This handout will provide two different trade-related examples.

First will be the trade example seen in lecture on Thursday, January 27th, 2010, concerning New York and Omaha. This handout will just repeat that example.

The second example will be a trade-related question from a midterm I have given in a previous year. First will be the question as presented in the midterm. After that will be a solution to the problem.

1. New York/Omaha Example From Lecture

I will illustrate the idea that if individuals specialize in the production of the good which he/she has comparative advantage, both individuals can be better off more stuff can be produced overall, with a specific example.

**Def:** Autarky: when no trade takes place

In autarky the amount consumed is same as amount produced

With trade amount consumed can be different than amount produced.

In order for both parties to benefit from trade: each party should specialized in the good for which it has comparative advantage. Then trade some of that (specialized good) for the other good.

**Def:** Specialize: produce more of good for which they have CA than they would in autarky.

I am going to start with NY and Omaha each producing at a point on their respective PPFs. Then I will show that if NY and Omaha produce more of the good for which each has a comparative advantage, then more stuff will be produced than before.
PRODUCTION TABLE:

<table>
<thead>
<tr>
<th></th>
<th>Business Ideas</th>
<th>Support Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>2 (\text{hours per idea})</td>
<td>0.5 (\text{hours per service})</td>
</tr>
<tr>
<td>Omaha</td>
<td>6 (\text{hours per idea})</td>
<td>1 (\text{hours per service})</td>
</tr>
</tbody>
</table>

Omaha and New York each have 60 hours.

OC TABLE:

<table>
<thead>
<tr>
<th></th>
<th>Business Ideas</th>
<th>Support Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>4 (\text{Service})</td>
<td>(\frac{1}{4}) (\text{Business Ideas})</td>
</tr>
<tr>
<td>Omaha</td>
<td>6 (\text{Service})</td>
<td>(\frac{1}{6}) (\text{Business Ideas})</td>
</tr>
</tbody>
</table>

NY has a comparative advantage in the production of business ideas.

Omaha has a comparative advantage in the production of support services.

We will now consider a specific example in which trade benefits both cities.

First we want to determine the range of prices for which both cities will be willing to participate in trade.

We will specifically consider the price of one business idea in terms of support services.

Price of business ideas in terms of support services

- The highest price for which trade will occur is 6 Business Ideas

  - If the price is higher than this, Omaha would find it cheaper to produce business ideas itself
  - If the price is lower than this, Omaha would find it cheaper to trade support services for business ideas with NY.

- The lowest price for which trade will occur is 4 support services

  - If the price is lower than this, NY would not find it beneficial to trade with Omaha (not cover its OC)
  - If the price is higher than this, NY would trade with Omaha

We now know the range of prices for which trade will occur. We will use this information below.
Now, let's begin with each city in autarky (not trading). For each city we need an initial bundle of production and consumption. In autarky the amount consumed must be equal to the amount produced. Each city will start at a point on its respective PPF.

Let's say in autarky each city devotes half of its time to producing business ideas and the other half of its time to producing support services. Then:

**Production/Consumption in autarky (No Trade)**

<table>
<thead>
<tr>
<th>City</th>
<th>Business Ideas</th>
<th>Support Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Omaha</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

Total production: 20 business ideas, 90 support services

![Graphs showing New York and Omaha PPFs](image)

**Once trade is possible each city will want to specialize good in which it has CA**

Now trade possible (each city specialize)

**After Trade (intermediate point):**

<table>
<thead>
<tr>
<th>City</th>
<th>Business Ideas</th>
<th>Support Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>21.25</td>
<td>35</td>
</tr>
<tr>
<td>Omaha</td>
<td>0</td>
<td>60</td>
</tr>
</tbody>
</table>

Total production: 21.25 business ideas, 95 support services

We can see in total more is produced now than before! Possible that both better off depending on how we split up this stuff that's produced.

Now let's consider a possible trade between these two cities. We want to construct a trade so that each city has at least as much of each good as it had in autarky (and hopefully some more of some good).

First let's set a price of business ideas in terms of support services. We discussed above that the range of prices such that both cities would be willing to trade between 4 and 6 support services for one business idea. Let's set the price to 5 support services for one business idea.

We will start with Omaha. After trade is allowed it produces 0 business idea and 60 support services. In order to consume any business ideas it needs to trade away some of its support services. We specifically want Omaha to consume at least 5 business ideas (as it did in autarky).

Given the price of 5 support services for one business idea, in order for Omaha to purchase 5 business ideas from New York, Omaha must pay a total of 25 support services to New York (5 business
ideas at a price of 5 support services per business idea).

After this trade, Omaha has 5 business ideas (which it purchased from NY) and 35 support services (it started with 60 services, gave 25 to NY).

New York started with 21.25 business ideas and gave 5 to Omaha. So New York is left with 16.25 business ideas. New York received 25 support services from Omaha. So New York has a total of 60 support services (it produces 35 itself, add the 25 from Omaha).

