ECNS 204

Principles of Microeconomics

Chapter 6 (Cost and Production) – Silberberg and Ellis

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Gains from Specialization

- Here, we are going to take a closer look at the costs of production

- There is a high degree of specialization of resources in the United States. That is, there are thousands of job classifications in the labor force, and even more subclassifications.

- Q. Why does this occur? Why is there such a high degree of specialization?

Comparative Advantage

- To explain the gains from specialization, we turn to an analysis of production and its relation to cost by considering a simple one-person economy.

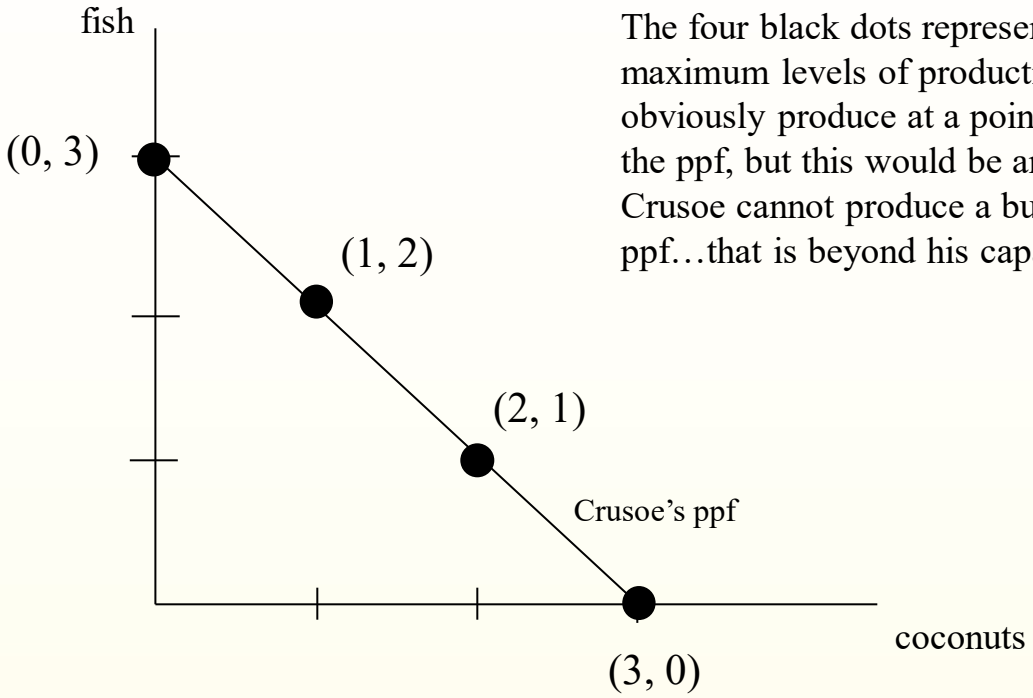
Robinson Crusoe Economy

- Crusoe is the sole producer and sole consumer. He faces the following decision:
  - He must decide *what* he can produce and *how much* he will actually produce.
  - He must decide whether to produce goods only for current consumption or to divert part of his effort into producing tools which will make him more productive in the future.
  - For simplicity, Crusoe must choose between:
    - Gathering coconuts
    - Fishing
  - Suppose that, in any one day, Crusoe can:
    - Catch 3 fish

    or
    - Gather 3 coconuts

Comparative Advantage

- Graphically, we can represent his ***production possibilities frontier*** (ppf):



The four black dots represent all possible maximum levels of production. Crusoe could obviously produce at a point on the interior to the ppf, but this would be an inferior point. Crusoe cannot produce a bundle outside of the ppf…that is beyond his capabilities.

In this example, Crusoe observes directly the concept of opportunity cost.

-For example, if he wants an additional coconut, he must give up one fish.

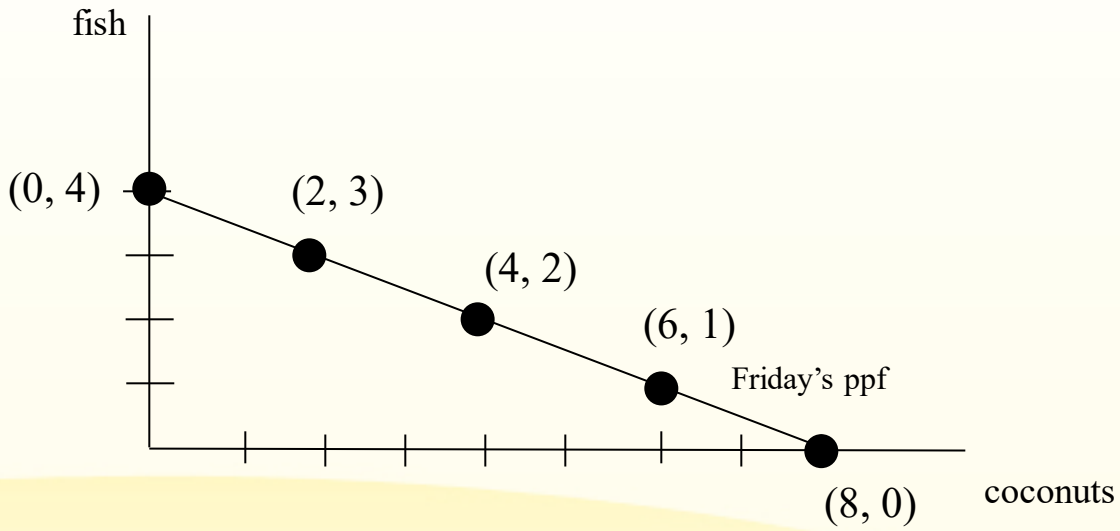
-The marginal cost of one coconut = one fish.

