

Lecture 4: Gains from Trade

1. The gains from trade theorem - free trade versus no trade (autarky)
2. Restricted/subsidized trade versus autarky
3. Free trade versus restricted trade
4. Failures of the gains from trade theorem
 - "non-convexities"
 - "non-tangencies"
5. Distribution of gains between countries
 - Equilibrium prices relative to autarky prices
6. Distribution of gains between individuals within countries
 - Identical endowments, different preferences
 - Identical preferences, different endowments

GAINS FROM TRADE: FACTS OR MYTHS?

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1. One country can gain only at the expense of another.
2. It is better to export "high tech" than resource-intensive goods.
3. Small countries lose out to large countries in trade.
4. We cannot gain by trading with non-market economies.
5. We are damaged by foreign subsidies.
6. High wage-countries will lose out to low-wage countries in trade.

GAINS FROM TRADE THEOREM

1. An undistorted market economy must be better off in free trade than in autarky.
2. For a small, undistorted market economy, completely free trade is better than any level of trade protection or subsidization.
3. For any undistorted market economy, free trade is better than any level of trade subsidization.

Note 1: These statements make no reference to anything about the trading partner, such as size, technological sophistication, etc. and make no reference to the direction of trade.

Note 2: These statements refer to aggregate national income and consumptions. They do not guarantee that everyone within a country is better off.

The Gains from Trade Theorem - Free Trade versus Autarky

p^f - vector of free trade prices, p_i^f

X^f - vector of free trade outputs, X_i^f

C^f - vector of free trade consumption, C_i^f

X^a - vector of autarky outputs, X_i^a

C^a - vector of autarky consumption, C_i^a

(1) Production efficiency, convexity

$$\sum_i p_i^f X_i^f \geq \sum_i p_i^f X_i^a$$

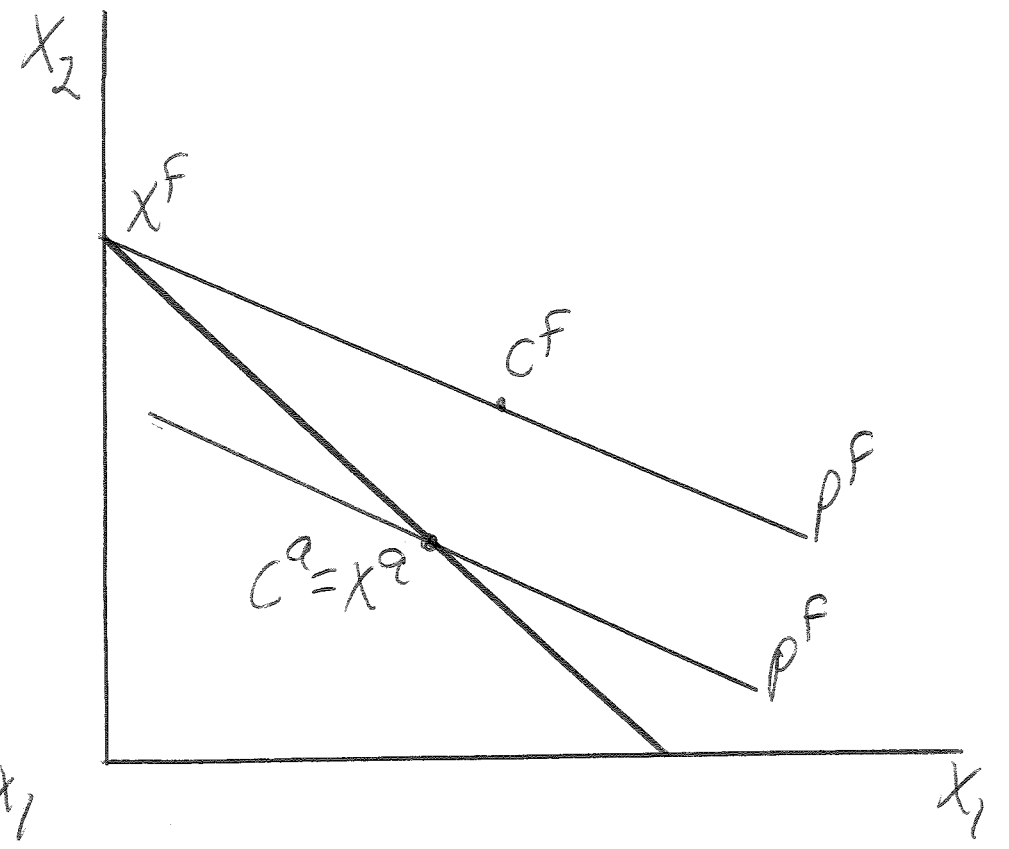
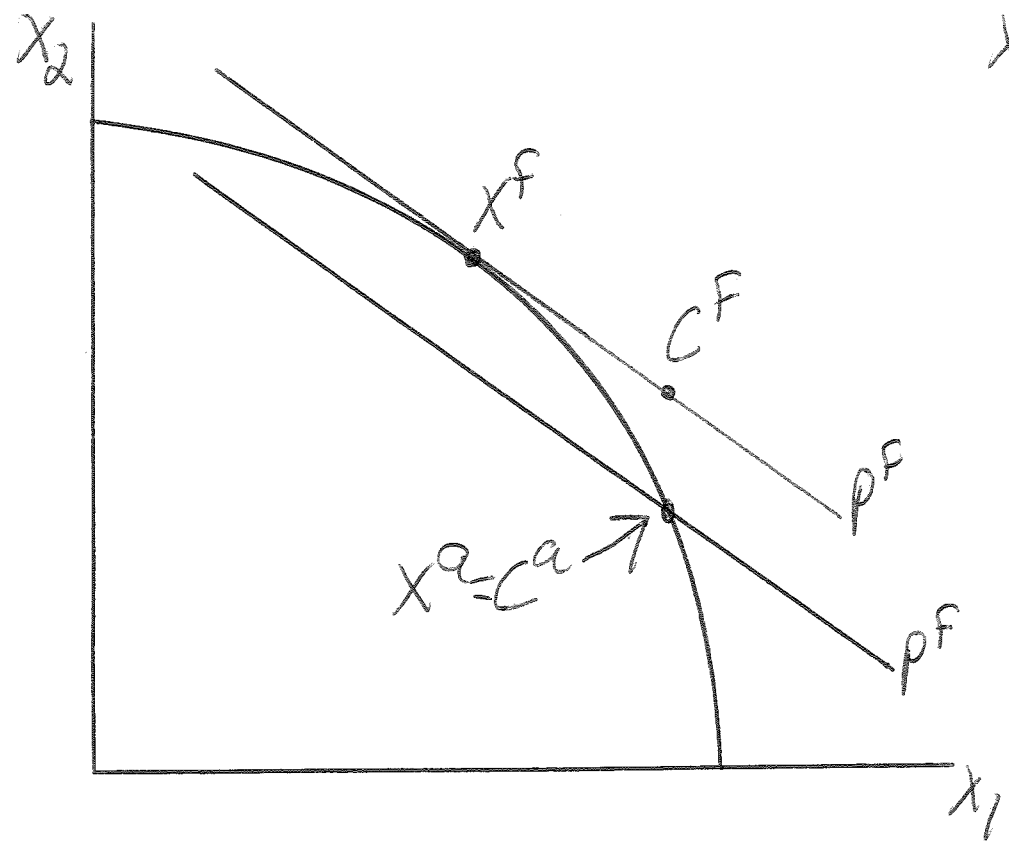
(2) Autarky market clearing, trade balance

