

International Trade: Costs and Benefits

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Issues

- ▶ Why do countries trade?
- ▶ Is trade beneficial?

Concerns about trade

Imports cost jobs

"It requires about 2.5 million full-time workers to produce \$100 billion worth of exportable goods and services. Since the rest of the world has been running a \$100 billion trade surplus with the United States, at least 2.5 million workers in the rest of the world owe their jobs to that surplus." – Lester Thurow

Trade reduces wages

*"Companies that produce goods in foreign countries to take advantage of cheap labor should not be permitted to **dictate the wages** paid to American workers." – Philadelphia Inquirer*

Trade costs "good" manufacturing jobs

Competitiveness

How can we compete with low wage countries?

Each nation is “like a big corporation competing in the global marketplace” - President Clinton

Competitiveness is a major concern when it comes to

- ▶ regulation
- ▶ wage setting
- ▶ taxes
- ▶ trade restrictions

Concerns about trade

Most of the above concerns are (largely) based on a misunderstanding.

There are valid concerns about trade.

But they are mostly about **redistribution** within the U.S.

More recent concerns:

- ▶ global supply chain disruptions (semiconductors)
- ▶ trade as a weapon (energy)

Comparative Advantage

Comparative Advantage

The key benefit of trade:

Countries can **specialize** in what they are particularly good at.

A major insight of economics:

International trade is determined by comparative advantage.
(So is within country trade)

Absolute advantage

Simple example:

- ▶ there are 2 good (Apples, Computers)
- ▶ there 2 countries (North, South).
- ▶ productivities are $z_{i,c}$
- ▶ e.g.: one unit of labor produces $z_{A,N}$ Apples in North.

Definition

N has an absolute advantage in A, if it has higher productivity:

$$z_{A,N} > z_{A,S}.$$

Absolute advantage

Rich countries have an absolute advantage in most goods.

- ▶ Except for highly localized goods (bananas), rich countries are highly productive at making just about anything.

This is where the (poor country's) concern about competitiveness comes from.

- ▶ How can we compete with the U.S., if our productivity is so much lower?

Fact

Absolute advantage is irrelevant for international trade.

Comparative advantage

Definition

N has a comparative advantage in A, if it has higher relative productivity (lower relative unit costs):

$$\frac{z_{A,N}}{z_{C,N}} > \frac{z_{A,S}}{z_{C,S}} \quad (1)$$

In words:

N's productivity **advantage** for good *A* ($z_{A,N}/z_{A,S}$) is greater than for good *C*.

The basic idea:

Should Tiger Woods cut his own grass, do his own taxes, drive his own car ...?

Comparative advantage example

Productivities:

	North	South
Apples	10	2
Computers	10	1

North has an absolute advantage in both goods: $10 > 2$ and $10 > 1$.

South has a comparative advantage in Apples: $\frac{2}{1} < \frac{10}{10}$.

Looking ahead: South will (successfully) export Apples to North.

Trade with production – Example

- ▶ 2 countries: North and South
 - ▶ indexed by $j \in (N, S)$
- ▶ 2 goods: Apples and Computers
 - ▶ indexed by $g \in (A, C)$
- ▶ Households spend half of their incomes on each good.
 - ▶ harmless simplification
- ▶ North is more productive in all goods (**absolute advantage**).
- ▶ The point: there are still gains from trade for both countries.

Trade with production

	North	South
Labor force L_j	100	400
Productivity: apples / worker $z_{A,j}$	160	100
Productivity: computers / worker $z_{C,j}$	16	2
Productivity ratio: z_C/z_A	10	50

Absolute advantage:

Labor productivity is higher in the North for all goods.

Comparative advantage:

- ▶ $\frac{160}{16} < \frac{100}{2}$
- ▶ South has comparative advantage in Apples.

Popular concerns about trade

- ▶ South:
 - ▶ can we compete with the productive North?
 - ▶ We need protection.
- ▶ North:
 - ▶ can we compete with the low wage South?
 - ▶ It will drive down our wages.