Comparative Advantage

Arrival of Friday

- Now, let's consider a two-person economy
  - Suppose a second person, Friday, arrives to the island
  - Now there is the possibility for exchange
  - Friday also chooses between fishing and gathering coconuts.
  - Assume, in one day, Friday can
    - Gather 8 coconuts

    or
    - Catch 4 fish



Comparative Advantage

- Given the Crusoe's ppf and Friday's ppf, let's arbitrarily choose…
  - Crusoe produces 2 coconuts and 1 fish
  - Friday produces 4 coconuts and 2 fish

- In our example, we say that Friday has the ***absolute advantage*** in producing coconuts and fish
  - If both allocate all of their time to gathering coconuts, Friday gathers more
  - If both allocate all of their time to fishing, Friday catches more.
  - Q. But, does this imply that Friday has the lower marginal cost of production for both goods?
  - Consider the following:
    - Crusoe: ▪ MC of producing 1 coconut = giving up 1 fish
      ▪ MC of producing 1 fish = giving up 1 coconut
    - Friday: ▪ MC of producing 1 coconut = giving up 0.5 fish
      ▪ MC of producing 1 fish = giving up 2 coconuts

Crusoe is the low cost producer of fish (i.e., he has a ***comparative advantage*** in fish production).

Friday has the ***comparative advantage*** in gathering coconuts

Comparative Advantage

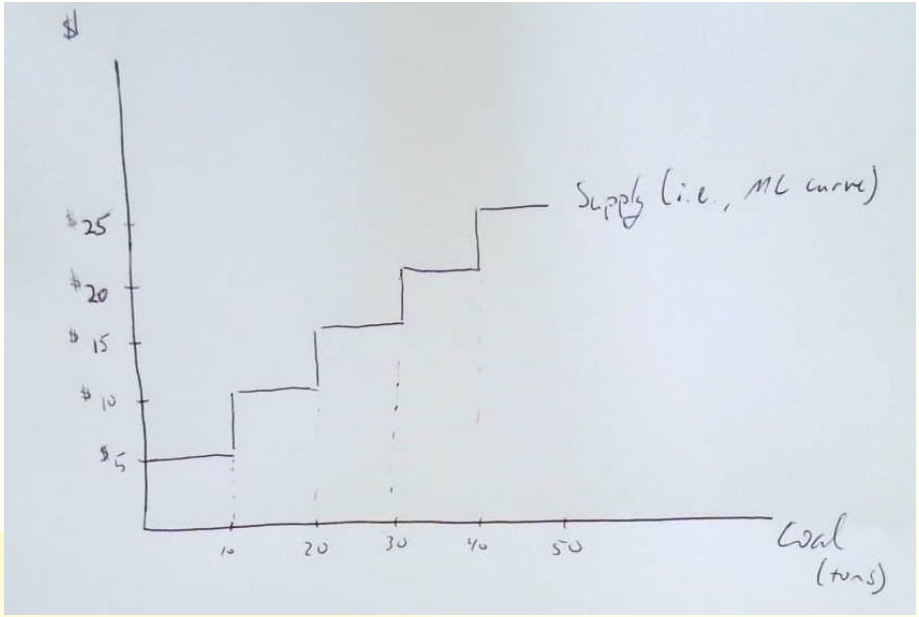
- More importantly, Crusoe and Friday can benefit by producing the good that they produce relatively cheapest, and then exchanging with each other.
- Consider the combined ppf for the Crusoe and Friday joint economy: https://montana.techsmithrelay.com/Q0HW
- Recall the original production bundle we arbitrarily for each individual when not taking the other person into account:
  - We assumed Crusoe chose to gather 2 coconuts and catch 1 fish: (2, 1)
  - We assumed Friday chose to gather 4 coconuts and catch 2 fish: (4, 2)
  - This means the total production in this two-person economy is 6 coconuts and 3 fish: (6, 3)
  - But, this bundle of coconuts and fish lies in the ***interior*** of the joint ppf we derived in the video clip posted above. Jointly, they can be producing MORE!
- If they specialize in what they are relatively good at, there will be 2 additional coconuts produced in this two-person economy
  - We explained above that Crusoe is the low-cost producer of fish (i.e., Crusoe has a comparative advantage in fishing). We also explained that Friday is the low-cost producer of coconuts
  - If Crusoe only fishes and Friday only gathers coconuts, then total production will be: (8 coconuts, and 3 fish)
- Practice problem, part 1: https://montana.techsmithrelay.com/6lS1
- Practice problem, part 2: https://montana.techsmithrelay.com/2cVh

