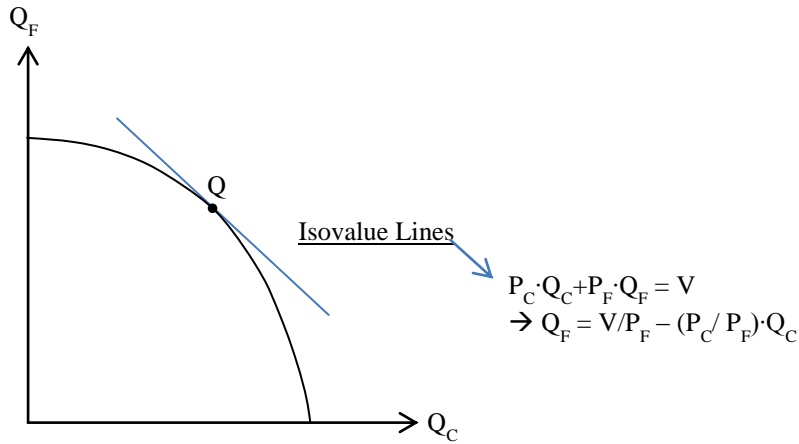# Chapter 6. Standard Trade Model

- The Ricardian Model

  - Production possibilities are determined by the allocation of a single resource, labor between sectors.

  - This model conveys the essential idea of comparative advantage but does not allow us to talk about the income distribution

- The specific factors model

  - Multiple factors of production (some are specific to the sectors in which they employed).

  - It also capture the short-run consequences of trade on the income distribution

- The Heckscher-Ohlin model

  - The multiple factors of production can move across sectors.

  - Differences in resources drive trade patterns.

  - This model captures the long-run consequences of trade on the income distribution.

- In spite of the differences in their details, our models show a number of features;

  - The productive capacity of an economy can be summarized by PPF, and differences in these frontiers give rise to trade.

  - Production possibilities determine a county's relative supply schedule.

  - World equilibrium is determined by world relative demand and world relative demand.

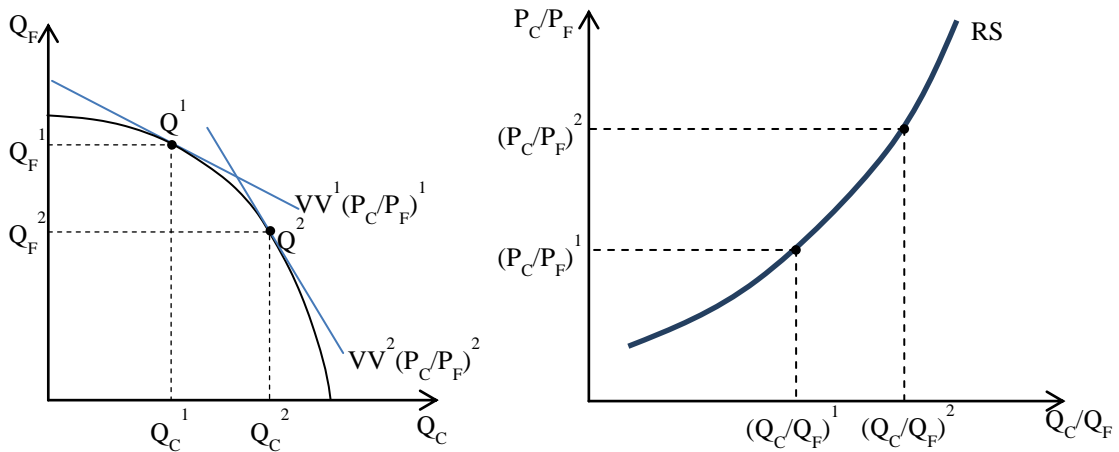- Economic growth & shifts of supply & demand will be discussed.