The point we will make

Countries can always compete with each other.

Competitiveness applies to firms, but not to countries.

Thinking ahead: what is the key difference between countries and firms?

Autarky

Let's solve for the equilibrium without trade (autarky).

Notation:

- ▶ price of apples = 1 (why can we do this?)
- ▶ price of computers = p_j .
- ▶ wage rate w_j .
- ▶ all differ across countries

Technologies

Labor is the only input.

$$\underbrace{Y_{g,j}}_{\text{output}} = \underbrace{z_{g,j}}_{\text{productivity}} \times \underbrace{L_{g,j}}_{\text{employment}} \quad (2)$$

for each good g (A, C) and country j (N, S).

Total income = total earnings = $w_j L_j$.

Income per capita: w_j .

Demand functions

Everyone spends half of their income of each good.

Computers:

$$p_{C,j}C_{C,j} = 0.5w_jL_j \quad (3)$$

Apples:

$$C_{A,j} = 0.5w_jL_j \quad (4)$$

This is for analytical simplicity only.

Autarky wages

Workers are paid their marginal products in both sectors

North:

- ▶ producing apples (the numeraire): $w_N = 160[\text{apples}] = 160$
- ▶ producing computers: $w_N = 16[\text{computers}] = 16p_N$
- ▶ mobile labor: $160 = 16p_N \implies p_N = 10[\text{apples}/\text{computer}]$

Note: the relative price p_N equals the productivity ratio $z_{A,N}/z_{C,N}$.

Autarky wages

South:

- ▶ producing apples: $w_S = 100$
- ▶ producing computers: $w_S = 2p_S$
- ▶ $p_S = 50 [\text{apples}/\text{computer}]$

No surprise: computers are expensive where they are difficult to make.

Employment and output

How is labor allocated across sectors?

That's determined by the demand for goods.

Assumption: half of income ($0.5wL$) is spent on each good

- ▶ $C_{A,j} = p_j C_{C,j} = 0.5w_j L_j$

The value of output equals factor costs

Apples:

- ▶ labor is the only input; cost $w_j L_{A,j}$
- ▶ demand: $0.5w_j L_j$
- ▶ $L_{A,j} = 0.5L_j$

Half of employment is in apples, half in computers

Autarky summary

	North	South	Note
Wage	160	100	$w = z_A$
Price of computers	10	50	$p = z_A/z_C$
Consumption: A	80	50	$0.5wL$
Consumption: C	8	1	$0.5w/pL$
Fraction working in A sector	50%	50%	cost = revenue
Fraction working in C sector	50%	50%	
Apple output	8,000	20,000	$z_A L_A$
Computer output	800	400	$z_C L_C$

Note: all prices are in apples (the numeraire)

Comparative Advantage

- ▶ North has higher labor productivity in both goods – **absolute advantage**.
- ▶ **Comparative advantage** looks at relative labor productivities.
- ▶ South: Productivity apples / computers = $100/2 = 50$
- ▶ North: Productivity apples / computers = $160/16 = 10$.
- ▶ South has comparative advantage in apples.

Comparative Advantage – Intuition

Think again about Tiger Woods's lawn...

What is the opportunity cost of a computer in North / South?

Free trade

- ▶ Who produces what?
- ▶ With free trade, each good costs the same in both countries.
 - ▶ Law of one price
- ▶ Normalize the price of apples to 1 again.
- ▶ It costs 10 to produce computers in the North, but 50 in the South.
- ▶ The price of computers must be between 10 and 50.

Let's try to find an equilibrium with $10 < p < 50$ (strict inequalities)

Free trade: South

Apple sector:

- ▶ $z_{A,S} = 100$
- ▶ price of apples = MC: $1 = w_S/100$
- ▶ that pins down $w_S = 100$ (for both sectors!)

