David Ricardo's Theory of

Comparative Advantage

Classical theory of comparative advantage

- 1500-1750 the mercantilist dogma dominated.
- Absolute advantage (A. Smith 1723-1790)
- Relative (or comparative) advantage (D. Ricardo 1772-1823)
- Assumptions of the Ricardo theory of comparative advantage:
  - Two countries, two goods, one factor of production, (labor).
  - Free trade, no transaction costs, or transportation costs.
  - Constant opportunity cost.
  - Free mobility of labour within a country.
  - No mobility of labour from country to country.

Classical theory of comparative advantage

- Ricardian theory of international trade challenged the ***mercantilist dogma of accumulating gold or silver by promoting industry specialisation*** and exports.
- Ricardo introduced the "***comparative advantage***“:
- Nations should ***concentrate resources*** only in industries where they have the greatest efficiency of production relative to their own alternative uses of resources.
- He argued that international trade is always ***beneficial***, even if one country is more competitive in every area of production.
- ***He opposed protectionism*** for national economies.

Assumptions of the Ricardo theory of comparative advantage:

- Two countries, two goods, one factor of production, (labor).
- Free trade, no transaction costs, or transportation costs.
- Constant opportunity cost.
- Free mobility of labour within a country.
- No mobility of labour from country to country.
- Production possibility frontier (or transformation curve) is a straight line.

- “Before” trade, both countries produce both goods.
- “After” trade, each country specializes in the production which has the comparative advantage.
- Comparative advantage: lower opportunity cost, or lower relative cost of production, or lower relative price.
- Gains from trade: specialization, greater production internationally, greater consumption for all (welfare increases)
- Next: Ricardo’s example with the 4 magic numbers (P. Samuelson)

Ricardo's example: labour cost of production (hours needed to produce one unit of production)

countries	**1 unit of cloth**	**1 unit of wine**
England	**100**	**120**
Portugal	**90**	**80**

Ricardo's example: labour cost of production (hours needed to produce one unit of production)

countries	**1 unit of cloth (price of cloth)**	**1 unit of wine (price of wine)**
England	**100**	**120**
Portugal	**90**	**80**

Labour theory of value: the amount of labour needed to produce one unit of a commodity, determines its value.

Portugal has the "absolute" advantage in producing both goods.
We will show that both countries gain from trade.

Ricardo's example: labour cost of production (hours needed to produce one unit of production)

countries	**1 unit of cloth (price of cloth)**	**1 unit of wine (price of wine)**	Relative price of cloth
England	**100**	**120**	0,83
Portugal	**90**	**80**	1,125

Ricardo's example: labour cost of production (hours needed to produce one unit of production)

countries	**1 unit of cloth (price of cloth)**	**1 unit of wine (price of wine)**	Relative price of cloth	Relative price of wine
England	**100**	**120**	0,83	1,2
Portugal	**90**	**80**	1,125	0,88

Ricardo's example: labour cost of production (hours needed to produce one unit of production)

countries	1 unit of cloth	1 unit of wine	Relative price of cloth with respect to wine	Relative price of wine with respect to cloth	Relative labour cost of the production of cloth with respect to wine	Relative productivity of wine with respect to cloth (opportunity cost of wine with respect to cloth)
England	**100**	**120**	0,83	1,2	0,83	1,2
Portugal	**90**	**80**	1,125	0,88	1,125	0,88

Comparative advantage

- “After” trade starts, each country
  - specializes in the sector producing at a lower relative labour cost.(comparative advantage)
  - exports the good of the comparative advantage and imports the other good.
- England specializes in the production of cloth.
- Portugal specializes in the production of wine.

Gains from Trade

- Both countries gain if ***the relative international price*** of cloth with respect to wine is between the two relative prices in a state of "autarky" for the two countries:
- $0{,}83^{Engl} < (Pc/Pw)^{int} < 1{,}125^{Port}$
- or for the relative price of wine
- $0{,}88^{Port} < (Pw/Pc)^{int} < 1{,}2^{Engl}$
- More production is available for the "world" through ***specialization*** in production.

Diagrammatical exposition
Before trade: Production Possibility Curves (or transformation curves)

