Comparative Advantage Part 1

- Most countries are net food importers.
- Particularly true of lower-income countries.
- I.e., “dependent on world market for food”
- Many policy makers view this as a problem per se
- Leads to call for *self-sufficiency in food*.

- E.g., Nigeria
- Approximately 80% “self-sufficiency ratio” in cereals.
- Pres. Obasanjo (1999-2007) outspoken booster of the idea: his government pursued “holistic agricultural and food self-sufficiency strategy,” and had “set targets, strategies, and timeframes for the achievement of national self-sufficiency to be followed by export program and promotion.”

President Olusegun Obasanjo.
Photo: José Cruz, Agência Brasil (published under Creative Commons license).

Ways in which Nigeria has pushed toward food self-sufficiency.

- Loans to farmers.
- Subsidized inputs.
- Underwriting agricultural research -- new crop hybrids.
- Tightly restricting, even banning, cereals imports.
- E.g., rice and wheat import ban, 1986-95.

- Are such policies wise?
- Are they likely to put a dent in poverty and malnutrition?

Arguments for import ban?

- Possible national security/international bargaining power argument in some cases.
- Eg. Risk of siege, boycott, blockade, international sanctions
- Perhaps applicable to medieval city states; Cuba; 19th century Hawaii.
- Probably not relevant to Nigeria.

Arguments against.

- Biggest one: *Comparative advantage*!
- Import ban could harm Nigerian food security by depressing real income.
- Idea: Prevents benefits of specializing in what farmers can produce most efficiently.

Understanding the comparative advantage argument

- Two countries: 'Nigeria' and 'America'
- Two goods: Rice and cocoa.
- 1 farmer in one season in Nigeria can produce 1 unit of rice or 3 units of cocoa.
- 1 farmer in one season in America can produce 2/3 units of rice or of cocoa.

- Not a realistic picture of either economy.
- We're ignoring Nigeria's oil, for example.
- But the point we're making would emerge in a much more complicated, realistic model as well.

Opportunity cost.

- Nigeria: 1 farmer in one season can produce 1 unit of rice or 3 units of cocoa.
- Opportunity cost of producing rice in Nigeria is 3 units of cocoa.
- Opportunity cost of producing cocoa in Nigeria is 1/3 units of rice.

Opportunity cost.

- America: 1 farmer in one season can produce 2/3 units of rice or of cocoa.
- Opportunity cost of producing rice in America is 1 unit of cocoa.
- Opportunity cost of producing cocoa in America is 1 unit of rice.

Important (though obvious) observation:

- In each country, the opportunity cost of one good is the *reciprocal* of the opportunity cost of the other good.

Comparative advantage defined.

- The country with the lowest opportunity cost of producing a good has a comparative advantage in that good.

- Therefore, Nigeria has a comparative advantage in .....
  - ....*cocoa*.
- and a comparative disadvantage in ....
  - ....*rice*.

Crucially important (if obvious) observation:

- A country must have a comparative advantage in something.
- A country can't have a comparative advantage in both goods.
- Due to the reciprocal property of opportunity costs.

Contrast with **absolute** advantage.

- A country has an absolute advantage in a good if its workers are more productive in producing it.
- Who has an AA here, in what?

- Note: A country certainly can have an AA in both goods, or an absolute disadvantage in both goods.

To anticipate:

- We'll see that comparative advantage is what determines the pattern of trade.
- Absolute advantage has no importance at all for the pattern of trade.
- But absolute advantage is important for the international distribution of income.

Notion of **autarky.**

- In this model, banning rice imports is effectively the same as shutting down trade completely.
- This is a thought experiment called “autarky.”
- Comparing autarky with free trade allows us to analyze what trade *does*.

