ANSWERS TO WHITE EXAM

Procedures for getting part of your exam re-graded:

1. Check the point total on your exam and read through the answer key.

2. All requests for re-grading must be made in writing. Please re-submit your exam and a separate page (with your name on it) that explains in detail what the grading issue is.

3. There is a statute of limitations for re-grading: I will not accept any re-grading requests that are submitted after Monday, November 15, 2004. This deadline does not change if you pick up your exam late.

Questions 1 through 5 make use of following information:

<table>
<thead>
<tr>
<th></th>
<th>Home</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units of labor per bottle of Beer</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Units of labor per Pizza</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Number of units of available Labor</td>
<td>3000</td>
<td>1000</td>
</tr>
</tbody>
</table>

1. (2 points) Which country has the comparative advantage in producing Beer? **HOME**
   
   *Home's opportunity cost equals 6/2 = 3, while Foreign's is 5/1 = 5, which is higher.*

2. (2 points) The graphs below show the countries’ PPFs (ignore the points marked there for now). Which Graph shows Home? **Graph 2**
3. (3 points) The next graph shows the RS and RD curves for Pizza (in terms of Beer). Please fill in the empty boxes with numbers, based on the information in the Table.

\[
\begin{array}{c}
P_P/P_B \\
\phantom{1/3} \\
\phantom{1/5} \\
1000/500 = 2
\end{array}
\]

4. (4 points) Based on these RS and RD curves drawn in the preceding graph, which of the points labeled in the PPFs shown in Graph 1 and Graph 2 could be production points, when the economies open up to trade (use the letters)? Point B and Point C.

*Foreign specializes in producing Pizza (because it gets 1/3 of a bottle of Beer per Pizza sold on the world market, and this is better than the domestic opportunity cost). However, demand for Pizza is high enough that Home must produce it, too. So on Home’s PPF the production point is the one where Home produces both goods (Point C), while Foreign produces at Point B.*

*Quite a few students chose B and D, apparently thinking each country would specialize in producing the comparative-advantage good. If you did not have the information in question 3 this would have been a good choice. However, question 3 lets you know that with trade (i.e., where the RD and RS curves intersect), demand for Pizza is sufficiently high that Foreign alone cannot satisfy it.*

5. (2 points) In this example, which country gains the most from trade? Foreign

*Home faces a world terms of trade that is identical to its own opportunity cost.*

6. (4 points) The following Table gives information about labor productivity in two Countries, A and B, that produce and consume automobile Tires and Crackers, using (amazingly) only Labor as an input to production.

<table>
<thead>
<tr>
<th></th>
<th>Relative productivity in Country A, in this industry (MPL^A/MPL^B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tires</td>
<td>3.0</td>
</tr>
<tr>
<td>Crackers</td>
<td>2.5</td>
</tr>
</tbody>
</table>

a. According to the Ricardian model, which country exports Crackers? Country B
I hope you did not torture yourselves by trying to convert marginal products into unit labor requirements. All you had to notice was that relative productivity (across countries) is higher for “A” in the Tire industry than in the Cracker industry.

b. Suppose the autarky price of a Tire is $100.00 in Country A. The autarky price of a box of crackers equals $2.50. In an autarky equilibrium, what is the opportunity cost of Tires in terms of Crackers in Country A? \[ \frac{100}{2.5} = 40 \] A calculation is required for part b, please use this space:

The opportunity cost is 100/2.5 = 40

7. (10 total points) Home produce Shirts and Soup, using Capital and Labor as factors of production. Labor is mobile between industries, but Capital is industry specific. In autarky, Home’s dollar wage is equal to $10.00 per hour.

Home decides to open up to trade with the rest of the world. One result is that the price of Soup rises by 15% while the price of Shirts rises by 8%.

a. (3 points) Which of the following could be the new equilibrium wage in Home after trade begins?

i. $10.80
ii. $11.20
iii. $11.50
iv. $14.00
v. Any of the above could be the new equilibrium wage

Why is the answer you chose correct?

The wage increase has to be between the two price increases. So the wage has to increase between 8% and 15%. Only answer ii (a 12% increase) works.

I wish more of you had mentioned the Specific Factors Model by name (but I did not take points off if you did not).

For questions where you had to give an explanation, I handled partial credit in the following way: if you got only a part of the explanation correct (and got something else in your explanation wrong), then so long as you chose the correct option, I took off only 1 point.

Example: one student who chose ii for this question wrote (correctly) that the percentage wage increase would be between the two percentage price increases, but then went on to say “this is the magnification effect.” The last part of the answer was incorrect (if there was a magnification effect the wage change would have been over 15% or less than 8%, depending on whether labor was the scarce factor or not).

