

International Trade

– Master Level –

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Part 2: Selected Topics of Pure Trade Theory



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- 1.2 Determining Equilibrium terms of trade
- 1.3 Factor Price (non-) equalization
- 1.4 Stolper-Samuelson and Rybczynski Theorem
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5.2 FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

5.3 Market power and the case of “Fair Trade”

Basic Literature:

- ▶ Krugman, P.R., Obstfeld, M. (2006), *International economics: theory and policy*. 7. ed., Boston Mass. et al.: Pearson.
- * Feenstra, R.C. (2008), *Advanced International Trade: Theory and Evidence*. New York: Worth.

References to more specific literature can be found in the slide collection.

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ General

- ▶ Trade requires that a (voluntary) exchange of goods is *mutually profitable*.
- ▶ A sufficient condition for mutual profitability is that the imported good X is relative cheaper (in terms of a unit of the exported good) compared to the opportunity cost of producing the good X itself.

⇒ Differences in *relative* prices

Which sources induce differences in relative prices and make specialization and exchange of goods profitable?

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ General

1. Technological/Productivity differences between countries
2. Different factor endowments of countries
 - a) (non-) availability of resources (e.g. oil, special metals), temporal/permanent
 - b) different relative endowments (e.g. (human) capital in relation to labor force)
3. Increasing returns
4. Preferences for variety

Point 1. is related to classical theory, point 2. is related to neoclassical theory, while 3. and 4. is addressed by more contemporary “new” trade theory.

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Classical Approach

Classical Ricardo Model – Assumptions:

- ▶ Two countries $i = 1, 2$, two homogenous goods y_j^i with $j = 1, 2$, one production factor (labor) L^i .
- ▶ No transportation costs, no transaction costs etc.
- ▶ Linear production function: $y_j^i = \frac{1}{a_j^i} L_j^i$

with labor coefficient $a_j^i = \frac{L_j^i}{y_j^i}$

- ▶ *Full employment*: $L_1^i + L_2^i = L^i$, $i = 1, 2$
- ▶ *Perfect competition*: price equals marginal cost:

$$c_j = w^i L_j^i = w^i a_j^i y_j^i$$

$$\text{Marginal cost of good } j: mc_j = w^i a_j^i = p_j^i$$

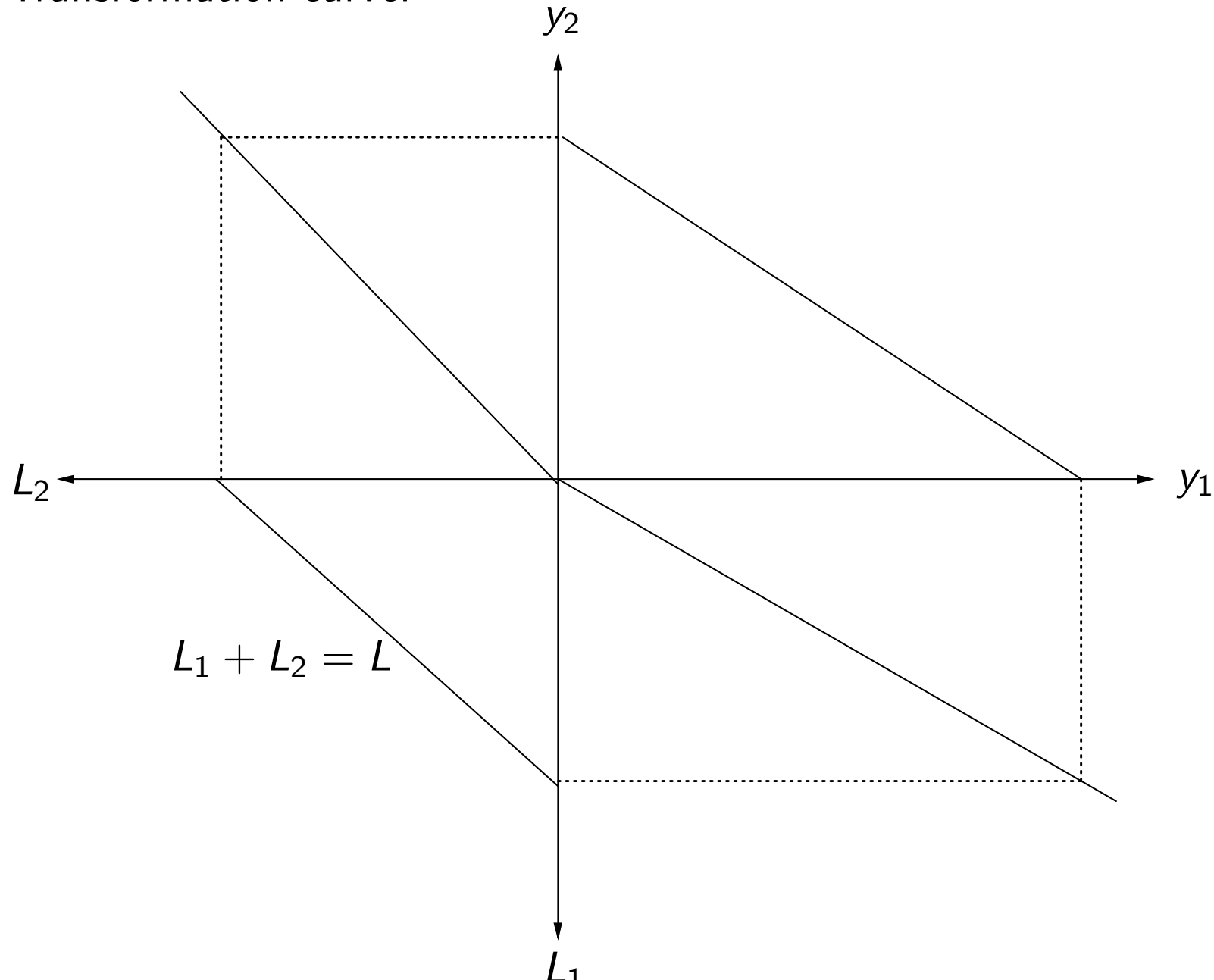
$$\Rightarrow p^i = \frac{p_1^i}{p_2^i} = \frac{a_1^i}{a_2^i}$$

where p^i is the *relative price* = *opportunity costs* of good 1.

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Classical Approach

Transformation curve:



1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade

David Ricardo (*Principles of Political Economy and Taxation*, 1817) considers that *comparative* cost advantages are a sufficient condition for trade. Mutually beneficial division of labor is possible even if one country is less productive in *both* sectors:

$$p^1 = \frac{p_1^1}{p_2^1} = \frac{a_1^1}{a_2^1} < \frac{a_1^2}{a_2^2} = \frac{p_1^2}{p_2^2} = p^2$$

does *not* imply any specific inter-country relations $a_i^1 \lesseqgtr a_i^2$

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Classical Approach

Incentive for commodity exchange:

- ▶ For an apple from country 1 you get more peaches when exporting it into country 2. Peaches become therefore less scarce in country 1.
- ▶ For a peach from country 2 you get more apples when exporting it to country 1. Apples becomes less scarce in country 2.

Each country specializes on the production of the good where it has a comparative cost advantage. On the world market the relative price will be $p = p_1/p_2$ with

$$\frac{p_1^1}{p_2^1} < \frac{p_1}{p_2} < \frac{p_1^2}{p_2^2}$$

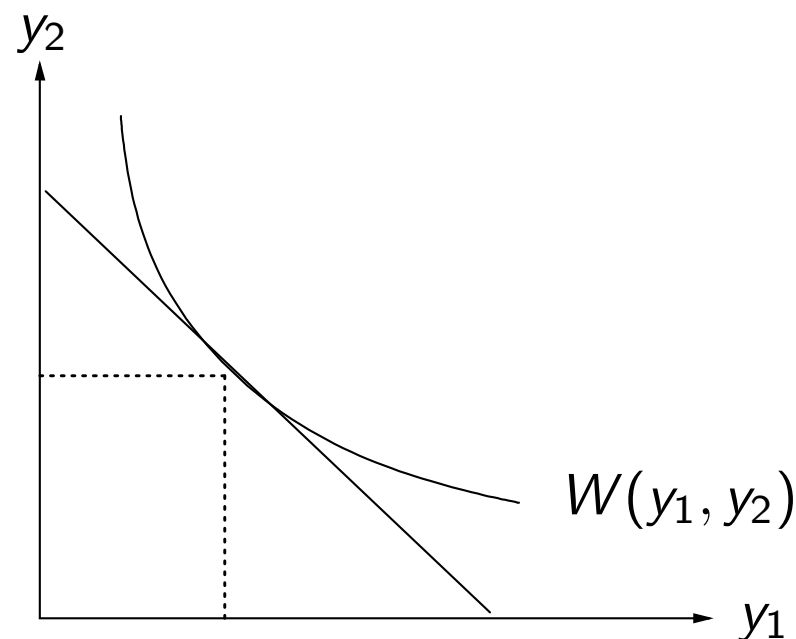
We call $p = p_1/p_2$ the relative price on the world market or the terms of trade or the real exchange rate.

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Classical Approach

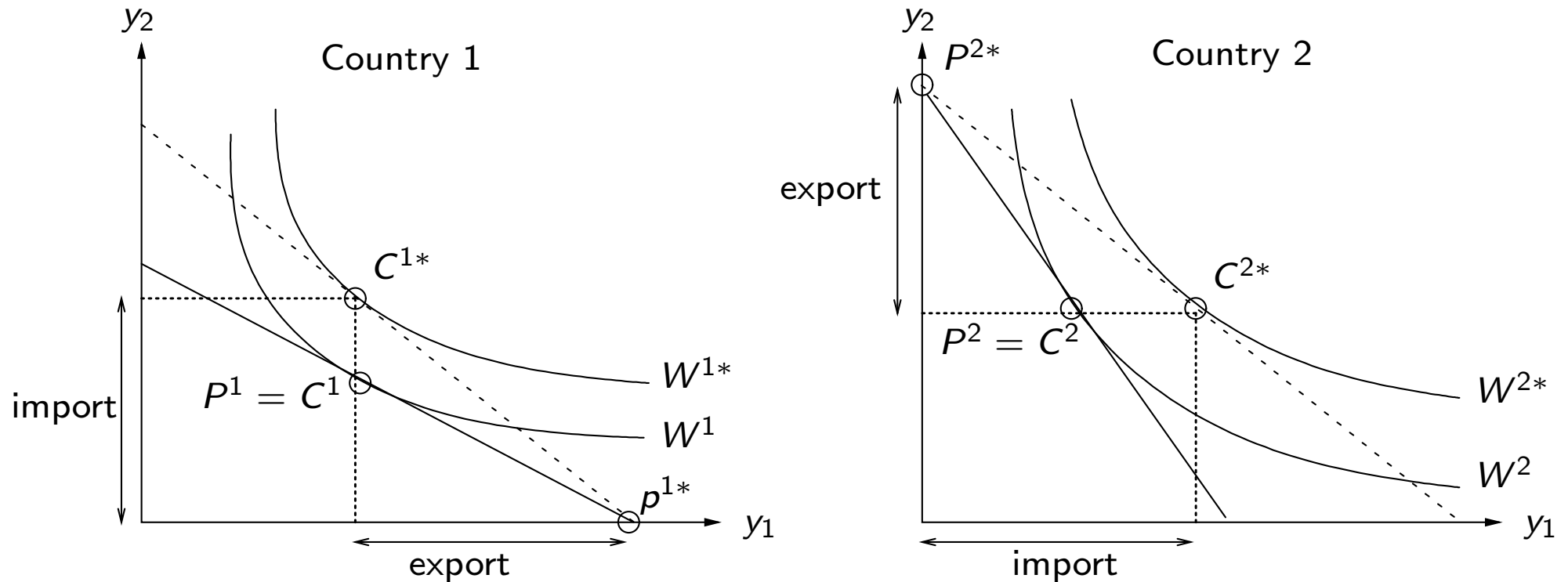
Welfare effects from trade:

- ▶ We assume that we have a welfare function $W(y_1^i, y_2^i)$ (for both countries) with convex indifference curves in the (y_1^i, y_2^i) -space. For the sake of simplicity we assume that a welfare function is the utility function of the representative household. The arguments are the *consumed* quantities.
- ▶ In the autarky case each country chooses the point on transformation curve which maximizes wealth.



1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Classical Approach



(P = production point, C = consumption point, with “*” is free trade, without “*” is autarky)

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Basics

- ▶ We now argue with 2 countries, 2 homogenous goods, and 2 production factors: labor L and capital C , both countries have the *same* technology..
- ▶ The production function is assumed to have “neoclassical” features: both factors are substitutable, decreasing marginal returns, constant returns to scale \Rightarrow concave transformation curve.

- ▶ Producing one unit to **minimal cost**:

$$\min_{L_i, C_i} wL_i + rC_i \quad \text{s.t.} \quad y_i(L_i, C_i) = 1$$

Let a_{Li}, a_{Ci} be the solution of the unit cost minimization problem.

- ▶ The unit costs can therefore be written as

$$c_i(w, r) = w \cdot a_{Li}(w, r) + r \cdot a_{Ci}(w, r)$$

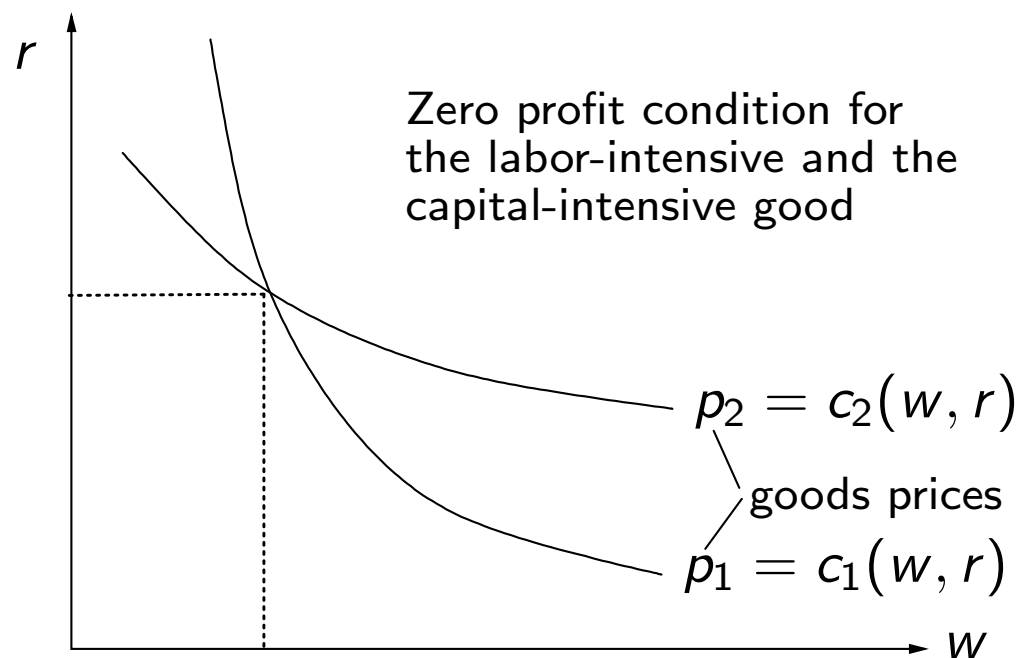
- ▶ **Perfect competition** implies zero profits: $p_i = c_i(w, r)$
- ▶ **Full employment**: $L_1 + L_2 = L, C_1 + C_2 = C$.
- ▶ Then we can conclude: $dy_2/dy_1 = -p_1/p_2$

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Basics

Assumption: Goods differ in the capital (labor) intensity in an unambiguous way (no factor intensity reversals). Then there is an unambiguous relation between goods prices and factor prices:

Lemma: If both goods are produced and if there are no factor intensity reversals, then *each price vector* (p_1, p_2) *corresponds with a unique factor price vector* (w, r) !



1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Basics

The “cone of diversification”:

- ▶ Recall, that we have from cost minimization

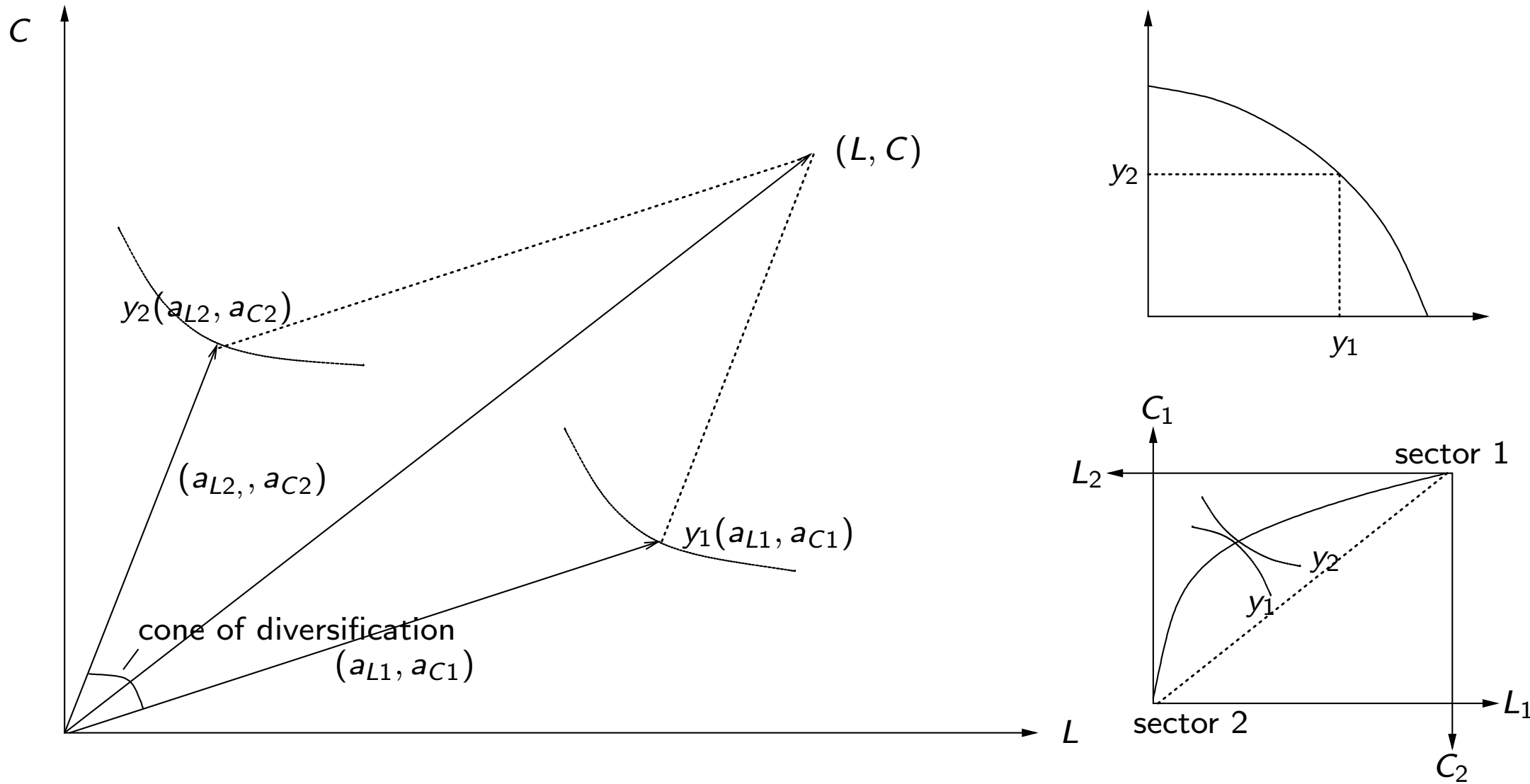
$$c_i(w, r) = wa_{Li}(w, r) + ra_{Ci}(w, r)$$

with $a_{Li}(w, r)$, $a_{Ci}(w, r)$ as the *optimal* factor demand *per unit*.

- ▶ Let (p_1, p_2) be given \Rightarrow then (w, r) is given
 \Rightarrow then $a_{Li}(w, r)$, $a_{Ci}(w, r)$ are given.
- ▶ Due to linear homogeneity, the MRS is constant along an expansion path. The vectors (a_{Li}, a_{Ci}) in the (L, C) -space characterize such expansion paths for goods $i = 1, 2$.
- ▶ Let (L, C) be the positive factor endowment of the country. With given good and factor prices we have a unique output decision y_1, y_2 . The outputs determine the length of the vectors (a_{Li}, a_{Ci}) .

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Basics



1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Theory

The Heckscher-Ohlin Approach – Assumptions:

- ▶ 2 goods, 2 countries, 2 production factors C, L
- ▶ Identical production function in both countries:

$$y_i^1(C_i^1, L_i^1) = y_i^2(C_i^2, L_i^2), \quad i = 1, 2$$

with

$$\frac{\partial y_i^j}{\partial x} > 0, \quad \frac{\partial^2 y_i^j}{\partial x^2} < 0 \quad x = C_i^j, L_i^j$$

and constant returns to scale

- ▶ Factors are mobile between sectors but immobile between countries
- ▶ Unambiguous factor intensities of good $i = 1, 2$ (no reversals)

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Theory

Assumptions: (continued)

- ▶ perfect competition, full employment
- ▶ no transportation cost, no transaction cost
- ▶ identical homothetic preferences
- ▶ *different relative factor endowments* (w.l.o.g.):

$$\frac{C^1}{L^1} > \frac{C^2}{L^2}$$

What results from these assumptions?

- ▶ For two countries with different relative factor endowments we have two different production frontiers.
 - ▶ Autarky: Employing the same scheme of welfare indifference curves, we obtain different relative prices $p_1^1/p_2^1 \neq p_1^2/p_2^2$.
 - ▶ A capital (labor) abundant country will have a comparative price advantage for the capital (labor) intensive good.
- ⇒ Sufficient condition for trade.

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Theory

- ▶ The terms of trade will be in between the autarky price relation:

$$p^1 < p < p^2$$

- ▶ Production and consumption points differ, we have export and import and increased welfare.

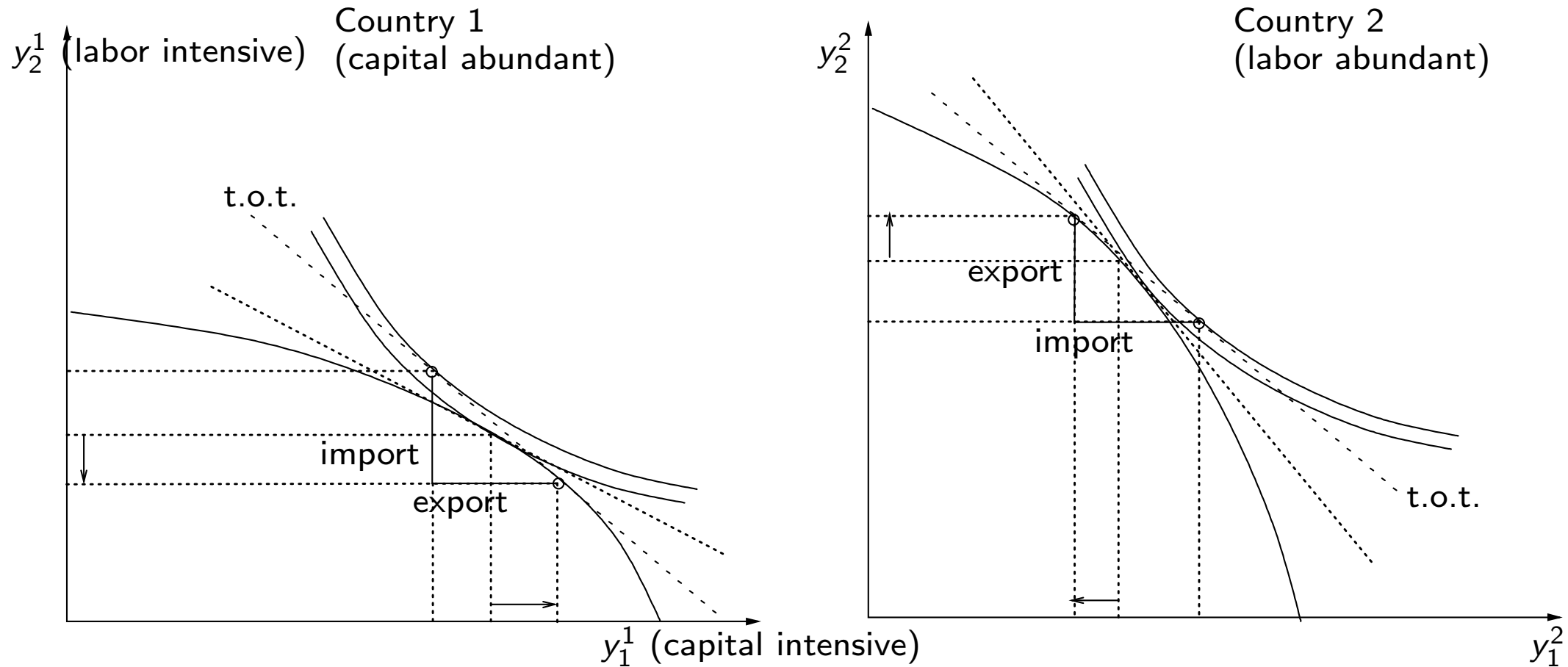
Theorem (Heckscher 1919, Ohlin 1924):

Under the given conditions each country will specialize on the production of the good (and export it) which uses its abundant factor intensively.

[The relative capital abundant country specializes on the capital intensive good (and exports this), while the relative labor abundant country specializes on the labor intensive good (and exports this).]

1. Classical and Neoclassical Theory of Trade

1.1 Reasons for specialization and trade/ Neoclassical Approach / Theory



1. Classical and Neoclassical Theory of Trade

1.2 Determining equilibrium terms of trade

- ▶ The terms of trade $p = p_1/p_2$ determines
 - ▶ the production point (y_{1P}^j, y_{2P}^j) on the transformation curve of country $j = 1, 2$,
 - ▶ the consumption point (y_{1C}^j, y_{2C}^j) as the tangent of t.o.t. with welfare indifference curve.
 - ▶ Thus, it implicitly determines the *planned exports and imports* $y_{iP}^j - y_{iC}^j \geq 0$
- ▶ The physical exports of one country must equal the physical imports of the other country:

$$y_{iP}^1 - y_{iC}^1 = y_{iC}^2 - y_{iP}^2, \quad i = 1, 2$$

- ▶ There exists one price relation p so that these import and export plans are consistent! (Equilibrium terms of trade)
- ▶ These t.o.t. also determine how the wealth gains from trade are distributed across the countries.

1. Classical and Neoclassical Theory of Trade

1.2 Determining equilibrium terms of trade

Relative supply and relative demand:

- ▶ Relative supply

$$\frac{y_{1P}^1 + y_{1P}^2}{y_{2P}^1 + y_{2P}^2}$$

The larger $p = p_1/p_2$ the more attractive is the production of good 1 = increasing supply function as long as $p^1 < p < p^2$.

If $p < p^1$ then no country will produce good 1 (relative supply zero), if $p > p^2$ then both countries produce only good 1 (relative supply not defined, “to infinity”)

- ▶ Relative demand

$$\frac{y_{1C}^1 + y_{1C}^2}{y_{2C}^1 + y_{2C}^2}$$

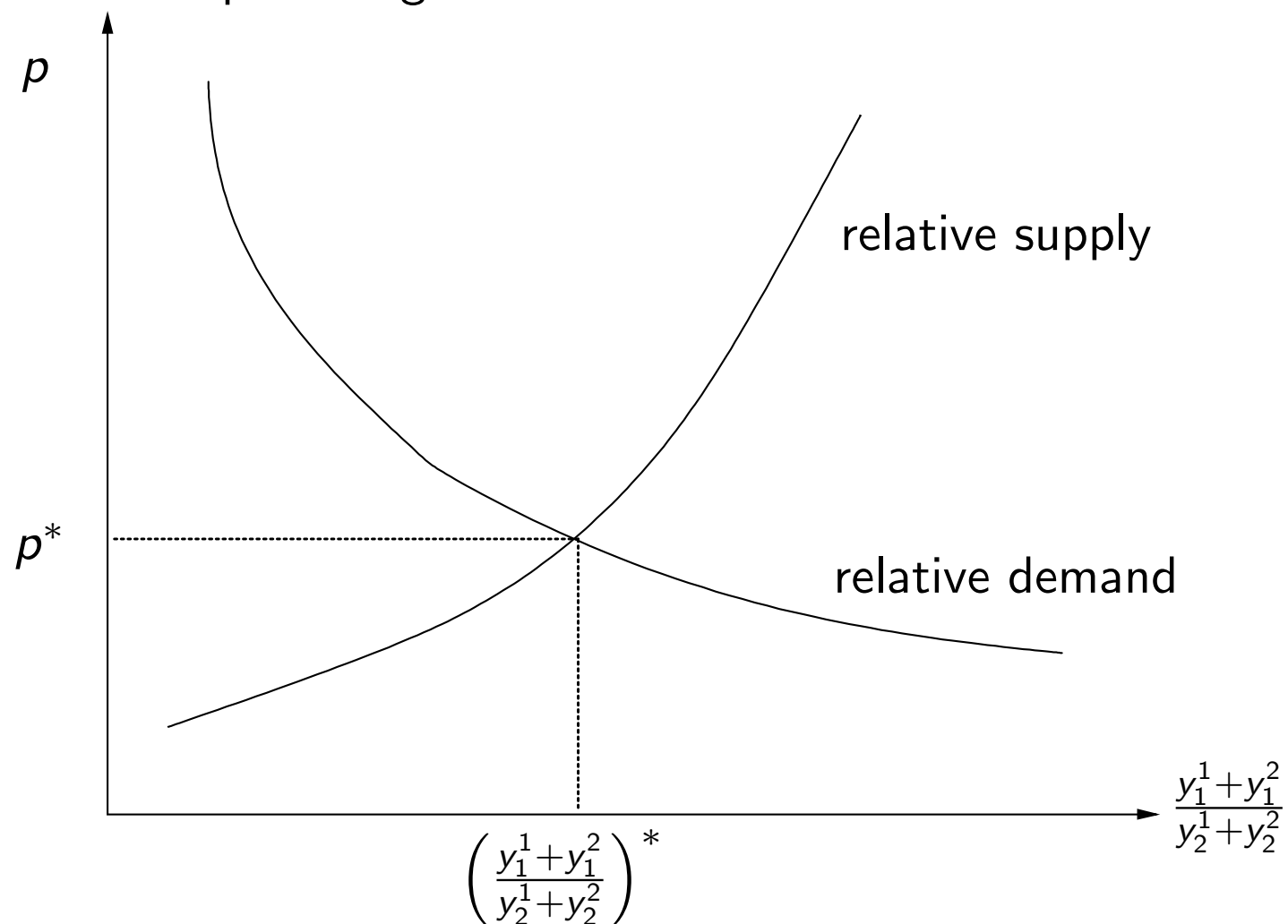
The larger p the lower is the relative demand due to substitution effects.

