■ HECKSCHER-OHLIN MODEL

Main theory of trade over past 60 years has been the Heckscher-Ohlin (H-O) model

Key assumptions:

- production functions exhibit constant returns, good X is *labor-intensive*, good Y is *capital-intensive* in production

- technology is the same across countries

- labor and capital are fixed in supply, and are *perfectly mobile* between industries within a country, but *perfectly immobile* between countries

- no market distortions

- countries have identical and homogeneous preferences

- countries differ in their relative factor endowments

Relative Factor Abundance/Scarcity

Relative factor endowments are the meaningful difference between countries - how is this defined?

$$(K/L)_h > (K/L)_f \qquad (1)$$

This means h is relatively *capital abundant*, and f is relatively *labor abundant* - this is reflected in autarky factor prices

Factor Intensities

By assumption, we know that:

$$(K/L)_y > (K/L)_x \qquad (2)$$

In equilibrium, the capital/labor ratio is chosen so as to minimize costs at prevailing relative factor prices w/r, where w is the wage rate, and r is the rental cost of capital

It is possible that at different relative factor prices there will be *factor-intensity reversals* - these are assumed not to occur in the H-O model

FIGURE 1: RELATIVE FACTOR ENDOWMENTS

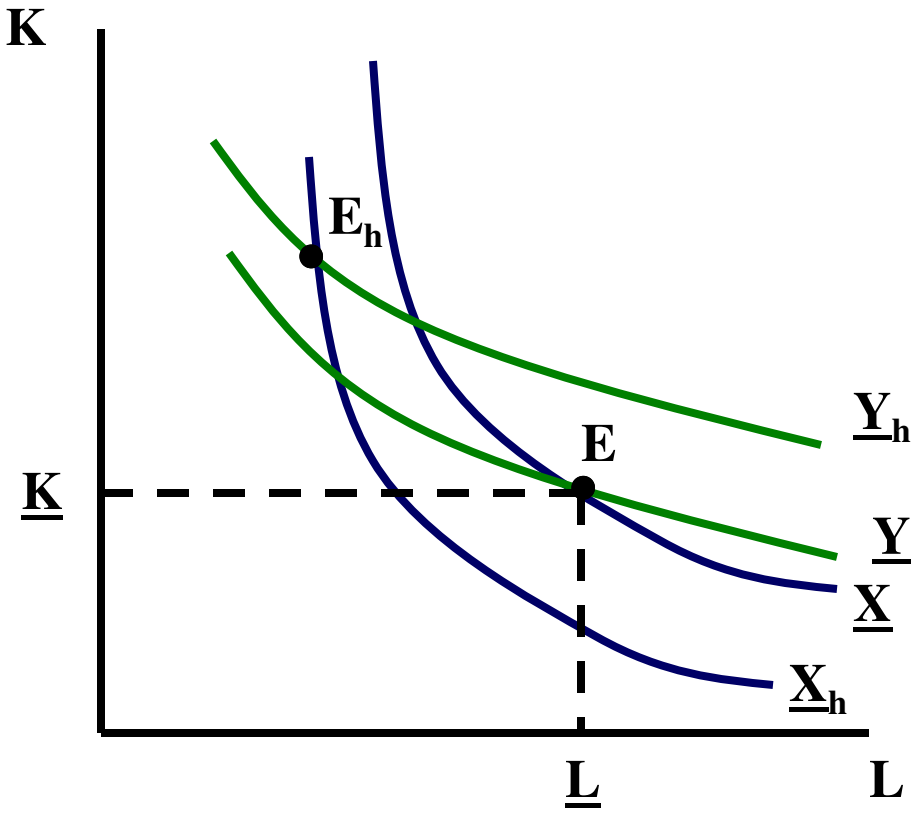


FIGURE 2: PRODUCTION FRONTIERS

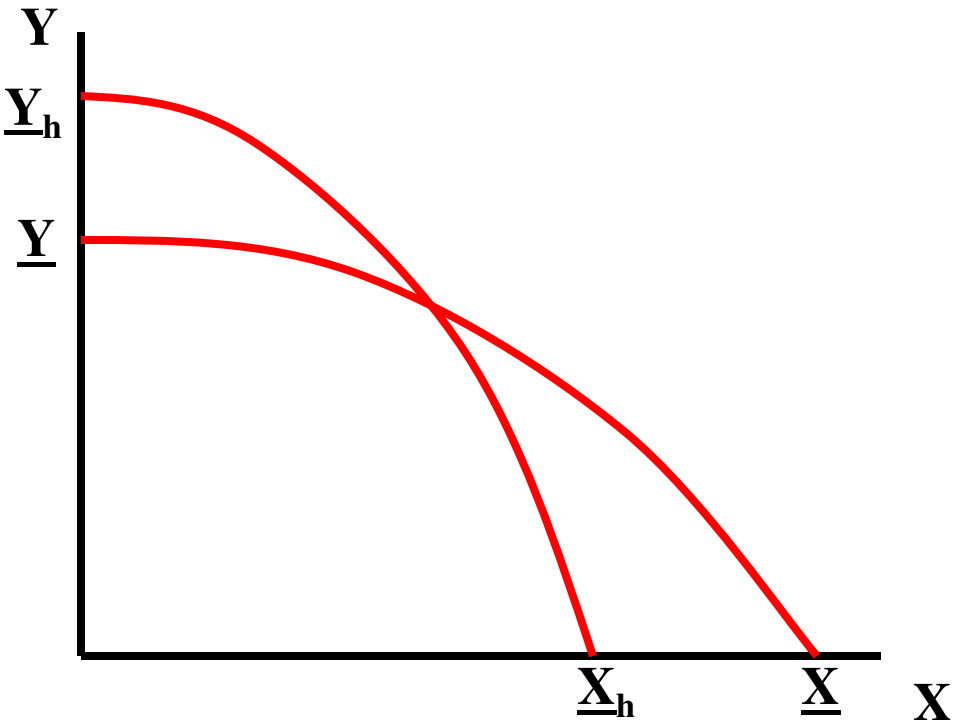
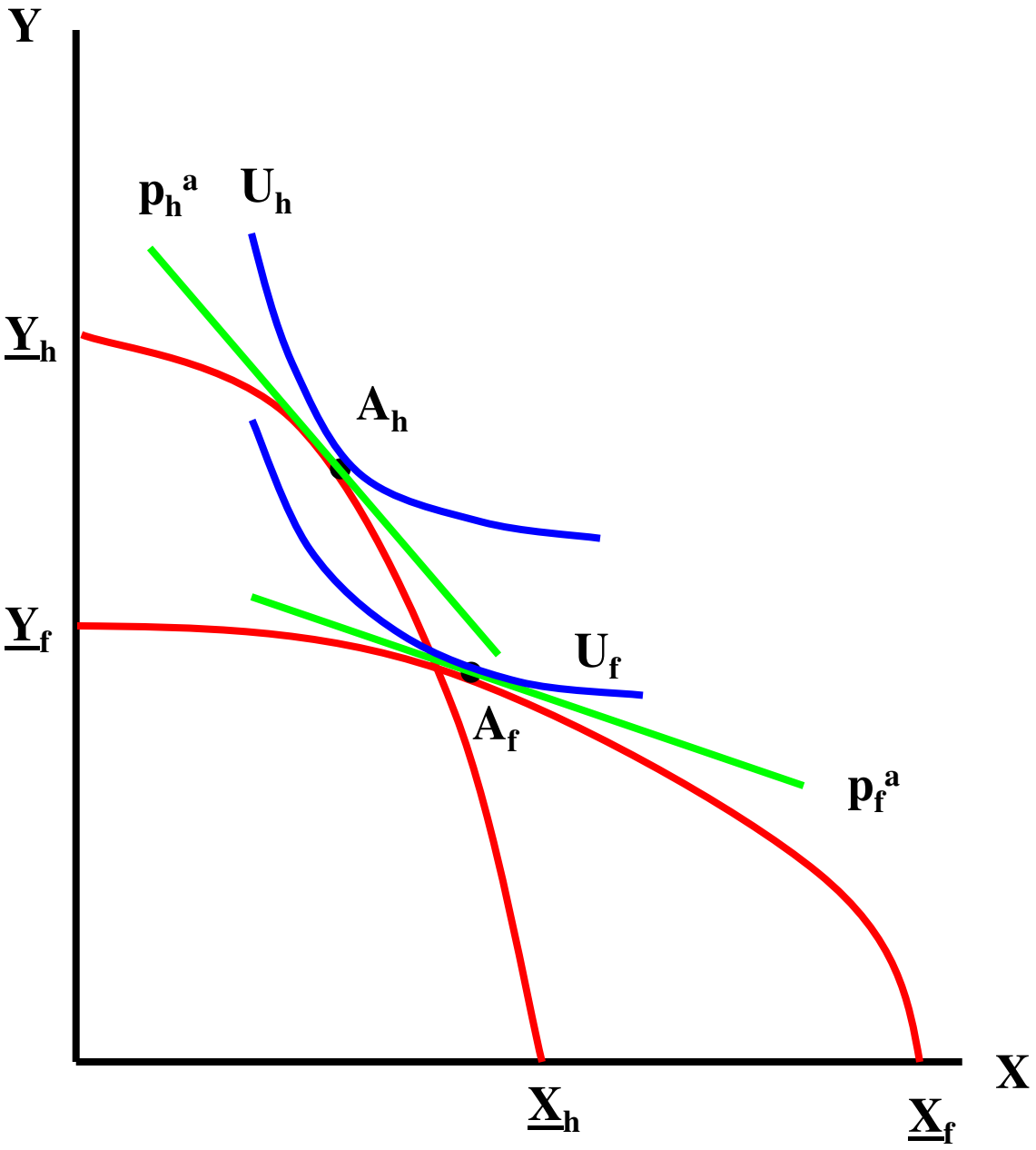


