ECON 422: International Economics

Lecture 3: Gains From Trade and Comparative Advantage Theory

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Winter 2018

This Lecture

- Gains from trade and comparative advantage

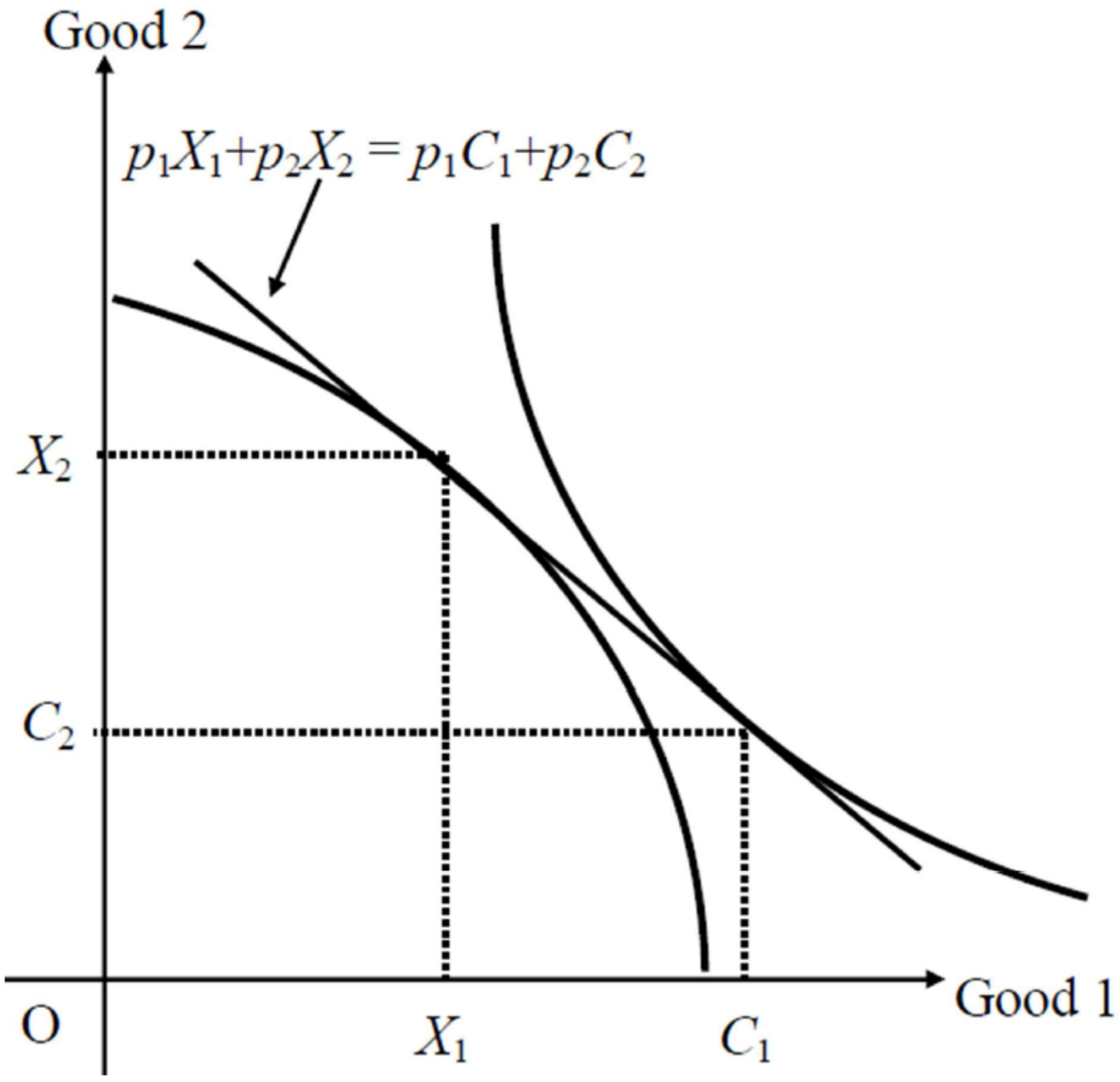
Assumptions from Neoclassical Theory

- *Neoclassical Assumptions*
  - Perfect competition
  - Constant Returns to Scale (CRS)
    - Note: DRS can be allowed
    - IRS change the nature of the model
  - Identical, homothetic preferences (implies representative agent)
  - No distortions
- *Small Open Economy*
  - Price-taker in world markets
  - (In a large open economy, world price depends on how much the country trades)

Basic Ingredients

- *Production Possibility Frontier*
  - Market Allocates Resources to maximize value of production
- *Budget Constraint*
  - Country faces budget constrained determined by international prices
- *Indifference Curves*
  - Representative agent chooses consumption bundle to maximize utility

