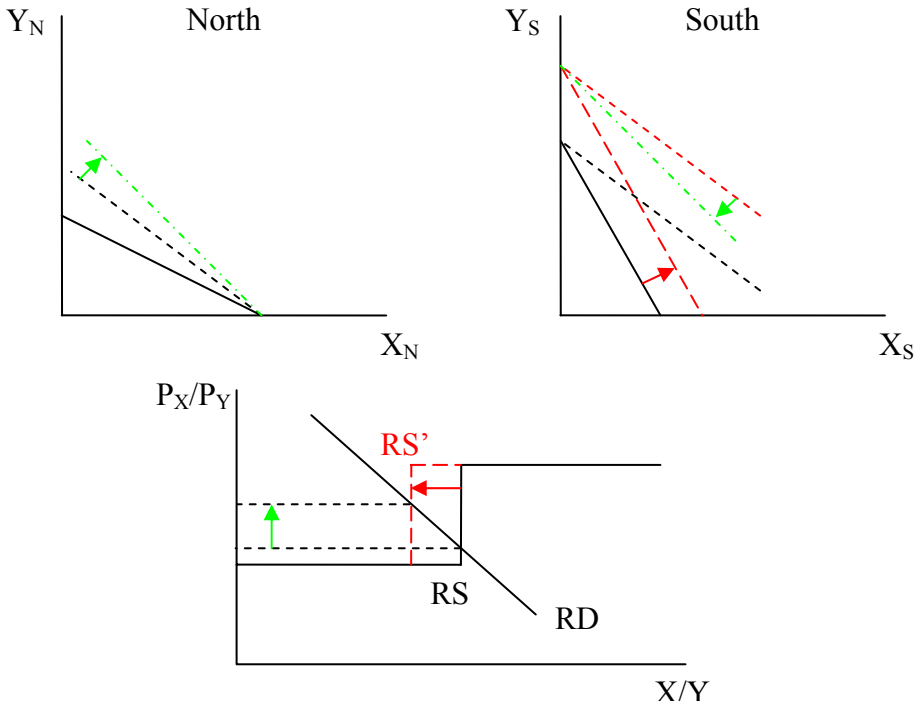
Name:_____

Final Exam - *Answers*
December 22, 2004

Answer all questions on these exam sheets. The three questions are of approximately equal weight. Look ahead and budget your time accordingly.

1. Population growth has pretty much stopped in much of the rich world, but it continues in much (though not all) of the developing world. There is of course a lot more going on than just that, but for this question you should ignore such things as technological progress and capital accumulation, and just focus on the effects of population growth in the poorer parts of the world. That is, you will use the two main general-equilibrium, two-country models of trade theory to work out the effects of population growth in one of the countries on real wages of labor in those countries. In each case, use whatever tools of analysis you find appropriate to demonstrate your results.

   a. First, use the Ricardian Model of two countries that, in their initial equilibrium, are both specialized into producing only one of the two goods. Call the countries North and South, with North specializing in good X and South specializing in good Y. Then suppose that population increases in South. Work out what will happen to equilibrium relative prices of the two goods and also to the real wages of labor in the two countries.



The figure shows the initial (free-trade) equilibrium with North producing only X and South producing only Y. The equilibrium relative price, between the two countries' autarky prices, is shown in the world relative supply and demand diagram at the bottom. Expansion of the population/labor force in South expands its production possibilities without changing its relative costs, so the PPF of South shifts outward as shown. If prices were not to change, South would continue to specialize and produce more of good Y. This reduces the ratio X/Y at the specialization point of relative supply in the bottom diagram, thus shifting its vertical portion to the left. The equilibrium relative price of X therefore rises. This in turn rotates clockwise the price lines in both North and South in the upper diagrams. In North, this is an improvement in its terms of trade and raises welfare. In South it is a worsening, and lowers welfare.

