTION

$$Q_c = Q_c(K, L_c)$$

$$Q_f = Q_f(T, L_f)$$

$$L_c + L_f = L$$

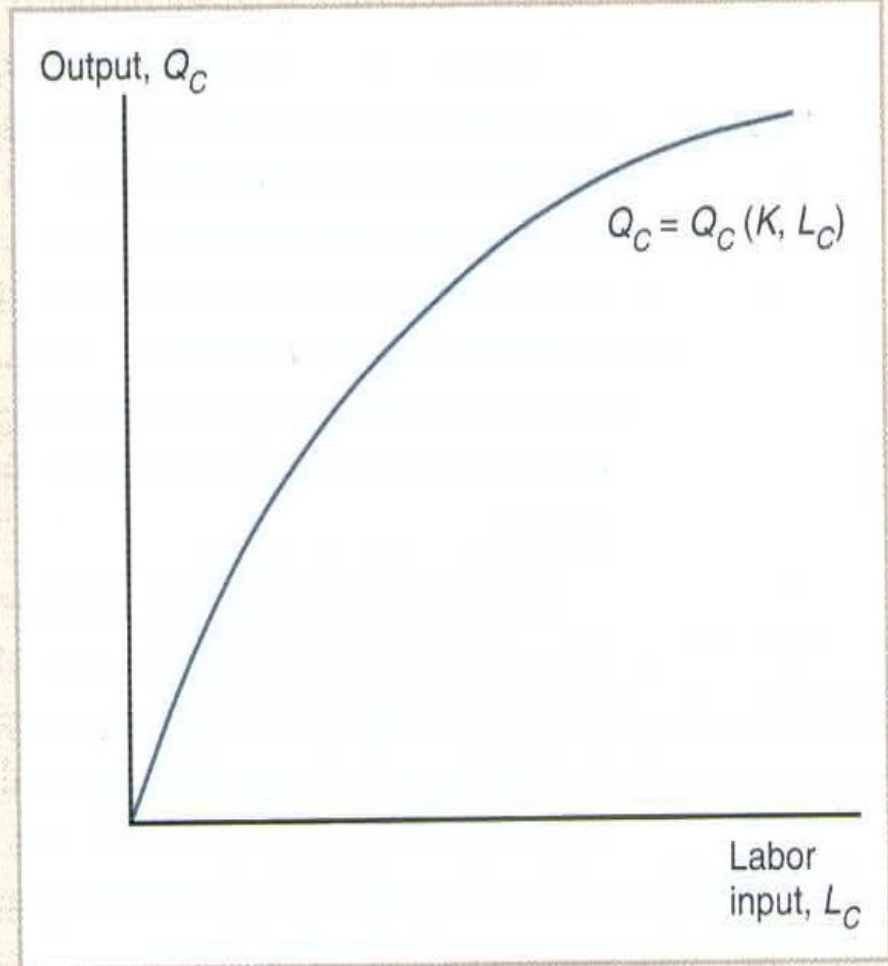
# PRODUCTION POSSIBILITIES

- Slope of  $Q_c = Q_c(K, L_c)$  represents the marginal product of labor
- Diminishing Returns

## Figure 4-1

### The Production Function for Cloth

The more labor that is employed in the production of cloth, the larger the output. As a result of diminishing returns, however, each successive person-hour increases output by less than the previous one; this is shown by the fact that the curve relating labor input to output gets flatter at higher levels of employment.