1. Classical and Neoclassical Theory of Trade

1.2 Determining equilibrium terms of trade

Since we have partial specialisation, a smooth change in the relative prices induces a smooth change in the relative supply:

relative price of good 1



1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

Ricardian approach: We have **not** factor price equalization!

Why?

- ▶ The reason why countries with comparative disadvantages in *both* sectors (overall low productivity) also gain from trade is that the **wages** are lower than in the other country. A lower wage compensates the disadvantage of higher cost due to lower productivity.
- ▶ Productivity differences should be reflected by relative wage differences. Empirical data (partially) support this result.

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

- ▶ Assume $a_1^1 > a_1^2$, $a_2^1 > a_2^2$ but $a_1^1/a_2^1 < p < a_1^2/a_2^2$.
Hence country 1 specializes to good 1 and country 2 specializes to good 2.
- ▶ Take good 2 as a numeraire.
- ▶ From price = marginal cost we have for the *relative wages* \tilde{w}^i :

$$\text{country 1} \quad \tilde{w}^1 = \frac{p}{a_1^1} \quad \text{and} \quad \tilde{w}^2 = \frac{1}{a_2^2} \quad \text{country 2}$$

From $p < a_1^2/a_2^2$ and $a_1^1 > a_1^2$ we have

$$\tilde{w}^1 = \frac{p}{a_1^1} < \frac{1}{a_2^2} = \tilde{w}^2$$

- ▶ A country which has an absolute disadvantage but comparative advantage in good 1 will have a *lower relative wage*. The trade pattern depends on comparative advantages, but the absolute advantages determine the level of wages.

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

Neoclassical approach: we *have* factor price equalization!

Why?

- ▶ For a globally efficient allocation the production factors should be directed into the most productive opportunities, implying a global equalization of factor prices. With free trade we have a tendency into this direction even without global factor mobility!
- ▶ In a labor abundant country, labor is relative cheap compared to scarce capital.
- ▶ If this country specializes to to the labor intensive good according to the HO theorem, labor demand increases and induces a rise of wages (vice versa for the other country).
- ▶ *Result:* Tendency to equalize factor prices. Mobility of goods (trade) compensates the immobility of production factors!

Factor Price Equalization Theorem (Samuelson 1949):

Under the assumption of the HO model the factor prices (w, r) equalizes across the countries if there is free trade.

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

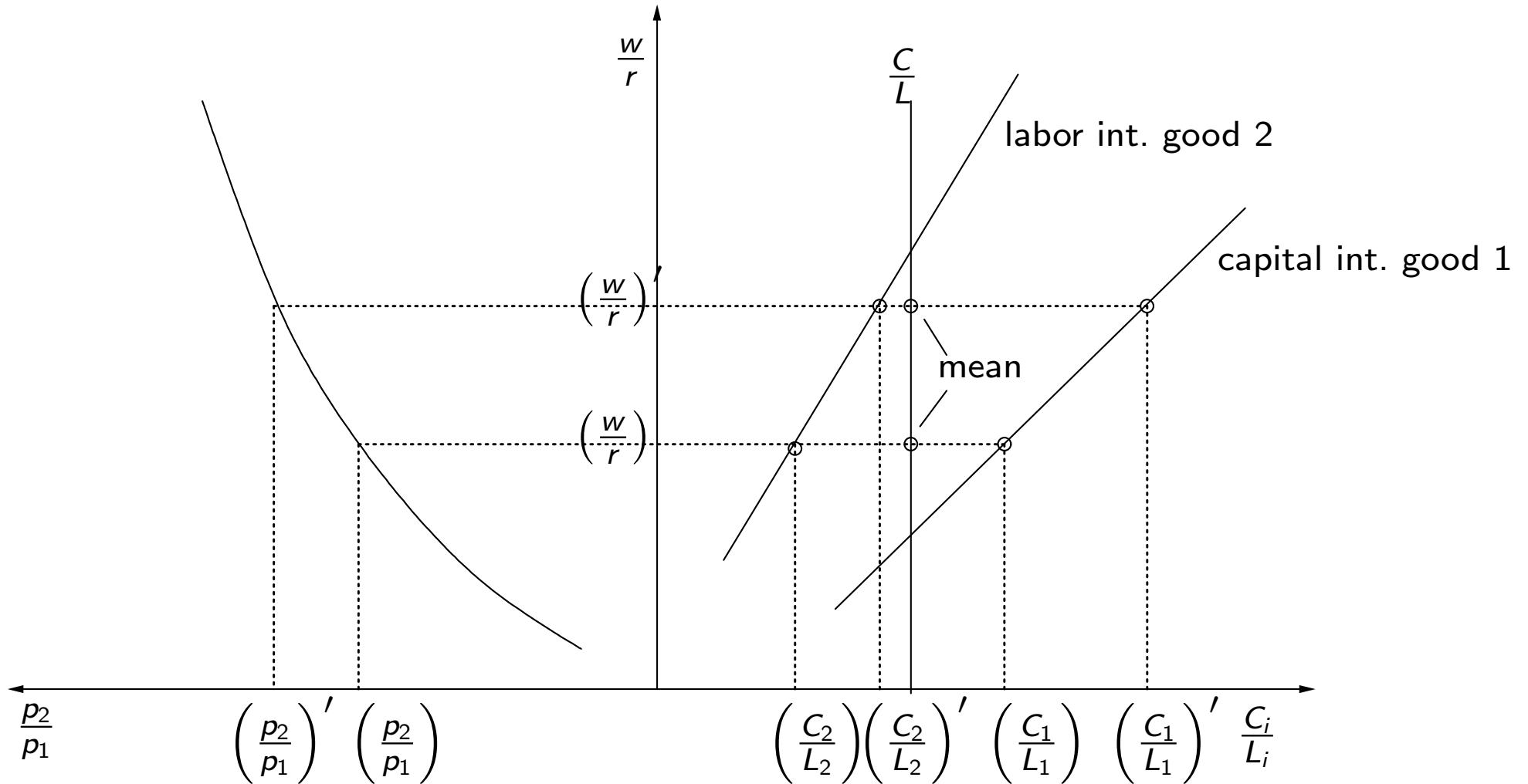
Harrod-Johnson diagram:

- ▶ From the properties of the production function and the cost minimization calculus we have the result that the optimal capital intensity C_i/L_i depends positively on the relative factor price w/r .
- ▶ By assumption, for each relative factor price one good is unambiguously the capital intensive good while the other is labor intensive.
- ▶ Each point on the contract curve is characterized by w/l , and it corresponds with a point on the transformation curve, and henceforth with a relative goods price p_1^j/p_2^j .

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

The Harrod-Johnson diagram:



1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

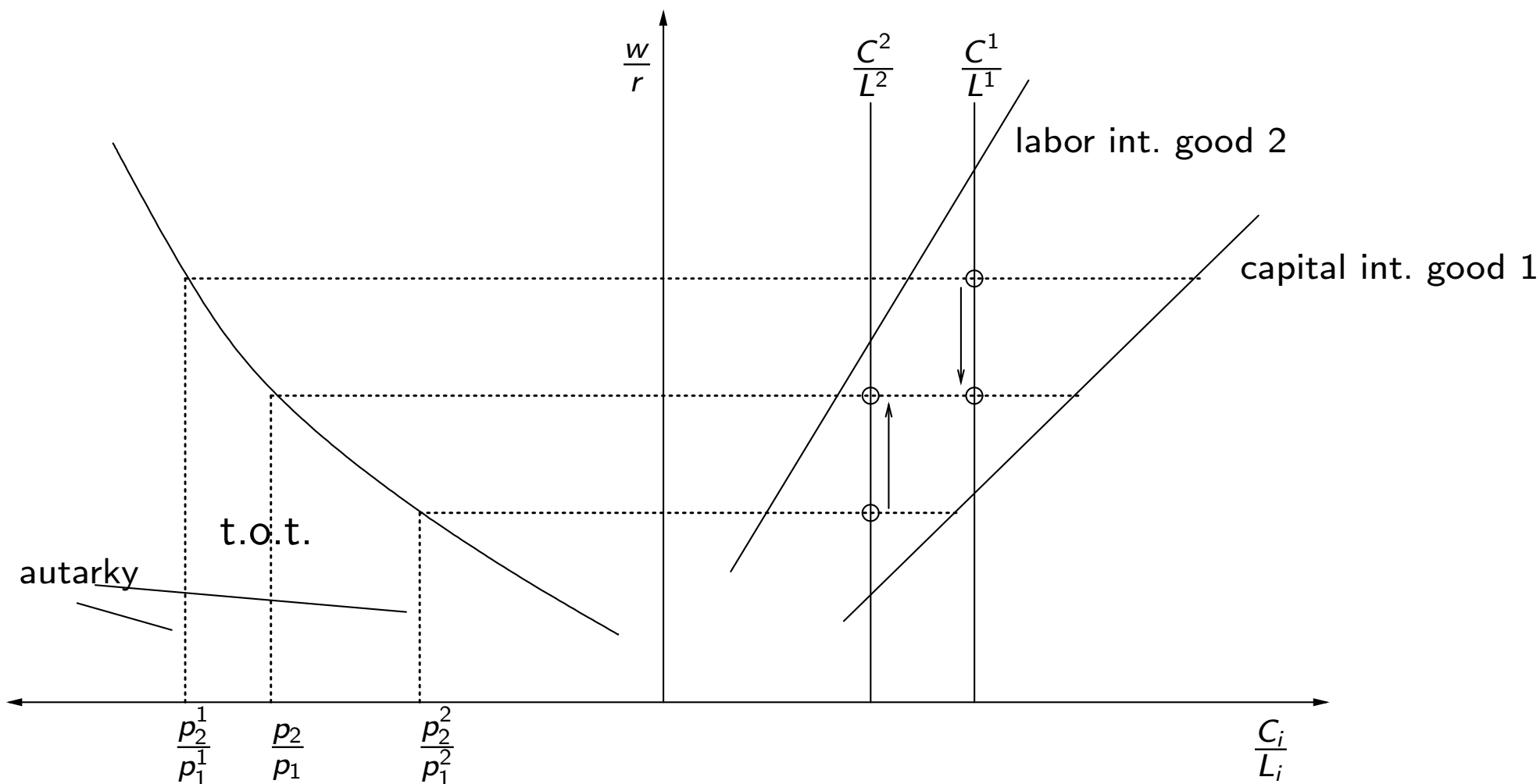
- ▶ For a given relative factor price w/r and relative goods price p_2^j/p_1^j the Harrod-Johnson diagram shows the chosen capital/labor ratios in both sectors.
- ▶ Since we have assumed full employment when deriving the curves, it is ensured that the *average* capital/labor in both sectors (sectoral ratio weighted with the outputs) is equal to the relative factor endowment of the country.
- ▶ Given the relative factor endowment we can derive an interval for the relative factor price which ensures the production of both goods.
- ▶ Now we have trade and relative goods prices according to the t.o.t. Both countries specialize to the good which utilizes the abundant factor intensively. As the Harrod-Johnson diagram shows, this implies the convergence of relative factor prices.

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization

Factor price equalization:

(Note that all curves are identical in both countries since they use the same technology. Note that here we define t.o.t. = p_2/p_1)



1. Classical and Neoclassical Theory of Trade

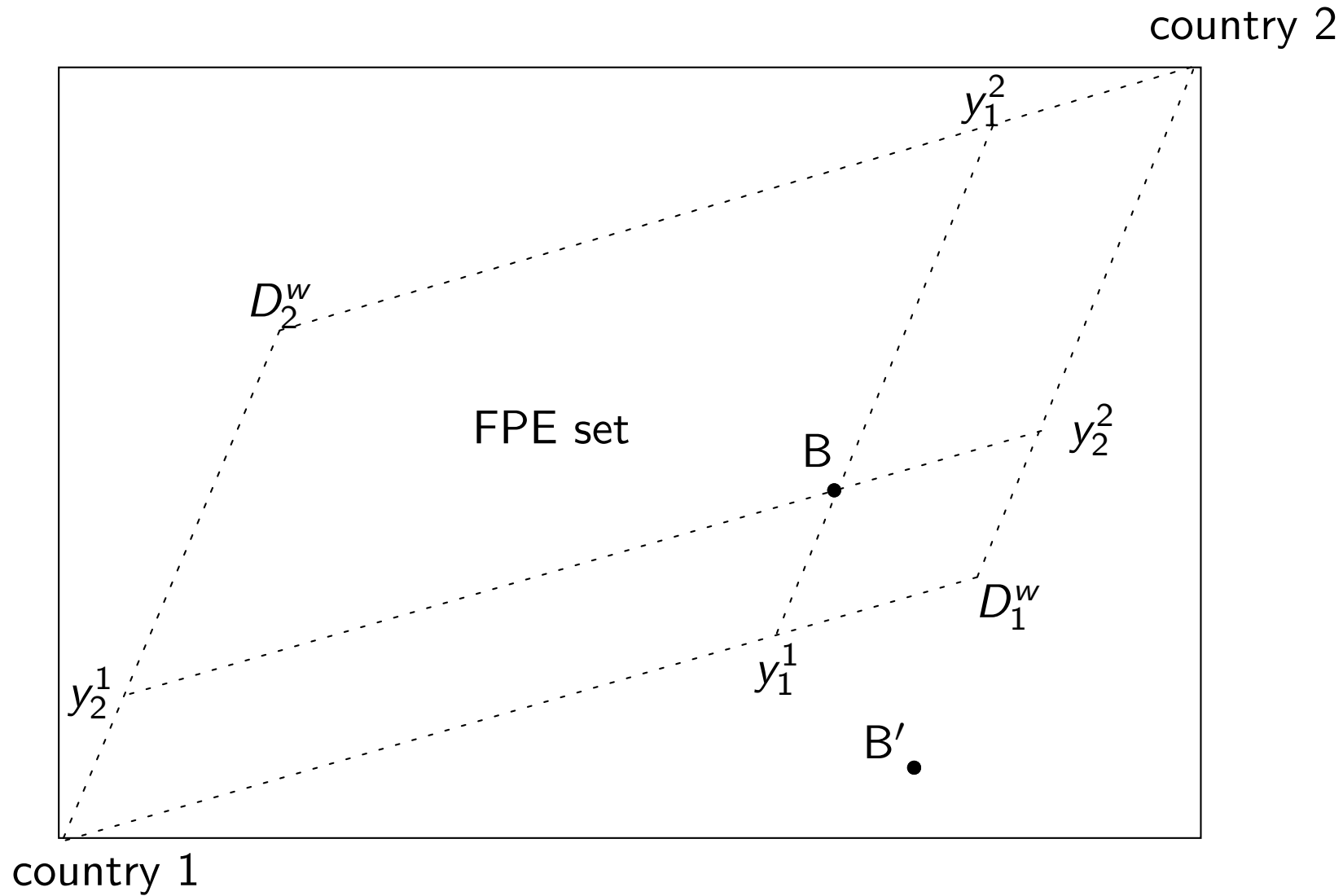
1.3 Factor Price (non-) equalization

Dixit-Norman diagram:

- ▶ Consider that factors are mobile across countries and decide to reside in allocation B (see graphic). This clearly implies identical factor prices in both countries.
- ▶ With given (w, r) also (a_{Li}, a_{Ci}) is given which is identical in both countries. Therefore we have two diversification cones which build a parallelogram.
- ▶ Since (w, r) and (p_1, p_2) are unambiguously correlated we have the world demand for both goods which are represented by the points $D_i^w = (a_{Li}, a_{Ci})d_i^w$ on the vertexes of the parallelogram.
- ▶ Observe, that point B lies in both diversification cones. Country 1 produces y_1^1, y_2^1 , and country 2 produces y_1^2, y_2^2 which sum up to the world demand D_1^w, D_2^w . Thus, B is an *integrated equilibrium*.
- ▶ *Result:* Each resource allocation B in the parallelogram represents free trade with factor price equalization. Therefore, the parallelogram is called **Factor Price Equalization (FPE) set**. Thus we have FPE also for a given interior point B with immobile factors.

1. Classical and Neoclassical Theory of Trade

1.3 Factor Price (non-) equalization



1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

Change of goods prices (terms of trade):

- ▶ What happens with the factor prices when t.o.t. change?
- ▶ Recall, that from cost minimization and perfect competition we have

$$p_i = c_i(w, r) = a_{Li}w + a_{Ci}r$$

Total differentiation leads to

$$dp_i = a_{Li}dw + a_{Ci}dr$$

Dividing both sides by $p_i = c_i$:

$$\frac{dp_i}{p_i} = \frac{wa_{Li}}{c_i} \frac{dw}{w} + \frac{ra_{Ci}}{c_i} \frac{dr}{r}$$

$$\Rightarrow \hat{p}_i = \theta_{Li}\hat{w} + \theta_{Ci}\hat{r}$$

obviously with $\theta_{Li} + \theta_{Ci} = 1$. Price changes (in %) are linearly related to changes of the factor prices (in %), depending on their unit cost shares.

1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

- ▶ We have the linear system $\hat{p}_i = \theta_{Li}\hat{w} + \theta_{Ci}\hat{r}$, $i = 1, 2$
- ▶ Assume that good 1 is labor intensive: $\theta_{L1} - \theta_{L2} > 0$ while good 2 is capital intensive: $\theta_{C2} - \theta_{C1} > 0$.
- ▶ Assume a change of the terms of trade where the labor intensive good becomes relative more expensive: $\hat{p}_1 - \hat{p}_2 > 0$.
- ▶ Solving the linear system gives (see Feenstra)

$$\hat{w} > \hat{p}_1 > \hat{p}_2 > \hat{r}$$

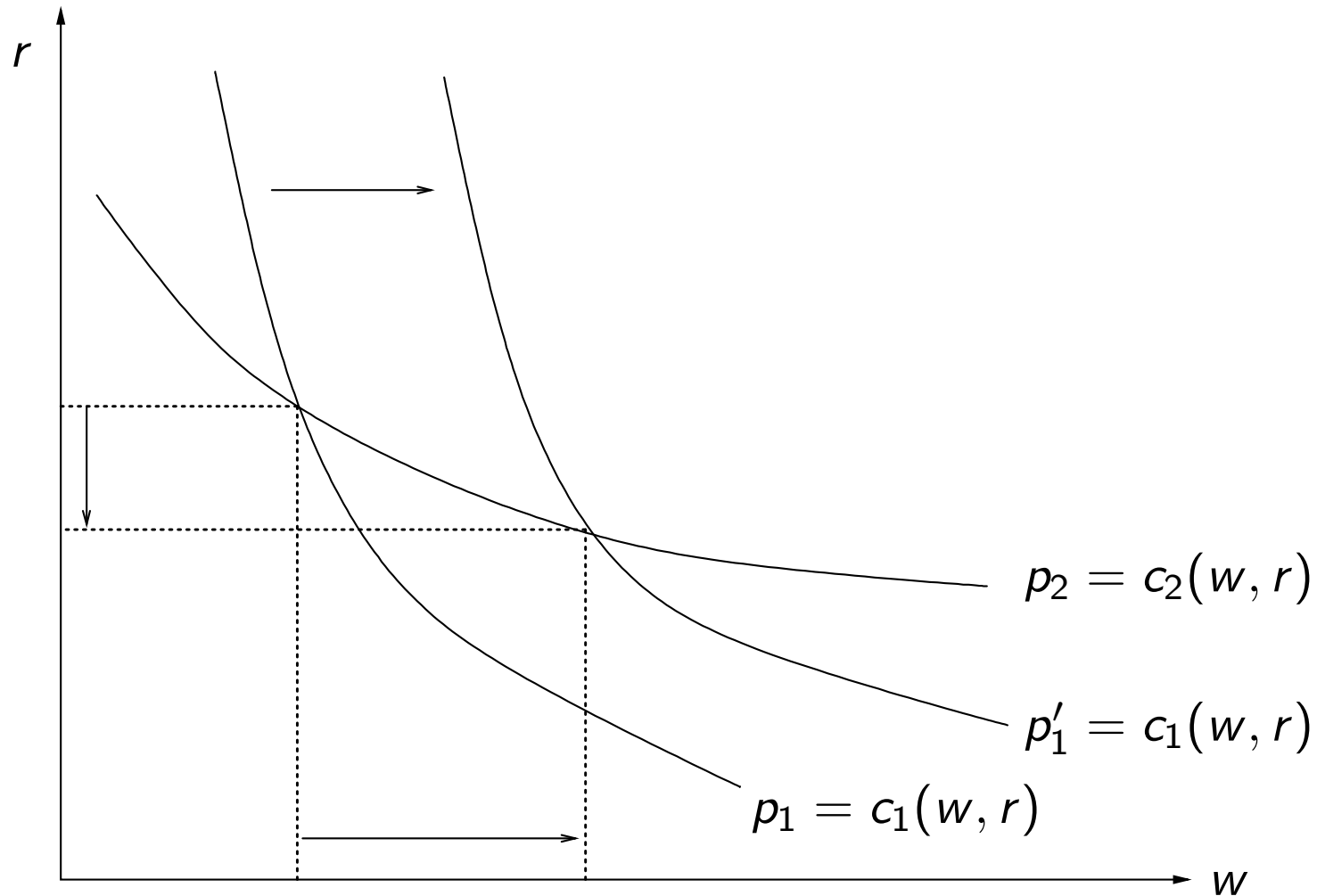
Stolper-Samuelson theorem (1941):

An increase of the relative price of a good will increase the real return to the factor (real factor price) which is intensively used for this good, and it will reduce the real return of the other factor.

1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

Illustration of the Stolper-Samuelson theorem:



1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

Change of endowment:

- ▶ Assume a change in the factor endowment when the product prices are fixed and exogenously given.
- ▶ Total differentiation of the full employment condition gives

$$\begin{aligned}a_{L1} dy_1 + a_{L2} dy_2 &= dL \\ a_{C1} dy_1 + a_{C2} dy_2 &= dC\end{aligned}$$

Dividing by L resp. C and rearranging gives

$$\begin{aligned}\frac{y_1 a_{L1}}{L} \frac{dy_1}{y_1} + \frac{y_2 a_{L2}}{L} \frac{dy_2}{y_2} &= \frac{dL}{L} \\ \frac{y_1 a_{C1}}{C} \frac{dy_1}{y_1} + \frac{y_2 a_{C2}}{C} \frac{dy_2}{y_2} &= \frac{dC}{C}\end{aligned}$$

or in growth rates: $\lambda_{L1} \cdot \hat{y}_1 + \lambda_{L2} \cdot \hat{y}_2 = \hat{L}$

$$\lambda_{C1} \cdot \hat{y}_1 + \lambda_{C2} \cdot \hat{y}_2 = \hat{C}$$

where λ_{ij} is the fraction of the factor j which is employed in sector i . Obviously, we have $\lambda_{j1} + \lambda_{j2} = 1$.

1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

- ▶ This (see previous slide) is a linear system.
- ▶ Again, assume that good 1 is labor-intensive and good 2 capital-intensive, implying $\lambda_{L1} > \lambda_{C1}$ and $\lambda_{C2} > \lambda_{L2}$.
- ▶ Assume a change in the endowment such that $\hat{L} > 0, \hat{K} = 0$.
- ▶ From solving the linear system we have (see Feenstra):

$$\hat{y}_1 = \frac{\lambda_{C2}}{(\lambda_{C2} - \lambda_{L2})} \hat{L} > \hat{L} > 0$$

and

$$\hat{y}_2 = \frac{-\lambda_{C1}}{(\lambda_{C2} - \lambda_{L2})} \hat{L} < 0$$

- ▶ Summarizing the effects: $\hat{y}_1 > \hat{L} > 0 > \hat{y}_2$

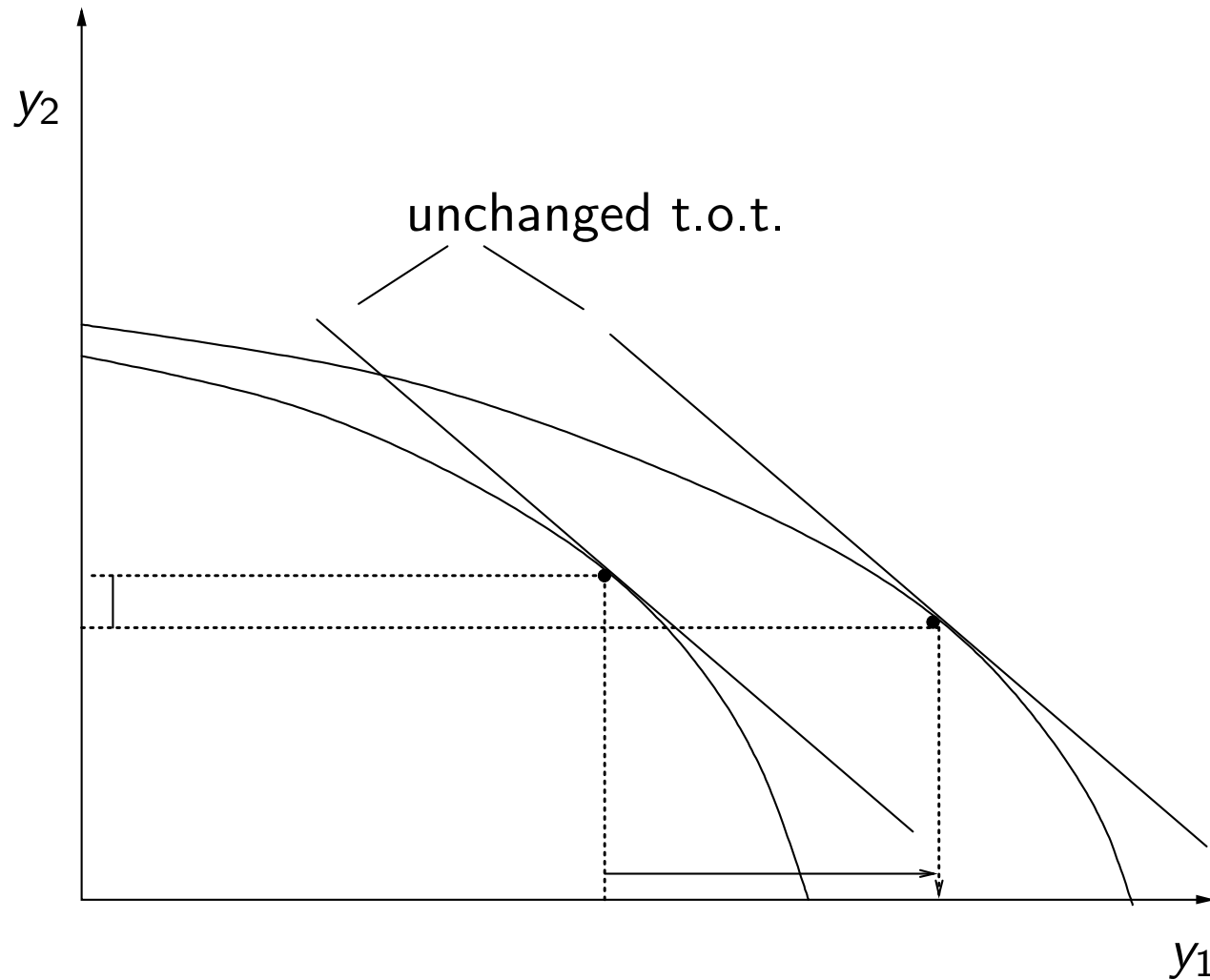
Rybczynski (1955) theorem:

An increase in the endowment of one factor will increase the output of the sector which uses this factor intensively, and decrease the output of the other sector.

1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

Illustration of the Rybczynski theorem:



1. Classical and Neoclassical Theory of Trade

1.4 Stolper-Samuelson and Rybczynski Theorem

Examples:

- ▶ “Dutch Disease”: The discovery of oil at the Netherland’s coast led to a boom of ther oil industry. This led to a contraction of other industries since resources are redirected to the oil industry.
- ▶ The dependency of develloping countries on a specific natural resource which is abundant in this country, may prevent the economy from develloping other industries. New discoveries of that resource may discourage the country from economic development.
- ▶ In OECD countries we have stagnation in the growth of labor force, but a accumulation of capital (physical and human). Labor intensive industries and such with unskilled labor shrink in absolute terms.

1. Classical and Neoclassical Theory of Trade

1.5 The Heckscher-Ohlin-Vanek approach

Empirical Problem – The Leontief Paradoxon

- ▶ Leontief (1953) calculated the amount of capital and labor to create \$ 1 million worth of exports or imports (US, 1947). The US could be regarded as a capital abundant country. The results indicate that the US imports or more capital-intensive than the exports.
- ▶ Many explanations of this paradoxon.
- ▶ Most convincing: The test is *misleading* (Lerner 1980): One should measure how much labor is *embodied* in exports compared to imports, not the technologically determined labor intensity of export and import goods. Then you should compare the labor intensity of what is produced (which is partially exported) with the labor intensity of what is consumed (which is partially imported).

1. Classical and Neoclassical Theory of Trade

1.5 The Heckscher-Ohlin-Vanek approach

The Heckscher-Ohlin-Vanek approach:

- ▶ The approach is formulated for n goods, m factors and l countries. We will concentrate on the 2-2-2-case.
- ▶ From cost minimization we have the optimal factor demand for one unit given by the matrix

$$A = \begin{pmatrix} a_{L1} & a_{L2} \\ a_{C1} & a_{C2} \end{pmatrix}$$

- ▶ Let $Y^j = (y_1^j, y_2^j)^T$ be the vector of *outputs* of country j .
- ▶ Let $D^j = (x_1^j, x_2^j)^T$ be the vector of *demand* of country j .
- ▶ Then $T^j = Y^j - D^j$ is the vector of *net exports* of country j .
- ▶ The *factor content* of traded goods is

$$F^j = \begin{pmatrix} F_L^j \\ F_C^j \end{pmatrix} = AT^j$$

The goal is to derive a relation between factor endowment of country j and the factor content of the traded goods.