The Basic Ingredients in a Graph



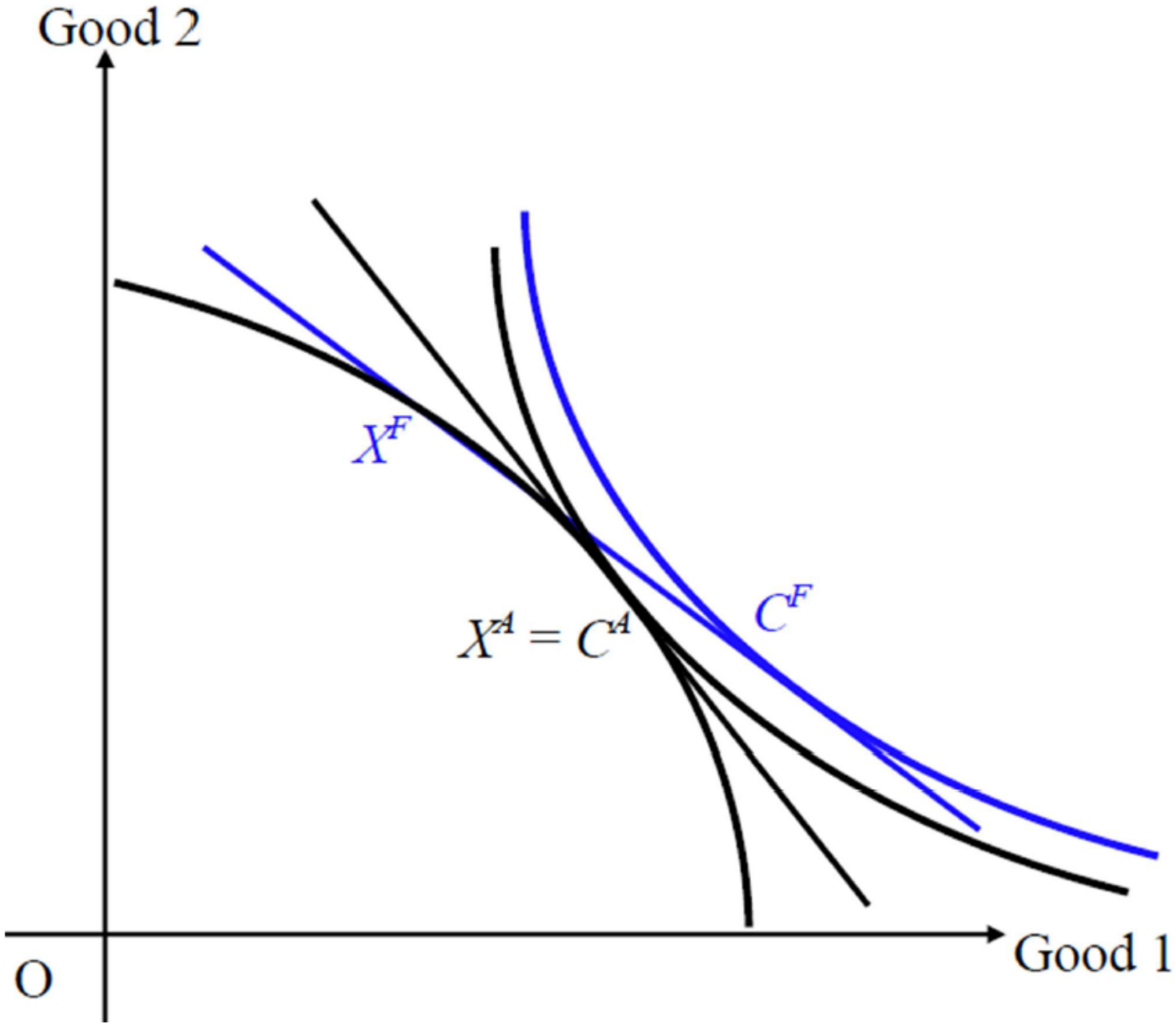
Autarky vs. Free Trade

- Many of the central questions in trade mentioned above are answered by comparing two extreme scenarios:
  - Autarky vs. Free trade
- Intermediate questions
  - How does good market integration affect prices?
  - What is the effect of prices on the outcome of interest?

Three General Results from Neoclassical Trade Theory

1. *Gains from trade*
2. *Comparative advantages*:
3. *Terms of trade*

Gains From Trade



Gains From Trade: Intuition

- Producing X^A and consuming C^A is feasible at any relative price
  - Relative price change vs. autarky expands consumption possibilities
  - $\rightarrow$Consumption gains
- Producing X^F raises revenue
  - Reallocation of production vs. autarky increases revenue
  - $\rightarrow$Production gains
- In a small open economy, trading is like any other productive activity
  - Not trading is always feasible
  - First welfare theorem implies that free trade is preferred to any other allocation

GFT: General Result

- $\left(c^F, x^F, m^F\right)$ = (column) vectors of consumption, production, imports
  - under (row) vector of free-trade prices p^F
  - leads to utility u^F
- $\left(c^A, x^A, m^A\right)$ = (column) vectors of consumption, production, imports
  - under (row) vector of autarky prices p^A
  - leads to utility u^A
- Note: exports are equal to $-m$
- $e\left(p, u\right)$= minimum expenditure needed to attain utility u and prices p

GFT: General Result

- Free-trade:

$$e\left(p^F, u^F\right) = p^F c^F = p^F x^F$$

  and p^F given

- Autarky:

$$e\left(p^A, u^A\right) = p^A c^A$$

  and $c^A = x^A$

GFT: General Result

Proof

$$e\left(p^F, u^A\right) \leq p^F c^A$$

GFT: General Result

Proof

$$
\begin{aligned}
e\left(p^F, u^A\right) &\leq p^F c^A \\
&= p^F \left(x^A + m^A\right)
\end{aligned}
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\end{aligned}
$$

- Notes
  - Holds for any free-trade price
  - First inequality = consumption gains; Second inequality = production gains
- Inequalities are weak. When does the theorem fail?
  - No substitution on consumption or production
  - Identical countries

Is there a better allocation than free trade?

