Flashback: Gains From Trade

1) Specialization Gains: if production is done by whoever is best at it and where it is done best, then:
   1) world production rises
   2) world consumption rise

2) Productivity Gains
   a) More Competition
      Although producers don’t like this, it usually means lower costs and better products for consumers
   b) Increased Technology Transfer
      Technological progress is likely faster
   c) Economies of Scale
      Sometimes large scale production means lower costs per unit. Trade allows firms (ex. Airbus & Boeing) to produce for world markets, not just local markets.

Gains From Trade: Some Statements.

1) Kathy Lee only pays her overseas workers $5/day to work in a sweatshop to produce clothes for Americans. I don’t want any part of that exploitation!

2) A firm can hire labor for $1.50/hour if it moves to Malaysia. How can American workers compete?

3) I’ve heard that, in effect, nations are battling for the high tech, high productivity sectors. What happens if America loses?

This handout, and overheads for this handout, can be found at: http://faculty.tcu.edu/jlovett. Next go to “Introduction to Microeconomics;”, then “Chapter Reviews and Handouts”. Alternatively, just e-mail me at j.lovett@tcu.edu
Problem 1

<table>
<thead>
<tr>
<th>Absolute Costs (days of labor/output)</th>
<th>Productivity (output/unit of labor)</th>
<th>Comparative Costs (opp. costs/output)</th>
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<tbody>
<tr>
<td>Olive Oil</td>
<td>Wheat</td>
<td>Olive Oil</td>
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<tr>
<td>Troy</td>
<td></td>
<td>3 days jug</td>
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<tr>
<td>Lemnos</td>
<td>5 days jug</td>
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<table>
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<tr>
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<tr>
<td>Lemnos</td>
<td>Troy</td>
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</tbody>
</table>

Absolute Costs & Productivity in Olive Oil Production
- Which nation has the lowest absolute costs for Olive Oil production? _______________
- Which nation has the highest productivity in Olive Oil production? _______________
- Which nation has the absolute advantage in Olive Oil production? _______________

Absolute Costs & Productivity in Wheat Production
- Which nation has the lowest absolute costs for Wheat production? _______________
- Which nation has the highest productivity in Wheat production? _______________
- Which nation has the absolute advantage in Wheat production? _______________

Comparative Costs
- Which nation gives up the least wheat production when they produce a jug of olive oil? _______________
- Which nation has the comparative advantage in olive oil production? _______________
- Which nation gives up the least olive oil production when they produce a basket of wheat? _______________
- Which nation has the comparative advantage in wheat production? _______________

“Most Best” or “Least Worst” (bad grammar, but a good idea)
- In this example, one nation has an absolute advantage in both goods. Which nation has an absolute advantage in both goods? _______________
- What good is that nation “most best” at? _______________
- In this example, one nation is at an absolute dis-advantage in both goods. Which nation has an absolute dis-advantage in both goods? _______________
- What good is that nation “least worst” at? _______________
### Problem 1 - key

<table>
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<td>Wheat</td>
<td>Olive Oil</td>
<td>Wheat</td>
</tr>
<tr>
<td>Troy</td>
<td>3 days jug</td>
<td>4 days basket</td>
<td>0.33 Olive Oil day</td>
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<tr>
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<td>0.75 Wheat O.O.</td>
<td>1.33 O.O. Wheat</td>
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<tr>
<td>Lemnos</td>
<td>5 days jug</td>
<td>5 days basket</td>
<td>0.2 Olive Oil day</td>
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<tr>
<td></td>
<td>1.0 Wheat O.O.</td>
<td>1.0 O.O. Wheat</td>
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<td>Ratio</td>
<td>Troy</td>
<td>Lemnos</td>
<td>0.6 x 1.67 x</td>
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<td>“most best” at</td>
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<td></td>
<td>Olive Oil at Wheat</td>
<td>Olive Oil at Wheat</td>
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<td>Troy is</td>
<td>Lemnos is</td>
<td>“most best” at</td>
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<tr>
<td></td>
<td>“most best” at</td>
<td>“least worst”</td>
<td>Olive Oil</td>
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</table>

### Absolute Costs & Productivity in Olive Oil Production
- Which nation has the lowest absolute costs for Olive Oil production? **Troy**
- Which nation has the highest productivity in Olive Oil production? **Troy**
- Which nation has the absolute advantage in Olive Oil production? **Troy**

### Absolute Costs & Productivity in Wheat Production
- Which nation has the lowest absolute costs for Wheat production? **Troy**
- Which nation has the highest productivity in Wheat production? **Troy**
- Which nation has the absolute advantage in Wheat production? **Troy**