6.1. A Standard Model of a Trading Economy

- Four key relationships

  - PPF & relative supply curve

  - Relative prices & Relative Demand

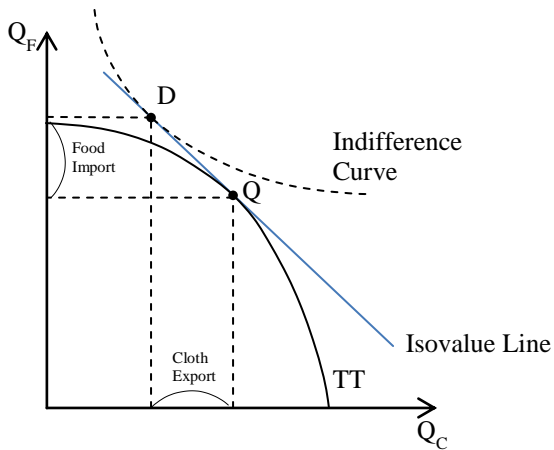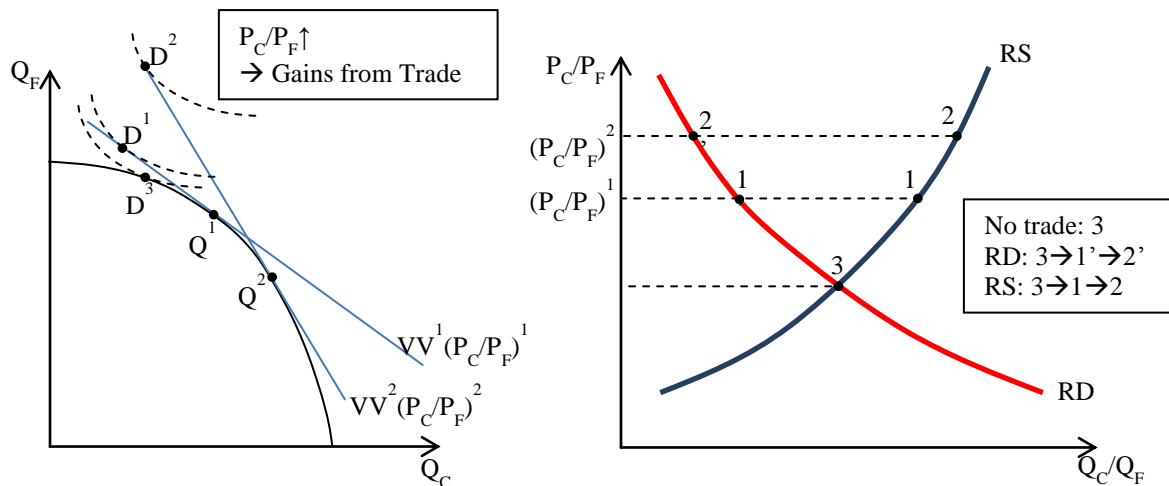 - world Equlibrium by RD & RS

  - Terms of trade on a nation's welfare

<Production Possibilities & Relative Supply>

Q_F

Q

Isovalue Lines

$P_C \cdot Q_C + P_F \cdot Q_F = V$

$\rightarrow Q_F = V/P_F - (P_C/P_F) \cdot Q_C$

Q_C

<Fig 6-1: Relative Supply Determine the Economy's Output>

Q_F

Q_F^1

Q_F^2

Q^1

Q^2

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

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

Q_C^1 Q_C^2 Q_C

P_C/P_F

RS

$(P_C/P_F)^2$

$(P_C/P_F)^1$

$(Q_C/Q_F)^1$ $(Q_C/Q_F)^2$ Q_C/Q_F

<Fig 6-2: How an Increase in the Relative Price of Cloth Affects Relative Supply>

<Relative Prices & Demand>

Q_F

D

Food Import

Indifference Curve

Q

Cloth Export

Isovalue Line

TT

Q_C

Value of an economy's consumption = Value of production

$P_C \cdot Q_C + P_F \cdot Q_F = P_C \cdot D_C + P_F \cdot D_F = V$

<Fig 6-3: Production, Consumption, and Trade in the Standard Model>

**<Fig 6-4: Effects of a Rise in the Relative Price of Cloth and Gains from Trade>**

- The move from D^1 to D^2 reflects two effects of the rise in P_C/P_F.