- **In small open economy: No**
- Distorted allocation with consumption taxes and production subsidies
  - Consumers face $p^F + \tau^c$, choose c^B, get utility u^B
  - Producers face $p^F + \tau^p$, choose y^B
  - Tax rebated lump sum$\rightarrow p^F c^F = p^F x^F$

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- Same reasoning as before applies:

$$\begin{aligned} e\left(p^F, u^B\right) &\leq p^F c^B \\ &= p^F \left(x^B + m^B\right) \\ &\leq p^F x^F \\ &= e\left(p^F, u^F\right) \\ \rightarrow u^B &\leq u^F \end{aligned}$$

- Free trade is preferred to any feasible allocation

Is there a better allocation than free trade?

- **In large economy: Yes**
- Distorted allocation with consumption taxes and production subsidies
  - Now, world price is $p^{FB} \neq p^{F}$
  - I.e., world price **depends on the policy**

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- **Free trade (p^{F}) preferred to distorted trade (p^{FB}) if it improves terms of trade:**
  - I.e., if

$$p^{F} m^{B} = \left(p^{F} - p^{FB}\right) m^{B} \leq 0$$

    then $u^{F} \geq u^{B}$
  - Otherwise, distorted trade could be preferred

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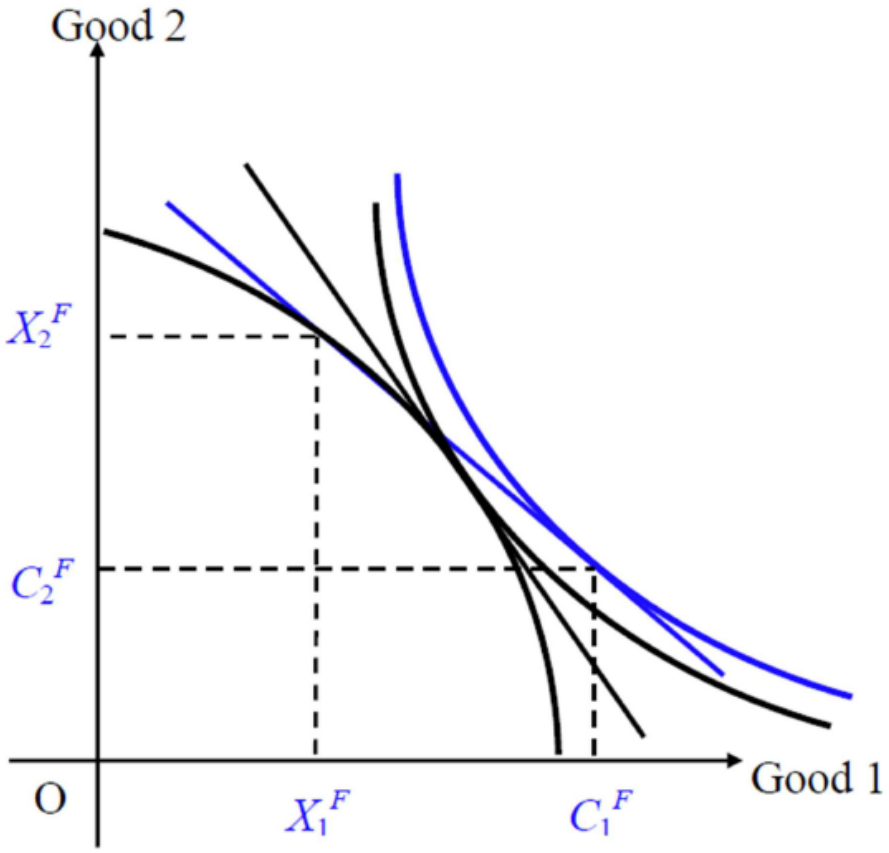
    then $u^F \geq u^B$
  - Why?

$$\begin{aligned} e\left(p^F, u^B\right) &\leq p^F c^B \\ &= p^F \left(x^B + m^B\right) \\ &\leq p^F x^F + p^F m^B \\ &= e\left(p^F, u^F\right) + p^F m^B \end{aligned}$$