England

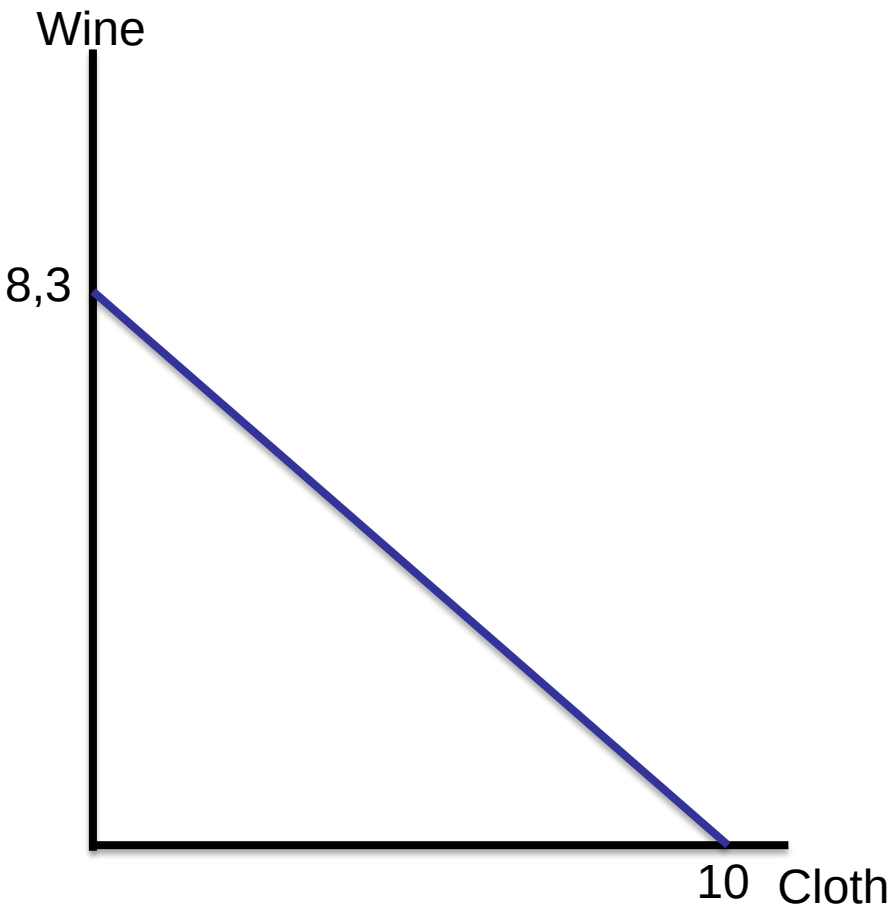
Portugal

	Cloth	Wine	L
England	100	120	1000
Portugal	90	80	1000

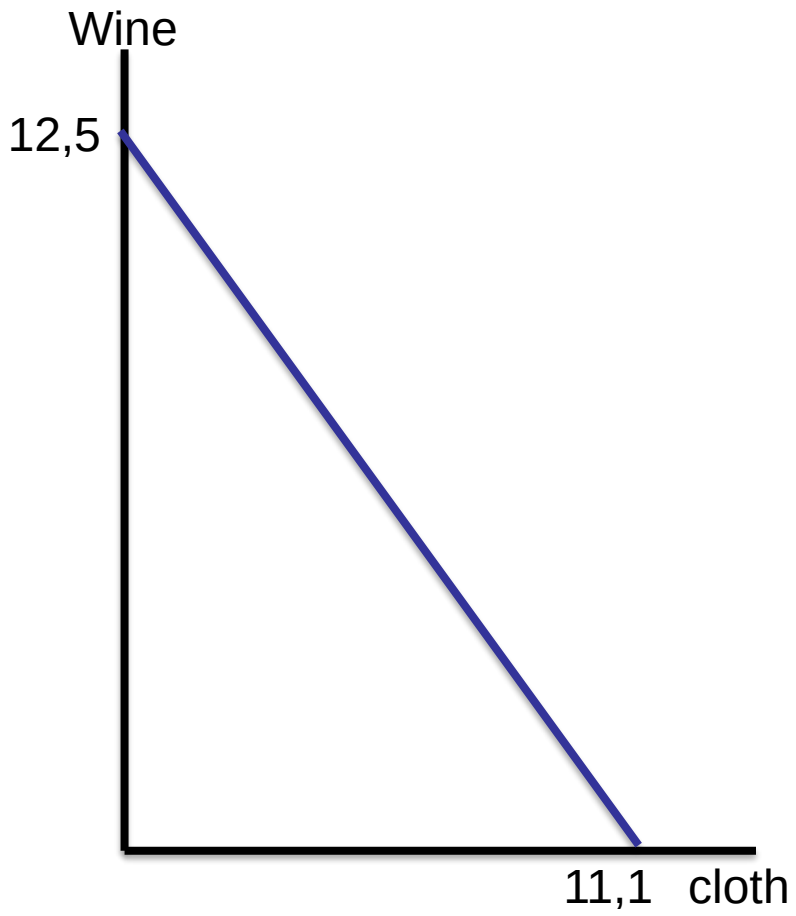
How much of each product can each country produce?

