14.54 International Trade
—Lecture 4: Exchange Economies—

Today's Plan

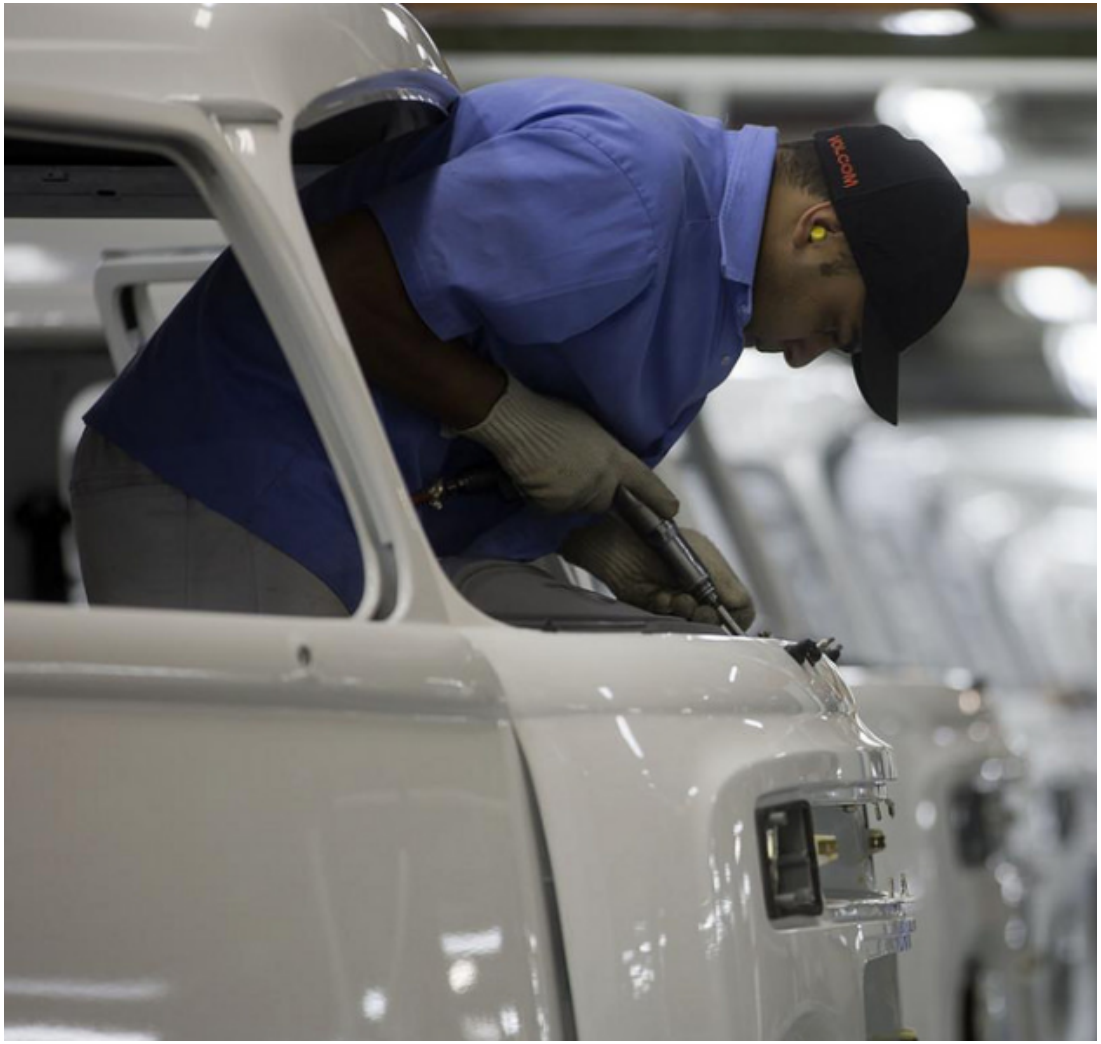
1. Basic Setup of Endowment Economy
2. Autarky Equilibrium
3. Small Open Economy
4. Two Country Equilibrium

The small graphs on slides 10-17, 22, 23, 26-30, and 32 -34 are courtesy of Marc Melitz. Used with permission.