1. Classical and Neoclassical Theory of Trade

1.5 The Heckscher-Ohlin-Vanek approach

- ▶ Total factor endowment (with full employment assumption) is given by

$$V^j = AY^j$$

- ▶ Let D^w be the vector of world demand and $V^w = AY^w$ the world endowment of factors.
- ▶ Since preferences are identical and homothetic, and since the goods prices are equalized due to trade, we have the same proportions in the consumed bundle of goods in all countries. Hence, the demand of country j is a fixed share of the world demand:

$$D^j = s^j D^w$$

1. Classical and Neoclassical Theory of Trade

1.5 The Heckscher-Ohlin-Vanek approach

- ▶ World consumption must equal world production: $D^w = Y^w$.
Thus we have for country j (see Feenstra):

$$\begin{aligned} AD^j &= s^j AD^w = s^j AY^w = s^j V^w \\ \Rightarrow F^j &= AT^j = V^j - s^j V^w \end{aligned} \quad (1)$$

or in terms of an individual factor:

$$F_i^j = V_i^j - s^j V_i^w$$

- ▶ If country j 's endowment of factor i relative to the world endowment of this factor exceeds country j 's share of total demand ($V_i^j / V_i^w > s^j$) then the country is abundant in that factor.

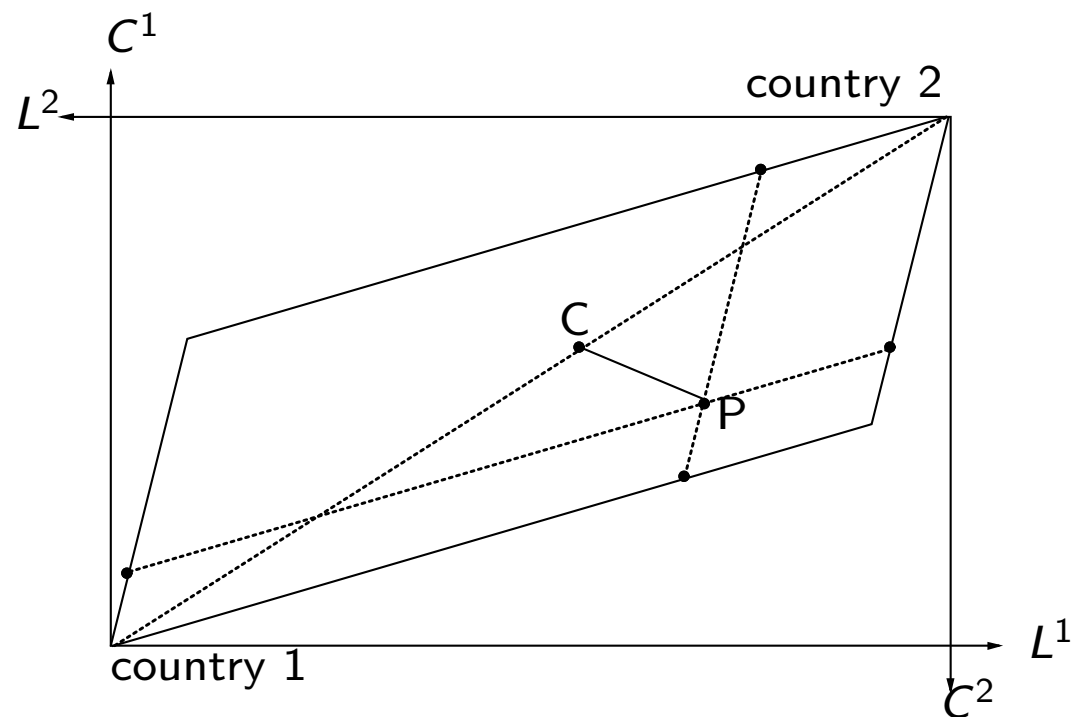
1. Classical and Neoclassical Theory of Trade

1.5 The Heckscher-Ohlin-Vanek approach

Theorem (Learner 1980):

If capital is abundant relative to labor in country j , then (1) implies that the capital/labor relation embodied in production of country j exceeds the capital/labor relation in country j 's consumption:

$$\frac{C^j}{L^j} > \frac{C^j - F_C^j}{L^j - F_L^j}$$



2. Trade With Factor Mobility

Introductory remark:

- ▶ Usually we assume partial specialization.
- ▶ Usually we assume a small country: inflows/outflows of factors will not change the terms of trade.
- ▶ As a result, the Rybczynski theorem applies.

We analyze:

- ▶ Mobility of capital by means of an intertemporal calculus (saving \rightarrow investment): section 2.1
- ▶ A model by Markusen with simultaneous induced mobility of labor and capital: section 2.2
- ▶ Mobility of labor or Human Capital: section 2.3

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

Capital flows as an **intertemporal decision problem**:

- ▶ Capital are accumulated savings. Since in all models the goods Y_1, Y_2, \dots have been interpreted as consumption goods, the complete world production is consumed. For capital accumulation we need *savings* (waive for consumption) and production of *investment goods*.
- ▶ This requires an intertemporal decision about consumption: Partial waive for consumption today enables larger output and consumption tomorrow.
- ▶ In open economies with trade, the domestic savings need not to be equal the domestic investments into the capital stock:

$$GDP = C + I + (Ex - Im) \quad \Longleftrightarrow \quad S = I + (Ex - Im)$$

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

What drives capital flows between countries?

- ▶ real return r, r^*
- ▶ capital flow controls
- ▶ taxes, differences in taxation systems
- ▶ uncertainty (e.g. exchange rates \Rightarrow “Monetary Macroeconomics”)
- ▶ stability of the (political) environment

Different types of capital flows:

- ▶ *Long run*: foreign direct investment (considered here) – claims on the foreign’s capital stock and its management
- ▶ *Short run*: portfolio investments – adjusts immediately if prices, interest rates, exchange rates etc. change

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

Microeconomic foundation:

- ▶ 2 periods, only one good that can either be consumed or invested
- ▶ perfect capital market with one interest rate for lending and borrowing
- ▶ *Intertemporal budget constraint* with lending/borrowing:

$$C_{t+1} = Y_{t+1} + (1 + r)(Y_t - C_t)$$
$$\Rightarrow C_t + \frac{1}{1 + r} C_{t+1} = Y_t + \frac{1}{1 + r} Y_{t+1}$$

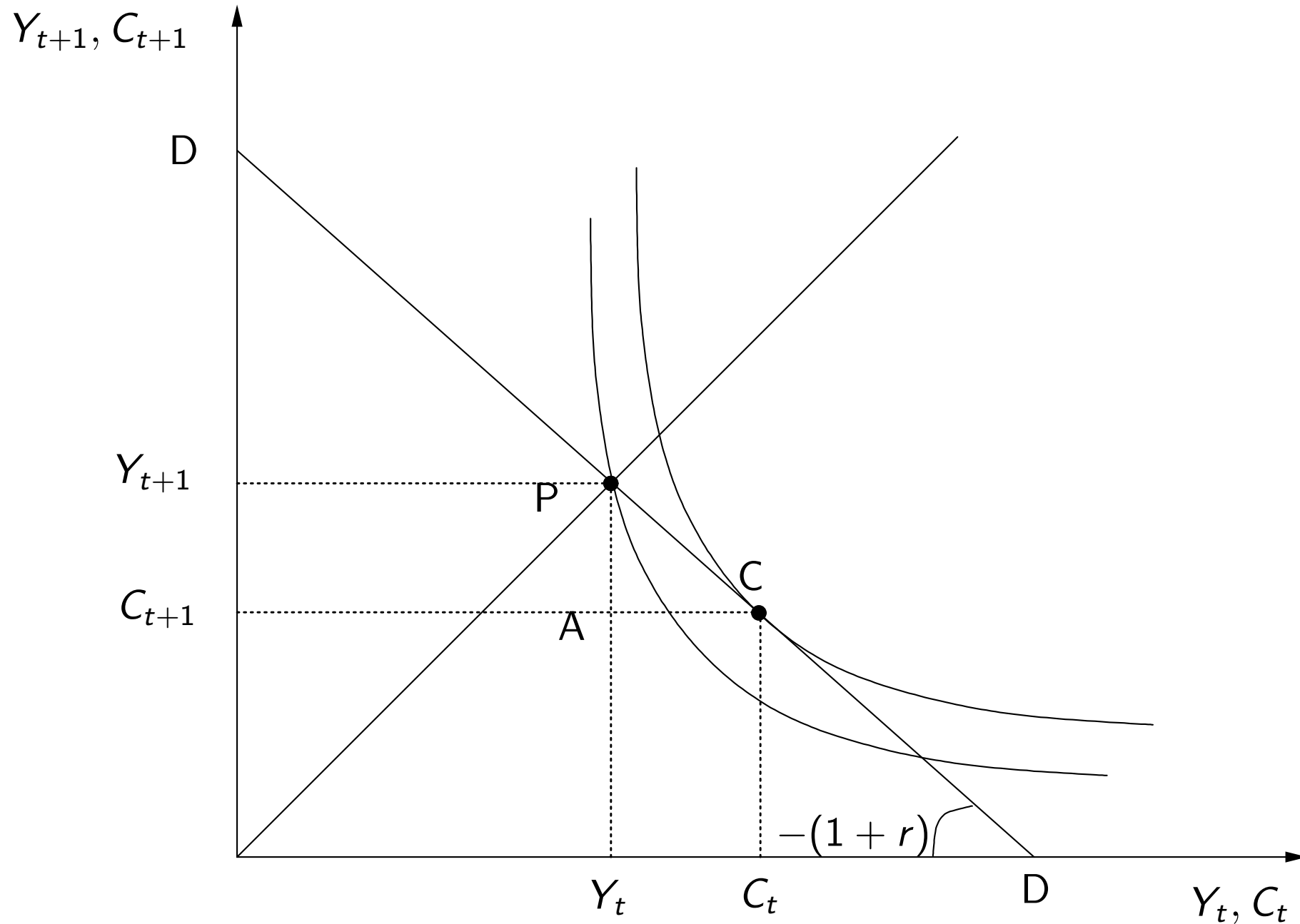
- ▶ Consumers maximize the net present utility

$$U = U(C_t) + \frac{1}{1 + \rho} U(C_{t+1})$$

with ρ as the intertemporal discount factor. They have to maximize utility conditional to the intertemporal budget constraint DD .

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments



2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

- ▶ In t the households consume more than it is produced = positive net imports = negative trade balance AC . The consumption is partially financed by foreign savings (increased debt = positive capital balance)
- ▶ In $t + 1$ the debt is repaid including interest rate: AP , implying a positive trade balance (and negative capital balance).
- ▶ Both balances in t and $t + 1$ reflect *optimal* behavior, not disequilibrium.

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

- ▶ Now consider that Y can not only be consumed but also be *invested*.
- ▶ Investment leads to capital accumulation. Thus the production frontier shifts and we have

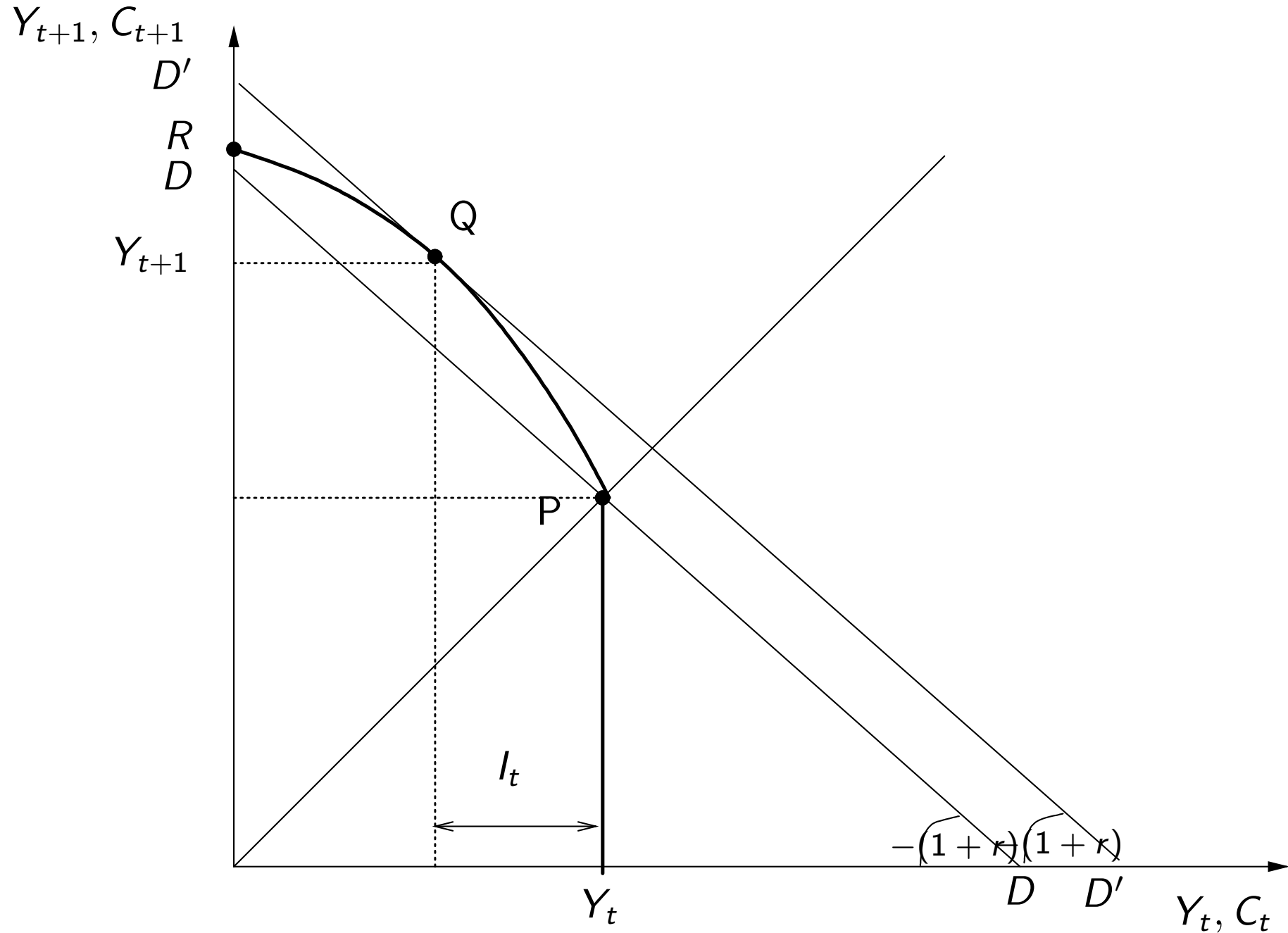
$$Y_{t+1} = Y_t + F(I_t)$$

with $F(\cdot)$ as the production effect of investments and $F' > 0, F'' < 0$

- ▶ Note that we have here only one good Y , so that capital accumulation can not have effects according to the Rybczynski theorem.
- ▶ Saving and investment therefore lead to an **intertemporal production frontier** (RP in the following graphic).

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments



2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

- ▶ The calculus of an investor is whether to invest into the physical project I_t or to invest the funds at the world capital market at the rate r . The returns from investment $F(I_t)$ are therefore discounted with $1/(1+r)$.
- ▶ Profit maximization gives

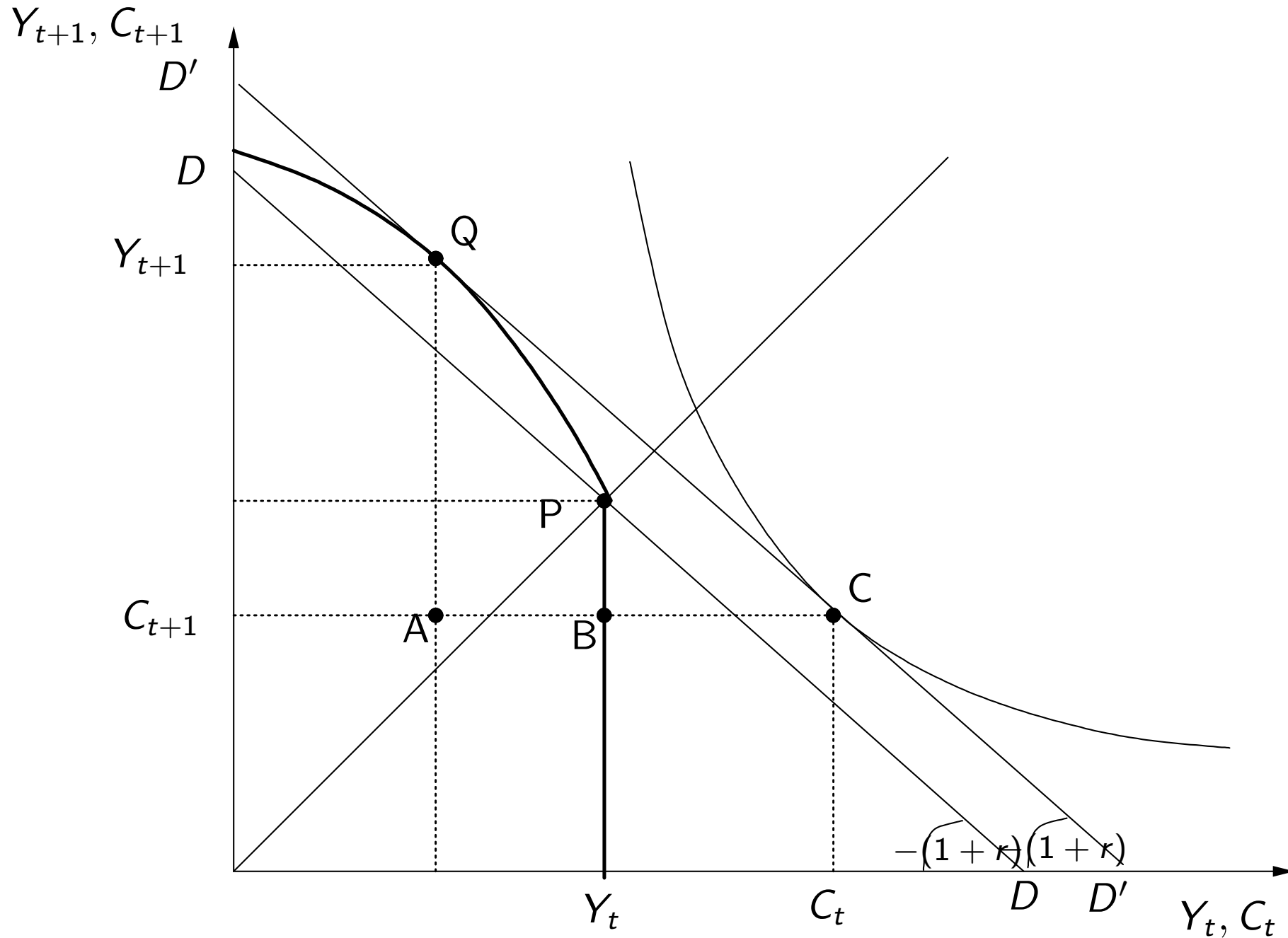
$$\max_{I_t} \pi = \frac{1}{1+r} F(I_t) - I_t$$
$$FOC \quad \Rightarrow \quad \frac{dF}{dI_t} = 1 + r$$

which is the tangential point Q at the intertemporal production frontier RB .

- ▶ Due to the increased production in $t+1$ the intertemporal budget constraint shifts to $D'D'$.
- ▶ The same calculus for intertemporal consumption is applied to the new constraint. The achievable utility is higher than before.

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments



2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

The complete result of intertemporal consumption and investment decisions:

- ▶ Remind, that $S = Y - C = I + (Ex - Im)$. In t we have a negative trade balance (positive capital balance) AC , containing excess consumption BC and investment AB .
- ▶ In $t + 1$ the foreign debt is repaid including interest payments AQ which implies a positive trade balance.
- ▶ Borrowing and repaying capital is indirectly borrowing and regiving goods.

2. Trade With Factor Mobility

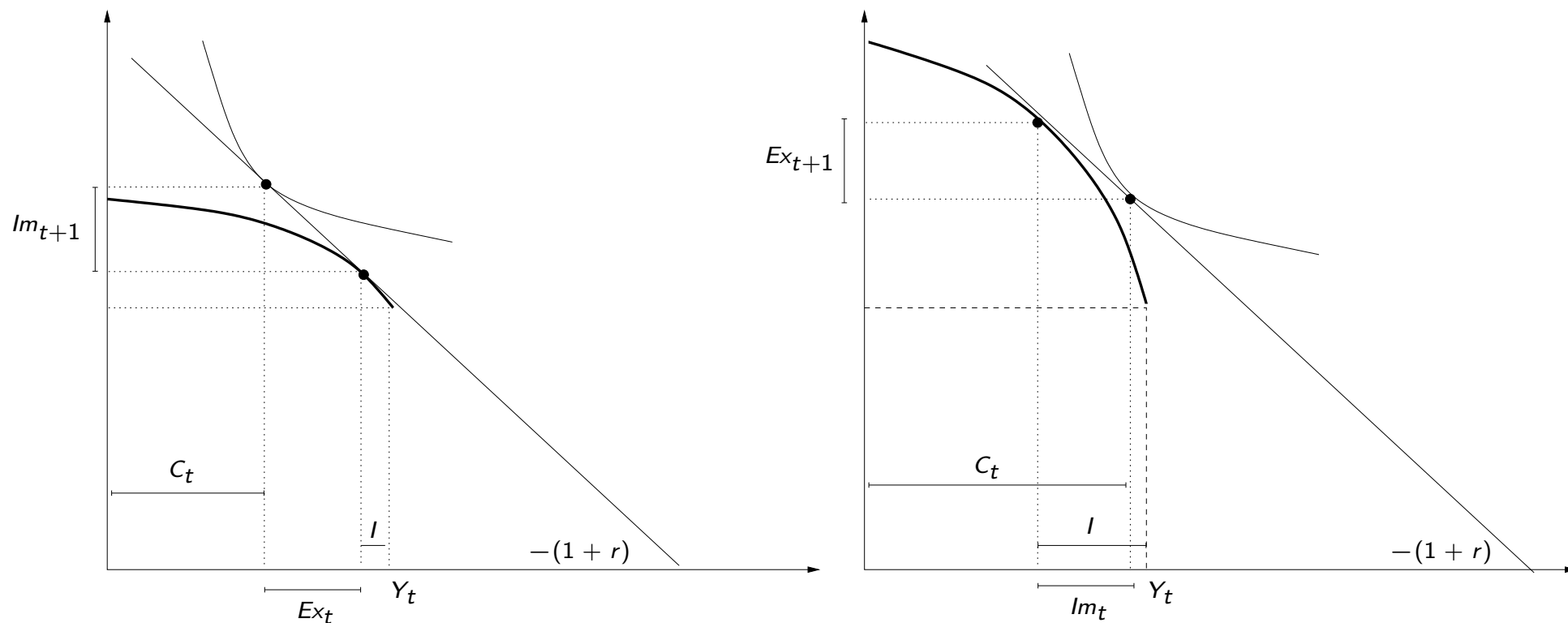
2.1 Intertemporal approach to the balance of payments

Consider two countries with different investment opportunities and different time preferences:

- ▶ An optimal positive trade balance in t in country 1 implies an optimal negative trade balance in t in country 2, and vice versa in $t + 1$.
- ▶ Given the time preferences and different returns on investments (different intertemporal production frontiers), the optimal plans for consumption and investment (and henceforth exports and imports) must be consistent.
- ▶ The world market interest rate r adjusts so that intertemporal plans of both countries are coordinated.

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments



Left side: low marginal productivity of I_t , patient consumers

Right side: large marginal productivity of I_t , less patient consumers

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

Possible effects of capital flows from the developed to less developed countries:

- ▶ A country with a higher return on investments have a comparative advantage for attracting investments.
- ▶ The capital receiving countries build up a capital stock much faster.
- ▶ This has also a positive effect on the labor productivity: wages will rise.
- ▶ In the country with capital outflows there might be reverse effects: unskilled labor will (relativley) lose.
- ▶ As the empirical picture shows, there are net capital flows to the developing (especially non oil-exporting) countries, but the amount is less than 7% of total investments.

2. Trade With Factor Mobility

2.1 Intertemporal approach to the balance of payments

Some literature:

- * Obstfeld, Maurice und Kenneth Rogoff (1995): The Intertemporal Approach to the Current Account, in: Grossman, Gene und Kenneth Rogoff (eds.): *Handbook of International Economics*, Vol. III, Amsterdam et al., 1733-1799.
- ▶ Feldstein, Martin und Charles Horioka (1980): Domestic Savings and International Capital Flows. *Economic Journal*, Vol. 90, 314-329.
- ▶ Griswold, Daniel T. (2001): America's Record Trade Deficit. A Symbol of Economic Strength. *Cato Institute for Trade and Policy Analysis*, No. 12, 9. Februar 2001, Washington D.C.

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

Markusen, J.R. (1983), Factor Movements and Commodity Trade as Complements. *Journal of International Economics* 14, 341-356.

- ▶ *Ricardo*: Trade due to productivity differences; no FPE, factor price differences reflect productivity differences.
- ▶ *HOV*: Trade due to different factor endowments; different endowments create factor price differences; this creates goods price differences and an incentive to trade; with (partial) specialization and free trade we have FPE.

Basic idea of the Markusen model:

- ▶ Starting with identical relative factor endowment.
- ▶ Different productivities create factor price differentials. These differentials create factor movements.
- ▶ The different relative factor endowments are then a result of productivity differences.
- ▶ Result: FPE (trivial), factor movements enlarge specialization and trade!

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

Model setup:

- ▶ The standard 2-2-2 scenario.
- ▶ Identical *initial* factor endowments.
- ▶ Good 2 is the labor-intensive good (no reversals)
- ▶ Identical homothetic preferences.
- ▶ Production functions with constant returns to scale for country $j \in \{h, f\}$:

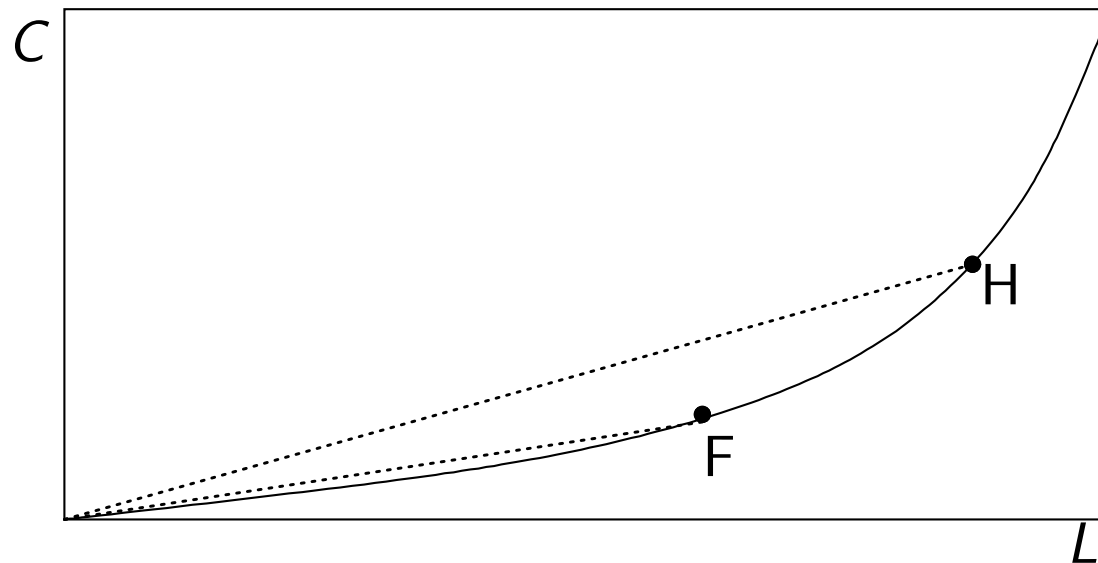
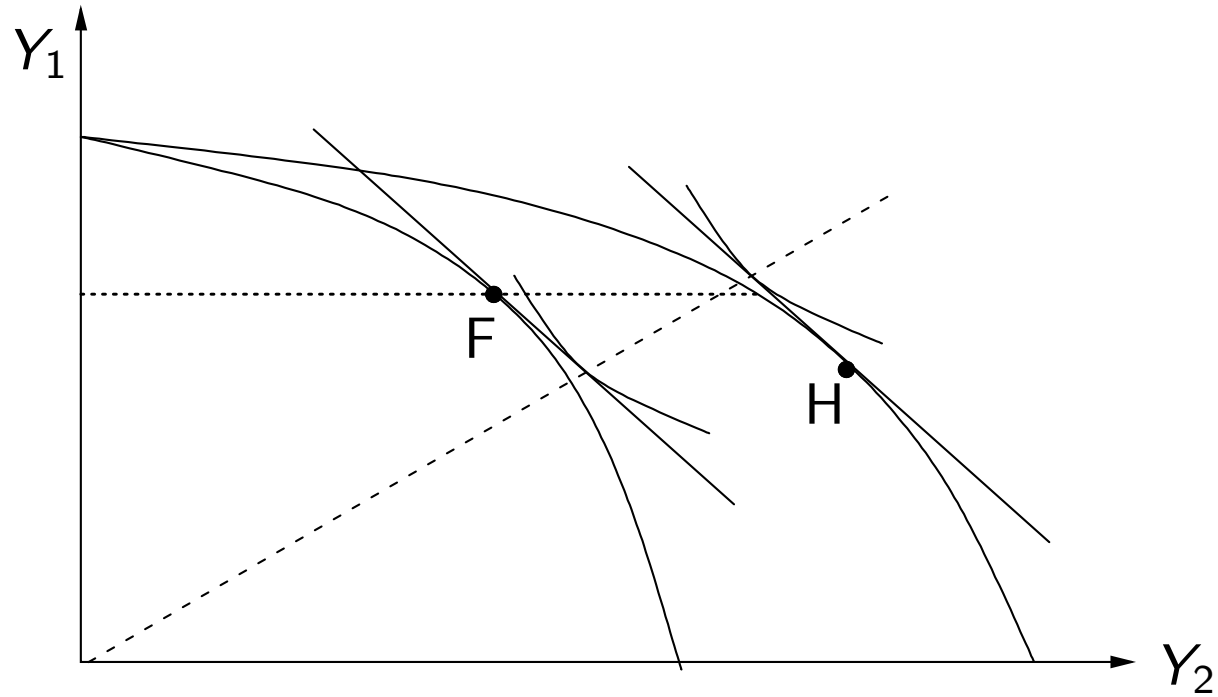
$$Y_1^j = G(L_1^j, C_1^j)$$

$$Y_2^j = \alpha^j F(L_2^j, C_2^j)$$

with $\alpha^h > \alpha^f$, i.e. the home country has a higher productivity in sector 2. (Since Y_2 is labor-intensive, this has the same effect as labor augmentation in country 2.)