Adam Smith and Absolute Advantage

- Adam Smith (1776) 'The Wealth of Nations'
- *Absolute advantage*
  - By assuming that each country could produce some commodities using less labor than its trading partners, he showed that *all parties* could benefit

David Ricardo and Comparative Advantage

- David Ricardo (1817) 'Principles of Political Economy and Taxation'
  - trade's potential benefits to the world were more than even Adam Smith imagined

- Paul Samuelson: '*Comparative advantage is the best example of an economic principle that is undeniably true yet not obvious to intelligent people*'

- So, if you understand it by the end of this chapter – you have come a long way in your study of international trade!

David Ricardo

Comparative Advantage

- Now, let's try to formulate the idea of comparative advantage more rigorously

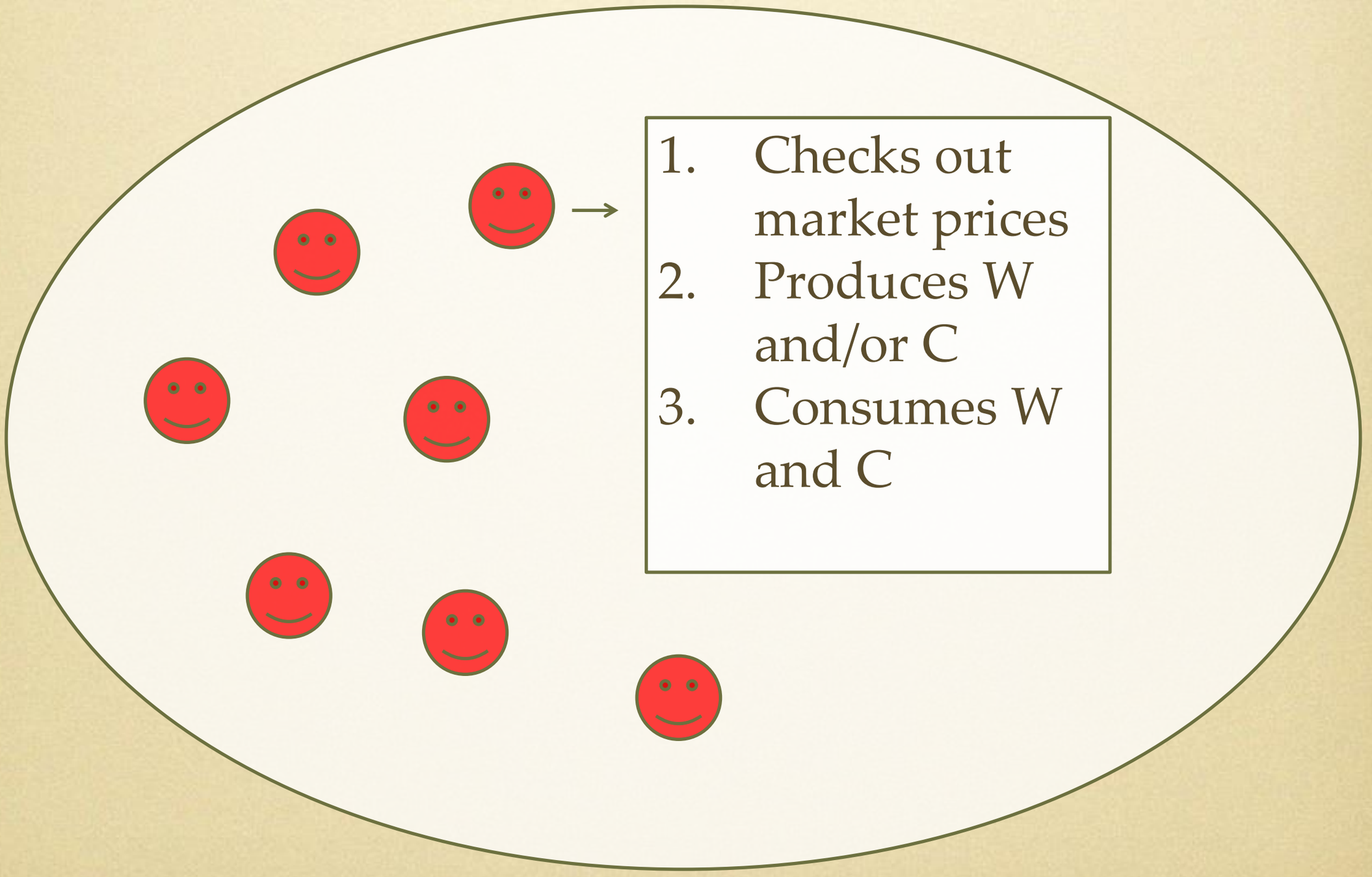
- To do this we need to describe the economy we want to study

