International Trade: Lecture 5

Ricardian Trade with Multiple Goods

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Fall 2025

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- Eaton and Kortum (2002): many x many Ricardian trade with many industries and many countries

Ricardian Model with Multiple Goods: Preliminaries

- 2 countries $i \in \{H, F\}$
- Many goods indexed (labeled) $g \in [0, 1]$
- One factor of production: labor L_i mobile between sectors
- In country i, to produce one unit of good g, firms use $a_{i,g}$ units of labor
- Key force: differences in local technology (labor productivity)
- Trade balances (value of exports = value of imports)

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- But what is exactly between good 0 and good $1/2$?
  good $1/4$
- Do you see where this is going? Each one of the lines below indexes a "different good":

Can find a real number between two different real numbers
$\implies$ infinitely many goods $g \in [0, 1]$!

Perfect Competition, Prices and Unit Costs

- No trade barriers (for now), i.e. domestic prices are equal to prices abroad
- In country i, firms producing good g maximize profits under perfect competition:

$$\max_{y_{i,g}} \pi_{i,g} = \max_{y_{i,g}} p_g y_{i,g} - w_i a_{i,g} y_{i,g}$$

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- Labor is mobile $\implies$ single wage w_i for workers producing every good in each country
- Under perfect competition, goods prices reflect unit cost:
  - If home makes g, its factory-gate price is $P_g = a_{H,g} w_H$
  - If foreign makes g, its factory-gate price is $P_g = a_{F,g} w_F$

Where will production be located?

- In the simple Ricardian model, we conclude that country F has a comparative advantage if $\frac{a_{F,g}}{a_{H,g}} \leq \frac{a_{F,g'}}{a_{H,g'}}$.

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- Prices: price of good g will be the lowest of unit costs at home or abroad:

$$P_g = \min\{w_H a_{H,g}, w_F a_{F,g}\} \qquad \text{for } g \in [0,1]$$

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- Define: $A_g \equiv a_{F,g} / a_{H,g}$. $\implies$ A_g strictly decreasing in g.
  - $A_0 = \frac{a_{F,0}}{a_{H,0}}$: home is the most productive
  - $A_1 = \frac{a_{F,1}}{a_{H,1}}$: home is the least productive

Relative cost schedule

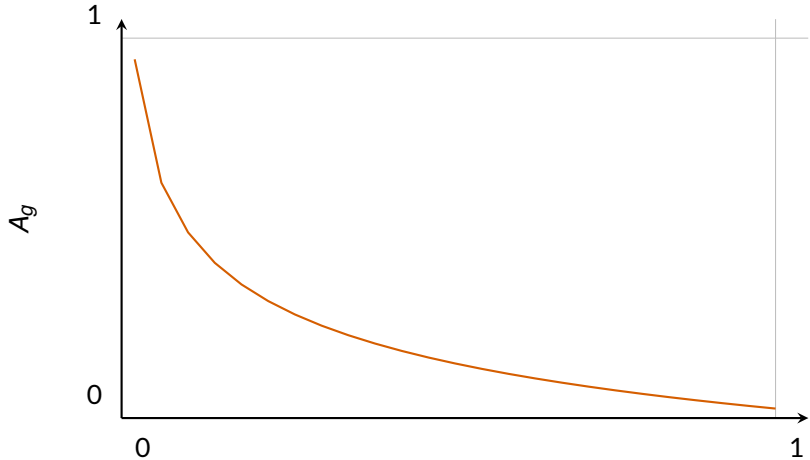

Figure: Relative unit labor costs $A_g = a_{H,g} / a_{F,g}$

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- Question: how does this relate to Cobb-Douglas preferences we saw before?