Before trade: Production Possibility curves or transformation curves

England



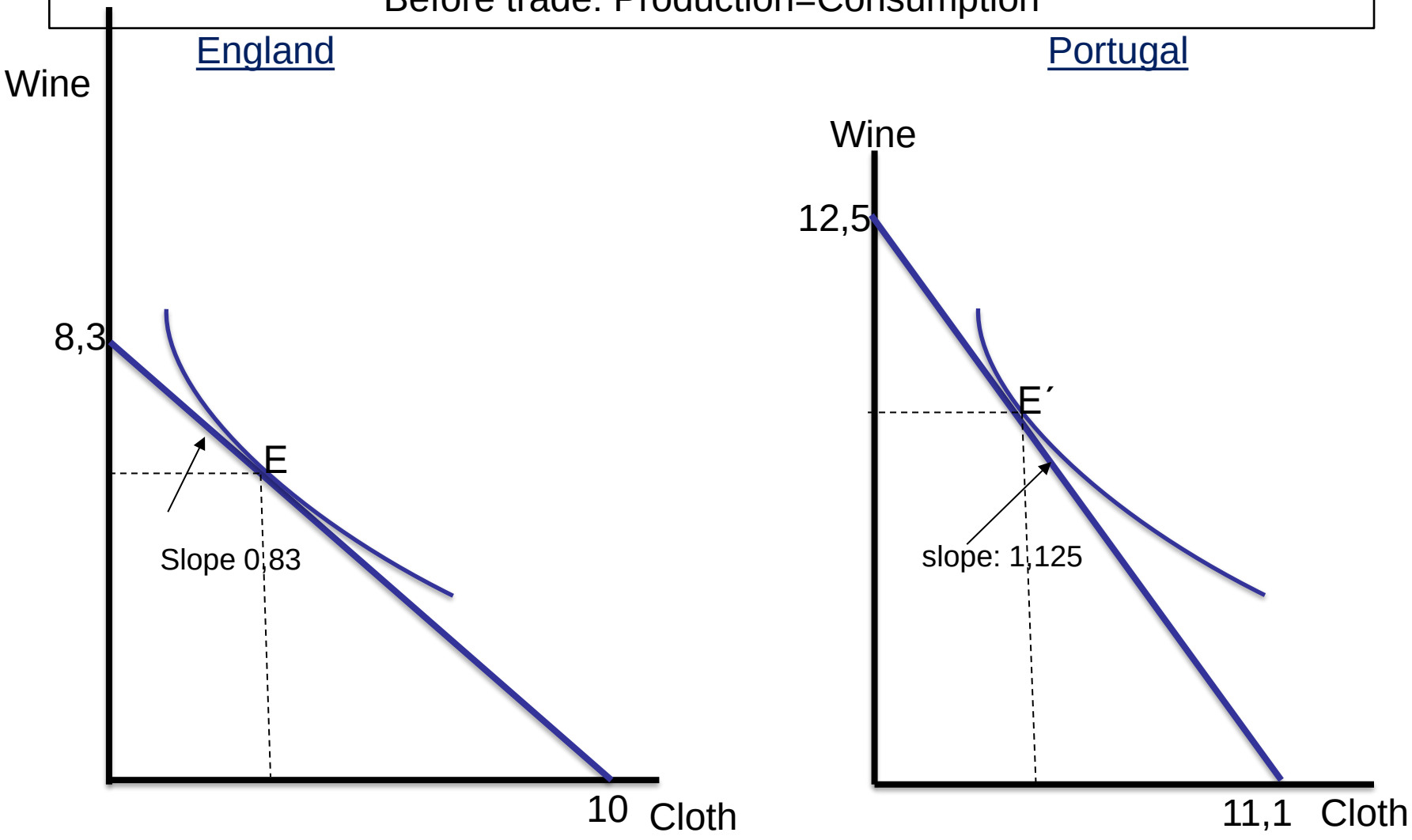
Portugal



L=1000

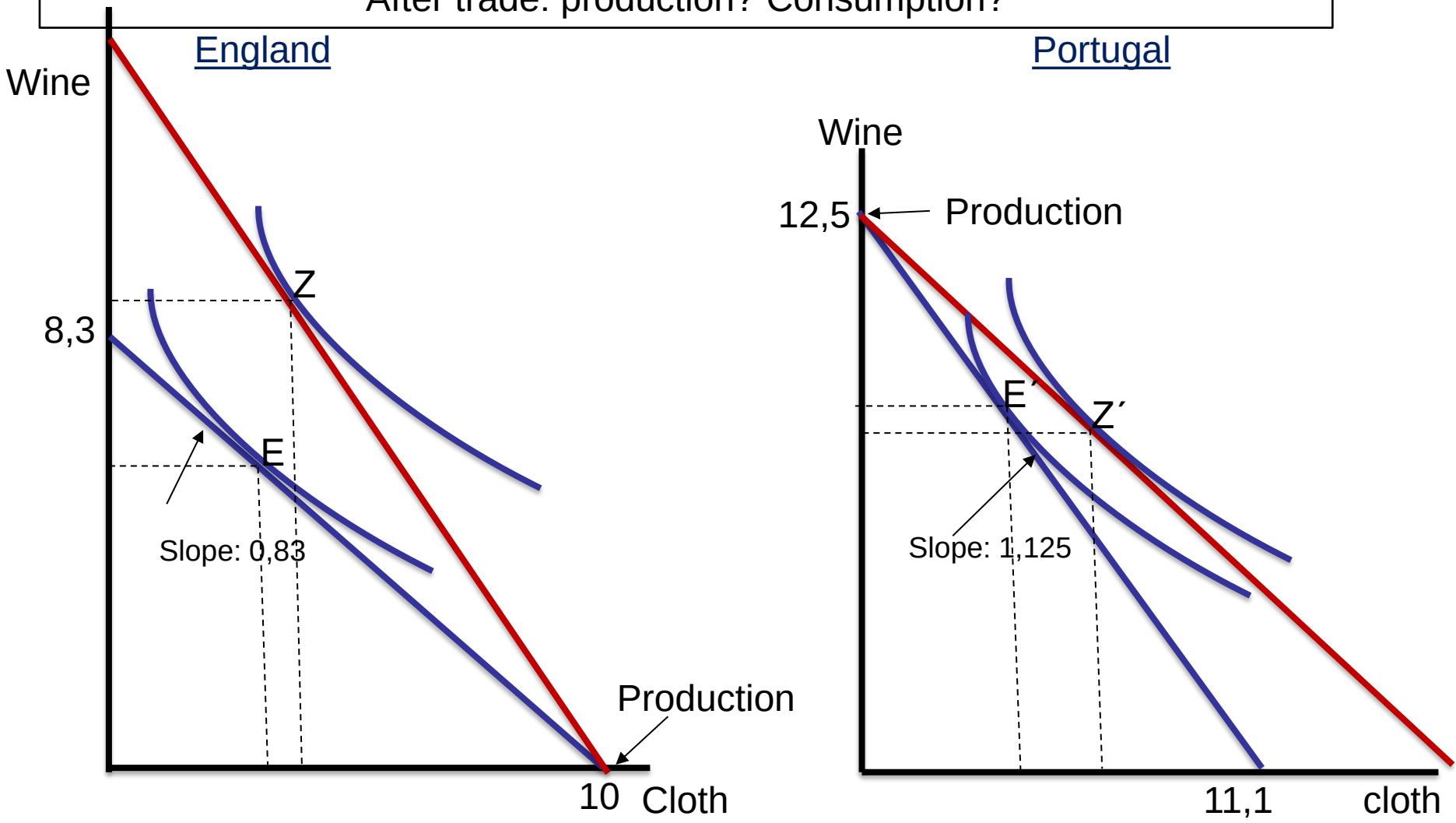
	Cloth	Wine	L
England	100	120	1000
Portugal	90	80	1000

Before trade: Production=Consumption



	Cloth	Wine	L
England	100	120	1000
Portugal	90	80	1000

After trade: production? Consumption?



General case: labour cost of production

Countries	1 unit of cloth	1 unit of wine
I	α_{LC}	α_{LW}
II	α^*_{LC}	α^*_{LW}

labour cost of production

Countries	1 unit of cloth	1 unit of wine	Opportunity cost of the production of cloth with respect to wine
I	α_{LC}	α_{LW}	$\alpha_{LC} / \alpha_{LW}$
II	α^*_{LC}	α^*_{LW}	$\alpha^*_{LC} / \alpha^*_{LW}$

labour cost of production

Countries	1 unit of cloth	1 unit of wine	Opportunity cost of the production of cloth with respect to wine	Relative price of cloth with respect to wine (or relative labour cost)
I	α_{LC}	α_{LW}	$\alpha_{LC} / \alpha_{LW}$	$\alpha_{LC} / \alpha_{LW}$
II	α^*_{LC}	α^*_{LW}	$\alpha^*_{LC} / \alpha^*_{LW}$	$\alpha^*_{LC} / \alpha^*_{LW}$

if $(\alpha_{LC} / \alpha_{LW}) < (\alpha^*_{LC} / \alpha^*_{LW})$

- then
- Country, I, has the comparative advantage in the production of cloth.
- country II has the comparative advantage in the production of wine. ⇒
- Country I exports cloth, imports wine.
- ⇒ Country II exports wine, imports cloth.

