

**Economics 433: Advanced International Trade**

**Final Exam**

December 19, 2006

**Answer Key**

**This exam has two parts. Please answer all questions in part I and 6 of the 7 questions in part II.**

If you attempt all 7 questions in part II, be sure to cross out the question you do not want to have graded. Otherwise, the first 6 questions will be graded. (There is no extra credit for doing all 7 questions.)

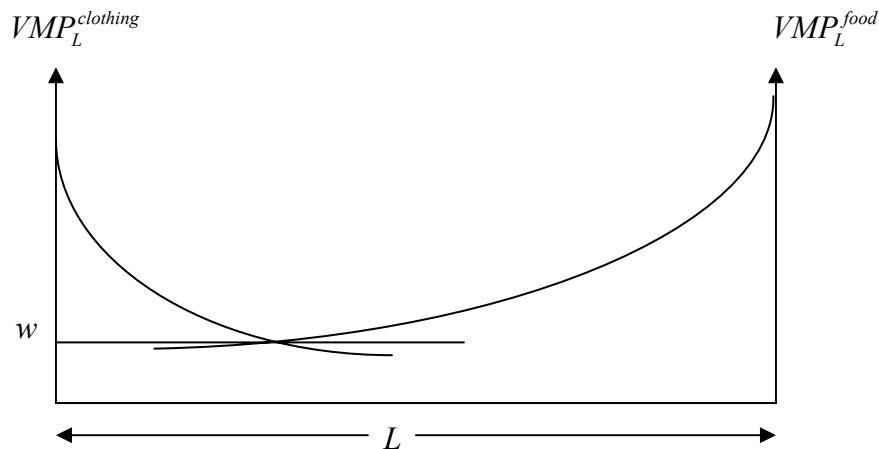
Each part will be weighted in proportion to its allotted time. Be sure to read the questions carefully, and provide concise explanations when they are solicited.

**Part I: Multiple Choice (30 points)**

1. The Factor Content Theorem states that, under the assumptions of the Heckscher-Ohlin model:
  - a. Countries effectively expand their factor stocks through trade.
  - b. Countries with large factor stocks benefit more from trade than countries with meager factor stocks
  - c. Each country implicitly exports the factor(s) with which it is relatively well-endowed.
  - d. Trade makes factor owners feel contented.
  
2. Each of the following statements concerns trends in the terms of trade for developing countries since World War I. Which is correct?
  - a. The terms of trade have steadily worsened.
  - b. The terms of trade have steadily improved.
  - c. The terms of trade have led to immiserizing growth for most developing countries.
  - d. There has been no clear tendency for the terms of trade to improve or worsen.
  
3. If a *large* country imports cotton, and it imposes tariffs on its cotton imports:
  - a. it may drive down the world price of cotton.
  - b. it may drive up the world price of cotton.
  - c. it will necessarily worsen its own terms of trade.
  - d. it will discourage domestic cotton production.
  
4. Which of the following has grown most rapidly during the past 30 years?
  - a. global exports
  - b. global imports
  - c. global production (GDP)
  - d. global foreign direct investment flows
  
5. Which of the following is *not* a reason why trade liberalization might cause a country to grow more rapidly?
  - a. Trade liberalization might give its producers access to a rapidly growing menu of foreign intermediate and capital goods.
  - b. After liberalization, it might be easier to observe and de-engineer technologically sophisticated imports.
  - c. Exporters may learn about technologies from their buyers abroad.
  - d. The country's comparative advantage might lie in goods with little scope for learning by doing.
  
6. When a country goes from autarky to free trade, there are typically *gains from specialization* because:
  - a. Consumers adjust the proportions in which they consume goods.
  - b. Domestic producers adjust the proportions in which they produce goods.
  - c. The value of the country's production is no longer constrained to match the value of its consumption (in world prices).
  - d. Wages and the return to capital rise relative to the prices of all final goods.

7. Which of the following was *not* a general obligation of signatories to the GATT, and more recently of WTO members?
- To honor the principles of non-discrimination—national treatment and most-favored nation (with a few exceptions)
  - To reduce at least half of one's trade barriers during each major round of negotiations (with a few exceptions).
  - To avoid quantitative restrictions (with a few exceptions).
  - To "bind" tariffs at maximum agreed-upon levels (with the exception of safeguards).

