Putting theory to work: The standard model

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- Last time: The Heckscher-Ohlin Model
    - Introduction
    - The point
    - The model
        - Setup and assumptions
        - Production possibilities
        - Production and prices
        - Autarchy equilibrium
        - Trade equilibrium
    - The big four theorems
    - The problems
        - Assumptions
        - Evidence
    - Moving forward

- Today: The Standard Model
    - Introduction
    - Model
        - Setup and assumptions
        - Production possiblities
        - Supply and Prices
        - Demand and Prices
        - Trade and Prices
    - Growth
        - Production
        - Terms of Trade
        - International effects
    - Tariffs and subsidies
    - International lending
- The location of production

- But first a review!

- Insert review here

Chapter 6: The standard model

- Best chapter yet
  - Probably a Krugman chapter
  - Lots of intuition, simple model, important questions
- Why do countries trade?
  - Differences in technology?
  - Differences in factor endowments?
- We just need different production possibilities
- For much analysis *it doesn't matter!*

Laying out the model

- ► Environment
- ► Supply and Prices
- ► Demand, Welfare, and Prices
- ► Equilibrium

Environment

- Two countries: Home (H), Foreign (G)
- Two goods: Food (F), Clothes (C)
- We aren't going to specify the factors
  - Ricardo: Labor
  - Specific Factors: Land, Capital, Labor
  - Heckscher Ohlin: Capital, Labor
- We aren't going to specify exact technology for converting factors into goods
  - Ricardo: Unit Labor requirement
  - Specific Factors: $Q_C(K, L), Q_F(T, L)$
  - Heckscher Ohlin: $Q_C(K, L), Q_F(K, L)$

Supply

- Each country is going to be given a production possibilities frontier
- We don't ask where it came from
- Book: Economy will produce at point on PPF which maximizes value
- This result makes sense for a dictator (or social planner)
- Will the market deliver that result?

Supply

- We know:
  1. Full employment of factors (and positive marginal product) means production on the PPF
  2. We have argued that slope of PPF is the negative ratio of marginal products
  3. From wages/rental, in equlibrium: $\frac{P_F}{P_C} = \frac{MPL_C}{MPL_F}$
- Therefore: a line with negative slope of prices will be tangent to the PPF at the point of production
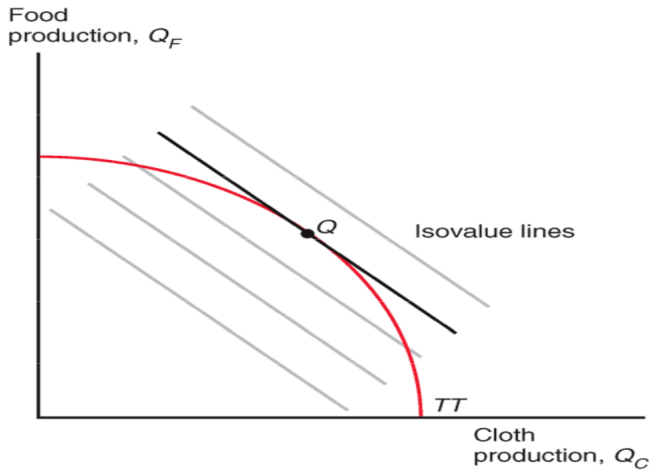- But what about the value of production?

The isovalue lines

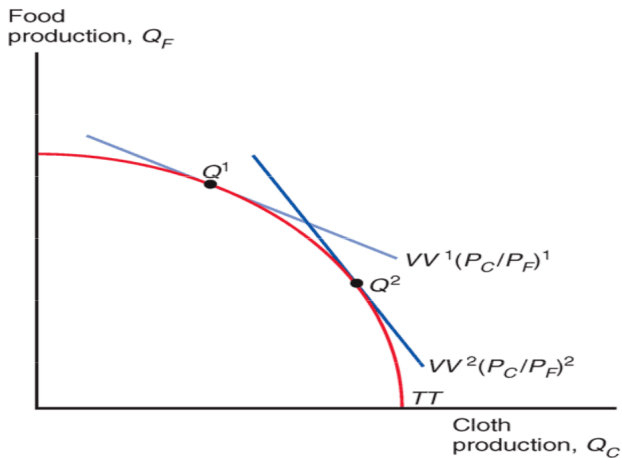- What is the equation for the price line tangent to the PPF?