- We will start with very simple economy, which looks like a perfect world!

Assumptions About a Perfect World

1. Prices are determined by markets
2. Each country has a fixed amount of labor available, the only factor of production - denoted by L
3. Labor is completely mobile among industries *within* each country and completely immobile *among* countries.
4. The world consists of two countries: Home and Foreign
5. Each uses labor to produce two commodities: Wine (W) and Cloth (C)

A Perfect World: Home Country

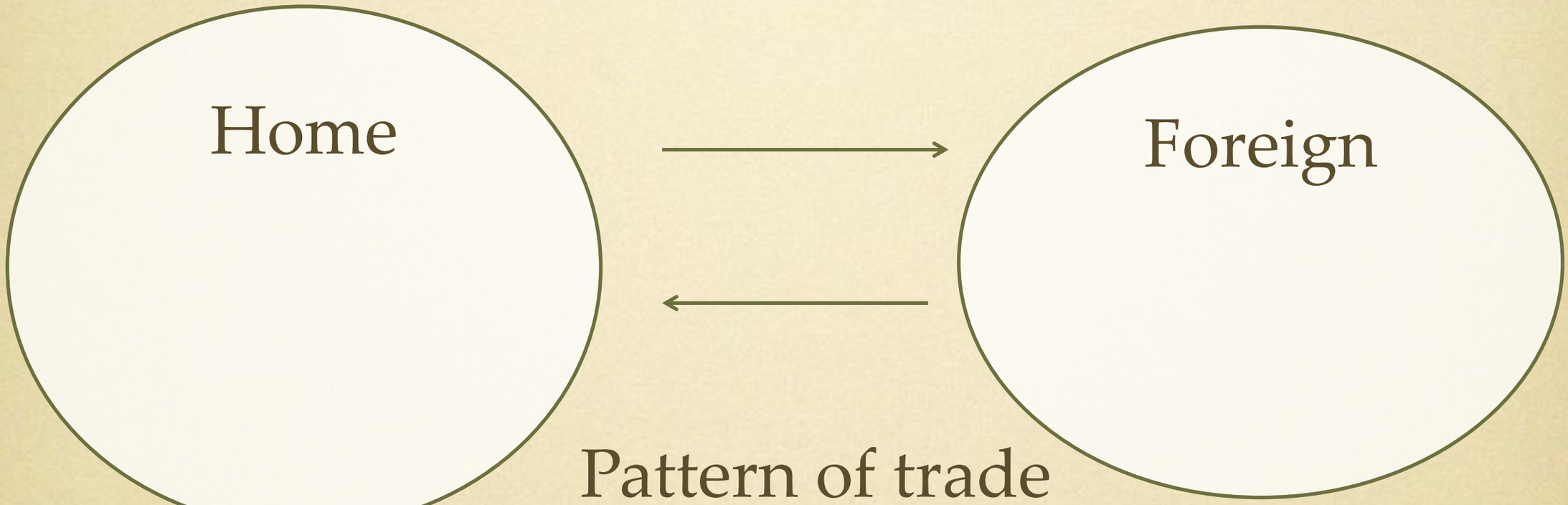


A Perfect World: Autarky in Home Country

- Production decision of each farmer: Supply Curve
- Consumption decision of each farmer: Demand Curve
- Market forces operate and equalize supply and demand
- This gives us product prices!