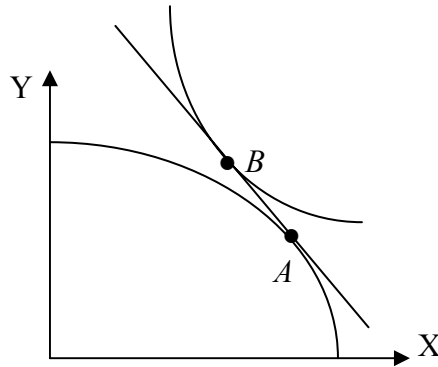
The following diagram is relevant for questions 8 and 9 below. It depicts labor market equilibrium in the small open economy of Comercio, which produces food and clothing. Food is produced with land and labor ( $L$ ); clothing is produced with capital and labor. Land is specific to food, capital is specific to clothing, and labor is mobile between the two sectors.



8. If Comercio has a comparative advantage in food, and it imposes a tariff on clothing imports, the effect will be to:
- make capitalists better off and land owners worse off.
  - make land owners better off and capital owners worse off.
  - make both land and capital owners better off.
  - make both land and capital owners worse off.
9. Now suppose Comercio has a comparative advantage in clothing, and that the wage depicted above ( $w$ ) is far less than the market-clearing wage in the countries to which Comercio exports. If anti-sweatshop activists in these destination markets successfully impose a minimum wage above  $w$  on clothing producers in Comercio, then
- profits (i.e., producer surplus) for land owners in Comercio will fall.
  - profits (i.e., producer surplus) for capital owners in Comercio will fall.
  - wages for all workers will rise.
  - wages for all workers will fall.

10. According to U.S. law, a foreign producer is guilty of dumping if
- it is selling its product in the U.S. market at a price above the price it charges in its home market.
  - it is selling its product in the U.S. market at a price below its marginal production costs.
  - it is selling its product in the U.S. market at a price below its average production costs.
  - it sells its product at a price below the price charged for a comparable product by a U.S. producer.
11. Which of the following is *not* likely to be necessary for multinational investments to take place?
- The parent company must have some source of profits that cannot be replicated by competitors—be it product, process, or brand reputation.
  - There must be strong plant-level increasing returns to scale in production.
  - The parent company must be able to reap some cost advantage by producing in the foreign market, as opposed to producing at home and exporting to the foreign market.
  - There must be some “internalization advantage” that makes it more profitable to own foreign production facilities than to deal with others who operate such facilities under licensing or subcontracting agreements.
12. Suppose Cramistan is a small, open economy that satisfies the assumptions of the Heckscher-Ohlin model. It produces good X (which is labor-intensive) and good Y (which is capital-intensive). An increase in the efficiency with which this country produces good Y should:
- increase the relative price of labor in Cramistan.
  - increase the relative price of capital in Cramistan.
  - reduce welfare in Cramistan.
  - cause Cramistan’s production possibility frontier to shift inward.
13. If a country wishes to encourage production in the software industry, perhaps because it generates public knowledge, which type of policy is best from a welfare perspective?
- A tariff on imports of software.
  - A quota on imports of software.
  - A subsidy for consumption of software.
  - A subsidy for production of software.