    - When P_C rises, the economy can trade a given amount of cloth for a larger amount of food imports

    - Second, the change in relative prices leads to a shift along the indifference curve, toward food and away from cloth.

    - The income effect tends to increase consumption of both goods, while the substitution effects to make the economy consume less C and more F.

    - In Fig 6-4, the substitution effect of demand is greater than the income effect, so D_C/D_F decreases.

<The Welfare Effect of Charges in the Terms of Trade>

- $P_C/P_F\uparrow$ → Cloth exporter country is better off (D_1→D_2).

- A rise in ToT increases a country's welfare, vice versa.

- Note that changes in a country's ToT can never decrease the country's welfare below its welfare level in the absence of trade.

- Aggregate gains are rarely evenly distributed, leading to both gains & losses for individual consumers.

<Determining Relative Prices>

<Fig 6-5: Equilibrium Relative Price with Trade and Associated Trade Flows>

## <Economic Growth: A Shift of the RS Curve>
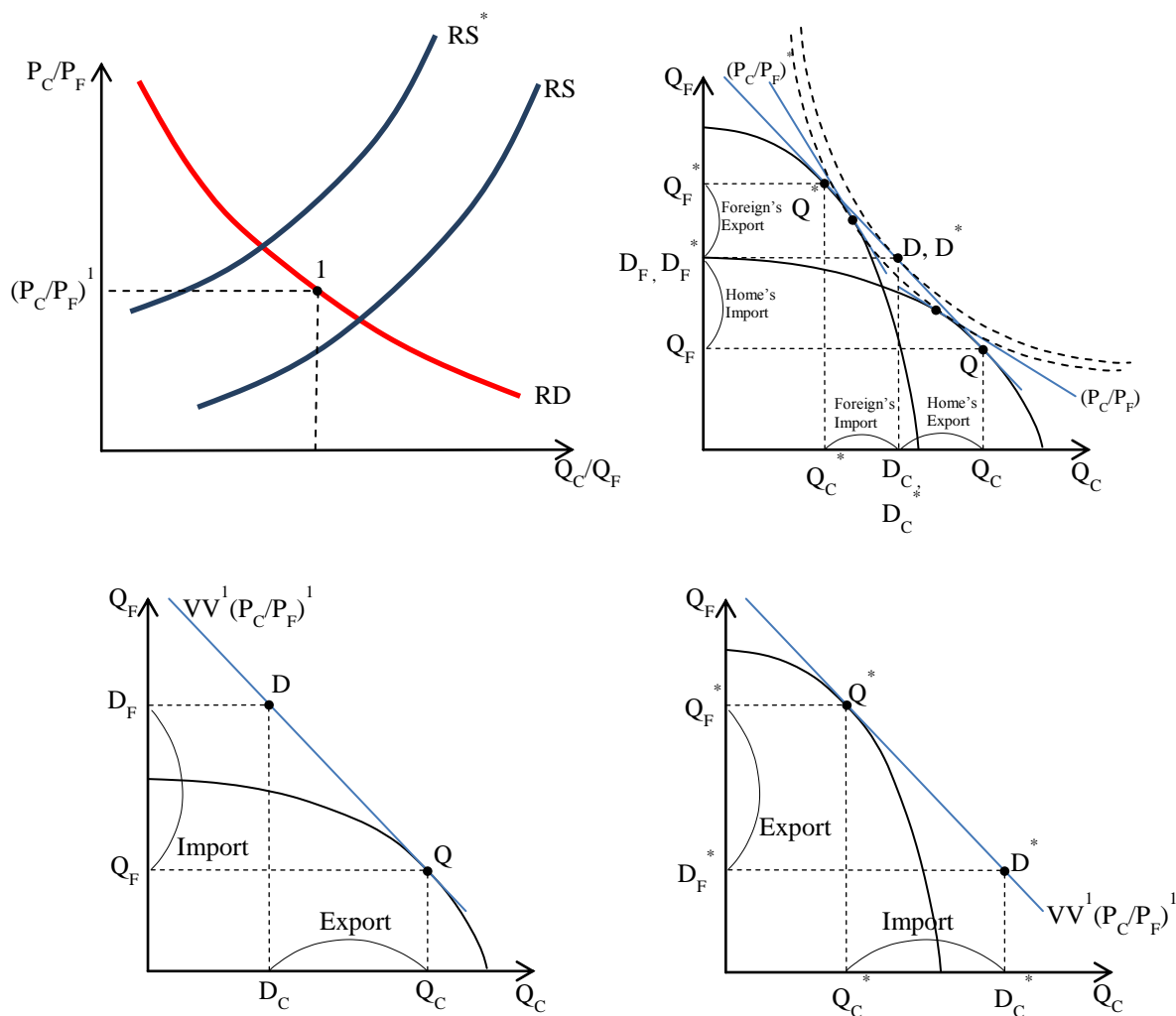
- Economic growth in the rest of the world may be good for our economy because it means larger markets for our exports & lower prices for our imports.