### Comparative Costs
- Which nation gives up the least wheat production when they produce a jug of olive oil? **Troy**
- Which nation has the comparative advantage in olive oil production? **Troy**
- Which nation gives up the least olive oil production when they produce a basket of wheat? **Lemnos**
- Which nation has the comparative advantage in wheat production? **Lemnos**

### “Most Best” or “Least Worst” (bad grammar, but a good idea)
- In this example, one nation has an absolute advantage in both goods. Which nation has an absolute advantage in both goods? **Troy**
- What good is that nation “most best” at? **Olive Oil**
- In this example, one nation is at an absolute dis-advantage in both goods. Which nation has an absolute dis-advantage in both goods? **Lemnos**
- What good is that nation “least worst” at? **Wheat**
Assume that each nation has 1000 laborers available per day.

Complete the Graphs on the next page. In particular:

- Graph each nation’s PPF (per day).
- Indicate the slope of each country’s PPF on your graph.
- Indicate where each country should produce. Assume complete specialization.
- Indicates each country’s exports, imports, and consumption. Make sure the amount of Olive Oil one country imports equals the amount of Olive Oil the other exports. Likewise, make sure the amount of Wheat one country imports equals the amount of Wheat the other exports. Finally, make sure both nations are gaining from trade. Note that there an infinite number of correct answers to this part.
- Indicate the rate at which the nations are trading (i.e. show the Terms of Trade)

Fill in the chart below with your results.

Gains from Specialization

<table>
<thead>
<tr>
<th></th>
<th>Troy</th>
<th>Lemnos</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Olive Oil</td>
<td>Wheat</td>
</tr>
<tr>
<td>Production</td>
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<td></td>
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<tr>
<td>- Exports</td>
<td></td>
<td></td>
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<tr>
<td>+ Imports</td>
<td></td>
<td></td>
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<tr>
<td>= Consumption</td>
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</table>

Assume the population = 1,000, i.e. the number of workers.

Consumption Capita/day
A change in absolute costs for Troy, but no change in Troy’s PPC or Comparative costs.

Greeks Sack Troy!
Troy — Troy has fallen. Agamemnon and his gang of Greeks sacked Troy last night. Reports indicate it was an inside job; the Greeks got inside the city without breaking down the city gates. Deidulès, has hypothesized that the Greeks invented flying machines called aeroplanes and dropped soldiers with large blankets to slow their fall. These “paratroopers” then opened the gates for a larger force of Greeks. Pasiaphi suggests that the Greeks might have built a wooden bull, filled it with Greek warriors, and waited for Trojans to take it inside their city. Theseus, however, discounts Pasiaphi’s theory as a load of more on TROJAN WAR on p XXV

Hermaphrodites Weds Self
Hermaphrodites, stating that “It is time for me to settle down and have children,” wed himself in a private ceremony on Samos. Prior to the wedding the couple was often in the headlines with their very public disagreements over everything from More on HAPPY COUPLE on p XXI

Cyclopes Eyes Tourism
Cyclopes, Prime Minister of Naxos, indicated that he wants to bring more visitors to his island. The Naxos Chamber of Commerce, to this end, plans an ad campaign title “Naxos: We’re More Than Just Sheep”. Sirens report that More on CYCLOPES on p XXII

Cretans Refuges Flee to Troy!
Troy — Troy, which only a year ago saw most of its physical capital laid in the Trojan War, is now experiencing a massive influx of refugees from Crete. The Cretan refugees report that their civilization collapsed. The Cretan government in Knossos could not be contacted to confirm this. This, in combination with the destruction of capital during the recent Trojan War will greatly reduce the capital a typical Trojan has to work with. Economic theory predicts that these two factors will greatly reduce output per worker hour in Troy. Falling productivity more on TROJAN WAR on p XXV

Hermaphrodites Seeks Divorce
Hermaphrodites, stating that “I don’t know who he is anymore. The magic is gone.”, filed for divorce in Samos. Hermaphrodites countered, stating “I love her but she won’t give me any space. I never get alone time. As sad as a divorce will be, I’ll relish the time by myself.” More on UNHAPPY COUPLE on p XXI

Sirens to Sing at Bass Hall
The Sirens open tonight at Bass Hall in downtown Troy. Daily Bugle Music critics who recently visited the Sirens... well... never returned. Nonetheless, ticket sales have surpassed all previous records at Bass Hall. Management claims that their decision to halt beavers made is More on Sirens on p XIX
Problem 2: Troy’s productivity has fallen in half, but it has twice the population. Its PPC is unchanged.