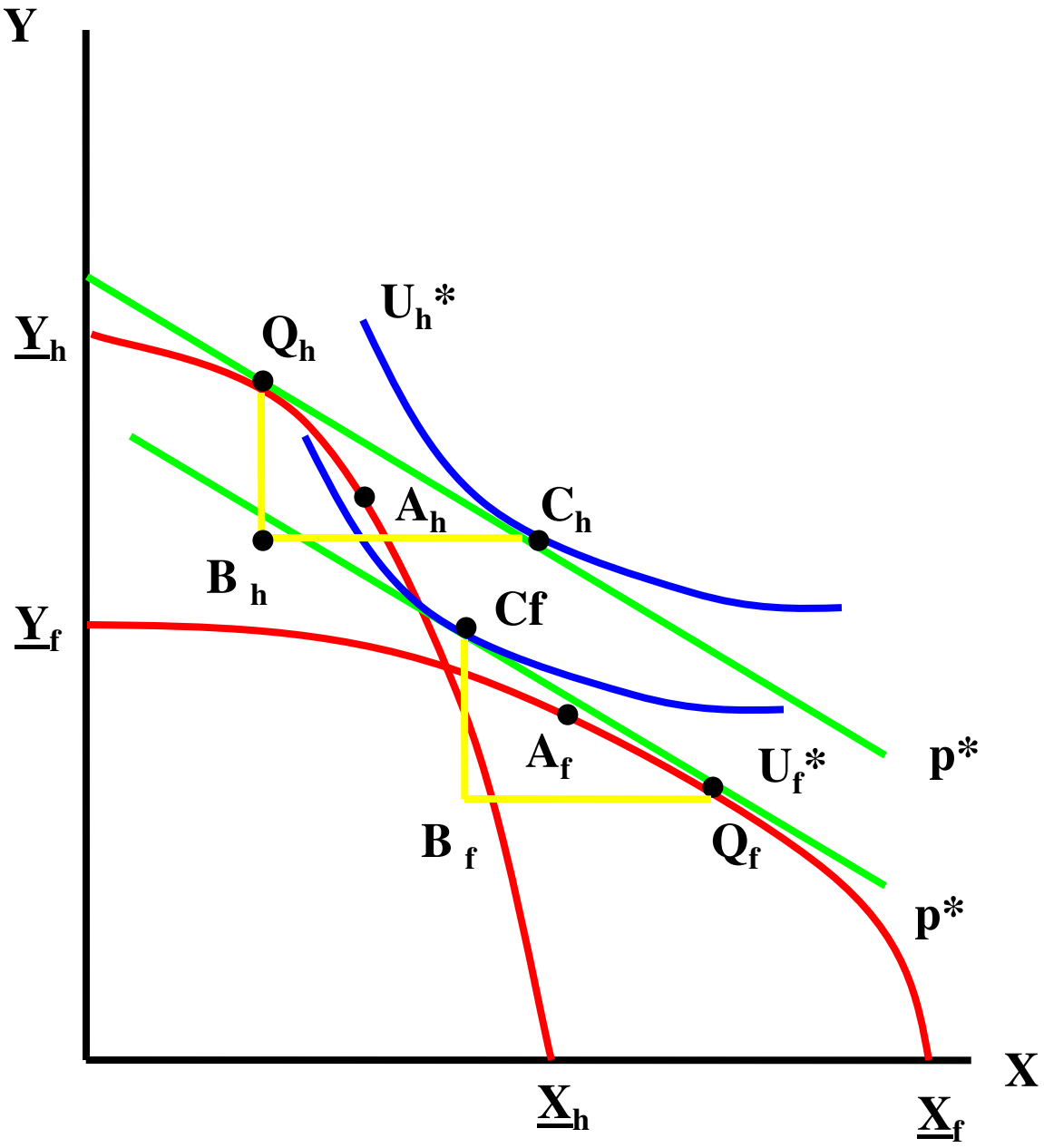
FIGURE 3: AUTARKY EQUILIBRIUM



Under autarky:

$p^a_h > p^a_f$

FIGURE 4: HECKSCHER -OHLIN THEOREM



■ **Theorem 1 (Heckscher-Ohlin)**

A country will export the good that intensively uses its relatively abundant factor of production