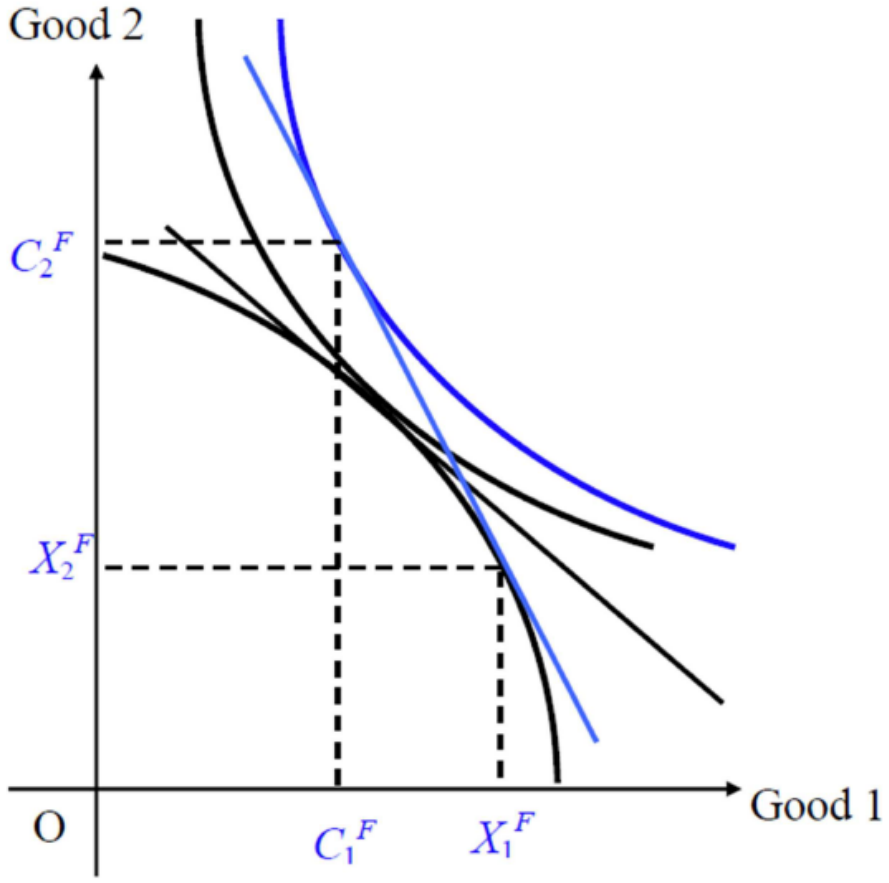
2.Comparative Advantages

- What determines the pattern of trade?
- In neoclassical models, the pattern of trade depends on exogenous variables:
  - Technologies, endowments, tastes, institutions
  - No role for multiple equilibria or agglomeration
- The gains-from-trade theorem implies a general correlation result without introducing details of specific models
  - However, the trade pattern cannot be predicted for specific goods, except in special cases

2.Comparative Advantages



$(p_1/p_2)^F < (p_1/p_2)^A$



$(p_1/p_2)^F > (p_1/p_2)^A$

CA: General Result

- Suppose gains from trade theorem holds. Then

$$\left(p^A - p^F\right) m^F \geq 0$$

  - I.e., import the good that is more expensive under autarky

- Why?
  - We have $p^A c^F \geq p^A c^A$
  - In addition: $p^A x^F \leq p^A x^A$
  - Subtracting the second line from the firs and using $p^F m^F = 0$

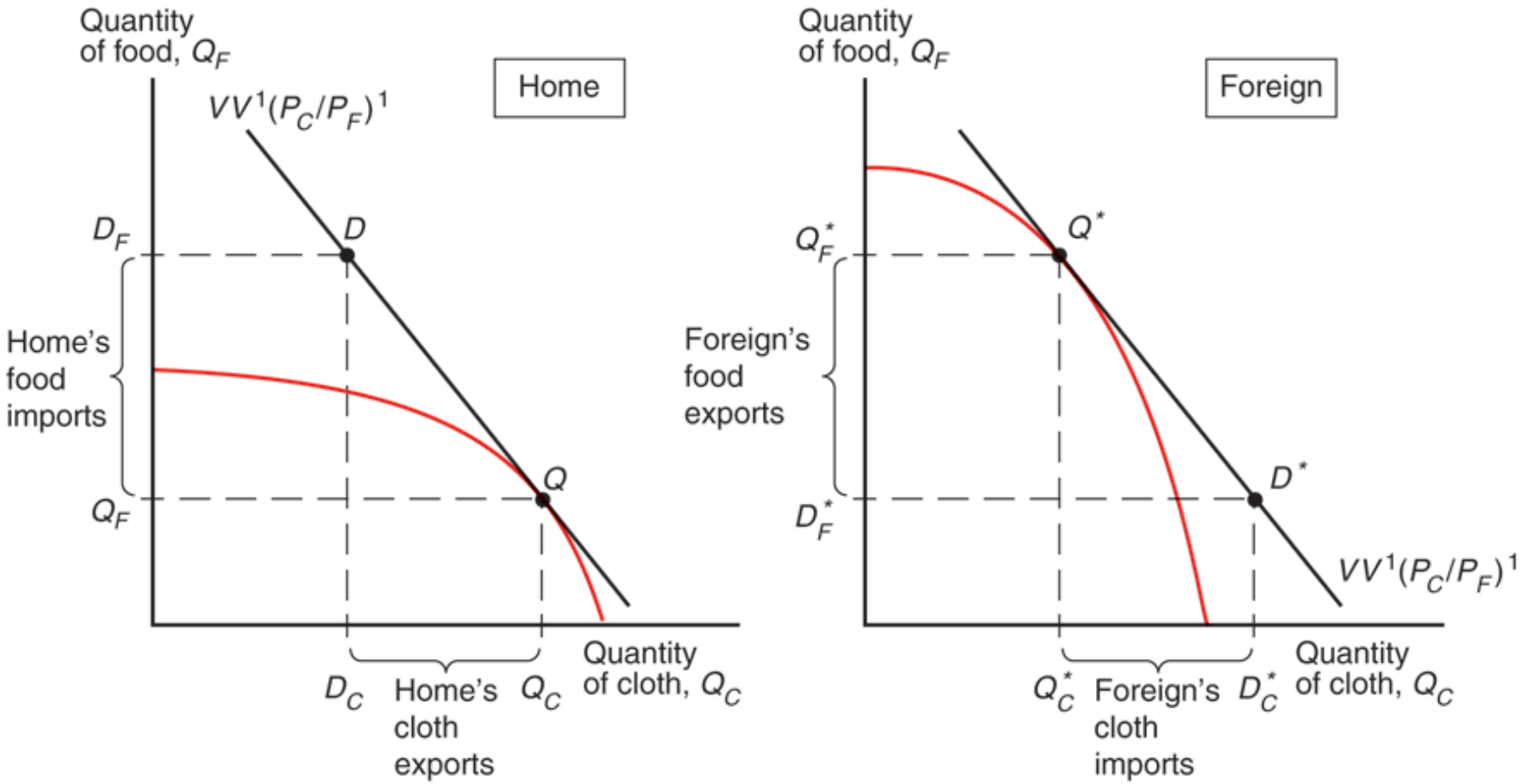
- With 2 goods and 2 countries
  - Import goods which are more expensive under autarky at home than abroad