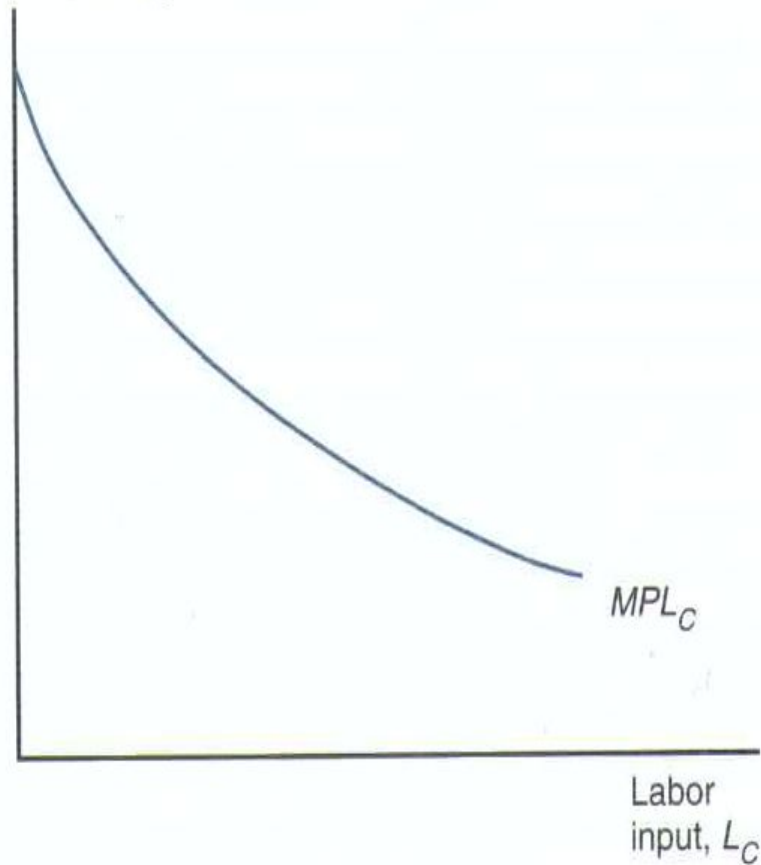


### Figure 4-2

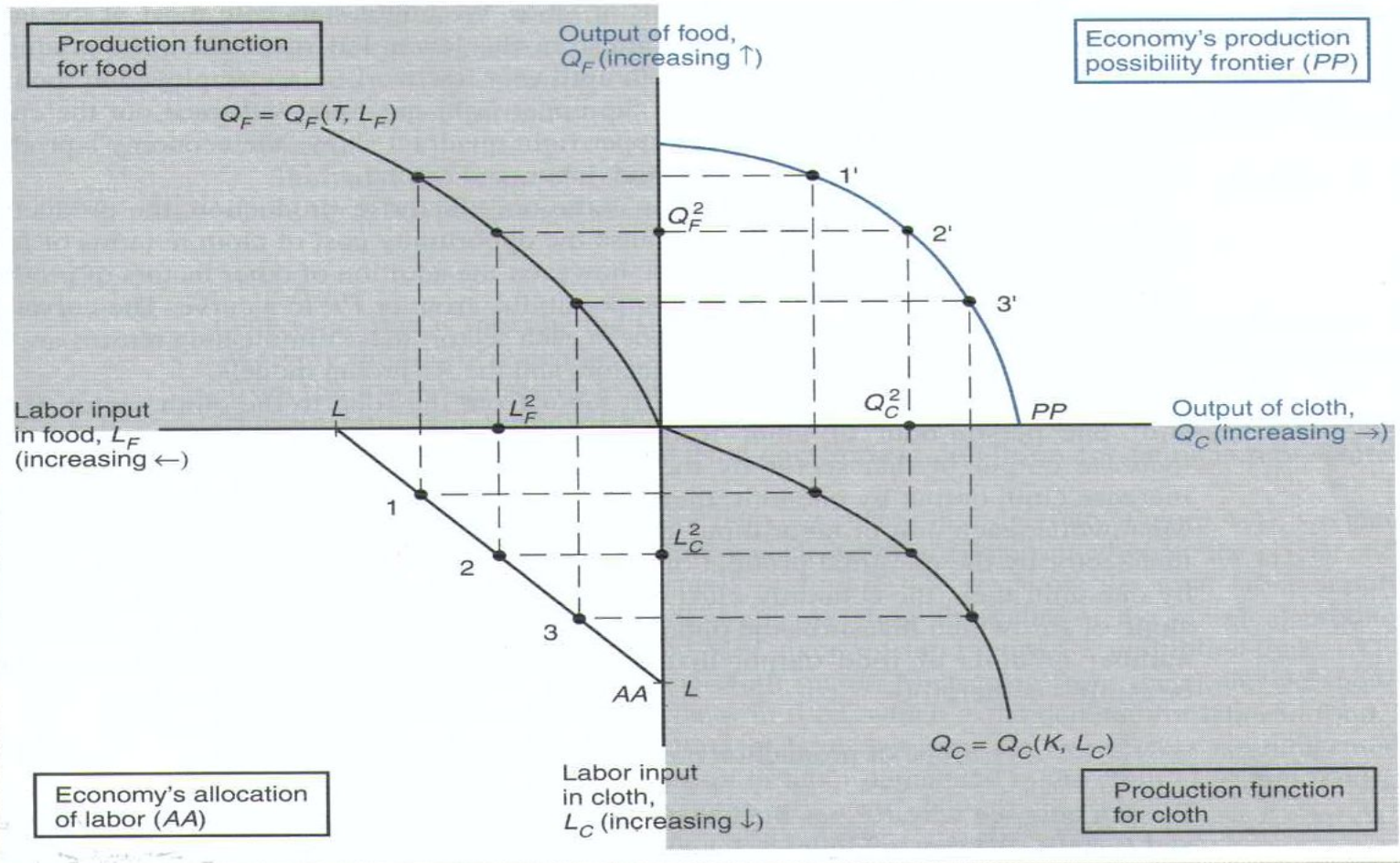
#### The Marginal Product of Labor

The marginal product of labor in the cloth sector, equal to the slope of the production function shown in Figure 4-1, is lower the more labor the sector employs.