$$X_i^a = C_i^a \quad \sum_i p_i^f X_i^f = \sum_i p_i^f C_i^f$$

(3) Substitute (2) into (1)

$$\sum_i p_i^f C_i^f \geq \sum_i p_i^f C_i^a$$

Free trade is "Revealed Preferred" autarky



Restricted/Subsidized Trade versus Autarky

Let domestic prices be $p^d = p^f(1+t)$

(A) If X_i is imported, $t_i > 0$ is an import tariff, $t_i < 0$ is an import subsidy.

(B) If X_i is exported, $t_i < 0$ is an export tax, $t_i > 0$ is an export subsidy.

(1) Value of output is maximized at producer prices

$$\sum_i p_i^f (1 + t_i) X_i^f \geq \sum_i p_i^f (1 + t_i) X_i^a$$

(2) Autarky market clearing, trade balance

$$X_i^a = C_i^a \quad \sum_i p_i^f X_i^f = \sum_i p_i^f C_i^f$$

(3) Add the following to both sides of (1)

$$\sum_i p_i^f (1 + t_i) C_i^f$$

(4) Now substitute (2) into (1)

$$\sum_i p_i^f (1 + t_i) C_i^f \geq \sum_i p_i^f (1 + t_i) C_i^a + \sum_i p_i^f (1 + t_i) (C_i^f - X_i^f)$$