Labour theory of value

- $Pc/Pw = \alpha_{Lc}/\alpha_{Lw}$
- The relative cost of production in terms of hours needed to produce good C, relative to the production of W, determines the relative price of the good C with respect to W.
- This holds for the case of a closed economy (no international trade)

Equation $(Pc/Pw = \alpha_{Lc}/\alpha_{Lw})$ holds for the case of a closed economy

- For the case of **two** countries:
- Suppose that (before international trade) it is true that:
- $(\alpha_{Lc} / \alpha_{Lw}) < (\alpha^*_{Lc} / \alpha^*_{Lw}) \Rightarrow$
- $\Rightarrow (Pc / Pw) < (P^*c / P^*w)$
- $\Rightarrow$Country, I, exports cloth and imports wine.
- And country, II exports wine and imports cloth.

When **free trade begins between the two countries:**

- $(Pc/Pw) < (Pc/Pw)^i < (P^*c/P^*w)$ (7)
- The relative international price of cloth, $(Pc/Pw)^i$
  - is the same in both countries and
  - is between the two relative prices that correspond to a state of autarky.

It is also true that

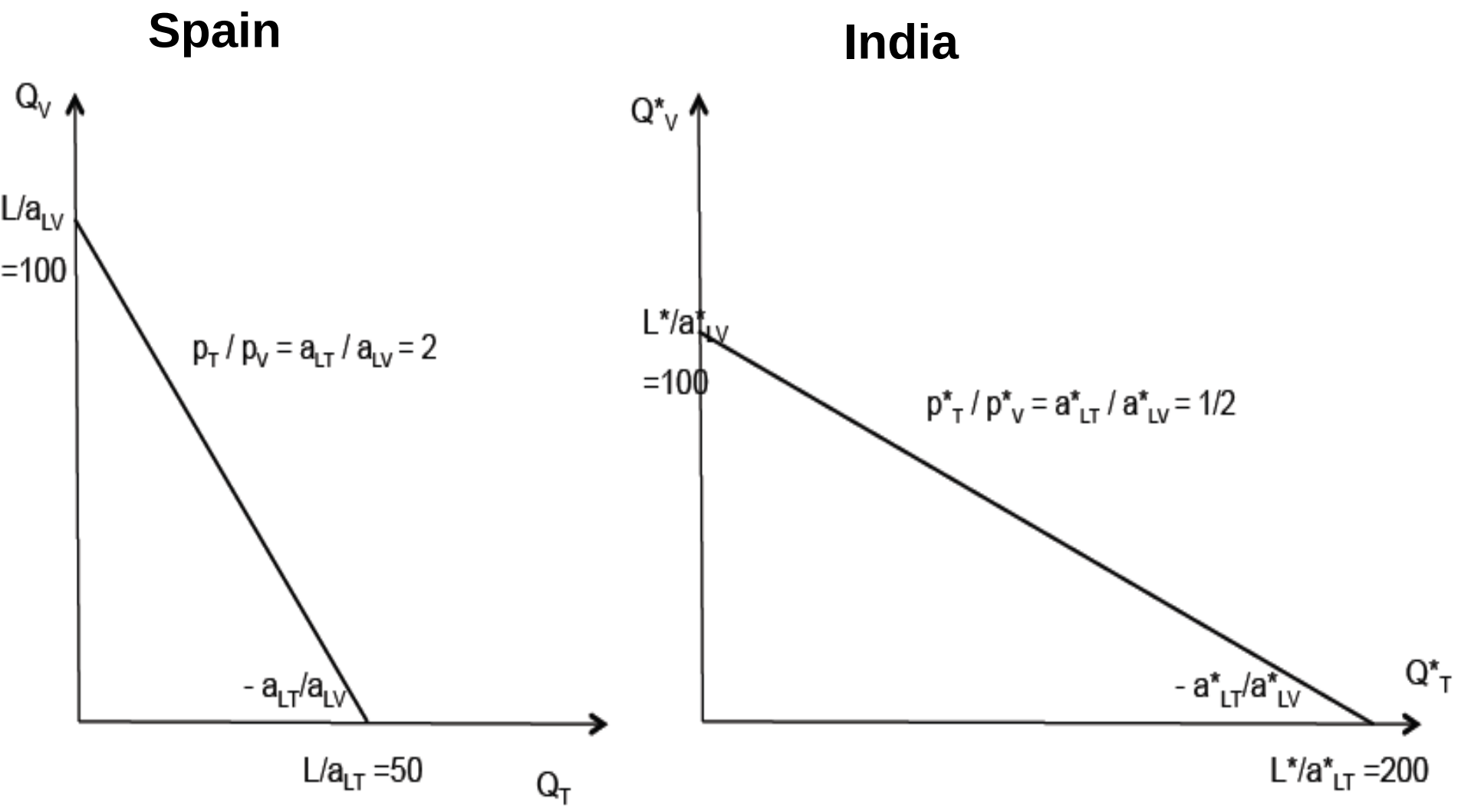
- $(\alpha_{Lc} / \alpha_{Lw}) < (Pc/Pw)^i < (\alpha^*_{Lc} / \alpha^*_{Lw})$
- hence, after international trade has started the labor theory of value does not hold.