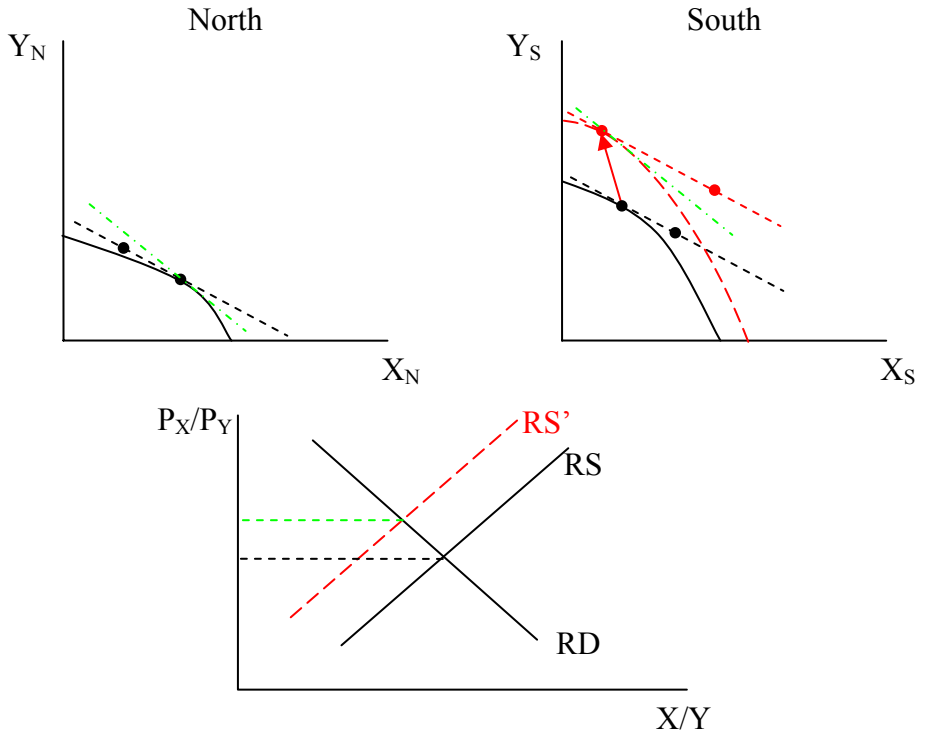
In each country, the wage of labor in units of what it produces is unchanged. But the wages in units of the other good change:

- $w_N/P_X = 1/a_X$ *is unchanged*
- $w_S/P_Y = 1/a_Y^*$ *is unchanged*
- $w_N/P_Y = (1/a_X)(P_X/PY)$ *goes up*
- $w_S/P_X = (1/a_Y^*)/(P_X/P_Y)$ *goes down*

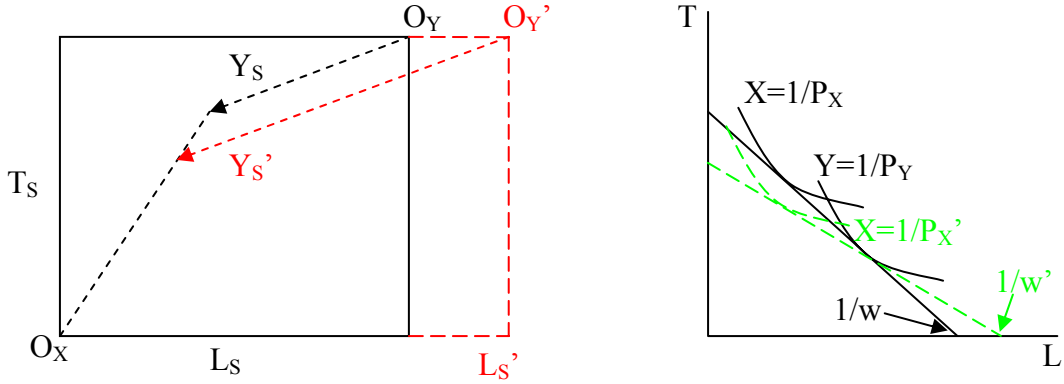
b. Now use the Heckscher-Ohlin model, together with the Standard Trade Model, with both countries producing both goods in all equilibria, and with South having a relative abundance of labor, even initially. Show the effects, as before, of an increased population in South on equilibrium relative prices and on the real returns to labor in both countries. (You can ignore the effects on the real return to the other factor – call it land.)