Supply

- We have shown that equilibrium production is at a point where production value is maximized
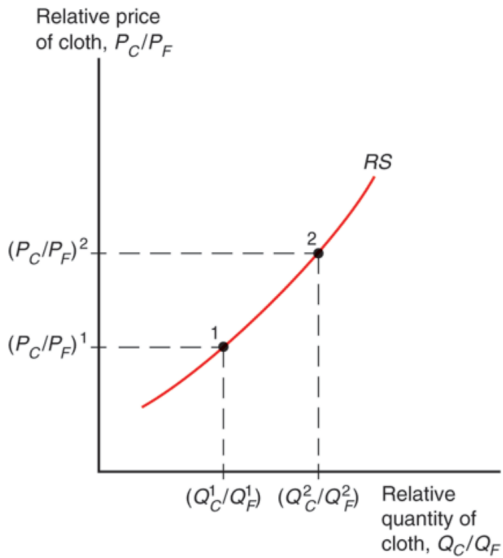- Follows from the equilibrium wage and rental equations, and therefore the no-profit condition

Supply

Food production, Q_F

Q

Isovalue lines

TT

Cloth production, Q_C

Supply

Food production, Q_F

Q^1

$VV^1(P_C/P_F)^1$

Q^2

$VV^2(P_C/P_F)^2$

TT

Cloth production, Q_C

Supply

Relative price of cloth, P_C/P_F

$(P_C/P_F)^2$

$(P_C/P_F)^1$

RS

1

2

(Q_C^1/Q_F^1) (Q_C^2/Q_F^2) Relative quantity of cloth, Q_C/Q_F

Demand

- Until this class, demand has just been a curve
- (ok, in a homework I made you plot a couple of them)
- Today we want to analyze welfare
- We need to go a bit farther
- In short – today we skimp on the supply, but say more about demand

Demand

- We have just seen that the value produced is $P_C Q_C + P_F Q_F$.
- Trade balance says that the value of consumption must equal value of production:

$$P_C Q_C + P_F Q_F = P_C D_C + P_F D_F$$

- What does this imply about the location of consumption on our PPF when trading?
- What additional condition do we have in autarchy?

The indifference curve

- The set of bundles of goods over which the consumer is indifferent
  - More of either good is better
  - Slope at any point in $(-\infty, 0]$, that is, must compensate
  - If I have little of one good, you have to give me a lot of the other to compensate for further reduction. (decreasing marginal utility)
- Results in convex curves emanating from the origin
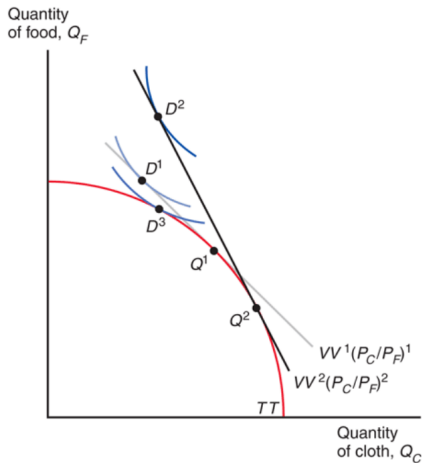
Demand

- Where would autarchy consumption be?
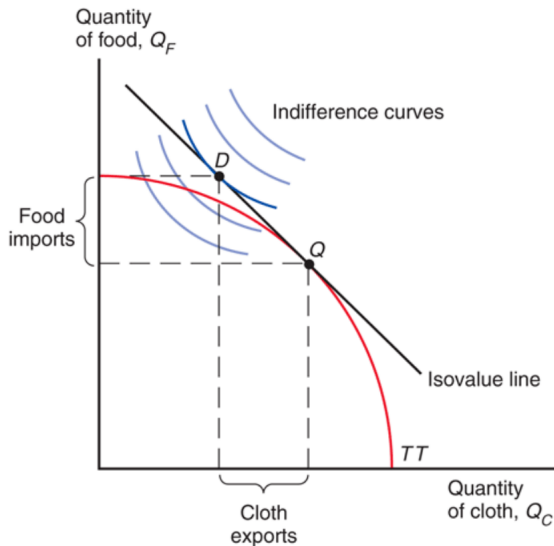
Price changes and welfare

