

Comparative
Advantage
Part 2

How do we find autarky prices in Home and Foreign?

- We can look at supply behavior: Relative supply (quantity of wine)/(quantity of cloth)
- As a function of relative price of wine (price of wine)/(price of cloth)
- Then look at the intersection with relative demand curve
- This gives us autarky price in each country!

Home country

- If $P_W/P_C < MPL_C / MPL_W$ then Home farmers produce only C
- $W/C=0$

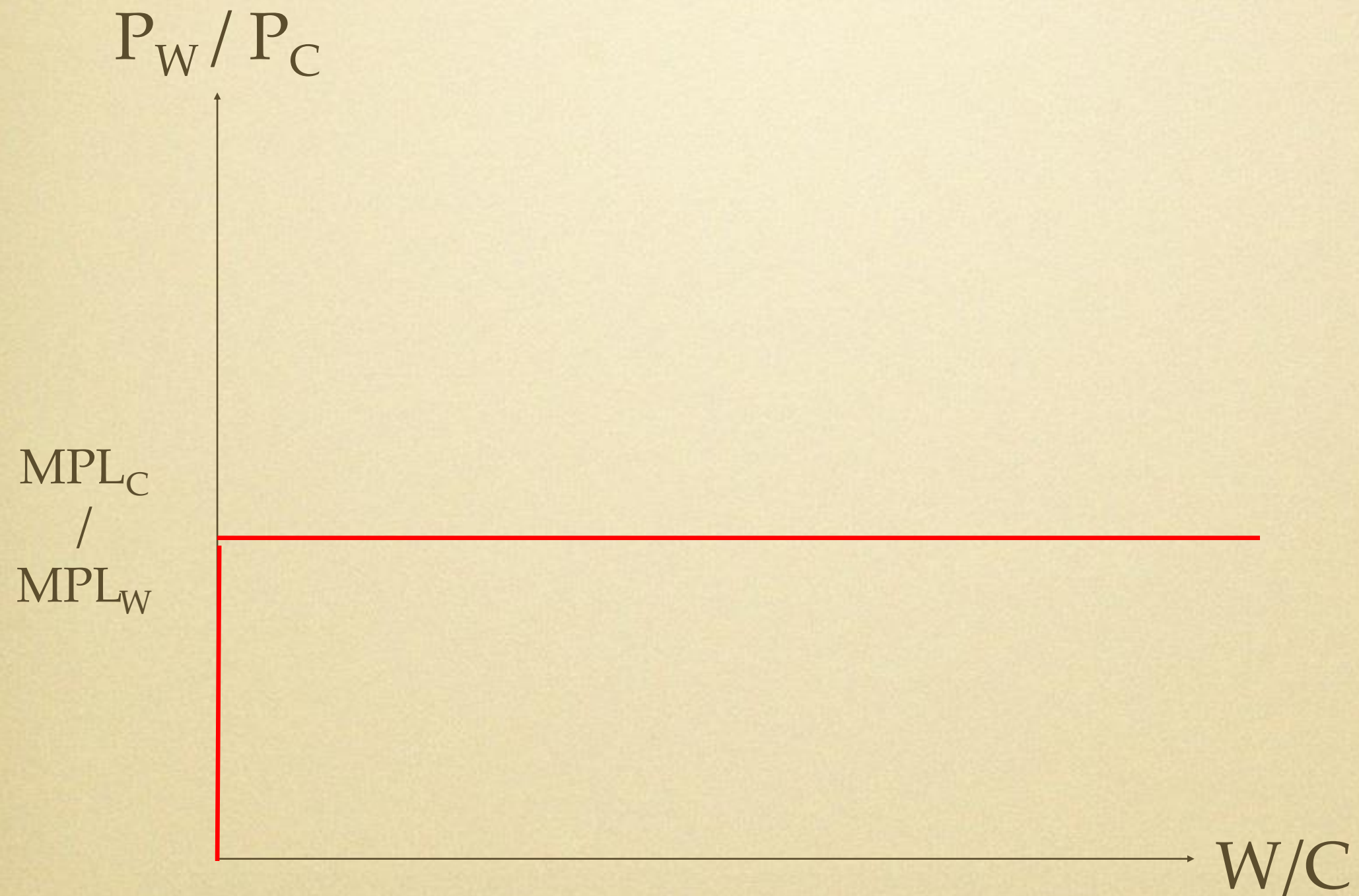
Home country

- If $P_W/P_C > MPL_C / MPL_W$ then Home farmers produce only W:
- $W/C = \infty$

Home country

- If $P_W/P_C = MPL_C / MPL_W$ then Home farmers can produce any combination of W and C on PPF

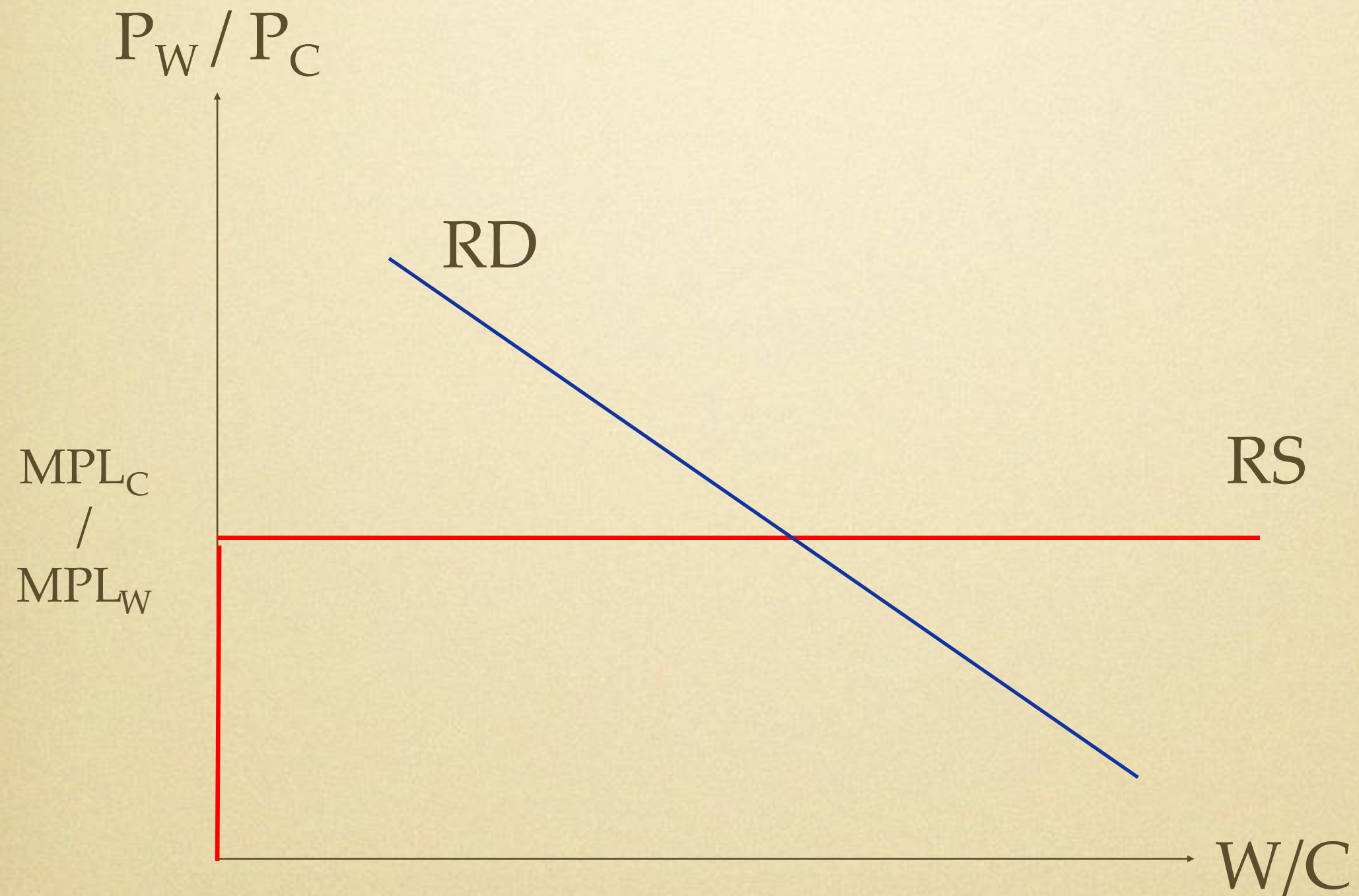
Home Relative Supply



Next, need relative demand.