With both countries producing both goods, there is factor price equalization, so the effects on real wages will be the same in both countries, unlike the Ricardian model above. (This would not *be true if either of the countries were completely specialized, but we are not considering that case here.) Simply put, what is going to happen is this: Increased labor in South causes it, at initial prices, to expand production of the labor-intensive good – which it exports, due to its labor abundance – and contract production of the other good (both of these due to the Rybczynski Theorem). This increases the world relative supply of the labor intensive good, causing its relative price to fall just as in the Ricardian case. This fall in price, as in the Stolper-Samuelson Theorem, reduces the real wage of labor.*

All this is illustrated with the diagrams on the next page.



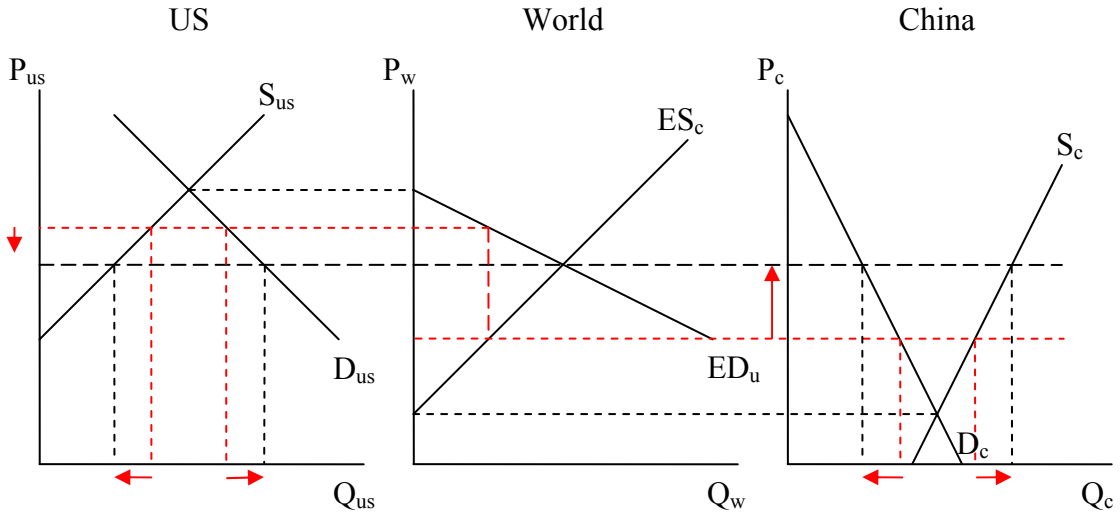
Here, good X is land intensive and Y is labor intensive, so that the initial equilibrium has South producing relatively more Y. The increase in South's population expands the Edgeworth Box in the labor direction as shown on the left below (you could also do this with the Lerner Diagram), causing it, at initial prices of goods and therefore of factors, to allocate more factors to producing Y (from Y_S to Y_S') and less to producing X. Thus, above and to the right, the PPF of South expands upward and to the left, the production point at the initial price also moving northwest. With South's output of Y rising and of X falling, the world ratio of X to Y produced must fall, and the relative supply curve shift to the left as shown above. Equilibrium relative price of X therefore rises, causing further adjustments of output in both countries. Finally, using the Lerner Diagram on the right below, a rise in P_X holding P_Y fixed reduces the nominal wage, and since no price has fallen this is also a fall in the real wage.



2. As you know, the U.S. has quotas on imports of textiles and apparel from China (as well as from other developing countries) that are due to expire a few days from now. In response to that fact, U.S. producers have requested that the U.S. protect them, after the quotas are gone, by placing a tariff on imports from China. China, in turn, has now announced that it will tax exports itself. In this question I would like you to analyze the likely effects of these three policy changes on the U.S., on China, and on other countries. Each part of the question says explicitly what you should do. In all of them except the last, I will assume that only a single product is at issue and call it apparel.

   a. To begin, suppose that the world consists only of the U.S. and China, that the apparel industry is a small enough part of these countries' economies that it can be analyzed in partial equilibrium, and that the U.S. and China are both large enough for their policies to affect prices in the other. In that context, analyze the effects in both economies of removing a U.S. import quota on apparel, assuming that the rights to import under the quota were allocated to the Chinese government.