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<td>6 days jug</td>
<td>8 days basket</td>
</tr>
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<td>5 days jug</td>
<td>5 days basket</td>
</tr>
<tr>
<td>Ratio</td>
<td>Troy</td>
<td>Lemnos</td>
</tr>
<tr>
<td></td>
<td>Lemnos</td>
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</table>

Absolute Advantage
- Which nation has the absolute advantage in Olive Oil production? _______________
- Which nation has the absolute advantage in Wheat production? _______________
- Has this changed from problem 1? _______________

Comparative Costs
- Which nation has the comparative advantage in Olive Oil production? _______________
- Which nation has the comparative advantage in Wheat production? _______________
- Has this changed from problem 1? _______________

Putting It All Together
- Troy lost its absolute advantage. However, Troy’s comparative costs and comparative advantage remained unchanged. What happened to the standard of living in Troy? _______________
- What determines the products a country should produce if it wishes to gain from trade? _______________ (comparative costs, absolute costs)
- So …. If absolute costs by themselves do not determine what a country should specialize in, what, if anything, do they determine? _______________
Problem 2-key:  Troy’s productivity has fallen in half, but it has twice the population. Its PPC is unchanged.

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<tbody>
<tr>
<td>Troy vs Lemnos</td>
<td>0.6 x</td>
<td>0.8 x</td>
</tr>
<tr>
<td>Lemnos vs Troy</td>
<td>1.67 x</td>
<td>0.83 x</td>
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✦ Troy is “least worst” at Olive Oil.  ➪ Lemnos is “most best” at Wheat.
✦ Troy is “least worst” at Olive Oil.  ➪ Lemnos is “most best” at Wheat.
✦ Troy is “least worst” at Olive Oil.  ➪ Lemnos is “most best” at Wheat.

Absolute Advantage

- Which nation has the absolute advantage in Olive Oil production?  **Lemnos**
- Which nation has the absolute advantage in Wheat production?  **Lemnos**
- Has this changed from problem 1?  **Ya betcha!**

Comparative Costs

- Which nation has the comparative advantage in Olive Oil production?  **Troy**
- Which nation has the comparative advantage in Wheat production?  **Lemnos**
- Has this changed from problem 1?  **No. The relative (i.e. comparative) costs didn’t change, only the absolute costs.**

Putting It All Together

- Troy lost its absolute advantage. However, Troy’s comparative costs and comparative advantage remained unchanged. What happened to the standard of living in Troy?  **They sucked it up, man!**
- What determines the products a country should produce if it wishes to gain from trade?  **Comparative costs** (comparative costs, absolute costs)
- So …. If absolute costs by themselves do not determine what a country should specialize in, what, if anything, do they determine?  **The base standard of living from which a nation “trades up”**.
Assume that Troy has 2,000, and Lemnos has 1,000, laborers available per day.

Complete the Graphs on the next page. In particular:

- Graph each nation’s PPF (per day).
- Indicate the slope of each country’s PPF on your graph.
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<tr>
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Troy's population is 2,000. Lemnos's population is 1,000.
Do Absolute Costs (i.e. productivity) Matter?

No … when it comes to determining what a nation should produce.

No … when it comes to determining whether or not a nation can gain from trade.

Yes … when it comes to determining a nation’s standard of living.

Gains From Trade: 4 Principles

1) The Law of Comparative Advantage: Differences in comparative costs, not absolute costs, are what determine trade patterns. Regardless of comparative costs, any nation’s citizens (on average) will gain from free trade.

Harberger’s “Law”¹: Specialization gains ≅ 20% of amount traded.

U.S. 20% x 12% of GDP ≅ 2.5 % of GDP

≈ $300 Billion

≈ $990/person ($3,960 for a 4 person family)

But …by themselves, these are static (one time) gains.
2) Productivity is the primary determinant of living standards. Relative living standards are largely a function of productivity differences.

A student, however, needs to do more than just understand 1) and 2) in isolation. He or she needs to synthesize them. This 3rd principle, shown below, is the central focus of this paper. It is a synthesis of 1) and 2):

3) a synthesis of 1) & 2) ➞ Productivity determines a nation’s “base” standard of living from which it “trades up”. For a nation’s citizens to live better, the nation should take steps to increase productivity, and then, regardless of its productivity, freely trade with its neighbors to live even better.

4) In the long-run, the largest gain from trade is increased productivity resulting from the greater competition and knowledge transfer trade brings, not static Ricardian (i.e. specialization) gains. i.e. A good way for a nation to increase its productivity is to open itself to free trade.

A thought experiment. If the increased competition, greater knowledge transfer, etc. from trade increase productivity by 0.25%/year, how long does it take these productivity gains to exceed the Ricardian (specialization gains) of about 2.5% in the U.S.?