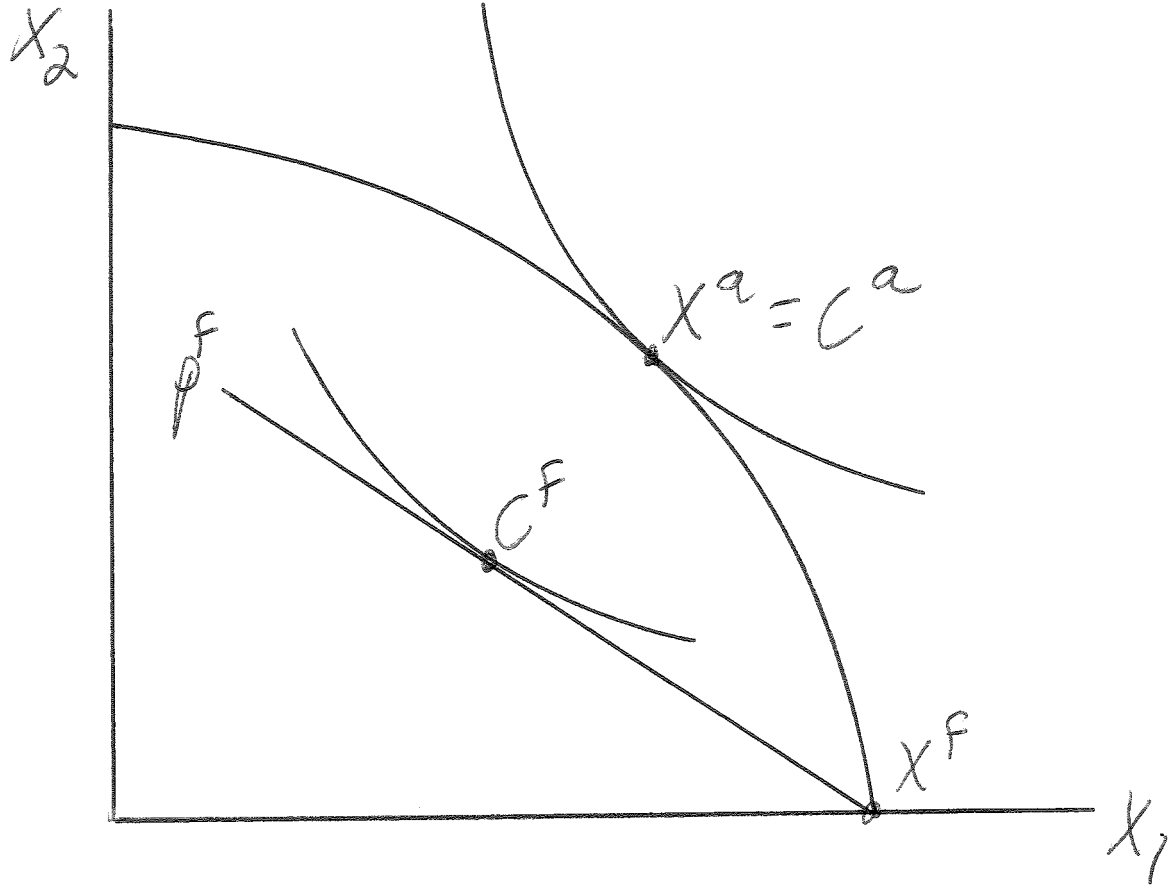
(5) But using the balance-of-trade equation (2), this reduces to

$$\sum_i p_i^d C_i^f \geq \sum_i p_i^d C_i^a + \sum_i p_i^f t_i (C_i^f - X_i^f)$$

Restricted trade is superior to autarky. Subsidized trade may not be superior to autarky. Note that the last term in the last equation is tax revenue (or subsidy expenditure).

Another way of stating the result is to say that a sufficient condition for gains from trade is that trade tax revenue is positive.

Government decides (perhaps implemented by a subsidy to X) that the country should specialize in X.



Free Trade versus Restricted Trade

Let p^r denote the vector of world prices under trade restrictions. p^f continues to denote world prices in free trade.

(1) Production efficiency in free trade

$$\sum_i p_i^f X_i^f \geq \sum_i p_i^f X_i^r$$

(2) Balance of payments in free trade

$$\sum_i p_i^f X_i^f = \sum_i p_i^f C_i^f$$

(3) Balance of payments in restricted trade

$$\sum_i p_i^r X_i^r = \sum_i p_i^r C_i^r$$

(4) Do some stuff

$$\sum_i p_i^f C_i^f \geq \sum_i (p_i^f X_i^r - p_i^f C_i^r) + \sum_i p_i^f C_i^r + \sum_i (-p_i^r X_i^r + p_i^r C_i^r)$$

(5) Simplify

$$\sum_i p_i^f C_i^f \geq \sum_i p_i^f C_i^r + \sum_i (p_i^r - p_i^f)(C_i^r - X_i^r)$$

The last term in (5) is a terms of trade effect. The terms-of-trade effect will be negative if prices of imports are higher under free trade.

Result

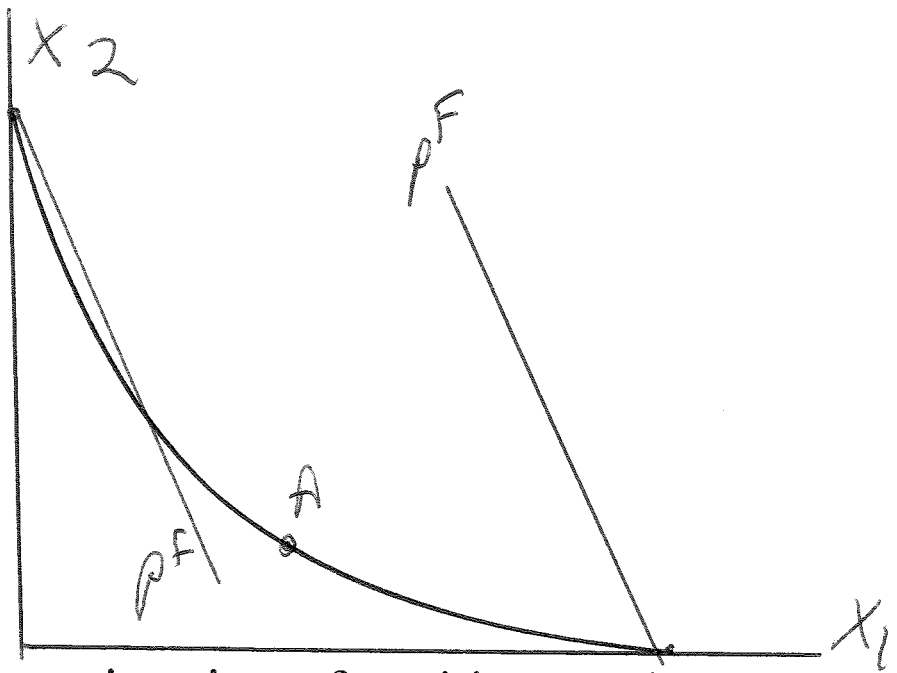
- (a) Free trade is superior to restricted trade for a "small" (price taking) economy.
- (b) Restricted trade may be superior to free trade if the trade restrictions sufficiently improve the terms of trade.
- (c) Free trade is superior to subsidized trade for any economy.