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements



2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

1. Even if country h has a higher productivity in sector 2, the *relation* of marginal returns to labor and capital are identical to those of country $f \Rightarrow$ identical contract curve in the Edgeworth box.
2. If both countries would choose the same point F on the contract curve (implying *identical* relative factor prices), then country h would produce more of Y_2 but the same amount of Y_1 compared to country f , implying a *different* marginal rate of transformation.

If we assume trade and therefore an identical price relation, then the production point in h must be “downhill” in point H .

3. For homothetic preferences (same price relation = same structure of the consumed goods bundle), country h exports good 2, while country f exports good 1.

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

- ⇒ But then the factor prices can not be equal (see points F and H on the contract curve):
- ▶ Let $p = p_2/p_1$ be the world market price of good 2 (expressed in terms of good 1).
 - ▶ Competitive equilibrium requires that factor price equals the value of its marginal product:

$$w^j = p\alpha^j \frac{\partial F}{\partial L} = \frac{\partial G}{\partial L}, \quad r^j = p\alpha^j \frac{\partial F}{\partial C} = \frac{\partial G}{\partial C}$$

- ▶ We see that C_1/L_1 in H is larger than C_1/L_1 in F , and with decreasing returns we have $\partial G/\partial L$ in H exceeds $\partial G/\partial L$ in F and vice versa for C .
- ⇒ Thus, we have $w^h > w^f$ and $r^h < r^f$.

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

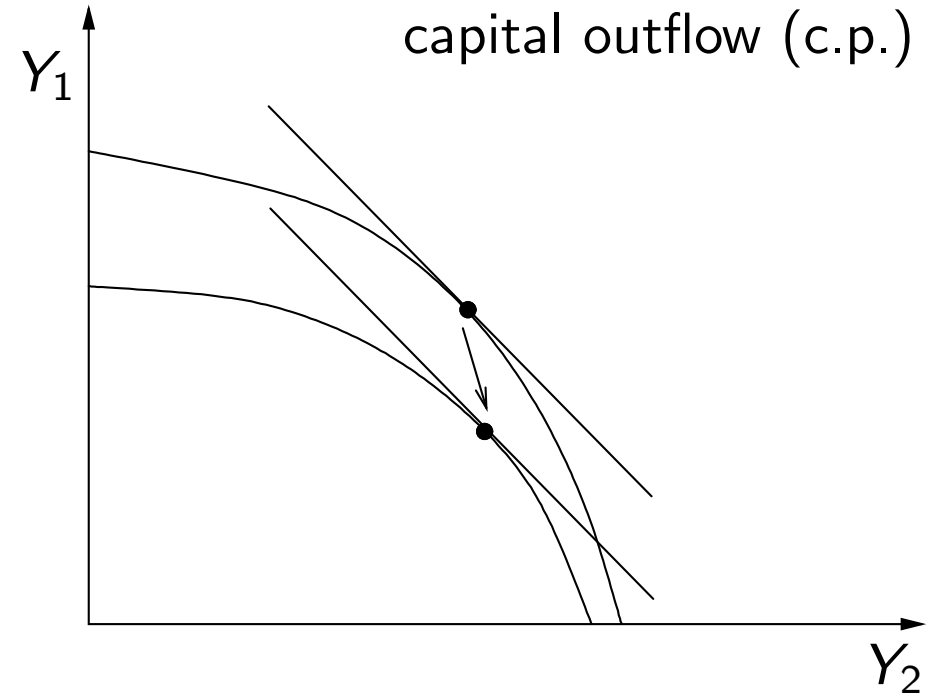
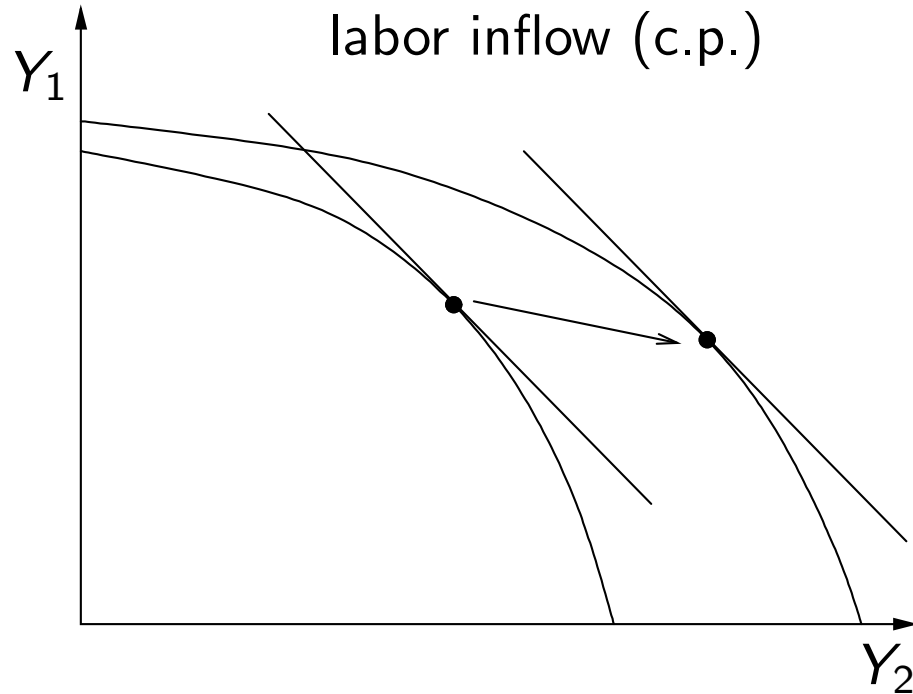
This creates an **incentive of the factors to move** (if one assume that differentials in factor prices are the only reason to move):

- ▶ Labor moves from country f to h , capital moves from h to f until factor prices are equalized.
- ▶ Each country *receives* the factor which is *intensively* utilized in the *export* sector.
- ▶ This adds an HOV base for trade and **reinforces** the direction of specialization and trade.

2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

Country h :



2. Trade With Factor Mobility

2.2 Trade models with induced factor movements

Remind the Rybczynski theorem:

- ▶ An increase of the endowment of a factor induces an increase of production of the good which intensively utilizes this factor while the other good's production is reduced (with constant terms of trade).
- ▶ Both, the inflow labor, and the outflow of capital work in the same direction: Country h enforces the production of good 2, country f enforces the production of good 1.
- ▶ Since the goods prices and therefore consumption points are unchanged, this implies an **enlargement of trade**.

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

- ▶ Labor can be more or less skilled, depending on the level of education. Many models distinguish raw labor force (unskilled labor) L and human capital H .
- ▶ Wages for high-skilled labor will exceed wages for unskilled labor, the wage differential depends on the differential of (expected) marginal return to labor and can be interpreted as the rent for former investment in human capital.
- ▶ Wage differentials depend on technological differences, the level of education, the share of skilled workers, and eventually positive spillover effects of HC.
- ▶ The decision to migrate and the decision to accumulate HC (invest into education) become interdependent.
- ▶ In a first step, we put the focus on the migration of (unskilled) labor L .

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

Debate about migration:

- ▶ Germany faces an outflow of high-skilled labor (engineers, physicians, top managers etc.) which exceeds the inflow (loss of human capital). Discussing measures to reverse this trend.
- ▶ In the 1950ies and 1960ies also unskilled or less skilled labor was scarce! Labor force from Italy and Spain, later from Turkey have been encouraged to migrate to Germany.
- ▶ In both cases the lack of labor force or human capital induces an underutilization of production capacities and may lead to a loss of growth rate.

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

Motives of migration:

- ▶ Higher wages in the foreign country
- ▶ Better supply with goods and access to infrastructure
- ▶ Better social security
- ▶ More economic and political freedom

Barriers of mobility:

- ▶ Different language and culture
- ▶ Losing existing social contacts (family, friends etc.)
- ▶ transaction and transportation costs
- ▶ uncertainty

2. Trade With Factor Mobility

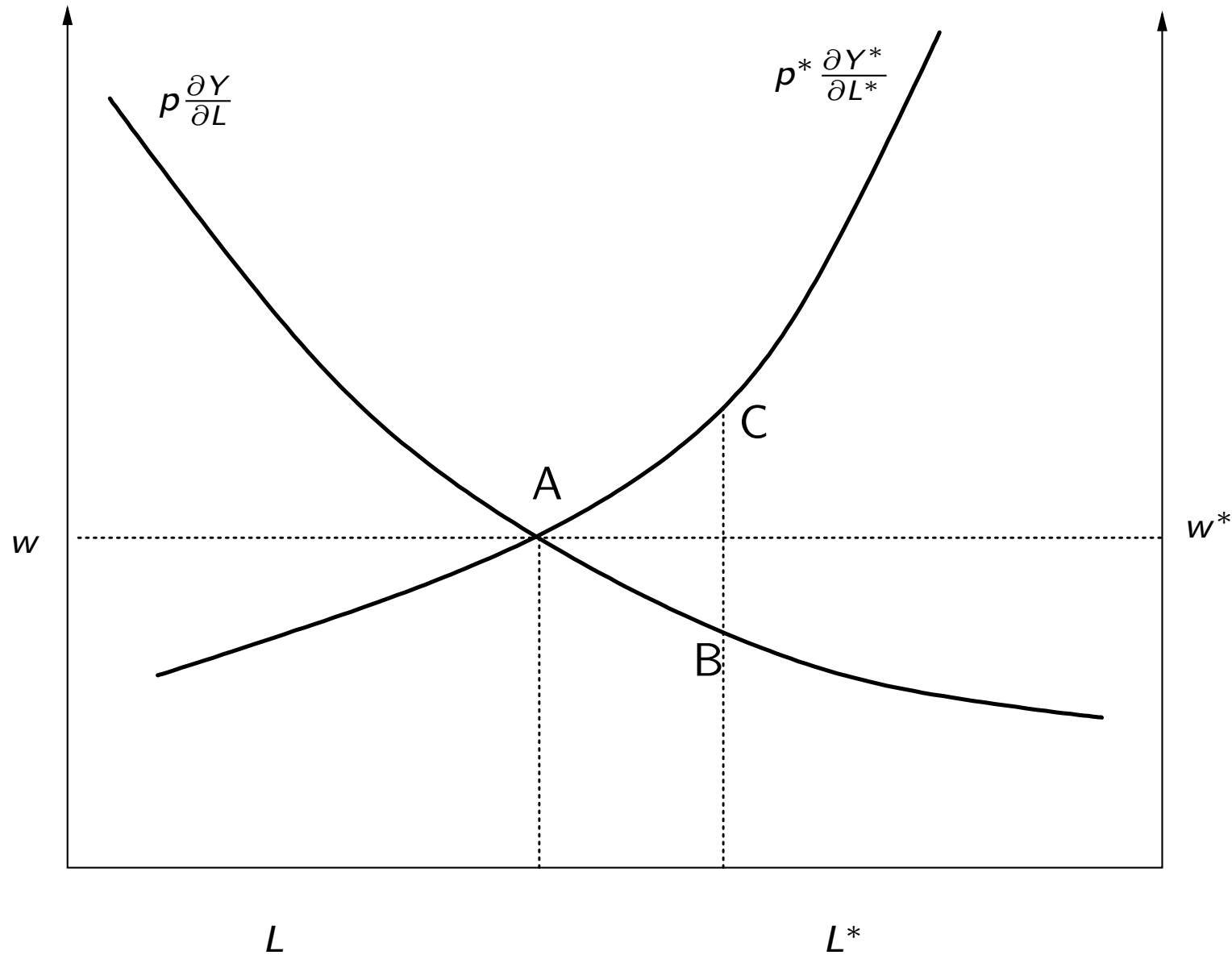
2.3 Migration of Labor and Human Capital

Assume that wage differentials = differences in labor productivity are the driving force. Then we have the same effects than previously discussed for capital mobility:

- ▶ The real wages will be equalized. The migrants as well as the worker in the sending country receive higher wages, while the worker in the receiving country face a wage loss.
- ▶ The factor allocation is improved in terms of efficiency, therefore the output will increase (see triangle ABC in the graphic).

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital



2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

- ▶ In times of small and moderate migration, these effects might be small and statistically insignificant.
- ▶ In time of mass migration (e.g. late 19th century) these effects have been significant (source: cf. Krugman/Obstfeld)

	real wage 1870 (US = 100)	increase or real wage in % 1870-1913
<i>receiving countries</i>		
Argentina	53	51
Australia	110	1
Canada	86	121
USA	100	47
<i>sending countries</i>		
Ireland	43	84
Italy	23	112
Norway	24	193
Sweden	24	250

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

- ▶ “Brain Drain” = Migration of HC from the perspective of the sending country
 - ▶ “Brain Gain” = Migration of HC from the receiving country, but also HC losses might have stimulating effects
 - ▶ Typical situation: Return on HC is higher in the *developed* and industrialized countries compared to *developing* countries. Thus, there is an outflow of HC from developing countries. The share of skilled workers and hence average wages decrease.
- ⇒ Thus rich countries were seen to become richer, the poor countries become poorer at the first sight. Should there be a taxation-compensation scheme? (Bhagwati)

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

- ▶ It is more likely that high-skilled workers migrate rather than less-skilled (e.g. larger wage differentials, lower barriers to migrate).
- ▶ Slight increase in migration.

	Emigration rates in 2000				Changes in emigration rates 1990–2000			
	Low education (%)	Intermediate education (%)	High education (%)	Total (%)	Low education (%)	Intermediate education (%)	High education (%)	Total (%)
China	0.1	0.1	3.8	0.2	0.0	0.0	0.8	0.1
India	0.1	0.4	4.3	0.4	0.0	0.1	1.5	0.1
Philippines	1.4	3.3	13.7	5.0	0.1	0.3	0.8	0.8
Romania	4.6	2.0	11.8	3.7	1.1	1.1	2.7	1.3
Eastern Europe	5.0	3.3	14	5.2	0.5	1.2	0.8	1.1

Iranzo, S., Peri, G. (2009), Migration and trade: Theory with an application to the Eastern-Western European integration. *Journal of International Economics* 79, 1-19

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

Problems:

- ▶ The sending country has invested into HC but the receiving country utilizes neither its productivity effect nor its positive externalities. Typically, the government spend money for education, financed by taxes.
- ▶ According to the Rybczynski theorem, the HC-intensive sector in the sending country shrinks while the unskilled-labor intensive sector grows. This reverses the developing process.
- ▶ Loss of income and therefore tax base.
- ▶ Since skilled workers are more productive than unskilled workers, the output per capita will also decrease in the sending country (c.p.).
- ▶ Further complicated effects in case of labor market frictions like minimum wages, information asymmetries, and unemployment.
- ▶ In a dynamic perspective, growth models like Uzawa/Lucas show that loss of HC is more harmful than a loss of physical capital: the convergence process slows down.

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

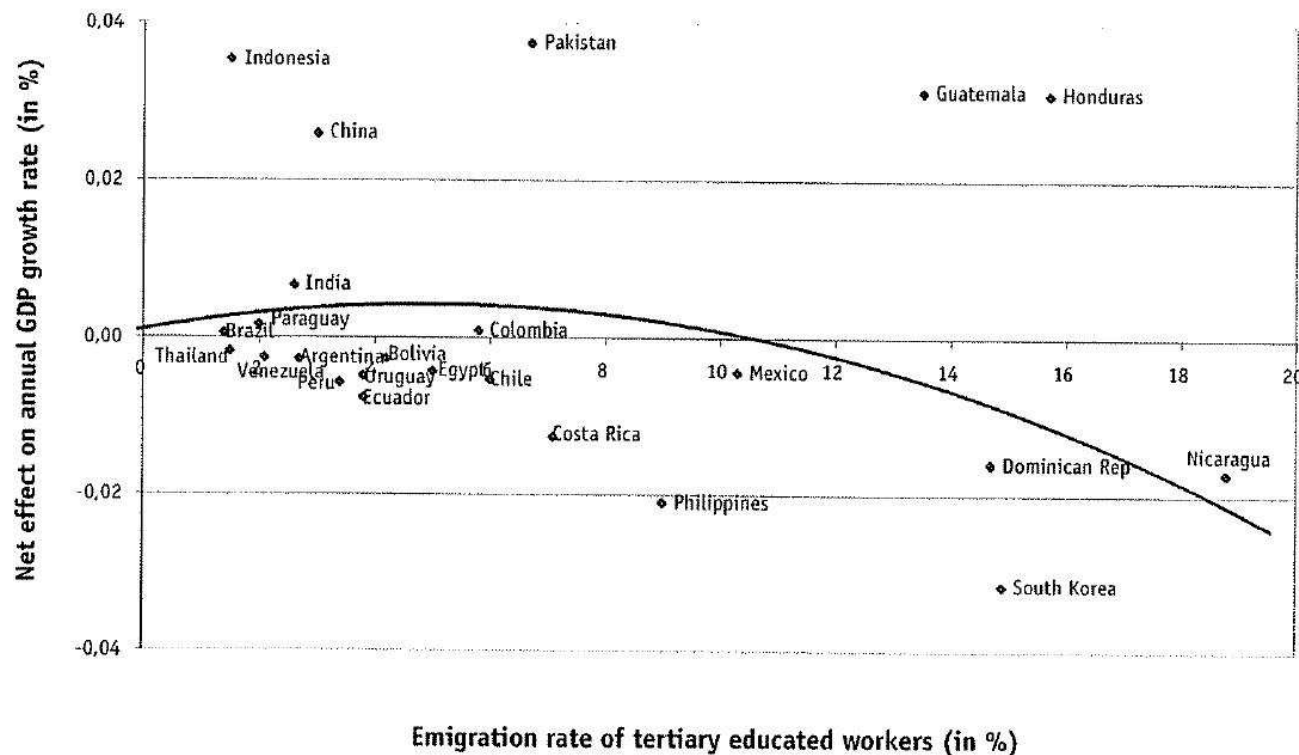
But there are also positive effects:

- ▶ Migration of HC leads also to FPE (in tendency). In the sending country, the investment into new HC is stimulated since its marginal productivity increases (vice versa for the receiving country). It is possible that the encouraging effect on skill-creation outweighs the loss effect of emigration.
- ▶ Furthermore, the decision to become more educated now not only depends on the domestic marginal product but also on the foreign return on HC, i.e. workers invest into HC with the perspective to eventually leave the country. Thus, international wage differentials not only induce migration but also alter the incentive scheme for HC accumulation.
- ▶ High-skilled workers in the foreign country will partially transfer income to the sending country.
- ▶ Return to home country after being additionally skilled.
- ▶ HC flows as a vehicle of knowledge diffusion.

2. Trade With Factor Mobility

2.3 Migration of Labor and Human Capital

- ▶ The empirical literature is inconclusive in most points.
- ▶ Correlation between emigration rate and the effect on the GDP growth rate: ambiguous effect



Source: Rapoport (2004)

3. Trade and Multinational Firms

3.1 Introduction

- ▶ Most trade theories assume that a single firm, residing in one country, produces a certain good which can then be exported.
- ▶ Empirically seen, many firms produce a good in *different countries*, or they *segment the production chain* and produce different parts of the good in different countries. The headquarter of the firm resides in one country.
- ▶ Firms which are producing in more than one country and/or where production and headquarter services operate in different countries, are called **Multinational Firm** (MNF).
- ▶ It is controversial whether a Foreign Direct Investment (participating in another firm's capital $> 10\%$) make a firm being a MNF.

3. Trade and Multinational Firms

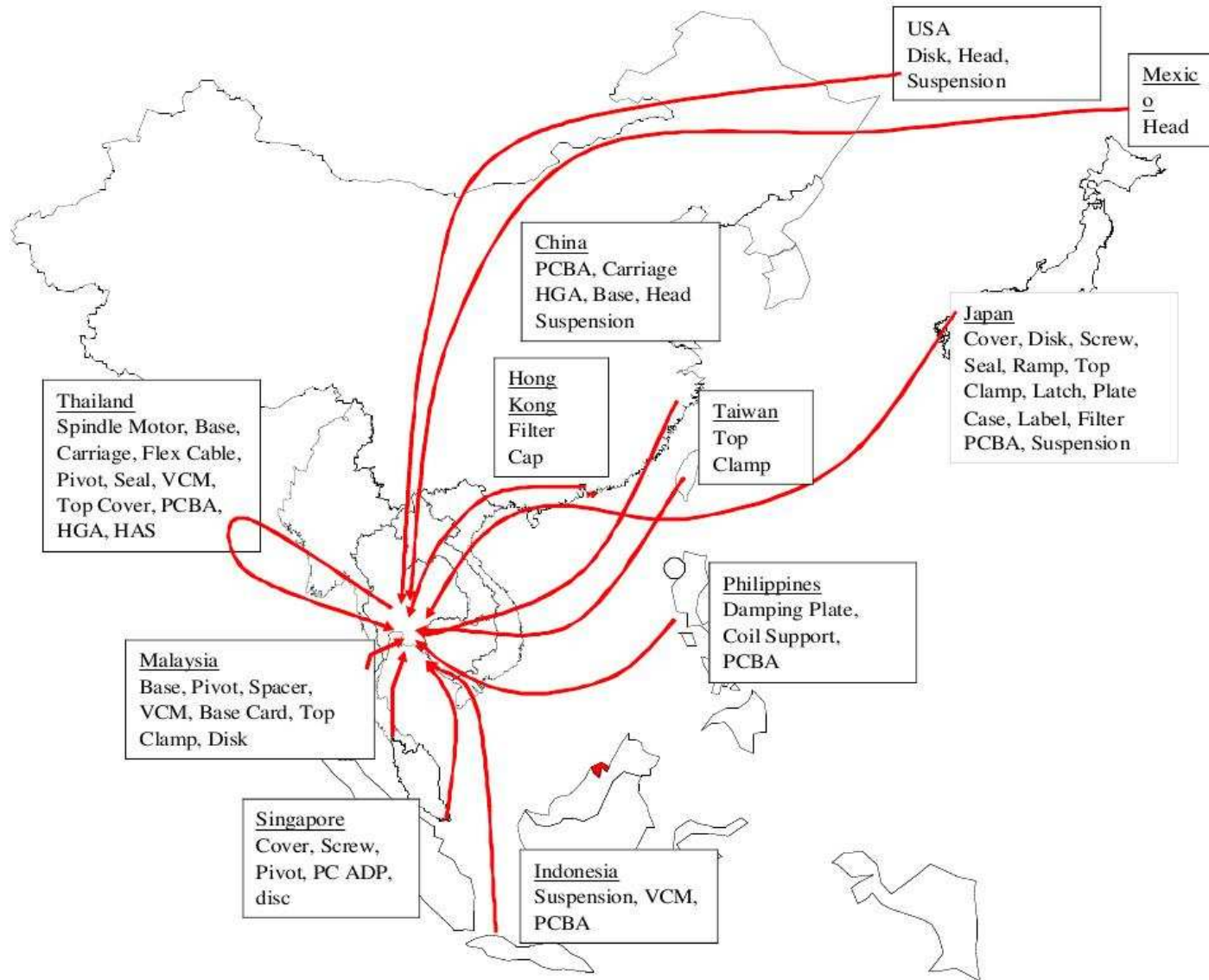
3.1 Introduction

- ▶ The 100 largest MNEs generated in 2007 revenues of 8,078 Billion Dollar with 14.87 Mio. employees (World Investment Report 2009).
- ▶ Increasing activity of MNF is correlated with increasing **intra-industrial** trade:
 - ▶ *horizontal* intra-industrial trade (by product differentiation)
 - ▶ *vertical* intra-industrial trade (segmentation of production chain)
- ▶ Vertical intra-industrial trade is often within the same firm: **intra-firm trade!**
- ▶ Therefore the exports and imports increase faster than the produced goods.

3. Trade and Multinational Firms

3.1 Introduction

Manufacturing a hard disk drive:



3. Trade and Multinational Firms

3.1 Introduction

- ▶ **Horizontal MNF:** The complete production of good y is done simultaneously in different countries. Note that this erodes the incentive to export.
- ▶ **Vertical MNF:** Different parts of the production process of the good y are done in different countries \Rightarrow trade with intermediate products

What are motives to become a MNF?

- ▶ Firms can have a competitive advantage in different locations \Rightarrow approach by M. Porter (see part of Prof. Gogorishvili)
- ▶ Different dimensions which are important for the location decision (according to J.H. Dunning 1980):
 - ▶ Ownership advantages
 - ▶ Location related advantages
 - ▶ Internalisation advantages

3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

Markusen, J.R. (2002), *Multinational Firms and the Theory of International Trade*. Colorado.

- ▶ Partial equilibrium approach: The consequences of firm's decision on total economy are neglected.
- ▶ Options of a firm:
 - ▶ Produce only **national** (don't become MNF), and export into the foreign country.
 - ▶ Produce in foreign country while headquarter services stay in home country, and export into home country (**vertical MNF**)
 - ▶ Produce in both countries, no exports/imports (**horizontal MNF**). In this case, the firm is able to charge different prices.
- ▶ The firm is involved into Cournot competition (not explicitly modelled here) when in both countries we have the same linear demand scheme.

3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

	profit domestic country	profit foreign country
national	MC_d, L_d, G	MC_d, T, L_f
vertical	MC_f, T, L_d	MC_f, L_f, G
horizontal	MC_d, L_d, G	MC_f, L_f, G

$MC_i =$ marginal cost in $i \in \{d, f\}$,

$L_i =$ market size/demand,

$G =$ fixed costs for setting up a production plant,

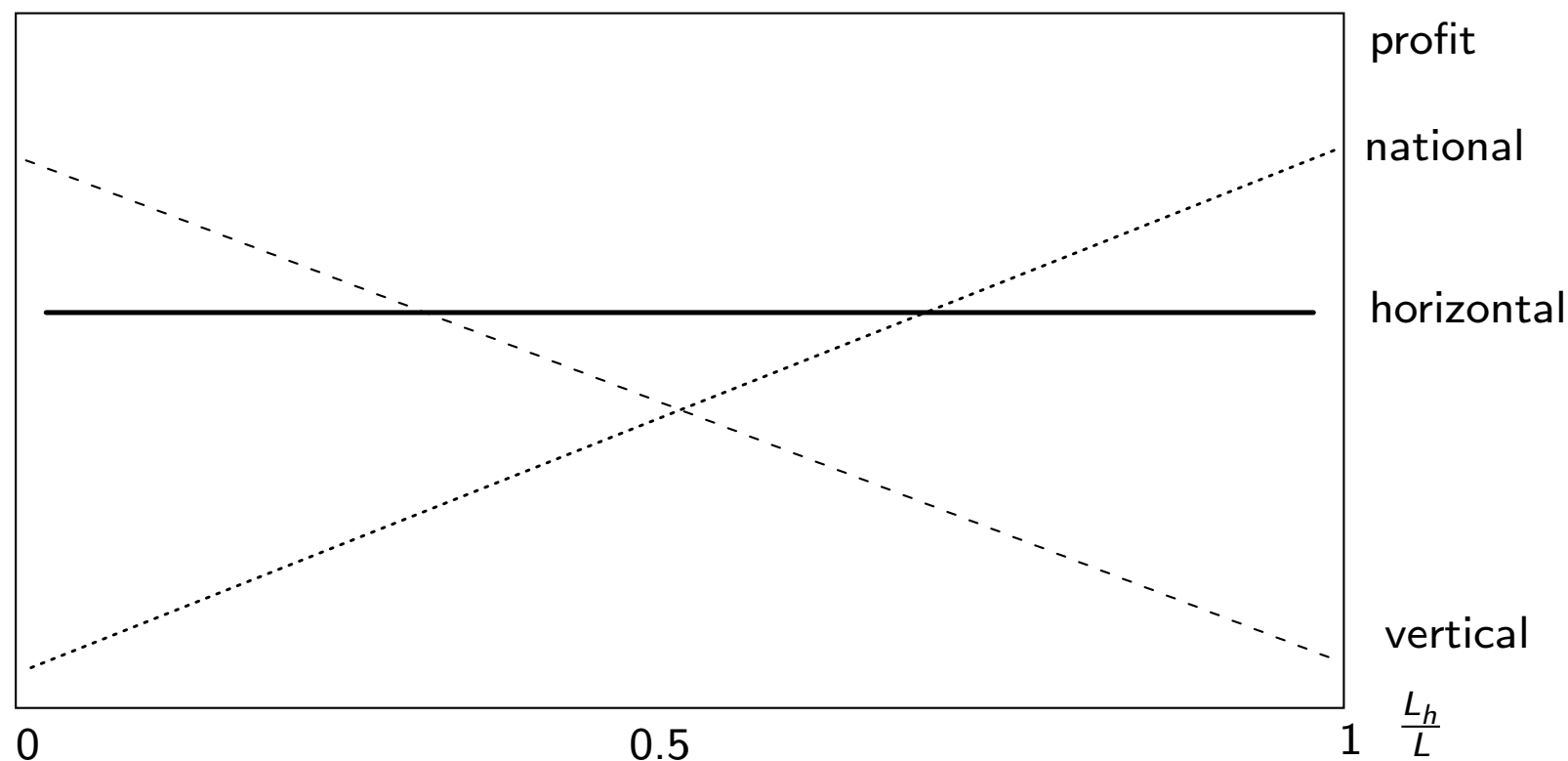
$T =$ transportation cost.