As well as the H-O theorem, there are a number of other key results that go with it:

- the Stolper-Samuleson theorem

- the factor-price equalization theorem

- the Rybczynski theorem

■ **Stolper-Samuelson**

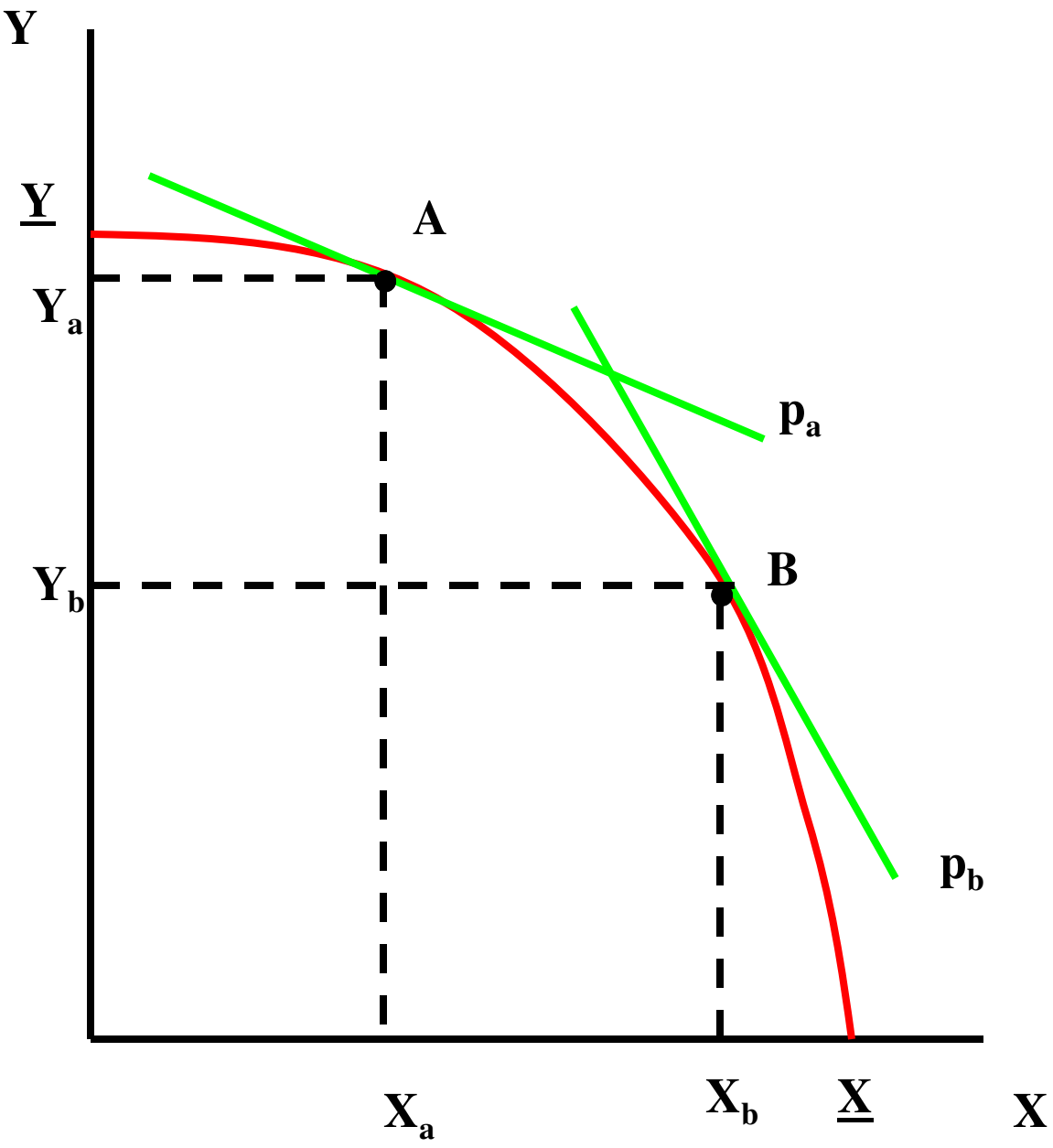
Given the H-O theorem, there must be a connection between relative goods prices and relative factor prices,