What determines which good will be exported?

- Conditions that have to do with production:
  - **The relative productivity of labour**, that is the relative labor cost, determines the structure of trade.
  - Country I, which has a relatively greater productivity of labour in the production of cloth, will export cloth and import wine.

Example: labour cost of production

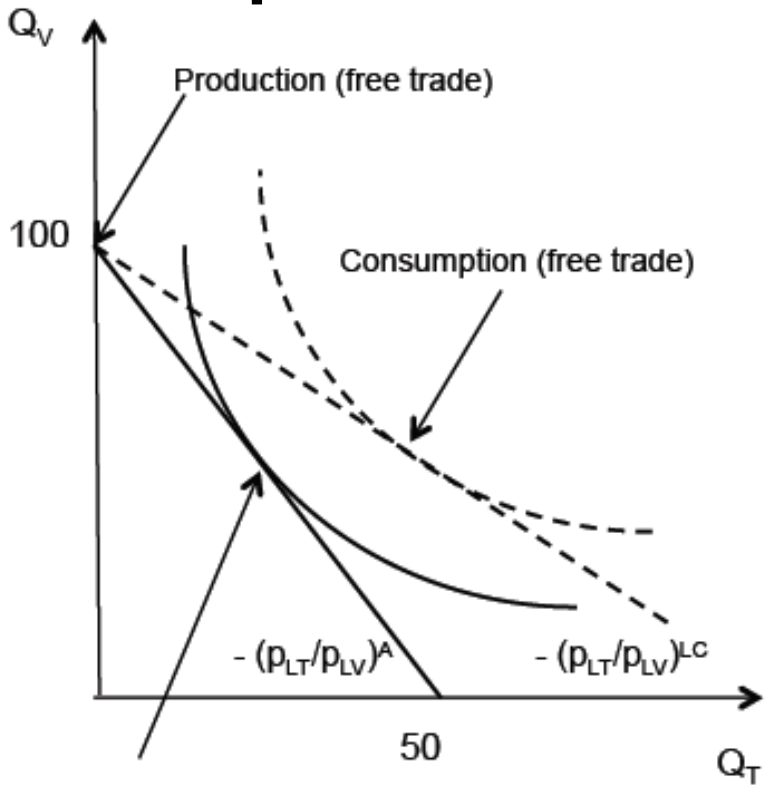
	1 unit of (T)	1 Unit of (V)	Relative price of T with respect to V	**Hours of labour that each country possesses**
Spain	**2**	**1**	2	100
India	**5**	**10**	1/2	1000


Spain
India
Q_V
L/a_{LV}
=100
$p_T / p_V = a_{LT} / a_{LV} = 2$
$- a_{LT}/a_{LV}$
L/a_{LT} =50
Q_T
Q^*_V
L^*/a^*_{LV}
=100
$p^*_T / p^*_V = a^*_{LT} / a^*_{LV} = 1/2$
$- a^*_{LT}/a^*_{LV}$
Q^*_T
L^*/a^*_{LT} =200

Example: labour cost of production

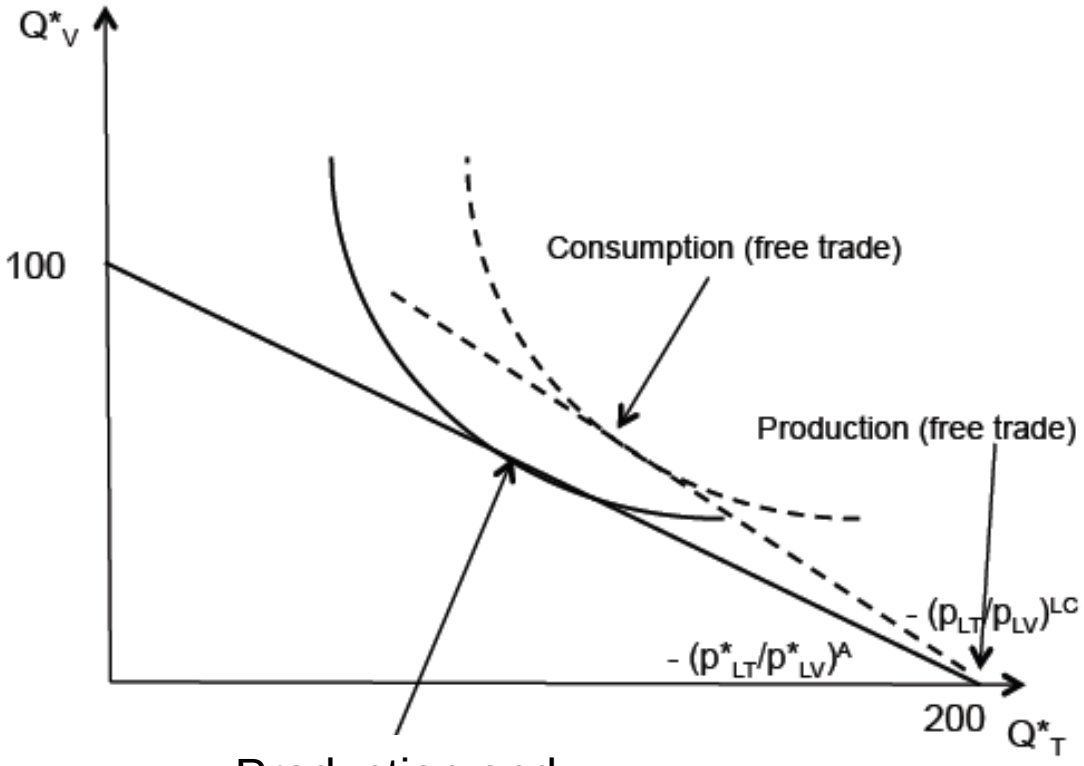
	1 unit of (T)	1 Unit of (V)	Relative price of T with respect to V	Relative price of V with respect to T	Opportunity cost of T with respect to V	Relative productivity of labour in V with respect to T
Spain	**2**	**1**	2	**1/2**	2	2
India	**5**	**10**	**1/2**	2	1/2	1/2