The firm calculates the possible total profits (foreign + domestic) and decides about the internationalization policy (national, vertical, horizontal).

3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

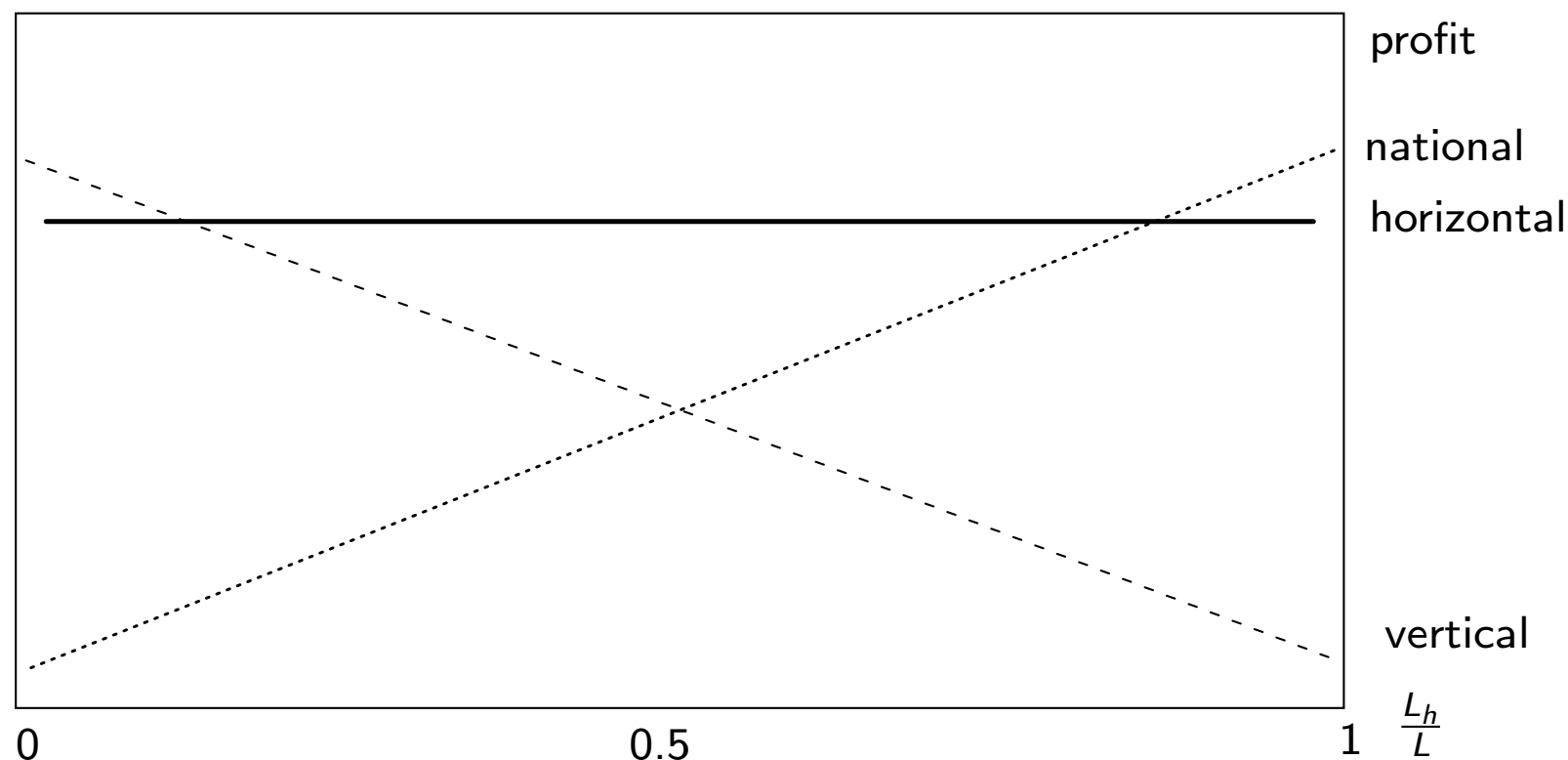
A **baseline parametrization** of the model: Let $MC_d = MC_f$ and $L_d + L_f = L$ so that we can calculate the domestic market share L_d/L . In case of a horizontal MNF, there are the same profits per unit in both countries so that different domestic market shares have no impact on total profits.



3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

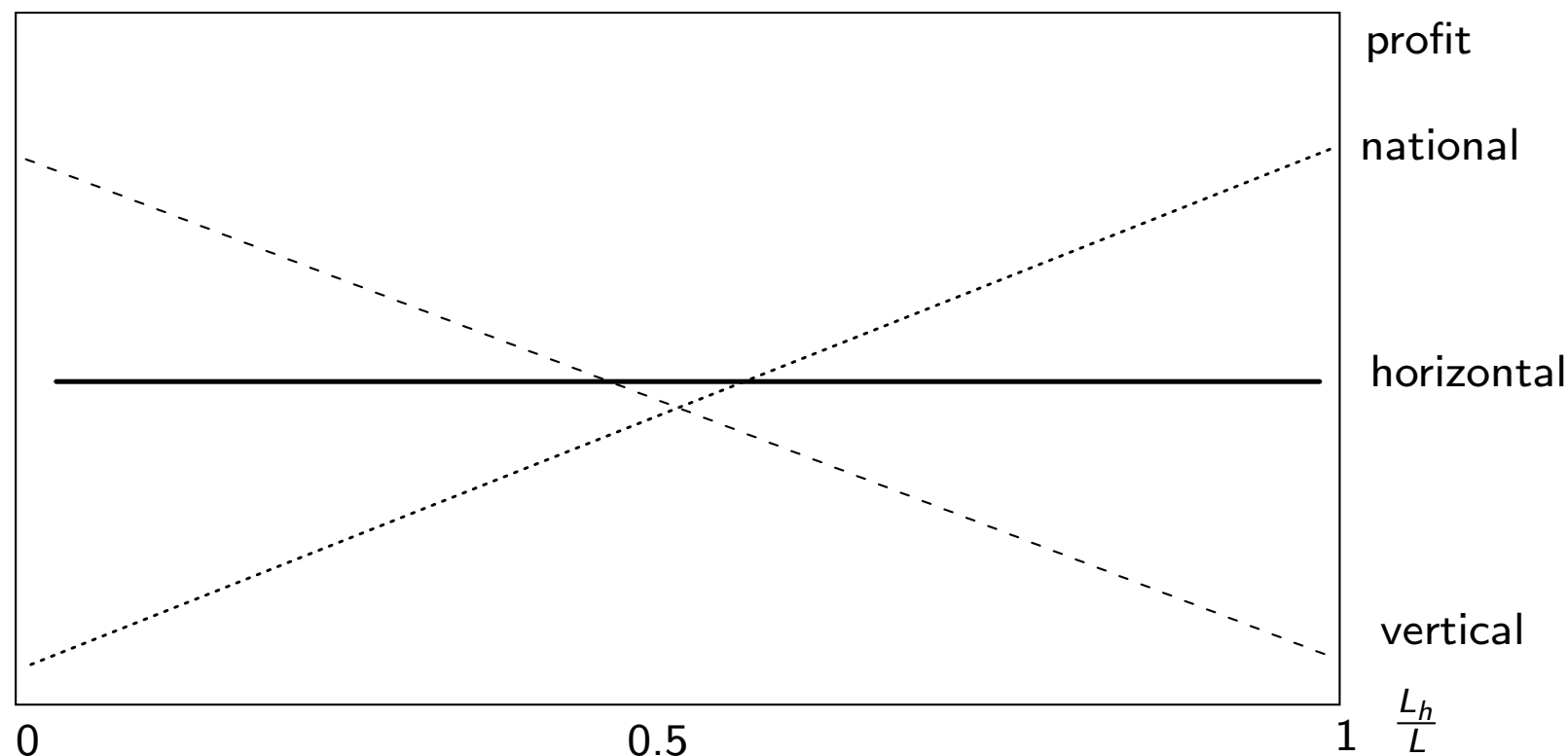
Increasing world demand L : All curves shifts upwards but profits for horizontal MNF more than the others: In case of trade between two large countries of similar size it is more likely to have horizontal MNF.



3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

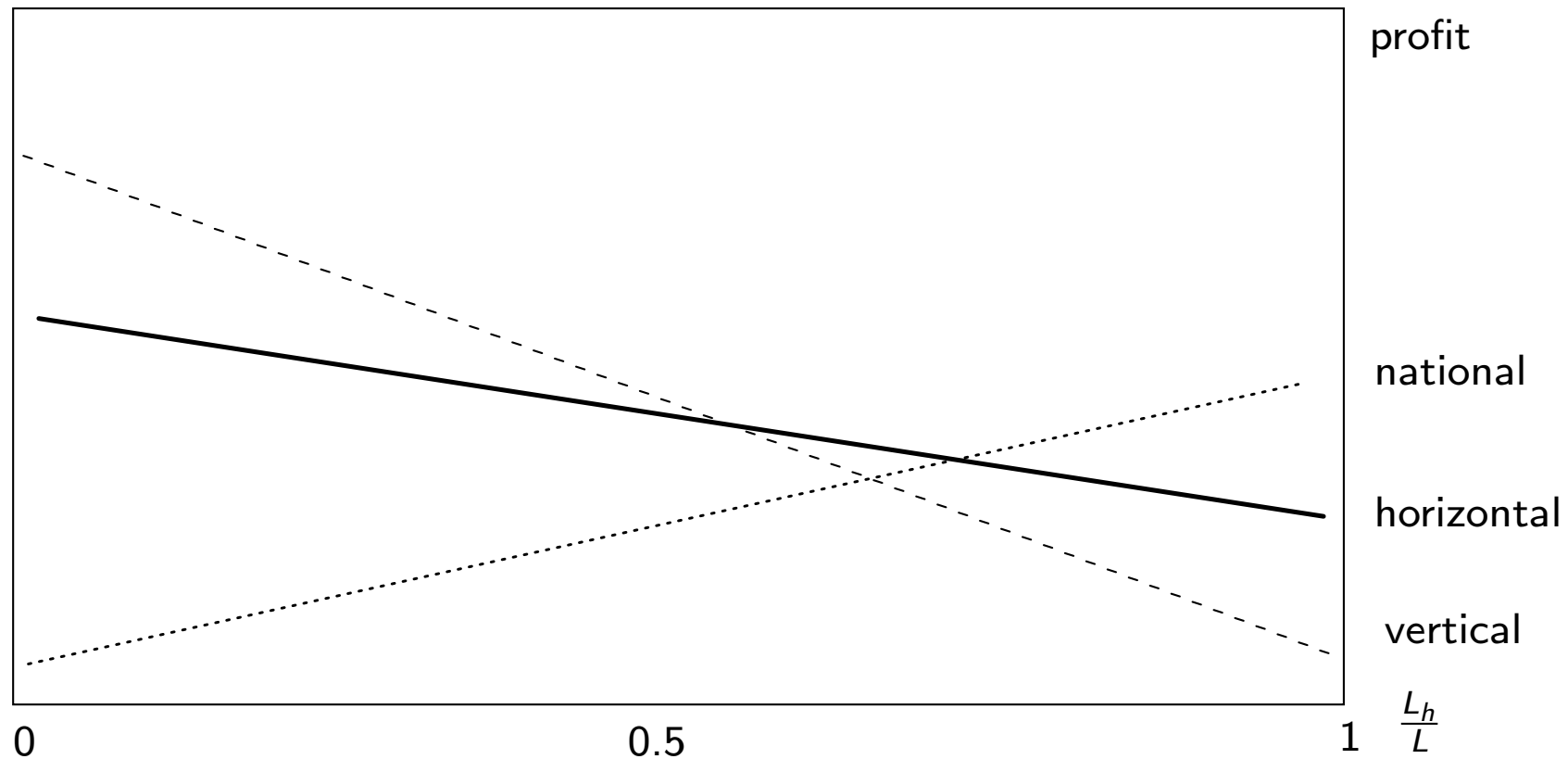
Reducing transportation costs: Does not affect horizontal MNF, but the other curves shift upwards. It becomes more likely to observe national production or vertical MNF, depending on the country size differences.



3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

Reduced marginal costs in foreign country ($MC_d > MC_f$):
Vertical MNF become more liely.



3. Trade and Multinational Firms

3.2 Vertical and horizontal MNF, intrafirm-trade – partial equilibrium approach

- ▶ The aim of the model is to explain which determinants will lead to which internationalization strategy (national, horizontal, vertical).
- ▶ Since it does not relate the output to different production factors via a production function, it cannot explain which parts of the production process (value creation chain) is located in which country.
- ▶ It is a partial approach, not a general equilibrium approach.
- ▶ Further consequences from internationalization: knowledge transfer, technology transfer, building up human capital (not discussed here).

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ Helpman, E. (1984), A Simple Theory of International Trade with Multinational Corporations. *Journal of Political Economy* 92(3), 451-471.
- ▶ see also Feenstra, chapter 11

Special fragmentation of the production chain:

- ▶ “Headquarter services” in one country – production facilities in the other country (vertical MNF), or production facilities in many other countries (horizontal MNF).
- ▶ Firm-specific factors (knowledge, technology)
- ▶ MNF engaged in producing differentiated goods.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ Homogenous good y_1 , unskilled-labor-intensive
- ▶ Differentiated goods y_{2i} , uses α units of skilled labor H as *fixed* costs = headquarter costs, and β units of unskilled labor L as *variable* costs.
- ▶ Symmetric cost function $C_{2i} = q\alpha + w\beta y_{2i}$ with q as the factor cost of skilled labor.
- ▶ Zero profit condition for all firms according to perfect competition in sector 1 and Chamberlin monopolistic competition in sector 2.
- ▶ CES utility function for differentiated goods
- ▶ In equilibrium the demand is $y_{2i} = \bar{y} \forall i$ and the number of variants N in both countries are determined (analogously to Krugman model)

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

Analysis of the integrated world equilibrium *without* MNF:

- ▶ Domestic factors are utilized only by domestic firms, i.e. production and costs are performed in the domestic country.
- ▶ From cost minimization for the homogenous and the heterogeneous goods we have the unit factor demand matrix

$$A = \begin{pmatrix} a_{1L} & \beta \bar{y} \\ a_{1H} & \alpha \end{pmatrix}$$

- ▶ Let $Y^j = (y_1^j, N_2)^T$ be the vector of the output of good 1 and the number of firms in sector 2 (where the firm's equilibrium output \bar{y} is already part of the matrix A).
- ▶ Then full employment condition gives $AY^j = V^j$ (endowment vector), analogously to the HOV model.

3. Trade and Multinational Firms

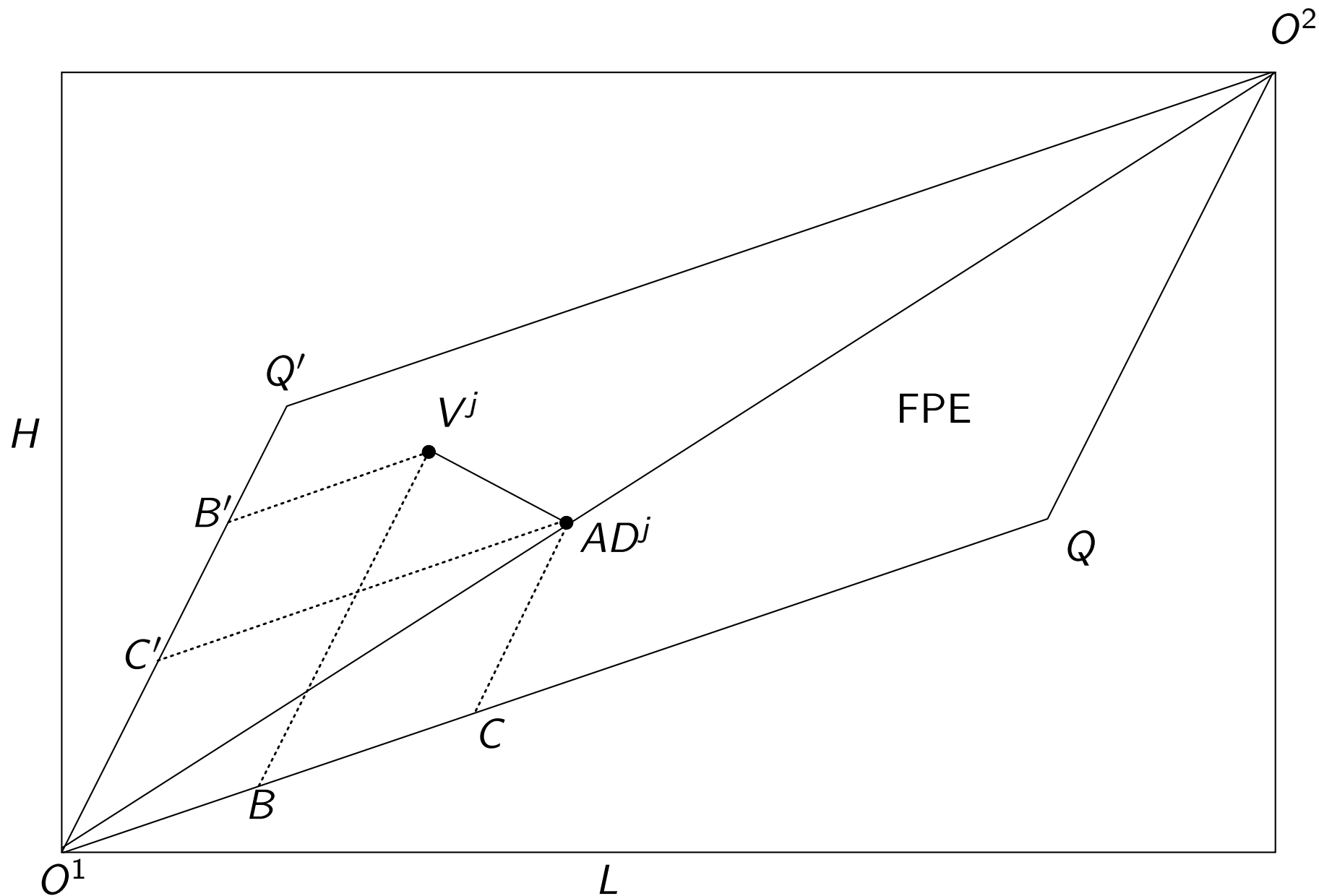
3.3 Specialization pattern and trade with MNF – general equilibrium approach

Consider the following Dixit-Norman diagram:

- ▶ With the endowment vector V^j , country 1 is abundant of skilled labor H . AD^j is the consumption point (due to identical homothetic preferences it must lie on the main diagonal).
- ▶ Country 1 uses O^1B in sector 1 and O^1B' in sector 2. By construction of the cone, O^1B' is also a measure for the number of differentiated goods.
- ▶ Country 1 consumes O^1C from good 1 and O^1C' from the differentiated good. Obviously, it imports the homogenous good since $O^1B < O^1C$ and is a net exporter of the differentiated good since $O^1B' > O^1C'$. Net exporter means that there is *intra-industrial* trade with the differentiated good but there is a positive trade balance in this sector.
- ▶ We have a mixture of inter-industrial and intra-industrial trade. We have FPE since V^j is in the FPE set.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach



3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

Now consider **MNF activities**:

- ▶ The production of good 2 can be *fragmented*. We have fixed headquarter costs for skilled labor in one country, and variable costs for unskilled labor in the other country.
- ▶ So we have *three* different production processes with different intensity of skilled labor. The factor requirements for L and H are given by:

$(\beta\bar{y}, 0)$ variable requirements for good 2

(a_{1L}, a_{1H}) requirements for good 1

$(0, \alpha)$ fixed requirements for good 2

- ▶ Multiplying these requirements with the total demand gives an *extended* FPE set as shown in the following graphic.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ Consider the point V' outside the original (small) FPE set O^1QO^2Q' . That means that there is *no FPE due to trade*.
- ▶ Country 1 is abundant of skilled labor which is relative cheap. MNF will therefore place their headquarters in country 1 and produce with unskilled labor in country 2. These activities of MNF will lead to FPE because the demand of skilled labor in country 1 will rise. Thus, the FPE set with activities of MNF is larger.
- ▶ Since there are *three* production activities and only *two* factors there are many combinations of activities across countries which meet the full employment condition. We focus on those which induce a minimum of trade.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ With the endowment vector V' domestic firms in country 1 produce varieties of good 2 using resources $O^1 C'$.
- ▶ The rest of skilled labor resources $C' V'$ is devoted to headquarter services for MNF. They utilize unskilled labor in country 2 of the amount $V' V^m$ in order to produce additional varieties of good 2 in country 2 to the amount $C' V^m$. Hence, the *employment vector* V^m differs from the *endowment vector* V' .
- ▶ Additional skilled resources of country 2 of amount $V^m Q'$ are also used to produce good 2 by domestic firms, while $O^2 Q'$ is used to produce the homogenous good 1.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

Trade pattern:

- ▶ In the region $O^1S'Q'$ we have full specialization of country 1 to the differentiated good 2, and it imports the homogenous good from country 1.
- ▶ The trade in the differentiated good 2 is not so clear. Country 1 is specialized to good 2, but also unskilled labor in country 2 is used together with country 1's headquarter services to produce good 2. Since the variants are imperfect substitutes, we have intra-industrial trade.
- ▶ The figure shows a situation where the produced amount of good 2 equals the consumed amount (see C'). This is the special case of a *balanced* trade. If V' would be slightly shifted to the right (left), country 1 would be a net exporter (importer) of good 2.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ *How is it possible that country 1 has a balanced trade in good 2 but imports good 1?* The reason is that utilizing labor force in country 2 by MNF creates *positive profits* for country 1 (in order to cover the fixed headquarter costs).
- ▶ Thus, the “**intra-firm trade**” of services (or intermediate goods) has to be taken into account. In this case it works like “invisible exports” of country 1 which are used to pay imports of the homogenous good 1.
- ▶ More technically: MNF utilize the amount $V'V^m = L^*$ of unskilled labor. It is $\beta\bar{y}$ the amount of L per variety and therefore $N^* = L^*/\beta\bar{y}$ is the number of varieties produced by MNF. So the *value of headquarter services* “exported” to country 2 is $\alpha N^* = \alpha L^*/\beta\bar{y}$.

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

- ▶ Consider an endowment vector V'' in the region $S'Q'O^2R'$. Again, MNF will have headquarters in country 1 and utilize unskilled labor force in country 2 at the amount $V''V^n$.
- ▶ In this region, country 1 can be importer or exporter of the homogenous good (depending on the relation to the demand vector AD^j), but it is exporter of the heterogenous good and headquarter services.
- ▶ We neglect a detailed analysis of the trade volumes (inter-sectoral, intra-sectoral, intra-firm)!

3. Trade and Multinational Firms

3.3 Specialization pattern and trade with MNF – general equilibrium approach

Brief summary:

- ▶ The existence of MNF allows for combining production factors across countries to produce one (differentiated) good. Foreign production plants utilize domestic headquarters services (or the domestic headquarters utilize foreign labor force). This **enlarges the FPE set!**
- ▶ The trade pattern has a richer structure: We have **inter-sectoral, intra-sectoral, and intra-firm trade**. The latter reflects that the utilization of resources in a foreign country creates profits for the headquarter which are a substitute for “exports”.

4. Theory of Trade Policy

- ▶ We have analyzed trade patterns and the effects of trade on distribution and welfare by assuming that prices and quantities are determined by markets (typically: perfect competition).
- ▶ We now investigate the effect of distortions by policy measures like
 - ▶ (import) tariffs:
specific tariff $p + t$, ad valorem tariff $(1 + t)p$
 - ▶ (export) subsidies
 - ▶ import quotas
 - ▶ “voluntary” export restraints
 - ▶ other measures

4. Theory of Trade Policy

- ▶ Partial versus total welfare analysis:
 - ▶ partial: effects on consumer and producer surplus and tariff revenues
 - ▶ total: all effects on factor allocation and relative prices \Rightarrow transformation curve analysis
- ▶ Small versus large country:
 - ▶ small country: terms of trade are given and unaffected by the tariff
 - ▶ large country: tariff changes demand, demand changes terms of trade.
- ▶ What happens with tariff revenues?
 - ▶ not considered in welfare analysis (only private welfare)
 - ▶ considering governmental spending of revenues (private plus gov. welfare)
 - ▶ revenues are given to the consumers

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

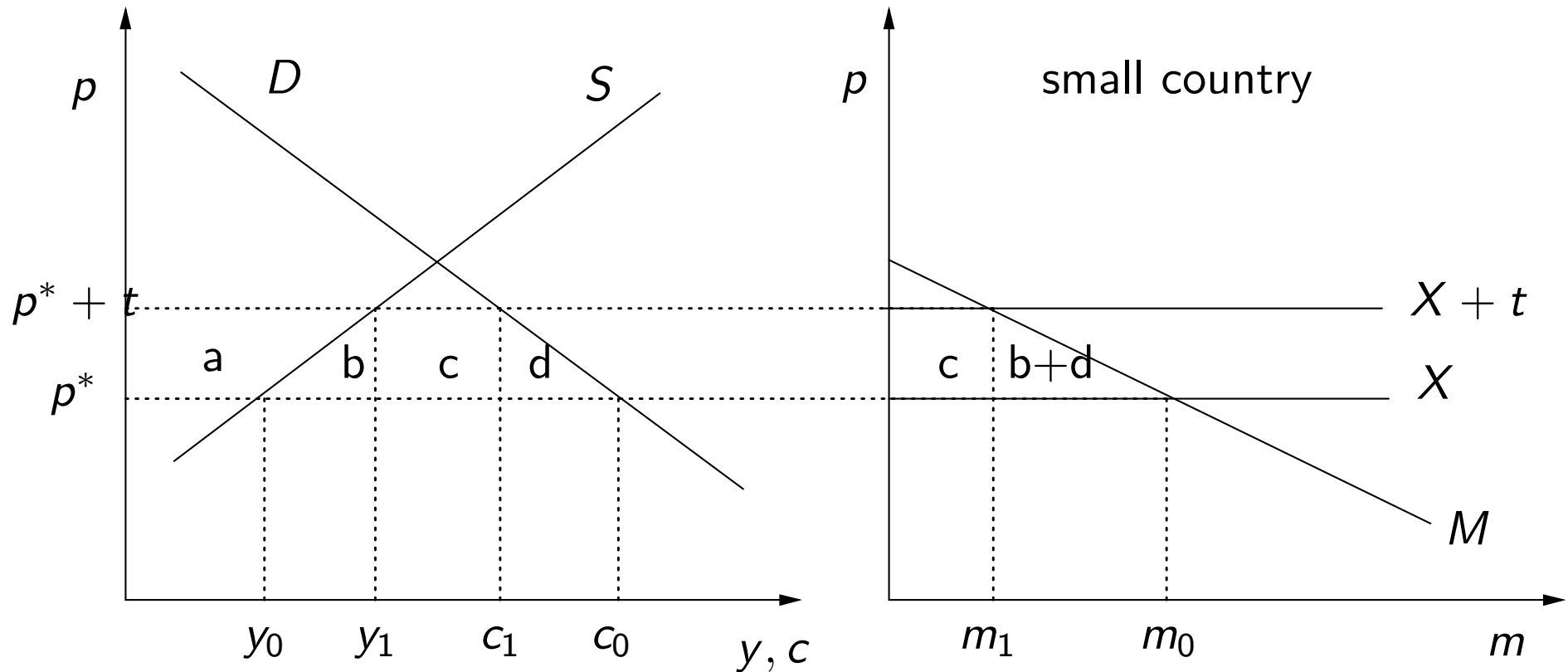
Tariffs:

- ▶ Protect the domestic industry from foreign competitors; therefore prone to political pressure
- ▶ What might be “good” for some domestic sectors may be harmful for domestic consumers and may distort factor allocation. Under specific conditions domestic welfare may increase – at the expense of the welfare of other countries (“beggar-by-neighbour-policy”)
- ▶ Answer to tariffs (and other trade barriers) may be retorsion tariffs ⇒ mutually “optimal” trade barriers lead to a pareto-inferior equilibrium ⇒ necessity of negotiations (GATT, WTO)
- ▶ WTO allows tariffs (i) in cases of “unusual” import competition (“escape clause”), (ii) as antidumping duties
- ▶ Success in negotiations (see graphic), but tendency to substitute tariffs for other forms of trade barriers.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Small country – partial equilibrium:



4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

- ▶ Left side: domestic market, right side: (residual) import demand, changes in demand do not affect p^* (totally elastic supply function).
- ▶ The tariffs increases the domestic price. Demand is reduced to c_1 , supply is increased to y_1
- ▶ Disentangling welfare effects:
 - ▶ Consumer surplus loss: $-(a + b + c + d)$
 - ▶ Producer surplus gain: $+a$
 - ▶ Tariff revenues: $+c$
 - ▶ Total effect (sum): $-(b + d) < 0$
- ▶ The deadweight loss $-(b + d)$ is the triangle under the import function (right side)

