

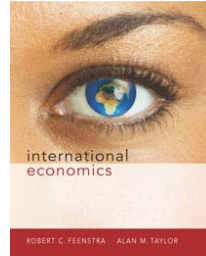
Advanced International Economics

ECON 758

Professor Yamin Ahmad

Lecture 2: Tools of Analysis for International Trade Models

- Partial and General Equilibrium
- Production Possibility Frontiers
- Indifference Curves



In This Lecture

- Assumptions of the Basic Model
- Price Line
- Production Possibilities Frontier and MRT (marginal rate of transformation)
- Consumer Indifference Curves and MRS (marginal rate of substitution)
- Closed Economy (Autarky) Equilibrium
- National Demand and Supply Curves

Note: These lecture notes are incomplete without having attended lectures

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Economic Methodology

- **Economic Model**—an abstraction (simplification) of reality; use mathematics to represent real world ideas.
 - Geometric model: limited to 3 dimensions
 - Algebraic model: not hampered by dimensionality limitations
- **Positive analysis** — the analysis of economic behavior without making recommendations about what is or ought to be.
- **Normative analysis** — economic analysis that makes value judgments about what is or should be.

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Types of Economic Models

- **Partial equilibrium (PE) model** — output, consumption, prices and trade are determined for a particular market or good, one at a time.
 - Typically ignore resource constraint
- **General equilibrium (GE) model** — output, consumption, prices, and trade are all determined simultaneously for all goods.
 - Incorporates resource constraint

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The Basic General Equilibrium Model

General Model Assumptions

1. Rational Behavior
2. Two Country, Two Good World
3. No Money Illusion

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Assumption 1: Rational Behavior

- Economic agents (producers and consumers) are goal-oriented.
- Consumers **maximize** satisfaction (“**utility**”), subject to constraints.
- Firms **maximize profit**, subject to constraints.

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Assumption 2: Two-country, Two-good World

- **Two countries:** America (A) and Britain (B)
- **Two goods:** Soybeans (S) and Toys (T)
- Goods are identical in both countries.
- Some of both goods are always consumed in both countries.

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Assumption 3: No Money Illusion

- **No money illusion** means that economic agents make decisions based on changes in all prices.
- **Nominal price** — a price expressed in terms of money.
- **Relative price** — a ratio of two product prices.

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Relative Price Rule

- If $P_S / P_T = k$,
then 1 unit of $S = k$ units of T (in value)
or
1 unit of $T = 1/k$ units of S (in value)



A Very Simple Example...

- Suppose $P_S = 10$; $P_T = 5$;
- *Question:* How many T's would be of equal value to four S's?

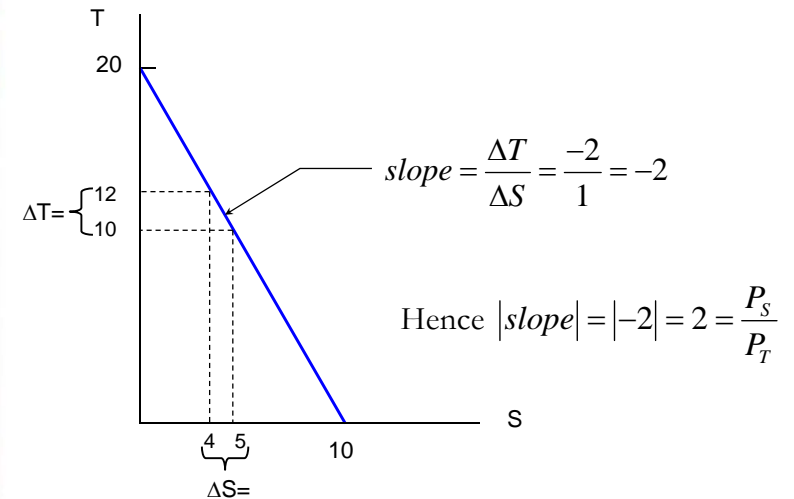


Tool of Analysis: Price Line

- **Price Line (PL)** — shows combinations of two goods that can be purchased with a fixed amount of money.
- Money (M) = $P_S \times S + P_T \times T$
- |Slope of PL| = relative price (P_S / P_T)
- **Shift of PL** — caused by a change in income (money).
- **Rotation of PL** — caused by a change in one product price, other things constant.



Example of a Price Line



Production/ Supply Side

Supply Side Assumptions

4. Fixed Resources and Technology
5. Perfect Competition
6. Perfect Mobility of Resources

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Assumption 4: Fixed Resources and Technology

- **Tool of analysis: Production Possibilities Frontier (PPF)**
- **PPF** — shows maximum amount of one good that can be produced given the country's fixed resources and technology and the level of output of the other good.