Computer sector:

- ▶ price of home grown computers = MC: $w_S/2 = 50 > p$

South cannot produce computers - it specializes in **apples**.

Free trade: South

Let's compute prices and quantities produced.

- ▶ employment in apples (everyone): $L_{A,S} = 400$
- ▶ apple production = income:

$$Y_{A,S} = z_{A,S} \times L_{A,S} = 100 \times 400 = 40,000 \quad (5)$$

$$= w_S L_{A,S} \quad (6)$$

- ▶ consumption of apples (half of income): $C_{A,S} = 20,000$
- ▶ consumption of computers (half of income): $p \times C_{C,S} = 20,000$

We don't know p yet.

Free trade: North

Computer sector:

- ▶ $z_{C,N} = 16$
- ▶ $p = w_N/16$.
- ▶ We don't know w_N yet.

The example is rigged so that the North only produces computers. In general, one country would produce both goods and the other would produce the good with comparative advantage.

Free trade: North

Employment in computers (everyone): $L_{C,N} = 100$

- complete specialization

Computer production:

$$Y_{C,N} = z_{C,N}L_{C,N} = 16L_c = 1,600 \quad (7)$$

Income: $1,600p$.

Spending on apples (half of income): $C_{A,N} = 800p$

Spending on computers (half of income): $pC_{C,N} = 800p$

$$C_{C,N} = 800$$

Free trade: Market clearing

Computers:

$$Y_{C,N} = C_{C,N} + C_{C,S} \quad (8)$$

$$= 800 + 800 \quad (9)$$

Spending on computers:

$$pC_{C,S} = p \times 800 = 20,000 \quad (10)$$

This pins down $p = 20,000/800 = 25$

Income: $Y_N = 1,600p = 40,000$

Free trade

	North	South
Wage	16	100
Price of computers	25	25
Consumption: apples	20,000	20,000
Consumption: computers	800	800
Fraction working in apple sector	0%	100%
Fraction working in computer sector	100%	0%
Apple output	0	40,000
Computer output	1,600	0

Free trade

- ▶ Consumption of both goods rises in both countries (weakly).
- ▶ Welfare definitely improves.
- ▶ Real wages rise in both countries.
 - ▶ South: $w = 100$ (apples), but w rises in terms of computers
 - ▶ North: $w = 16p$ (computers), but w rises in terms of apples.

Competitiveness

Both countries worry about competitiveness:

- ▶ North: Wages are too low in the South
- ▶ South: Productivity is too high in the North

Both are mistaken.

- ▶ Wages are low because productivity is low.
- ▶ This ensures that both countries are competitive in some goods.

Productivity Growth in the South

	North	South	Note
Labor force	100	400	unchanged
Productivity: apples / worker	160	200	was 100
Productivity: computers / worker	16	4	was 2

We double productivity in the South.

Productivity Growth in the South

Try an equilibrium where the North specializes in computers and the South in apples.

South (specialize in A):

- ▶ everyone produces A: $L_{A,S} = 400$
- ▶ $Y_{A,S} = z_{A,S}L_{A,S} = 400 \times 200 = 80,000$ (doubles of course)
- ▶ $w_S = 200$ (doubles of course).
- ▶ income: $Y_S = 80,000$ ($p_A = 1$).
- ▶ consumption (half of income): $C_{A,S} = 0.5 \times 80,000 = 40,000$

Productivity, income, $C_{A,S}$ all double.

Productivity Growth in the South

North (specializes in C):

- ▶ $L_{C,N} = 100$.
- ▶ $Y_C = z_{C,N}L_{C,N} = 100 \times 16 = 1,600$ (unchanged of course).
- ▶ $w_N = 16 \times p$ (unchanged real wage).
- ▶ $pY_N = 1600p$ (unchanged).