Marginal product  
of labor,  $MPL_C$







**Figure 4-3**

**The Production Possibility Frontier in the Specific Factors Model**

Production of cloth and food is determined by the allocation of labor. In the lower left quadrant, the allocation of labor between sectors can be illustrated by a point on line AA, which represents all combinations of labor input to cloth and food that sum up to the total labor supply  $L$ . Corresponding to any particular point on AA, such as point 2, is a labor input to cloth ( $L_C^2$ ) and a labor input to food ( $L_F^2$ ). The curves in the lower right and upper left quadrants represent the production functions for cloth and food, respectively; these allow determination of output ( $Q_C^2$ ,  $Q_F^2$ ) given labor input. Then in the upper right quadrant, the curve PP shows how the output of the two goods varies as the allocation of labor is shifted from food to cloth, with the output points 1', 2', 3' corresponding to the labor allocations 1, 2, 3. Because of diminishing returns, PP is a bowed-out curve instead of a straight line.

To increase output of cloth by one unit,  
then, the economy must reduce output  
of food by  $MPL_f/MPL_c$

Slop of production possibilities curve=  
-  $MPL_f/MPL_c$



# Price, Wages and Labor Allocation

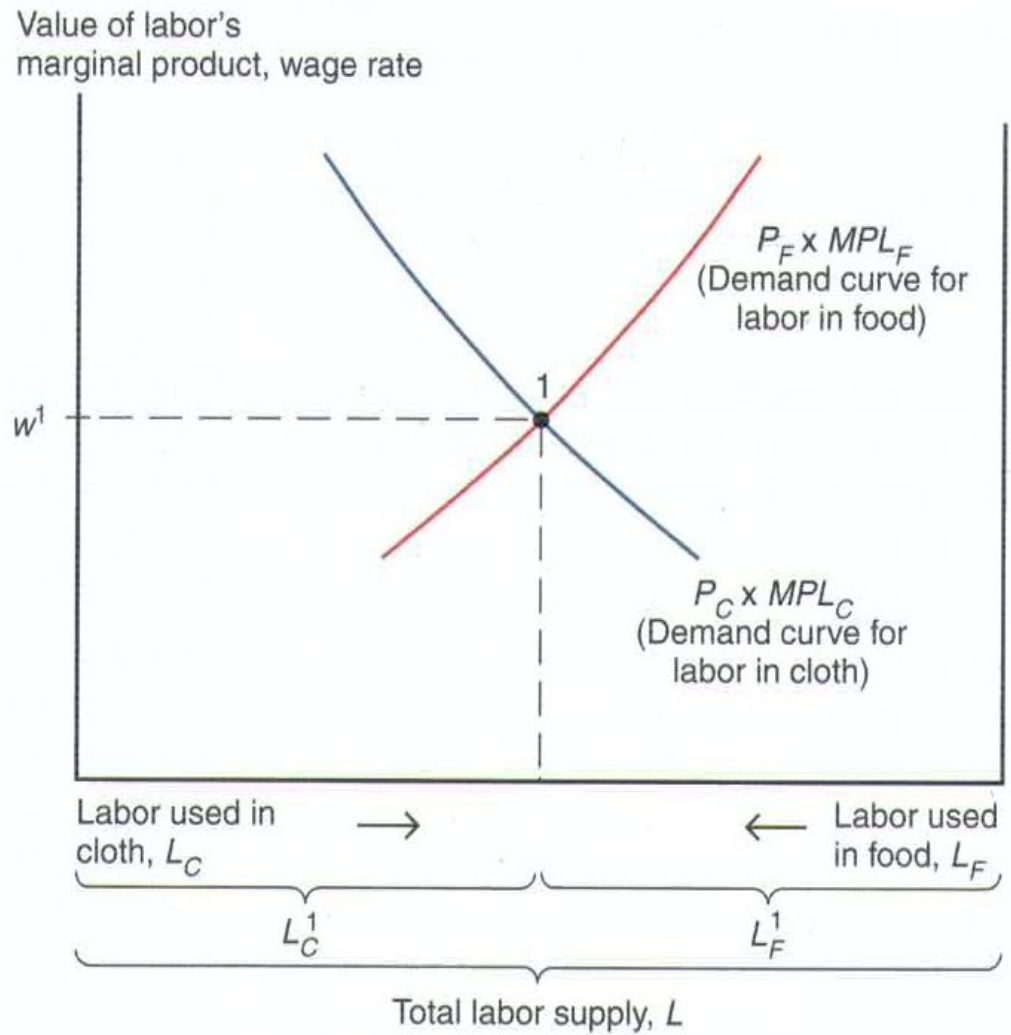
- ▣  $MPL_c * P_c = w$

- ▣  $MPL_f * P_f = w$

**Figure 4-4**

**The Allocation of Labor**

Labor is allocated so that the value of its marginal product ( $P \times MPL$ ) is the same in the cloth and food sectors. In equilibrium, the wage rate is equal to the value of labor's marginal product.