- Suppose my country sells clothes to buy food
- If the relative price of clothes goes up:
    - I become richer – Foreign has to give me more food for my clothes (*income effect*)
    - I change my consumption bundle to relatively more food (*income effect*)
    - What happens to production at Home?
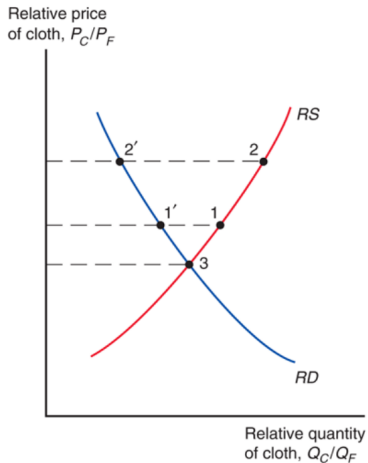   - What happens to production at Foreign?

Price changes and welfare

▶ See income and substitution effects in chart

(a) Production and Consumption

Price changes and welfare

(b) Relative Supply and Demand

- ▶ Which good does Home export?

Price changes and welfare

- How would Home consumption change if the relative price of Clothes fell?

Price changes and welfare

- *Terms of trade*
- Defined as the price of the exported good divided by the price of the imported good
- Welfare increases if terms of trade rise (or improve)
- Welfare decreases if terms of trade fall (or worsen)
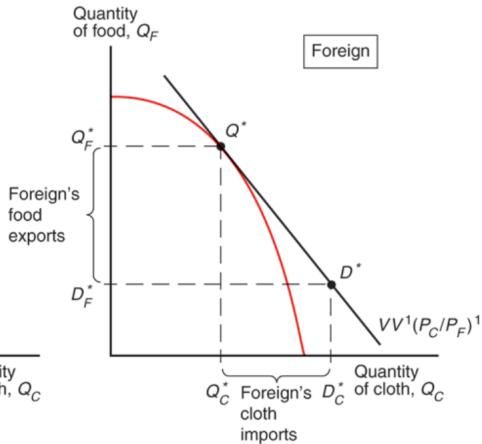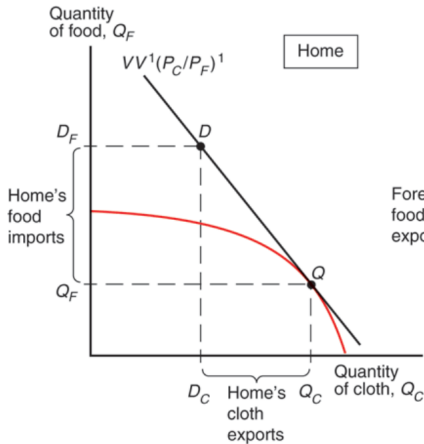- A worsening of the terms of trade can never make welfare fall below autarchy level (why?)

Equilibrium Trade
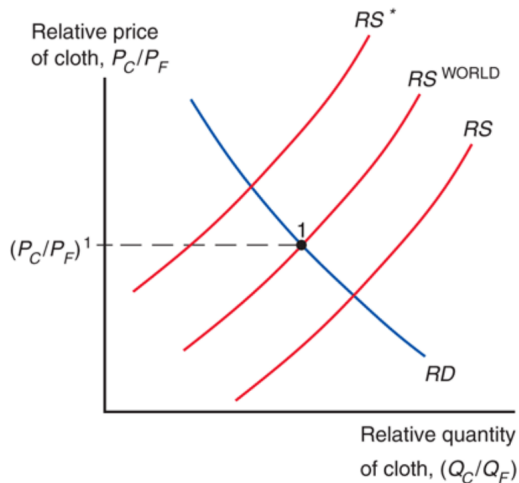
- Are *RS* and *RS** the autarchy supplies?

Equilibrium Trade

- What is wrong with these pictures (under the assumptions we have typically been making?)

