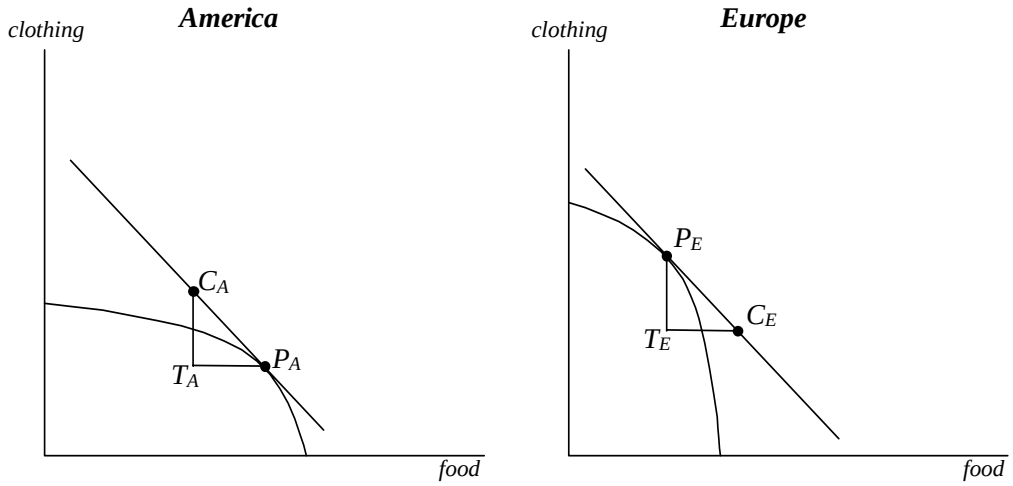
Final Exam - *Answers*
December 21, 2000

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

1. Use the two-country, two-good, Heckscher Ohlin model to find the effects on one country of a change in preferences abroad that shifts away from its exported good. Specifically, assume that there are two countries, American and Europe, both producing food and clothing from land and labor. America is relatively abundantly endowed with land, compared to Europe, and land is used more intensively in production of food than in production of clothing. The change in preferences will be introduced in part (b).

   a. On the axes below, draw production possibility curves for America and Europe, and then use them to illustrate a free trade equilibrium pattern of production,

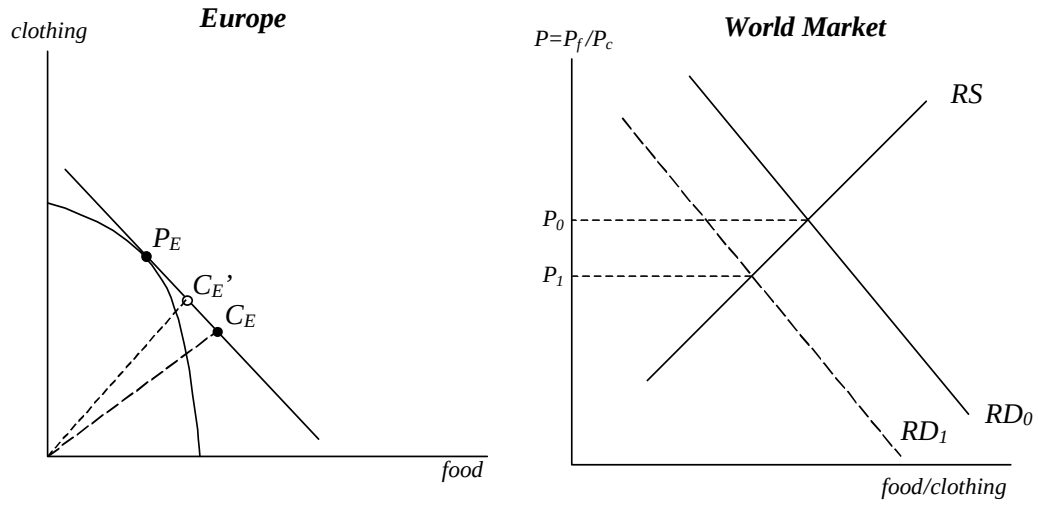


consumption, and trade for the two countries. In the space below the figures, state briefly which country exports which good, and why.