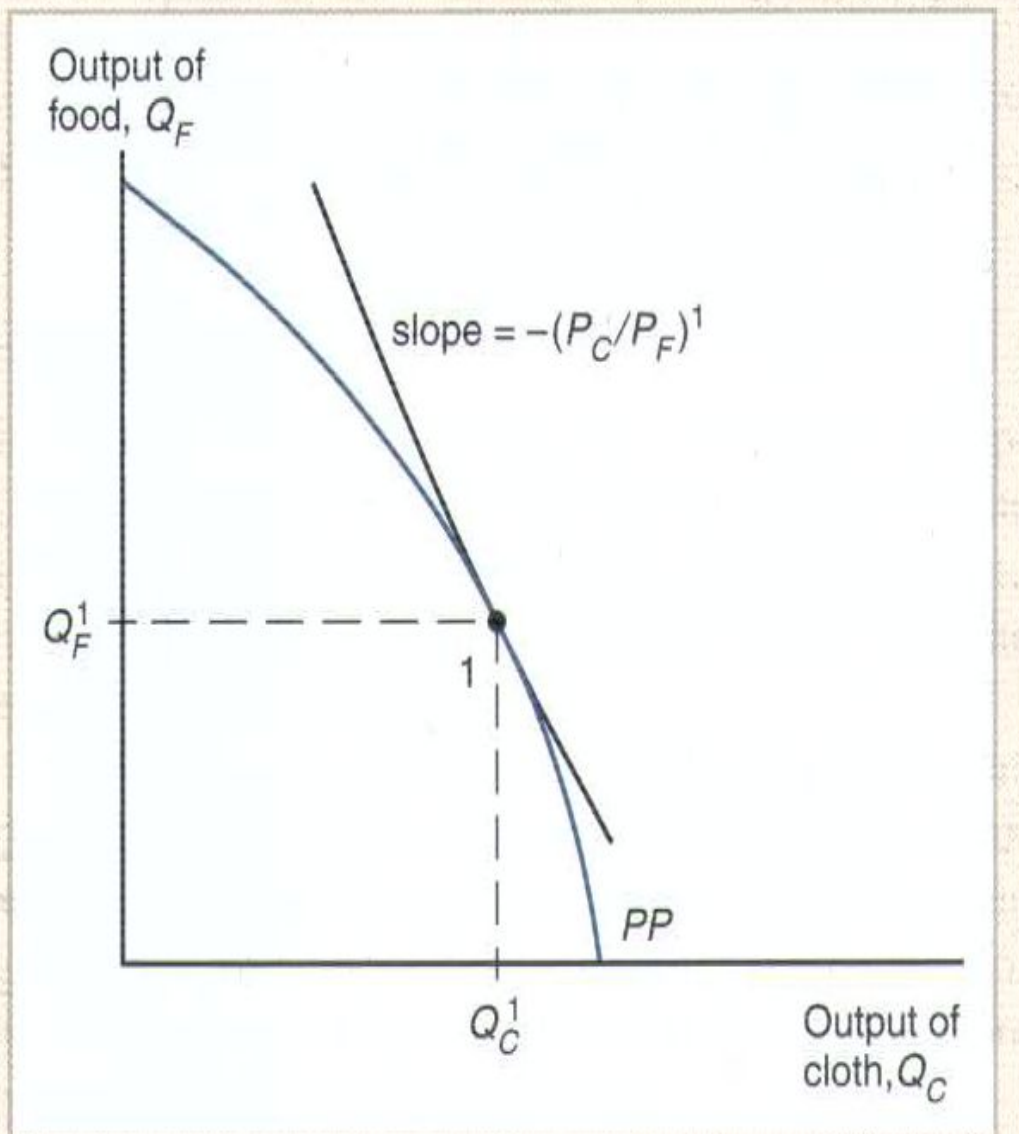


- ▣  $MPL_c * P_c = MPL_f * P_f = w$
- ▣  $- MPL_f / MPL_c = - P_c / P_f$
- ▣ At the production point, the production possibility frontier must be tangent to a line whose slope is minus the price of cloth divided by that of food

## Figure 4-5

### Production in the Specific Factors Model

The economy produces at the point on its production possibility frontier ( $PP$ ) where the slope of that frontier equals minus the relative price of cloth.