According to the Law of Demand, RD curve is downward sloping

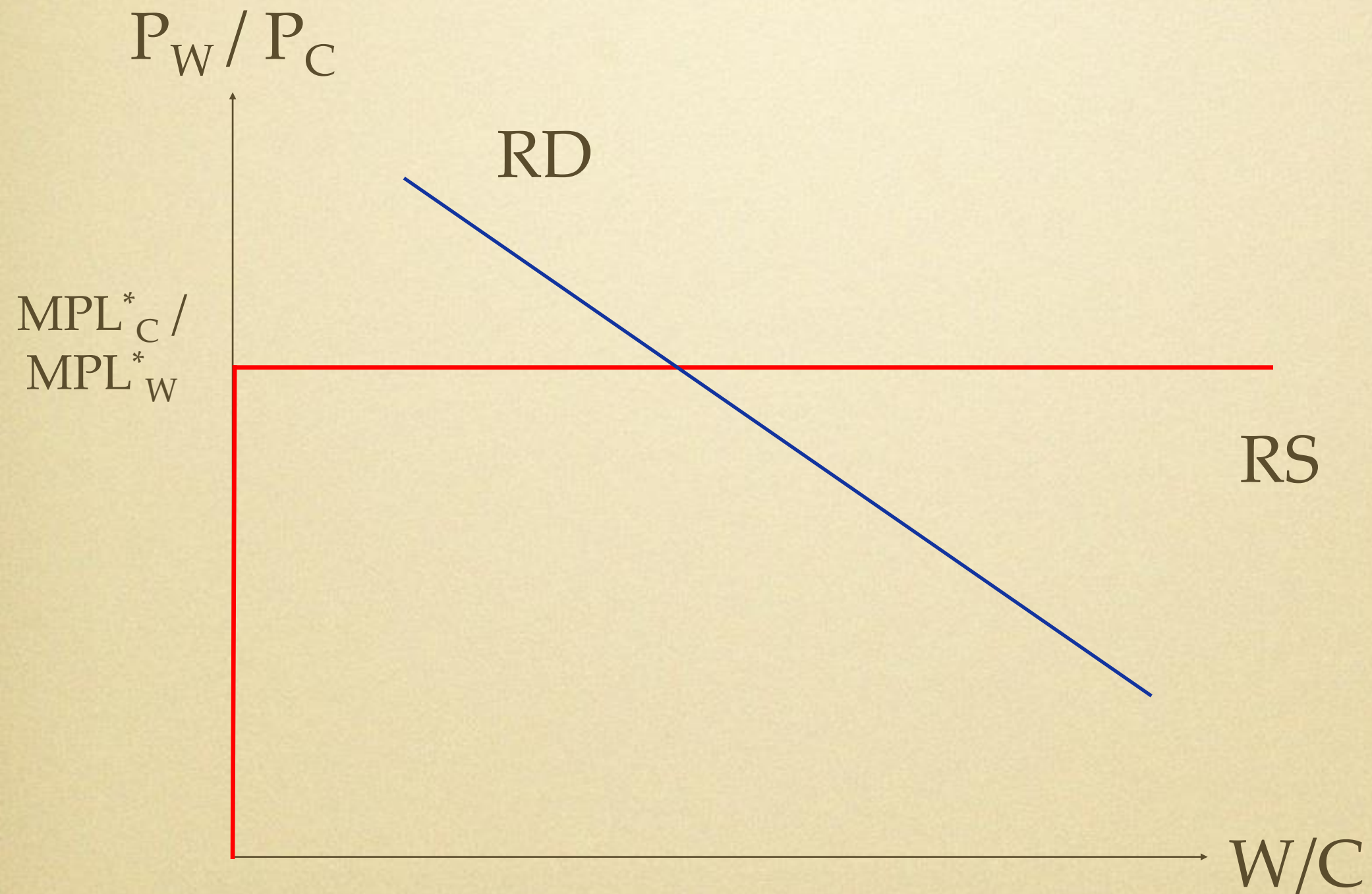
Home Autarky Equilibrium



Autarky equilibrium.

- In autarky, RS must equal RD in each country.
- Yields relative price of wine = MPL_C / MPL_W in Home.
- Or opportunity cost of producing W!

Foreign Autarky Equilibrium



Autarky equilibrium in Foreign

- Again, RS must equal RD.
- Yields relative price of wine = MPL_C^* / MPL_W^* in Foreign.
- Or opportunity cost of producing W!

- Remember, we assumed that Home has a comparative advantage in W:

$$(MPL_C / MPL_W) < (MPL^*_C / MPL^*_W)$$

- Hence, Home's autarky relative price of wine is lower than Foreign's autarky relative price of wine!
- Wine is relatively cheaper in Home
- Hence, cloth is relatively cheaper in Foreign
- Makes perfect economic sense☺

Free trade

- Now, suppose countries are able to trade with each other
- **Trade patterns:** Home exports W and Foreign exports C
- Hence each country exports the good in which it has a **comparative advantage** and imports the good in which it has a comparative disadvantage

Free trade

- What happens with trade?
- Our economic intuition tells us:
- Home: exports of W bid-up domestic price of good W - $(P_W/P_C) \uparrow$
- Foreign: imports of W decrease relative price of W - $(P_W/P_C) \downarrow$
- Two countries are in **trade equilibrium** when relative prices are the same in the two countries