Answer: 10 years. $1.0025^{10} = 102.5\%$, i.e. a 2.5% improvement

\[ \text{The deadweight loss eliminated for both imports and exports with “typically” shaped demand and supply curves.} \]
Gains From Trade: Some Statements … Revisited

1) Kathy Lee only pays her overseas workers $5/day to work in a sweatshop to produce clothes for Americans. I don’t want any part of that exploitation!

Comparative Advantage: Assuming kidnapping and enslavement is not involved, these workers are there voluntarily. Why? Empirically, export led jobs tend to pay better than jobs for “domestic consumption.” i.e. These workers would likely be making only $3/day without trade.

Productivity: It is productivity differences not trade, likely explain the gap between these workers pay and U.S. workers pay.

2) A firm can hire labor for $1.50/hour if it moves to Malaysia. How can American workers compete?

Comparative Advantage: The law of comparative advantage says that U.S. can compete, i.e. sell to the rest of the world and gain from it regardless.

Productivity: The likely reason Malaysians are making (about) 1/6 a typical U.S. wage is that their productivity is (about) 1/6 of U.S. workers. Americans can continue to live at only about 6x level of Malaysians is the stay 6x as productive.

Ex. (although textiles is a bad choice)
Malaysia: $1.50/hr x 1 hr/2 socks = $0.75/sock
USA: $9.00/hr x 1 hr/12 socks = $0.75/sock

Through competition, unit (labor) costs to roughly equalize. Workers who have 6x the productivity tend to earn 6x the wage.
3) I’ve heard that, in effect, nations are battling for the high tech, high productivity sectors. What happens if America loses?

Comparative Advantage: America can still compete in world markets. Further, trade will increase absolute living standards in the U.S.

Productivity: But U.S. living standards relative to the rest of the world may fall. Our children will live better than us, but not as good as Connie the Canadian’s kids.

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Productivity Convergence: an Analogy

Scenario 1:

Jan is a 16 year old swimmer in the U.S. She trains at the U.S. Olympic center. She uses the most modern physical and mental training techniques in the world. She also has the best nutrition & analysis available.

- Jan has a world class time in the 400 meters.
- Jan is improving her time, but only in small increments. She is already close to the top of her game.

Sita is a 16 year old swimmer from rural India. She has the same innate athletic ability as Jan. She’s never used modern training techniques. Sita now adopts the same training, nutritional, & analysis techniques as Jan.

- Sita has a lousy time for an Olympic athlete.
- Sita, however, will rapidly improve her time. There is lots of room for improvement.
- Sita will likely converge on Jan from below.

... But wait! There’s more!
Scenario 2:

**The United States** is a country. The U.S. has had a pro-growth environment (relatively free markets, public education, etc.) for a long time.

- The U.S. has a world class output/worker.
- The U.S. is improving its output/worker, but only in small increments. It is already close to the top of the game.

**India** is a country. India has had years of less than optimal growth policies. India is now shifting towards pro-growth policies (more) similar to that of the United States.

- India has a relatively low GDP/capita.
- India, however, will rapidly improve its output/worker. There is lots of room for improvement.
- India will likely converge on the U.S from below.

Higher productivity growth in India, China, etc. should not come as a surprise.

**Will India, China, etc. overtake the U.S.?**

Only if their “fundamentals” are better than that of the U.S. Currently, this does not appear to be the case.
In the words of Oliver Twist; “May I have some more please?”

The Hecksher-Ohlin Theorem
A factor which is more abundant in a country than in the world as a whole gains the most from trade. A factor which is less abundant in a country than the world as a whole gains less or loses from trade. **Say what?**

Scenario 1: Assume the population of each High School is predominantly heterosexual.

- **Female**
  - Testosterone High
    - We’re hot commodities locally!
    - We don’t want interschool dating.
  - Estrogen PolyTech
    - We’re hot commodities locally!
    - We don’t want interschool dating.

- **Male**
  - Testosterone High
    - We’re a dime a dozen locally!
    - We want interschool dating.
  - Estrogen PolyTech
    - We’re a dime a dozen locally!
    - We want interschool dating.

**Barriers to Interschool Dating**

Scenario 2: Who gains the most from free(r) trade?

- **Highly Educated and Skilled**
  - Rest of World
    - We should make our own movies offer our own financial services, etc.
    - We don’t need free trade.
  - U.S.A.
    - Give us Free Trade!

- **Less Educated and Skilled**
  - Rest of World
    - Give us Free Trade!
  - U.S.A.
    - Give us Free Trade!

Sure we earn a bit less than the educated and skilled. However, we’re relatively hot locally! We don’t want free trade.