CA: 2 by 2 Case

- **With 2 goods and 2 countries (home and foreign=*)**
  - Home imports=Foreign exports: $m_1^F = -m_1^{F*}$ and $m_2^F = -m_2^{F*}$
  - Import goods which are more expensive under autarky at home than abroad
    - I.e., $m_1^F > 0$ if $\frac{p_1^A}{p_2^A} > \frac{p_1^{A*}}{p_2^{A*}}$

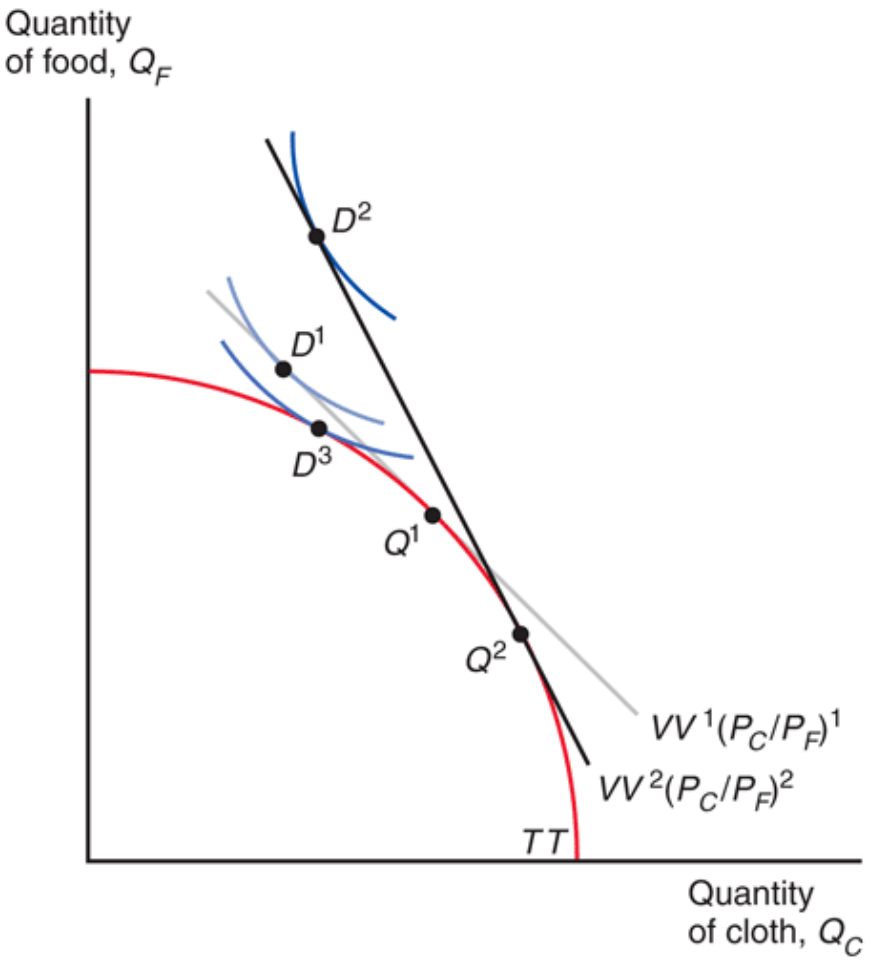
- **Key implication**
  - Export the goods that are more or less abundant?
  - Export the goods that are in higher or lower supply?