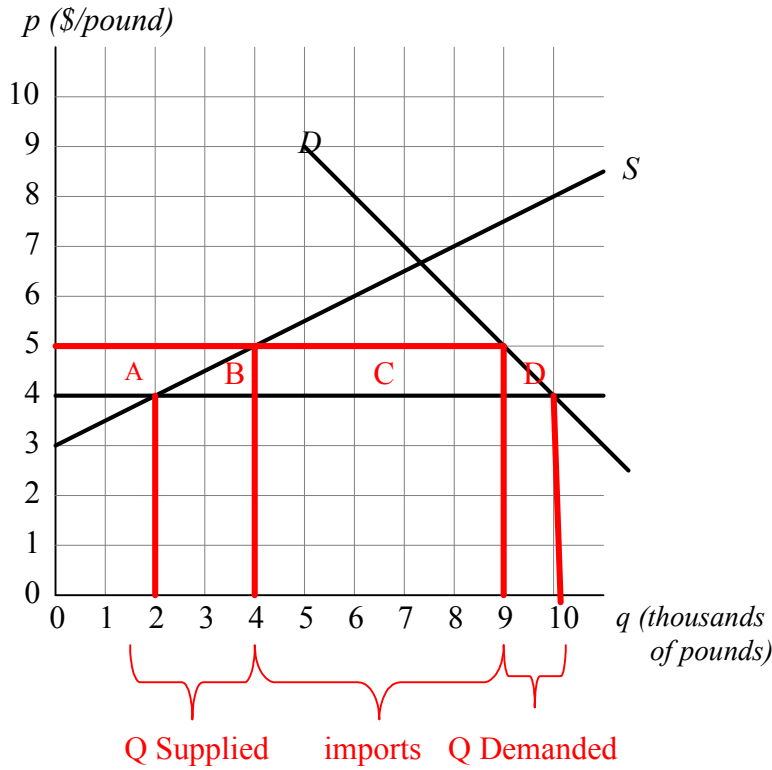
14. Suppose the assumptions of the two-good, two-factor Heckscher-Ohlin model hold for a particular country, and the production of X uses less capital per worker than the production of Y. If the graph below depicts the trading equilibrium for this country, then:
- The return to capital would increase in this country if it were to prohibit trade.
  - This country exports Y in order to import X.
  - The volume of X production would increase in this country if it were to prohibit trade.
  - Using world prices to value goods, the value of the X and Y combination at point A is less than the value of the X and Y combination at point B.



15. Which of the following statements best summarizes the evidence discussed in class on trade and growth?
- African countries have tended to have the most liberal trade policies, but they have not grown particularly rapidly.
  - Countries with export marketing boards have grown especially rapidly.
  - Countries with relatively liberal trade policies have typically grow faster, but it is difficult to tell whether this reflects good trade policies *per se*, or good economic management in general.
  - Countries that have heavily protected their import-competing industries have enjoyed rapid learning by doing, and thus have experienced relatively rapid growth.

**Part II: Numerical Problems (70 points) Answer any 6 of the following 7 questions.**

- 1) The graph below shows domestic supply and demand for bananas in a small country. The world price of bananas is \$4 per pound.



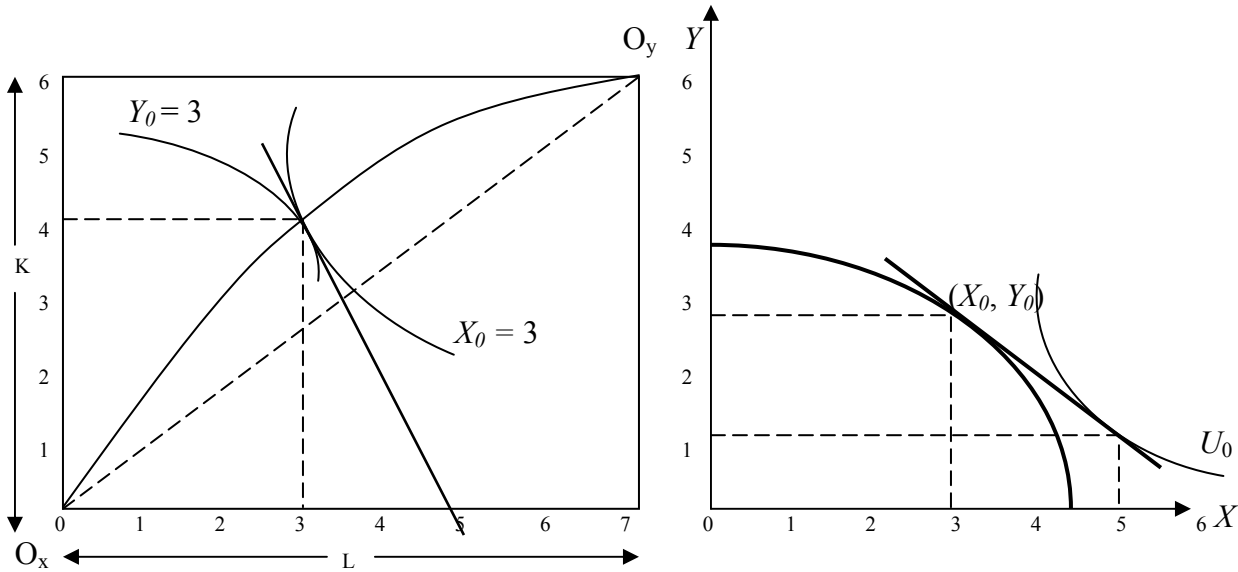
When a new government takes power, it abandons free trade in favor of a quota of 5 thousand pounds on banana imports.