Consumption in each city after trade:

<table>
<thead>
<tr>
<th>City</th>
<th>Business Ideas</th>
<th>Support Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY produces</td>
<td>16.25</td>
<td>60</td>
</tr>
<tr>
<td>Omaha produces</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Total production</td>
<td>21.25</td>
<td>95</td>
</tr>
</tbody>
</table>

Notice that each city has more stuff than in autarky. New York has 16.25 business ideas (more than in autarky) and 60 support services (the same as autarky). Omaha has 5 business ideas (the same as in autarky) and 35 support services (more than in autarky). Both New York and Omaha have benefited from trade (they both get to consume more stuff than before).

We can also look at consumption after trade on each city’s PPF:

Notice, after trade each city is now consuming at a point OUTSIDE of its PPF. Trade allows each city to consume a bundle that would otherwise be unattainable! This is a benefit from trade.
2. Sample Trade Question From Previous Midterm

I recommend that you try to answer this question on your own before looking at the solutions.

**Problem 1.** Consider an economy with two agents, New York and Omaha. The economy only produces two goods, "Business Ideas" and "Support Services". New York and Omaha can produce the goods as follows:

<table>
<thead>
<tr>
<th></th>
<th>Soybeans</th>
<th>Sugar Beets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>8 hours/</td>
<td>5 hours/</td>
</tr>
<tr>
<td>Illinois</td>
<td>2 hours/</td>
<td>4 hours/</td>
</tr>
</tbody>
</table>

(a) Fill in the following table, computing the opportunity cost of production of each good for each country:

<table>
<thead>
<tr>
<th></th>
<th>Soybeans</th>
<th>Sugar Beets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Who has the absolute advantage in the production of soybeans? Why?

(c) Who has the comparative advantage in the production of soybeans? Why?

(d) Consider the price of soybeans in terms of sugar beets. What is the highest price at which soybeans can be traded that would make both states better off? What is the lowest price? Explain.
(e) Graph the production possibilities frontier for Illinois, assuming it has **40** hours. Put soybeans on the y-axis.

(f) Suppose Illinois uses 20 hours to produce soybeans and 20 hours to produce sugar beets. Clearly label the resulting bundle (call it Bundle A) produced on your PPF in part (e). Specifically how many soybeans and how many sugar beets are in Bundle A?

(g) On the diagram in part (e) label a bundle that has the same amount of sugar beets as Bundle A that is *attainable AND inefficient*. Call this Bundle B.

(h) On the diagram in part (e) label a bundle that has the same amount of sugar beets as Bundle A but is *unattainable*. Call this Bundle C.

(i) If Illinois and Minnesota were to specialize in production and then trade, what good should Illinois specialize in and why?

(j) Suppose the price of one soybean is 1 sugar beet. Starting at Bundle A, Illinois specializes in the good you chose in part (i). It produces one more unit of this specialized good and trades with Minnesota. The new bundle consumed is Bundle D. How many sugar beets and how many soybeans are in Bundle D? Plot Bundle D on diagram in part (e).
Solution.

Part (a)

<table>
<thead>
<tr>
<th></th>
<th>Soybeans</th>
<th>Sugar Beets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>$\frac{8}{5}$ sugar beets</td>
<td>$\frac{8}{5}$ soybeans</td>
</tr>
<tr>
<td>Illinois</td>
<td>$\frac{1}{2}$ sugar beets</td>
<td>2 soybeans</td>
</tr>
</tbody>
</table>

Part (b)

Illinois has the absolute advantage in production of soybeans since they require fewer resources (time) to produce soybeans than Minnesota.

Part (c)

Illinois has the comparative advantage in the production of soybeans since they have a lower opportunity cost of production than Minnesota.

Part (d)

- High price: $\frac{8}{5}$ sugar beets. If the price were any higher Minnesota would produce soybeans itself; Minnesota would not trade.

- Low price: $\frac{1}{2}$ sugar beets. If the price were lower Illinois would not cover its opportunity cost; Illinois would not trade.
Part (e)

![Diagram of PPF of Illinois](image)

Part (f)

Bundle A consist of 5 sugar beets, \( \frac{20}{4} = 5 \), and 10 soybeans, \( \frac{20}{2} = 10 \).

Part (g) & (f)

See the diagram in part (e).

Part (i)

Illinois should specialize in the production of soybeans since it has the comparative advantage.

Part (j)

Bundle D consist of 5.5 sugar beets and 10 soybeans.

In order of Illinois to produce on more soybean they need to take 2 hours away from the production of sugar beets which would decrease the production of sugar beets by .5 units. Thus, the after trade production would for Illinois would be a movement along their PPF to 4.5 sugar beets and 11 soybeans.

Now Illinois will trade the extra soybean they just produced to Minnesota in exchange for a sugar beet. Thus, Illinois will consume 5.5 sugar beets and 10 soybeans.