Failures of the Gains from Trade Theorem

(1) "Non-Convexities": Cannot generalize from local results

Equilibrium with $X_2 > 0, X_1 = 0$ can be locally optimal (and stable). Here we have

$$\frac{p_1}{p_2} < \frac{MC_1}{MC_2}, \quad p_2 = MC_2 \quad p_1 < MC_1 \quad (X_1 = 0)$$



This could arise in a situation of positive production externalities, such as spillover among X_1 -sector firms.

(2) "Non-Tangencies": Distortion between producer and consumer prices

Let $p(1-t) = \text{mrt}$, for example, taxes on X production: $p(1-t)$ are producer prices

(3) Value of output is maximized at producer prices

$$\sum_i p_i^f (1 - t_i) X_i^f \geq \sum_i p_i^f (1 - t_i) X_i^a$$

(4) Autarky market clearing, trade balance

$$X_i^a = C_i^a \quad \sum_i p_i^f X_i^f = \sum_i p_i^f C_i^f$$

(5) Welfare must be evaluated at consumer prices

$$\sum_i p_i^f C_i^f \geq \sum_i p_i^f C_i^a + \sum_i p_i^f t_i (X_i^f - X_i^a)$$

which can also be written as

$$\sum_i p_i^f C_i^f \geq \sum_i p_i^f C_i^a + \sum_i (p_i^f - mc_i)(X_i^f - X_i^a)$$

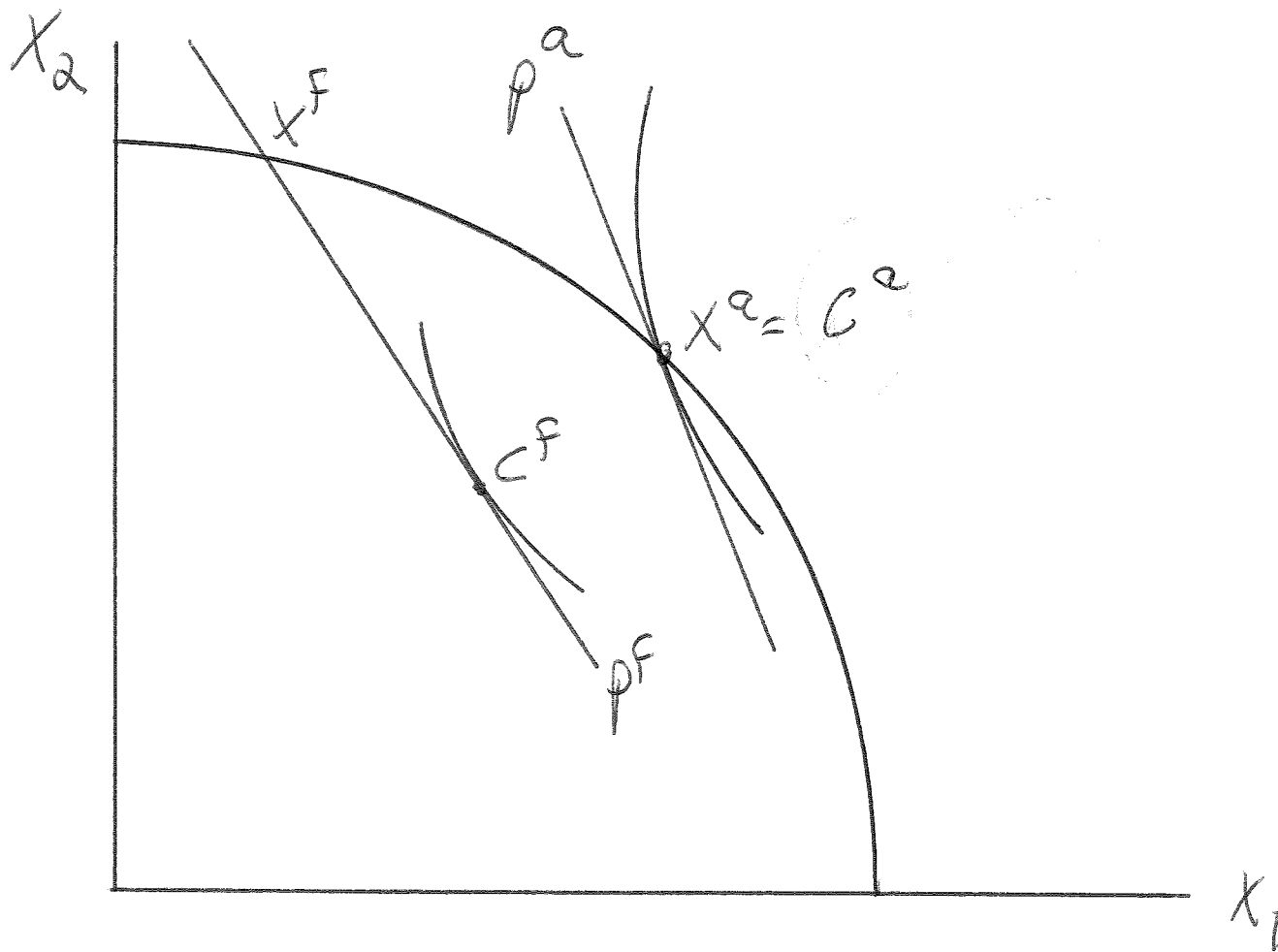
The last term can be called a "production expansion" or a "Harberger triangle effect."