Assuming that the government gives all of the import licenses to the new president's brother-in-law, indicate the amount by which each of the following will *change*. (Use minus signs to indicate reductions.)

- quantities supplied +2,  
 quantity demanded -1,  
 quantity imported -3,  
 consumer surplus -9.5 (-A-B-C-D),  
 producer surplus +3 (A),  
 brother-in-law surplus +5 (C),  
 net welfare -1.5 (B+D).

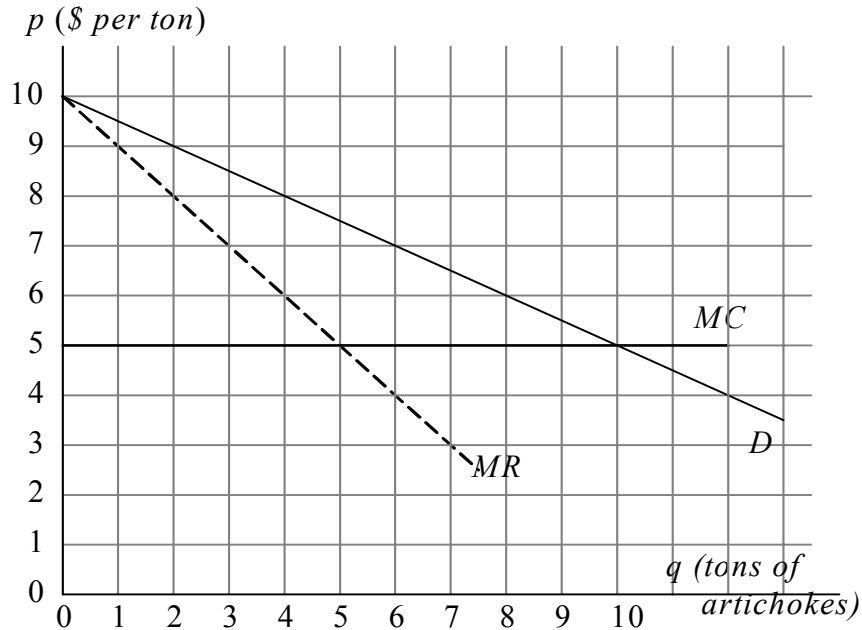
What is the tariff equivalent of this quota?  $t =$  .25.

2) The figures below depict equilibrium for a particular small, open economy. The Edgeworth box on the left shows the factor allocation; the production possibility frontier, trading line and social indifference curve on the right show the associated product market equilibrium.



- In this equilibrium, what good does this country export and good what does it import? ( $X$  or  $Y$ )  $X$  Export? ( $X$  or  $Y$ )  $Y$ . What *quantity* does it export? 2 What quantity does it import? 2 What is the relative price of  $X$  in world markets?  $P_x^W / P_y^W$  1
- What is the ratio of wages to rental costs of capital in this equilibrium?  $w/r =$  2 How much labor does it allocate to the production of good  $X$ ? 3 How much capital? 4 Which good is more capital intensive?  $X$
- Assuming that this country and its trading partners satisfy the assumptions of the Heckscher-Ohlin model, and further assuming that factor price equalization occurs, is this country a net exporter of capital or of labor? labor How much labor is embodied in its imports? 2 How much capital is embodied in its imports? 2.67 (Hint: Use your answer to (b) to calculate the amount of labor and capital needed to produce one unit of the imported good, then combine this figure with your answer to (a) concerning the number of units of this good that are imported.)

- 3) The domestic supply and demand for artichokes in a small country are depicted below. A single artichoke mogul (Maurice) is the only domestic supplier; his marginal production cost is \$5 per ton of artichokes. The world price per ton of artichokes is \$4.



The government of this country is weighing five possible policy options:

- A strict prohibition of artichoke imports.
- Allow artichoke imports, but subject them to a 50 percent tariff.
- Allow 2 tons of artichokes to be imported at the world price.
- Allow artichokes to be imported without quotas or tariffs.
- Break up Maurice's monopoly into lots of small artichoke suppliers, but don't allow imports. (Hint: this makes Maurice's MC schedule the domestic supply schedule.)