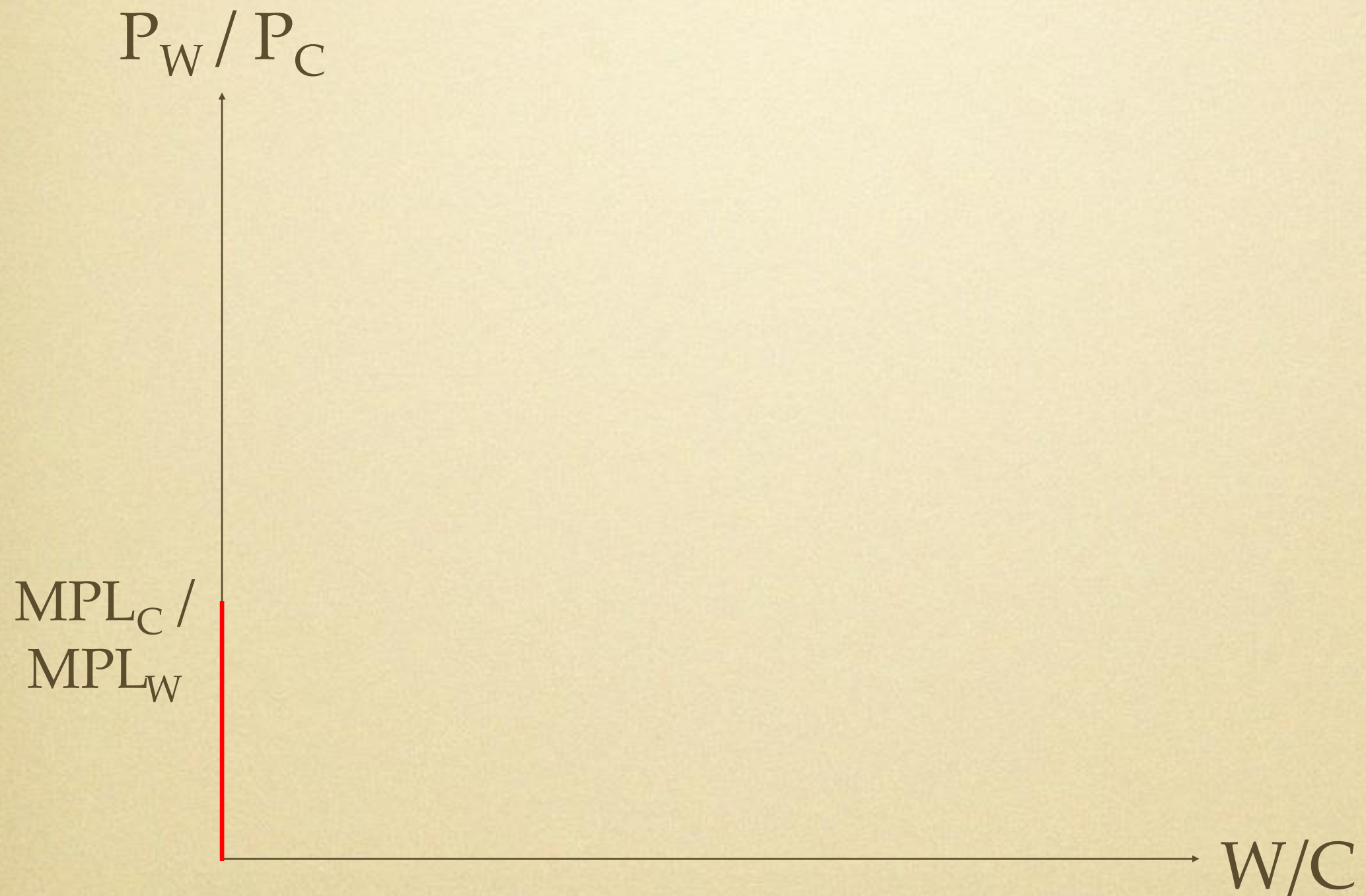
Free trade.

- Our next goal is to prove that our economic intuition is indeed right, in a more rigorous way
- Now, we need the *world* RS curve and RD curve.
- The RD curve is easy, since it's the same as before.
- Why?
- Now for the RS curve.

World Relative Supply of W

- If $P_W/P_C < MPL_C / MPL_W < MPL^*_C / MPL^*_W$
 - then both countries specialize in C
 - $W=0, C = L \cdot MPL_C + L^* \cdot MPL^*_C$
 - $RS=W/C=0$

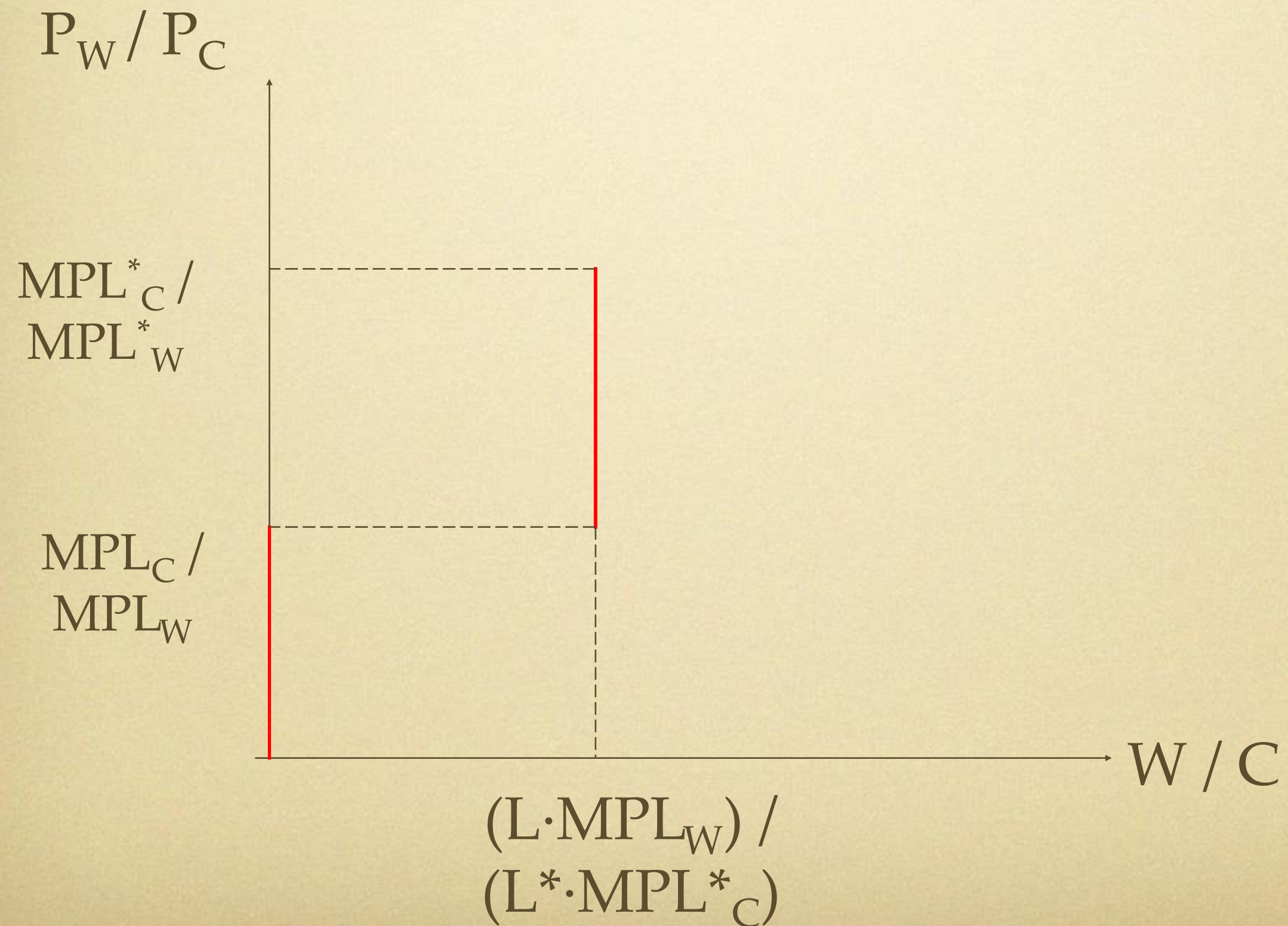
World Relative Supply



World Relative Supply of good W

- If $MPL_C / MPL_W < P_W/P_C < MPL_C^* / MPL_W^*$
- then Home specializes in W and Foreign specializes in C:
- $W = L \cdot MPL_W, C = L^* \cdot MPL_C^*$
- $RS = (L \cdot MPL_W) / (L^* \cdot MPL_C^*)$