End model development

- We have now presented the model
- Simpler than the others we developed
- Countries have PPFs
- Countries have demand
- Prices affect both production and consumption
- Improvement in terms of trade helps
- Worsening of terms of trade hurts

Some analysis

- Is growth in other countries good or bad for us?
- If other countries will not respond, should we impose tariffs?
- How will Danish current account surplus affect future Danish consumption?

Growth

- Question 1: Is China's growth good for Denmark?
- Question 2: Is Danish growth better or worse thanks to international trade?

Growth

- Claim in book (pg. 158):
  The international trade effects of growth result from the fact that such growth typically has a bias.
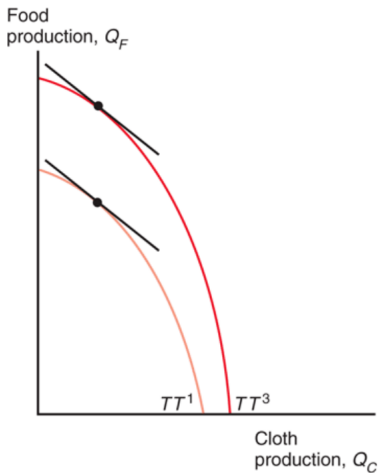- I suspect that unbiased growth still affects trade
- come back to this point

Biased growth

- Growth that expands the production possibilities more towards one good
- Growth that, for any fixed price, always causes relatively more of one good to be produced
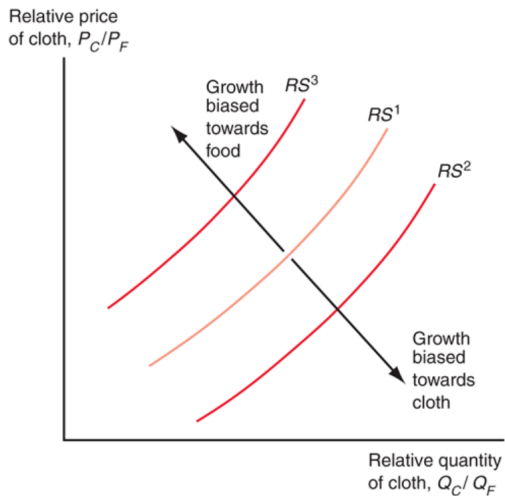
Biased growth
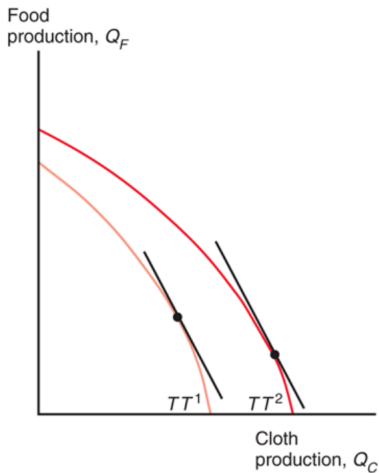
(a) Growth biased toward cloth

(b) Growth biased toward food

Biased growth

- Suppose equilibrium trade prices didn't change
- Foreign supplies same good mix
- Home supplies relatively more of one good
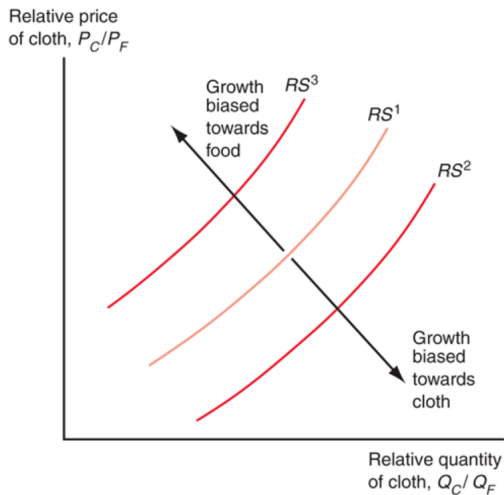- This will affect the world relative supply