- Foreign country operates the same way
- Now, suppose countries start to trade

A Perfect World: Trade



Pattern of trade

Trade equilibrium:

Home Supply+ Foreign Supply=

Home Demand +Foreign Demand

- How do we know whether each country gains or loses from trade?
- If farmers are able to consume more with trade than in autarky, then trade must be beneficial.
- Note: all farmers are identical in our perfect world, hence it is sufficient to check whether the aggregate economy is able to consume more!

What do we need to know to analyze this economy

1. Country's resource endowment – the quantity of labor available in this country

L – labor endowment in Home

L^* – labor endowment in Foreign

What do we need to know to analyze this economy

2. Technology to transform labor inputs into outputs

Marginal product of labor

MPL_W – marginal product of labor in W in Home

MPL_C – marginal product of labor in C in Home

MPL^*_W – marginal product of labor in W in Foreign

MPL^*_C – marginal product of labor in C in Foreign

Numerical example

Labor endowment L = 100, MPL_W =0.2, MPL_C =0.5

1. How many workers are needed to produce one unit of W?

2. How many workers are needed to produce one unit of C?

Numerical example

Labor endowment L = 100, MPL_W =0.2, MPL_C =0.5

3. Suppose Home country uses its labor to produce only W. How many units of W it can produce?

4. Suppose Home uses its labor to produce only good C. How many units of C it can produce?

Absolute Advantage

Definition: Home Country has *absolute advantage* in production of good W if $MPL_W > MPL^*_W$

- Labor productivity in W is higher in Home than in Foreign
- Or, it takes fewer workers to produce a unit of W in Home than in Foreign:

$1/MPL_W < 1/MPL^*_W$

Comparative Advantage

Definition: Home has ***comparative advantage*** in production of W if

the opportunity cost of producing W is lower in Home than in Foreign.

Comparative Advantage

- What is the opportunity cost of producing W?

- **Definition:** Opportunity cost of W is the amount of C that must be given up to obtain one more unit of W

Comparative Advantage

- Home: opportunity cost of W equals MPL_C / MPL_W

- Foreign: opportunity cost of W equals MPL^*_C / MPL^*_W

- Home has ***comparative advantage*** in production of W if

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

The Law of Comparative Advantage

It will be beneficial for a country to specialize in the production of the good in which it has a comparative advantage and to trade for the good in which it has a comparative disadvantage

NOTE:

One country cannot have a comparative advantage in production of both goods!

Hence, trade is always beneficial!

The production possibilities frontier (PPF)

Definition: PPF is a curve that shows all efficient combinations of goods W and C a country could produce

To draw a country's PPF we must know:

1. Country's resource endowment – the quantity of labor available in this country

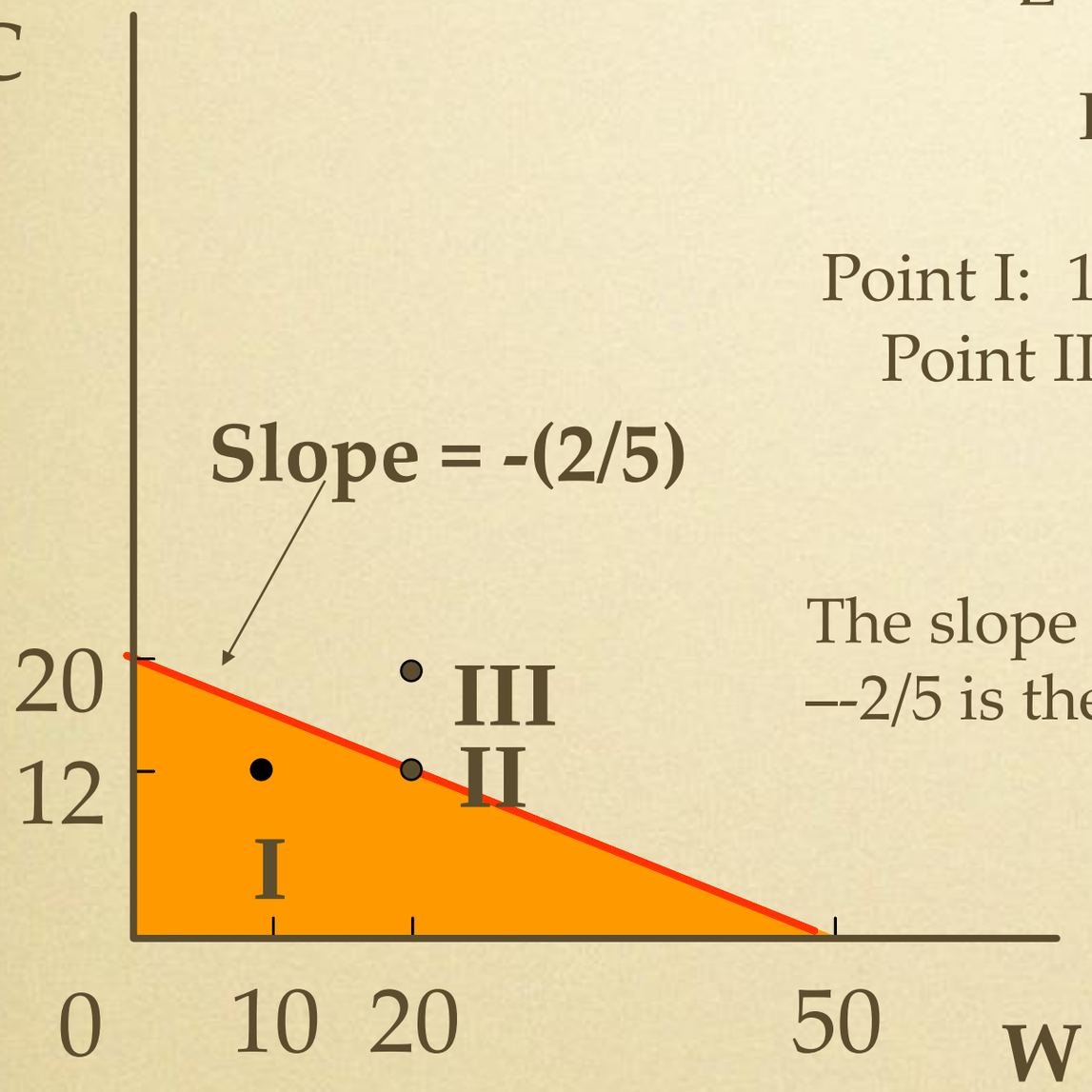
2. Technology to transform labor inputs into outputs