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Features of a Production Possibilities Frontier

- Full and efficient employment of resources
- Slope of PPF = opportunity (social) cost

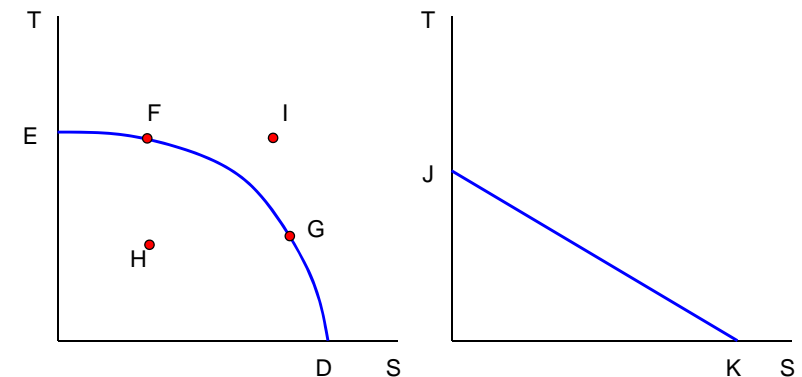
$$= \frac{\Delta T}{\Delta S}$$
 (Marginal Rate of Transformation – MRT)
- Shape of PPF:
 - constant cost (linear PPF) vs.
 - increasing cost (bowed out/concave PPF)

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Examples of PPFs

- a) Increasing Opportunity Cost b) Constant Opportunity Cost

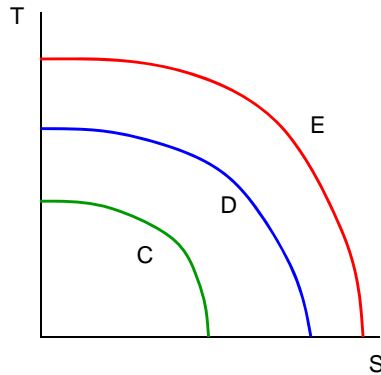


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Production Possibilities Frontier (cont.)

- Question: Which of the PPF's below represent greater production in the economy?



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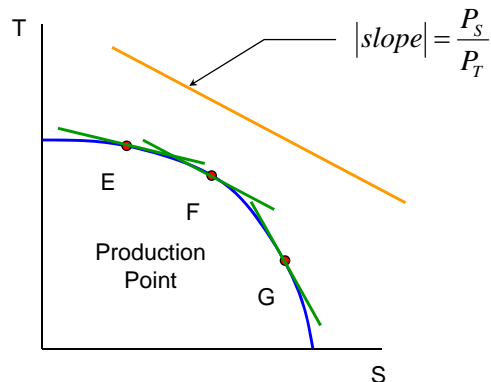
Assumption 5: Perfect Competition in Both Industries in Both Countries

- Price equals marginal cost or
slope of PPF = slope of PL
i.e. $\frac{\Delta T}{\Delta S} = \frac{P_S}{P_T}$
 $MRT = \frac{P_S}{P_T}$
- Labor unions are not present
- Hence the price ratio is determined by the slope of the PPF!

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Relationship Between Price Line and Production Point



- Slope of PPF (MRT) = Slope of Price Line (P_S/P_T)

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Assumption 6: Resources Perfectly Mobile Between Industries

- Resources earn the same payments in both industries within a country.
 - Factors of production will move between industries in response to any potential differences in factor payments
 - Factors (e.g. labor) earn the same factor payments (i.e. wages) in both industries within a country

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Demand Side

Demand Side Assumptions

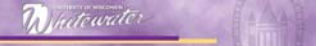
7. “Social” or “National” Indifference Curves

Tool of Analysis: Indifference Curves

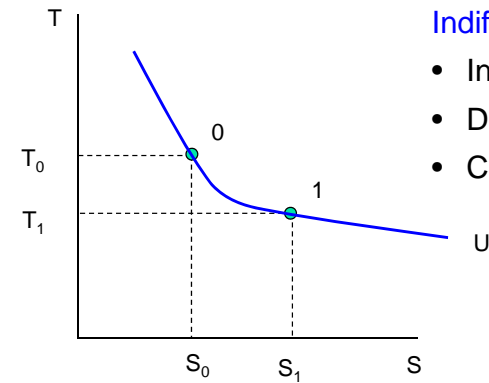
- Represents demand side of the economy (consumers)
- **Indifference Curve** — shows combinations of two goods that yield the same level of satisfaction (“**utility**”) to a consumer.