Biased growth

(c) Effects of biased growth on relative supply

Biased growth

- Of course, going to affect equilibrium price

Relative price of cloth, P_C/P_F

Growth biased towards food RS^3

RS^1

RS^2

Growth biased towards cloth

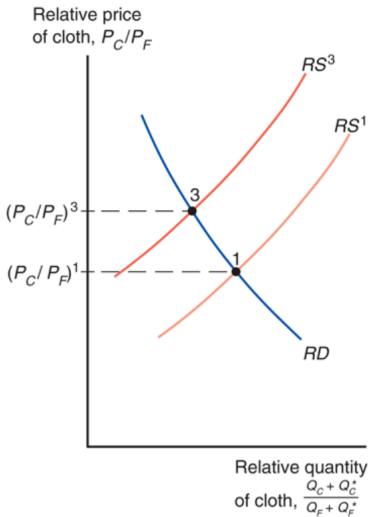Relative quantity of cloth, Q_C/Q_F

(c) Effects of biased growth on relative supply
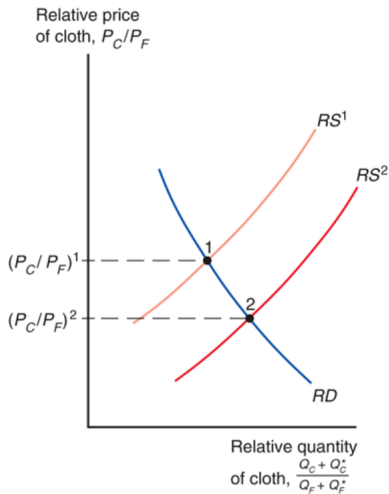
Biased growth

(a) Cloth-biased growth

Biased growth

(b) Food-biased growth

Biased growth

- Effect on price depends upon which good gets the biased growth
- Effect on price does not depend upon which country grows
- If Home exports cloth, does growth in Foreign in Food help or hurt Home? Why?

Biased growth

- Export-biased growth is bad for terms of trade
- Import-biased growth is good for terms of trade

Biased growth

- Columbia Economist Jagdish Baghwati showed as a graduate student that growth at home can actually reduce welfare
- But productivity growth usually increases income, even if it worsens terms of trade
- Growth of other countries in Home's export industry does not increase income

Unbiased Growth

- I think it also affects trade and production
- Effect similar to export-orientated biased growth (bad)

Case study from book

- Should we expect growth in developing countries to hurt developed world consumers?
- Depends in which industry their growth happens
- Case: Chinese productivity growth in manufacturing – China's export industry

Case study from book

- China-US terms of trade
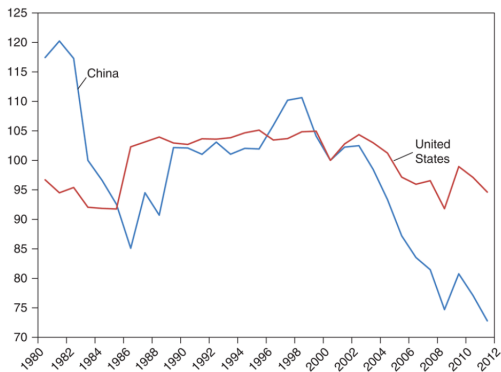
Source: World Development Indicators, World Bank.

- What the book isn't saying. . .

Tariffs and Export Subsidies

- What are they?
  - *Tariffs* are taxes levied on imports
  - *Export subsidies* are payments given to domestic producers who sell abroad
- Scope - effect on terms of trade
  - Tariffs are not usually motivated by terms of trade
  - They do have terms of trade effects
- Questions
  - Do tariffs help or hurt Home consumers?
  - Do export subsidies help or hurt Home consumers?

Tariffs

- Tariffs are a tax applied in some places, not others
- Different relative prices faced by people in different countries
- We defined terms of trade as export good pr. / import good pr.
- But now we have two sets of rel. prices – *internal* and *external*

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Tariffs

- We are going to call *external* prices the terms of trade
  - External prices govern the value of Home's exports in terms of Foreign's exports
  - Internal prices govern the choices of production and consumption at Home
- Suppose Home puts a tariff on Food
- Suppose external prices do not change
  - What happends to production of Food at home?
  - What happends to consumption of Food at home?
 - If Food were Labor-intensive, which factor benefits?