Motivation

- We initially study an exchange economy where the production levels are fixed
  - Goods can be traded, but production levels can not adjust
- How unreasonable an assumption is this?
  - Not too unreasonable for an analysis of trade in the very short run (less than a few years)
  - Within this time frame, all factors of production are fixed (allocated to the production of a particular good)
  - Moving these factors of production across sectors to produce different goods take time
  - Consumer demand, however, can react much more quickly to a change in prices
- Of course, an assumption of fixed production would not be valid for an analysis over a longer time frame
  - Then, production levels would respond to changes in prices
  - We will study this in the next section of the course

For now GM workers cannot start looking for another job...



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... but U.S. consumers can buy Japanese cars

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Basic Setup of Endowment Economy

- Back to two goods: C and F
- A country can produce a fixed amount of C and F, which can be considered an endowment $\mathbf{E} = (E_C, E_F)$
- Assume that all consumers share the same homothetic preferences
  - ... So aggregate demand is generated by a consumer with those same preferences who owns the aggregate endowment $\mathbf{E}$
- If the country is open to trade, then consumers can trade C and F on world market at an international relative price $p^T = p_C^T / p_F^T$

Terms of Trade

- $p^T = p_C^T / p_F^T$ is often referred to as the country's terms of trade
  - However, the accepted convention for a country's terms of trade is that the price of the exported good (or average price of exported goods) is expressed in the numerator
  - ... and the price of the imported good in the denominator
- So if a country exports F then its terms of trade would be $1/p^T = p_F^T / p_C^T$
- To avoid confusion, will always write relative prices with C in the numerator

Terms of Trade and Exchange Rates

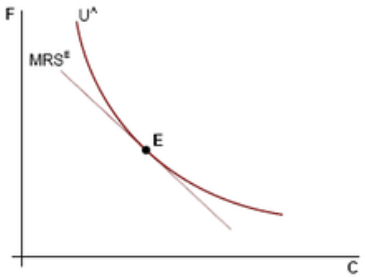
- Important note: a country's terms of trade is a very different concept from a country's exchange rate
- An exchange rate is the price of one country's currency in terms of another country currency
- All else equal, a depreciation of the U.S. dollar (a rise in the U.S. dollar prices of foreign currencies)
  - Raises the relative price of foreign goods in the United States$\Rightarrow$ Lower volume of U.S. imports
  - Lowers the relative price of U.S. exports prices abroad$\Rightarrow$ Higher volume of U.S. exports

Terms of Trade and Exchange Rates: Summary

- A country's exchange rate affects the balance of trade or net flows: exports and imports move in opposite directions
- A country's terms of trade affects the volume of trade or gross flows: exports and imports move in the same direction
- In this course, we will abstract from exchange rate movements and assume that trade is balanced: net flows are equal to zero

Autarky Equilibrium

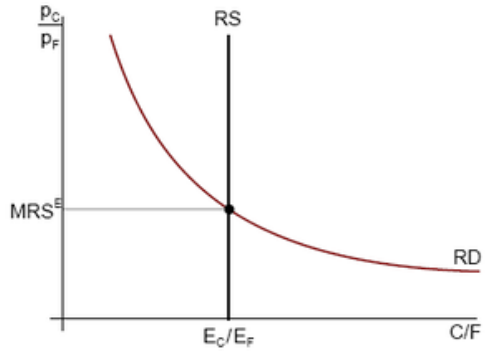
- **Definition:** A country is in autarky when it is completely closed to international trade
- In this equilibrium, a country must consume (in the aggregate) its endowment and achieves utility level U^A



- The MRS at **E** represents the equilibrium relative price of C and F in autarky

