Final Exam - *Answers*
December 22, 2009

Answer in blue book. Use the indicated point values as a guide to how extensively you should answer each question. Look ahead and budget your time accordingly. The exam has a total of 60 points.

1. (8 points) The Wall Street Journal recently quoted USTR Ron Kirk as saying that the Doha Round "is like a cricket match. You don't know the score and it takes a long time, but it does end, and there is a winner." Discuss (not the part about cricket, but the rest).

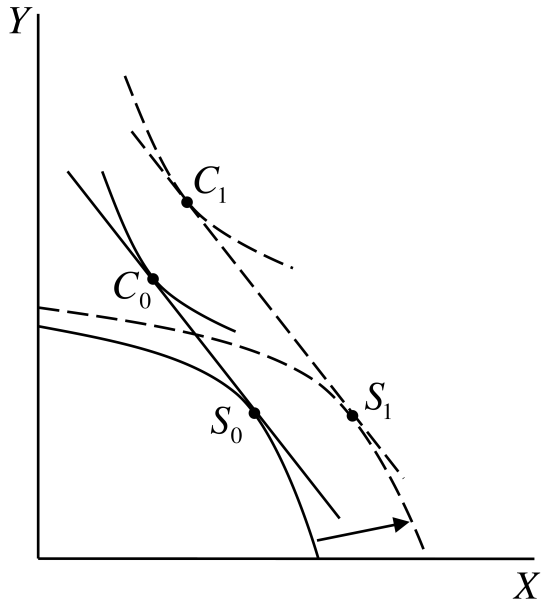
   Ans: Your answer should ideally include the following:

   - *Indication that Ron Kirk is the United States Trade Representative, and that as such he is the lead negotiator for the United States in the Doha Round.*
   - *Indication that you know what the Doha Round is – the current round of multilateral trade negotiations that has been going on since 2001 and has not yet ended.*
   - *Discussion of what it means for a round to end (attaining agreement that all WTO members sign onto) and whether indeed the Doha Round will necessarily end in this sense (not at all sure to happen; it may be declared over by the Director General without agreement, or it may, perhaps, go on indefinitely).*
   - *Discussion of whether it makes sense to say there is a "winner" if it does end, given that agreement hopefully would mean that all countries gain, and those gains would be impossible to quantify. Trade itself is not a zero-sum game, and neither are trade negotiations.*

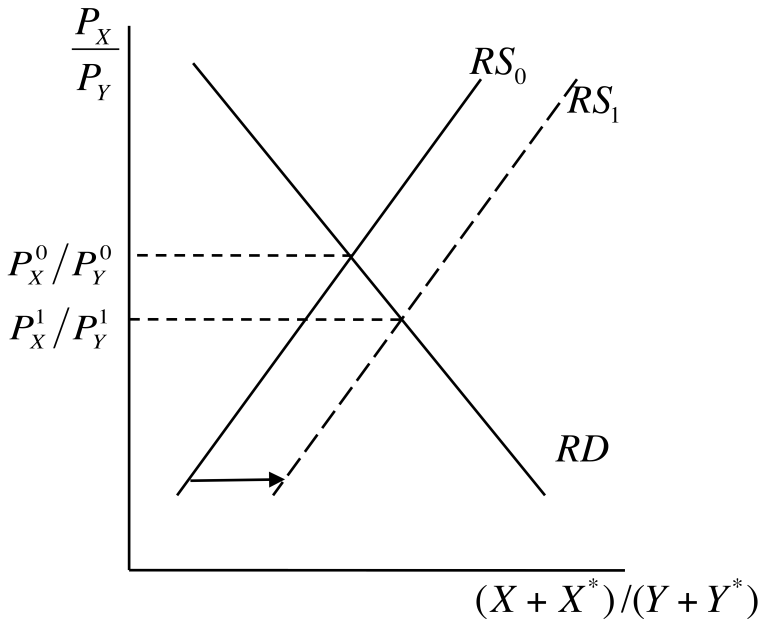
2. (7 points) Apply the analytical tools (diagrams) of the standard trade model to the assumptions of the Heckscher-Ohlin (i.e., factor proportions) trade model to determine the effect on the terms of trade of a large capital-abundant country if it experiences an increase in its endowment of capital (other factor endowments of both it and the other country remaining unchanged). That is, will its terms of trade improve or worsen, and why?