If you got the explanation completely wrong, then I took off the full 3 points even if you chose the correct option, in accord with the exam rules.

In the event that you chose the wrong answer but then gave the right explanation, I took off two points.
b. (3 points) As a result of trade, the marginal product of Labor

i. **falls in Home’s Soup industry**
   
   ii. rises in both the Soup and the Shirt industry in Home
   
   iii. falls in both the Soup and the Shirt industry in Home
   
   iv. falls in Home’s Shirt industry

**Why is the answer you chose correct?**

*Soup is the export good, because its relative price rises when trade begins. Labor moves to the Soup industry. With diminishing returns, the marginal product of labor falls.*

*Most students who made the wrong choice here got MPL mixed up with VMPL = Wage, and reasoned incorrectly that the wage rose in both industries so therefore MPL did.


c. (2 points) Owners of Capital in the Shirt industry

i. lose from trade regardless of what they purchase.

ii. gain from trade regardless of what they purchase.

iii. would gain from trade if they purchase only Shirts.

iv. would gain from trade if they purchase only Soup.

d. (2 points) Workers in the Soup industry

i. lose from trade regardless of what they purchase.

ii. gain from trade regardless of what they purchase.

iii. **would gain from trade if they purchase only Shirts.**

iv. would gain from trade if they purchase only Soup.

8. (10 points) Draw a carefully-labeled graph in the space below to illustrate what happens to the real incomes of owners of Capital in the Soup industry after Home opens up to trade.

![Graph](image-url)
Soup is the export industry. Prior to trade, the return to Soup industry capital is the area of the triangle ADE. When employment rises, the marginal product of labor falls, raising the return to owners of capital (who now produce more shirts and pay a smaller percentage of output to workers) to the area of the triangle ABC.

Points taken off for a mislabeled graph: 1 point for every labeling mistake.
Wrong direction for employment & profits: 3 points
Failure to show change in profits: 4 points
Failure to label gains to owners of capital (in an otherwise correct graph): 2 points

The labor-market equilibrium graph (the one with both industries, which we use to show that the equilibrium wage rises by an amount between the two price changes) cannot be used to show the gains to owners of capital. If you drew this graph, you lost as much as 10 points unless you included some additional explanation to help me see that you knew why the capitalists would be better off.

9. (2 points) According to the Standard Trade Model, a country is likely to import a good if

i. the country is very large.
ii. production of the good used the country’s scarce factor intensively.
iii. the country had a very high relative demand for the good compared to the rest of the world.
iv. i. or ii.
v. ii. or iii.
vi. i, ii, or iii.

10. (7 total points) Suppose you have the following information about two countries, which have identical tastes and have access to the same technologies for producing Manufactures and Agricultural products.

<table>
<thead>
<tr>
<th></th>
<th>Home</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>capital used in agriculture</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>total supply of capital</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>labor used in agriculture</td>
<td>250</td>
<td>900</td>
</tr>
<tr>
<td>labor used in manufacturing</td>
<td>500</td>
<td>1200</td>
</tr>
</tbody>
</table>

a. (2 points) **HOME** is capital abundant. **Calculation required, please use this space:**

\[
\text{HOME } K/L = \frac{1000}{(250 + 500)} = 1.33
\]

\[
\text{FOREIGN } K/L = \frac{2000}{(900+1200)} = 0.95
\]

b. (2 points) **Manufacturing** is labor intensive. **Calculation required, please use this space:**

\[
\text{Agriculture } K/L = \frac{500}{250} = 2
\]

\[
\text{Manufacturing } K/L = \frac{500}{500} = 1
\]

c. (3 points) Reforms in Foreign’s restrictive immigration policy lead to an influx of immigrants to the country. According to economic theory, could Foreign be a candidate for immiserizing growth? Why or why not?
Yes. Foreign is labor abundant, and is therefore an exporter of labor-intensive Manufactures. Growth of the labor supply is biased growth toward’s Foreign’s exports. If the world price of Manufactures falls far enough, Foreign could be worse off for having grown.

It was worth one point if you at least knew Foreign was labor abundant and would export the labor intensive good. It was also worth one point if you had no idea how to answer this question but did know the three pre-conditions for immiserizing growth.

11. (8 points) The graphs below show the PPF and an indifference curve for two countries that produce Eggs and Computers. Please complete the graphs by showing that there is a world price at which both countries gain from trade. To save yourselves time, please do not label imports and exports. However, you do have to show that each country gains from trade.

I took off 4 points if you drew the trade equilibrium in such a way as to have both countries exporting the same good (in order to do this you had to make the indifference curves for one country intersect), or if you got all indifference curves intersecting for any other reason.

If you did not show a world price with trade and higher indifference curves with trade, you may have lost as many as 8 points.