- Growth in other countries may mean increased competition for our exporters and domestic producers.
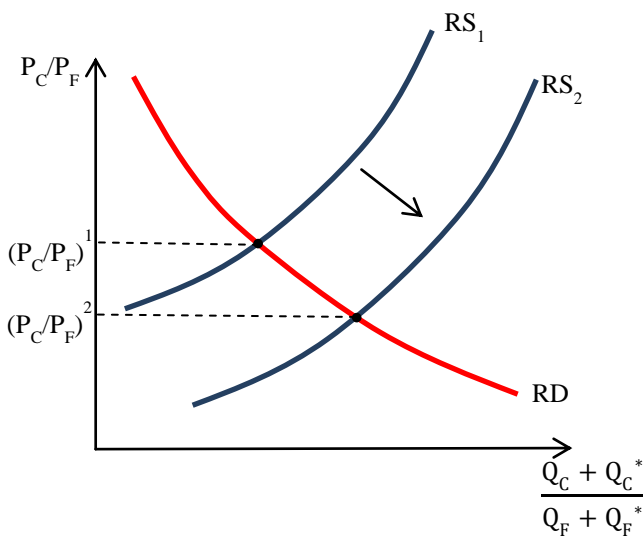
< Growth & the Production Possibility Frontier>

- Ricardian Model: Technical progress

- Heckscher-Ohlin Model: Supply of a factor of production

<Fig 6-6: Biased Growth>

<World Relative Supply & the Terms of Trade>
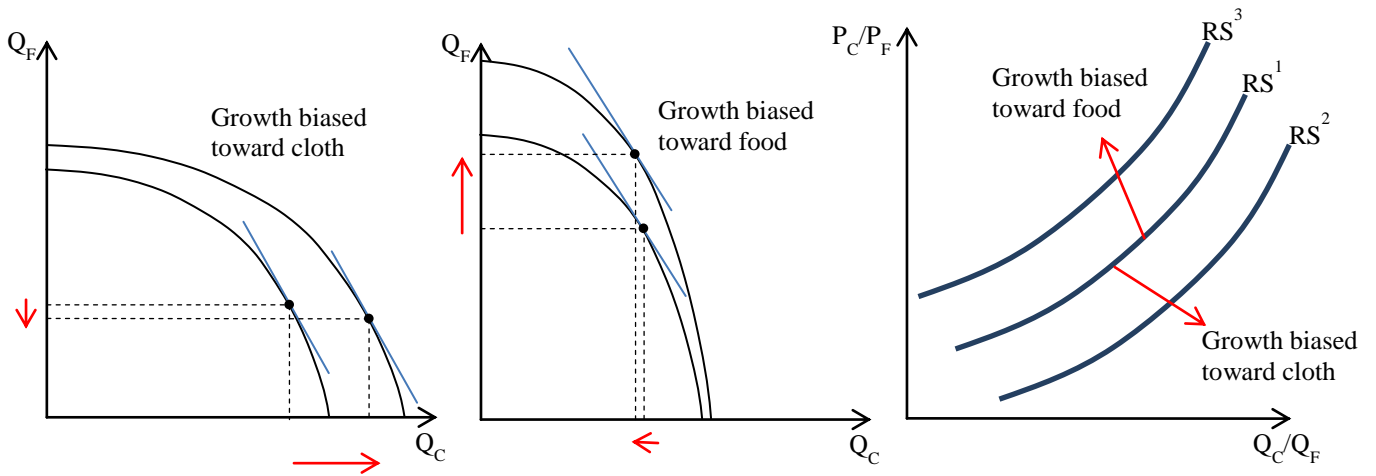
- If Home experiences growth strongly biased toward cloth, so that its output of cloth rises at any given relative price of cloth, while its output of food declines.
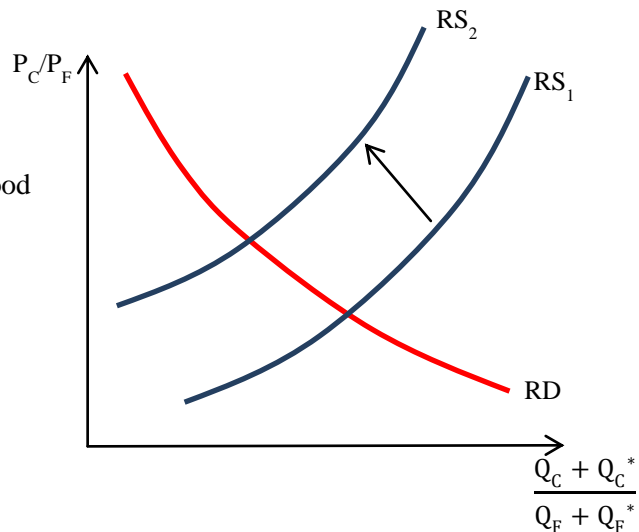