   Ans: Increasing the endowment of the county allows it to produce more of both goods, expanding its production possibility frontier (PPF) outward from the origin. Since this is the Heckscher-Ohlin Model and it is the endowment of capital that has increased in what was already a relatively capital-abundant country, a PPF that was already skewed toward the capital-intensive good – let's say X – becomes even more skewed. The figure below shows, in solid lines, the initial PPF together with the tangent initial price line and the indifference-curve tangency that determines consumption and thus trade. The country produces more than it consumes of X and thus exports it.

Dashed lines show the expanded PPF after the increase in the endowment of capital, together with the corresponding points of production, S, and consumption, C, if prices were <u>not</u> to change. As shown, this causes the country's trade to increase.



We now look at the world market, represented by the relative supply and demand for X relative to Y on the world market shown below. The initial relative price of X, P_X^0 / P_Y^0, clears the world market by equating relative supply to relative demand. When the capital endowment of one country increases, world relative demand does not change (assuming that the countries share identical homothetic preferences). However, because the capital-abundant country was already exporting good X, it must have been producing relatively more X/Y than the world, and when it expands supply, producing even more X, this ratio for the world increases at any given price. Thus the relative supply curve shifts to the right as shown. This, in turn, causes the equilibrium relative price of X to fall, as also shown.

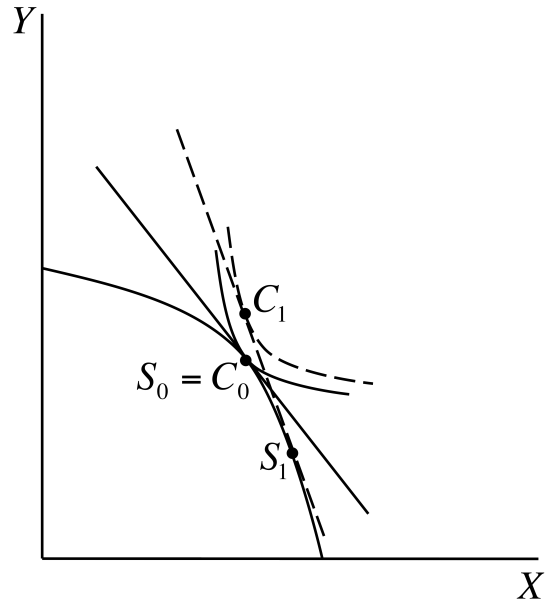


But the country's terms of trade is defined as the relative price of its export compared to its import. Since the capital-abundant country exports X, this fall in P_X/P_Y is a worsening of its terms of trade.

3. (8 points) Answer the following questions regarding the gains from trade

   a. Illustrate the gains from free trade in the standard trade model. In that model, is it possible for a country be made worse off by free trade, compared to autarky?

   Ans: In the standard model, a country in autarky operates at a tangency between the production possibility frontier and an indifference curve, as shown by point $S_0 = C_0$ in the figure below. With free trade, a country produces at a tangency of the PPF to the world price line, and then consumes where that price line is tangent to an indifference curve. If the world price differs from the autarky price, these two tangencies, shown as S_1 and C_1 below, will not coincide, and the country therefore trades. But the indifference curve reached by this trade is necessarily higher than the one in autarky. Since the trade indifference curve is tangent to a price line that is in turn tangent to the PPF, it cannot lie inside the PPF, and it cannot therefore represent a lower level of welfare than was attained in autarky. So the answer is <u>no</u>. In this model, a country cannot be made worse of by free trade, compared to autarky.



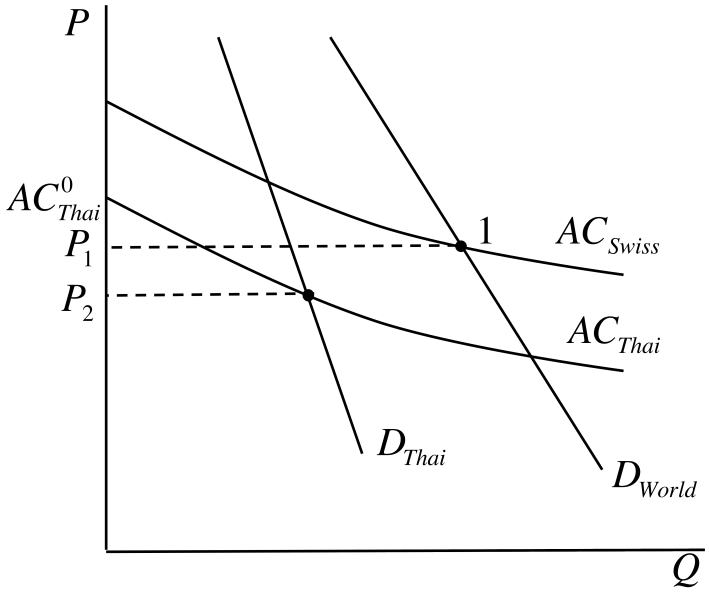
b. How can the presence of increasing returns to scale cause a country to be made worse off by trade? Explain in words and illustrate in a diagram an example of how this could occur?