12. (2 points) Which of the following is an accurate statement of the Rybczynski Theorem?

i. A country will tend to export the good that uses its abundant factor as an input.
ii. When countries open up to trade, the abundant factor gains purchasing power, while the scarce factor loses purchasing power.
iii. A country will tend to export the good that abundantly uses the country’s intensive factor.
iv. At a given world price, growth biased towards an industry will increase output in that industry and reduce output in the other industry.
v. None of the statements above is an accurate statement of the Rybczynski Theorem.

13. (2 points) Which of the following is an accurate statement of the Heckscher-Ohlin Theorem?

i. A country will tend to export the good that uses its abundant factor as an input.
ii. When countries open up to trade, the abundant factor gains purchasing power, while the scarce factor loses purchasing power.
iii. A country will tend to export the good that abundantly uses the country’s intensive factor.
iv. At a given world price, growth biased towards an industry will increase output in that industry and reduce output in the other industry.
v. None of the statements above is an accurate statement of the Heckscher-Ohlin Theorem.

Answers i and iii are genuine incorrect definitions of the H-O theorem that I got from students who took this course in previous semesters. i is wrong because both industries “use” the abundant factor (only the export industry uses it intensively). iii is wrong because it gets “abundant” and “intensive” mixed up.

14. (3 points) In autarky, in a Heckscher-Ohlin world, the ratio of the wage to the return to land is higher in Home than it is in Foreign. According to economic theory, if Home and Foreign begin to trade, then

i. Home will export land-intensive goods and the return to land will fall at Home.
ii. Home will export labor-intensive goods and the Foreign wage will fall.
iii. Home will export land-intensive goods and the Home wage will fall.
iv. Home will export labor-intensive goods and the Home wage will rise.
v. Home will not be willing to trade with Foreign.

Why is the answer you chose correct?

The country that is land abundant will have the higher wage-to-rent ratio. That is Home. Therefore, Home exports land-intensive goods. Trade raises the return to land and reduces the return to Home’s scarce factor, labor.

15. (2 points) A country produces Manufactures and Agricultural products, using labor and land as inputs, with diminishing returns to both inputs. If the country produces more Manufactures,

i. The marginal product of labor falls in Agriculture. The opportunity cost of Manufactures rises.
ii. The marginal product of labor falls in Agriculture. The opportunity cost of Manufactures falls.
iii. The marginal product of labor rises in Agriculture. The opportunity cost of Manufactures rises.
iv. It is impossible to determine the answer to this question without knowing anything about the country’s trading partners.

16. (4 points) It takes 5 units of labor and 2 units of capital to produce a pair of shoes in Country Z. The wage equals $5 per hour while the return to capital equals $15 per unit. The market for shoes is perfectly competitive, and the price of a pair of shoes is $55.00

a. When the country begins to trade, the price of a pair of shoes rises by 10%. The return to capital falls by 2%. According to economic theory, what happens to the wage?

i. It rises by 10%.
ii. It changes by a percentage amount between negative 2% and positive 10%.
iii. It rises by more than 10%.
iv. It rises by less than 10%.

There was a quick way to answer this question: just appeal to the Stolper-Samuelson Theorem. There was also a long and laborious way to answer the question. The long way was
to note that in perfect competition entry occurs into the industry until profits are equal to zero. Therefore

\[ \text{Price} = \text{Wage} \times 5 \text{ units labor} + \text{Return to Capital} \times 2 \text{ units of labor}. \]

\[ 55 \times (1+0.10) = \text{Wage} \times 5 + 15 \times (1-0.02) \]

\[ \$60.50 = \text{Wage} \times 5 + \$14.7 \]

\[ \text{Wage} = \$9.16. \text{ There is an increase in the wage of } 83.2\%. \]

b. Please identify (by name) the International Trade theorem that you used to answer the previous question. Stolper-Samuelson Theorem

This is the magnification effect.

I took off points for severely-mangled versions of “Stolper-Samuelson” (eg., “Stolperson”).

17. (6 points) Please define the Leontief paradox and explain briefly how differences in technology can explain this paradox.

The Leontief paradox is the finding that a country exports goods that are intensive in the country’s abundant factor, in violation of the Heckscher-Ohlin Theorem.

Leontief used factor content of US import competing industries to proxy for the factor content of US imports. If high wages have led US manufacturers to use more capital-intensive methods to produce goods than US trading partners do, then goods produced in import competing firms in the US will be more capital intensive than the same goods produced in other countries.

Generally, a correct definition was worth 3 points, and a correct explanation was also worth 3 points. If your explanation was not about technology (eg. If you explained why differences in tastes could explain the pattern of trade Leontief found), then you lost 3 points because you explained the wrong thing.