Strongly biased economic growth in cloth

→Q_C↑, Q_F↓→H's ToT↓ (P_C/P_F↓)

F's ToT↑

<Fig 6-7(a): Growth and World Relative Supply>

Strongly biased economic growth toward food

→Q_C↓, Q_F↑→H's ToT↑

F's ToT↓

<Fig 6-7(b): Growth and World Relative Supply>

- Export-biased growth → ToT↓, Benefit goes to the world
  Import-biased growth → ToT↑, Expense goes to the world

\<International Effects of Growth\>

- Export-biased growth in Home → ToT↓

  " " in Foreign → ToT ↑

 Import-biased growth in Home → ToT ↑

  " " in Foreign → ToT↓

- Immiserizing Growth

  - After WWⅡ, The growth in the industrialized countries increased synthetic substitutes for raw materials, and the poor nations extended their capacity to produce what they are exporting.

  - The growth in the industrial world would be import-biased, while that in the less-developed world would be export-biased.

  - Export-biased growth would worsen their TOT so much that they would be worse off than if they had not grown at all

  - Immiserzing growth can occur if strongly export-biased growth would be combined with very steep RS & RD curves.

6.2. Tariffs & Export Subsidies: Simultaneous shifts in RS & RD

- Import Tariffs: taxes levied on imports
  Export Subsidies: payments given to domestic producers who sell good abroad

  →Usually for income distribution, industry promotion, or balance of payments

  - Tariffs & subsidies drive a wedge between the price at which goods are traded internationally (external prices) and the prices at which they are traded within a country (internal price)

  - ToT corresponds to external, not internal prices. The extent of ToT effects depends on how large the country imposing tariff is relative to the rest of the world.