Numerical example

$L = 100$, $MPL_W = 0.5$, $MPL_C = 0.2$

Draw the PPF

Numerical Example



$L = 100$, $MPL_W = 0.5$, $MPL_C = 0.2$

PPF – red line $2W+5C=100$

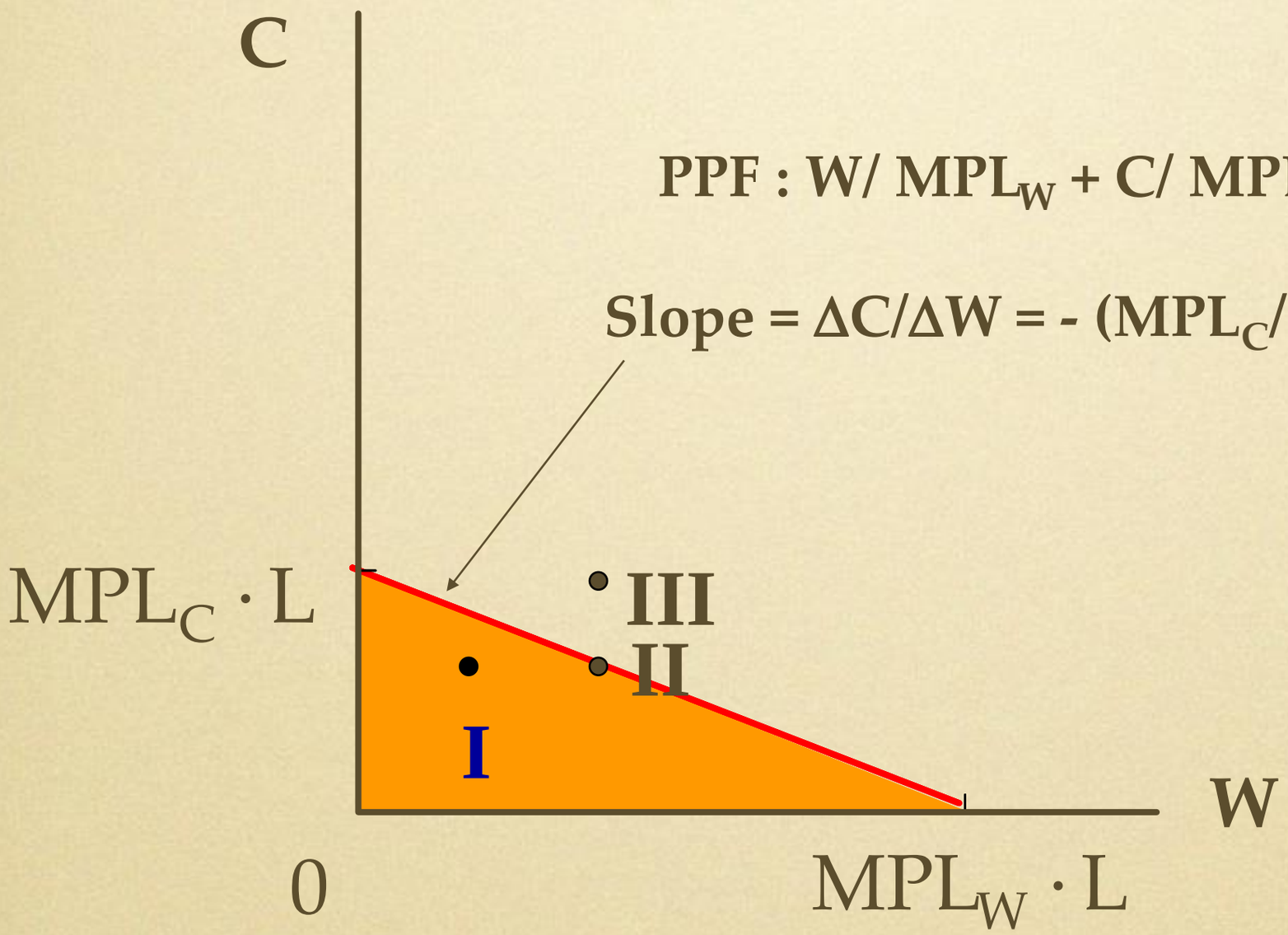
Point I: $10 \cdot 2+12 \cdot 5=80$ units of labor are used
Point II: $20 \cdot 2+12 \cdot 5=100$ units of labor are used
Point III is unattainable

The slope of the frontier -[MPLC/ MPLW] = –-2/5 is the opportunity cost of W

Production opportunity set

- All possible combinations of W and C a country could produce
- The area formed by the two axes and the PPF