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An Indifference Curve



Indifference Curves are:

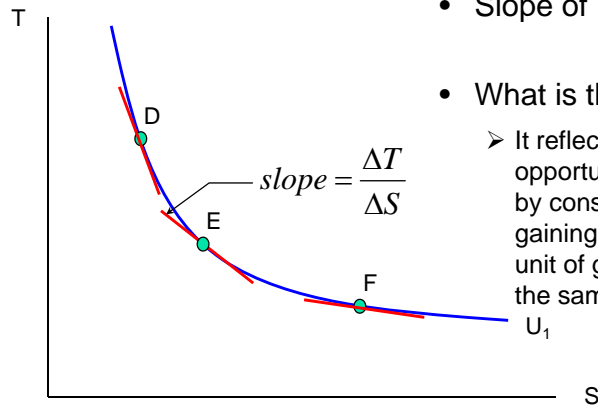
- Individual Specific
- Downward Sloping
- Convex to the origin

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Marginal Rate of Substitution (MRS)



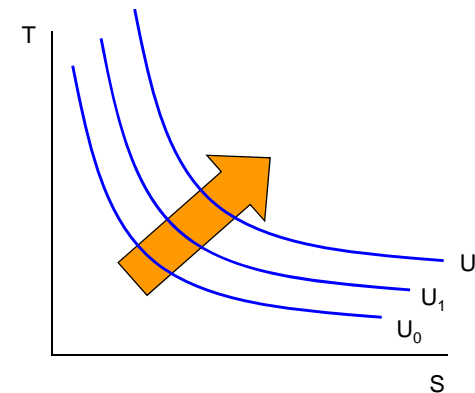
- Slope of IC = MRS
= $\Delta T / \Delta S$
- What is the MRS?
 - It reflects the opportunity cost faced by consumers of gaining an additional unit of good S, but at the same level of utility.

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Indifference Curves (cont.)



- Higher Indifference Curves represent higher levels of utility.
- Why? U_1 and U_2 represent combinations of T and S that are at least the same (if not more) of either good (compared to U_0).

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Some Things to Think About...

- Question: Can indifference curves cross?
- Answer:

- Question: Are the indifference curves “parallel”?
- Answer:

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Properties of Indifference Curves

To summarize, indifference curves are:

- Individual-specific
- Downward-sloping
- Convex to the origin
- Higher curves indicate higher levels of satisfaction
- Non-intersecting
- Slope of indifference curve is the **marginal rate of substitution (MRS)**

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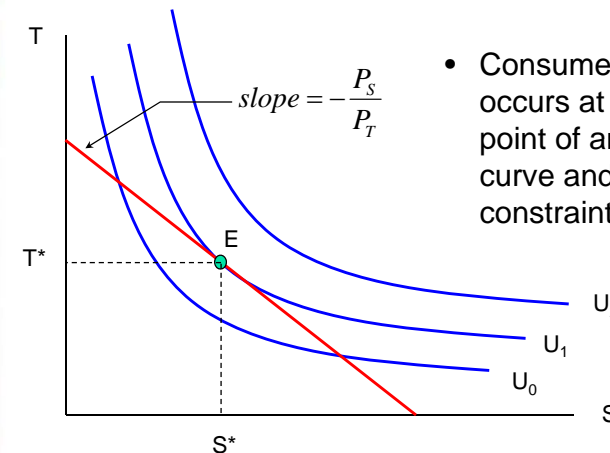
Consumer Utility Maximization

- **Consumer maximizes utility** subject to an income or **budget constraint** (price line)
- What does this mean?...
 - Given your budget (income), you try and pick combinations of S and T that lie within your budget whilst giving you the greatest utility!

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Consumer Utility Maximization



- Consumer solution occurs at the tangency point of an indifference curve and the budget constraint.