Autarky Equilibrium: Relative Supply and Demand

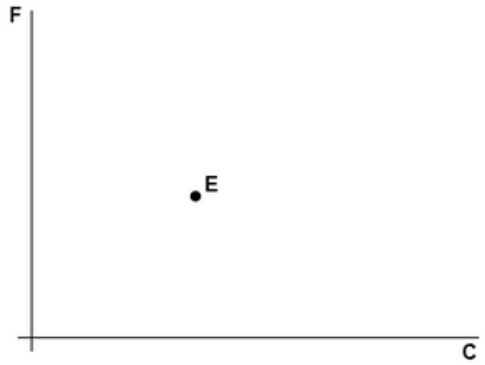
- One can also think of the equilibrium relative price as determined by relative supply and demand



- We will also show that, in a closed economy with many consumers (with the same homothetic preferences but different endowments), MRS^E is the equilibrium trade price between these consumers

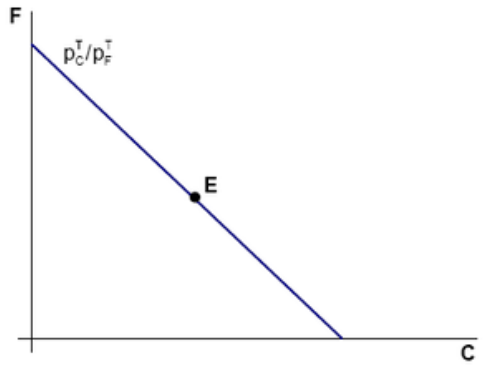
Small Open Economy

- Now assume that this economy opens up to international trade at a given world relative price $p^T = p_C^T / p_F^T$



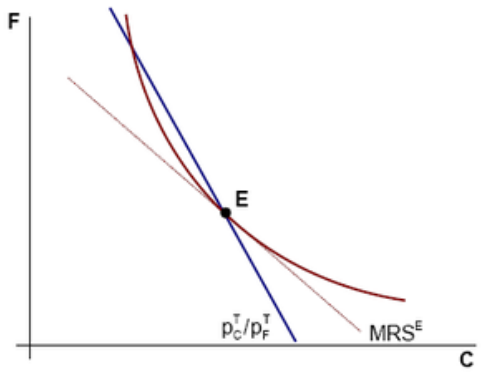
Small Open Economy (Cont.)

- Now assume that this economy opens up to international trade at a given world relative price $p^T = p_C^T / p_F^T$



Small Open Economy (Cont.)

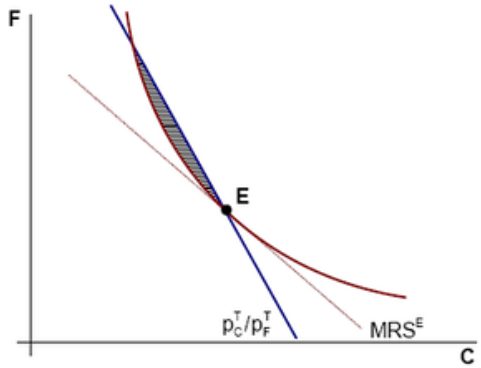
- **Case 1:** $p^T > MRS^E$



- Will these trade opportunities make the country better off?

Small Open Economy (Cont.)

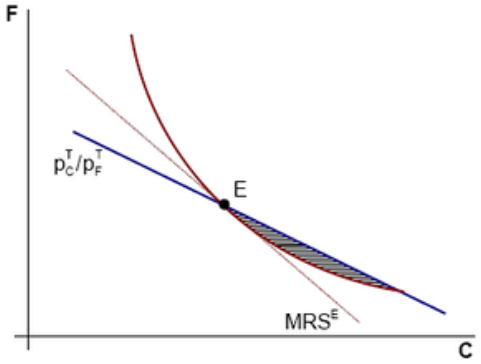
- **Case 1:** $p^T > MRS^E$



- Will these trade opportunities make the country better off?

Small Open Economy (Cont.)