Ans: The example given in Krugman and Obstfeld is of the watch industry, in which both Switzerland and Thailand have average costs that decline with industry output, due to increasing returns to scale. For any given output, Thailand has lower average cost than Switzerland, due perhaps to lower wages. However, Switzerland had established itself in this market first, and was able to capture the world market with an average cost reduced by its large scale to a level below what Thailand's cost would be if its output were very small. Therefore, under free trade, if Thai producers were to consider entering the market, they would see their average costs as higher than the price established by the larger-scale Swiss producers. They therefore do not enter.

However, if Thailand were to close its market, forcing domestic demanders to buy from domestic producers, the industry would operate at a positive output. This output would reduce Thailand's average cost below what it would be at zero output, due to the increasing returns to scale, and it could perhaps, if output is large enough and its wages low enough, reduce it below the price of Swiss watches. If so, Thai consumers are made better off by not trading, since they get watches cheaper than they could have gotten buying only from the Swiss under free trade. Thus the move from free trade to autarky benefits the Thai economy. (On the other hand, a second move back to free trade, could benefit it even more, since now the Thai watch industry's costs have become competitive and, with free trade, it will displace the Swiss producers.)

All this is illustrated in the figure below. AC_{Swiss} and AC_{Thai} are the two countries' average cost curves, as described above. D_{World} is the demand curve for watches on the world market, and the initial equilibrium is point 1, where Swiss producers are in equilibrium with zero profit (price equals AC) selling to the whole market, because Thai producers, were they to enter, would have average cost of AC^0_{Thai} at the vertical intercept of their average cost curve since they are not producing. This is above P_1, which is why they cannot enter the world market.

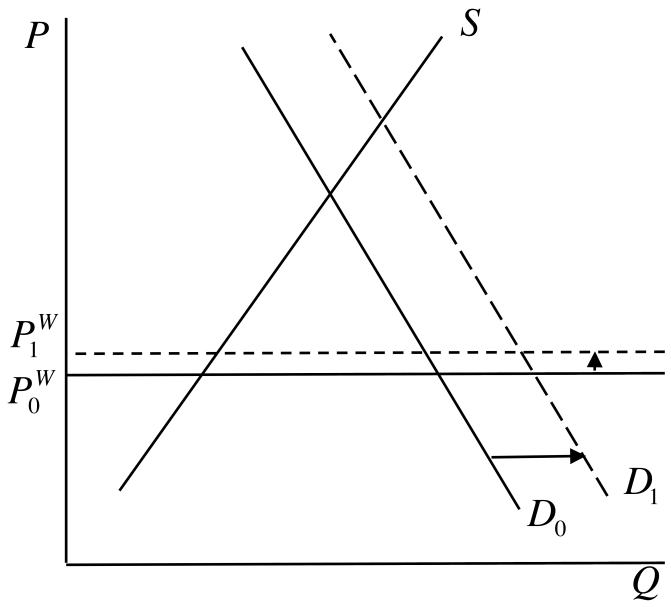
If Thailand cuts itself off from trade, however, then the Thai market alone reaches equilibrium at point 2, with a price P_2 that is below P_1.



4. (4 points) Evaluate the following argument, using tools of analysis as appropriate:

> "The injury test for safeguards protection is redundant and therefore unnecessary. If there is an increase in imports in an industry, then that increase must necessarily cause injury to domestic suppliers."

Ans: This statement is <u>not</u> true. There are several reasons why a country's imports might increase, and these do not all cause injury to domestic suppliers. A simple example, shown below, is a change in preferences that causes the demand for an imported good to shift to the right. In a small country, with fixed world price, there will be no effect at all on domestic suppliers. And in a large country, this increase in demand will cause the world price to rise, and domestic suppliers will be better off.



5. (6 points) Write a short essay explaining the current US program of Trade Adjustment Assistance (TAA), including the following

    a. Reasons why a special program of assistance for trade-displaced workers is appropriate.

    b. What sorts of benefits does the program provide to workers.

    c. The meaning of and rationale for Alternative Trade Adjustment Assistance.