Result

If distortions lead to the under (over) production of some goods, a weighted increase (decrease) in the outputs of these goods is a sufficient condition for gains from trade.

Suppose that there is a positive externality in the X_1 sector, or that the government taxes the production of X_1 . Then the private marginal cost of X_1 , equal to its price, is greater than the true (social) marginal cost which is the slope of the production frontier.

Too little X_1 is produced initially, and if the world price is less than the autarky price, this can push the economy even further from optimality and may reduce welfare.



Distribution of total gains between two countries

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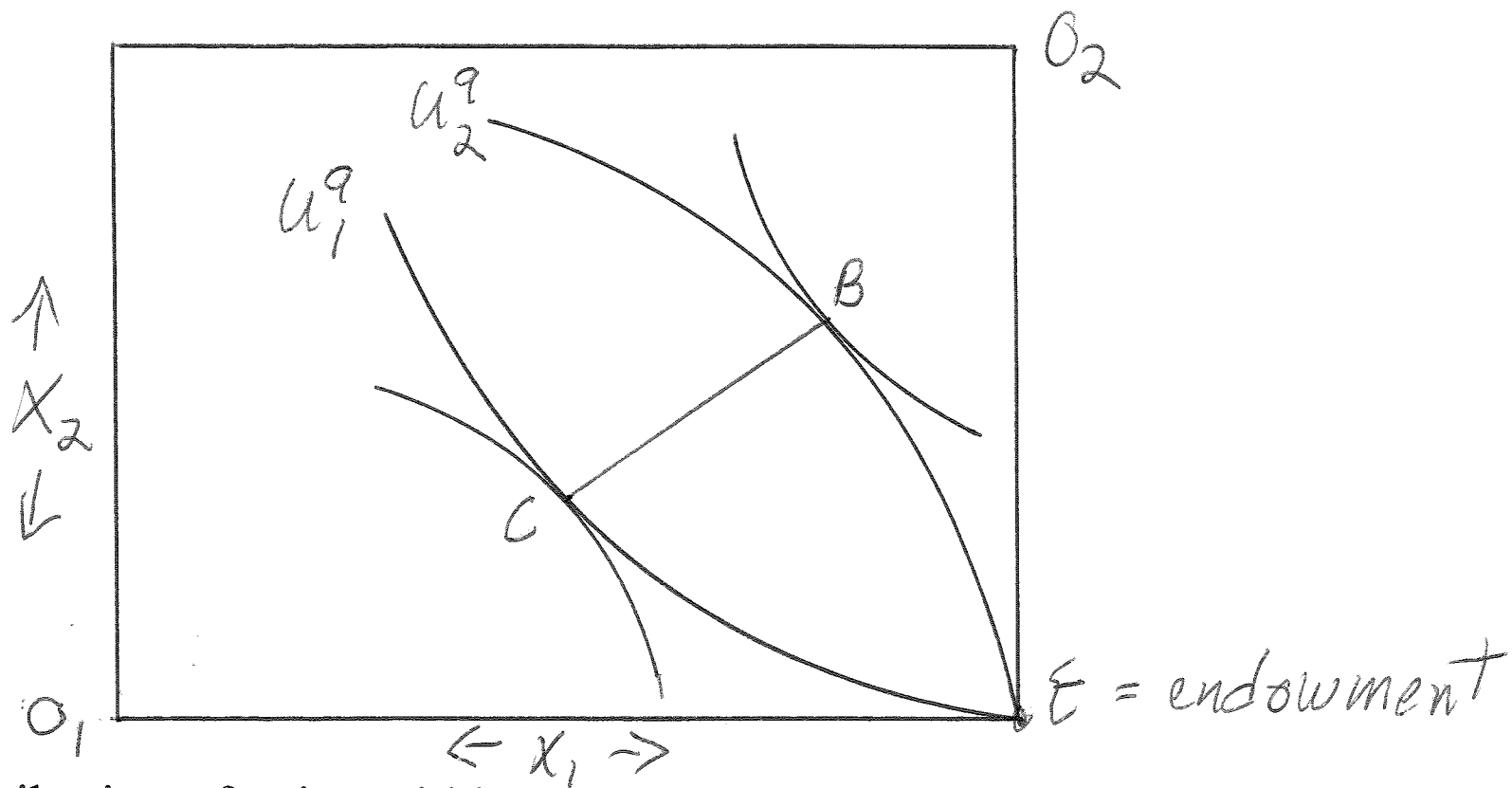
Note that the gains-from-trade theorem makes no references at all to what is happening to the foreign country.

The assumptions of the theorem are purely domestic: if they hold, free trade is better than autarky.

However, there is still a question of how the total surplus created by trade is distributed between countries

Consider a pure exchange case, where country 1 has all of the world's X_1 and country 2 has all of the world's X_2 .

There are many possible trades from the endowment point E that make both better off, or at least no worse off.