 - ToT is intended to measure the ratio at which countries exchange goods

<Relative Demand & Supply Effects of a Tariff>
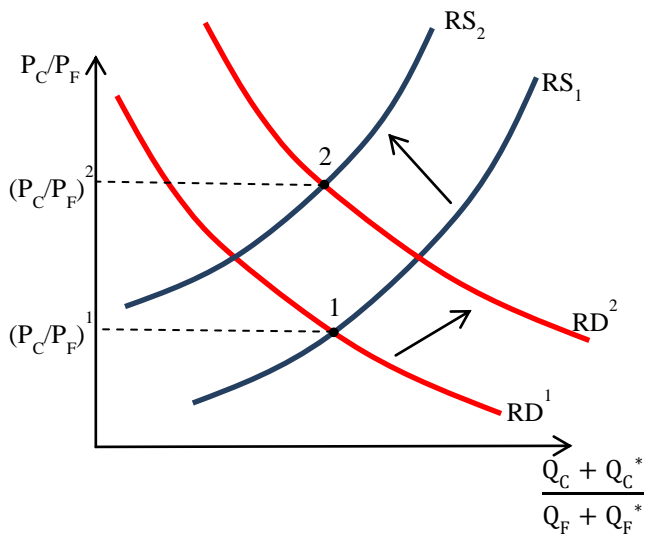
- Tariff(關稅) on food

→Domestic price of foods↑

→Home
    produce more food
    consume less food

→RS decrease
    RD increase

→P_C/P_F↑(Home's ToT improves!)

    at Foreign's expense

<Fig 6-8: Effects of a Food Tariff on the Terms of Trade>

- If Home imposes a 20 percent tariff on the value of food imports, for example, the internal price of food relative to cloth faced by Home produces and consumers will be 20% higher than the external relative price of food on the world market.

- The extent of this ToT effect depends on how large the country imposing the tariff is relative to the rest of the world.

<Effects of an Export Subsidy>

- For any given world prices, 20% subsidy will raise Home's internal price of cloth relative to that of food by 20%.

  - Subsidy on cloth export → produce more cloth, consume less cloth→Home's ToT↓

<Fig 6-9: Effects of a Cloth Subsidy on the Terms of Trade>

<Implications of ToT Effects: Who Gains & Who Loses?>
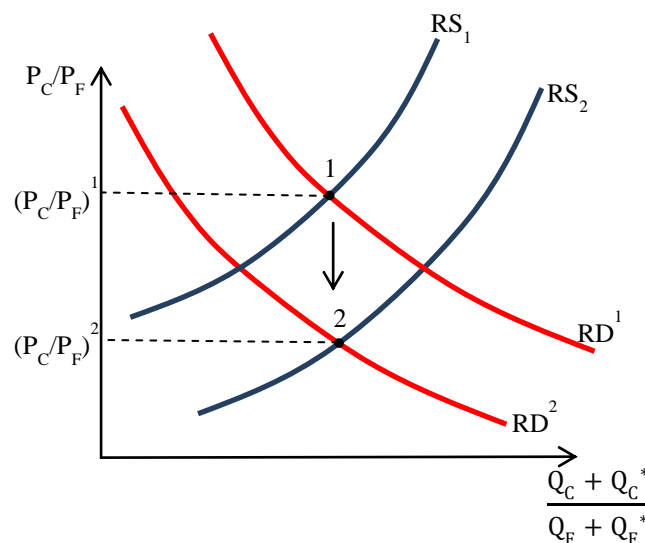
Two-country Model

- Home's tariff improves its ToT → Home's welfare↑
  Costs from distorted production & consumption→ Home's welfare↓

  → | Foreign's welfare goes down! |

- Home's subsidy worsen its ToT → welfare↑
  Costs from distortions → welfare↓

 → | Foreign's welfare improves! Our Loss! |

Many-country Model

- In many country model,
  A Foreign country may impose a tariff on sth we also import, lowering its demand for that good, lowering its price and benefiting us.
  A Foreign may subsidize the export of a good that competes with US exports, this foreign subsidy will obviously hurt the our ToT

- Thus, in many-country Model,
  Subsidies to exports we imports help us, while tariffs against our export hurt us.

- The fact that the subsidy to Foreign's exports to us is good is not a popular one.

  - It actually help our consumers.

  - But it has effects of foreign subsidize on income distribution within U.S. under competition

6.3. International Borrowing & Lending

< Intertemporal Production Possibilities & Trade>

- Intertemporal Trade: Exchange goods today in return for some goods in the future.