Tariffs

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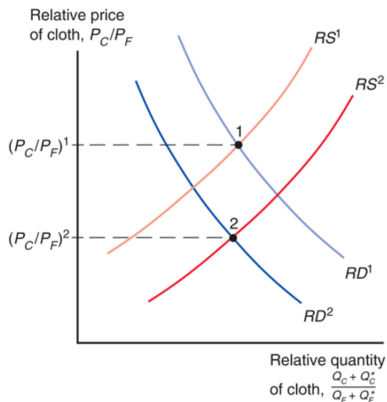
External Price (TOT) Effect of Home Tariff on Food
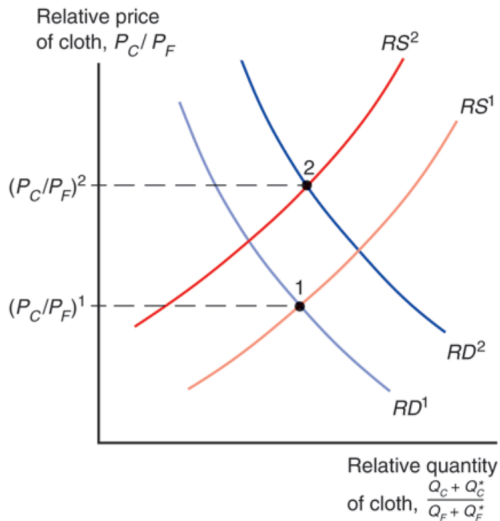
External Price (TOT) Effect of Home Tariff on Food

- Terms of Trade for Home improved
- Now Home can afford more Food for the same production of Clothes
- Great, right! But wait, let's think about this again
- Domestically, a Tariff is initially like a worsening of terms of trade!
- We need the External Price TOT Effect to dominate
- There is an optimal tariff
  - Typically small for small countries, large for large countries. Why?
  - Talk more about this in a later chapter

Export subsidy

- In a similar fashion, will reduce external TOT
- Domestically, however, will increase the internal price of the export good

Relative price of cloth, P_C/P_F

RS^1

RS^2

$(P_C/P_F)^1$

1

$(P_C/P_F)^2$

2

RD^1

RD^2

Relative quantity of cloth, $\dfrac{Q_C + Q_C^*}{Q_F + Q_F^*}$

Trade Policy Discussion

- Export subsidy and tariff seem very similar
- That is because we are missing something really important

Trade Policy Discussion

- Financing!
  - Tariffs are financed by Foreign
  - Export Subsidies are financed by Home

Trade Policy Discussion

- Is it good for Denmark if China subsidizes its exports?
- The (Stiglitz, I think) new car example
- Good for who again?

Intertemporal Trade

- Dipping into 2nd half of the course – International Finance
- Why? Because analysis is similar to current model
- Setup:
    - Two countries: Home (H), Foreign (G)
    - Two goods: Cheese today, and Cheese tomorrow
    - Countries have different technology for converting today Cheese into tomorrow Cheese.
    - Maybe only Home has refrigerators

Intertemporal Trade

- More serious motivation:
    - One country might have better investment opportunities
    - One country may have found oil, but it will run out tomorrow

Intertemporal PPF
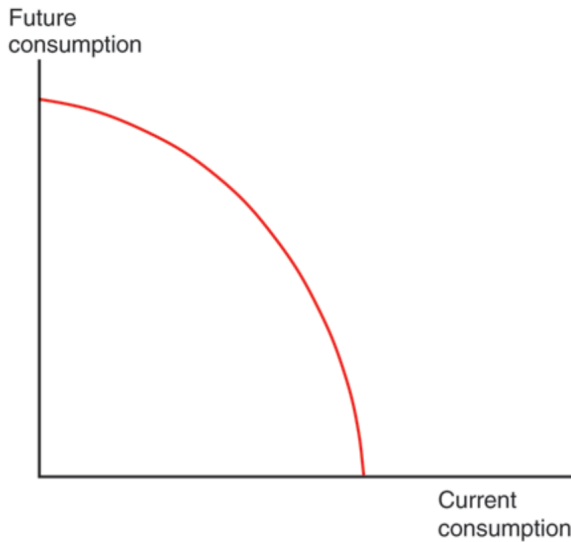
Price of Future Consumption

- Just like bank loan, you have to pay for current consumption
- Suppose that you have to pay $1 + r$ units of future cheese for one unit of current cheese
- How much current cheese to I have to give up for one unit of future cheese?
- That is the relative price of future cheese in terms of current cheese

Intertemporal Cheese equilibrium