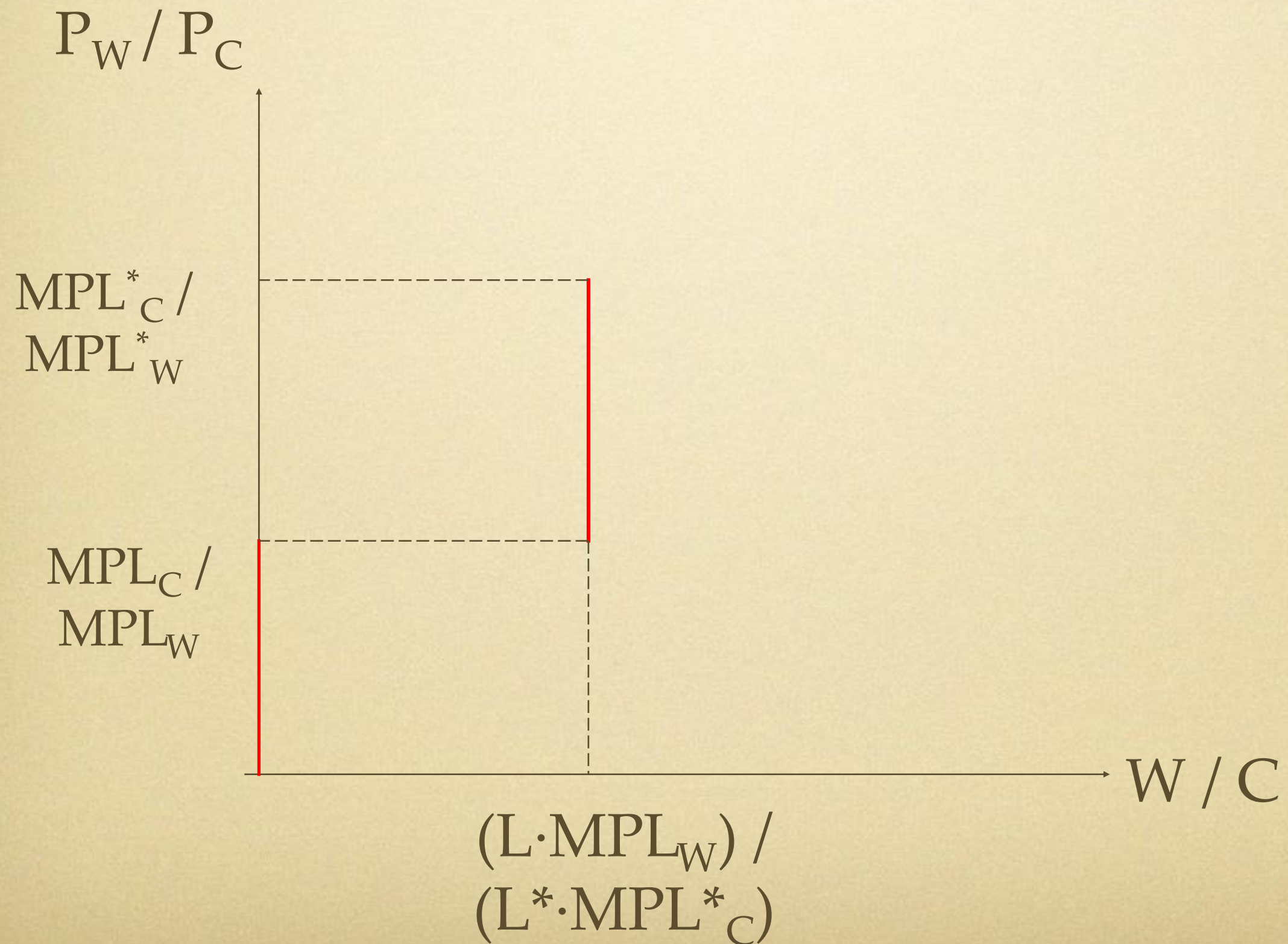
World Relative Supply



World Relative Supply of good W

- If $MPL_C / MPL_W < MPL^*_C / MPL^*_W < P_W/P_C$
- then both countries specialize in W:
 - $W = L \cdot MPL_W + L^* \cdot MPL^*_W, C=0$
 - $RS = \infty$

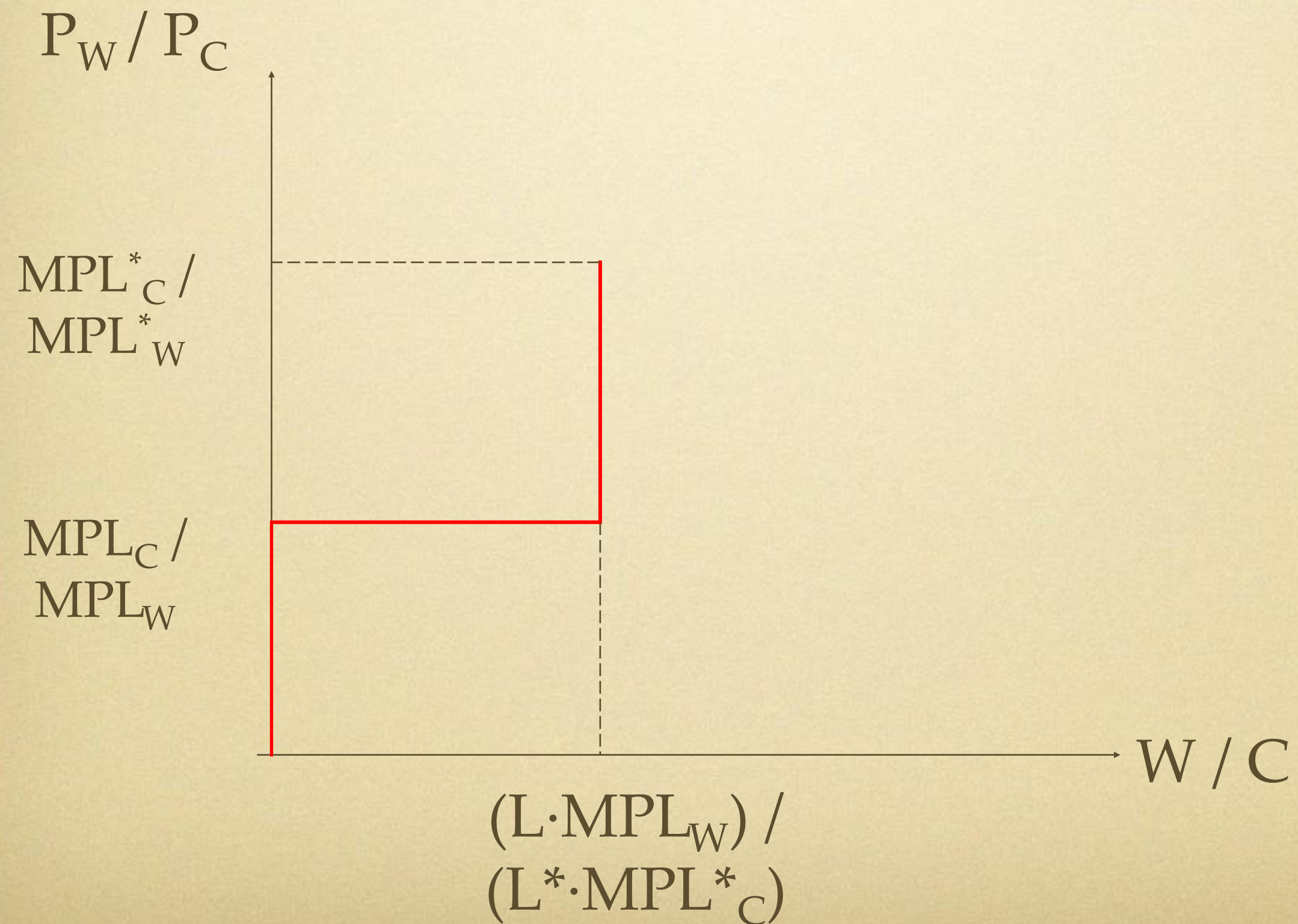
World Relative Supply



World Relative Supply of good W

- If $P_W/P_C = MPL_C / MPL_W < MPL^*_C / MPL^*_W$
 - then Foreign specializes in C: $C = L^* \cdot MPL^*_C$
 - Home can produce any combination of W and C on its PPF
 - If it produces $W=0$, then $RS=0$
 - If it produces $C=0$ and $W = L \cdot MPL_W$ then
$$RS = (L \cdot MPL_W) / (L^* \cdot MPL^*_C)$$