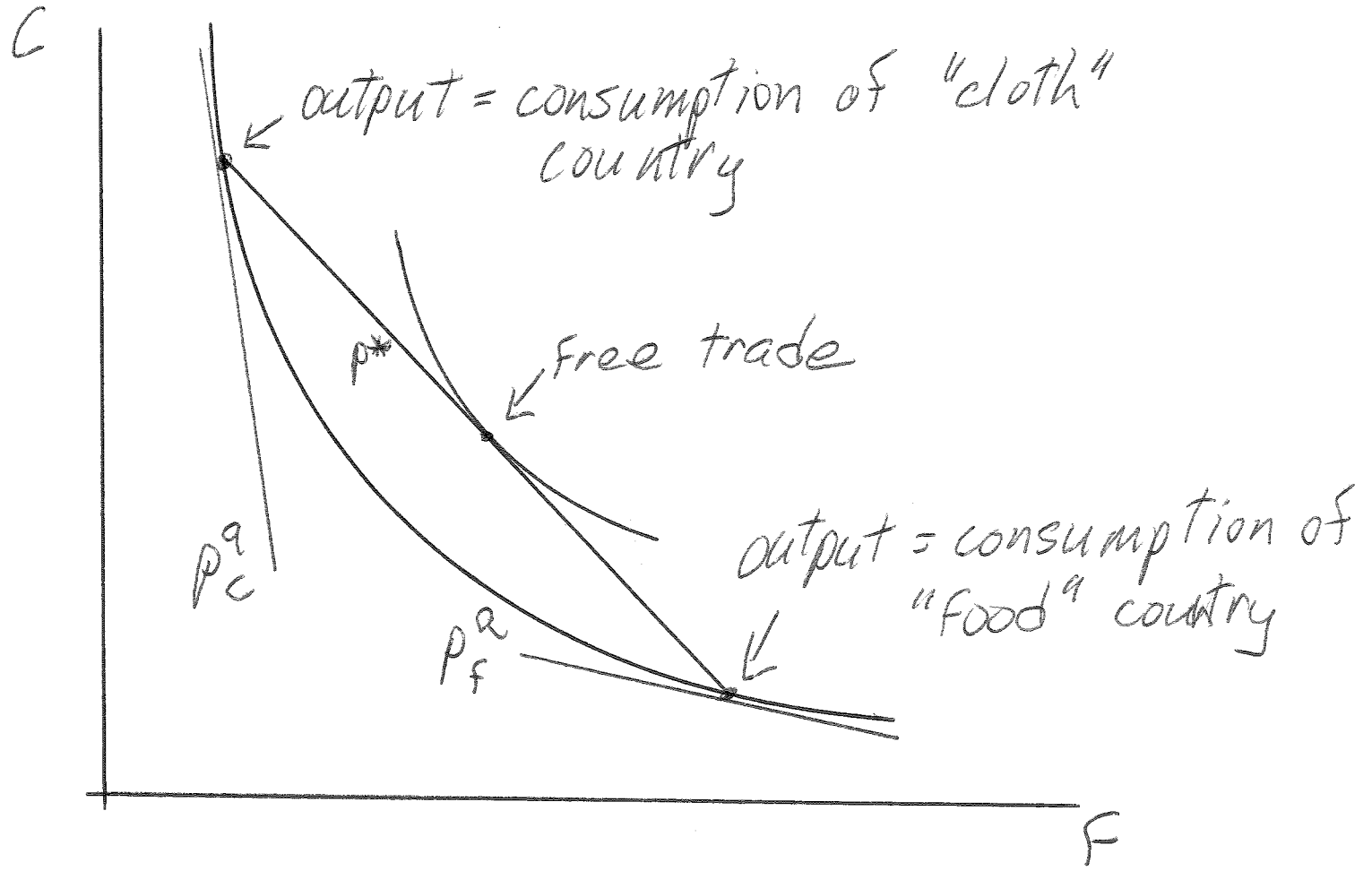


Distribution of gains within a single country

We must remember that the distribution of gains between two individuals within a country may be very unequal.

Suppose our country has many food suppliers and only one clothing supplier.

