

Short questions

Question 1

Stag Hunt and Prisoner's dilemma.

Question 2

True. The equilibrium is given by $Q_R = Q_G$ subject to $P_R = -P_G$. This yields $P_R^* = 25$.

Question 3

With a price of 1, you just keep your endowed mixture of 6 pounds. With a relative price of $2/3$, you can sell your four pounds of oats for six pounds of wheat, for a total of eight pounds of grain. With a relative price of $3/2$, you can sell your two pounds of wheat for three pounds of oats, for a total of seven pounds of grain. So regarding prices, you prefer $2/3$, then $3/2$, then 1.

Question 4

- a. $\sqrt{w} = 0.1\sqrt{100} + 0.9\sqrt{0} = 1 \Rightarrow w = 1$.
- b. $1 = p\sqrt{25} + (1 - p)\sqrt{0} \Rightarrow p = 0.2$.

Question 5

The marginal cost of producing tin goes up, the supply curve of tin shifts back, and the price of tin goes up. This entails a reduction of quantity demanded – some erstwhile users at the margin now forgo using tin because of the higher price – they find substitutes or leave their marginal activities unfulfilled. As tin users shift more into substitutes, their prices go up somewhat, inducing greater quantities of supply of tin substitutes. The key mechanism is price change as a reflection of relative scarcity and an inducer to changes in behavior better fitting the new conditions. Not least is the search for and discovery of new technologies and entrepreneurial ventures to meet opportunities corresponding to the new array of prices.

Question 6

- a. 25 cents.
- b. \$8.25.
- c. The phone call.

Question 7

The royalty percentage is part of the cost to the publisher of copies sold. That percentage will affect how much the publisher profits (producer surplus) at the margin. If selling more books entails progressively greater efforts/costs in *promotion and advertising*, then a higher percentage for the author may discourage promotion by the publisher. When $X=20$, the result could be a sales volume so much reduced that the author actually gets less in royalty payments than when $X=10$.

Question 8

False. Inferior goods are goods with a negative income effect. The income effect goes against the substitution effect but this only results in a Giffen good if the income effect is sufficiently strong.

Question 9

- a. $X < 4, Y < 2$.
- b. $X = 4, Y = 2$.

Question 10

- a. Crusoe
- b. 0.67 coconut
- c. 0.67 coconut
- d. 0.50
- e. 0.50
- f. 120 fish
- g. 80
- h. 4
- i. 24
- j. $24/40 = 0.60$

Long questions

Question 1

- a. Expected harm from not carry chains is $6\% * \$200 = \12 , so cheaper to carry chains for \$10.
- b. With a map, $2/3$ of the time you are in low risk region, so don't carry chains and suffer $3\% * 200 = \$6$ expected annual harm, and $1/3$ of time find yourself in high risk region, so suffer the \$10 cost to carry chains. Total expected harm = $2/3 * \$6 + 1/3 * \$10 = \$7.33$. The difference between that and \$10 harm from having no map is \$2.66, the most you are willing to pay for a map.

Question 2

- a. Baron Manfred's utility is $2\theta\sqrt{e}$ and Sparticus' utility is $2(1 - \theta)\sqrt{e} - e$.
- b. The FOC for Sparticus is $\frac{1-\theta}{\sqrt{e}} - 1 = 0 \Rightarrow e^*(\theta) = (1 - \theta)^2$.
Substituting this into Baron Manfred's utility yields an objective function of $2\theta(1 - \theta)$. The FOC is $1 - 2\theta = 0 \Rightarrow \theta^* = \frac{1}{2} \Rightarrow e^* = \frac{1}{4}$.
- c. Manfred: $2 - L$. Sparticus: $L - 1$.
- d. In part (b), the utility of Baron Manfred is $\frac{1}{2}$ and the utility of Sparticus is $\frac{1}{4}$. In part (c), the utility of Baron Manfred is $2 - L$ and the utility of Sparticus is $L - 1$.
Therefore Baron Manfred would be willing to pay $2 - \frac{1}{2} = \frac{3}{2}$
- e. Sparticus would accept no less than $\frac{1}{4} - -1 = \frac{5}{4}$.
- f. Manfred pays Sparticus anywhere in the range $[1.25, 1.5]$ in exchange for Sparticus delivering 1 unit of output.

Question 3

- a. For the individual, the Lagrange problem is $L = u(x_i, g_i + g_{-i}) + \lambda(m - x_i - g_i)$. The FOCs are: $u_x = \lambda$, $u_G = \lambda$. Therefore $u_x = u_G$.
- b. For the planner, the Lagrange problem is $L = \sum_{i=1}^N u(x_i, G) + \lambda(Nm - \sum_{i=1}^N x_i - G)$. The FOCs are: $u_x = \lambda$, $Nu_G = \lambda$. Therefore $u_x = Nu_G$.
- c. The sub-optimality is because the public good is like a good with a positive externality.
Decentralized provision will be less than the social optimum.
- d. With the tax and subsidy, the individual's Lagrange problem becomes $L = u(x_i, g_i + g_{-i}) + \lambda(m - (1 + t)x_i - (1 - s)g_i)$. The FOCs are $u_x = (1 + t)\lambda$, $u_G = (1 - s)\lambda$. Therefore $(1 - s)u_x = (1 + t)u_G$. Substituting in $u_x = Nu_G$ yields $(1 - s)N = 1 + t$ which can be rearranged to yield $t = (1 - s)N - 1$.
- e. There are many sensible disadvantages. Examples include the following.
 1. It is difficult to acquire the preference information necessary to implement such a policy.
 2. It is difficult to guarantee that the government agents do not use the subsidies for pork.
 3. Black market evasions of the tax.
 4. Inefficiencies or administrative costs in converting tax revenues into subsidy payments.
 5. Rent-seeking by subsidy recipients, who might misrepresent their costs or opportunities.
 6. Lock-in of policy once the situation changes.
 7. Mission creep and zealotry by policy administrators. Politicization of the affairs connected to the policy.

Question 4

- a. Ordinal utility functions only convey which of two allocations is preferred. Such information is invariant to positive monotonic transformations of the utility function. Cardinal utility functions also convey how much an allocation is preferred to another allocation and are therefore sensitive to PMTs.
- b. The UPF looks like the NE quadrant of a circle cutting each axis at 2 units.
- c. The social indifference curves are symmetric Leontief and so each person gets 2 units of the good.
- d. The social indifference curves are symmetric and linear and so each person still gets 2 units of the good.
- e. Under the new utility functions, society's total utility is maximized if 1 gets all of the good since his marginal utility is everywhere higher.
- f. Examples of disadvantages include:
 1. The informational requirements of ensuring Pareto efficiency can be prohibitive.
 2. Pareto efficiency can contradict liberty (see Sen's impossibility of being a Paretian liberal).
 3. Sometimes an inefficient but equitable outcome is preferable to an efficient outcome depending on society's preferences.