

Exercises to be covered in the tutorial

1. (Concept: Production Possibility Curve) A great example of trade-offs comes from the life of a full-time student. Such students can be imagined as having only two uses of their time—studying and socializing—and two outputs from those uses—knowledge acquired and social satisfaction. If a student is efficient, he or she cannot increase the amount of knowledge acquired at university without giving up social satisfaction.

- (a) **Provide a definition and draw the production possibility frontier.**
See diagram below.
- (b) **Show a point in which the student is not producing efficiently (point x). Why does this inefficiency occur in x?**
- (c) **Show a point that is unattainable given the current state of “technology” (point z). Why is z unattainable?**
- (d) **Show a point where the student is producing efficiently (point y). Why is y efficient?**
- (e) **What is the opportunity cost of an extra unit of knowledge? What is the OC of another unit of social satisfaction? Illustrate this by linking it to movements along the PPF.**

Suppose the student would like to increase the amount of knowledge from a to b. In order to achieve this, he/she must forego e-f of social satisfaction – this is the opportunity cost of the increase in knowledge production.

Now imagine that the student produced c amount of knowledge. To achieve the same increase in knowledge (from c to d), he/she would need to forego g-h social satisfaction, which is more than f-e above. This is due to a general property called increasing opportunity costs. The more resources are already devoted to an activity, the smaller is the payoff to devoting additional resources to that activity. (e.g. not all resources are equally suited to the production of a good)

Hence the opportunity cost of one more unit of social satisfaction is some amount of forgone knowledge, and the opportunity cost of another unit of knowledge is forgone social satisfaction.

The slope of the production possibilities curve shows the trade-off between two goods (the opportunity cost) in an economy.

- (f) **This production possibility frontier can shift out along each axis. A speed-reading course moves the curve out along the axis for knowledge acquisition, allowing the student to obtain both more knowledge and more social satisfaction (because some time that can be saved from studying can be shifted to socializing). List one other example of a technical improvement that shifts the frontier out along the learning axis, and one that shifts it out along the social satisfaction axis. Illustrate this in the graph by drawing a new production possibilities curve.**

Perhaps a few solid nights of sleep, or having a very good tutor might move the PPF out along the knowledge axis (but the max. amount of social satisfaction produced remains constant). For any quantity of social satisfaction produced, we can now produce more knowledge than before. See diagram in lecture notes.

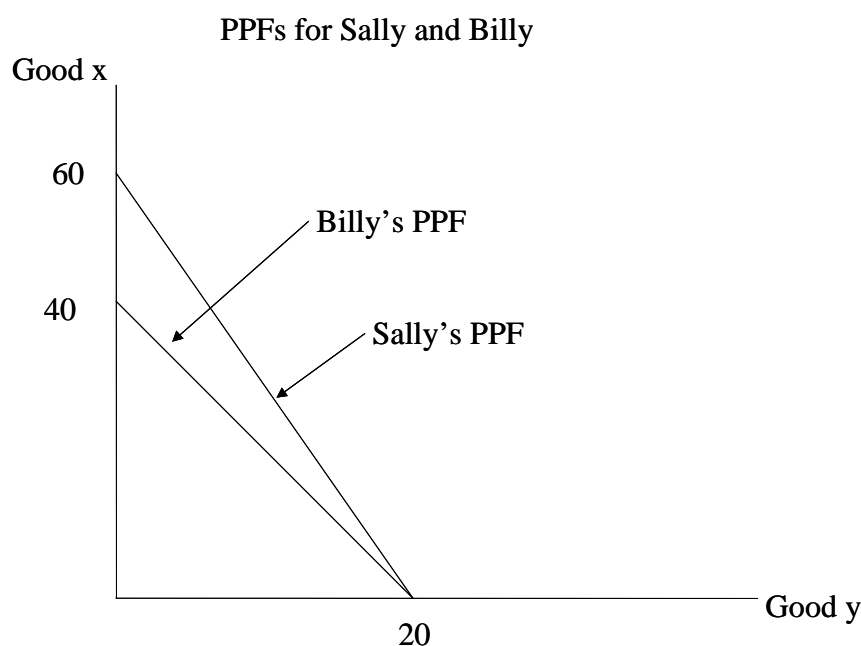
Becoming a member of a uni society related to an activity that you are passionate about (you can meet the “right” people straight away) might shift it out along the social satisfaction axis.

The minimum price that Billy would sell a donut for is 2 cakes.
The maximum price that Sally would pay for a donut is 3 cakes.

(f) Will Billy and Sally trade? If yes, at what prices?