Spain



Production and consumption before trade

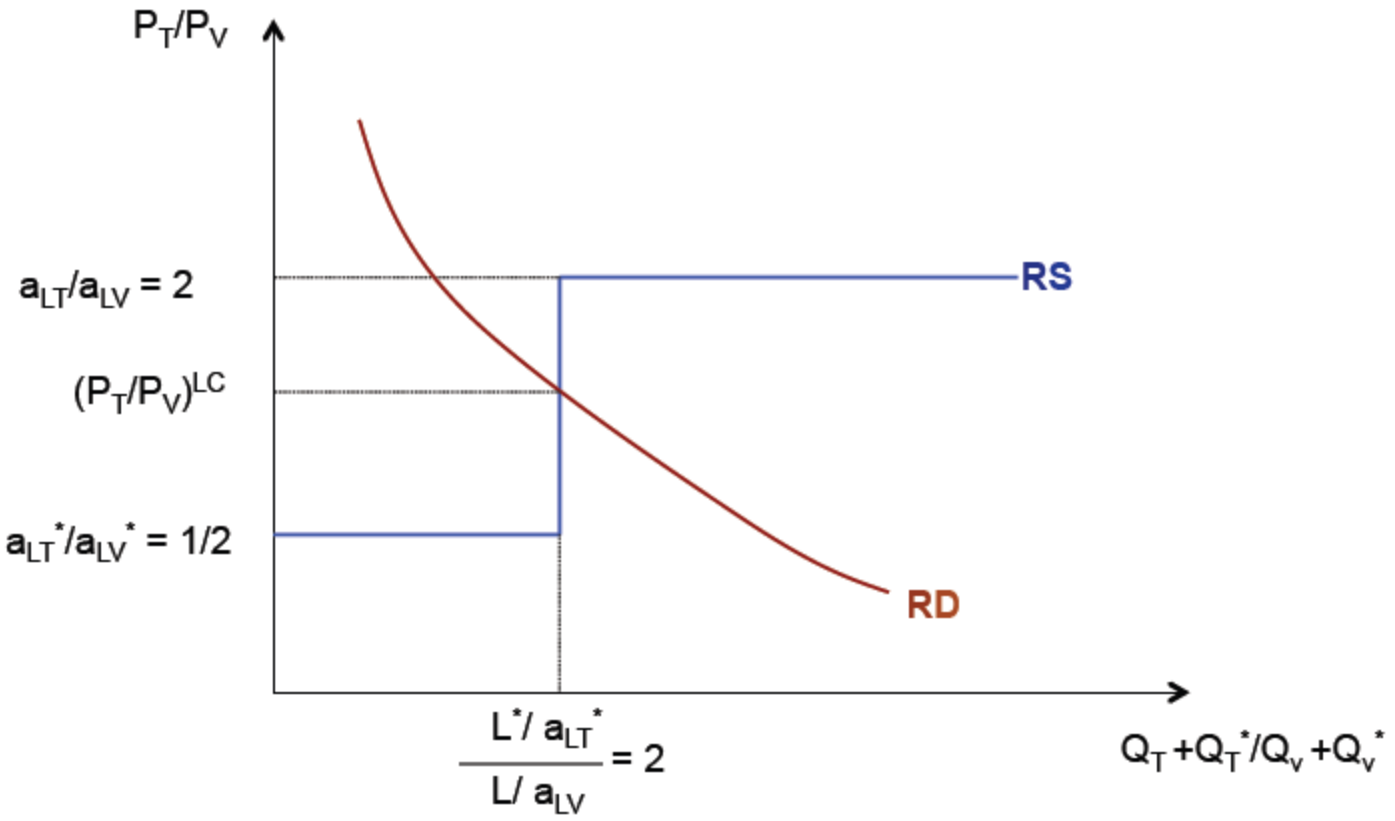
India



Production and consumption before trade

Each country specializes in the production of the sector with the comparative advantage