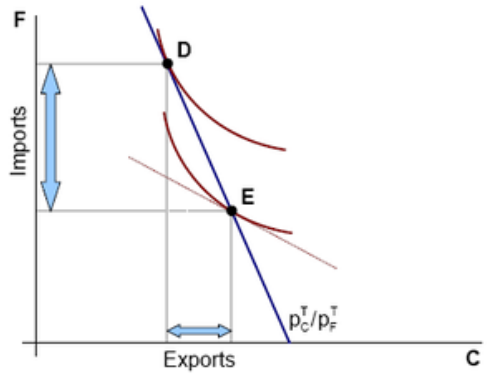
- **Case 2:** $p^T < MRS^E$
  - Do gains from trade depend on ranking of p^T and MRS^E?



- No! All the points in the new shaded area also represent higher welfare than in autarky
  - All those points represent selling (exporting) F and buying (importing) C

Determination of Imports and Exports

- Given a world trade price p^T, how are trade volumes determined?



- Hwk: redraw graph for case where $p^T < MRS^E$

Two Country Equilibrium

- Now introduce another country (home and foreign)
- Can we find a trade price such that both countries agree to trade with one-another?
  - ... and gain from such trade?
- Assume that there are no trade restrictions so that consumers in both countries face the same trade price p^T

Two Country Equilibrium (Cont.)

- For this example, assume that $MRS^E < MRS^{E^*}$
- Is $p^T > MRS^{E^*}$ a possible equilibrium trade price?
  - No! Both countries would want to export C
- Is $p^T < MRS^E$ a possible equilibrium trade price?
  - No! Both countries would want to export F
- Is $MRS^E < p^T < MRS^{E^*}$ a possible equilibrium price?
  - Yes! Home exports C and Foreign exports F
  - Both countries must gain from trade at any price in that range

Motives for Trade

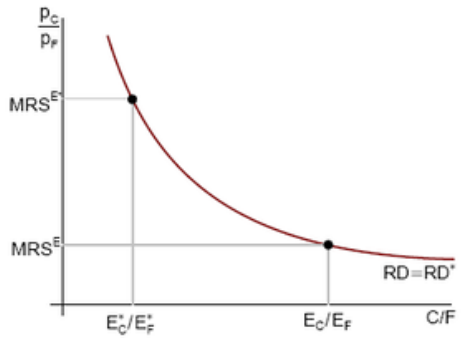
- What happens if $MRS^E = MRS^{E^*}$?
  - There is no reason to trade
- Why will $MRS^E \neq MRS^{E^*}$?
- Countries have similar preferences but different endowments
  - Endowments must be different in the sense that $E_C / E_F \neq E_C^* / E_F^*$ (Why?)
- Countries have similar endowments but different preferences
  - Less likely to occur in the context of country trade
  - Example: POW camps and Red Cross packages

Comparative Advantage

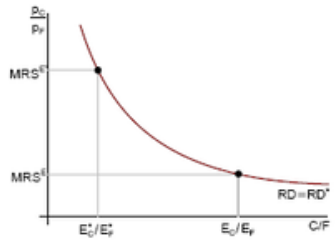
- **Definition:** A country has a comparative advantage in a good if its relative price (before trade) is lower than the world relative price
- **Law of comparative advantage:** A country will export goods in which it has a comparative advantage

Differences in Country Endowments as a Source of Comparative Advantage

- Assume same (homothetic) preferences in both countries so that only endowments differ across countries
- Endowments then determine *MRS* in autarky and hence also determined the pattern of comparative advantage



Country Endowments and Comparative Advantage



- If $E_C/E_F > E_C^*/E_F^*$ then Home has a comparative advantage in C
  - ... and Foreign has a comparative advantage in F
  - Thus, Home will export C and import F
- Note that comparative advantage is not determined by the absolute size of countries (endowments) but by the relative endowments
- $E_C/E_F > E_C^*/E_F^*$ implies that C is relatively abundant in Home (relative to foreign) and that F is relatively scarce
- If $E_C/E_F = E_C^*/E_F^*$ then there is no motive for trade

Country Endowments and Comparative Advantage (Cont.)