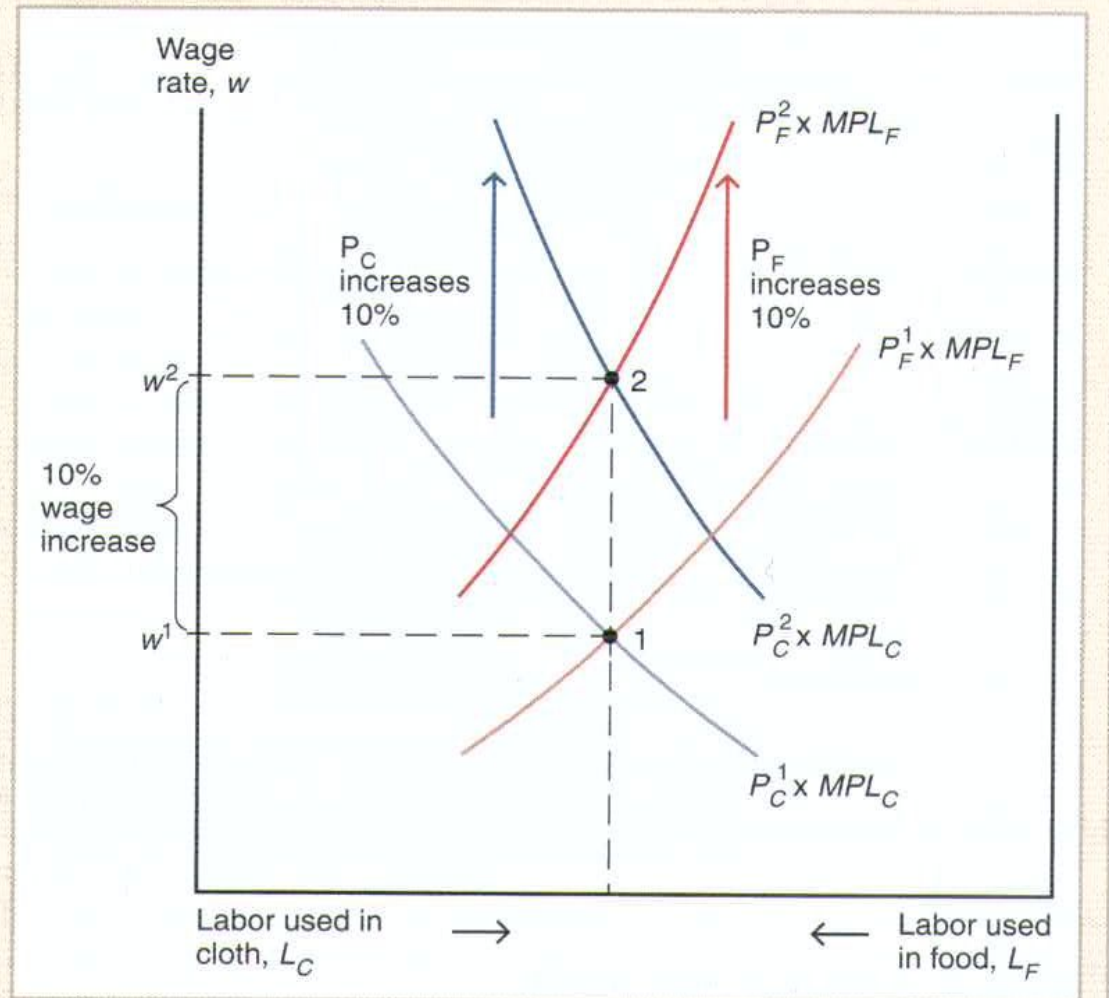


# An Equal – Proportional Change in Prices

**Figure 4-6**

## An Equal-Proportional Increase in the Prices of Cloth and Food

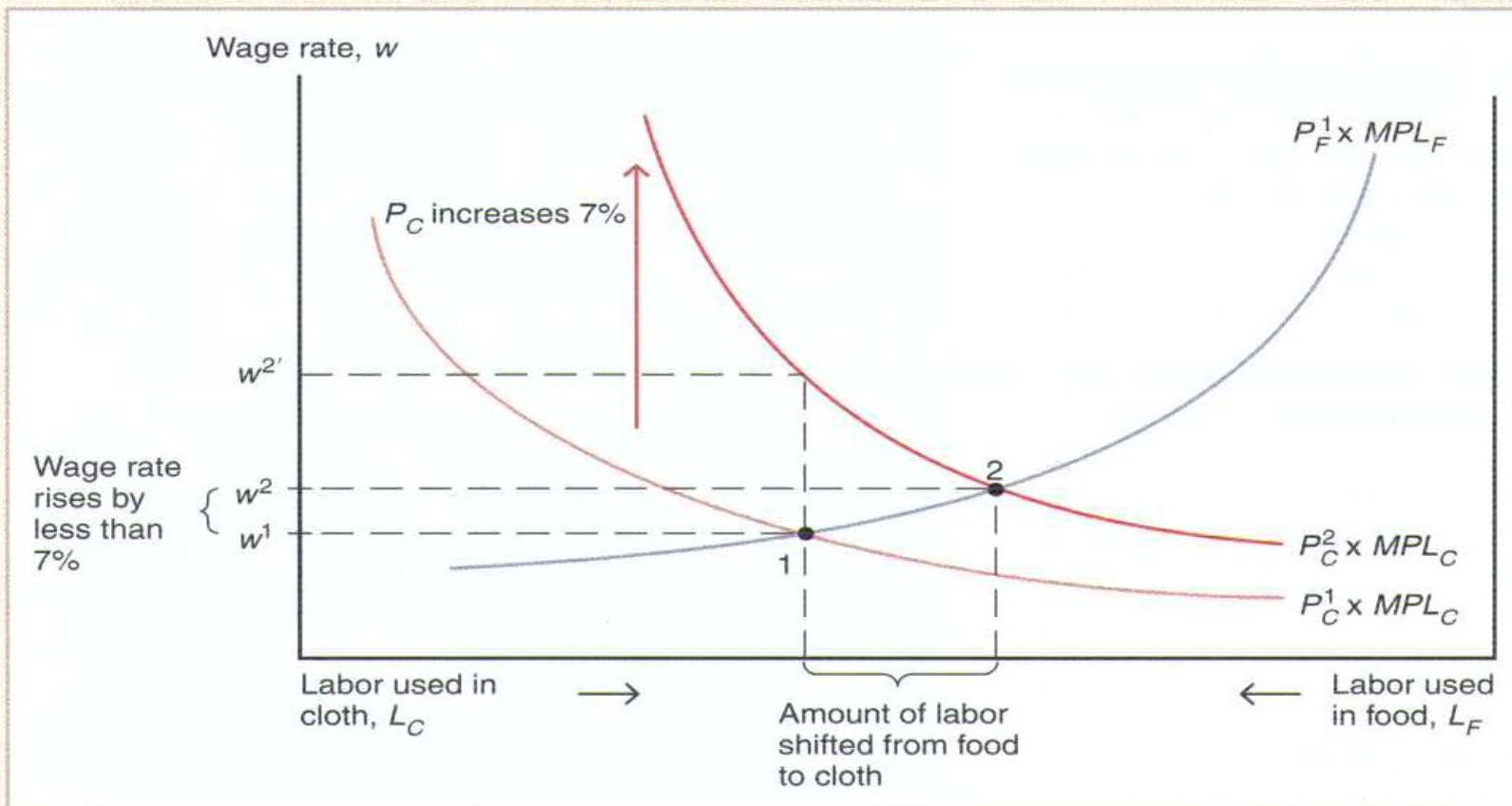
The labor demand curves in cloth and food both shift up in proportion to the rise in  $P_C$  from  $P_C^1$  to  $P_C^2$  and the rise in  $P_F$  from  $P_F^1$  to  $P_F^2$ . The wage rate rises in the same proportion, from  $w^1$  to  $w^2$ , but the allocation of labor between the two sectors does not change.





- With the same amount of labor employed in each sector, receiving the same real wage rate, the real incomes of capital owners and landowners also remain the same.