Because America is relatively well endowed with land, compared to Europe, and because food is relatively land intensive, we know from the Heckscher-Ohlin model that the production possibilities of America will be relatively greater for food than for clothing, as shown. At common prices, such as will prevail with free trade, America will therefore produce relatively more food and relatively less clothing than Europe. If preferences for consuming the goods are identical (or even just similar, so long as they do not differ as much as production), America will produce more food than it consumes, while Europe will produce more clothing than it consumes, as shown. Thus America exports food and Europe exports clothing, in the amounts given by T_AP_A and T_EP_E respectively.

b. Suppose now that that preferences in Europe shift away from food and toward clothing (so that at any given prices and income, Europe's consumers buy less food and more clothing). You can think of this, if you like, as motivated by concerns about genetically modified food or mad-cow disease, although that is not actually part of the model, and the shift here is away from food regardless of where it has been produced. In the space below, illustrate the determination of world equilibrium prices and how they would be affected by this change in preferences.

The transformation curves in part (a) could be used to show that each country will produce a higher ratio of food to clothing as the relative price of food rises. This leads to an upward sloping relative supply curve, RS, for food/clothing, which can be combined with a downward sloping world relative demand curve, RD, to determine the world equilibrium price, as shown on the right below. The shift in preferences in Europe causes its consumption point to move up and to the left, as shown on the left below. This reduces its ratio of food to clothing demanded, and causes a shift down and to the left of the world relative demand curve, shown on the right from RD_0 to RD_1. The result is a fall in the world relative price of food, from P_0 to P_1.



c. How will this change in world prices affect America? Specifically, determine the effects on

i. Output of food

ii. Output of clothing

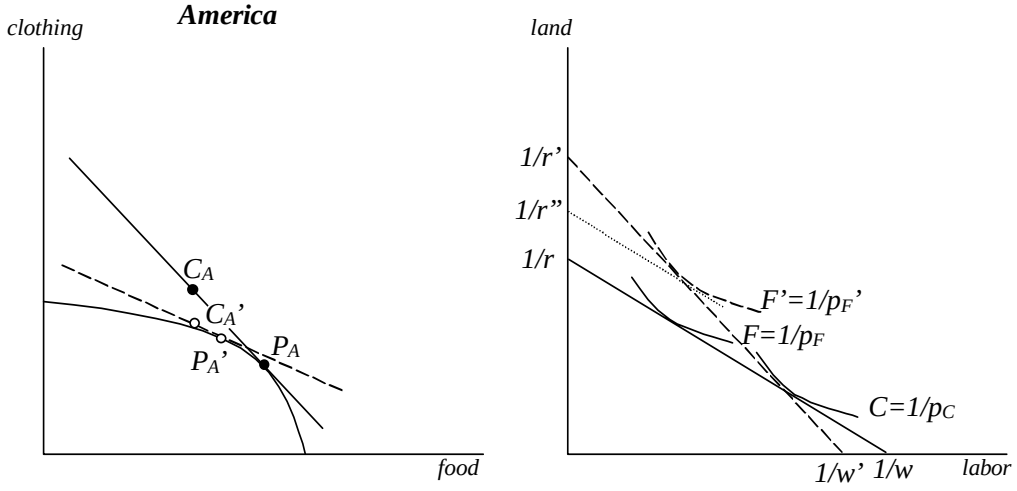
iii. The real wage of labor

iv. The real rental price of land

v. Overall national welfare

The fall in the world relative price of food causes America to reduce production of food and increase production of clothing, moving along its transformation curve as shown on the left below. It can no longer reach the level of aggregate consumption that it had before, and therefore overall national welfare declines.

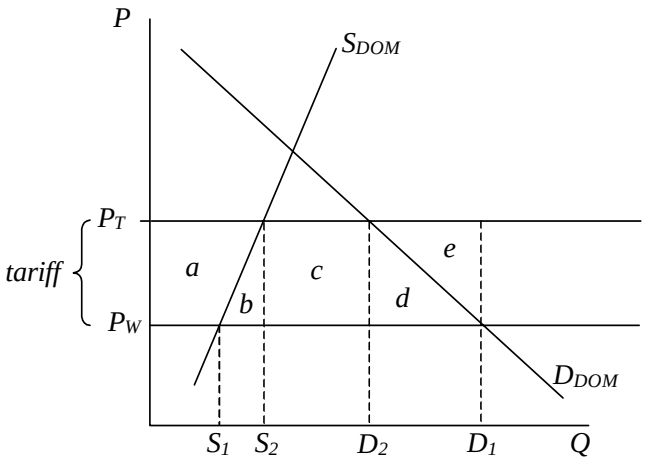
Within the country, the fall in price of food shows up on the Lerner diagram as an outward shift of the unit value isoquant for food, assuming that we hold the price of clothing fixed as numeraire. As shown by the intercepts of the isocost lines, this causes the nominal wage of labor to rise, which is also a real increase since no price has risen. It also causes the nominal rental on land to fall. The fall from r to r' is greater than the fall to r", which is constructed as equal to the fall in price of p_F. Therefore the rental falls relative to the prices of both goods, and thus falls in real terms.



