Production Possibility Frontier Econ 1101

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Production Possibility Frontier

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ECON 1101 Lecture 7.2

1. Production Possibility Frontier (introduction, autarky)

Plan

2. Comparative advantage and gains from trade

3. Increasing returns to scale: gains from trade

4. Real world ex: international division of labor

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1. Production possibility frontier

Production possibility frontier

- Introduction
- Simple example
- Setup and Autarky

Comparative advantage and gains from trade

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2. Comparative advantage and gains from trade

Comparative advantage and gains from trade

- Open to trade (trading with some one else)
- Concepts of absolute advantage and comparative advantage
- Trade based on comparative advantage
- Gains from trade (example of Pareto improvement)
- Comment: Ricardian Trade

Ricardian Trade

The idea of comparative advantage as basis for trade dates back to **David Ricardo** (1772-1823)



His model of trade (based on CA) still works (200 years later)

- Countries with low-skill labor (and hence low opportunity cost): specialize in producing low skill goods, (labor-intensive goods)
- Countries with high skill labor (high capital): specialize in producing high skill goods, (engineering, services computers)

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Ricardo: Comparative advantage trade



Comparative advantage and gains from trade

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3. Increasing Returns and Gains from trade

Increasing Returns and gains from trade

- Increasing returns: when the opportunity cost decreases as we produce more (think of learning by doing)
 - PPF (not a straight line)
- Trade based on increasing returns
- Some real life examples

Increasing Returns

For Robinson and Friday we assume that productivity was constant regardless of how many fish they already caught or coconuts picked

• What if they got better at catching fish with the amount they caught or with the coconuts they picked?

Increasing returns to scale (IRS) - productivity improves with the amount of production

- What are some reasons we might observe this?
 - (1) Learning by doing (get better with experience)
 - (2) Large-scale production more efficient (think of a factory producing 1 million units versus 1 unit per factory)

Increasing Returns and PPF

With increasing returns, the PPF is bent inward

• Steeper "ends" represent **increasingly better skill** at picking or catching with more production

Recall the better the skill the lower the opportunity cost, this implies:

- as slope is becoming less and less steep with more production
- the opportunity cost is becoming smaller with more production

Let's see how does this look like...

Increasing Returns to Scale, PPF looks like:



We can see OC of one more fish falls as fish production increases

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IRS and decreasing OC

In terms of slope of the curve decreases as we go down the curve (increase production), which means opportunity cost of fish is decreasing



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IRS and Trade Patterns

Now suppose Robinson can trade with his twin brother (Robinson 2) who lives in the next island

- Robinson1 and Robinson2 are equally productive (they both have the same technology) with IRS
- Note since they are identical no one has a comparative advantage

In autarky they could either produce 24 coconuts or 24 fish

- Keeping our assumptions (they prefer mixed bundles) they might produce **7 fish and 7 coconuts in Autarky**
- The cost is they sacrifice some learning by doing by not specializing
- This is with autarky they still might do both (no specialization) even if not particularly good at either task without specialization

IRS and Trade Patterns

- Autarky: produce 7 and consume 7. Cost: sacrifice some learning by doing
- Now suppose Robinson1 can trade with Robinson2

If they decide to trade they can take advantage if the increasing returns to scale by specializing:

Consider the following:

- Robinson 1: Produces 24 Fish 0 Coconuts
- Robinson 2: Produces 0 Fish 24 Coconuts
- Each consumes 12 Fish 12 Coconuts

Robinson 1 and Robinson 2: Specialization

Trade pattern

• Robinson 1

	Produce	Consume
Autarky	7 F, 7 C	7F, 7 C
Trade	24F, 0 C	12F, 12 C

• Robinson 2

	Produce	Consume
Autarky	7 F, 7C	7 F, 7 C
Trade	0 F, 24 C	12F, 12C

Lets see the graphs...

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IRS: Robinson 1



IRS: Robinson 2



Trade based on Increasing Returns to Scale

Interest in the theory of increasing returns is driven by the empirical observation that much trade is between similar countries

- U.S. and Canada,
- U.S. and Europe
- U.S. and Japan

all high skill countries that trade a lot among themselves

With increasing returns, through trade, it's possible to:

- (1) Have large production volumes of any given product
- (2) Have consumers consume a large variety (taste for variety)

Suppose MN were a country

- Suppose autarky (no trade with other states/countries),
- What would we consume? It wouldn't be so bad:



With trade can have even more variety

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Comparative advantage and gains from trade

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Application: International Division of Labor

International Division of Labor and the iPhone:

- iPhone 5 32GB is \$299.99 at Sprint
- (But Sprint pays Apple more than this, let's say \$600 as rough guess)
- How is this made and how is the money being divided up?



Components: about \$200? (Like Robinson 1 and Robinson 2 trading)

- All made in advanced economies (nations similar to US with high skill labor and capital intensive production)
 - high skill labor used to develop these top-of-the-line technologies.
 - capital intensive production processes use hardly any labor
- Toshiba (Japan) making memory
- Samsung (Korea) processor
- Infineon (Germany) baseband
- Broadcom (U.S) Bluetooth
- There are huge scale economies at work here, in research and development and development of production processes

We also have specialization according to comparative advantage (Like Robinson and Friday trading)

- Assembly in China (maybe \$10-\$15)
- Estimates of about \$6.50, but this seems low, may not include manufacture of the very nice box, etc.

• All components go to the massive Foxconn complex (300,000 workers!) for assembly. Assembly is labor intensive



• Specialization according to comparative advantage. Low skill workers earning about \$170 a month

Customer Service (Robinson / Friday Trade)

- Consumers need to call someone to get phone hooked up and resolve glitches. This is labor intensive, so goes where labor is cheap and the population can speak English.
- Philippines, where pay is \$500 a month.

- Apple (U.S) is estimated to keep more than half of the \$600! Employs high skill workers. The \$300 plus is a return on: medskip
 - "Innovations" like Siri



· Investments on things like Apple stores:



Apple store in New York



Apple store in Shanghai

• And could have used some of that money to fix the maps...