4. Theory of Trade Policy

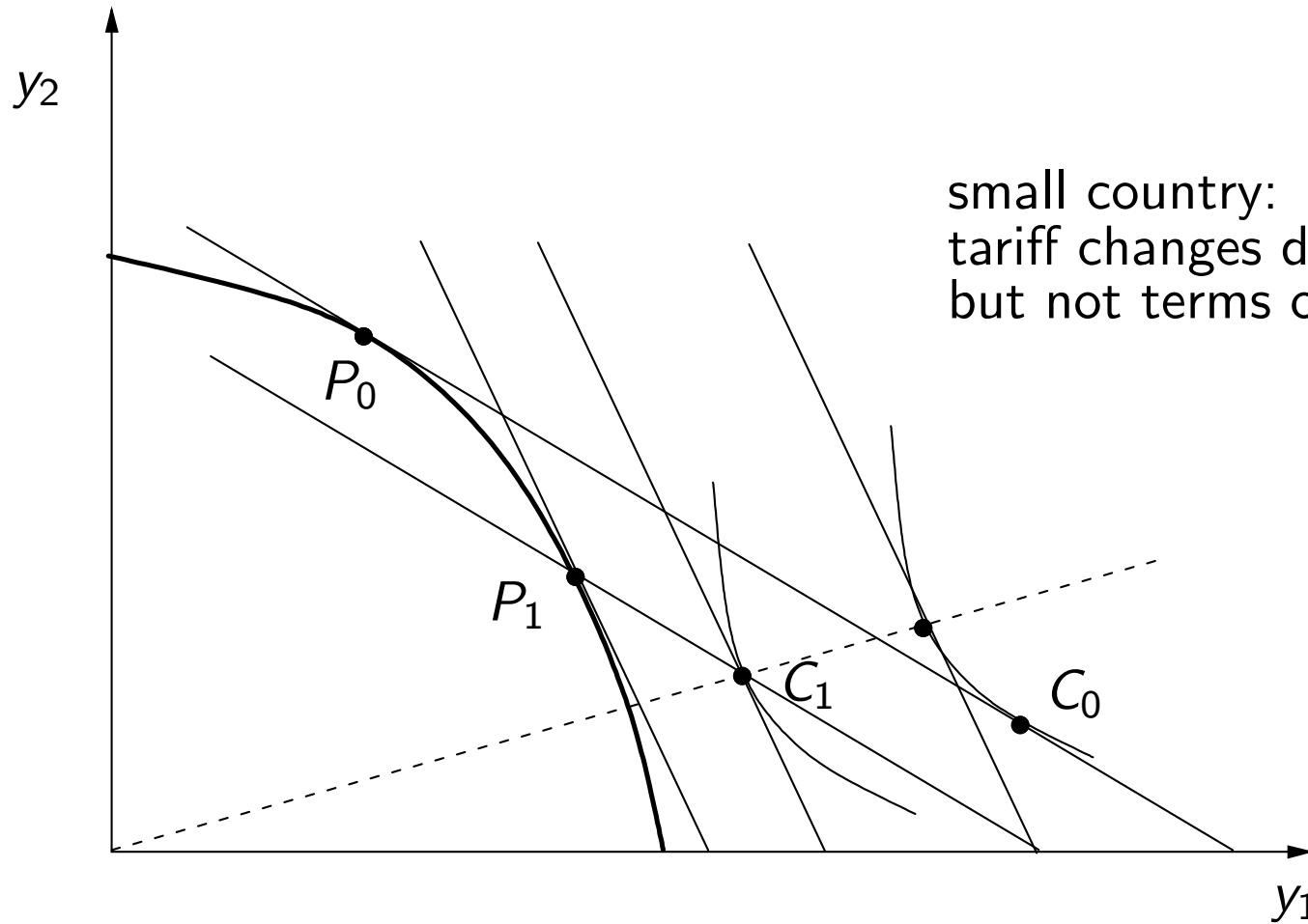
4.1 Welfare analysis of tariffs and quotas

Small country – total equilibrium:

- ▶ The tariff does not only have an impact on the market for the imported good.
- ▶ An increase in the output of the import-competing domestic industry (the primary aim of the policy measure) implies a decrease of the other sector's output (in case of full employment) and hence a reallocation of resources.
- ▶ Welfare effects can be properly analysed in a total equilibrium framework, i.e. by means of transformation and welfare indifference curves.
- ▶ Producers and consumers make their decisions according to the domestic price (relation) $p = p^* + t$ (steeper price lines in the graphic). The consumption point, however, is determined by the fixed terms of trade = opportunities to exchange the produced bundle of goods on the world market.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas



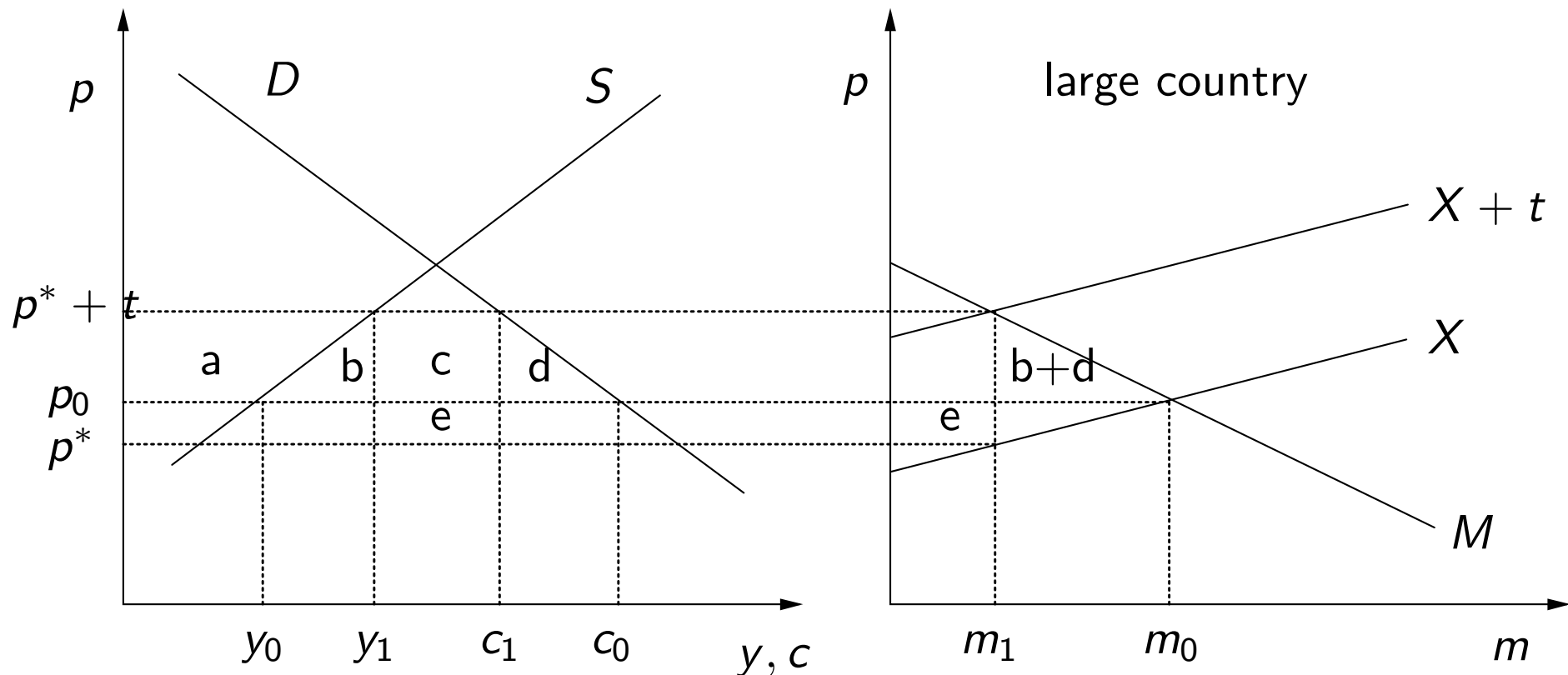
small country:
tariff changes domestic relative prices
but not terms of trade

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Large country – partial equilibrium

A large country affects the terms of trade, i.e. changes in the demand for the import good has price effects p^* , hence: $p = p^*(t) + t$ with $dp^*/dt < 0$.



4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

- ▶ The terms of trade in the free trade case is $p_0^* = p_0$. The decreased demand leads to a lower world market price p^* , so the domestic price increases *less* than t . The world supply curve is therefore not perfectly elastic.
- ▶ Disentangling the welfare effects:
 - ▶ Consumer surplus loss: $-(a + b + c + d)$
 - ▶ Producer surplus gain: $+a$
 - ▶ Tariff revenue: $+(c + e)$
 - ▶ Total effect (sum): $e - (b + d)$
- ▶ The total effect is ambiguous and may be positive, depending on the terms of trade effect e (\Rightarrow elasticity of the world supply function).

4. Theory of Trade Policy

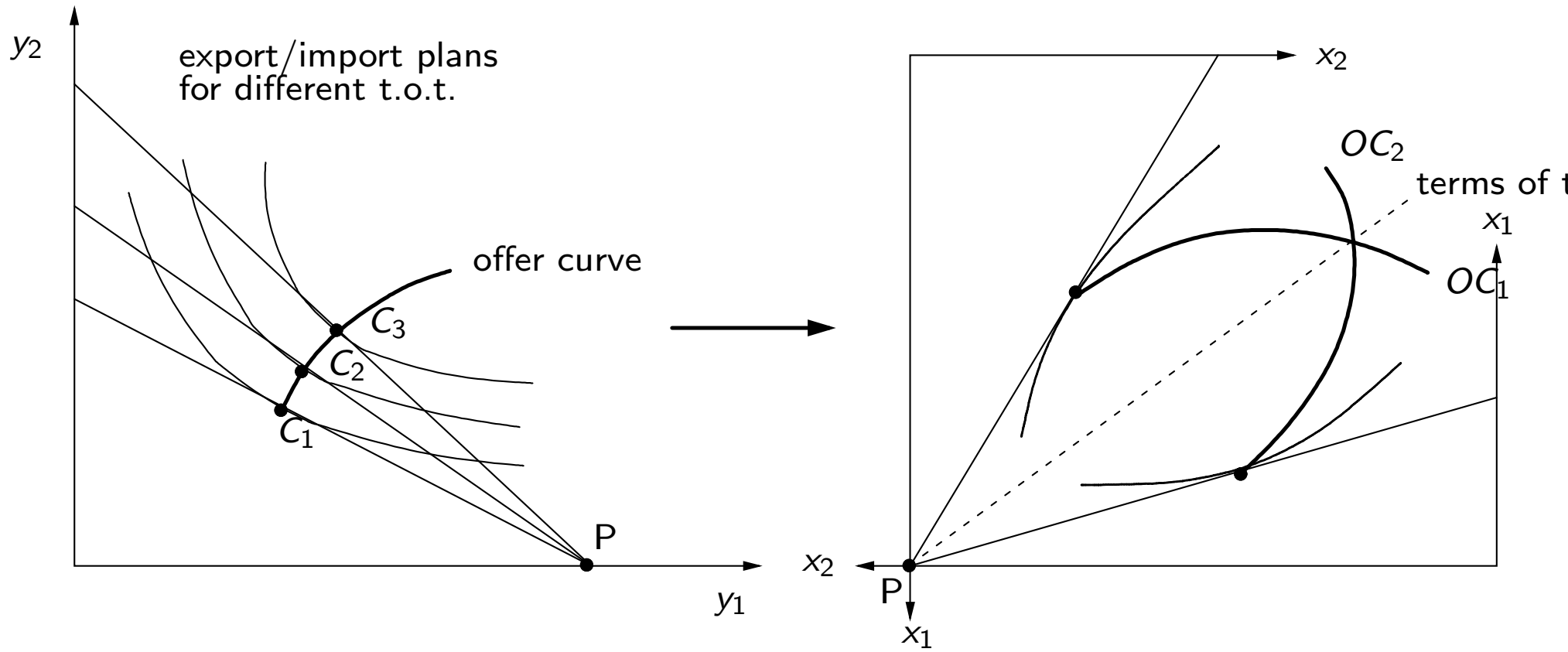
4.1 Welfare analysis of tariffs and quotas

Large country – total equilibrium:

- ▶ We need the concept of the **offer curve**.
- ▶ This curve relates the *planned* exchange of export goods with import goods for different terms of trade, as given by the distance of production and consumption points.
- ▶ The intersection point of both offer curves gives us the equilibrium terms of trade where all plans are consistent:
Planned exports of country 1 = planned imports of country 2.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas



4. Theory of Trade Policy

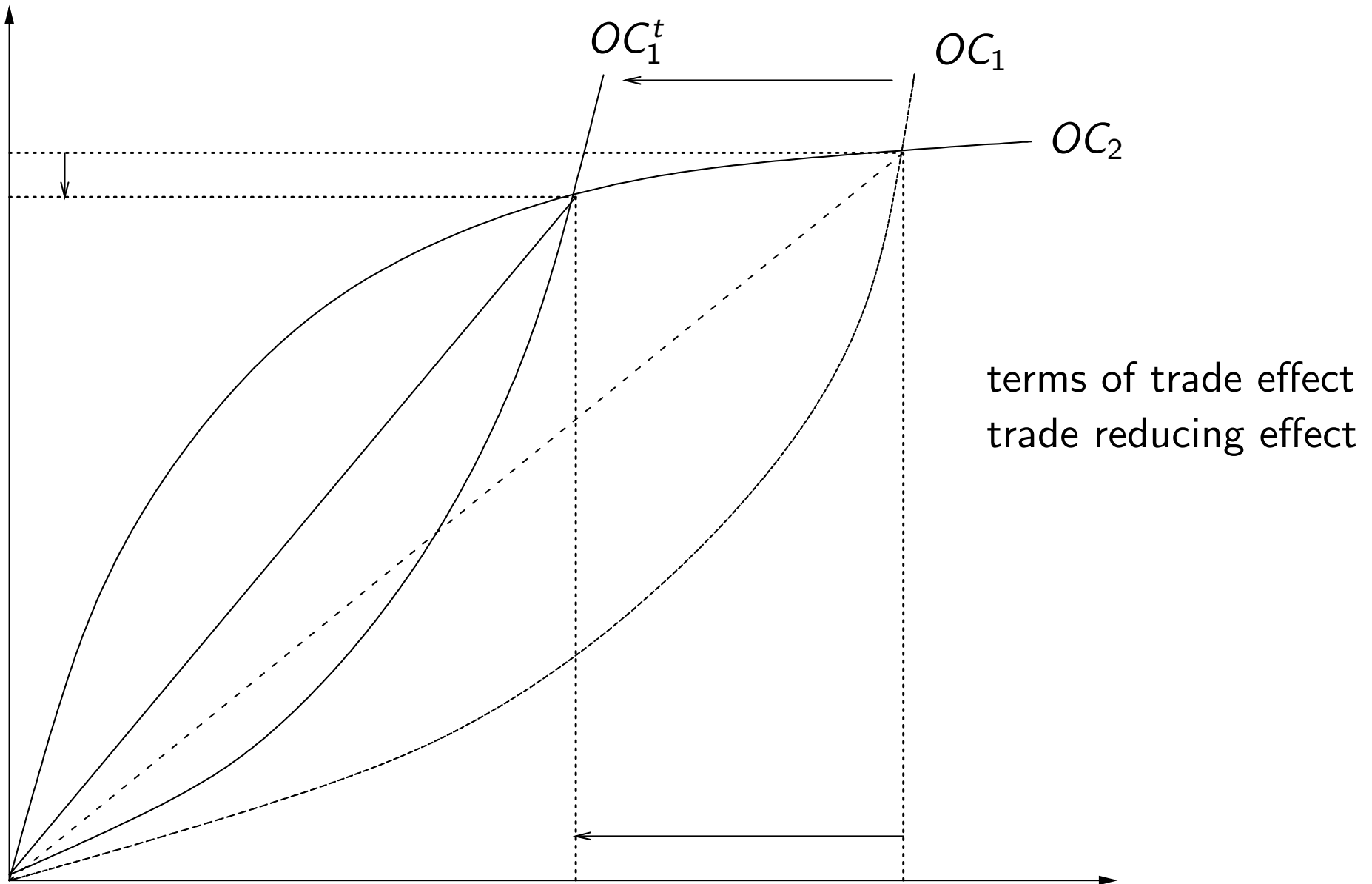
4.1 Welfare analysis of tariffs and quotas

Effect of a tariff on the terms of trade:

- ▶ A tariff makes the imported good more expensive. We assume that the tariff revenues are given to the consumers (compensation for the higher import good prices).
- ▶ The domestic demand for imported goods decrease. Consumers are less willing to give export goods in order to obtain import goods. Thus, the *offer curve rotates* (around the origin) to the left side (see graphic).
- ▶ This means an *improvement of the terms of trade* (steeper t.o.t. relation): You have to waive less export goods to obtain a certain amount of import goods. Also the total trade volume decreases (see graphic).

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas



4. Theory of Trade Policy

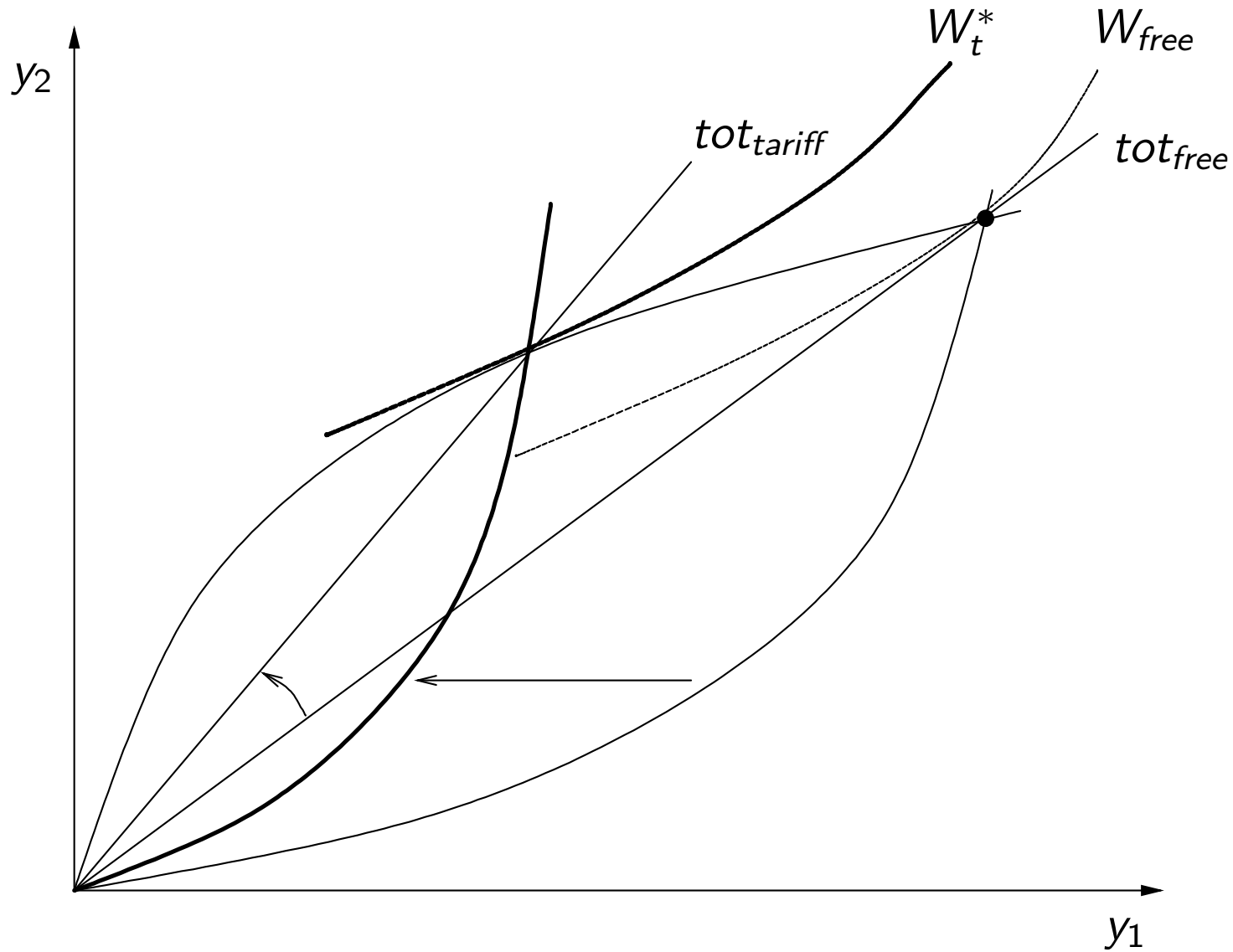
4.1 Welfare analysis of tariffs and quotas

Now it is easy to determine the optimal tariff by determining the optimal equilibrium terms of trade:

- ▶ Since the offer curve of the other country is given, we determine the tangential point of the other country's offer curve with the highest possible domestic *trade indifference curve* (with standard neoclassical features).
- ▶ This must then be the intersection point of the domestic offer curve (see graphic).
- ▶ Thus, implicitly we have determined the corresponding tariff.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas



4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Retorsion tariff:

- ▶ The optimal tariff is a “**beggar-my neighbour**” policy because it worsens the terms of trade relation of the other country and harms its welfare! Its trade indifference curve is on a lower level than in the free trade case.
- ▶ In the free trade case both trade indifference curves must be tangential since this situation is Pareto efficient.
- ▶ The other country takes the new offer curve of the home country as given and chooses the tangential point with its own highest trade indifference curve (see graphic). This is the “best response” to the tariff of the home country. The trade volume again decreases.
- ▶ This may induce a “tariff race” which ends up in an inefficient *equilibrium* situation.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Tariffs and imperfect markets:

- ▶ If in a competitive world tariffs are harmful, does this also hold true in case of imperfect markets?
- ▶ **No.** For example: if a foreign monopolist has market power he will charge a high price which lowers domestic welfare. A tariff might discipline to some extent the monopolist and works as a substitute for competition (for details see Feenstra).

Theorem (Brander and Spencer 1984):

When the home country imports from a foreign monopolist with constant marginal costs, then

- ▶ a small positive specific tariff increases home welfare if marginal revenue is steeper than the demand function,
- ▶ a small positive ad valorem tariff increases home welfare if the elasticity of demand increases as consumption of the imported good falls.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Non-tariff instruments: quotas

- ▶ Import quotas are constraints to the imported quantity.
- ▶ To import the good a firm needs a license.

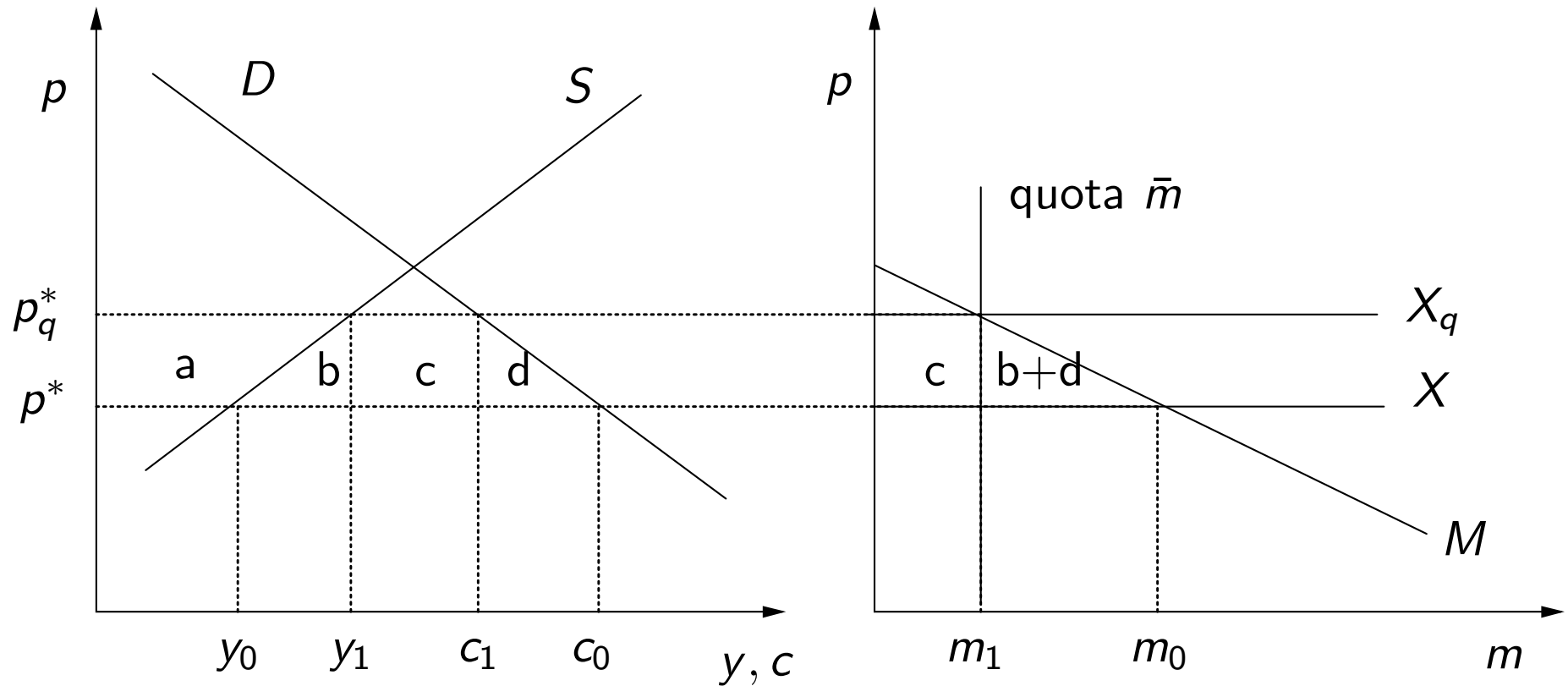
(a) Import tariffs and quotas are equivalent in case of perfect competition

- ▶ A tariff causes a reduction of import quantity and an increase in firm's output. An import quota will cause directly the same reduction of import quantity. Since the consumer will then demand more domestic products, the output and also the price will rise.
- ▶ The partial equilibrium analysis is identical with the tariff case: The import reduction of a small country has no effect on the world market price, while a large country's import quota has a price reducing effect on the world market.

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

Small country:



4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

- ▶ Disentangling welfare effects:
 - ▶ Consumer surplus loss: $-(a + b + c + d)$
 - ▶ Firm surplus gain: $+a$
 - ▶ What is about c ?
- ▶ Area c are *not* tariff revenues anymore. Note, that an importer can buy goods on the world market at price p^* and sell it to the domestic consumers to the price p_q^* . Hence, area c represents the profits or rents of an importer. This may create different incentives and may lead to different outcomes:
(\Rightarrow next slide)

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas

1. Import licenses are given to domestic firms. Then c are the importer profits as a part of the income. Total welfare (sum): $-(b + d)$ as in the case of tariffs.
2. There are rent-seeking activities of firms in order to obtain a profitable import license. Consider that these activities are inefficient and resource consuming. In the worst case the loss due to rent seeking is as high as the additional rents. Hence, c does not account for welfare, and the total welfare is then $-(b + c + d)$.
3. The import licenses are auctioned. If we assume that the highest possible auction price is paid, then c represents the auction revenues for the government, similar to the tariff revenues. The total welfare is again $-(b + d)$.
4. The authority to control the quotas is given to foreign exporters. They are then able to extract the rents of the importers so that c flows to foreign firms. The resulting welfare is again $-(b + c + d)$.

4. Theory of Trade Policy

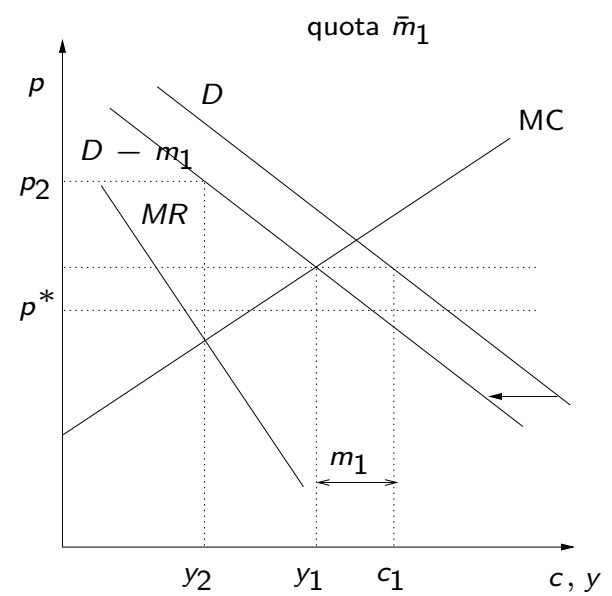
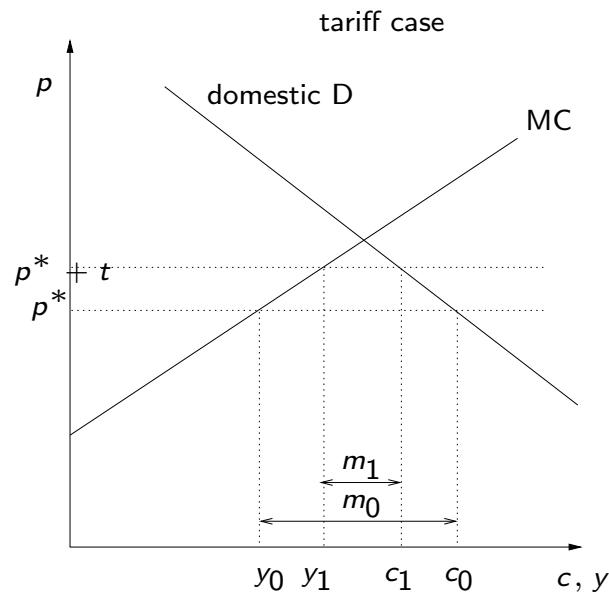
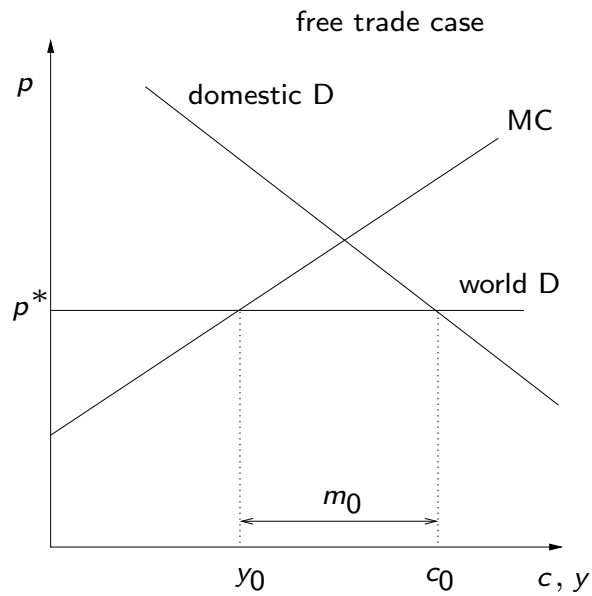
4.1 Welfare analysis of tariffs and quotas

(b) Import tariffs and quotas are not equivalent in case of imperfect competition:

- ▶ Consider the case of a **domestic monopoly** (next slide).
- ▶ In the *free trade* case, the monopolist faces a given p^* and a perfectly elastic world demand, i.e. demand and marginal revenues are horizontal. In Cournot maximum he produces y_0 which is the same solution as in case of perfect competition.
- ▶ In case of a *tariff*, the price is $p^* + t$. Output moves to y_1 , consumption moves to c_1 , the imports fall from m_0 to m_1 .
- ▶ Now consider an *import quota* of m_1 . For every price above p^* we will have imports m_1 . The residual demand for the monopolist is then $D - m_1$ with a corresponding marginal revenue curve MR . The monopolist is then able to charge the monopoly price for the residual demand, since the consumers cannot substitute the expensive good with imports. The output then falls to y_2 , the price increases to p_2 .