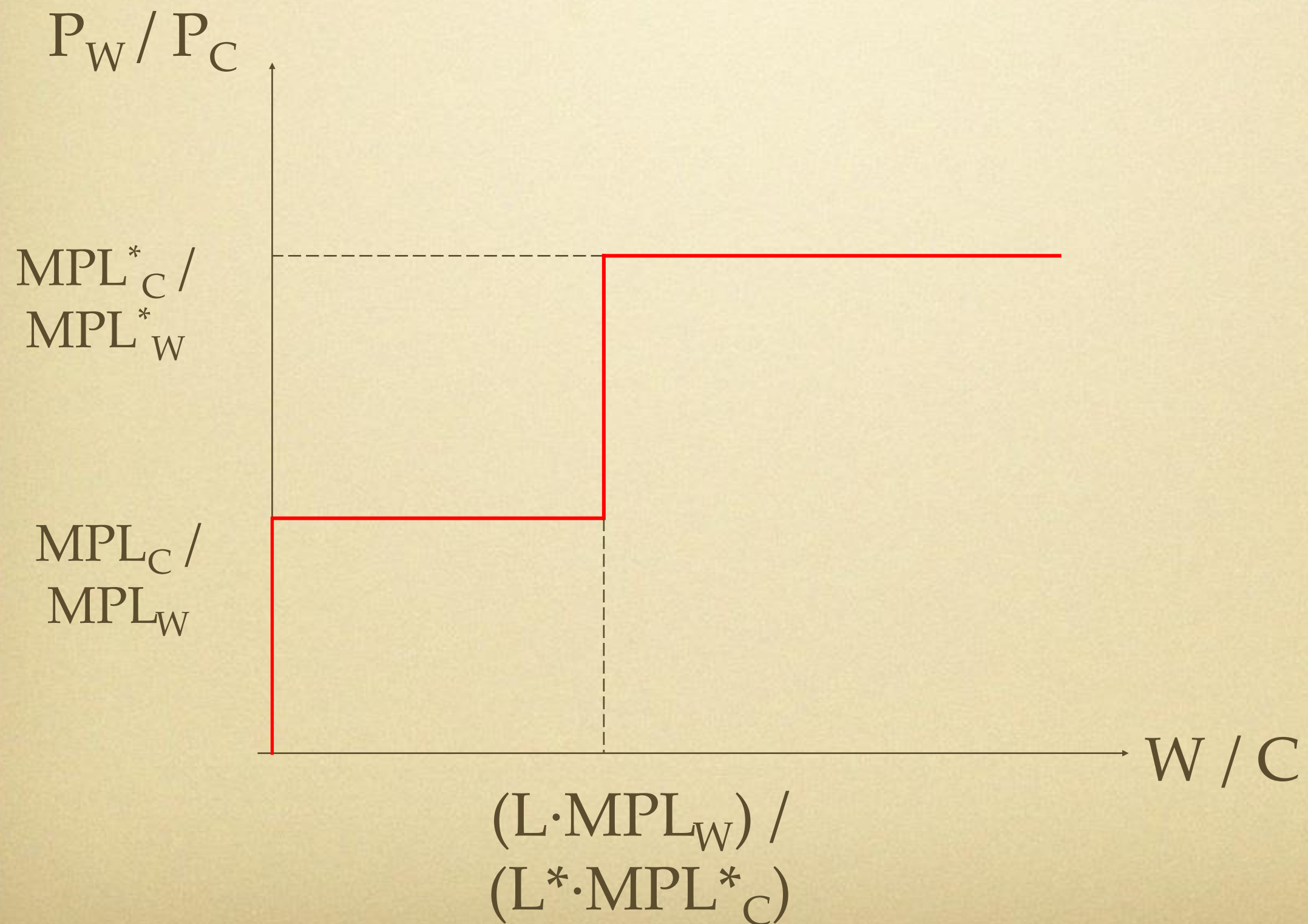
World Relative Supply



World Relative Supply of good W

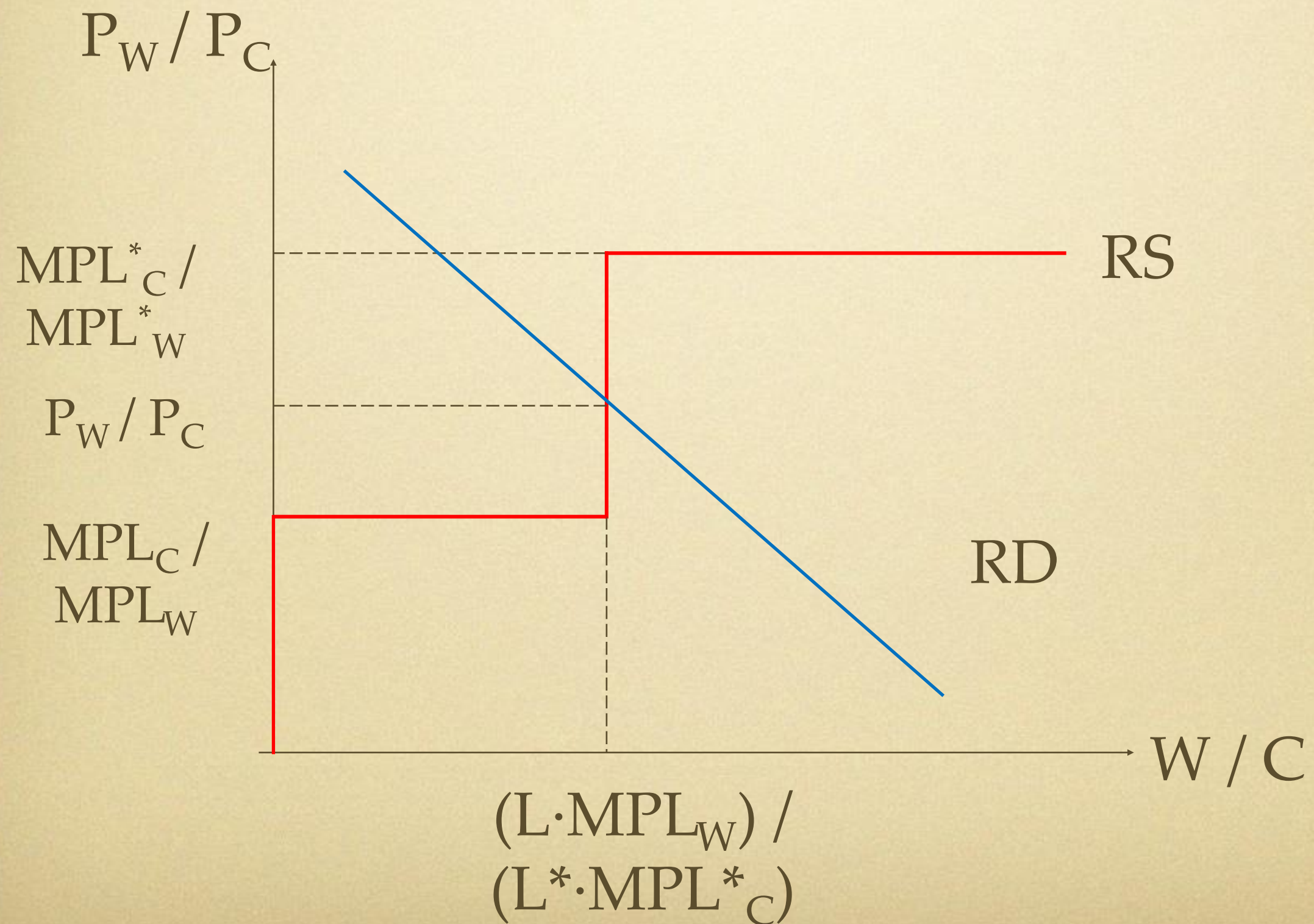
- If $P_W/P_C = MPL_C^* / MPL_W^* > MPL_C / MPL_W$
 - then Home specializes in W: $W = L \cdot MPL_W$
 - Foreign can produce any mix of W and C on its PPF
 - If Foreign produces only C: $C = L^* \cdot MPL_C^*$ then
$$RS = (L \cdot MPL_W) / (L^* \cdot MPL_C^*)$$
 - If Foreign produces only W then $RS = \infty$

