

Handout 03 - ECON 101 (Fall 2026)

Supply

1 Supply Starts with the Next Unit

Supply describes how much a seller is willing and able to sell at each possible price, holding other relevant conditions fixed. **Quantity supplied** is the amount at one particular price. Always name the product and time period: for example, loaves of bread per day.

This module studies **price-taking sellers**: each seller is too small to change the market price through its own sales. The seller chooses how much to sell at that price.

1.1 Revenue, profit, and the cost of the next unit

Total revenue is the money received from sales: price times quantity. **Profit** is revenue minus total cost. **Marginal revenue (MR)** is the extra revenue from one more unit; **marginal cost (MC)** is the extra cost of producing it. This includes the value of the best alternative use of resources, even when no extra cash payment is involved. For a price taker, marginal revenue equals the price P :

$$\text{total revenue} = P \times Q, \quad \text{extra profit from one more unit} = P - MC.$$

The letter Q denotes quantity. Connecting to Handout 2: for buyers, price is the cost of another unit; for sellers, price is the revenue from another unit.

The seller's rule. When successive units have increasing marginal costs, produce additional units while $P \geq MC$; stop before the next unit costs more than its price. At equality, the extra unit leaves profit unchanged; the course convention includes it. With whole units, the best quantity need not satisfy an exact equality.

1.2 An example: more output can mean less profit

Suppose a small producer can sell each item for \$6. The table shows the costs of successive items, with all costs measured in dollars.

Additional item	Revenue added	Cost added	Profit added	Decision
First	6	2	+4	Produce
Second	6	4	+2	Produce
Third	6	8	-2	Do not add

Two items add \$6 to profit compared with producing none. A third item would bring in more revenue, but reduce that gain to \$4. The first two items being worthwhile does not make the third worthwhile.

This explains the supply curve's connection to marginal cost: a higher price makes additional, more costly units worth producing. In the module's model, the height of supply shows the marginal cost of the corresponding output.

1.3 A fixed cost changes profit, but not the cost of the next unit

A **fixed cost** stays the same as output changes over the period being studied. A **variable cost** changes with output, such as materials used in each item. If the producer above owes a \$10 fee regardless of whether it makes zero, two, or three items, that fee does not change any entry in the *cost added* column.

With two items, profit is $12 - 6 - 10 = -4$ dollars. With no output, it is -10 . Producing two therefore gives the better outcome, even though the firm makes a loss. Choosing the best quantity and earning a positive profit are different questions. This comparison holds the unavoidable fee fixed; deciding whether to renew a contract or leave the business is a different decision.

Where to revisit the material. Seller decisions and fixed costs: textbook pp. 66–69, slides 11–26 and 36, worksheet Q2. Textbook references use Stevenson and Wolfers, *Principles of Microeconomics*, 3rd ed. Slide numbers count PDF pages.

2 Why Producing More Can Become More Expensive

2.1 Extra output per worker is different from total output

An **input** is a resource used in production, such as labor or equipment; **output** is what the firm produces. The **marginal product of labor** is the additional output from another worker, holding other inputs fixed. The word *product* here refers to output, not money.

Imagine a packing room with a fixed amount of space and equipment. Another worker can help, but as the room gets crowded, each additional worker may add fewer packed boxes. This is **diminishing marginal product**. It does not mean total output falls: adding eight boxes still increases output, even if the previous worker added twelve.

2.2 The connection to cost, step by step

Suppose each worker costs \$24 per hour and equipment stays fixed. The table isolates labor cost; materials would be counted separately.

Workers	Boxes per hour	Extra boxes per hour	Labor cost per extra box
1	16	—	—
2	28	12	$24/12 = \$2$
3	36	8	$24/8 = \$3$
4	40	4	$24/4 = \$6$

The third worker costs the same as the second but adds fewer boxes. Spreading that additional \$24 over eight extra boxes instead of twelve raises the labor cost per extra box. Over each increase in output,

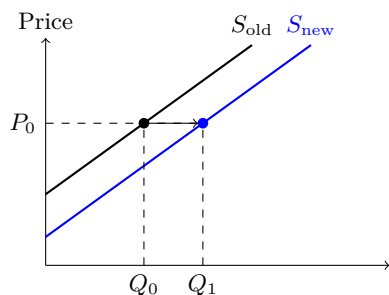
$$\text{cost per extra box} = \frac{\text{additional labor cost}}{\text{additional boxes}}.$$

With fixed equipment and an unchanged wage, smaller output gains make extra boxes more costly. A higher selling price is needed to make them worthwhile: this explains upward-sloping supply.