      To get you started, in the graph below the center panel shows a free trade equilibrium in the world market for traded apparel, where the supply curve is the excess supply from China whose domestic supply and demand are shown on the right, and the demand curve is the excess demand of the US whose domestic supply and demand are shown on the left.



      i. In the figure, show what the equilibrium must look like in the presence of a US import quota equal to one-half the free-trade level of imports.

      ii. Using what you found in part (i), determine what the effects of **removing** this quota would be if there were no other policy replacing it, thus moving to free

trade. Record your answers in the table below, putting check marks in the appropriate columns.

Effects of **Removing** the Quota:	Rise	Fall	No change	Ambi-guous
Price in US		✓		
Price in China	✓			
Supply in US		✓		
Demand in US	✓			
Supply in China	✓			
Demand in China		✓		
Trade	✓			
Welfare of US suppliers		✓		
Welfare of US demanders	✓			
Welfare of Chinese suppliers	✓			
Welfare of Chinese demanders		✓		
Welfare of US as a whole	✓			
Welfare of China as a whole				✓

Most of your answers should be self-explanatory from the figure, if you did it right. But the effects on welfare of the US as a whole and of China as a whole require some explanation. Provide that in the space below:

In the US, since the government has given the quota rents to China, only suppliers and demanders matter. From the figure, because demand exceeds supply, the gain to demanders must be larger than the loss to suppliers, so the U.S. as a whole gains.

In China, with supply greater than demand, suppliers gain more than demanders lose. However the country also loses quota rents, and these could be larger than the net gain to suppliers and demanders. So the overall effects is ambiguous.

b. Suppose now that the U.S. replaces the quota with a tariff that leaves US domestic apparel suppliers exactly as well off as they were with the quota. Describe, in the space below, how the new equilibrium differs from the equilibrium before the quota was removed. Who, now, gains and loses from the move from the quota to the tariff?

To leave US suppliers unaffected, the tariff will have to raise the US price to the same level that the quota did, and this means that all prices and quantities will have to be the same as they were with the quota. The other difference will be that the US will get the tariff revenue, equal to what the quota rents were before, which went to China. That is, the move from the quota to the tariff has no effect at all on any suppliers or demanders, but it hurts the government of China through its loss of quota rent, and benefits the government of the US by an equal amount through its tariff revenue.

c. Now suppose that, instead of the U.S. replacing the quota with a tariff, China replaces the quota with an export tax that, like the tariff in part b, would leave US suppliers exactly as well off as under the quota. What now will be the effects of moving from the quota to China's export tax?

The export tax will have to be the same size as the tariff in part b, and so will be all of the effects on prices, supplies, and demands. Again the only difference is who gets the revenues. In this case the Chinese government replaces its lost quota rents with an exactly equal amount of export-tax revenue. So now nobody *gains or loses from the switch in policy.*

d. This analysis has been overly simple, of course, in lots of ways. One of the most important is the absence of countries other than China and the US. Without actually doing any formal analysis, discuss how it would matter for the results in parts a, b, and c if you allowed for the presence of other countries, in addition to China, that were supplying apparel, each with its own quota. That is, suppose (as is true) that other developing countries each supply apparel, that each currently has its own quota for export to the US, and that the end of the quota regime will eliminate all of those quotas. Assume also (as may or may not be true, but is certainly feared by many) that China's costs tend to be lower than those of most other suppliers. You may assume, if it matters, that China and the U.S. are still large countries, but that the additional countries are each small.

i. If we just go to free trade, will any of your answers to part (a) be changed?

When the quotas are removed, the US price will fall and both existing and expanded demand will tend to shift to lower-cost suppliers, presumably China. So the effects on China and the US are as they were above, although there will now be some other countries who may lose out in competition with China.

ii. If the US puts a tariff only on the exports of China, but not on the other suppliers, how will this change your answer to part (b)?