World Relative Supply



- World relative demand is a combination of Home's relative demand and Foreign's relative demand

Trade Equilibrium



- Well done, now we know the price in trade equilibrium!
- And it's indeed in between of two autarkic prices
- Our economic intuition is right!

Trade Equilibrium

We observe complete specialization:

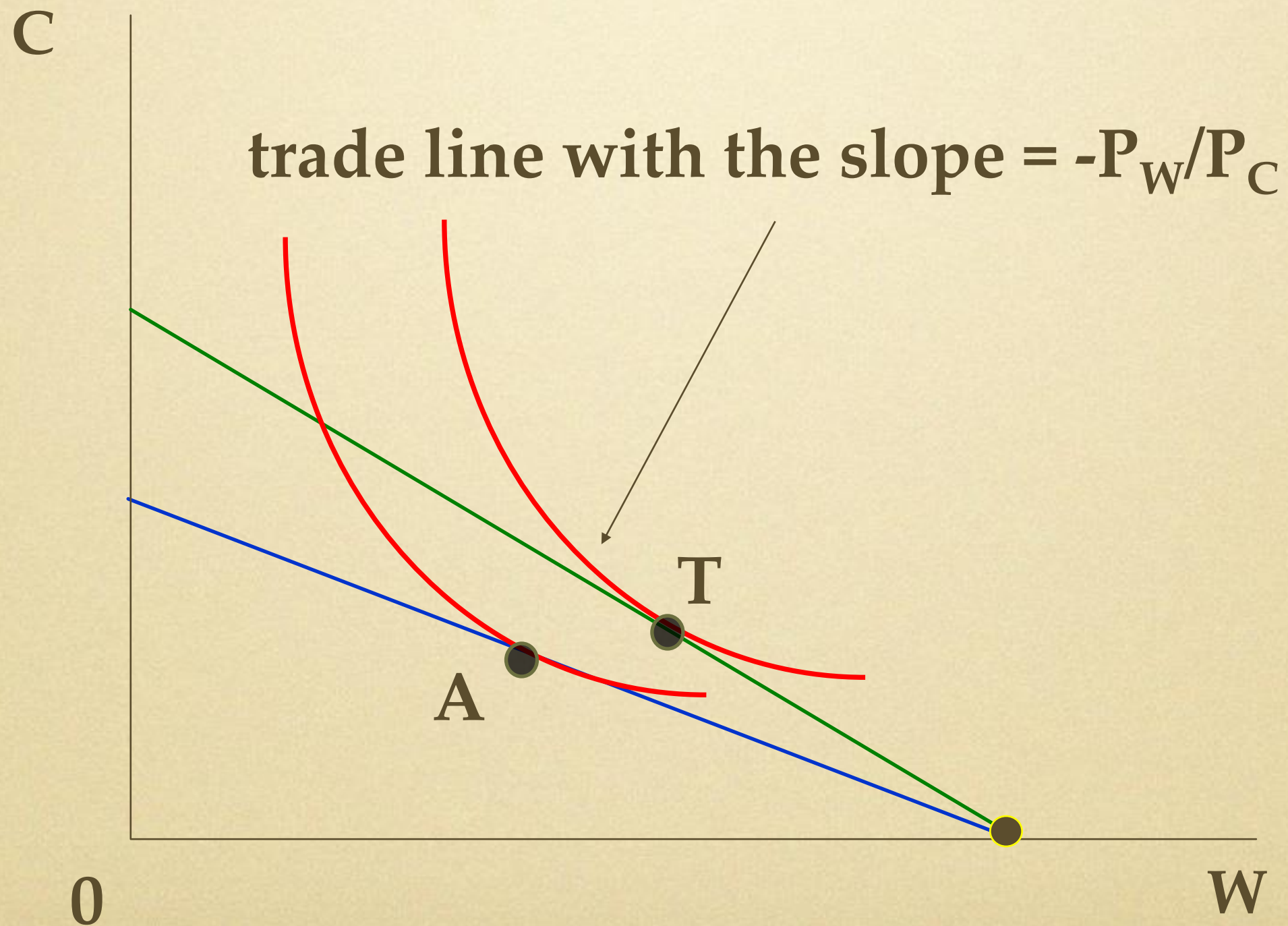
$$\text{MPL}_C / \text{MPL}_W < P_W/P_C < \text{MPL}^*_C / \text{MPL}^*_W$$