Exporting a good that embodies the relatively abundant factor will increase demand for that factor, and, hence, raise its relative price

$$w/r = G(P_x/P_y) \qquad (3)$$

where G depends only on the production functions

FIGURE 5: CHANGE IN RELATIVE PRICES



Theorem 2 (Stolper-Samuelson)

With constant returns to scale, and if both goods continue to be produced, a relative increase in the price of a good will increase the real return to the factor used intensively in that industry and reduce the real return to the other factor

- even if a country makes an *aggregate* gain from trade, there is a *redistribution* effect

- highlights important difference between Ricardian and H-O model; in the former, workers share equally in gains from trade, while in the latter only the abundant factor gains from trade

■ Factor-Price Equalization

If under autarky $p_f^a < p_h^a$, then factor price ratios $\omega_f^a < \omega_h^a$ under autarky. Hence, if with trade $p_f^* = p_h^*$, then it must be true that $\omega_f^* = \omega_h^*$

Equalization of factor price ratios means that ω rises in f and falls in h as trade occurs

■ **Theorem 3 (factor-price equalization)**

Under identical constant returns production technologies, free trade in goods will equalize relative factor prices through the equalization of relative goods prices, as long as both countries produce both goods

- this implies that trade in goods acts as a substitute for trade in factors of production

- in practice, trade is only likely to result in a tendency towards factor-price equalization - various things can prevent this from happening, e.g. transport costs, tariffs and other market distortions such as producer taxes and subsidies

■ **Rybczynski**

Suppose goods prices are fixed, but the endowment of one of the factors increases, e.g. an increase in the labor supply, the capital stock held constant

This will raise the output of good X, and lower the output of Y - why?

Fixed goods prices imply fixed factor prices, implying unchanged factor proportions in X and Y. As output of X expands to absorb extra labor, it requires extra capital to keep factor proportions constant. Only source of capital is industry Y which must contract

■ **Theorem 4 (Rybczynski)**

If relative goods prices are constant, and both goods continue to be produced, an increase in the supply of a factor will lead to an increase in the output of the good using that factor intensively, and a decrease in the output of the other commodity

FIGURE 8: THE RYBCZYNSKI LINE