Each individual will be willing to trade if they can buy a good for a lower price than their opportunity cost, or if they can sell a good for a price that is larger than their opportunity cost.

Trade is mutually beneficial when the price of x (cake) is between $\frac{1}{3}$ and $\frac{1}{2}$ of y (donuts); and when the price of y (donuts) is between 2 and 3 units of x (cake).



3. Discussion question

(Concept: Opportunity cost) At a party recently one of my colleagues mentioned that his 14-year-old daughter was babysitting for her 6- and 3-year-old siblings so that her parents could be at the party. I asked how much they were paying the teenager, and he answered that she was being paid nothing. He noted, however, that if his wife and he wanted the daughter to babysit, but she was called by someone else to babysit for pay, they would match the market rate that she would have received outside the house. My colleague is paying the girl her opportunity cost. When she has an alternative babysitting job that pays, she receives a rate of pay at home equal to her opportunity cost—what she was offered for babysitting elsewhere. When she has no alternative job, she is again paid the opportunity cost of her time—which is then zero! (Only an economist would do something like this.) (*From “Economics is Everywhere” by Daniel Hamermesh*)

(a) If you were in the daughter’s position, would you settle for what you would be paid elsewhere? Are there economic reasons why you might be willing to settle for less than others would pay for your babysitting services?

(b) Are there economic reasons why you would want to insist on—and get—your parents to pay more than others would pay for your babysitting services?

4. (Concept: Opportunity cost) Pablo and Lisa give up their current jobs to set up their own consultancy firm. Each earns \$60,000 per year in their current jobs. To set up the business, they must hire an office space for which they pay \$20,000 per year. They also need to hire a research assistant for their business. The salary cost of the assistant is \$50,000 per year. If they decide not to start the consultancy firm, they would instead deposit the \$70,000 cash in a bank account at an interest rate of 3%. In the first year of operation Pablo and Lisa expect to earn a revenue of \$200,000. What is the total opportunity cost of setting up & running the consultancy for one year?

Total opportunity cost = \$192,100 = \$70,000 (explicit costs) + 2*60,000 + 0.03*70,000 (implicit costs), while accounting costs (=actual expenditure, or explicit costs) are only \$70,000.

5. (Concept: Correlation and Causation) Give an example of two variables that move together, but that are otherwise unrelated. Relate your answer to *correlation* and *causation*.

You can find some examples on <http://www.tylervigen.com/spurious-correlations>

Additional exercises

6. (Concept: Growth) Australia can produce two goods – coffee and TVs. Consider two ways in which the Australian economy can grow: through an increase in population, and through technological progress. Illustrate both of these changes on a PPF. What is the advantage of the second type of growth over the former?

Both increase in population and technological progress shift the PPF outwards.

The advantage of technological progress is that it leads to an increase in the per worker (or per person) consumption.

Imagine an economy that produced only coffee. Increasing the number of workers who can spend time producing coffee would increase coffee production. This would not necessarily increase the consumption of coffee per person. (In principle, it could if the new workers were relatively more productive than the old workers but let's assume that this is not the case.) Alternatively, if the technological progress occurred and machines became more efficient, then the economy could produce more coffee with the same number of workers. This would lead to an increase in per person consumption of coffee (in the absence of trade).

This example illustrates the idea that living standards are determined by productivity.

7. (Concept: Opportunity cost) The School of Economics needs to find a new building for their School. They have two options: they could locate the school in an existing building the University owns in Newtown. Alternatively, the University could build a new building on a suitable site of land in Parramatta. Some of the University's administrators suggest that the first option is preferable, because it does not involve constructing a new building. Assess this decision and compare the two options. Can you say which one is better? Relate your answer to the concept of the opportunity cost.

The fact that the University already owns the building in Newtown by itself does not imply that it is in the best interest of the University to locate the School of Economics there. The costs of constructing this existing building in Newtown are sunk (unrecoverable) and should not enter into the decision-making arguments. The opportunity cost of using the building in Newtown is the value that the

University could generate from selling it or renting it out. If the University chooses to use the building in Newtown as the site for the School, it forgoes the rent or sale income – this is the opportunity cost of this decision.

Alternatively, if the University opts for Parramatta location, it will face the explicit costs of purchasing the land and constructing the building. These explicit costs will have an opportunity cost as well; for example the resources could have been put into expanding the Department of Chemistry.

It is impossible to assess which site is better for the School without knowing the University's preferences and dollar amounts associated with the costs (and obviously the benefits associated with each option – but here you can assume the marginal benefit of each option is the same). For example, contrary to administrators' suggestion, it is possible that the University would be better off selling the land in Newtown and using the proceeds to fund the new School of Economics building in Parramatta.