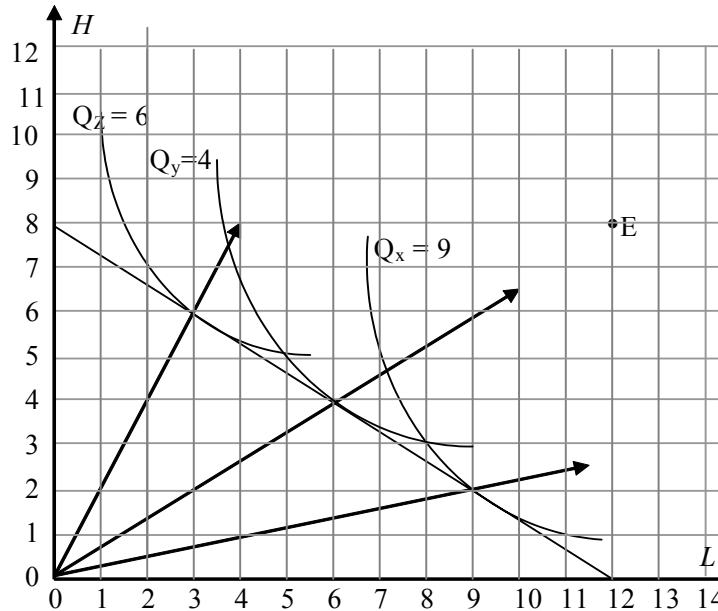
Indicate the effects of these policies on the domestic market by filling in the table below.

	Imports prohibited	Trade with tariff	Trade with quota	Free trade	Break up the monopoly
	(a)	(b)	(c)	(d)	(e)
Domestic price:	7.5	6	7	4	5
Maurice sells (tons):	5	8	4	none	10
Consumers import (tons):	none	none	2	12	none

Comparing policies (d) and (e), which generates more consumer surplus? d Briefly defend your answer.

In d, the price is lower which makes the consumer surplus greater.

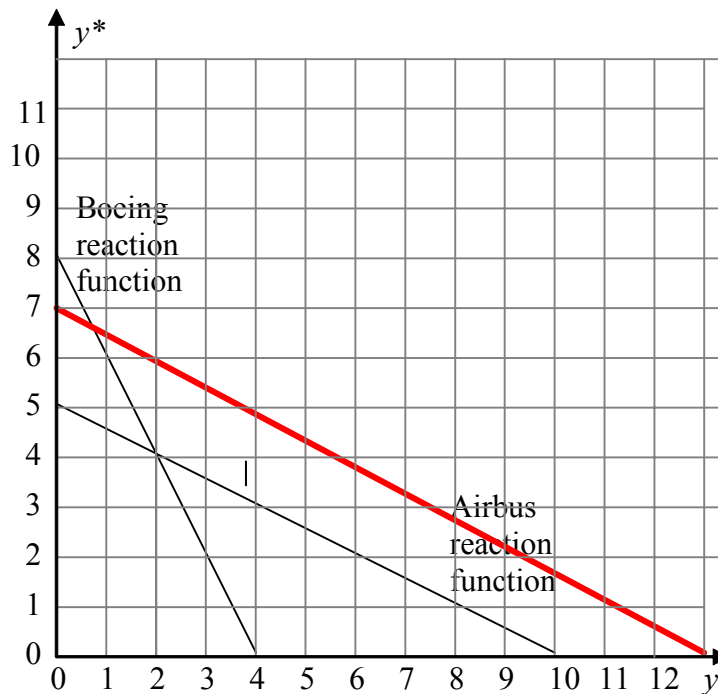
4) The Lerner diagram below shows unit-value isoquants for three types of production in Homeland—non-traded, low-skill services ( $X$ ), manufacturing ( $Y$ ), and management/research/technical services ( $Z$ ). These are the only possible forms of production. Each requires human capital ( $H$ ) and unskilled labor ( $L$ ).