Ans: The answer should include much of the following, although additional valid points from the readings can make up for missing some of this.

a. Needed to buy political support for trade liberalization. Trade-displaced workers are less likely to return to their jobs than workers who lose jobs due to recession. Trade displaced workers are often hurt by the effects of a government policy (trade liberalization), in contrast to workers who are displace by, say, technology. Costs of trade are concentrated on a small group of competing suppliers, in contrast to the benefits of trade that are widely dispersed.

b. Income support. Job training. Relocation allowance. Help with finding new jobs. Health coverage tax credit.

c. ATAA is "wage insurance," which means that when displaced workers take a new job at a wage lower than what they had before, the government pays them a fraction (50%) of the wage difference, for a limited period of time (2 years). The rationale is to encourage workers to take jobs at lower wages, and to encourage firms to offer such jobs, the expectation being that workers will become more productive over time, learning on the job, and their wages will therefore rise.

6. (11 points) The figure below shows domestic demand, D, and marginal cost of production, MC, in an industry in a small economy that faces a fixed world price P^W. Reproduce the figure in your blue book and then identify the quantities specified below. Since there are a large number of these, I suggest that for clarity you label quantities in your figure Q_1, Q_2, etc., and for parts (a)-(d) just write things like $S^C=Q_1$, $D^C=Q_2$, etc. Part (a) is done for you, to illustrate.

   a. Quantities produced domestically, S^C, demanded domestically, D^C, and exported or imported, X^C or M^C if the domestic industry contains many perfectly competitive firms and trade is free.

      Ans: $S^C = Q_1$

      $D^C = Q_2$

      $X^C = Q_1 - Q_2$

   b. Those same quantities, S^F, D^F, and X^F, or M^F, if there is only a single domestic producer and trade is free.

      Ans: $S^F = Q_1$
      $D^F = Q_2$
      $X^F = Q_1 - Q_2$

   c. Those same quantities, S^T, D^T, and X^T, or M^T, if there is only a single domestic producer and there is a prohibitive import tariff.

      Ans: $S^T = Q_1$
      $D^T = Q_4$
      $X^T = Q_1 - Q_4$

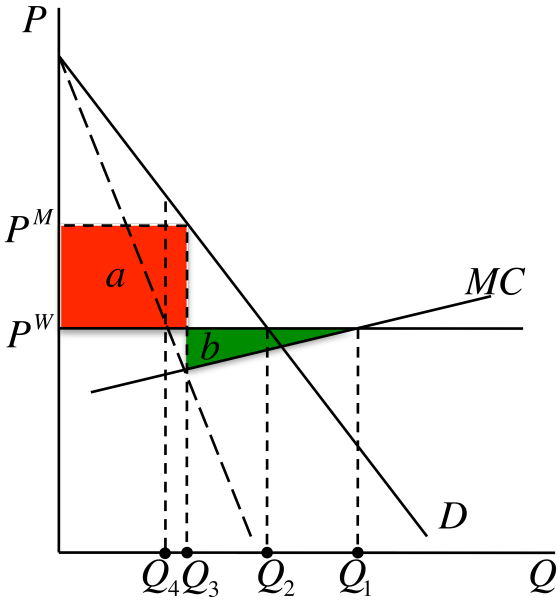
   d. Those same quantities, S^A, D^A, and X^A, or M^A, if there is only a single domestic producer, there is a prohibitive import tariff, and the producer, threatened with an anti-dumping duty, decides not to export.

      Ans: $S^A = Q_3$
      $D^A = Q_3$
      $X^A = 0$

   e. Identify in the figure how you would decide whether the firm in part (d) would be better off not exporting, or better off exporting without dumping.

      Ans: If the firm does not export, then it can charge the monopoly price P^M on the quantity Q_3. If it instead chooses to export without dumping, then since its export price is given by P^W (because this is a small country), to avoid dumping it will have to charge that price also at home. Thus its

price falls from P^M to P^W, and it loses the red area "a" on the quantity Q_3 that it was selling before. On the other hand, it can now expand its output to Q_1, and the marginal cost of these additional units of output, given by the MC curve, are below P^W. This therefore adds to its profit the green area "b". The firm is better off exporting if area b is greater than area a. If not, it is better off not exporting and charging the domestic monopoly price.