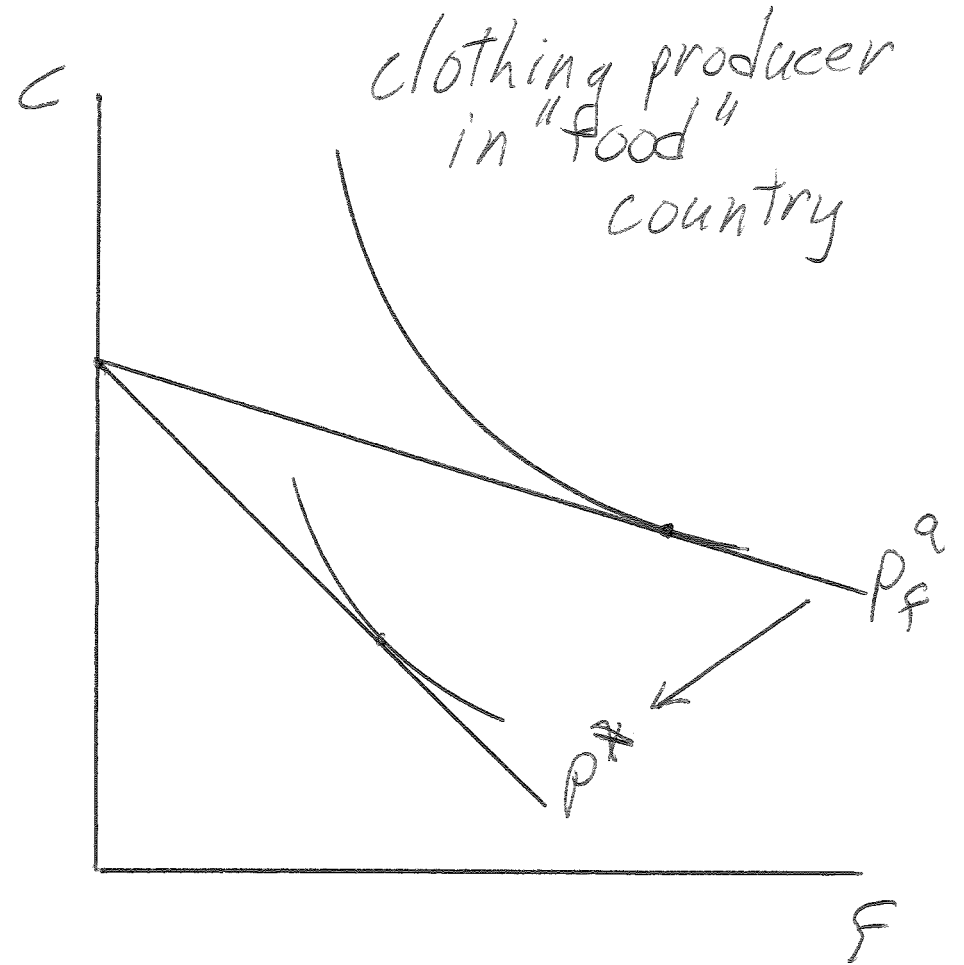
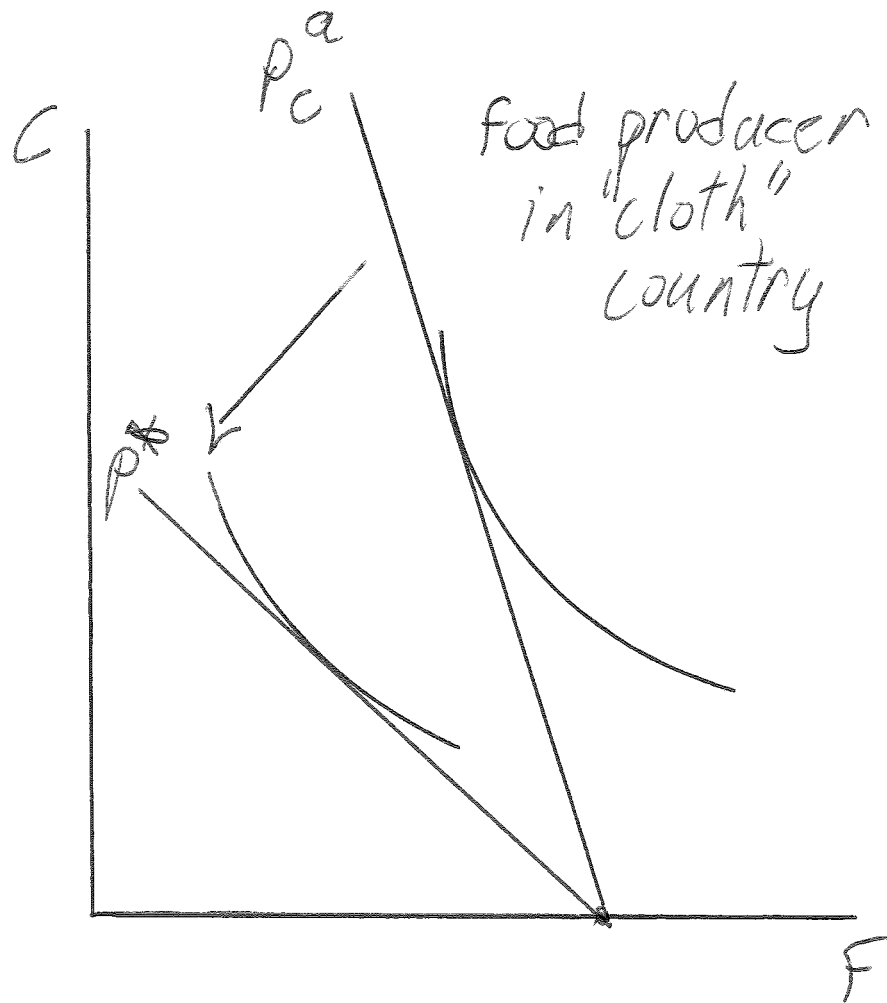
Suppose further that they cannot switch professions. Farmers cannot sew and tailors cannot sow. The opposite is true for the other country.



The effect of trade is that the price of food falls in country C, and the price of clothing falls in country F.



But this means that the single food producer in country C is going to be worse off, and the single clothing producer in country F is likewise worse off.