- When consumers all share the same homothetic preferences (no difference in tastes across countries) then a country will have a comparative advantage in its relatively abundant good
- It will export this good

Determination of the Equilibrium Trade Price

- Consider first the case where consumers share the same homothetic preferences
- Since countries face the same world trade price $p^T = p_C^T / p_F^T$, consumers everywhere will consume D_C and D_F in the same proportions: $D_C / D_F = RD(p^T)$
- So world relative demand is also given by $RD(p^T)$:

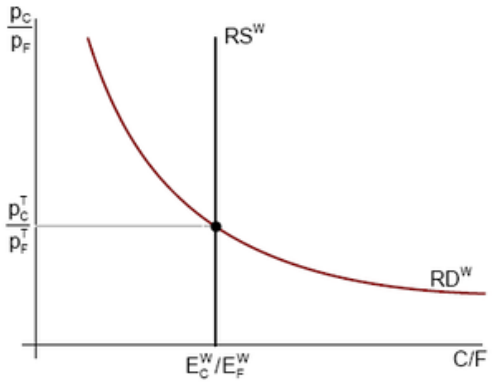
$$\frac{D_C^W}{D_F^W} = \frac{D_C + D_C^*}{D_F + D_F^*} = RD(p^T)$$

- On the supply side, the world relative supply is fixed (just like the relative supplies in each country)

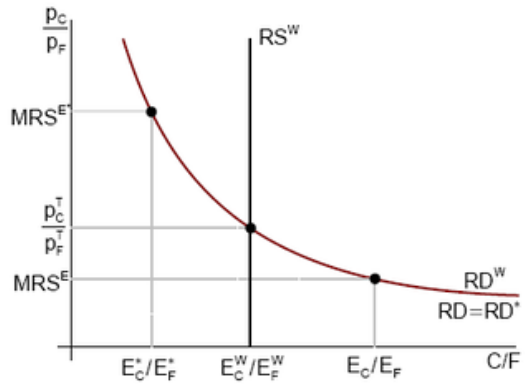
$$\frac{E_C^W}{E_F^W} = \frac{E_C + E_C^*}{E_F + E_F^*}$$

- The world equilibrium trade price p^T must solve $RD(p^T) = \frac{E_C^W}{E_F^W}$

Determination of the Equilibrium Trade Price (Cont.)



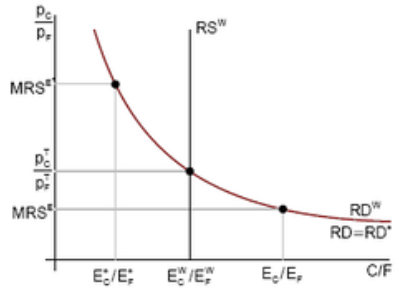
Determination of the Equilibrium Trade Price (Cont.)



- Can also verify that $MRS^E < p^T < MRS^{E^*}$:

$$\frac{E_C}{E_F} > \frac{E_C^*}{E_F^*} \Rightarrow \frac{E_C}{E_F} > \frac{E_C^W}{E_F^W} = \frac{E_C + E_C^*}{E_F + E_F^*} > \frac{E_C^*}{E_F^*}$$

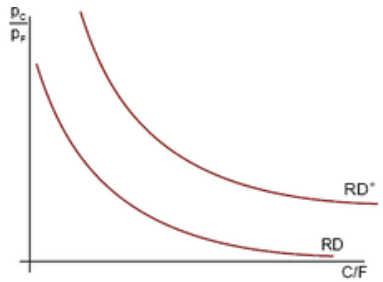
Aside: The Equilibrium Trade Price in a Closed Economy



- Note that the equilibrium trade price p_C^T / p_F^T is also the *MRS* of a consumer who consumes the world aggregate endowment E_C^W / E_F^W
- Can also apply this to the equilibrium with trade in a closed economy where consumers own different endowments
- This shows that the autarky equilibrium trade price p^A will be the *MRS* of a consumer who consumes the country aggregate endowment E_C / E_F