4. Theory of Trade Policy

4.1 Welfare analysis of tariffs and quotas



4. Theory of Trade Policy

4.2 Strategic trade policy

Strategic trade policy:

- ▶ Trade policy instruments are implemented in an optimal way in order to increase domestic wealth (to the extent of the other countries) \Rightarrow profit shifting or wealth shifting.
- ▶ This can only work in the case of large countries and/or imperfect markets. Otherwise the country would harm itself.
- ▶ Eventually both countries employ “mutually best” policy measures. The outcome will usually be suboptimal.
- ▶ Possible way out: Negotiations and contracts.

4. Theory of Trade Policy

4.2 Strategic trade policy

Example: tariffs in Cournot duopoly

- ▶ Consider the case that there is one domestic and one foreign firm producing the (homogenous) import good.
- ▶ Domestic quantity is y , foreign quantity is x , world market supply is $z = y + x$.
- ▶ The world market demand (derived from consumer's maximization calculus) is $z(p)$ or as the inverse demand $p(z)$ with $p'(z) < 0$.

4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ Foreign and domestic firm's calculus is

$$\max_x \pi^* = x[p(z) - t] - C^*(x)$$

$$\max_y \pi = yp(z) - C(y)$$

with the FOC

$$\pi_x^* = p(z) + xp'(z) - [C^{*'}(x) + t] = 0 \quad (2)$$

$$\pi_y = p(z) + yp'(z) - C'(y) = 0 \quad (3)$$

- ▶ The optimal quantities x and y will therefore be mutually dependent (“*best response functions*”):

$$x = r^*(y, t), \quad y = r(x) \quad (4)$$

4. Theory of Trade Policy

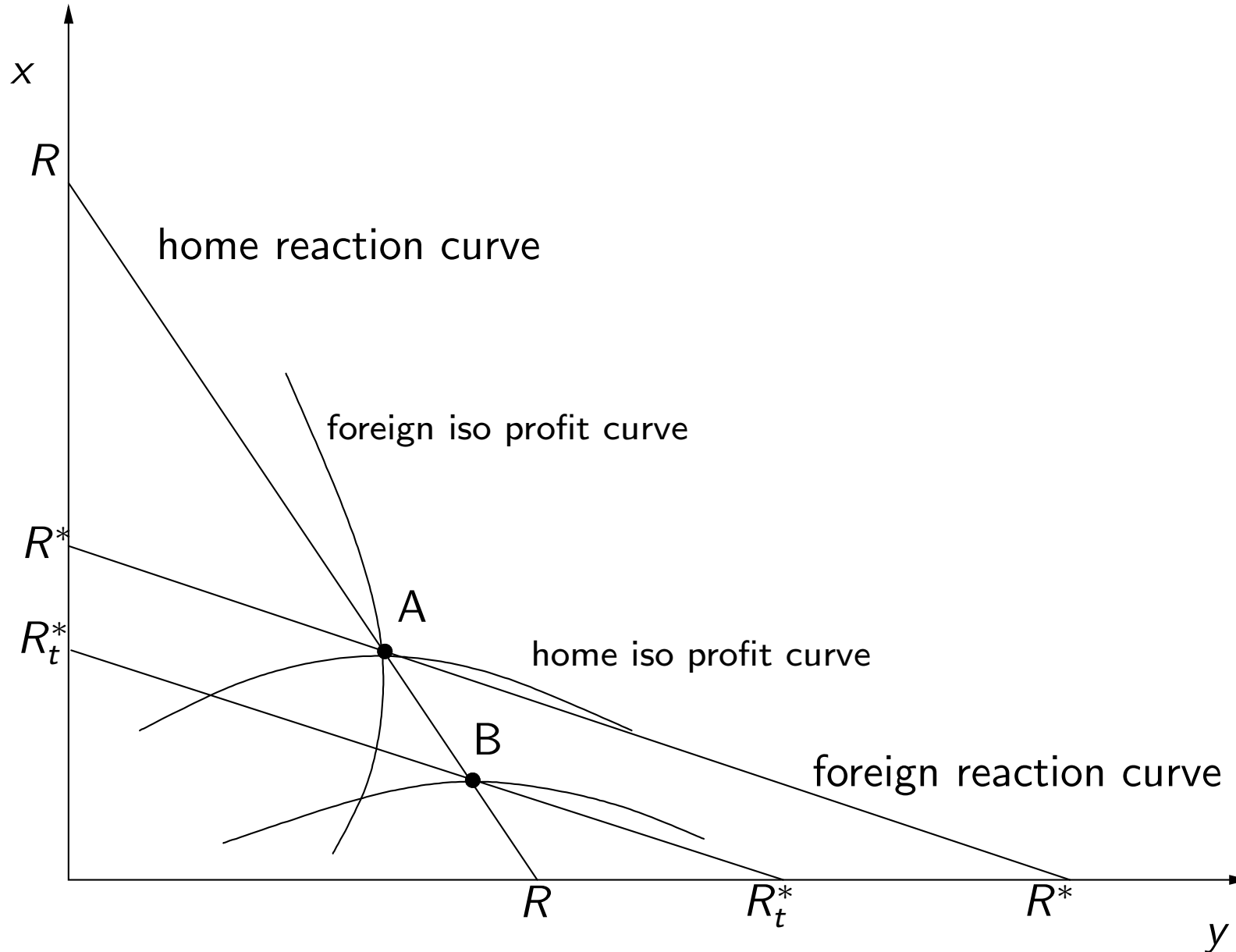
4.2 Strategic trade policy

- ▶ For “typical” demand and cost functions the best response functions (reaction functions) are downward sloping and will have an intersection point which is stable (standard Cournot duopoly solution, see next graphic).
- ▶ The intersection point is a Nash equilibrium which is the solution of the system (4).
- ▶ From the foreign firm’s second order condition $\pi_{xx}^* = 2p' + xp'' - C^{*''} < 0$ and the total derivative of the FOC: $\pi_{xx}^* dx - dt = 0$ we obtain $dx/dt = 1/\pi_{xx}^* < 0$ which implies that a tariff will shift the foreign firm’s reaction curve downwards which shifts profits to the domestic firm (see next graphic).

4. Theory of Trade Policy

4.2 Strategic trade policy

Result: Profit-shifting



4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ One can show (see Feenstra) that in case of Cournot competition small tariff rates will also have a **wealth increasing effect** on the domestic country!
- ▶ A similar argument applies for the case of **Bertrand** competition (heterogeneous goods) when an *ad valorem tariff* is employed. We have also profit-shifting but the effect on wealth is ambiguous.
- ▶ The analysis can be extended to the case that also the other country rises tariffs. The results depend on the assumption whether the second country decides after the first country employed the trade measure (leader-follower structure) or both countries decide simultaneously.

4. Theory of Trade Policy

4.2 Strategic trade policy

Export subsidies with imperfect competition:

- ▶ Many markets for technological products are characterized by oligopolies (example: aircraft, cars etc.). Governments are tempted to help the domestic industry to become more price competitive on the world market.
- ▶ In some cases the world market demand carries only a limited number of competing firms. Subsidies may then help that domestic firms will stay in the market while foreign firms have to leave it.
- ▶ If there are economies of scale or decreasing average cost for cumulative production, the subsidy could help that the domestic firm's output rises so that lower average costs are realized. If then the firms have become dominant, the subsidies could be reduced evtl. to zero.

4. Theory of Trade Policy

4.2 Strategic trade policy

Cournot duopoly (Brander and Spencer (1985))

- ▶ Homogenous good, one domestic and one foreign firm
- ▶ Domestic quantity y , foreign quantity x , world market:
 $z = x + y$.
- ▶ Domestic firm receives a subsidy s per *produced* output.
- ▶ Calculus of the firms:

$$\max_x \pi^* = p(z)x - C(x)$$

$$\max_y \pi = [p(z) + s]y - C(y)$$

with the FOC

$$\pi_x^* = p(z) + p'(z)x - C'(x) = 0$$

$$\pi_y = p(z) + s + p'(z)y - C'(y) = 0$$

4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ From the second order condition $\pi_{yy} < 0$ and the total derivative of the FOC $\pi_{yy} dy + ds = 0$ we receive

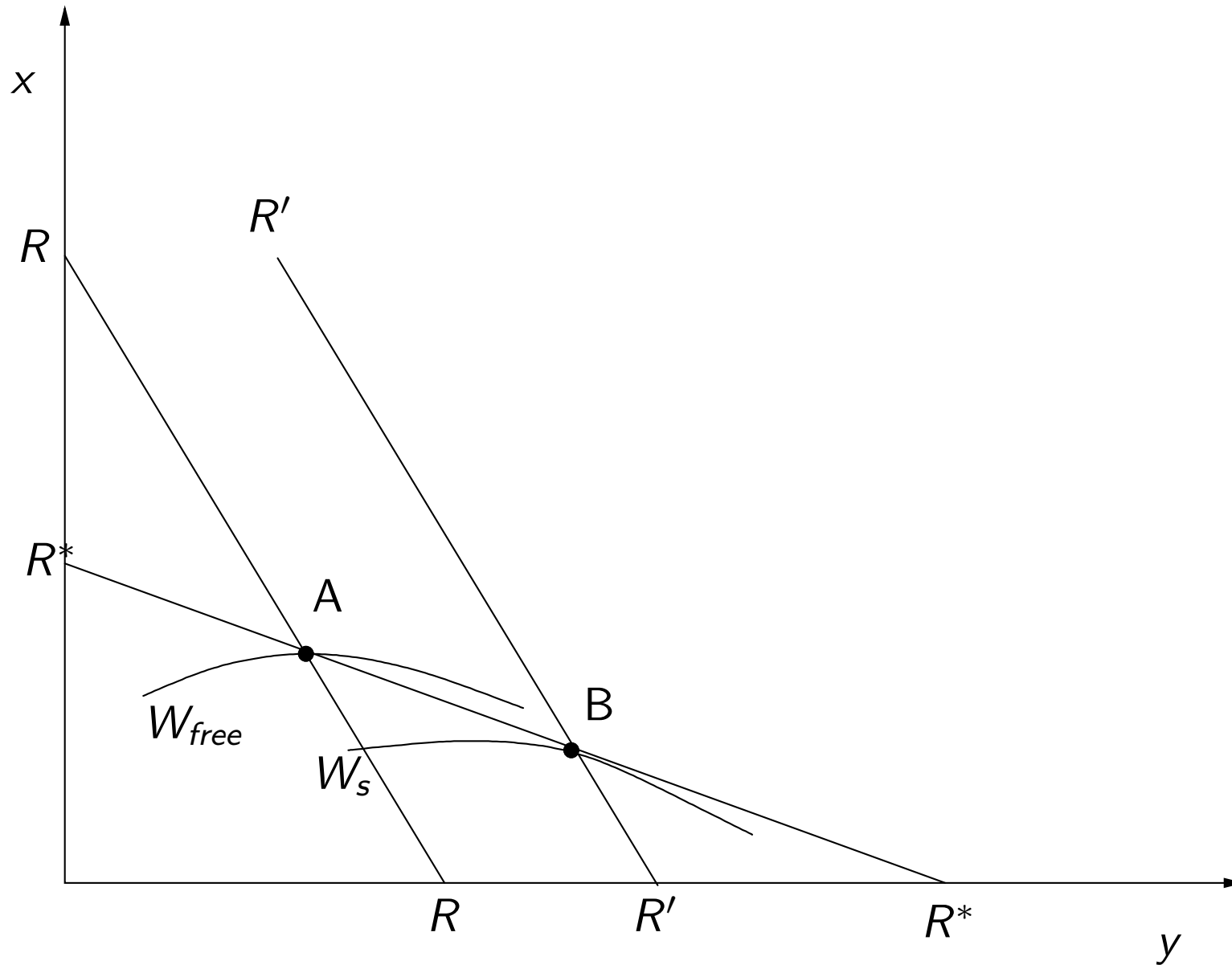
$$\frac{dy}{ds} = -\frac{1}{\pi_{yy}} > 0$$

which implies a right shift of the reaction function in case of a subsidy.

- ▶ With a downwards sloped rival's reaction curve this implies an increase in domestic output and a decrease of foreign firm's output in equilibrium.
- ▶ Subsidies lead to a **profit-shift** favoring the domestic firm (point A shifts to B).

4. Theory of Trade Policy

4.2 Strategic trade policy



4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ By technical assumptions guaranteeing the negative slope of the reaction functions and the stability of the Nash solution, the foreign firm's response to the domestic firm's output increase is not too elastic. Hence, **total output increases** and the **price falls**.
- ▶ A profit maximizing subsidy implies that in B the domestic iso profit curve is tangential to the foreign reaction curve.
- ▶ For determining the welfare we make a simplifying assumption: Both firms sell their products to a *third* market so that we do not have to take consumer preferences into consideration.
- ▶ Welfare is then firm profits minus the revenue costs of subsidies:

$$W = [p(z) + s]y - C(y) - sy = p(z)y - C(y)$$

which are the profits without subsidies so that we can relabel iso-profit curves as welfare indifference curves.

4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ The other country will clearly respond to this trade policy with “retorsion” measures.
- ▶ Mutually optimal subsidies will decrease world welfare (Pareto inefficiency), see Brander/Spencer (1985).
- ▶ Recall, that a subsidy increase total output and reduce the price. Therefore, **consumers will benefit**, and allocation is shifted towards the competitive solution. Brander/Spencer (1985) show, that **joint welfare maximizing subsidies** are given by:

$$s = (x - (c + c^*))p', \quad s^* = (y - (c + c^*))p'$$

where c, c^* are the consumed quantities of the imperfect competitive good. In a closed 2-country world we have $y + x = c + c^*$. If total consumption exceeds the production of one country, the optimal subsidies are positive!

4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ Similar approach to Bertrand competition (Eaton and Grossman (1986)). Strategic subsidies have also a profit- and welfare shifting effect but in the *reverse* direction! As a result, in case of Bertrand competition, negative subsidies (taxation) would be beneficial.
- ▶ **Theorem:**
 - a) Under Cournot competition, a subsidy of exports increases welfare.
 - b) Under Bertrand competition, a subsidy of exports decreases welfare. Instead, a tax on exports raises welfare.
- ▶ Any “strategic” use of (positive or negative) subsidies depends very sensitive to the type of competition. *“Since we do not expect the government to be able to distinguish the market conduct, it becomes impossible to implement these policies in a welfare-improving manner”* (Feenstra, 8-53).

4. Theory of Trade Policy

4.2 Strategic trade policy

Summing up the results: Can Trade Policy be Welfare Improving?

- ▶ In a world with *perfect competitive markets*, ...
 - ▶ ...free trade is welfare improving compared to autarky
 - ▶ ...trade policy (tariffs, quotas, subsidies) is...
 - ▶ ...welfare decreasing in case of a small country
 - ▶ ...typically welfare decreasing in case of large countries plus mutually optimal policies
- (welfare improvements by unilateral measures are always “beggar-my-neighbour” policy)

4. Theory of Trade Policy

4.2 Strategic trade policy

- ▶ In a world with *imperfect competition*, ...
 - ▶ ... free trade can be welfare improving by trade and specialization effects and the additional effect of enhancing competitive pressure.
 - ▶ ... trade policy (tariff, quotas, subsidies) may help to induce firms to behave more competitive like in Cournot oligopoly with subsidies. However, this requires a socially optimal design of policy measures which is typically not the Nash solution. *Each market imperfection creates room for welfare improving measures.*

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ Davis, D.R. (1998), Does European Unemployment Prop Up American Wages? *National Labor Markets and Global Trade. American Economic Review* 88, 478-494.
- ▶ Davis, D.R. (1998), Technology, Unemployment, and Relative Wages in a Global Economy. *European Economic Review* 42, 1613-1633.
- ▶ **Question:** What happens in a trade model when we assume imperfect labor markets with unemployment?
- ▶ For simplicity, it is assumed that unemployment is generated by minimum wages w_{min} (neoclassical standard argument).

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

We start from a neoclasical framework:

- ▶ Input factors: unskilled labor L with factor price \tilde{w} and skilled labor H with factor price r .
- ▶ Two sector model: Good Y is unskilled labor intensive, good X is skilled labor intensive (non-reversal of intensities).
- ▶ Good Y is the numeraire, so that $p = MC(r, \tilde{w})$ is the price of good $X =$ terms of trade in free trade case
- ▶ Constant returns to scale
- ▶ Perfect competition in goods markets

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

We start with a closed economy:

- ▶ As we know from the *Heckscher-Ohlin* approach, there is an unambiguous relation between relative factor endowment $h = H/L$ and relative price $p = \lambda(h)$ with $\lambda'(h) < 0$.
- ▶ From the *Stolper-Samuelson* theorem we know that there is an unambiguous relation between relative goods price p and the relative wage $w = \tilde{w}/r$, namely $w = \Psi(p)$ with $\Psi'(p) < 0$.
- ▶ In a closed economy equilibrium we have for a given relative endowment h an equilibrium price p^* and an equilibrium wage w^* .

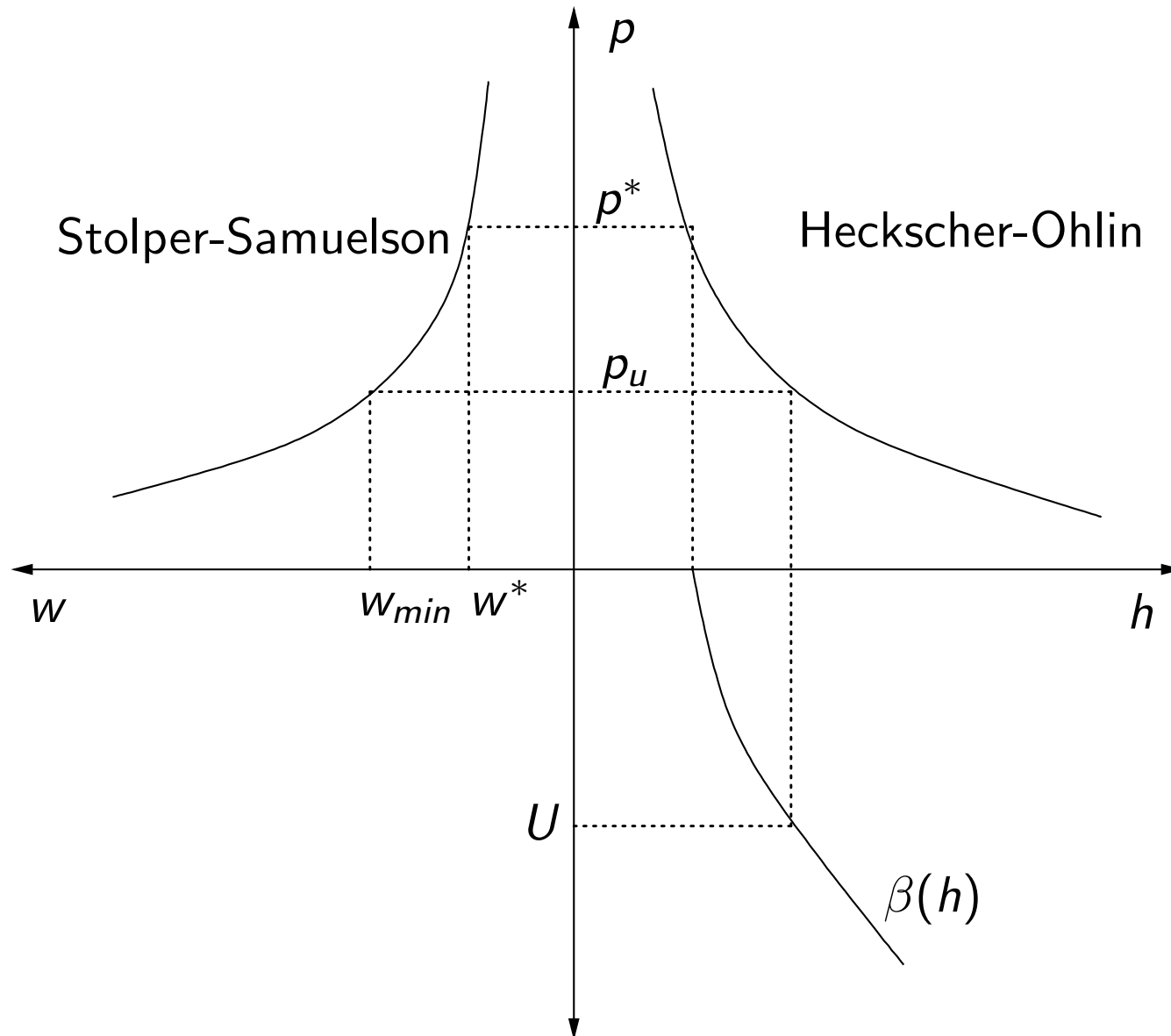
5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ Now impose a **minimum wage** w_{min} . This makes the unskilled labor good relative more expensive than the skilled labor intensive good.
- ▶ Hence the relative autarky price p will decrease to p_u .
- ▶ However, $w_{min} > w^*$ implies $p_u = \Psi^{-1}(w_{min}) < p^*$ which implies $h_u = \lambda^{-1}(\Psi^{-1}(w_{min})) > h$ for the **employed** factors.
- ▶ Since h represents the (full employed) factor endowment, $h_u > h$ implies that a part of unskilled labor is unemployed.
- ▶ It is N the employed unskilled labor, U is the unemployed amount. Then we have $L = N + U$ and $U = L - H/h_u = \beta(h_u)$.

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages



5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

Now we turn to the **free trade** case: What happens with the **Factor Price Equalization (FPE)** in case of minimum wages?

- ▶ Consider a country with flexible wages for skilled and unskilled labor (USA), and a country with minimum wages for unskilled labor (Europe), where w_{min} induces unemployment.
- ▶ See next graphic: The FPE set in case of global flexible wages is given by the dotted vertex. Due to minimum wages in Europe, the origin of FPE set moves. We have still full employment of skilled labor but unemployment U of the unskilled labor. The FPE set is smaller and shifted to the left.

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ Although the European minimum wages are fixed, it is possible to have FPE! This implies that American unskilled workers will also be better off due to the European labor market imperfections.
- ▶ It is possible that there exists world endowment vectors which lead to FPE and partial specialization only in case of flexible wages, e.g. point C, as well as endowments which will lead to partial specialization only in the minimum wage case, e.g. point D.

5. Special Topics on Trade and Globalization

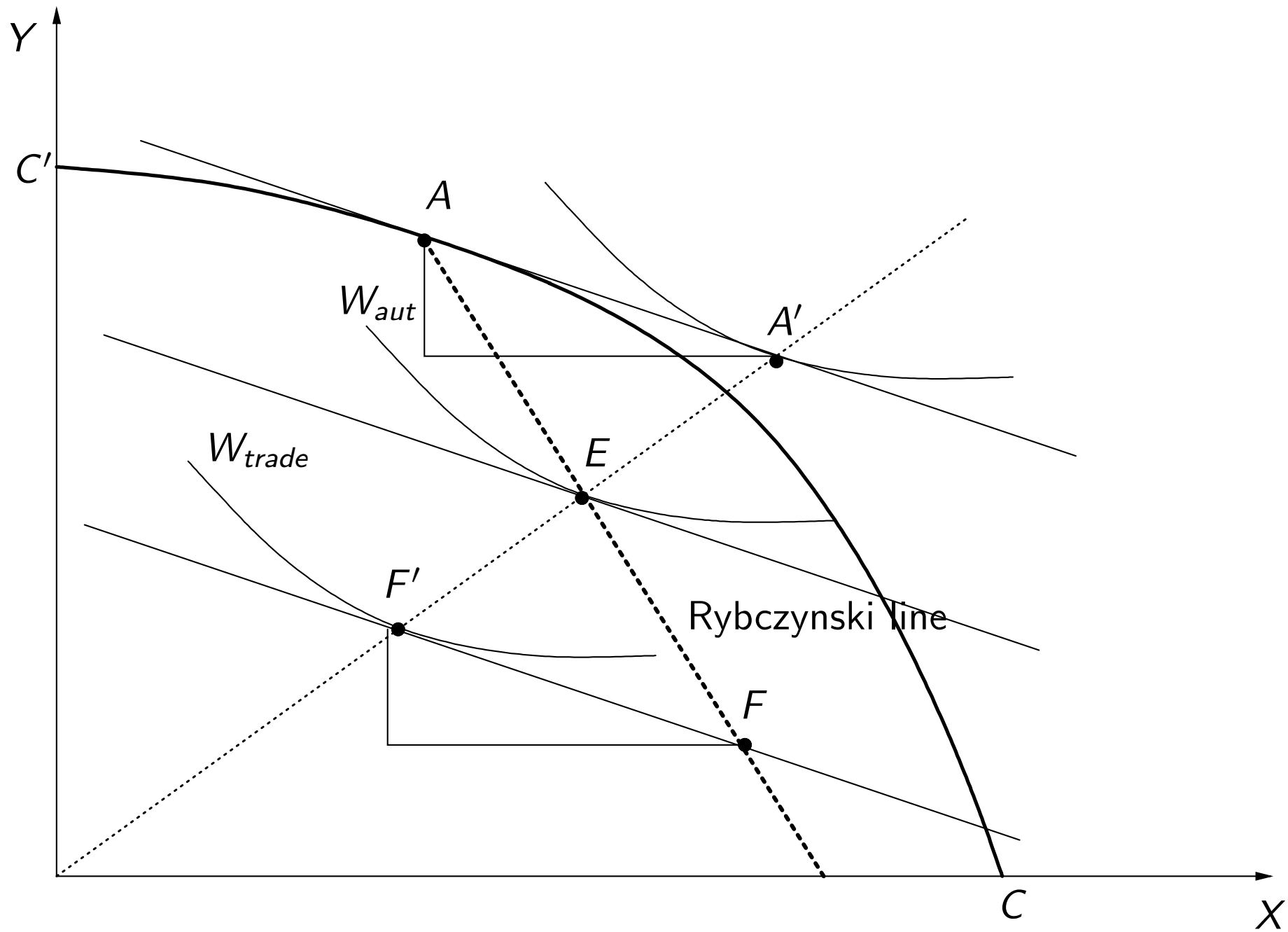
5.1 Impact of trade on unemployment with rigid wages

How trade affects the level of unemployment and welfare:

- ▶ Assume two countries (USA, Europe) which are identical in all respects except for the minimum wage for unskilled labor in Europe. The assumptions made before hold true.
- ▶ *Autarky in Europe*: In a transformation curve scheme the relative price must be between C' and A , that is $p < p_u$ to ensure minimum wages. If it is not the case – as depicted – the domestic consumers prefer A' .
- ▶ This leads to an excess demand for X and an excess supply of Y . Since the price cannot adapt ($p > p_u$ is not possible), the economy has to restrict the output as long as planned production equals planned consumption.
- ▶ With homothetic preferences, the economy will produce and consume in point E which lies on the **Rybczynski line** from point A . Since we have unemployed unskilled labor, the endowment relation h increases but the production opportunities decrease. Hence, the Rybczynski effect holds true!

