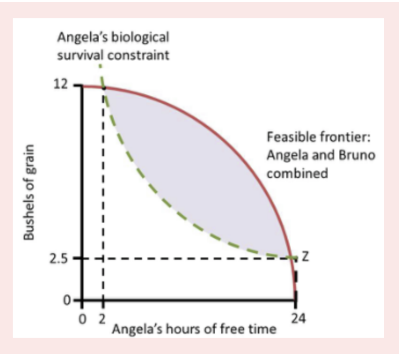
ECO111 Problem Set 7

17 October 2024

1. Bruno is a landowner and Angela is a farmer who pays a share of her grain output to Bruno for the use of the land. Angela and Bruno's feasible frontier is downward sloping and concave, while Angela's biological survival constraint is downward sloping and convex (as shown in the figure). If Bruno has all the bargaining power, which of the following statements is correct?



   (a) The marginal rate of transformation (MRT) of work hours into grain output is the slope of Angela's biological survival constraint, while the marginal rate of substitution (MRS) of work hours into subsistence requirements is the slope of the feasible frontier.

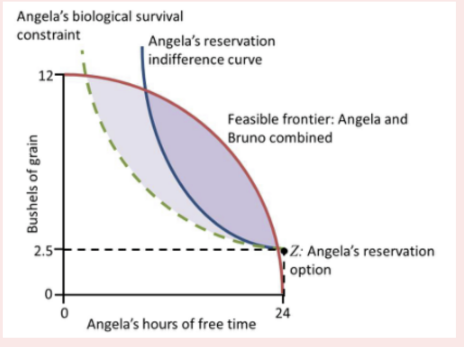
   (b) When the MRT of work hours into grain output is greater than the MRS of work hours into subsistence requirements, then Bruno should decrease Angela's free time.

   (c) When the MRT of work hours into grain output is lower than the MRS of work hours into subsistence requirements, then Angela's allocation of grain should be increased.

   (d) Angela's most preferred option is where the MRT equates her MRS.

2. Bruno is a landowner and Angela is a farmer who pays a share of her grain output to Bruno for the use of the land. The figure shows Angela

and Bruno's feasible frontier, Angela's biological survival constraint, and her reservation indifference curve. If Angela does not work, she receives a ration of 2.5 bushels from the government. Which of the following statements is correct?



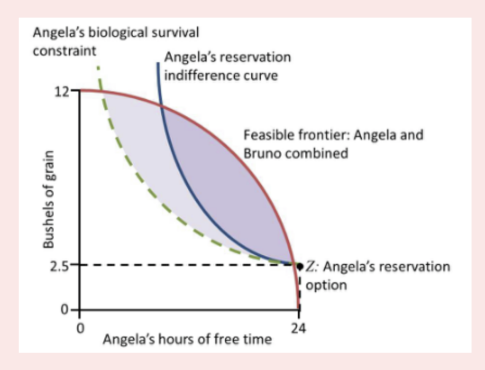
(a) The economically feasible set is the area between Angela's biological survival constraint and the feasible frontier.

(b) Angela's reservation indifference curve can be below her biological survival constraint.

(c) Angela's reservation indifference curve may not necessarily go through Z.

(d) The economically feasible set can be an empty set.

3. Consider the following figure, showing Angela's biological survival constraint, reservation indifference curve, and the feasible frontier. In which of the following cases would the area of the economically feasible set increase? (In each case assume that all other factors remain the same).



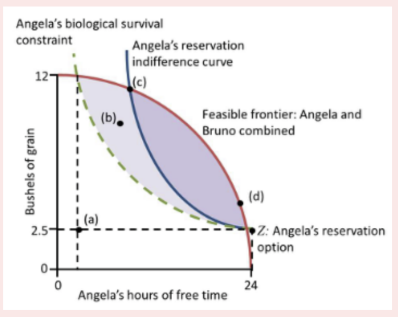
(a) New technology increases Angela's productivity.

(b) Angela's ration from the government is increased to 3 bushels.

(c) Angela becomes leaner and is able to survive on less bushels of grain.

(d) Angela becomes less keen to work and would demand more grain for each extra hour of work.

4. Bruno is a landowner and Angela is a farmer who pays a share of her grain output to Bruno for the use of the land. The figure shows Angela and Bruno's feasible frontier, Angela's biological survival constraint and her reservation indifference curve. Currently, if Angela does not work she receives a ration of 2.5 bushels from the government. Of the four depicted in the figure, which allocation strictly Pareto dominates Z?



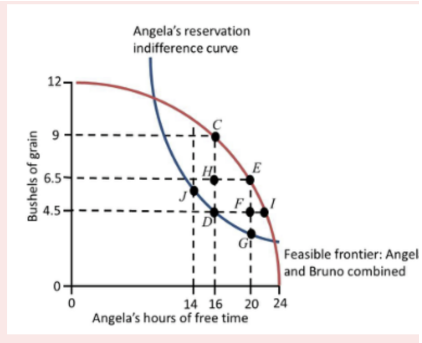
(a) (a)

(b) (b)

(c) (c)

(d) (d)

5. Bruno is a landowner and Angela is a farmer who pays a share of her grain output to Bruno for the use of the land, where Bruno makes a take-it-or-leave-it offer. The figure shows Angela and Bruno's feasible frontier and Angela's reservation indifference curve. Now the government introduces new laws that limits Angela's work time and/or sets a minimum pay in bushels of grain. If D is the outcome before any laws, which of the following statements is correct?



(a) If the new law limits Angela's working hours to 4 hours, then the outcome will be F.

(b) If the new law sets the minimum pay to 4.5 bushels, then the outcome will be I.

(c) If the new law limits Angela's working hours to 8 hours and sets the minimum pay to 6.5 bushels, then the outcome will be C.

(d) If the new law limits Angela's working hours to 10 hours and sets the minimum pay to 4.5 bushels, then the outcome will be D.

6. The Gini coefficient can be approximated from the Lorenz curve by the g=A/(A+B), where A is the area between the Lorenz curve and the 45-degree line and A + B is the area under the 45-degree line. Consider a population with three members and an aggregate income of 100. Which of the following statements are correct?

(a) When the incomes are (100/3, 100/3, 100/3), the approximate Gini coefficient is 0.

(b) When the incomes are (100, 0, 0), the approximated Gini coefficient is 1.

(c) When the incomes are (50, 50, 0), the approximated Gini coefficient is 0.5.

(d) The correct Gini coefficient is given by g=N/(N-1) x A/(A+B)