18. (2 points) The formula for the index of intra-industry trade in an industry is

\[ \text{i. } \text{IIT} = 1 - \frac{|EX - IM|}{EX + IM} \]

\[ \text{ii. } \text{IIT} = 1 + \frac{|EX - IM|}{EX + IM} \]

\[ \text{iii. } \text{IIT} = 1 - \frac{|EX + IM|}{EX - IM} \]

\[ \text{iv. } \text{IIT} = 1 - \frac{(EX - IM)}{EX + IM} \]

19. (2 points) When there are internal economies of scale, the average cost per variety produced __________ with an increase in the number of varieties and __________ with an increase in the output of any variety.

i. rises, rises

\[ \text{ii. } \text{rises, falls.} \]

iii. falls, falls.

iv. falls, rises
20. (3 points) There are two countries, Country A and Country B. The countries produce two goods, Manufactures and Food, using only Capital and Labor as inputs. Manufacturing is Capital-intensive. The countries have the same technologies for producing output, and they have the same preferences for Manufactures and Food. The countries are also engaged in completely free trade. Country A is Capital abundant.

Which of the following would cause an increase in the world price of Food in terms of Manufactures (i.e., in $P_F/P_M$)?

i. Growth of the Capital Stock in Country A.
ii. Growth of the Capital Stock in Country B.
iii. A transfer from Country A to Country B.
iv. A transfer from Country B to Country A.

Why is the answer you chose correct?

I messed up: I accidentally included two correct answers. Either one gets full credit.

Country A exports capital-intensive manufactures. Growth biased towards Manufactures in Country A will reduce $P_M/P_F$ and therefore increase $P_F/P_M$.

Country B exports labor-intensive agricultural products. Growth biased towards imports in B will raise $P_F/P_M$.

21. (2 points) In the presence of “taste bias” a transfer of income from a donor country to a recipient country

i. raises the world price of the recipient’s import goods (in terms of its export goods)
ii. has no effect on the terms of trade.
iii. raises the world price of the donor’s export goods (in terms of its imports)
iv. lowers the world price of the donor’s export goods (in terms of its imports)

22. (2 points) When there are internal economies of scale in production, the price per variety falls with trade. Which of the following is the most accurate inference to make?

i. the total number of varieties produced worldwide is smaller than in autarky
ii. aggregate output per firm has risen.
iii. Every country produces more varieties than it did in autarky.
iv. Every country consumes fewer varieties than it did in autarky.

23. (2 points) External economies of scale can be the result of

i. labor pooling
ii. fixed costs
iii. knowledge spillovers
iv. i, ii, or iii
v. i. or ii.
vi. i. or iii.

24. (2 points) Intra-industry trade that is based on internal economies of scale

i. tends to benefit a country’s abundant factor and to hurt its scarce factor.
ii. can make a country worse off if the country does not get the head start in the industry.
iii. is often bad for a country in the short run but beneficial in the long run.
iv. does not have adverse consequences for income distribution like North-South trade does.

25. (6 points) The United States has gotten a head start in producing scientific word processing software, and now supplies the world market. There are external economies of scale in the software industry. Investors in India believe India has the natural comparative advantage in software production, and insist that India is worse off under free trade than under autarky. In the space below, please draw a very carefully-labeled graph that illustrates a situation in which the Indian investors are only half correct: although India has a natural comparative advantage in producing this software, India nevertheless is better off importing software from the country that got the head start in the industry (United States) than in autarky.

As drawn above, India’s domestic market (i.e., demand) is too small for India to be able to realize very low costs due to external scale economies. The autarky price is above the world price set by the U.S. However, India’s costs are indeed lower than US costs.

I took off 2 points if you drew India’s AC above the US curve (but the graph was otherwise ok).
4 points if you drew the case where the investors were correct!
3 or more points if you did not draw all relevant demand curves.

26. (2 points) Employment in the textile industry has fallen by 300,000 since the year 2000. Please list two reasons besides trade that could explain this decline.

You should have listed any two of the following:

Recession: The economy reached a business cycle peak in 2001
Improvement in productivity in the industry
Change in demand in the industry

27. (2 points) Of the following types of analysis, which is the least inaccurate (most reliable) way of determining the effect of international trade on U.S. jobs?
i. tracking employment changes over time
ii. surveys of labor union leaders
iii. factor price equalization

**iv. factor content studies**

28. (2 points) Which of the following is a reason why factor content studies might overstate how many jobs are lost in the American textile industry due to trade with the rest of the world?

i. China might use more labor-intensive technologies for producing textiles than the U.S.
ii. Chinese-made textiles are cheaper than US-made ones, so American consumers buy more.

**iii. i. And ii.**

iv. None of the above