- Home produces only W
- Foreign produces only C

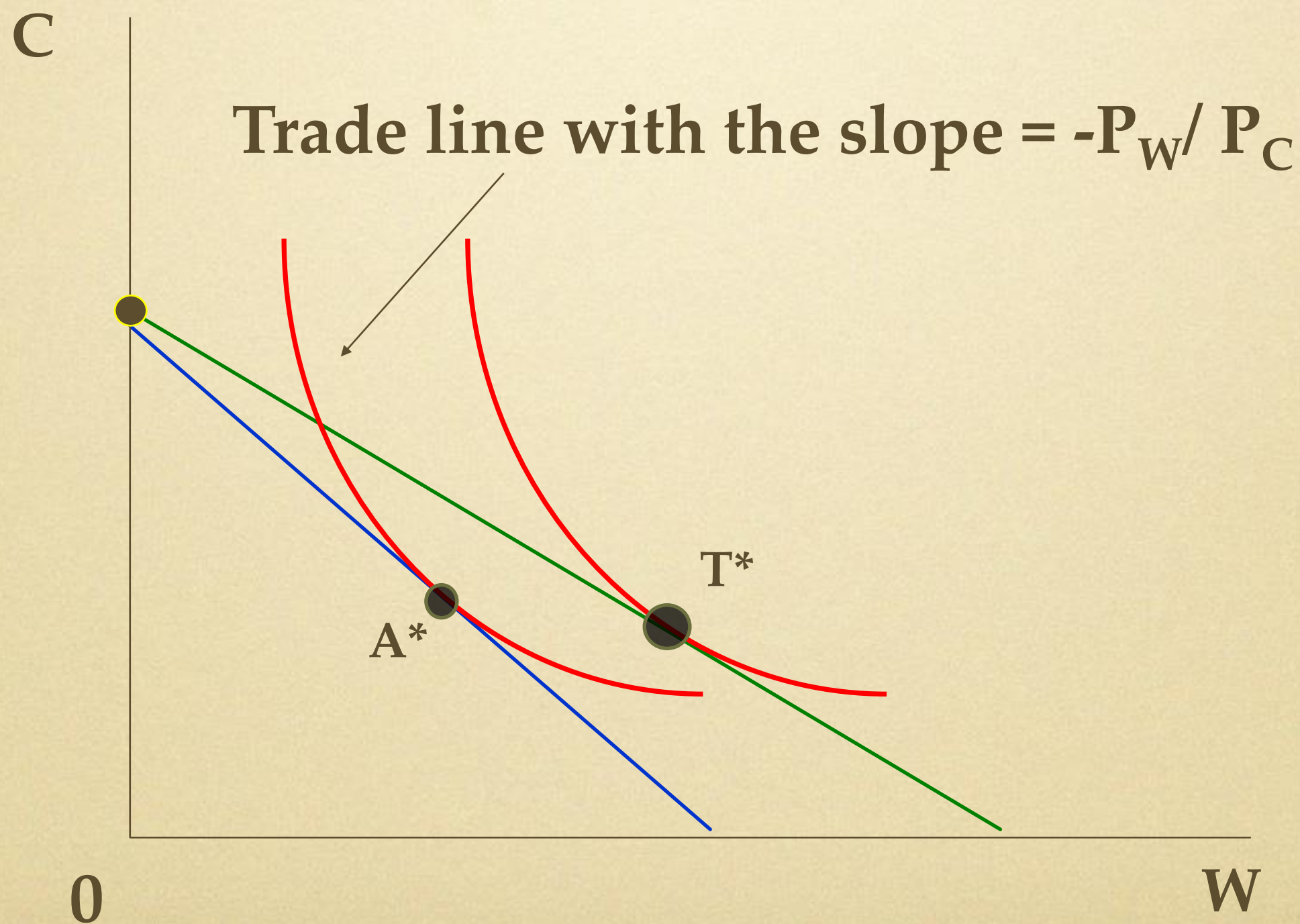
What does trade do to farmers well-being?

- Can tell by looking at consumption opportunity sets, before and after trade.
- In autarky: consumption set coincides with PPF
- With trade: consumption is along trade line

Trade equilibrium in Home



Trade equilibrium in Foreign



International Trade Equilibrium

- International trade allows each country to engage in consumption possibilities it did not have before trade
- We can see this as each country can now consume on its trade line which is outside of its PPF!
- **Gains from trade**

Going back to Nigeria's example

- 1 farmer in one season in Nigeria can produce 1 unit of rice or 3 units of cocoa.
- 1 farmer in one season in American can produce $\frac{2}{3}$ units of rice or of cocoa.
- Nigeria has AA in both goods
- Nigeria has CA in cocoa

Exercise

- Draw the PPF for each country and then draw the world Relative Supply of Cocoa
 - Suppose each country has 100 farmers
- What is the autarky relative price of cocoa in each country? What can you say about the trade relative price of cocoa?

Nigeria-America example

- You will get these answers: Autarky relative price of cocoa is $1/3$ in Nigeria and 1 in America
- With trade the price will be in between $(1/3, 1)$
- Nigeria will make only cocoa and will import rice
- Hence, food self-sufficiency is now 0%, but Nigerians *eat more rice* and are better nourished, although Nigeria loses its cereals sector!

Bottom line

- Comparative advantage provides huge argument for allowing countries to specialize in response to trade.
- Strong argument against national self-sufficiency (in food or anything else).

Additional Insight From Ricardo's Model

- Absolute advantage has no role at all in determining the pattern of trade; that is fixed by comparative advantage.
- However, absolute advantage is not irrelevant.

- Suppose that one country has an AA in both goods.
- Then its workers must receive a higher income in equilibrium than workers in the other country.
- Whatever workers in the less-productive country produce, a worker in the more-productive country will have the option of producing the same thing, in which case that worker will receive a higher income because of her higher productivity.
- If she chooses to produce the other good instead, that must be because it earns her higher income still.

Exercise

- Prove this idea more formally
- Consider Home and Foreign
- Foreign has AA in both W and C and CA in C
- Show that with trade $I < I^*$

More formally

- Foreign has AA in both W and C and CA in C
- Trade: $MPL_C / MPL_W < P_W/P_C < MPL^*_C / MPL^*_W$
- Home produces only W: income $I = P_W MPL_W$
- Foreign produces only C: income $I^* = P_C MPL^*_C$