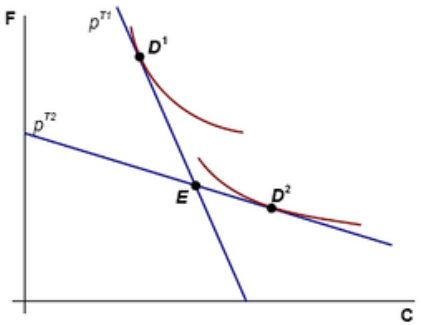
Determination of the Equilibrium Trade Price: Different Preferences Across Countries

- Now consider the case where consumers in each country have different preferences
- For aggregation purposes, assume that all consumers in each country have the same homothetic preferences
- So aggregate demand in each country can still be represented by a single relative demand curve (independent of endowments):



Different Preferences Across Countries: World Relative Demand

- One can still calculate a world relative demand curve: $(D_C + D_C^*)/(D_F + D_F^*)$ as a function of the world trade price p^T
- Given the endowments $\mathbf{E}$ and $\mathbf{E}^*$ and country preferences, one can calculate $\mathbf{D} = (D_C, D_F)$ and $\mathbf{D}^* = (D_C^*, D_F^*)$ as function of any trade price p^T



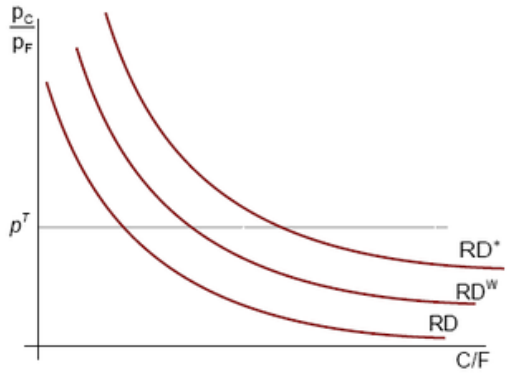
Different Preferences Across Countries: World Relative Demand (Cont.)

- From $\mathbf{D} = (D_C, D_F)$ and $\mathbf{D}^* = (D_C^*, D_F^*)$ as function of p^T, one obtains

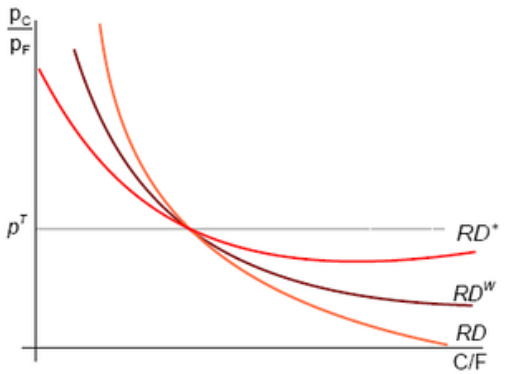
$$\frac{D_C^W}{D_F^W} = \frac{D_C + D_C^*}{D_F + D_F^*} = RD(p^T)$$

- Note that, unlike the case of common homothetic preferences across countries, this world relative demand curve will now depend on the endowments $\mathbf{E}$ and $\mathbf{E}^*$
- Also, $(D_C + D_C^*)/(D_F + D_F^*)$ must always be between D_C/D_F and D_C^*/D_F^*

Different Preferences Across Countries: World Relative Demand (Cont.)

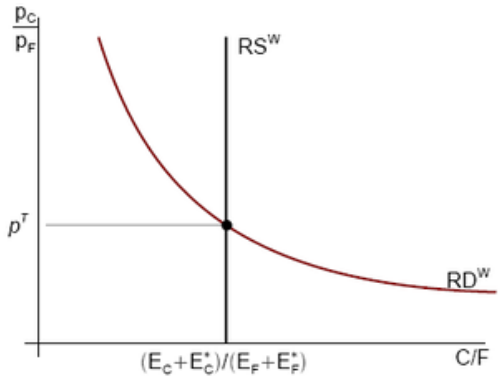


Different Preferences Across Countries: World Relative Demand (Cont.)



Different Preferences Across Countries: Equilibrium

- Once RD^W is constructed, equilibrium trade price is given once again by intersection of RS^W and RD^W



- Technical note: RD^W is not necessarily downward sloping everywhere (very unlikely, and will ignore this special case)

14.54 International Trade

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