Market clearing

- ▶ $C_{A,N} = 0.5 \times 1,600p = 40,000$ (not eaten in South; doubled)
- ▶ $p = 50$
- ▶ effectively: the price of apples fell by half

In both countries: $C_{A,j} = 40,000$ (doubles) and $C_{C,j} = 800$ (unchanged).

Welfare gains.

Lessons

Trade improves welfare (the size of the pie):

- ▶ allowing a country to borrow and save
- ▶ allowing a country to specialize in highly productive goods

The more different the countries, the more beneficial trade is.

Lessons

Both rich and poor countries benefit from trade.

- ▶ Your wages are not set in China.
- ▶ They are the marginal product of U.S. labor.

Competitiveness is not an issue.

One way of thinking about trade: a production technology.

- ▶ make (U.S.) corn into (Japanese) cars.
- ▶ foreign productivity growth is good.

If trade is so great, why is it not popular?

Recap Questions

1. Do we gain more from trading with Germany or with Thailand?
Reality check: who do we actually trade more with?
2. How would **dumping** change the conclusions?
Dumping: the foreign country exports its good below cost.
3. What happens if we have fixed capital?
Example: automobile factories that cannot be repurposed when we import cars.

Intra-Industry Trade

Most trade occurs between similar countries (e.g., rich with rich).

The reason is not comparative advantage, but **scale economies**

- ▶ we will discuss this more when we talk about growth

When firm / industry productivity increases with scale, we get

- ▶ intra-industry trade:
a country imports and exports different varieties of the same good (e.g., cars)
- ▶ vertical integration:
a country imports the parts that go into the final good (e.g., tires)

Opposition to Trade

Why so much opposition to free trade?

Trade debates are usually about **redistribution**, not about efficiency.

- ▶ Workers in import competing industries lose their jobs
 - ▶ U.S. cars, European agriculture
 - ▶ Displaced workers suffer permanent earnings losses (Autor, 2016)
- ▶ Trade can increase the skill premium / reduce demand for unskilled labor.
- ▶ Loss of high value added jobs
 - ▶ “Our standard of living can only rise if capital and labor increasingly flow to industries with high value-added per worker.” – Magaziner and Reich
- ▶ Trade policy as a lever for human rights or environmental concerns
 - ▶ E.g.: WTO, MFN for China.

Why so much opposition to free trade?

Free trade (like all change) destroys existing capital

- ▶ physical capital: plants become obsolete
- ▶ human capital: skills become obsolete

The key problem:

- ▶ the “losers” are geographically concentrated
- ▶ e.g. Rust Belt, Detroit
- ▶ workers are quite immobile (geographically and occupationally)

How to shield the “losers” without giving up the gains from trade (and innovation)?

Could trade lower a country's GDP?

One idea: **strategic sectors**

Imagine a world with 2 goods: apples and computers

- ▶ Apples are boring: grow trees and pick apples
- ▶ There is innovation in computers
- ▶ Innovators earn monopoly rents

If a country can specialize in computers, its GDP (growth) can rise

Key: **temporary** trade restrictions can **permanently** rearrange comparative advantage

Main motivation of industrial policies

Summary

Trade increases the size of the pie through

- ▶ specialization (comparative advantage)
- ▶ scale effects

Competitiveness is not an issue at the country level.

Trade also redistributes the pie.

Losers are:

- ▶ those employed in import competing sectors (textiles, toys, ...)
- ▶ the unskilled

Reading

Blanchard / Johnson, Macroeconomics, 6th ed., ch. 19-6

Additional reading:

- ▶ Jones, Macroeconomics, ch. 14.

Advanced reading:

- ▶ Coughlin (2002) nicely summarizes the benefits of free trade.
- ▶ Autor (2016) summaries the costs of trade as well.

References I

- Autor, D. H. (2016): "International trade and U.S. worker welfare: understanding the costs and benefits," Washington Center for Equitable Growth.
- Coughlin, C. C. (2002): "The controversy over free trade: the gap between economists and the general public," *Federal Reserve Bank of St. Louis Review*, 84.