- a. If this diagram depicts a competitive equilibrium, what prices must prevail for each of the activities in Homeland?  $P_X$  1/9,  $P_Y$  1/4,  $P_Z$  1/6. How much must one unit of each of the factors cost?  $W_H$  1/8,  $W_L$  1/12.
- b. Suppose that falling trade costs and the rapid emergence of industrial sectors in developing countries cause manufacturing goods to become available abroad at a price below the  $P_Y$  value you calculated in part a above. If prices for activities  $Z$  and  $X$  remain unaffected, and if Homeland is endowed with  $L = 12$  units of unskilled labor and  $H = 8$  units of human capital (refer to point  $E$ ), how much of each activity will Homeland supply in the new equilibrium?  $Q_X$  9,  $Q_Y$  0,  $Q_Z$  6.
- c. Relative to the initial equilibrium, what can you say about the *change* in the amount of low-skill services induced by the falling global price of manufacturing activities described in part b above?  $Q_X$  (**must have increased**, must have decreased, could have changed in either direction) must have increased. Briefly defend your answer.

**Y production ceases, therefore, Z and X production must increase to absorb the freed-up labor and clear the factor market.**

- 5) Airbus and Boeing produce identical airplanes, which they supply on global markets. Suppose they are Cournot competitors, and their reaction functions are as depicted below. (Boeing production is denoted by  $y$ ; Airbus production is denoted by  $y^*$ .)



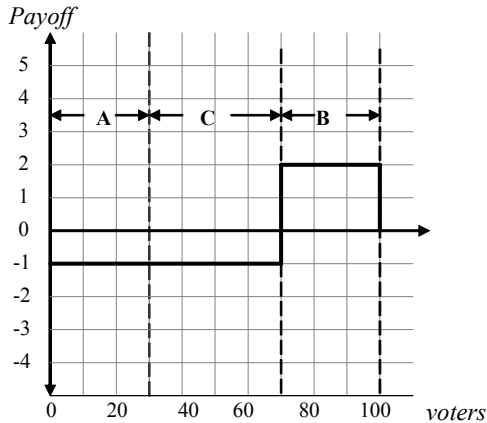
- a. If Boeing were to cease production altogether, how many planes would Airbus supply? 5 Does the presence of Boeing in the market tend to **increase prices** for wide body aircraft or decrease them? increase Judging from the equilibrium depicted in the graph, would you say that Boeing's production costs (per plane) are greater than, less than, or the same as Airbus's? Greater Briefly explain why.  
**In equilibrium, Boeing produces 2 planes whereas Airbus produces 4 planes.  $4 > 2$ , Boeing must have higher production costs because it produces less in equilibrium.**
- b. Suppose the Europeans decide to subsidize Airbus production. How will this change the equilibrium? Modify the graph above in a way that *qualitatively* reflects such a subsidy. (You would need more information to be able to precisely characterize the effects of the subsidy.) How will the subsidy affect Airbus production? (**up**, down, no change, ambiguous) up Boeing production? (up, **down**, no change, ambiguous) down The price of new aircraft? (up, **down**, no change, ambiguous) down
- c. If the U.S. reacts to the European subsidy with a subsidy for Boeing. Relative to the case where there are no subsidies for either firm, who are the winners and losers in this equilibrium with subsidies for both producers? Briefly defend your answer.

winners: **consumers of airplanes**

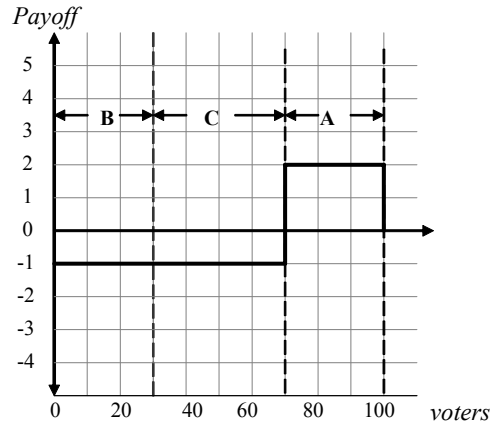
losers: **taxpayers**

**Tax payers loose because they are the ones financing the subsidies. Consumers of airplanes gain because the subsidies have driven down prices of planes in the market.**

6) The two diagrams below represent payoffs to voters from alternative policies. There are 100 voters; 30 are “A” types, 30 are “B” types, and 40 are “C” types. The first diagram implies that if policy 1 is implemented, A types and C types lose \$1 each, while B types gain \$2 each. The second diagram implies that if policy 2 is implemented, B types and C types lose \$1 each, while A types gain \$2.