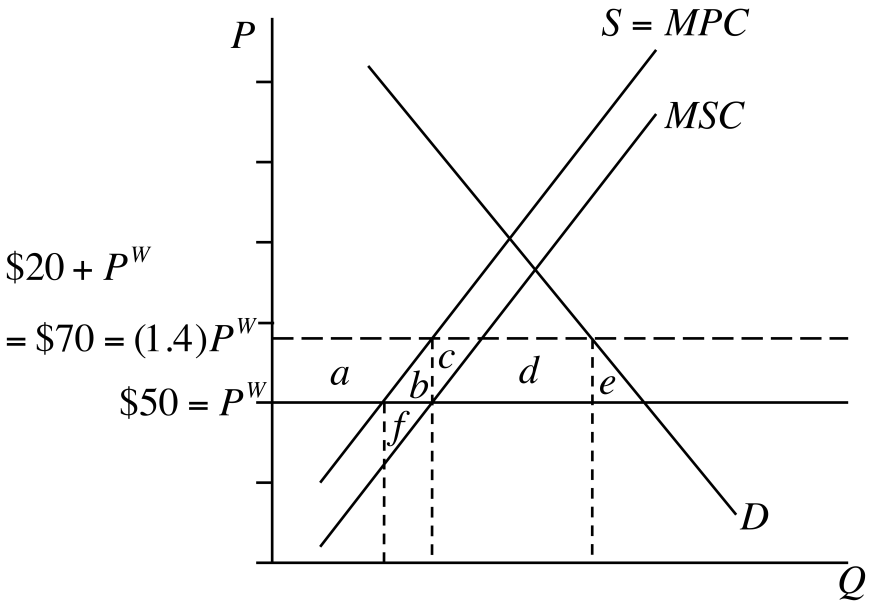
7. (16 points) Consider an industry in a small open economy that produces less than is demanded at the world price, which is $50 per unit. It therefore imports the good. Suppose that production of this good causes an external benefit to residents of the country that we know to be worth $20 per unit produced, but that producers of the good cannot charge for this. Maybe it smells good when it is produced.

    a. Show the effects of a 40% tariff on imports of this good, assuming that conditions are such that, while the tariff causes quantities supplied and demanded both to change, it does not eliminate imports completely. That is, show and identify in a supply-and-demand diagram the effects of the tariff on

        i. suppliers of the good,
        ii. demanders of the good,
        iii. government,
        iv. the residents who benefit from the externality, and
        v. the country as a whole (i.e., all of the above)

Ans: In the figure below, which can be used for all parts of this question, the 40% tariff raises the domestic price to both suppliers and demanders from $50 to $70. The supply curve now represents only marginal <u>private</u> cost, since I am choosing to represent the $20 benefit of the externality as a deduction from private cost to get marginal social cost, MSC. Welfare effects are as follows:

Suppliers gain:	*+a*
Demanders lose:	*–(a+b+c+d+e)*
Government (taxpayers) gains	*+(c+d)*
Residents (via externality) gain	*+(b+f)*
Country	*+(f–e)*



b. Does the country as a whole necessarily lose from this tariff? Does it necessarily gain?

Neither. It gains if f>e and loses if f<e.

c. Would your answer to (b) be any different if you knew that the supply elasticity was +1.0 and the demand elasticity was –1.0? Why? (This is hard. Don't spend time on it if it isn't obvious.)

Yes. Note first that area f equals area b. Thus, what matters is whether what we would normally consider the dead-weight loss due to production distortion is greater than or less than the dead-weight loss due to consumption distortion. The reason is that we now <u>want</u> the production distortion, in order to correct for the distortion of the externality. But these two triangles have the same height, and their base is the change in supply (for b) and demand (for e) due to the same price increase. If elasticities of supply and demand are both the same, then the <u>percentage</u> increase in supply will equal the percentage decrease in demand. But since the country imports, the level of demand is initially greater than supply, so in units of the good the drop in demand (the base of e) will be greater than the increase in supply (the base of b). Thus area e will be larger than area b (and thus f), so that the tariff necessarily makes the country worse off.

d. Now show the effects, starting again from free trade, of a production subsidy of $20 per unit produced, on suppliers, demanders, government, residents-via-the-externality, and the country as a whole.

In the same figure, the subsidy increases what suppliers receive to $70, just as the tariff did, but it leaves the price to demanders at its free trade level. Thus the welfare effects are as follows:

Suppliers gain:	*+a*
Demanders are unaffected:	*0*
Government (taxpayers) lose	*–(a+b)*
Residents (via externality) gain	*+(b+f)*
Country gains	*f*

e. Does the country as a whole necessarily lose from the subsidy? Does it necessarily gain?

It necessarily gains.