

Problem Set 5 – Comparative Advantage

*Estimated time: about an hour. Type your responses and submit a single PDF *ON CANVAS*. Show your work on anything you compute. Label all axes, intercepts, and key points on graphs. A photo of a hand-drawn sketch is fine.*

Part 1: Absolute and Comparative Advantage

- Ms. Patel and Mr. Okafor each teach science and social studies to their own 7th grade class. The table shows the units of learning each can produce in a week if they spend all their time on one subject. Assume learning is proportional to time.

	Science	Social Studies
Ms. Patel	9	6
Mr. Okafor	3	4

- Write each teacher's PPF as an equation and sketch both. Put science on the horizontal axis.
 - Who has the absolute advantage in each subject?
 - Find each teacher's opportunity cost of one unit of science learning and of one unit of social studies learning. Put your answers in a table.
 - Who has the comparative advantage in each subject? Explain in one sentence why the answer is not the same as in (b).
 - Working alone, Ms. Patel's class gets 6 units of science and 2 of social studies, and Mr. Okafor's class gets 1.5 units of science and 2 of social studies. Verify that each point is on the teacher's PPF, and find the total.
 - Now the principal departmentalizes according to comparative advantage. What is the total learning in each subject? How does it compare to (e)?
- Continuing Problem 1, combine the two teachers into a single PPF for the school.
 - If both teachers teach only social studies, how much social studies learning does the school get?
 - Starting from that point, which teacher should switch to science first? Why?
 - Write the equation for each segment of the school's PPF, including the range of science learning each segment covers.

- (d) Sketch the school's PPF. Label the intercepts and the kink, and say what each teacher is doing at the kink.
- (e) Plot the working-alone total from 1(e). Is it on the frontier or inside it? Show how you know using your equation from (c).

Part 2: Hours Instead of Output

3. Two staff members in a district central office share two tasks: preparing payroll reports and writing grant applications. Each works 40 hours a week.

	Hours per payroll report	Hours per grant application
Ms. Rivera	2	8
Mr. Chen	4	10

- (a) Who has the absolute advantage in each task? Be careful – in this table a smaller number means more productive.
 - (b) How many payroll reports could each person finish in a week if they did nothing else? How many grant applications?
 - (c) Write each person's PPF as an equation.
 - (d) What is each person's opportunity cost of one grant application, measured in payroll reports?
 - (e) Who should write the grant applications?
 - (f) Ms. Rivera's supervisor argues she should write the grants because she writes them faster than Mr. Chen. In two or three sentences, explain what the supervisor is getting wrong.
4. True or False, and explain in one or two sentences.
- (a) "If one teacher is better than another at every subject, there is nothing to gain from specialization."
 - (b) "A person can have a comparative advantage in both of two tasks."
 - (c) "If you have an absolute advantage in a task, you should specialize in it."

Part 3: Applying the Idea

5. Two neighboring rural districts each employ a half-time special education director and a half-time transportation coordinator. The superintendents are considering an arrangement where one district's staff handles special education for both districts and the other district's staff handles transportation for both.

- (a) Using comparative advantage, explain how both districts could come out ahead, even if one district's staff is better at both jobs.
 - (b) What information would the superintendents need to decide which district takes which job?
 - (c) Name one cost of this arrangement that our model leaves out.
6. Your campus is deciding whether to departmentalize 4th and 5th grade.
- (a) Using the model from class, make the case for departmentalizing in two or three sentences.
 - (b) Our model assumed each teacher's opportunity cost is constant, no matter how much of one subject they teach. Give a reason this might not hold for a teacher who teaches four math blocks a day. What would that do to the shape of each teacher's PPF?
 - (c) Give one other reason the gains in the model might not show up in practice.