CA: 2 by 2 Case

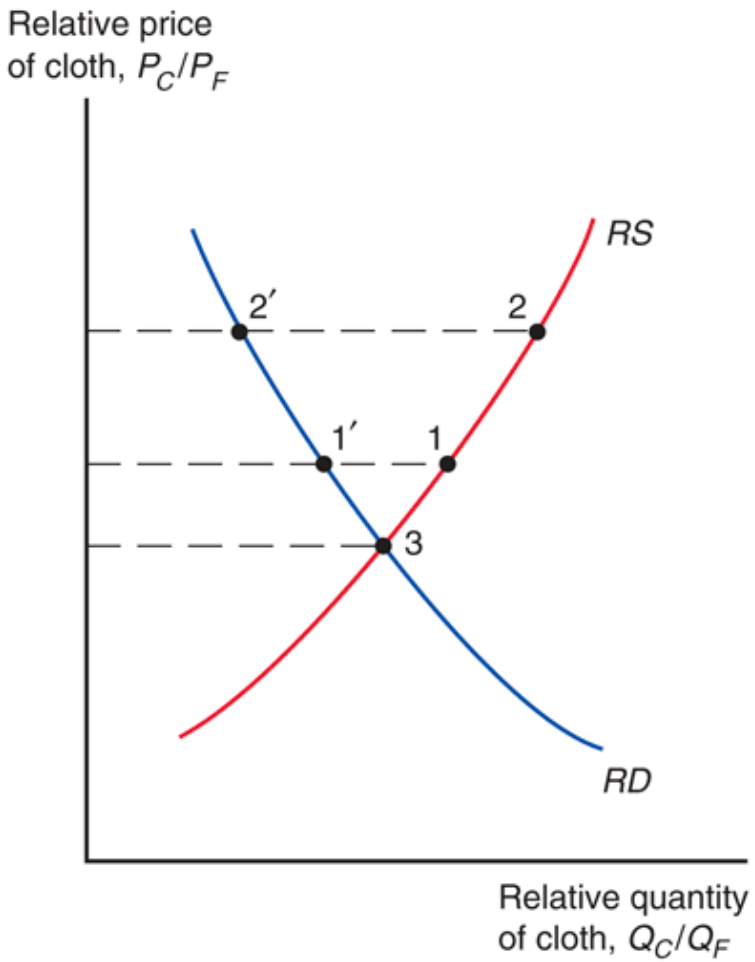


(b) Production, Consumption, and Trade

3. Terms of Trade



(a) Production and Consumption



(b) Relative Supply and Demand

ToT: General Result

- To a first order approximation, the equivalent variation to a change in prices Δp is:

$$(x - c)\,\Delta p$$

  - Welfare gain if % increase in price is larger in sectors with larger trade surplus
  - GFT increase with $p^F - p^A$

- Intuition: to a first order approximation, no quantity effects from price changes
  - so welfare effect = net revenue effect
  - so if p_g^F changes net revenue effect is $y_g^F - c_g^F$

ToT: Implications

- When the price of exports increases **due to international shocks**
  - Quantity and value exported increases (in units of imported goods)
  - Quantity imported will...?
  - Country's welfare increases
- To a first order approximation, GFT are zero at autarky
  - Perceived benefits of globalization are lower in less open economies
- Distributional effects?

Redistribution

- So far, only aggregate gains
- Assume heterogeneous households in terms of factor ownership and preferences
  - Household h earns e^h s.t. $\sum e^h = px$
  - Consumes c^h such that $\sum c^h = c$
  - Indirect utility: $v^h\left(p, e^h\right)$
- Trade creates winners and losers:
  - Through income=expenditure
  - Through individual price indexes

Redistribution: General Result

- **Result: there are lump-sum transfers such that free trade is Pareto superior to autarky**

- Proof
  - Transfers to household h: $T^h = p^F c^{hA} - e^{hF}$

Redistribution: General Result

- **Result: there are lump-sum transfers such that free trade is Pareto superior to autarky**

- Proof
  - Transfers to household h: $T^h = p^F c^{hA} - e^{hF}$
  - Household h can afford c^{hA}
  - Yet scheme is self-financing: $\sum_h T^h = p^F c^A - p^F x^F = p^F \left(x^A - x^F\right) \leq 0$

- Notes:
  - Only domestic transfers are needed
  - Informationally very intensive
  - Less informationally intensive: taxes on goods and factors

Summary of Neoclassical Trade

1. *Gains from trade*
   - If free-trade prices differ from autarky prices, representative consumer gains from trade
   - For a small economy, there is no better allocation than undistorted free trade
   - But for a large economy there may be, if it leads to terms-of-trade improvements

2. *Comparative advantages*:
   - Countries export goods whose relative price is relatively lower under autarky than under trade

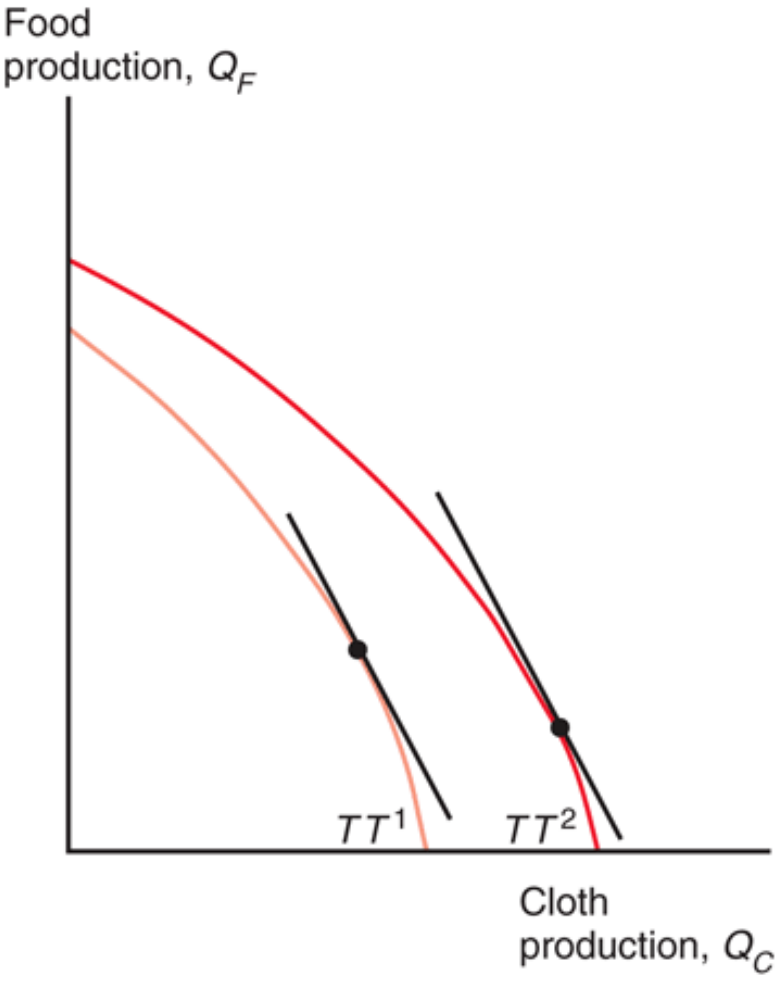
3. *Terms of trade*
   - Welfare is increasing in the relative price of exports

