

**AED 503 Economic Analysis of Public Policy**  
**Assignment 1, Fall 2009**  
**Due Date: October 15, 2009**

Answer all of the questions below. Your answers should be as complete as possible, using diagrams and written explanations where appropriate. In order to get partial credit, provide more than a one-or-two sentence answer. Each complete question is worth 25 points.

(1) In thinking about a consumer's preferences over bundles of goods, explain what is meant by *strict preference*, *indifference*, and *weak preference*. In your own words, explain what is meant by the axioms of *completeness*, *reflexivity* and *transitivity*. State and *explain* carefully the two key features of well-behaved consumer preferences. Illustrate in a diagram an indifference map for a consumer that has well-behaved preferences. (Remember to label the diagram). Also use an indifference map to explain why indifference curves for one consumer should not cross each other.

(2) Using an Edgeworth Box diagram, illustrate the concept of a *Pareto improvement* in an exchange economy consisting of two consumers (with well-behaved preferences), two goods, and some initial endowment of the two goods. Label carefully all of the elements of the diagram. Define precisely the condition required for a Pareto improvement, and point out in the diagram where this condition is satisfied relative to the initial endowment point. Then, redistribute the initial endowment to another point in the Edgeworth Box and explain where the condition for a Pareto improvement is satisfied for the new endowment. Then allow for the initial endowment being on the *contract curve* of exchange. Is it possible for a Pareto improvement to be made from such a point? If not, why not?

(4) Using an Edgeworth Box diagram, with eggs on the vertical axis, and bacon on the horizontal axis, show how a set of prices can result in there being an excess supply of eggs and an excess demand for bacon, and explain why this is *not* a competitive equilibrium. Remember to label everything in the diagram. What will have to happen to egg and bacon prices for there to be a competitive equilibrium? Is a competitive equilibrium also Pareto efficient? How do you know?

(5) In a Scottish village near Arbroath, the Laird Alex Ferguson runs a commercial fish farm consisting of 25,000 salmon, and also raises a few grouse on the side, totaling 1,500 birds. His nearest neighbor, Lady Annie Lennox raises 10,000 grouse for commercial hunting, and also raises 3,000 salmon. Both Laird Ferguson and Lady Lennox have well-behaved preferences. Given the *initial endowment*, at that point Laird Ferguson is willing to trade 800 salmon for 200 grouse, while Lady Lennox is willing to trade 400 grouse for 25 salmon.

Based on this information, answer the following:

(a) Using appropriate scaling, draw the Edgeworth Box based on the information given above. Then re-draw the Edgeworth Box to reflect Laird Ferguson losing 6,000 salmon to local poachers, and Lady Lennox's gamekeeper's skill at breeding grouse producing an additional 3,000 birds, Laird Ferguson's grouse remaining at 1,500 birds, and Lady Lennox's salmon remaining at 3,000 fish.

(b) At the *initial endowment* point, what are the *marginal rates of substitution* for Laird Ferguson and Lady Lennox? Given their marginal rates of substitution, is the initial endowment Pareto efficient? Why or why not? Could a Pareto improvement be made? Do you have enough information in the question to draw their indifference curves at the *initial endowment*? If not, what additional information would you need?

(c) Suppose an auctioneer sets the salmon price at \$300/fish, and the grouse price at \$150/bird. Given these prices, calculate the wealth of Laird Ferguson and Lady Lennox based on their *initial endowments*, and derive the value of the slope of their budget line(s). If these prices eventually result in there being a competitive equilibrium, does their wealth change compared to that at their initial endowment? With this information on prices, what will the marginal rates of substitution have to be for Laird Ferguson and Lady Lennox at the competitive equilibrium?

(d) If these prices *do not* result in competitive equilibrium, there being an excess supply of salmon and excess demand for grouse, what will have to happen to relative prices to bring about competitive equilibrium?