

EC337: Economics of Legal Issues, Spring 2009

Problem Set #1

Due: Monday, February 2.

January 26, 2009

1. Consider an economy with two individuals, Bert and Ernie. Suppose Bert and Ernie have identical preferences that depend only on C , the number of trays of cookies he eats, and R , the amount of time he spends relaxing:

$$u = \min\{C, R\}$$

(a) How would an economist describe the relationship between cookies and relaxation as captured by the utility function above? To put it another way, based on this utility function, what do you think Bert and Ernie do while relaxing? **Hint:** A one word answer should suffice for each question.

(b) Bert and Ernie spend their time engaged in one of two activities: baking cookies or relaxing. In a typical day of 24 hours, this means that

$$24 = W + R$$

where W denotes the number of hours Bert or Ernie spends baking cookies and R denotes the number of hours he spends relaxing. Suppose first that Bert and Ernie are equally productive in the time they spend baking so that each can produce one tray of cookies per hour.

If each consumes the cookies he bakes, how much time will Bert and Ernie spend baking every day? What utility do Bert and Ernie enjoy? **Hint:** I am asking you to maximize u subject to the restrictions that $W = C$ (each consumes his own cookies) and $24 = W + R$. To put it another way, I am asking you to maximize u subject to the restriction $24 - R = C$. In order to do this, replace C in the utility function by $24 - R$ and then choose R to maximize $\min\{24 - R, R\}$. This same technique can also be used for subsequent questions.

(c) Their friend Elmo, who has an amateur interest in economics, finds himself asking some questions regarding the allocation of utilities obtained in part (b):

(i) Is it Pareto optimal? **Hint:** Write the amount of cookies consumed by Bert as C_B and the amount of relaxation he enjoys as R_B . (Use C_E and R_E to denote the same quantities for Ernie). What relationship between C_B and R_B (and between C_E and R_E) must hold for any Pareto efficient allocation? Given the simplified resource constraint¹ $48 = (C_E + C_B) + (R_E + R_B)$ for the economy,

¹The simplified resource restriction $48 = (C_E + C_B) + (R_E + R_B)$ for the economy is determined by combining the resource constraint $48 = (W_E + W_B) + (R_E + R_B)$ with the production possibilities constraint $C_E + C_B = W_E + W_B$. The resource constraint says that Bert and Ernie together cannot spend more than 48 hours working or relaxing over the course of a single day. The production possibilities constraint says that together they cannot eat more cookies than they produce.

what relationship between C_B and C_E must hold for any Pareto optimal allocation?

(ii) Is it Egalitarian? **Hint:** I am asking you whether this allocation satisfies $u_B = u_E$ **and** respects the relationship between C_B and C_E [determined in part (c)(i)] that must hold for any Pareto optimal allocation.

(iii) Elmo is pretty sure it is Utilitarian. Why? It might help to think about whether there are there any Pareto optimal allocations that are not Utilitarian. **Hint:** In order to find a Utilitarian allocation, you should maximize $u_B + u_E$ subject to the relationship between C_B and C_E [determined in part (c)(i)] that must hold for any Pareto optimal allocation.

(d) Now suppose Bert is **three times** as efficient as Ernie so that he can produce **3 trays of cookies per hour** while Ernie only produces 1 tray per hour. If Bert consumes the cookies he bakes, how much time will he spend baking every day? **Hint:** I am asking you to maximize u subject to the restrictions that $3W = C$ (Bert consumes his own cookies) and $24 = W + R$. To put it another way: I am asking you to maximize u subject to the restriction $24 - \frac{1}{3}C = R$.

(e) In this **new** scenario where Bert is **three times** as efficient as Ernie, Elmo again finds himself asking questions about different allocations:

(i) Is the allocation where each consumes his own cookies Pareto optimal? **Hint:** In part (c), you determined the relationship between C_B and R_B (and between C_E and R_E) that must hold for any Pareto efficient allocation. Given the resource constraint $48 = (W_E + W_B) + (R_E + R_B)$ and the **new** production possibility constraint $C_E + C_B = W_E + 3W_B$ for the economy, what relationship between W_B and W_E must hold for any Pareto efficient allocation?

(ii) Elmo concludes that the allocation where each consumes his own cookies is not Egalitarian. Why? Is there an efficient Egalitarian allocation? **Hint:** I am asking you if there is an allocation that satisfies $u_B = u_E$ and respects the relationship between W_B and W_E [determined in part (e)(i)] that must hold for any Pareto optimal allocation; and

(iii) Is the allocation where each consumes his own cookies Utilitarian? If not, describe a Utilitarian allocation. **Hint:** You may choose to maximize $u_B + u_E$ subject to the relationship between W_B and W_E [determined in part (e)(i)] that must hold for any Pareto optimal allocation.

2. In class, we studied various approaches that a judge might use in order to get Delamirie to reveal the true value of the jewel. One reason that we were so concerned about the "true value" of the jewel was because this is the measure of damages specified for an action in trover. It was also mentioned that damages in the amount of the "true value" of the jewel would help encourage efficient "investment" by Armory *ex ante*.

Please answer each of the following in no more than a couple of sentences.

(a) Why does it matter so much that the judge determine the "true value" of the jewel? In particular, would Armory's behavior *ex ante* have been any different if the policy in trover cases were to award the "highest possible" value of the jewel instead?

(b) Quite apart from how you might have answered part (a), can you think of a good reason why it might be sensible to award "excessive" damages in this kind of trover case? **Hint:** Do you think most chimney sweep boys would have brought a suit against Delamirie under similar circumstances?