Relative production and demand



Another way to determine the sector of comparative advantage within the Ricardo Theory:

- We shall compare the **cost of production** between the two products for the two countries.
- Assumptions:
- **Countries**: I,II, **goods**: wine, cloth, **one factor**: labour
- ω: wage rate of country I
- $\alpha_{LC} \cdot \omega$: cost of production of one unit of cloth in country I.
- $\alpha_{LW} \cdot \omega$: cost of production of one unit of wine in country I.
- The wage and costs of country II, will be denoted with an asterisk.

- Suppose that the cost of production for wine is lower in country II than in country I.
- $\alpha^*_{LW} \cdot \omega^* \leq \alpha_{LW} \cdot \omega \Rightarrow (\alpha^*_{LW}/ \alpha_{LW}) \leq \omega/\omega^*$ and that
- $\alpha_{LC} \cdot \omega \leq \alpha^*_{LC} \cdot \omega^* \Rightarrow \omega/\omega^* \leq (\alpha^*_{LC}/ \alpha_{LC})$ $\Rightarrow$
- Country II has a lower cost of production in the wine sector.
- Country I has a lower cost of production in the cloth sector.
- $(\alpha^*_{LW}/ \alpha_{LW}) \leq \omega/\omega^* \leq (\alpha^*_{LC}/ \alpha_{LC})$

Comparative advantage restated

- The sector of the comparative advantage has a lower relative cost of production.
- The lower relative cost of production is due to
- either **the lower wage** or the **higher productivity of labour.**

Ricardo's Theory of Comparative Advantage (Many Goods Version)

- Basic idea:
- The Ricardian model explains **trade patterns based on labour productivity differences** across countries.
- Each country exports the goods that it can produce **at relatively lower labour cost** (or **higher productivity**).
- With many goods, we compare **relative costs** and **relative wages** to see which goods each country exports.

Two countries, many Goods

- Let us suppose:
- Two countries: **I** and **II**
- Many goods: **1, 2, …, n**
- Labour is the only factor of production.
- α_{Li} : labour required to produce one unit of good *i* in country I
- α^*_{Li}: labour required to produce one unit of good *i* in country II
- **ω** = wage rate in country I
- **ω*** = wage rate in country II

Comparative advantage condition:

- For each good, we compare production costs:
- $\alpha_{Li} \bullet \omega$ (country I) vs $\alpha^*_{Li} \bullet \omega^*$ (country II)
- Country I has a **lower cost** in good *i* if
- $\alpha_{Li} \bullet \omega < \alpha^*_{Li} \bullet \omega^*$
- Rearranging this gives:
- **$\omega / \omega^* <$** $\alpha^*_{Li} / \alpha_{Li}$

•Ranking Goods by Relative Productivity…

- $\alpha^*_{L1}/\alpha_{L1} < \alpha^*_{L2}/\alpha_{L2} < \ldots\ldots\ldots\ldots < \alpha^*_{Ln}/\alpha_{Ln}$
- And then compare with the wage ratio ω/ω^*
- $\alpha^*_{L1}/\alpha_{L1} < \alpha^*_{L2}/\alpha_{L2} < \omega/\omega^* < \alpha^*_{L3}/\alpha_{L3} \ldots. <\ \ <\alpha^*_{Ln}/\alpha_{Ln}$
- In turn, we can determine the trade pattern:
- Country II specialises in the production of goods 1 and 2, and exports goods 1 and 2.
- country, I, specialises in the production and export of goods 3,….n.
- Each country exports the goods it can produce at relatively lower cost.

Conclusions

- Comparative advantage arises from **relative labor productivity** and/or **differences in wages**.
- The **relative wage (ω / ω*)** adjusts so that both countries can find goods to export.
- Even if one country is more productive in all goods, **both can still gain from trade** because of *relative* (not absolute) advantage.
- The "many goods" version helps explain **diversified trade patterns** among countries with different technologies.
- A variety of goods allows **partial specialisation (countries don't need to specialise** completely in one good).
- Trade still raises welfare in both countries through **efficiency and variety**.

To summarise:

- Each country exports the goods for which its relative labour **cost** is **lower** than the **relative wage** of the other country.

- Lower cost can result from **higher productivity** or **lower wages** — this is the essence of comparative advantage.