# A Change in Relative Prices



**Figure 4-7**

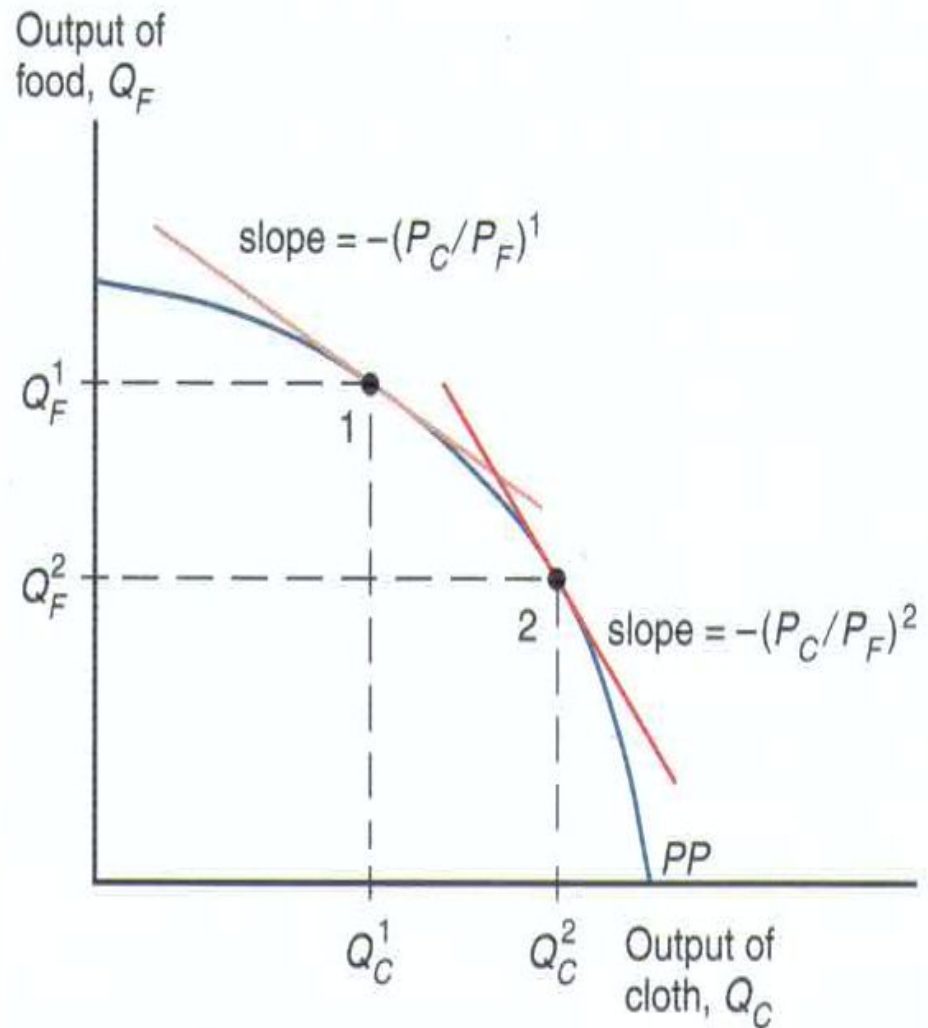
## A Rise in the Price of Cloth

The cloth labor demand curve rises in proportion to the 7 percent increase in  $P_C$ , but the wage rate rises less than proportionately. Labor moves from the food sector to the cloth sector. Output of cloth rises; output of food falls.

### Figure 4-8

#### The Response of Output to a Change in the Relative Price of Cloth

The economy always produces at the point on its production possibility frontier ( $PP$ ) where the slope of  $PP$  equals minus the relative price of cloth. Thus an increase in  $P_C/P_F$  causes production to move down and to the right along the production possibility frontier corresponding to higher output of cloth and lower output of food.