PPF: General Case



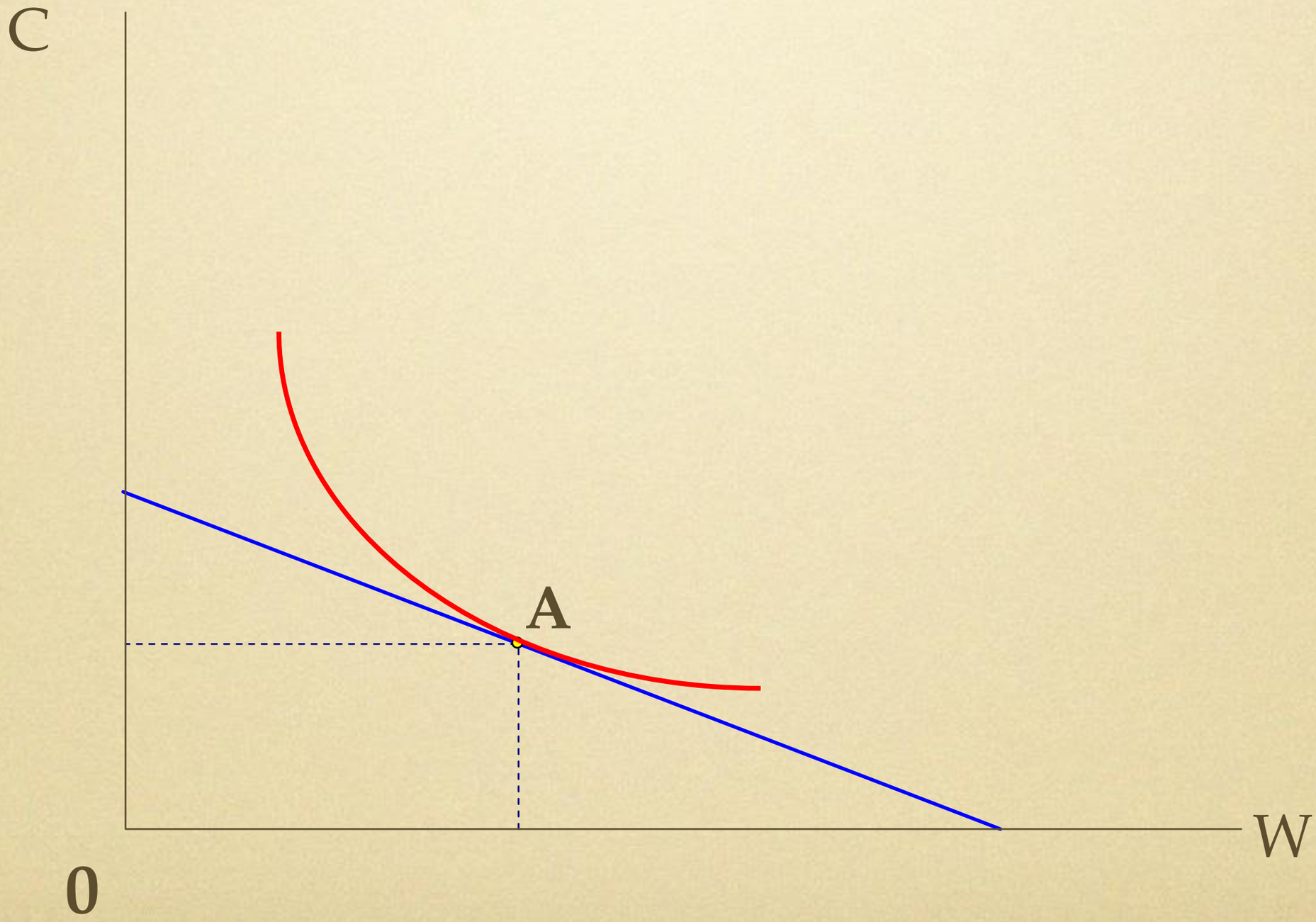
Consumption opportunity set

- All possible combinations of W and C country's residents could consume

Autarky

- Production and consumption opportunity sets coincide in autarky!