What is held fixed matters. Adding workers to the same packing room can raise marginal cost as output expands. Better equipment can instead reduce the resources needed per box, shifting supply right.

3 Two Ways to Read a Supply Shift

A supply curve is a **plan for how much to sell at each possible price**. A different selling price selects another point on that plan: a movement along the curve. A change in production conditions can change the plan itself: the seller now wants to supply a different quantity at the *same price*, so the curve shifts.



Lower marginal costs shift supply right.

At the same price P_0 , quantity rises from Q_0 to Q_1 .

Equivalently, each quantity can be supplied at a lower price: the new curve is also below the old one.

For upward-sloping supply, **rightward and downward describe the same increase in supply**. Read the horizontal change at a fixed price to avoid confusing a lower curve with a decrease in supply.

Where to revisit the material. Productivity and marginal cost: textbook pp. 70–71, slides 27–35, worksheet Q1; **Supply shifts:** textbook pp. 74–75 and 78–79, slides 45–50 and 57–60, worksheet Q3.

4 Explain the Change Before Moving the Curve

Name the market first. Then distinguish the *price received for its output* from the *prices paid for inputs*. A rise in the price of bread moves a bakery along its bread supply curve. A rise in the price of flour raises the cost of making bread and shifts that curve left.

4.1 The same event can affect two supply curves differently

Substitutes in production are alternative outputs made using the same limited resources. Suppose a workshop can use its machines to make either desks or shelves. If desks become more valuable, the workshop has a reason to devote more machine time to desks.

For *desks*, the higher selling price causes a movement along supply. For *shelves*, the price has not changed, but the opportunity cost of using machines for shelves has risen: it now means giving up more valuable desk production. Fewer shelves are offered at each shelf price, so shelf supply shifts left. This is about what producers can make instead, rather than what consumers can buy instead.

Match the explanation to the cost that changes.

Change	Reasoning at the same output price	Supply effect
Materials become cheaper	Making an additional unit costs less.	Rightward
Equipment becomes more productive	The same resources can produce more output.	Rightward
An alternative output becomes more valuable	Using capacity here gives up a better alternative.	Leftward
An unavoidable fixed fee rises	Total profit falls, but the next unit costs the same.	No shift for the existing firm

4.2 From a sentence to an equation

Let Q be units supplied per day and P the price in dollars per unit. Consider

$$Q = -8 + 2P \quad \Longleftrightarrow \quad P = 4 + \frac{1}{2}Q.$$

The inverse form puts price on the left because price is on the vertical axis. The graphed slope is $1/2$: an additional unit requires a price higher by \$0.50. Below \$4, the original equation predicts negative quantities; the seller supplies zero there, rather than a negative number of units.

Suppose improved production conditions let this firm supply *four more units at every price* along the positive-output part of the curve. Add four to the quantity expression:

$$Q_{\text{new}} = -8 + 2P + 4 = -4 + 2P, \quad P = 2 + \frac{1}{2}Q_{\text{new}}.$$

At \$6, quantity rises from four to eight units. The curve moves right by four units and down by \$2. These describe the same shift in different units; adding \$4 to the inverse equation would describe a different change.

4.3 Market supply adds sellers' quantities at the same price

At \$6, ten identical firms with the *original* supply curve each offer four units, so together they offer forty. Multiply the quantity expression by ten to obtain $Q_{\text{market}} = 10(-8 + 2P)$ wherever firms supply positive amounts. Do not multiply the price by ten. Additional sellers can increase market supply even when each existing seller's own curve stays unchanged.

Where to revisit the material. Alternative outputs: textbook p. 76, slides 51–52, worksheet Q4; **Equations:** slides 8–9 and 61, worksheet Q5–6; **Market supply:** textbook pp. 72–74, slides 38–43; **Chapter overview:** demand–supply comparison, textbook p. 80, and *Chapter at a Glance*, p. 81; **Expectations and complements in production:** textbook pp. 76–77 and slides 51–53.