8. (Concept: Comparative Advantage) There are two countries: Australia and the Rest of the World. Each of the countries can produce either good A or good B. Australia is more productive with respect to both goods (meaning Australia can produce more of any good with a given amount of resources). Which statement is not true?

- (a) Australia has an absolute advantage in producing both goods.
- (b) Only the country that does not have the absolute advantage can benefit from trade.
- (c) Comparative advantage determines the patterns of production between the countries.
- (d) The opportunity cost of producing good A is good B.

B is not true

9. (Concept: Opportunity Cost, Absolute and Comparative Advantage) Robinson Crusoe can gather 10 coconuts or catch 1 fish per hour. His friend Friday can gather 30 coconuts or catch 2 fish per hour.

What is Crusoe's opportunity cost of catching 1 fish? 10 coconuts

What is Friday's opportunity cost of catching 1 fish? 15 coconuts

Who has an absolute advantage in catching fish? Friday

Who has a comparative advantage in catching fish? Robinson Crusoe

10. Bob can produce either good x or good y. In one hour he can produce 4 units of good x. Alternatively he can produce 2 units of good y in that hour. Suzie can produce either 6 units of good x in an hour or 2 units of good y in an hour.

- a. What is absolute advantage? Who has the absolute advantage in producing x and which party has the absolute advantage of producing good y?
- b. What is comparative advantage? Which party has the comparative advantage of producing good x and good y?
- c. If each party has 10 hours in which they can work, draw the production possibilities frontier for each party. What does the slope of each production possibilities frontier represent?
- d. What is the maximum price that Bob is willing to pay for a unit of good x? What is the minimum price that Suzie would be willing to sell a unit of good x for? What is the minimum price that Bob would be willing to sell a unit of good y for? What is the maximum price that Suzie would be willing to pay for a unit of good y?

- a. The party that is more productive has the absolute advantage. Suzie has the absolute advantage in x, no one has the absolute advantage in y.
- b. Comparative advantage means having the lower opportunity cost. Bob has the comparative advantage in y -- his opportunity cost is two units of x compared with Suzie's opportunity cost of 3 units of x. Suzie has the opportunity cost in producing x -- her opportunity cost is 1/3 unit of y compared with Bob's opportunity cost of 1/2 unit of y.
- c. The slope of the PPF represents the opportunity cost for each individual changing production from one good to the other.
- d. Each individual will only be willing to trade if they can either buy a good for a lower price than their opportunity cost, or if they are selling a good, they must receive a price that is at least as large as their opportunity cost. The maximum price Bob is willing to pay for x is 1/2 a unit of y. The minimum price Suzie will accept for selling a unit of x is 1/3 a unit of y. The minimum price that Bob would sell y for is 2 units of x. The maximum price that Suzie would pay for a unit of good y is 3 units of x.

Together, these minima and maxima give the range of price in between which trade is mutually beneficial.

11. Now reinterpret question 10 with Bob and Suzie: rather than both parties producing goods x and y, instead consider the situation in which Bob and Suzie undertake tasks x and y at a workplace. Which party should do task x? Which party should perform task y? What is different about this case than if we are considering two goods (or services) being traded in the market?

In this case, Bob still has a comparative advantage in task y. Suzie has a comparative advantage in task x. To maximise output of the firm Bob should specialise in y and Suzie in task x. (Examples of this abound from real firms. For instance, a lawyer might be both better at providing legal advice and doing the filing than her assistant, but the total output of the firm might be greater if she lets the assistant do the filing while she concentrates on providing legal advice to clients.)

In this way, the idea that it is someone's relative opportunity cost (their comparative advantage) that determines what they should specialise in, and not their absolute advantage, also applies to the allocation of tasks within a firm, as well as to trading patterns we observe in the market.

There are several things different when we are considering internal organisation of production, as opposed to trade in markets. Here are a few of the important differences. First, task allocation in a firm is chosen by the manager -- they are not determined by voluntary trading choices of individuals in the market. That is, there is nothing automatic in regards to the decision as to task allocation in a firm -- it is up to a clever manager to see her worker's opportunity costs and allocate jobs accordingly. Second, we are abstracting in this argument about the balance between tasks required and the output mix that a firm would want to produce (that is, which goods they want to sell on the market). But to the extent that profits will be increased by a firm that is able to produce more output with the same (or less) inputs, comparative advantage is a key driver in how a successful firm will allocate tasks amongst its employees.