2. The graph below shows domestic supply and demand for a good in a small country that faces a world price for the good of P_W. Also shown is a "target price" of P_T that the country's government has promised to maintain for its domestic suppliers.

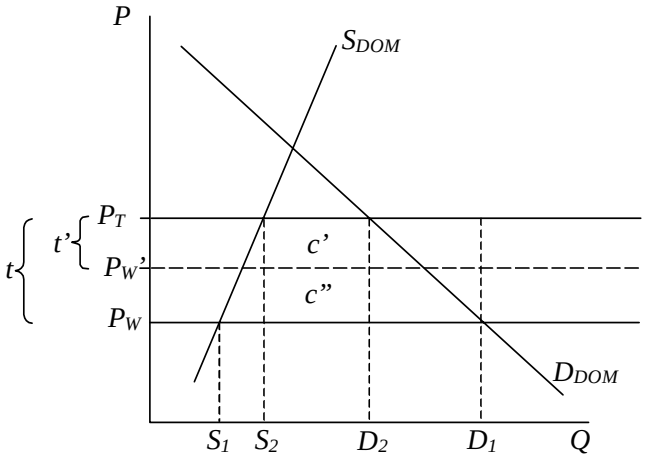
a. Show the effects of using an import tariff to provide this target price to the suppliers. Indicate clearly the size of the tariff needed to do this. Then add any necessary lines and labels to the figure, and use them to state the direction and sizes of effects of this tariff on

- Domestic production
- Domestic consumption
- Quantity of imports
- Tariff revenue
- Producer surplus
- Consumer surplus
- National welfare



Price can be raised to P_T either by a specific tariff equal to $P_T - P_W$, or by an ad valorem tariff equal to $(P_T - P_W)/P_W$. As the figure shows, this tariff will raise domestic production from S_1 to S_2, reduce domestic consumption from D_1 to D_2, and reduce imports from (D_1-S_1) to (D_2-S_2). Tariff revenue is area c. Producers gain producer surplus of area a, while demanders lose consumer surplus of area (a+b+c+d), for a net loss in national welfare of (b+d).

b. Now suppose that the world price, P_W, rises on the world market to P_W', about half way to P_T as shown below. Starting with the tariff that you had in part (a), assume that the size of the tariff is now changed automatically so as to keep the domestic price at P_T, as it would be under a "variable levy." What will this increase in world price, accompanied by this automatic change in the tariff, do to the same variables that you examined in part (a)?



The tariff is reduced from t to t', as shown. Since there is no change in the domestic price, there will be no change in quantities supplied, demanded, and traded, nor in producer or consumer surplus. The only change is that tariff revenue is reduced, from the old c=c'+c", to just c', a loss of c". The country's net welfare falls by this loss of tariff revenue, c".

c. Suppose that you now learn that the good you've been analyzing is cigarettes, and that they cause a negative externality whenever they are consumed, lowering the welfare of other consumers nearby. Let the size of that externality, just for convenience, happen to be equal to the difference between the target and initial world prices: $E = P_W - P_T$. How will knowledge of this externality alter your conclusions in part (a)? (For this part, you should ignore the world price increase in part (b)).

The only change from the answer to part (a) is that now the reduction in quantity demanded also causes a reduction in harm due to the negative externality. Since the per unit size of this externality happens to be equal to the tariff, the country gets an additional gain equal to E times the change in quantity demanded, or the area (d+e). Net welfare of the country therefore changes by $-(b+d)+(d+e) = e-b$. *As the curves are drawn, because the demand curve is so much flatter than the supply curve, it is clear that this is a net gain for the country.*

3. Write an essay describing the various circumstances under which the rules of the World Trade Organization permit a member to restrict imports. For each of these circumstances, discuss briefly what economic theory says about the desirability and/or optimality of these rules.