Autarky Equilibrium in Home

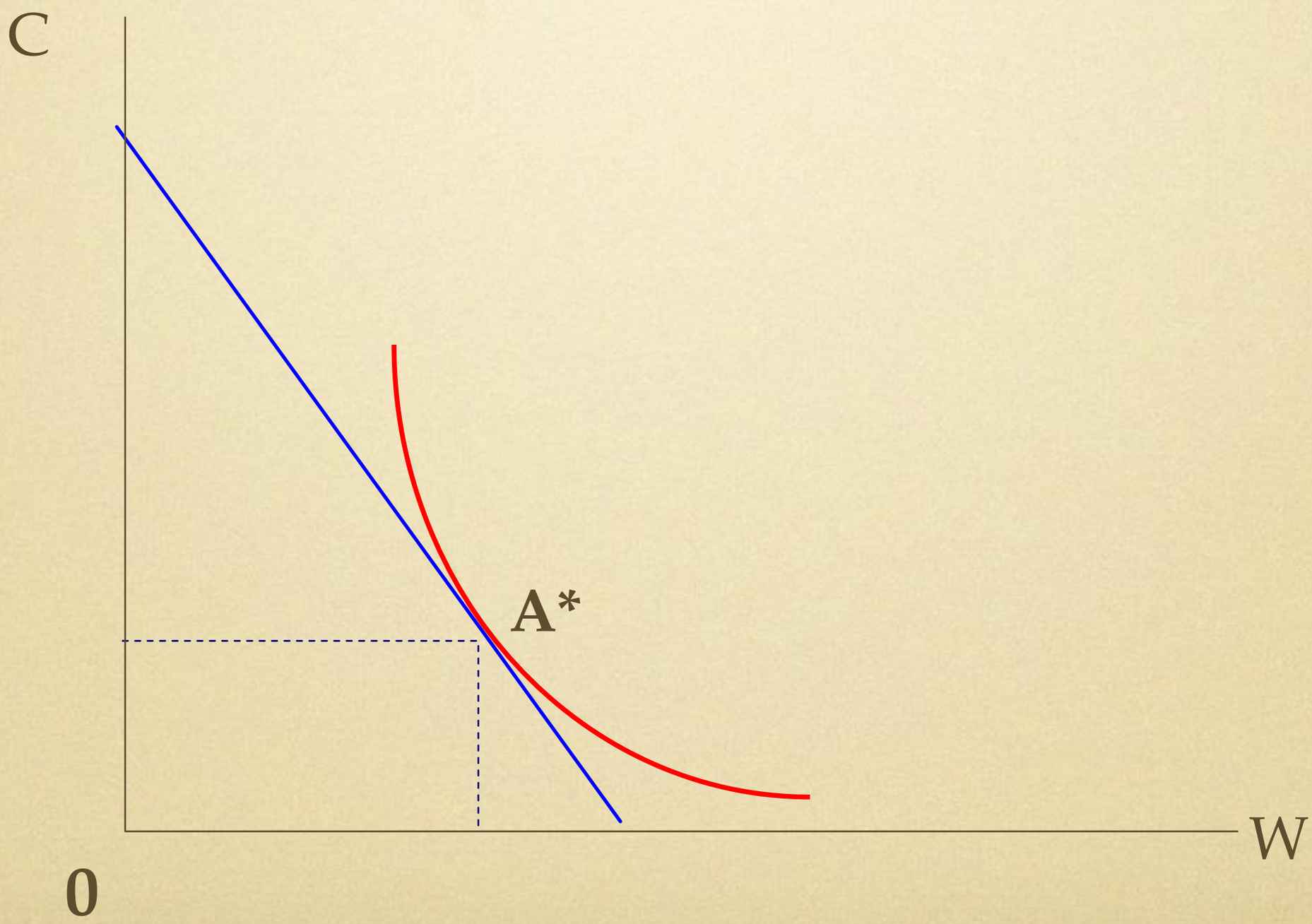


- Suppose that Home has a comparative advantage in W:

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

- Then Home's PPF is flatter

Autarky Equilibrium in Foreign



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!