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages



5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ *Autarky in USA*: The tangential point with the indifference curve would be downhill from point A , so we would have $p_{USA} > p_u$. Europe then has a comparative price advantage for good X , USA have a comparative advantage for good Y .
- ▶ *Free trade*: Normally, the terms of trade would be between both autarky price relations, but in Europe, $p > p_u$ is not possible, hence we take p_u as the given terms of trade.
- ▶ With p_u , American firms choose point A while American consumers choose A' . This results in an excess demand for good X and an excess supply of Y . Again, a price adaptation according to excess demand is not possible.
- ▶ The European economy will adapt the production to point F , and it will consume in F' , so that the goods exchange plans are compatible (see triangles).
- ▶ As a result, the introduction of *free trade will increase unemployment!*

5. Special Topics on Trade and Globalization

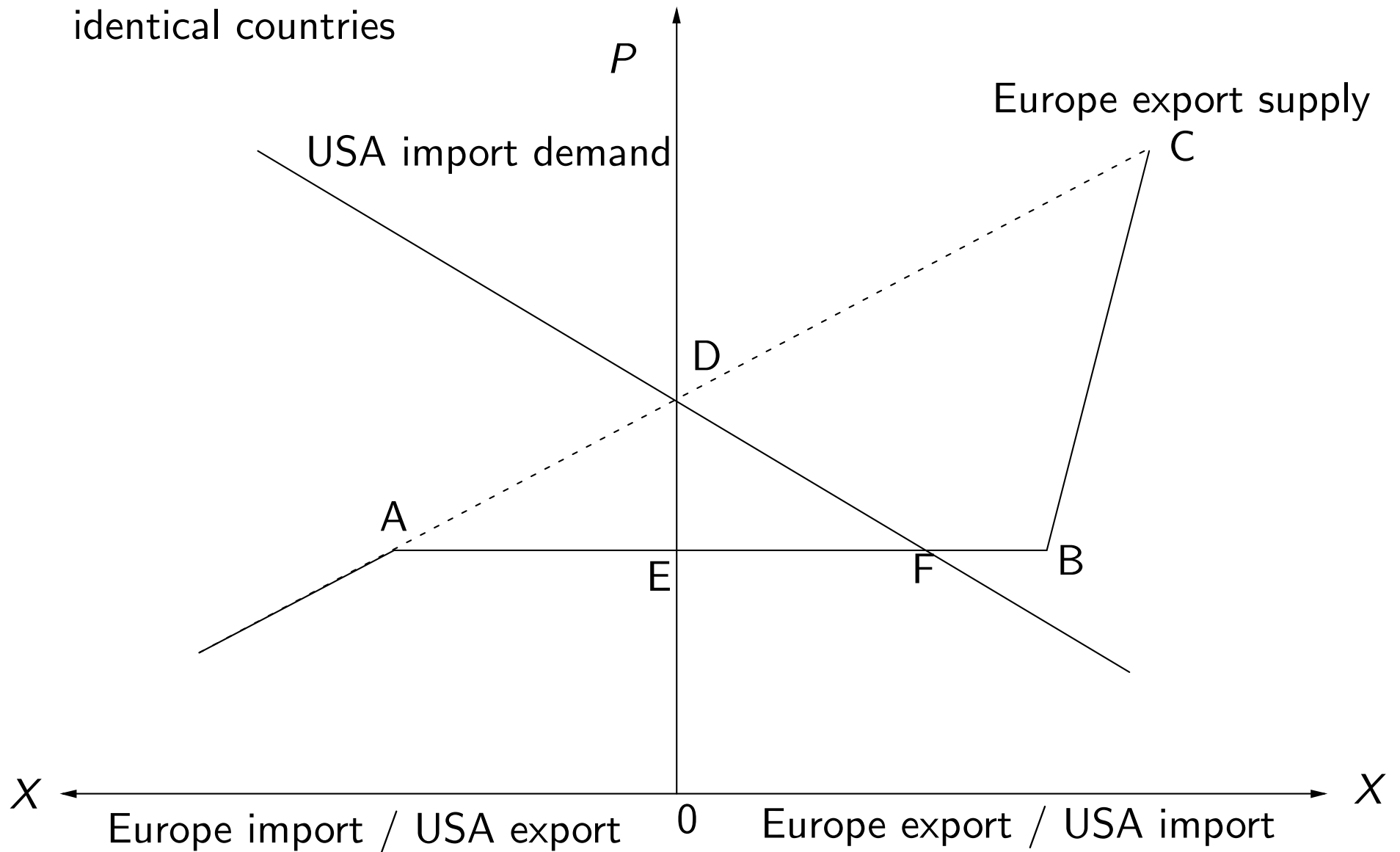
5.1 Impact of trade on unemployment with rigid wages

How the size of trade partners affects unemployment:

- ▶ For different p the net import demand for good X of the USA is a downwards sloped function where D is the autarky point.
- ▶ The corresponding net export function of Europe for good X is upwards sloped up to the point A . A further increase would contradict the minimum wage requirement. In autarky, Europe chooses point E with a certain degree of unemployment.
- ▶ Between A and B there exist consistent export/import plans which imply unemployment in Europe (corresponding to the Rybczynski line). According to the previous graphic we have a trade equilibrium in point F .
- ▶ On the right side of point B , it is not possible any longer to produce good X to a price which covers the costs. It is necessary to abandon the minimum wage.

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages



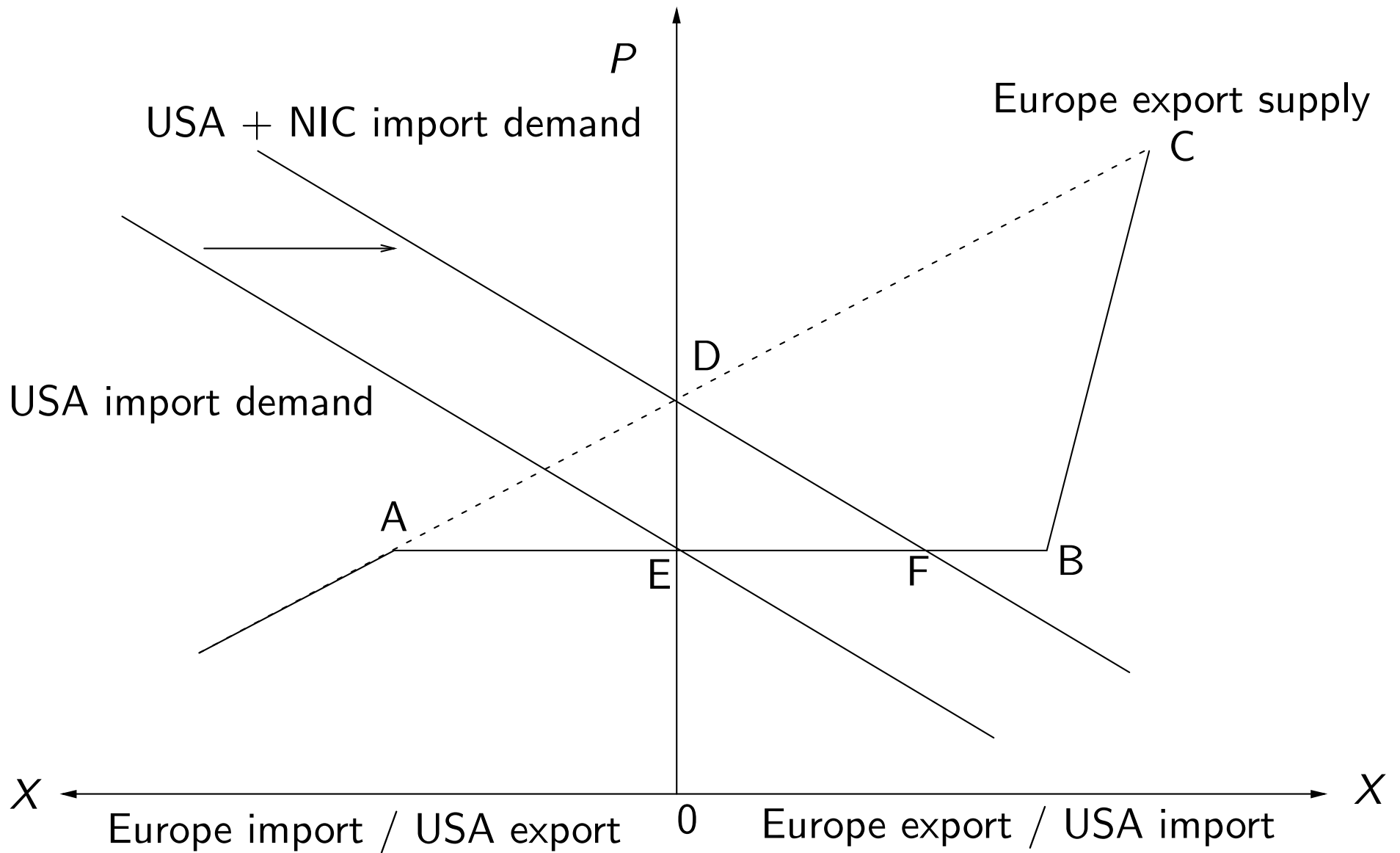
5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ Now consider the case that in point E there is no trade between USA and Europe.
- ▶ “Newly industrialized countries” (NIC) enter the world market. We assume that they have a comparative advantage in good Y . With the given price level, they will specialize on Y and have an excess demand for X . This induces a shift of the net import demand function to the right.
- ▶ It can be seen, that the entry of NIC into the world market and the increased trade with these countries increases European unemployment.

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages



5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

The impact of factor accumulation:

- ▶ Assume that H increases *in the USA*. According to the Rybczynski theorem the production of X increases while the production of Y is reduced. The USA demand on the world market for X is reduced. Therefore, the European production shifts from X in favor to Y , given the fixed terms of trade. We move from point E in direction of point A (see graphic on slide 150). The European unemployed people (and the welfare) benefit from the better education in the USA.
- ▶ Assume that H increases *in Europe*. The minimum wages prevent the conventional Rybczynski effect. The production frontier shifts to the right (see graphic on slide 150). The production of *both* goods will increase *proportionally*, and the employment effect is $\Delta N = \Delta H / h_u$.

5. Special Topics on Trade and Globalization

5.1 Impact of trade on unemployment with rigid wages

- ▶ Assume that L increases *in the USA*. Thus, its demand for X will increase. By the same argument we have put forward in graphic 150, this will increase European unemployment. Specifically, unemployment grows by the same amount as the foreign labor force $\Delta U_{Eur} = \Delta L_{USA} > 0$. There is no effect on global output.
- ▶ Assume that L increases *in Europe*. Output is not affected by this. The additional labor force is completely unemployed.
- ▶ The framework has to be extended to different technologies which imply wage differentials.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ *Foreign Direct Investement*: Investing capital or buying assets in a foreign country in order to exercise some managerial control in the long run. Commonly used (heuristic) crietrion: aquiring at least 10% of the capital of a firm.
- ▶ FDI are done by *multinational firms* (production firms as well as financial intermediates). In most models it is assumed that a domestic producing firm invests into foreign production capacities.
- ▶ Decision whether to produce in the domestic country and exporting the goods, or to invest in the foreign country, and producing and selling there (third possibility: Joint Venture and contractual agreement with foreign firm). This combines an *ownership* decision and a *localization* decision.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ FDI can be a substitute for exports (final goods), but it can also stimulate trade e.g. in case of FDI for outsourcing the production of intermediate goods, or producing abroad (with cost advantages) and importing the final goods.
- ▶ If a firm outsources parts of the production chain, then *intra-firm trade* occurs.
- ▶ FDI are seen as the “primary motor of globalization” (Renato Ruggiero, WTO director)

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ Firms have intangible assets like knowledge (e.g. patents), technological skills. Producing abroad is then *technology or knowledge transfer*, affecting the production function in the other country.
- ▶ The investing firm has specific knowledge and transfers it to the country with cost advantages in production by FDI. The receiving country faces a positive spillover effect (example: Siemens in China)
- ▶ Or the firm invests into foreign firms in order to share *their* superior knowledge and utilizing it in the home country.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Som eempirical data:

- ▶ More than 90% of FDI come from DC, and DC receive more than 80% of FDI.
- ▶ Less than 10% of FDI come from LDC, and LDC receive less than 20% of FDI (excluding China).
- ▶ DC invest much more into LDC than vice versa (FDI flow from DC to LDC)

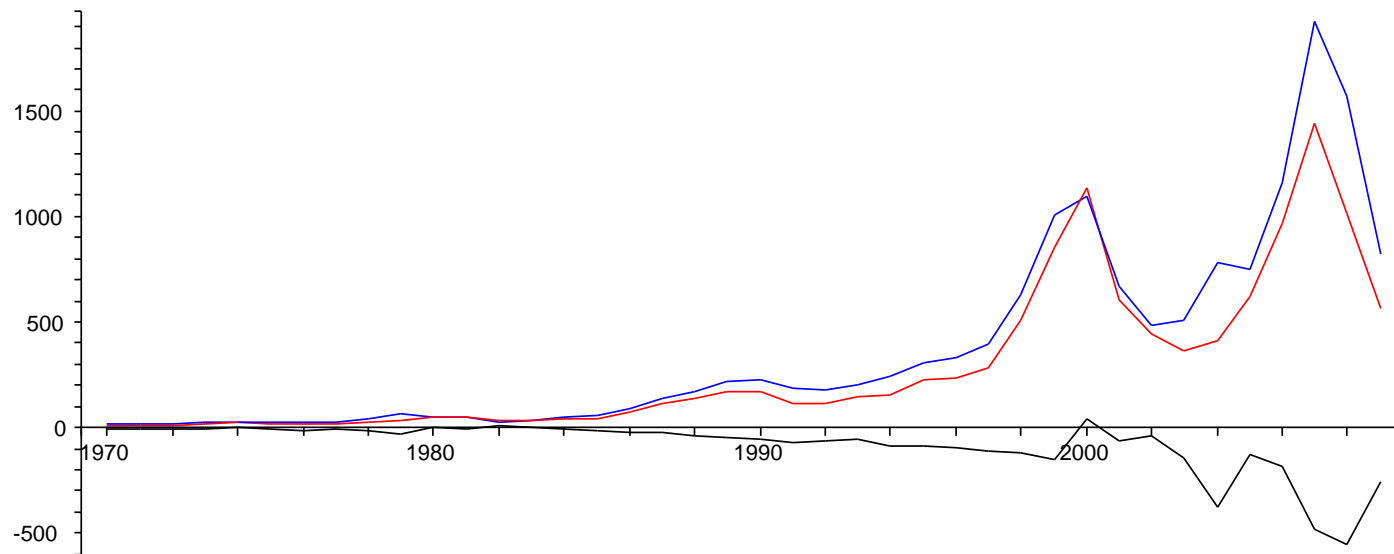
In the following figures: red = FDI inflow, blue = FDI outflow, black = net FDI inflow, values in billion US-\$ in current prices and current exchange rates, source: UNCTAD

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Developed countries (DC):

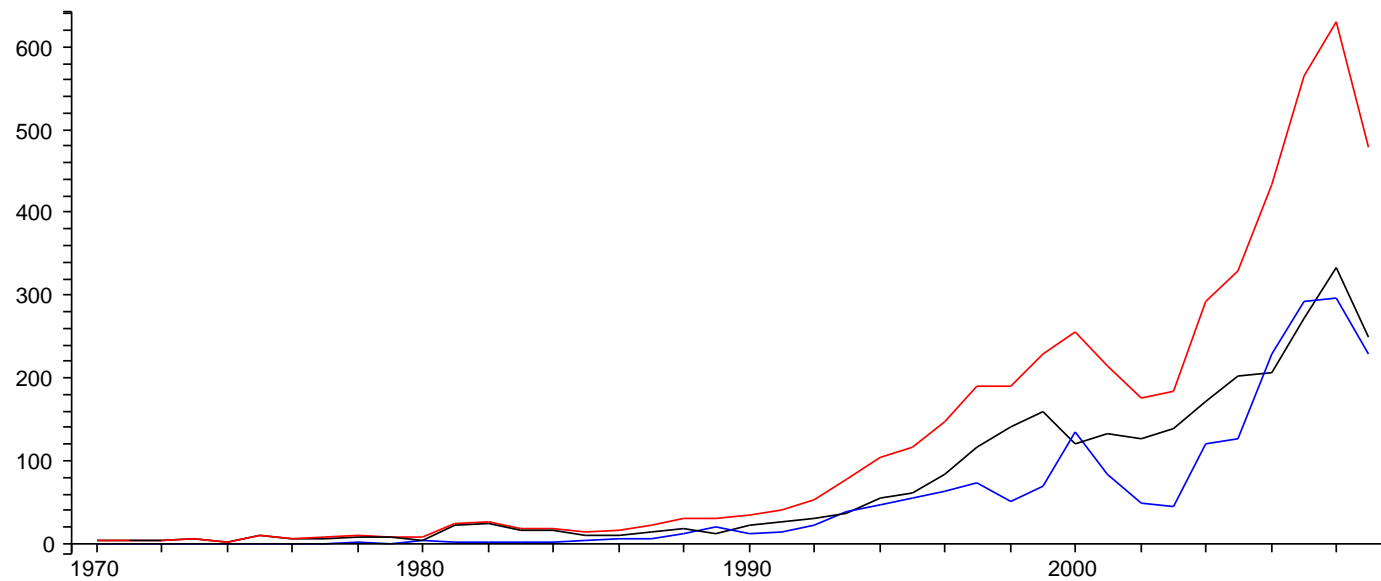


5. Special Topics on Trade and Globalization

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FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Developing countries (LDC):

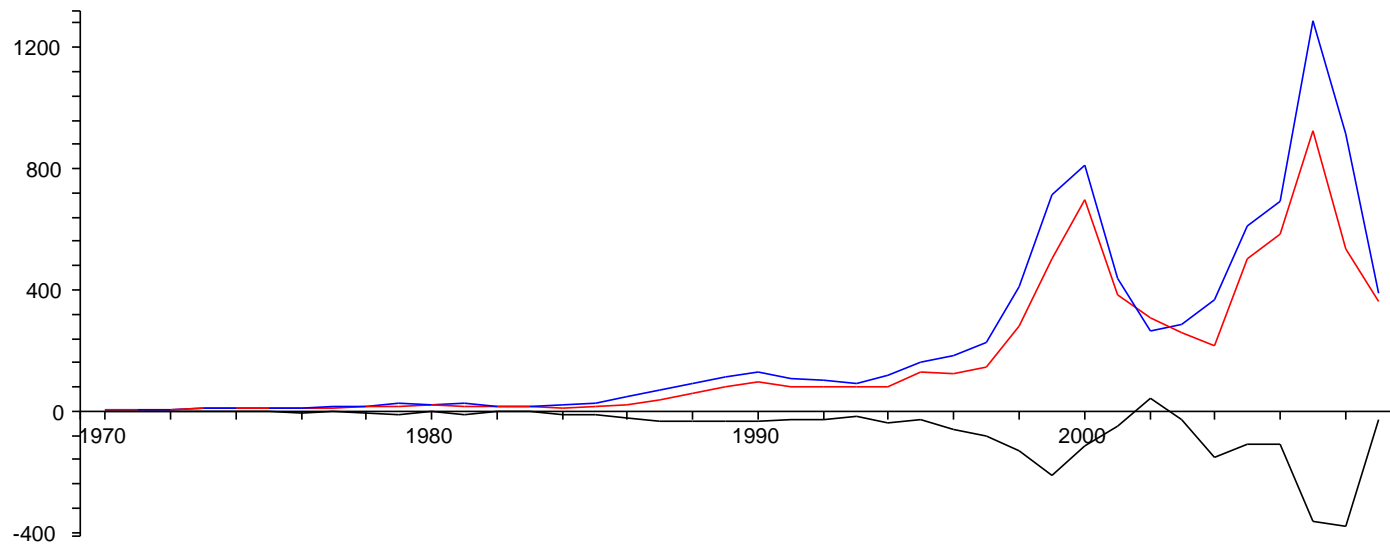


5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

European Union:



5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ In a Walrasian world where all factor prices equilibrate the markets, implying full employment, the existence of MNF enlarge the FPE set and might help to enhance the efficient allocation of resources.
- ▶ Nevertheless, in the process of globalization, MNF have often been criticized for their activities especially in developing countries. It was claimed that MNF may harm the domestic markets of developing countries, extract rents, and discourage development.
- ▶ If labor and capital markets are *not perfect*, it is possible that MNF indeed may harm developing countries. We discuss:

Batra, R.N. (1986), A General Equilibrium Model of Multinational Corporations in Developing Countries. *Oxford Economic Papers* 38(2), 342-353.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Assumptions:

- ▶ Two countries: capital-abundant home country of the MNF, underdeveloped labor-abundant country. The latter is small, i.e. it takes the terms of trade as given.
- ▶ Two sectors in the developing country: One sector X with competition among MNFs, in the other sector Y only local firms compete.
- ▶ Two non-specific factors, labor L and capital C , one specific factor S (knowledge, technology), owned by the MNF.
- ▶ Standard neoclassical production functions.
- ▶ Full employment of capital. Labor is not necessarily full employed since wages are determined institutionally (w is fixed).

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ Production functions:

$$X = X(L_x, C_x, S), \quad Y = Y(L_y, C_y)$$

with

- ▶ $X_i > 0, X_{ii} < 0, X_{ij} > 0$ ($i, j = L, C, S, i \neq j$) and $H_x = X_{LL}X_{CC} - X_{CL}^2 > 0$,
- ▶ $Y_i > 0, Y_{ii} < 0, Y_{ij} > 0$ (analogously) and $H_y = Y_{LL}Y_{CC} - Y_{LC}^2 = 0$.
- ▶ The assumptions regarding H_x, H_y seem to be strange but are trivial if we consider Cobb-Douglas production functions!
- ▶ It is assumed that MNF transmit S into the host country and utilizes it in production using local capital and labor. Later it is permitted that also accompanying capital is transferred to the developing country.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ The profits of the MNF are given by

$$\begin{aligned}\pi &= pX - wL_x - r_x C - F \\ &= pX_S S - F \quad (\text{from Euler equation})\end{aligned}\quad (5)$$

where F are the fixed costs of the specific factor S , p is the price of the good (in terms of units of the good of the other sector = numeraire).

- ▶ Profit maximization of MNFs gives

$$w = pX_L, \quad r_x = pX_C \quad (6)$$

while the profit maximization of the local firms give

$$w = Y_L, \quad r_y = Y_C \quad (7)$$

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ It is assumed that the *capital market is imperfect* (e.g. due to information asymmetries), so that the MNF has a better access to the capital market compared to local firms.
- ▶ It is reasonable to assume that banks prefer to lend money to MNF due to international reputation, more collaterals, lower risk etc. Thus, interest rates will differ:

$$\alpha r_x = r_y \quad \text{with } \alpha > 1$$

- ▶ Full employment: $C_x + C_y = \bar{C}, S = \bar{S}$

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ Combining the profit maximization and full employment conditions we have

$$\alpha p X_C(L_x, C_x, \bar{S}) = Y_C(L_y, \bar{C} - C_x) \quad (8)$$

$$w = p X_L(L_x, C_x, \bar{S}) \quad (9)$$

$$w = Y_L(L_y, \bar{C} - C_x) \quad (10)$$

- ▶ What happens if MNF transfer specific factors S to the developing country and utilizing the resources there? For simplicity, assume $p = 1$. Differentiating (8)-(10) and rearranging gives:

$$\begin{aligned} \frac{dL_x}{d\bar{S}} &= \frac{\alpha Y_{LL}(X_{LS}X_{CC} - X_{CS}X_{CL})}{D} > 0 \\ \frac{dC_x}{d\bar{S}} &= \frac{\alpha Y_{LL}(X_{CS}X_{LL} - X_{LS}X_{CL})}{D} = -\frac{dC_y}{d\bar{S}} > 0 \\ \frac{dL_y}{d\bar{S}} &= \frac{\alpha Y_{CL}(X_{CS}X_{LL} - X_{LS}X_{CL})}{D} < 0 \end{aligned}$$

with $D = -\alpha Y_{LL}H_x > 0$.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Result 1: The emergence of MNF in the capital-short labor-abundant developing country induces a shift of capital from the local firms to the MNF. Employment and output increases in the MNF sector but decreases in the local sector.

- ▶ What happens with the *total* employment? Adding $dL_y/d\bar{S} + dL_x/d\bar{S} = dL/d\bar{S}$ gives (see Batra for details)

$$\frac{dL}{d\bar{S}} = \frac{\alpha A(k_y - k_x)}{D}$$

with $A = Y_{CL}(X_{CL}(X_{CS} + X_{LS}/k_x) + SX_{CS}X_{LS}/C_x) > 0$ and $k_i = C_i/L_i$ as the capital intensity. This leads to

Result 2: If the MNF produces the relatively capital-intensive good, then the emergence of the MNFs cause a decline in total employment in the developing country.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

- ▶ Consider that the profits of the MNF are repatriated to the developed country, then the remaining GDP of the developing country is

$$GDP = pX + Y - \pi$$

- ▶ Differentiating with respect to \bar{S} and using (5), (6), (7) gives (for details see Batra)

$$\frac{dGDP}{d\bar{S}} = w \frac{dL}{d\bar{S}} - \bar{S} \frac{dX_S}{d\bar{S}} + X_C(1 - \alpha) \frac{dC_x}{d\bar{S}} < 0$$

- ▶ Since $dL/d\bar{S}$ is negative (see above) and $\alpha > 1$ the impact on the GDP is negative.

Result 3: The MNF cause a decline of the GDP when the transfer of S is not accompanied by a sufficient capital transfer.

5. Special Topics on Trade and Globalization

5.2

FDI, knowledge transfer and trade: Do developing countries always benefit from MNF?

Additional results:

- ▶ In the article it is shown that a *tax on the non-wage income* in the developing country can help to avoid these negative effects.
- ▶ Furthermore, it is shown that the effects might reverse when technology transfer \bar{S} is accompanied by *capital transfers (FDI)*. This is employed by assuming $d\bar{C}/d\bar{S} = \lambda > 0$. Recalculating the effect on the total employment gives

$$\frac{dL}{d\bar{S}} = \frac{\alpha[A(k_y - k_x) + \lambda Y_{CL}H_x]}{D}$$

where the sign depends on λ .

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

What does “Fair” Trade mean?

- ▶ First of all: normative judgement!
- ▶ Specialisation and trade affects different groups in a different way: It might be the case that unskilled worker in the South create benefits for the consumers in the North under extreme social conditions.
- ▶ Is trade responsible for this? Can trade or trade policy address this problem?
- ▶ More generally, trade situations and trade policy measures may be regarded as “unfair” if
 - ▶ ... there is a very disproportional distribution of the welfare gains from international division of labor and trade
 - ▶ ... they induce a welfare shift to the expense of the trade partner (e.g. beggar-my-neighbour policy, profit shifting, rent extraction)

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

- ▶ Many economists therefore come to the conclusion that more competition, open markets, less distortional policy measures increases fairness, including the chance for poor workers in the South to “catch up” with the North.

⇒ “Free trade is fair”

⇒ ?

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

- ▶ Even though the globalisation process proceeds, we observe in developing countries which are engaged in this process, that large groups (i.e. unskilled workers, rural population) do not benefit and still produce under conditions which would be unacceptable in developed countries.
- ▶ Many economists argue, that
 - ▶ ... labor force in poor countries is better off *compared to the autarky case*.
 - ▶ ... wage differentials reflect *productivity differences* (and different purchasing power of money wages)
 - ▶ ... wages in countries which are engaged in an *export orientited development strategy* have a much *higher productivity and wage growth rate* than under import substituting policy. Globalisation fosters the “catching up” process.
 - ▶ ... this problem should be addressed by *development policy* rather than trade policy (e.g. technological progress and institutional reforms)

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

Objections:

- ▶ Most positive examples of catching up economies (Japan, “Tiger countries”, China) are *not* based on pure free trade policies but on a sophisticated mix of trade policy measures and regulatory industrial policy.
- ▶ The theoretical arguments why free trade will be “fair” and beneficial also for the labor force in the South, are based on models which presume competitive markets, full employment etc. – conditions which are *not* valid.

What happens if considering market imperfections like monopsonistic labor markets or oligopolistic intermediaries (often Northern firms)?

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

Fair Trade – an ethical consumption perspective

- ▶ Ethically motivated consumers in developed countries pay voluntarily more for a product, if its production in the developing countries meets certain social standards.
- ▶ Producer and intermediaries can join a Fair Trade Organization (FTO) which proves the standards and is providing a label for the product (e.g. *TransFair* Coffee).
- ▶ The social standards typically include: minimum wages for workers, long-term contracts between producer and intermediary and/or resellers for dampening price fluctuations, standards for work safety and social insurance, access to specific long-term credits.
- ▶ The aid of ethically motivated consumers is channeled through trade.

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

What may be possible effects?

- ▶ *Allocation efficiency*: FTO and fair products change the system of relative prices. This will induce a reallocation of factors and may affect efficiency, the specialisation pattern, and welfare. Are ethical price premiums distorting allocation?
- ▶ *Distribution*: workers in FT relationships will be better off, but is this to the expense of other worker groups in the South? (e.g. wages of non-FT workers, unemployed workers)
- ▶ *Welfare*: Is there an overall positive welfare effect for the economy?

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

A first general consideration:

- ▶ If we are in a perfect Walrasian world, then an equilibrium allocation where consumers have specific (ethical) preferences must be efficient and Fair Trade must then be a Pareto optimum. There is no logical basis to argue that ethical prices “distort” the system of relative prices.
- ▶ If ethical prices (which reflect consumer’s preferences) have a distortional effect, then there must exist imperfect markets. But if markets are imperfect, then the allocation without ethical consumption can not be Pareto efficient. Then perhaps Free Trade may help to mitigate inefficiencies.

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

- ▶ Hayes, M. (2006), On the Efficiency of Fair Trade. *Review of Social Economy* 64(4), 447-468.
- ▶ Consider firms which act as monopsony on local labor markets.
- ▶ A monopsony on a labor market is a *wage setting firm* which chooses a wage and employment level that maximizes profits, given a (inverse) labor supply function:

$$\begin{aligned}\max_L \pi &= py(L) - w(L)L \\ \text{FOC} \quad \Rightarrow \quad 0 &= p \frac{dy}{dL} - w(L) - \frac{dw}{dL} L \\ \frac{w}{p} &= \frac{dy}{dL} - \frac{dw}{dL} \frac{L}{w} \frac{w}{p} \\ \Rightarrow \quad \left(1 + \frac{dw}{dL} \frac{L}{w} \right) \frac{w}{p} &= \frac{dy}{dL}\end{aligned}$$

which implies that real wages are *below* marginal productivity.

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

- ▶ Households decide whether to accept this wage contract or to be self-employed – which means in poor rural regions in the South that they “survive” on a subsistence level.
- ▶ Wages below marginal productivity depart from efficiency and lead to lower employment.
- ▶ The non-employed worker should be regarded as involuntary unemployed, since lower wages would not induce more labor demand.
- ▶ The model shows that FTO work in a similar way like a subsidy on the wage or a minimum wage.
- ▶ In *monopsony* it can be shown that *minimum wages or wage subsidies are able to enhance both, efficiency and employment.*
- ▶ A further result is, that this does not necessarily require a price premium for ethical consumers.

5. Special Topics on Trade and Globalization

5.3 Market power and the case of “Fair Trade”

- ▶ Piyapromdee, S., Hillberry, R., MacLaren, D. (2008), “Fair Trade” Coffee and the Mitigation of Local Oligopsony Power. Research Paper No.1057, University of Melbourne, Department of Economics.
- ▶ The paper presents a model which describes the way how coffee is produced: Small farmers harvest coffee berries and sell them to private intermediaries. These intermediaries process the berries to green coffee beans. These beans are exported by local exporters to international traders which sell them on the global coffee market to the roasters. The roasters process the beans to the final product and distribute them through resellers to the consumers. In practice, some steps of this process are done by vertically integrated large firms.
- ▶ The model focusses on the first part: Local intermediaries which demand the harvested berries are characterized as *oligopsonies with market power*.

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- ▶ FTOs address the interaction between farmers and these intermediaries (processors). There are *commercial processors* which maximize their profits, and *fair trade processors* which maximize a goal function which compromises their profits with the benefits of the farmers. The weight α of the farmer's benefit in the goal function indicate the influence of FTO.
- ▶ A detailed analysis of the general heterogenous oligopsony model shows that an increasing influence of fair trade processors reduce the oligopsony power of commercial processors. The outcome moves into the direction of competition, and the extraction of farmer's welfare is reversed.
- ▶ A calibration and estimation of the model shows, however, that the effects are positive but small.