**Policy 1**



**Policy 2**

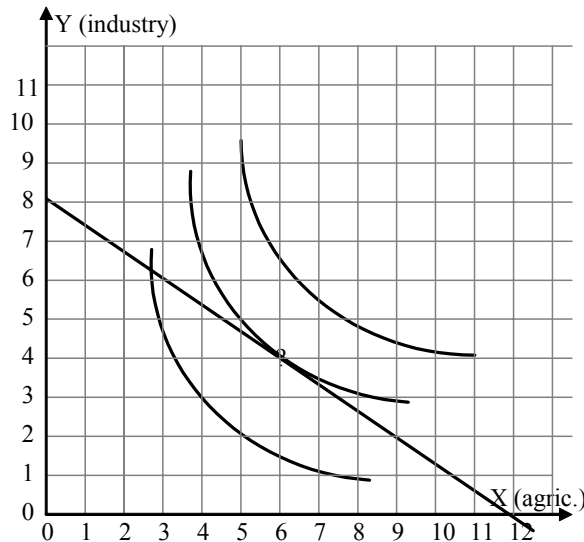
- If enacted, how much will policy 1 increase or reduce net social welfare? (Pay attention to units, and use a negative sign to indicate a reduction.) -1. If each of the 100 voters knows his or her type, and if voting is costless, will policy 1 get majority support? (yes or no) no
- If each of the 100 voters knows his or her type (A, B or C), but the opportunity costs of voting is \$1.50 for each voter, will policy 1 get majority support among those who cast votes? yes
- Suppose policies 1 and 2 are bundled together into a single bill—call it the *Omnibus I-Got-Mine Bill*. If enacted, how much will the *I-Got-Mine Bill* increase or reduce net social welfare? (Use a negative sign to indicate a reduction.) -2. If each voter knows his or her type, and if voting is costless, will this bill get majority support? (yes or no) yes. Briefly defend your answer.

With the combined bill, A's expect an outcome of  $(-1 + 2) = 1$ , B's expect an outcome of  $(-1 + 2) = 1$ , and C's expect an outcome of  $(-1 + -1) = -2$ . A+B constitute a 60% majority who gain, therefore, the bill will pass.

- Now suppose that the A types already know what type they are, but the B and C types won't find out which of these two groups they belong to until after the policy is implemented (i.e, each considers himself to have a  $4/7$  chance of being a C type and a  $3/7$  chance of being a B type). If voting is costless and voters maximize their expected payoff, will policy 1 enjoy majority support? (yes or no) yes. Briefly defend your answer.

Expected Value:  $(4/7)(-1) + (3/7)(2) = -4/7 + 6/7 = 2/7$ . Because the expected value is positive ( $2/7$ ), 70% of voters will vote yes, which constitutes a majority.

- 7) An economy uses labor alone to produce industrial goods (Y) and agricultural goods (X). It has  $L=4$  workers, and currently has the production possibility frontier diagrammed below. A set of social indifference curves is also diagrammed.



- a. Currently, what is labor productivity (output per worker) in the industrial sector?  $h_y =$  2. What is labor productivity in the agricultural sector?  $h_x =$  3.
- b. Given the labor productivities you identified in part (a), and given the indifference curves in the graph, how much labor is currently devoted to industrial sector production?  $L_y =$  2. How much labor is devoted to agricultural sector production?  $L_x =$  2.
- c. Suppose that, because of learning by doing, productivity in each sector improves at a rate proportional to the number of workers employed therein. Specifically,  $\frac{\Delta h_x}{h_x} = 0.01L_x$ ,  $\frac{\Delta h_y}{h_y} = 0.02L_y$ . If this economy is closed to trade, what is the current average rate of growth in labor productivity?  $\frac{L_x}{L} \left( \frac{\Delta h_x}{h_x} \right) + \frac{L_y}{L} \left( \frac{\Delta h_y}{h_y} \right) =$  0.03. Suppose the global relative price of agricultural goods is  $\frac{P_x}{P_y} = 2$ . At what rate would this economy grow if it were to open to trade?  $\frac{L_x}{L} \left( \frac{\Delta h_x}{h_x} \right) + \frac{L_y}{L} \left( \frac{\Delta h_y}{h_y} \right) =$  0.04. Do you recommend that this country open to trade? (yes, no) yes. Briefly explain why or why not.

Opening to trade has the dual benefits of increasing the average rate of growth relative to autarky as well as gains from trade.