   *The WTO does not require that all tariffs be zero, or that tariffs never be increased. This is true in spite of the fact that economic theory provides essentially **no** first-best justification for restricting imports under **any** circumstances. The rules therefore need to be understood in context, sometimes with certain restrictions of imports being accepted in return for other liberalization.*

   The major circumstances under which the WTO permits imports to be restricted are the following:

   - *Countries can always levy tariffs up to the "bound" tariff levels that they have negotiated on entrance to the WTO or that they have negotiated as members during rounds of multilateral trade negotiations.*

     The importance of the tariff bindings is that they bring at least some tariffs down to the bound levels, when countries might not participate at all if they were not permitted to keep some tariffs high.

   - *They can levy any tariffs they wish to on sectors where they have not negotiated tariff bindings.*

     Exempting certain sectors may be the necessary cost of getting countries to reduce barriers at all in other sectors, and thus may be the cost of getting the benefits that economic theory predicts from liberalization in these other sectors.

   - *Until the termination of the Multi-Fibre Arrangement (MFA), some countries are permitted to continue some restrictions on imports of textiles and apparel.*

     Economic theory provides little justification for the MFA, nor for its continued restrictions on trade for up to ten years after the formation of the WTO. It can only be understood in the context of political realities within the most powerful industrialized countries.

   - *A "balance of payments exception" permits countries to restrict imports if a trade deficit is making it difficult for them to continue pegging their exchange rate.*

     Economic theory does not provide a clear answer to whether a pegged exchange rate is a good idea, and therefore to whether a trade restriction to maintain it is justified. A standard answer is that trade restrictions are a second-best means of solving balance of payments problems, with the first best solution being adjustment of the exchange rate.

- *The Safeguards Clause permits countries to raise a tariff temporarily if their domestic industries are suffering injury from imports.*

  Economic theory is clear that a tariff does provide benefits to import competing producers, including both the firms and their workers. Therefore if it is politically or morally necessary to lessen the injury to such groups from imports, a tariff is a way to do it. However, it is a second-best tool for that purpose, since a more direct subsidy to production, for example, could achieve the same benefits without the cost of distorting consumption.

- *The Anti-Dumping Clause permits countries to impose tariffs on imports that are "dumped," meaning priced for export below a "fair" price, defined either as their domestic price or cost.*

  Economic theory provides hardly any basis for viewing dumped imports as harmful, and therefore cannot justify the use of anti-dumping duties. The one exception is predatory dumping, in which a foreign firm seeks to drive out domestic competitors for the purpose ultimately of charging a monopoly price. But the WTO's rules permitting anti-dumping duties do not require any evidence of predatory effect or intent.

- *The Countervailing Duty Clause permits countries to impose tariffs on imports that are subsidized by their governments.*

  Economic theory demonstrates that subsidies to exports are necessarily harmful, although primarily to the exporting country, and that production subsidies may also be harmful if they are not correcting some sort of distortion. Countervailing duties can therefore be justified on the grounds that they offset the effects of undesirable subsidies, and therefore reduce the motivation to use them. The WTO rules do make some attempt to distinguish desirable (distortion-correcting) from undesirable subsidies and to direct countervailing duties toward the latter.

- *In the process of forming a customs union, member countries with below average tariffs in a sector are permitted to increase their tariffs as they adopt the common external tariff of the customs union.*

  Economic theory says that a customs union (or free trade area) can be welfare worsening even if external tariffs are not raised at all, so this permission for some countries to raise their external tariffs during the formation of a customs union is surely worse than the alternative of not permitting external tariffs to be raised at all. But practically speaking, the alternative would require that a customs union set its external tariffs at the level of the minimum of all its member countries, which would probably prevent any customs unions from being formed. The requirement in practice, that the external tariff be no higher than the average of the counties' previous tariffs, at least honors the spirit of not raising protection, even though individual tariffs will go up.

- *The ultimate remedy in the dispute settlement mechanism of the WTO, if a dispute cannot be resolved by negotiation and if a finding against a party is not responded to by changing the offending behavior, is for the complaining country to levy retaliatory tariffs.*

  There is no pretense that the retaliatory tariffs themselves are beneficial in any sense, economic or otherwise. However, the threat of this retaliation provides the incentive for countries to abide by WTO rules and dispute settlement decisions. Economic theory, in the form of game theory, predicts that the threat of a welfare-worsening outcome is necessary in order to secure cooperation in games like the Prisoners Dilemma, which embodies important aspects of the interactions between countries that the WTO seeks to influence.