4. *Redistribution with heterogeneous consumers and workers*
   - There is always a redistribution policy that leaves everyone at least as well off as before a trade liberalization

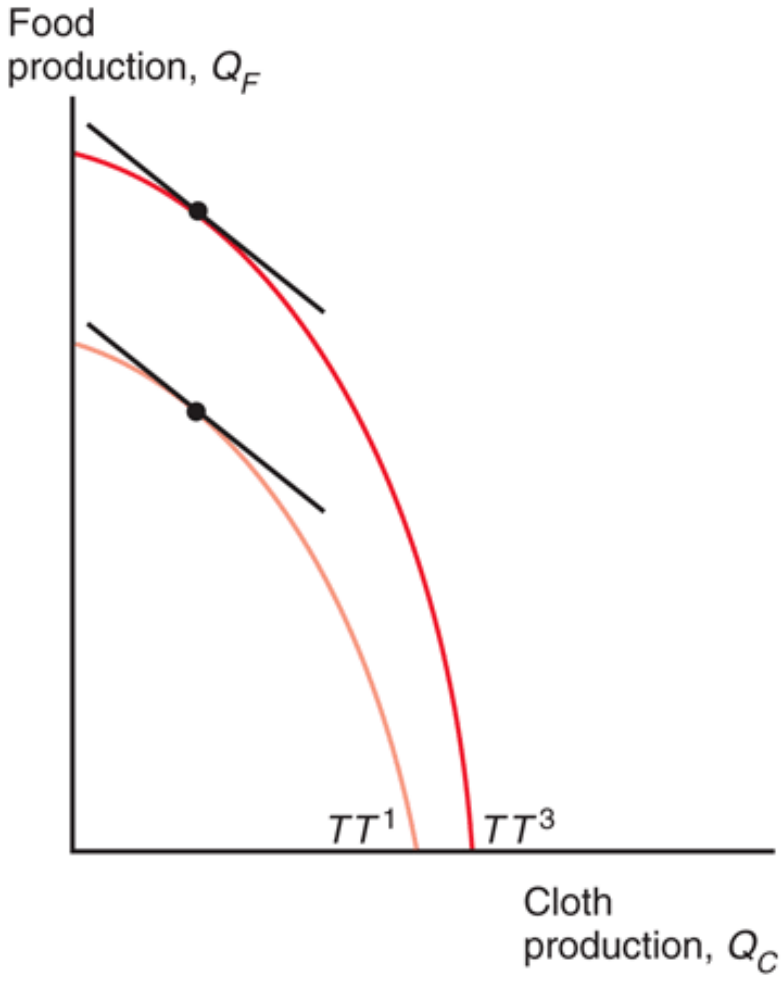
Application: Effects of Economic Growth

- Is economic growth in China good for the standard of living in the U.S.?
- Is growth in a country more or less valuable when it is integrated in the world economy?
- Key distinction: export-biased growth versus import-biased growth