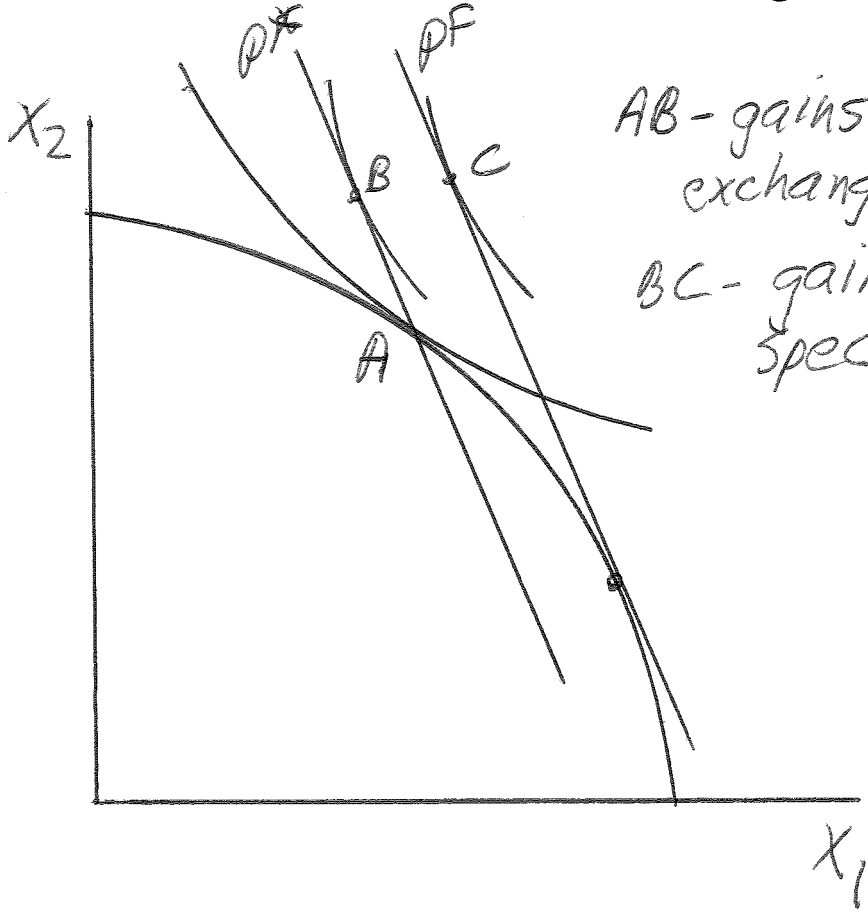


Miscellaneous

Gains from exchange versus gains from specialization

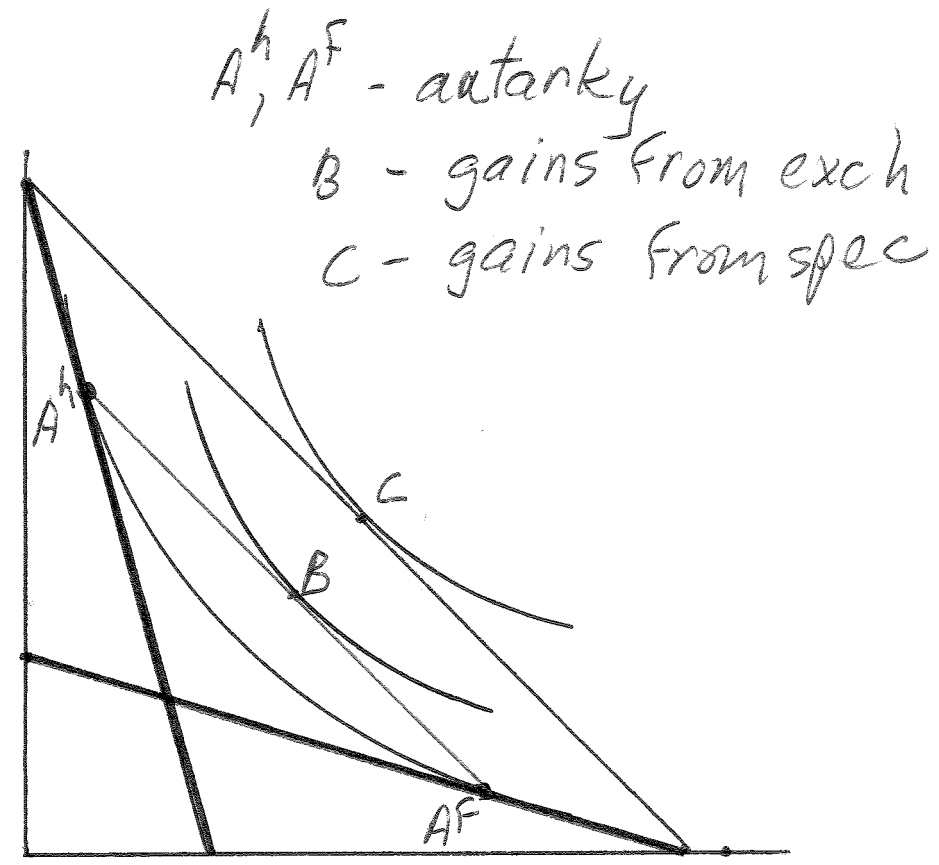
(1) gains from exchanging fixed production quantities due to differences in endowments or tastes.

(2) gains from reallocating production to increase the world endowments of all goods, which are then exchanged.



AB - gains from exchange

BC - gains from spec



A^h, A^F - autarky

B - gains from exch

C - gains from spec