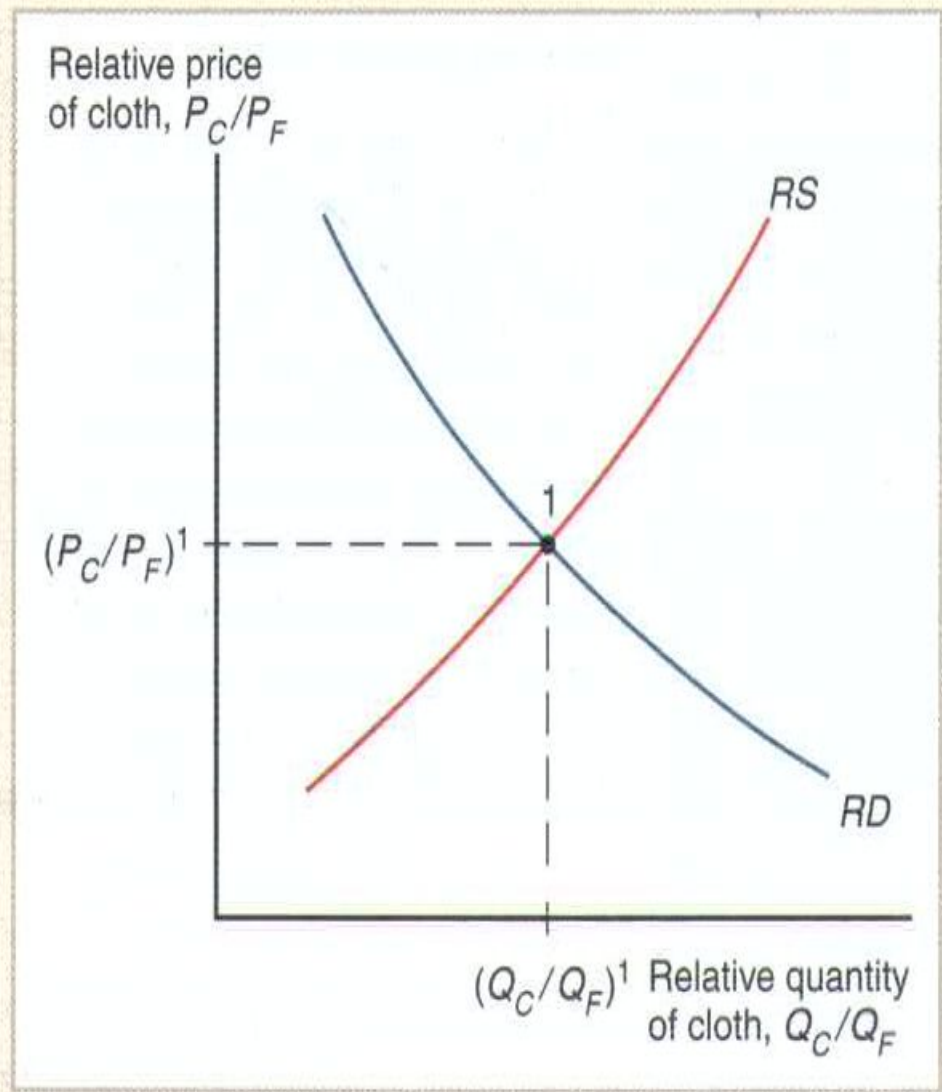




**Figure 4-9**

**Determination of Relative Prices**

In the specific factors model, a higher relative price of cloth will lead to an increase in the output of cloth relative to that of food. Thus the relative supply curve  $RS$  is upward sloping. Equilibrium relative quantities and prices are determined by the intersection of  $RS$  with the relative demand curve  $RD$ .



# Relative Prices and Income Distribution

- ▣ The factor specific to the sector whose relative price increases is definitely better off.
- ▣ The factor specific too the sector whose relative price decreases is definitely worse off.
- ▣ The change in welfare for the mobile factor is ambiguous.

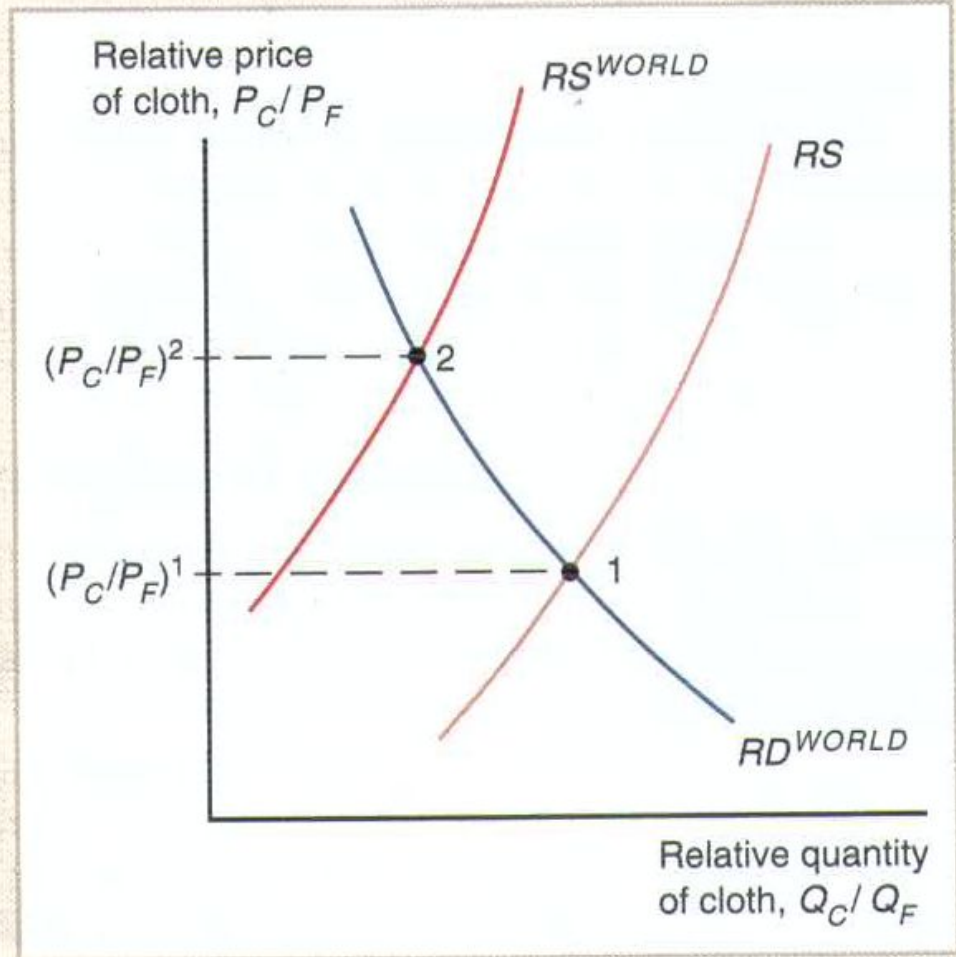


# International Trade in the Specific Factors model

**Figure 4-10**

## Trade and Relative Prices

The figure shows the relative supply curve for the specific factors economy along with the world relative supply curve. The differences between the two relative supply curves can be due to either technology or resource differences across countries. There are no differences in relative demand across countries. Opening up to trade induces an increase in the relative price from  $(P_C/P_F)^1$  to  $(P_C/P_F)^2$ .



# Income Distribution and the Gains from Trade

- ▣ Trade Benefits the factor that is specific to the export sector of each country but hurts the factor specific to the import-competing sectors, with ambiguous effects on mobile factors.

**Thank you**