Biased Growth

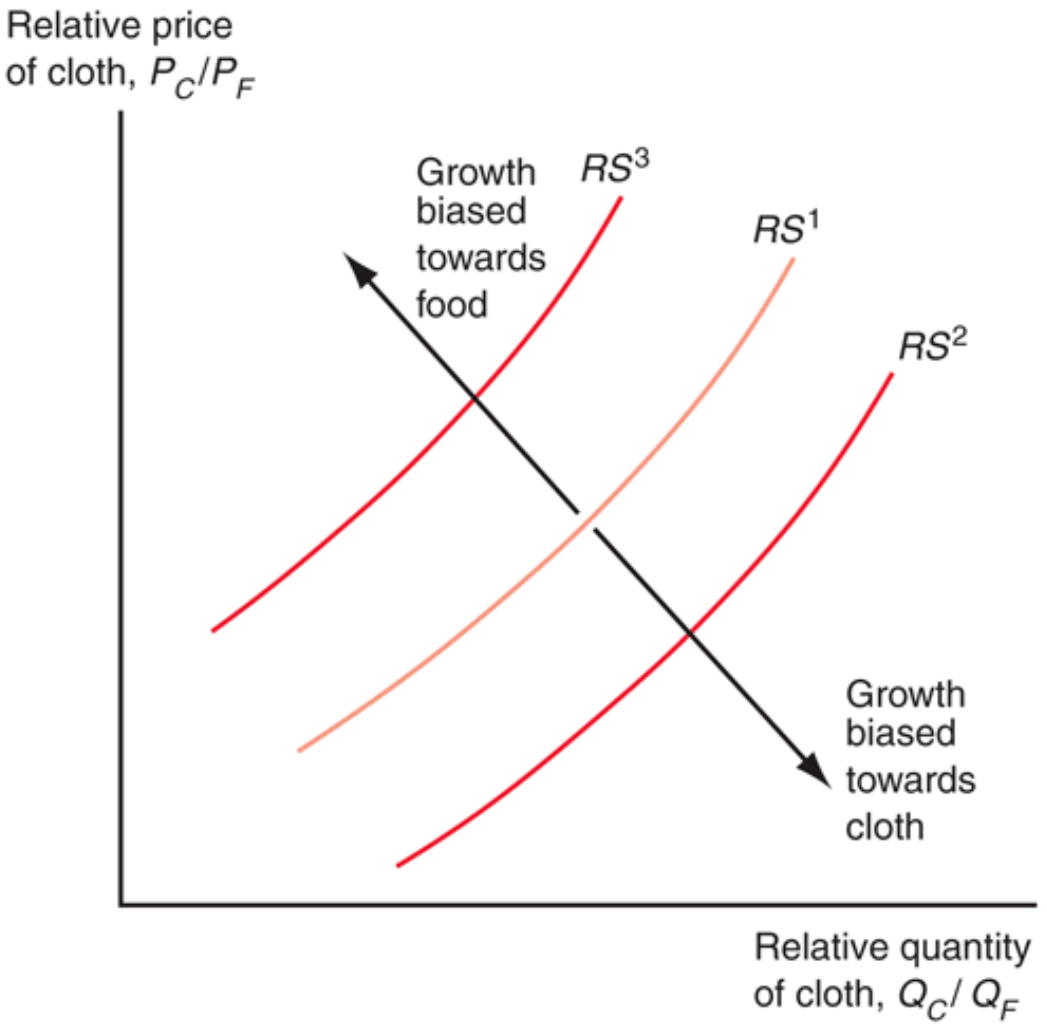


(a) Growth biased toward cloth



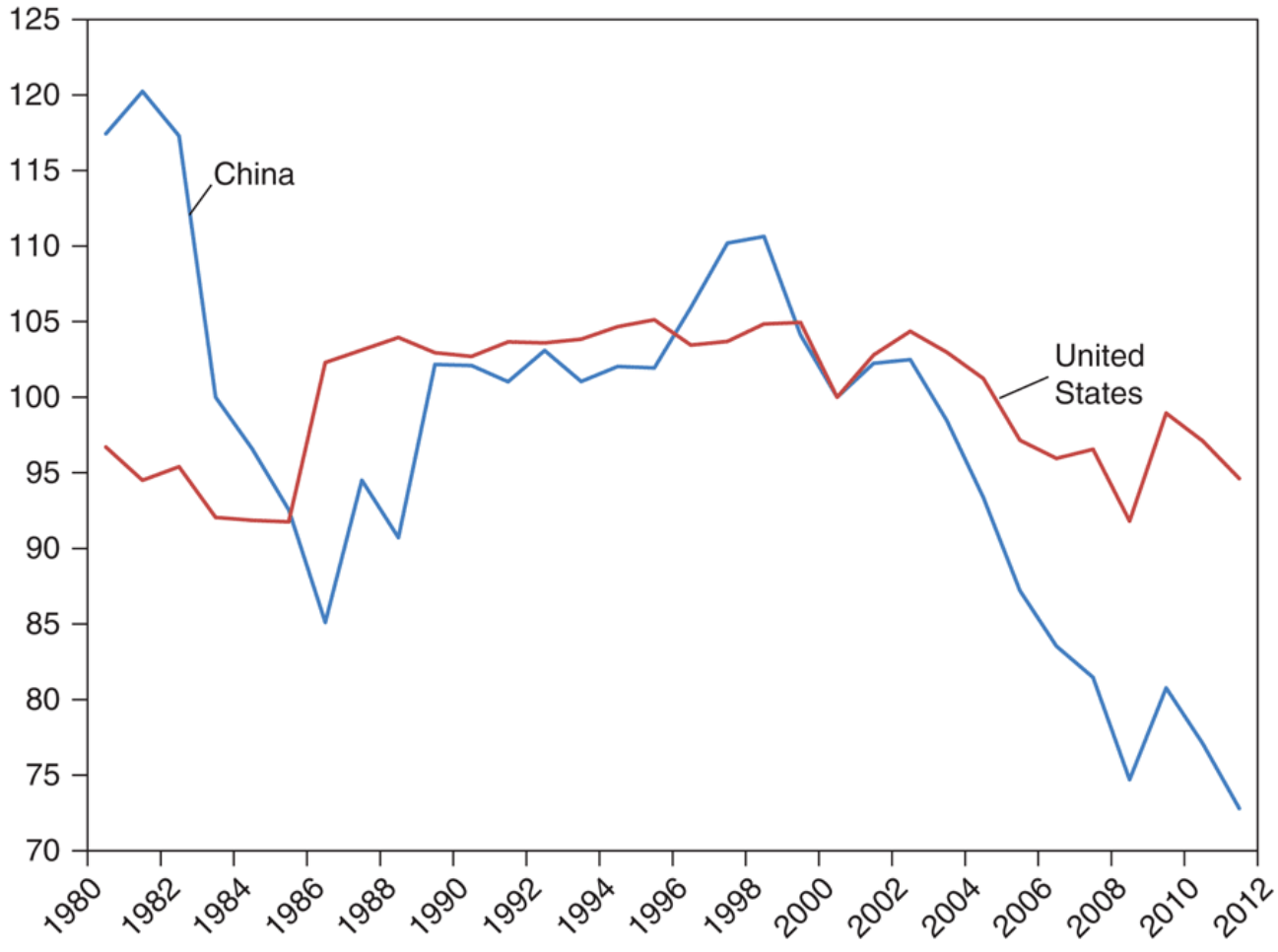
(b) Growth biased toward food

Biased Growth and ToT



(c) Effects of biased growth on relative supply

ToT of U.S. and China



Source: World Development Indicators, World Bank.