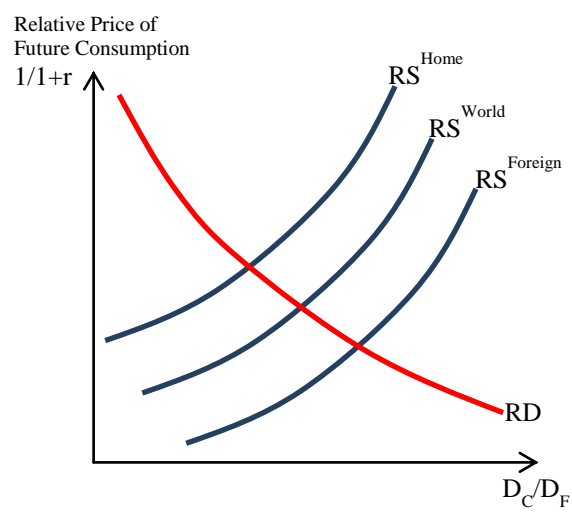<Fig 6-10: The Intertemporal Production Possibility Frontier>
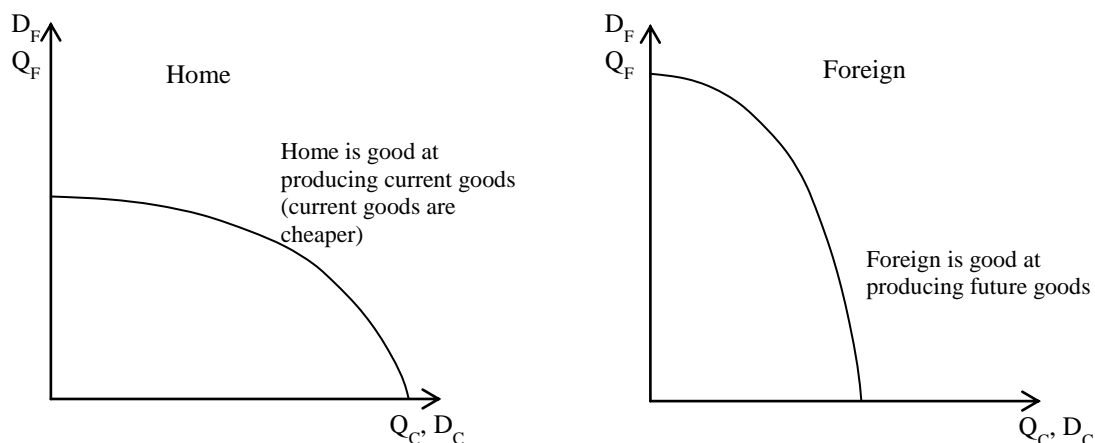
- In absence of international borrowing & lending, the relative price of future consumption to be higher in Home than in Foreign, and thus of we open the possibility of trade over time, we would expect Home to export present consumption and import future concumption.

< Real Interest Rates>

- The trade-off is one unit of consumption in the present for $(1+r)$ units in the future, the relative price of future consumption is $1/1+r$
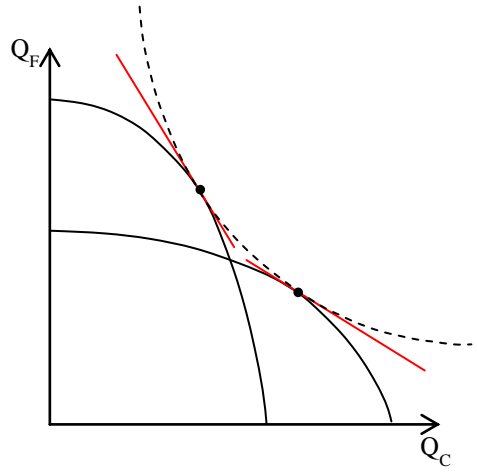

- When the relative price of future consumption rises (r falls), a country responds by investing more; this increases the supply of future consumption relative to present consumption and implies an upward-sloping relative supply curve for future consumption.

- Intertemporal relative demand curve that relates the relative demand for future sonsumption to its relative price $1/1+r$.

<Fig 6-11: Equilibrium Interest Rate with Borrowing and Lending>

- At the equilibrium real interest rate, Home will export present consumption in return for imports of future consumption.