Equilibrium

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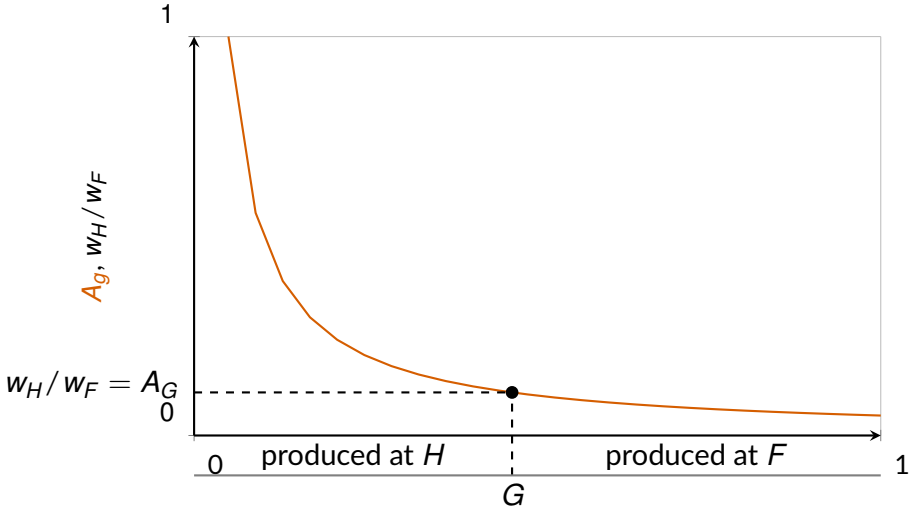
- Recall: trade pattern and specialization depends on Home-to-Foreign wage ratio (gap) w_H / w_F

Specialization



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Equilibrium determination

- Recall:
  - Home produces G share of goods
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- How to find G?

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- Or, solving for w_H / w_F:

$$\frac{w_H}{w_F} = \frac{G}{1-G} \frac{L_F}{L_H}$$

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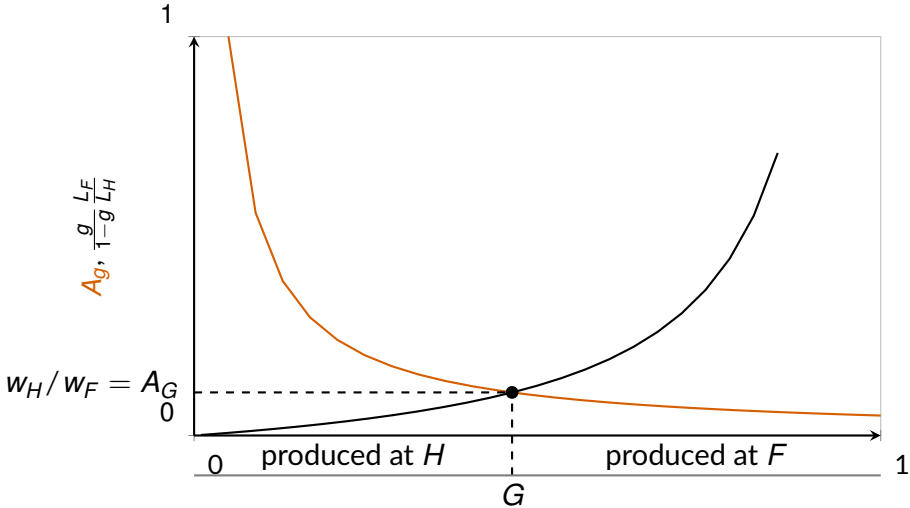

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- Great Doubling of the global workforce (Freeman 2006):
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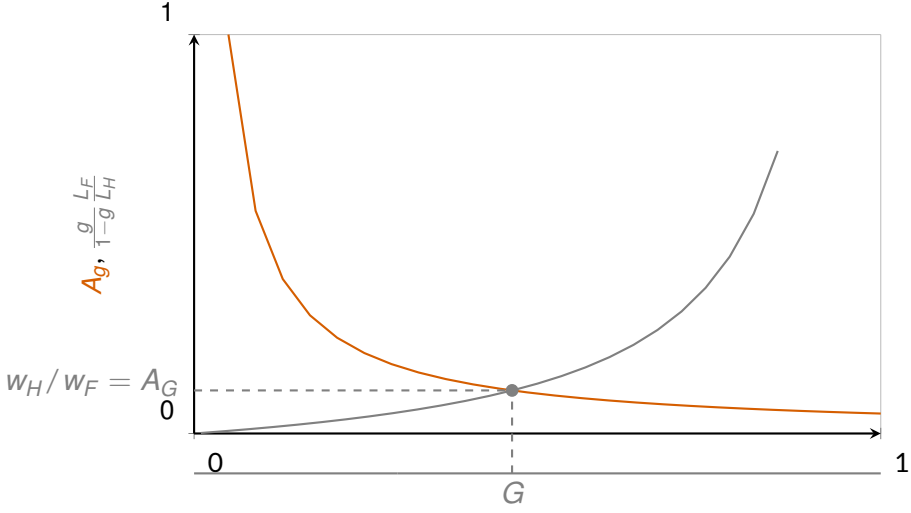
- If foreign population increases to $L'_F > L_F$ then:

$$\frac{g}{1-g} \times \frac{L'_F}{L_H} > \frac{g}{1-g} \times \frac{L_F}{L_H} \qquad \text{for every } g > 0$$

Increase in Foreign Labor Supply



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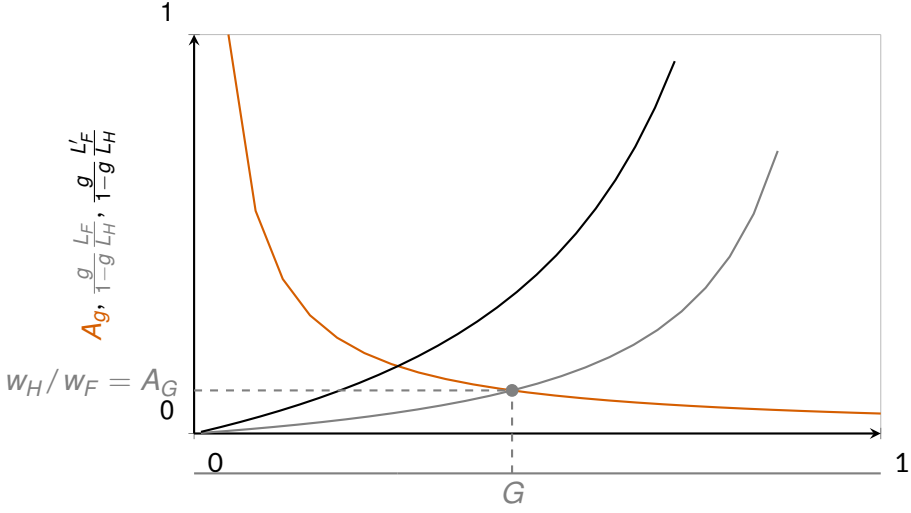

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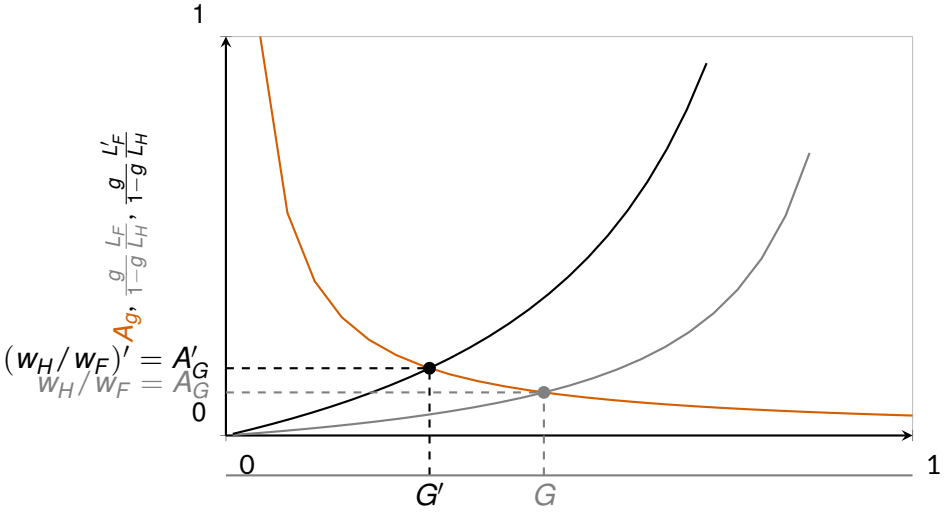