MC and Supply

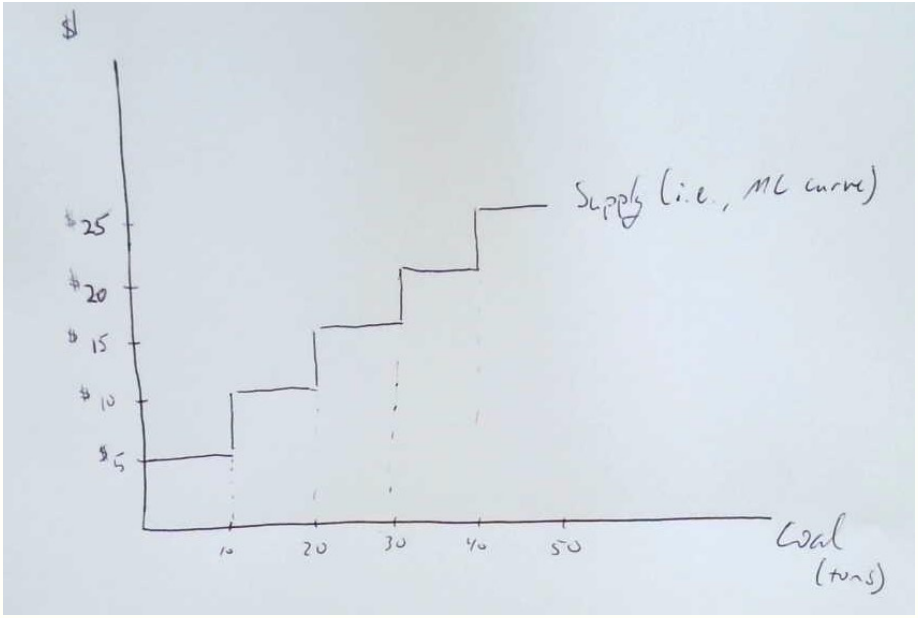
- Consider a firm that owns 10 coal mines
  - Each mine produces 10 tons of coal per day
  - However, the mines differ in the ease with which coal is brought to the surface
    - Some mines are deep and have already been heavily excavated
    - Others are near the surface and easy to excavate

- Suppose
  - 1st mine produces 10 tons at $5/ton
  - 2nd mine produces 10 tons at $10/ton
  - 3rd mine produces 10 tons at $15/ton

- Graphically, this looks like the diagram to the right



MC and Supply



- Consider area under the MC curve
  - For first 10 tons, this area = (10 tons)($5/ton) = $50
  - What does this represent?
    - It is the total cost (TC) of producing the first 10 tons
  - TC of producing 40 tons, for instance, is equal to $50 + $100 + $150 + $200 = $500
    - This amount represents society's opportunity cost of 40 tons of coal.
    - That is, the labor and other resources that must be used to mine 40 tons of coal could have been used to produce $500 worth of other goods for consumers.

- Suppose the market price of coal = $20/ton
  - Here, producers produce up to the point where P = MC
  - Consequently, 4 mines are excavated
    - Mine 1 earns $15/ton in profits
    - Mine 2 earns $10/ton in profits
    - Mine 3 earns $5/ton in profits
    - Mine 4 earns $0/ton in profits
    - Thus, total profits are $30/ton (or $300)

MC and Supply

- Based on the graph in the previous slides, notice that the average cost of producing 40 tons of coal is only $500/40 = $12.50
  - This is less than the market price
  - Yet, it does not pay to increase output further!
  - This illustrates that production decisions are based on whether the price received is at least equal to MC of production (not the average cost of production!)
    - The decision to produce one more unit is made at the margin.
  - By this reasoning, we understand the supply curve of a firm is thus the MC curve of that firm (they are the same thing!)

- When all firms in an industry behave in this profit-maximizing manner, the important consequence follows:

  When each firm produces to the point where price = MC, then the total output is produced at the minimum possible cost

MC and Supply

- Ex. We can illustrate this result graphically
  - Suppose we have a 2-firm industry in coal production
  - Each firm has their own MC curve (shown graphically below as MC_1 and MC_2)
  - Suppose further that the market price is $20/ton
- The total costs of production are equal to ($20/ton)(100 tons) + ($20/ton)(150 tons) = $5,000
- Our argument is that there is no other way the two firms can produce 250 tons of coal to minimize costs any further.
- Convince yourself of this by thinking about other possible production combinations across the two firms (e.g., suppose firm 1 produced 90 tons and firm 2 produced 160 tons).