- Intertemporal Trade: Exchange goods today in return for some goods in the future.
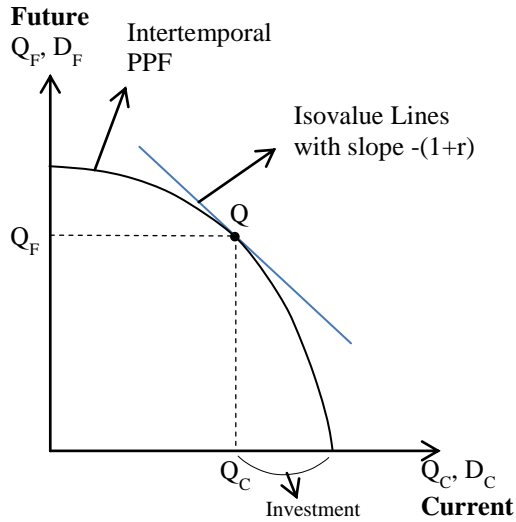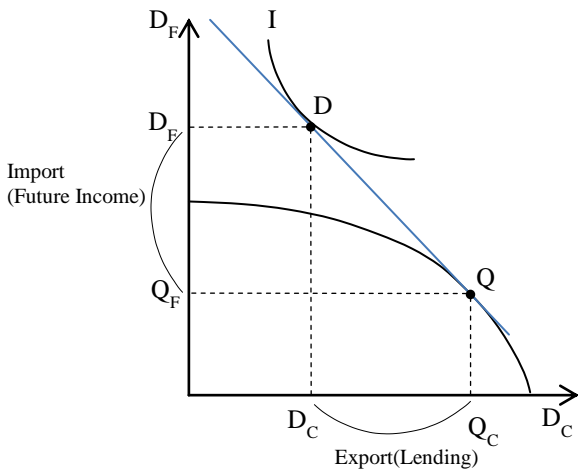

$V = Q_C + Q_F/1+r$ ⠀⠀(Q_C = Current Production)

⠀⠀⠀⠀⠀⠀⠀⠀⠀(Q_F = Future Production)

$Q_F = -(1+r)Q_C + (1+r)V$

- If r goes up, investment drops.

<Fig 6A-1: Determining Home's Intertemporal Production Pattern>

$D_C + D_F/1+r = Q_C + Q_F/1+r$: Intertemporal Budget Constraint

→ $D_F - Q_F = (1+r)(Q_C - D_C)$: Intertemporally Balanced!
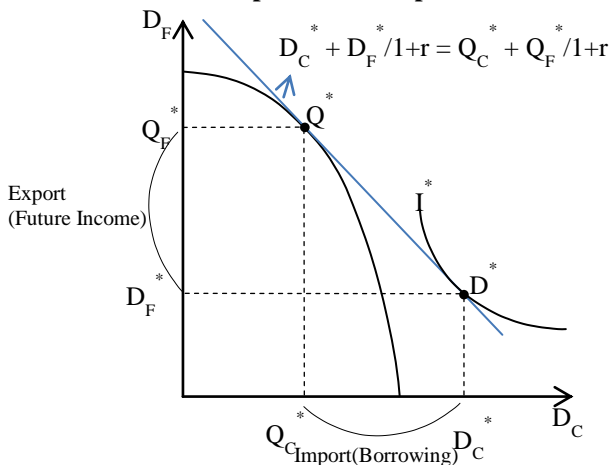
<Fig 6A-2: Determining Home's Intertemporal Consumption Pattern>

A high real interest rate corresponds to a high return on investment, that is, a high return to diverting resources from current production of consumption goods to production of capital goods, construction, and other activities that enhance the economy's future ability to produce.

<Fig 6A-3: Determining Foreign's Intertemporal Production and Consumption Pattern>

< Intertemporal Comparative Advantage>

- A country that has a comparative advantage in future production of consumption goods is one that in the absence of international borrowing and lending would have a low relative price of future consumption, that is, a high real interest rate.

  - This high real interest rate corresponds to a high return on investment, that is, a high return to diverting resources from current production of consumption goods to production of capital goods, construction and other activities that enhance the economy's future ability to produce.