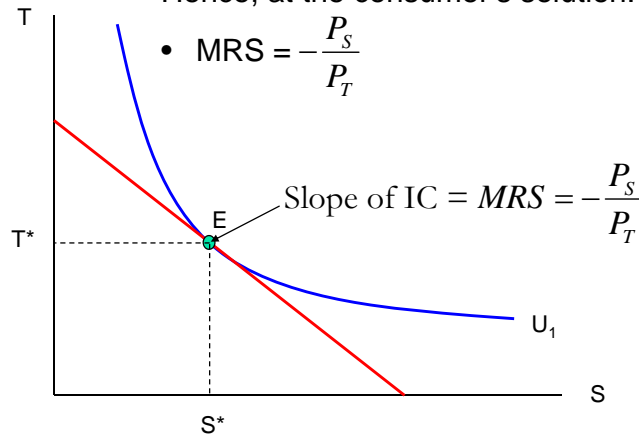
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Consumer Utility Maximization

Hence, at the consumer's solution:

- $MRS = -\frac{P_S}{P_T}$



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Assumption 7: Social Indifference Curves

- **Social or National Indifference Curves (SIC)** represent the consumption preferences of the consumers in a country.
- Problem: group preferences may not be consistent.
 - Quick illustration: Condorcet's Voting Paradox

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TABLE 2.1 Illustration of Condorcet's Voting Paradox

Order of Preference	Moe	Larry	Curly
1	A	B	C
2	B	C	A
3	C	A	B

3 bundles of goods: A, B and C

- A vs. B: A wins two votes to one
- B vs. C: B wins two votes to one
- Does that mean A is preferred to C?

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General Equilibrium Model for a Closed Economy (Autarky)

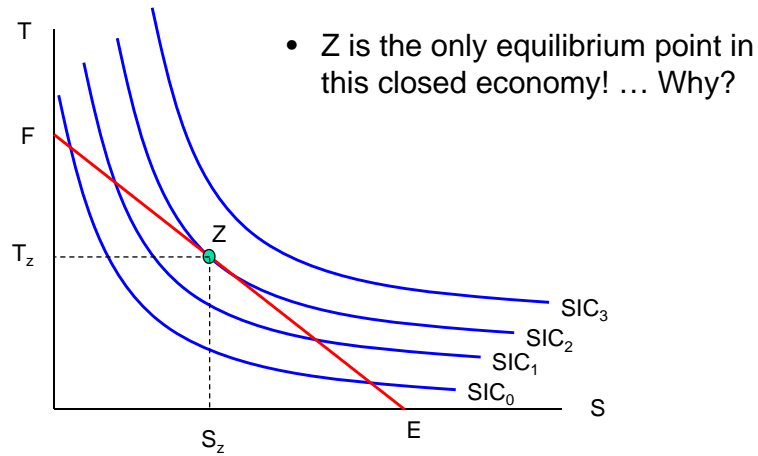
Definitions:

- **Autarky** — self-sufficient country before trade, i.e. it represents the level of production and consumption that would in a country in the absence of trade
- **Equilibrium** — tangency point of the PPF and Social Indifference Curves
 - i.e. $MRT = MRS$

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General Equilibrium for a Closed Economy: Constant Opportunity Costs

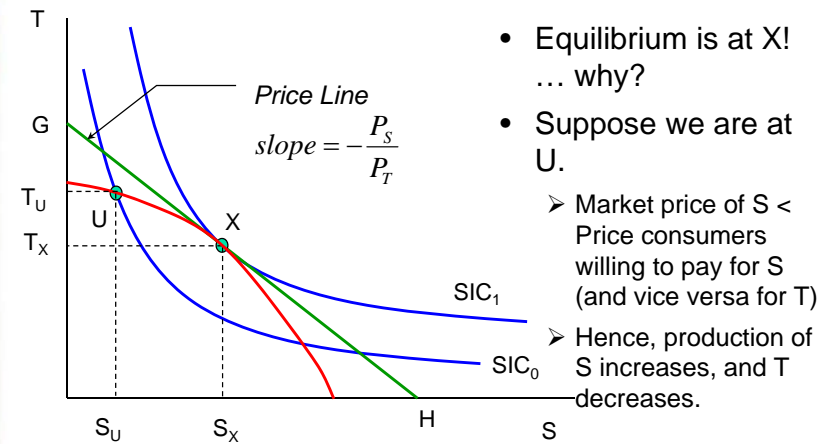


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General Equilibrium for a Closed Economy: Increasing Opportunity Costs

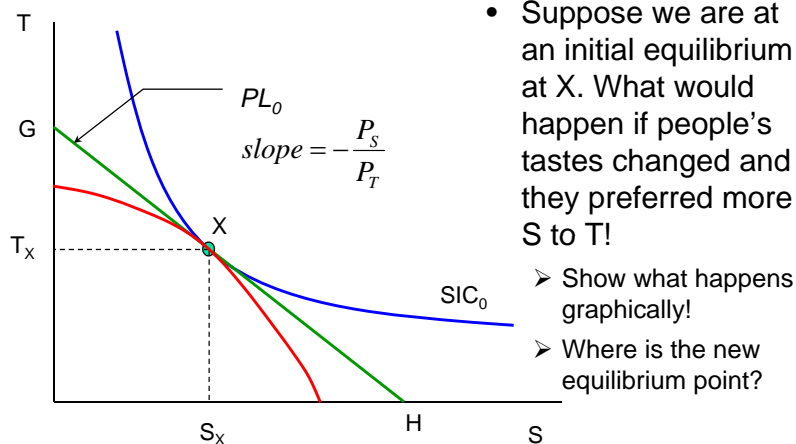


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Tricky Question #1:



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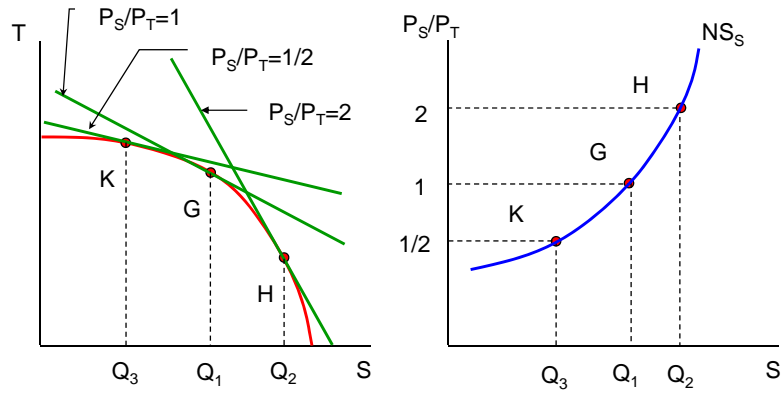
Another Way of Showing General Equilibrium for an Economy

- **National Supply Curve** — shows the amounts of a good produced in a nation at various relative prices for that good.
- **National Demand Curve** — shows the amounts of national consumption of a good at various relative prices.

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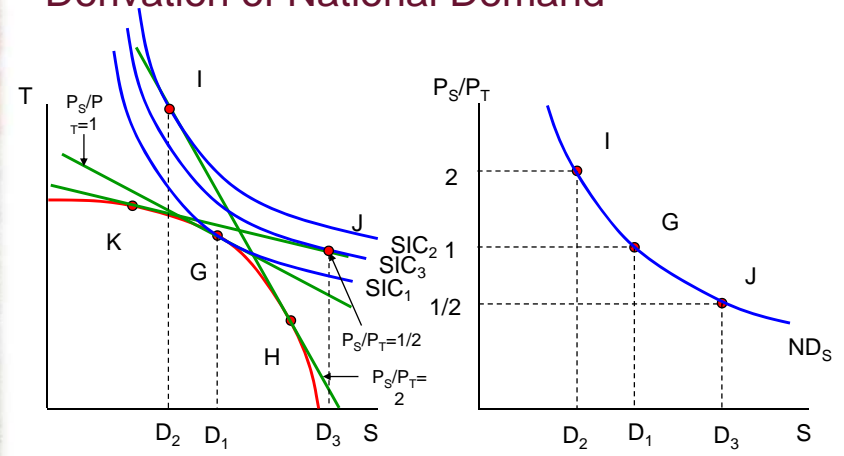
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Derivation of National Supply



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Derivation of National Demand



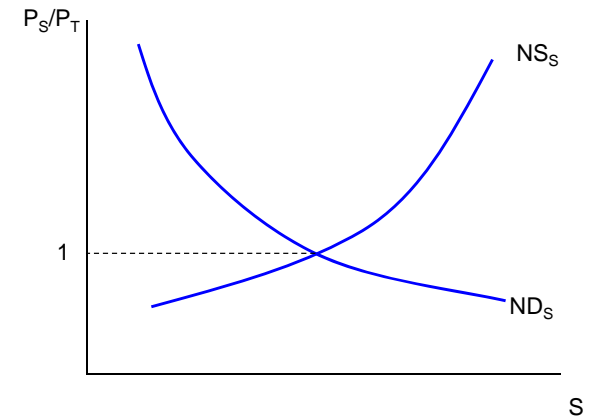
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Autarky Equilibrium

- **Equilibrium autarky price** — determined at the intersection of National Demand curve and the National Supply curve.

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Alternative Derivation of Autarky Price Ratio



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Trade Based on Differences in Autarky Prices

- If country A has a lower autarky relative price of S, then it has a **comparative advantage** in S and a **comparative disadvantage** in T.
- International trade can occur based on comparative advantage.
 - We shall see this next lecture...



International Differences in Autarky Prices