The tariff that would have left China's exports unchanged will not be sufficient to leave US suppliers unharmed if it does not apply to all suppliers. Therefore to achieve that goal, the US will have to use a larger tariff against China than the tariff equivalent of its previous Chinese quota. Thus China's price will be driven down further than it was with the quota, while the other suppliers will now benefit at China's expense.

iii. If only China now applies an export tax, how does this now compare to the regime before quotas were eliminated?

It can't anymore restore China to its situation before the quotas were removed. As in (ii) just discussed, China's export tax will have to be larger than the tariff equivalent of its previous quota, and it thus loses out to other supplying countries. But the export tax is certainly better, for China, than the US tariff, since, again, China gets the revenues.

e. China has said that it will design its export tax as a specific tax – that is, it will be the same monetary amount per unit (per shirt, for example) regardless of the value of that unit. Explain what they hope to accomplish by doing this, and why they expect it to work.

A specific export tax will tax low-value items at a higher ad valorem equivalent than high-value items. They expect this to provide an incentive for Chinese producers to shift toward making and exporting higher-value apparel products.

3. Write an essay addressing the question, "Is the WTO good for developing countries?" The main purpose of your essay, frankly, is *not* to answer that question definitively, but rather to show your knowledge of the various things that the WTO does, and to combine that with your knowledge about the effects of trade and trade policies so as to illuminate how all this matters, for good or for ill, for developing countries.

Your essay should touch on the major functions of the WTO, including the following (I don't expect you to express all the same views as I do here, but only to show some thoughtful understanding):

- *Rules governing trade policies*
  - *MFN – allows small and weak countries to benefit from tariff reductions negotiated by larger, richer countries*
  - *Tariff bindings – countries cannot arbitrarily raise tariffs. That protects LDCs from being the targets of such increases, but it also prevents them from raising tariffs themselves. From an economic standpoint, that's good, though they may not see it that way.*
  - *Rules for administered protection (anti-dumping, countervailing duties, and safeguards) – these provide tools that LDCs can adopt and use if they wish, though these tend to undermine the disciplines against using tariffs that the other rules contribute to.*
  - *Rules for preferential trading arrangements, requiring zero tariffs on almost all trade among the parties to the arrangement. It is not clear how beneficial these are for LDCs, yet more and more of them are being created. Perhaps more stringent rules, better enforced, would be desirable.*
  - *GATS – intent is to open markets for service providers around the world, including in LDCs. Many of them feel that they won't have comparative advantage in services – such as finance, banking, insurance, telecoms, etc. – and therefore will be shut out of these markets.*

- *TRIPs – this is quite explicit in forcing LDCs to adopt rich-country intellectual property standards and, in particular, to enforce the intellectual property rights of rich-country firms. This means that LDC consumers will pay higher prices for products subject to patents and copyrights, including medicines. Although it is true that IP enforcement may encourage innovation that will benefit LDCs, the larger and more likely effect is to increase their costs and, in the case of medicines, deprive poor LDC consumers of life-saving medications.*

- *Negotiations*
  - *The rounds of negotiation under the GATT, and now the WTO, have opened up markets around the world, but the greatest opening has been in the developed countries. LDCs have participated in only a limited way, and in particular they have not obtained much market access in those products – textiles and apparel, for one, and many agricultural products – in which they might plausibly be able to export.*
  - *The current Doha Round is ostensibly dedicated to developing country interests, although how much it will actually achieve in that regard is open to question. A central issue in the Doha Round negotiations has been subsidies and market access in agriculture, especially in products like cotton and sugar where some LDCs are likely exporters.*
  - *The dispute settlement mechanism of the WTO starts with negotiations between the disputing parties, and if that fails provides a formal mechanism for settling differences. This makes international trade policy (and sometimes other policies as well) subject to a form of international rule of law. In principle, this should be most helpful for small and weak countries, including most LDCs, who would otherwise be subject almost exclusively to being pushed around by their larger, richer trading partners.*