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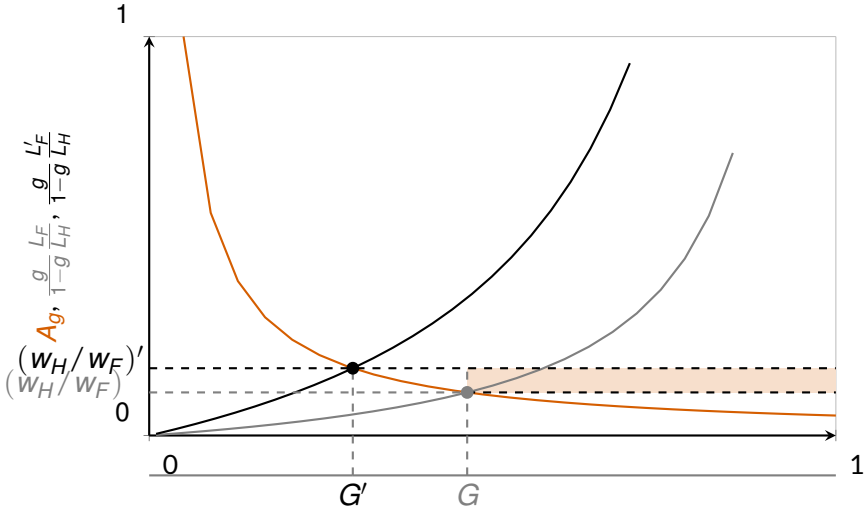
  - Goods $g \in [G', G]$, pivotal (change sources), gains:

$$\begin{aligned} (w_H/p_g)' &\geq (w_H/p_g) \\ \iff w'_H/(w'_F a_{F,g}) &\geq w_H/(w_H a_{H,g}) \\ \iff w'_H/w'_F &\geq a_{F,g}/a_{H,g} = A_g \end{aligned}$$

Welfare effects



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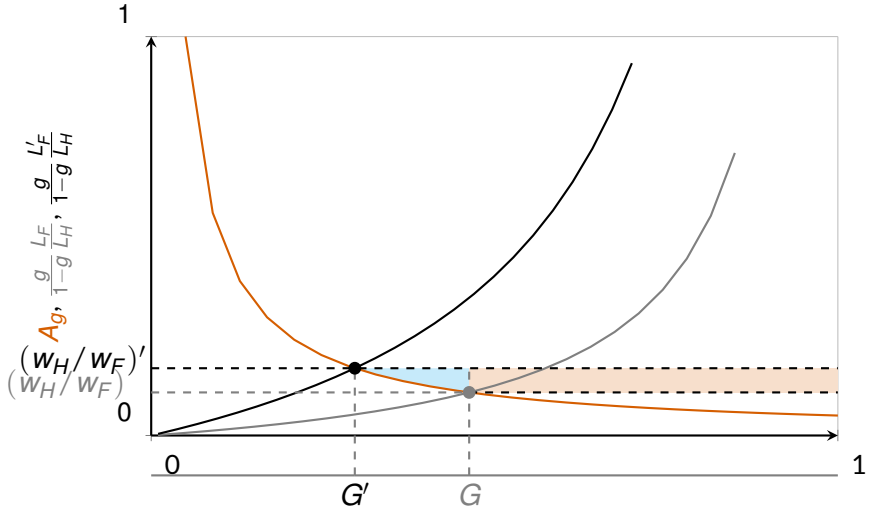

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- Not every good produced at home will be exported; only if:

$$\tau w_H a_{H,g} \leq w_F a_{F,g} \text{ or, equivalently, if } \frac{w_H}{w_F} \leq \frac{1}{\tau} \frac{a_{F,g}}{a_{H,g}} \equiv \frac{1}{\tau} A_g$$

Specialization with Trade Barriers

- Now, cut-offs:
  - Foreign will export all goods satisfying $\frac{w_H}{w_F} > \tau A_{G_H}$, comprising $[G_H, 1]$
  - Home will export all goods satisfying $\frac{w_H}{w_F} \leq A_{G_F} / \tau$, comprising $[0, G_F]$
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- Again, these cut-offs are implicitly defined through a function:

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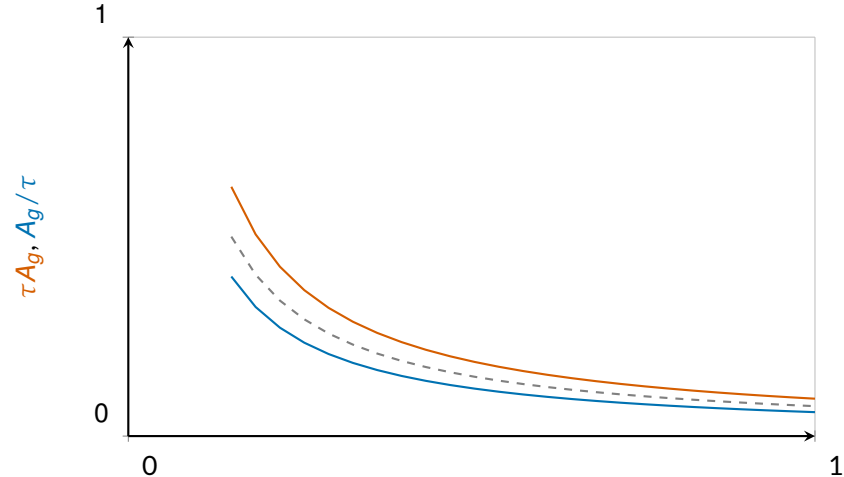
Equilibrium with Trade Costs



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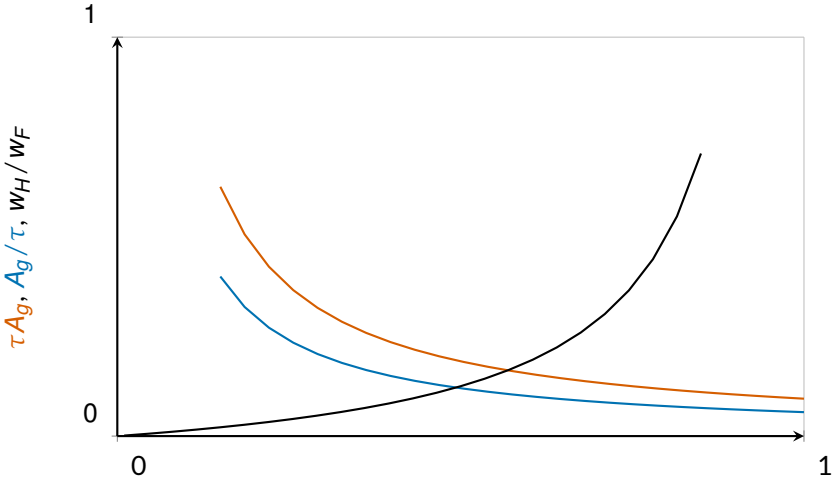

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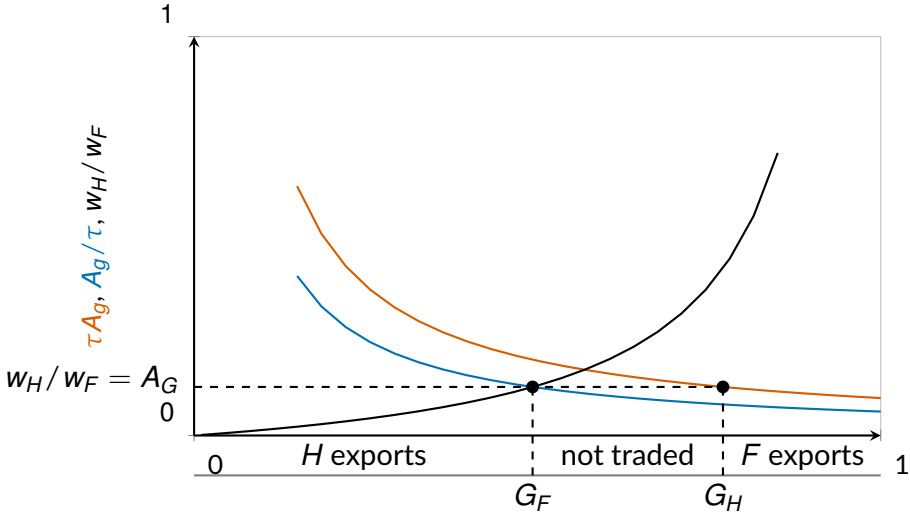

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