More formally

- Then $P_W/P_C < MPL_C^* / MPL_W^*$ and $I = P_W MPL_W$

$$I < P_C (MPL_C^* / MPL_W^*) MPL_W$$

- $I^* = P_C MPL_C^*$

$$= I^* (MPL_W / MPL_W^*)$$

- $MPL_W < MPL_W^*$

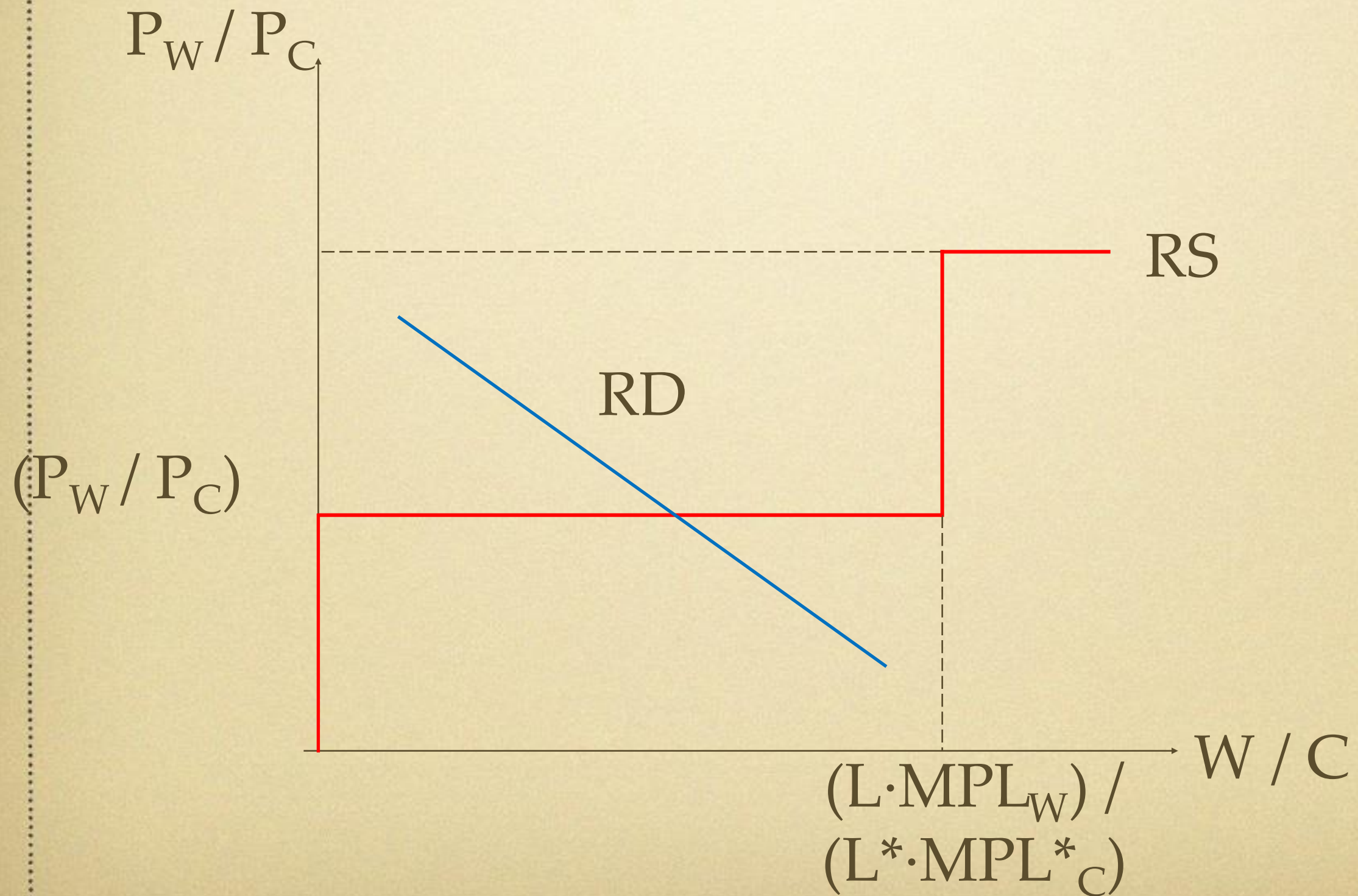
$$< I^*$$

- Thus, comparative advantage determines the pattern of trade, while absolute advantage determines the international distribution of income.
- Example: aggregate labor productivity in the US is approximately eight times aggregate labor productivity in Mexico,
 - but that does not mean that Mexican workers cannot compete with American workers.
 - It merely means that their wages are approximately one-eighth of American wages!

Another Insight From Ricardo's Model

- Suppose Home country is very large relative to Foreign country

Home is very large



- The trade price will be the same as Home's autarky price!
- Makes sense as Home dominates world market
- Incomplete specialization in Home: they make both goods
- Important conclusion for the welfare effects of trade!

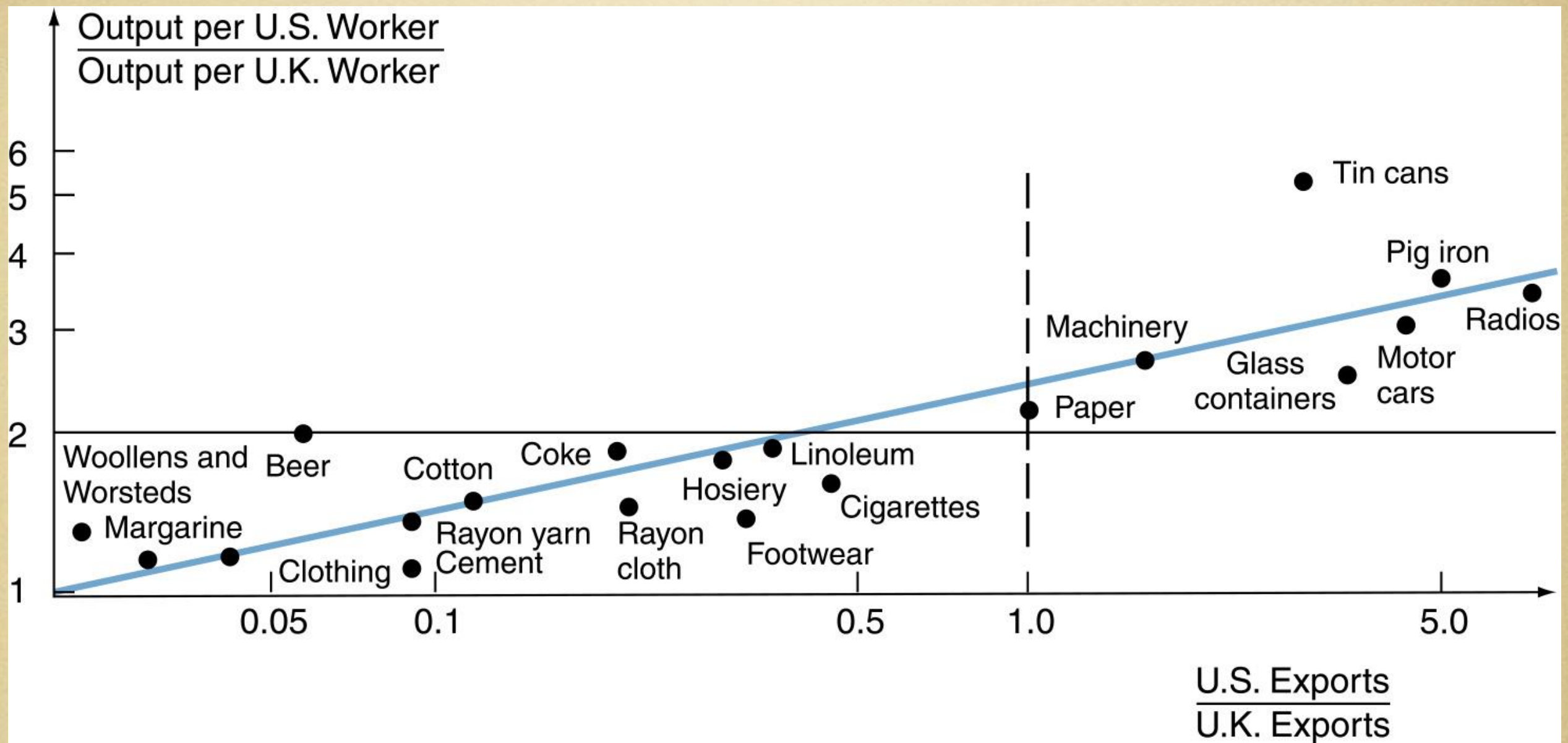
- In Home: Trade line coincides with PPF
 - Home will continue to consume the same as in autarky
 - Don't benefit from trade (don't lose either)
- In Foreign, trade line is outside PPF
 - they benefit from trade

A lesson from Ricardian model

- Smaller countries capture most of the gains from trade
- If the difference in country size is large enough, the small country will capture all of the gains from trade!

Empirical Tests of the Ricardian Model

- The first effort to test empirically the Ricardian model was made by G.D.A. MacDougall in 1951. He used 1937 data on US and UK exports.
- **Testable hypothesis:** The higher the output per worker in US relative to UK in a given industry, the higher the exports by US relative to those by UK in that industry.
 - Trade b/w the US and UK was excluded
 - Both countries faced generally equal tariffs in third markets



Relative Labor Productivities and Comparative Advantage—United States and United Kingdom.

Empirical Tests of the Ricardian Model

- Remark 1: Ricardian model does not provide theoretical basis for such test: the model says nothing about exports to a third country!
- Remark 2: Other models predict similar result as well!
- We will come back to empirical test later on.

Application: how large are the gains from trade?

- There are few historical examples of countries that moved from autarky to free trade or vice versa

The U.S., December 1807 – March 1809:

- The Congress imposed a halt to international trade at the request of President Thomas Jefferson
- Britain was at war with Napoleon and wanted to prevent ships from arriving to France
- As a result Britain patrolled the eastern coast of the U.S.

Application: how large
are the gains from trade?

- The U.S. declared trade embargo for 14 months
- Exports fell from \$49 million in 1807 to \$9 million in 1809
- It is estimated that the cost of trade embargo to the U.S. was about 5% of GDP

Application: how large
are the gains from trade?

Another case: Japan's rapid opening to world economy
in 1854 (after 200 years of autarky)

- Commodore Matthew Perry (the U.S.) forced Japan to open its borders
- Japan started to export good such as silk and tea to USA and import wool
- Estimates: Japan's gains from trade were 4-5 % of GDP.