

# 2. Supply

ECON1101 • KC Notes

## 2.0 Perfectly Competitive Markets

- **Market:** Set of all consumers and suppliers willing to buy and sell a given good or service
- **Market Equilibrium:** when the price and quantity of a good is stable
  - Also, when price consumers want is the same as the price suppliers want to sell
- **Perfectly Competitive Market** has the following characteristics:
  1. Consumers and suppliers are **price takers** (at equilibrium)
    - No incentive to cut or increase price as they lose all consumers
    - Consumers have no incentive to negotiate increase in price
  2. **Homogenous goods** – all same product
  3. **No externalities** – no costs or benefits to people not involved in production or consumption of the good
  4. **Excludable and Rival** – No excluding consumers, good unavailable after consumed
  5. **Full Information** – suppliers and consumers know all characteristics of a good
  6. **Free Entry and Exit** of suppliers

## 2.1 Individual Supply Curve

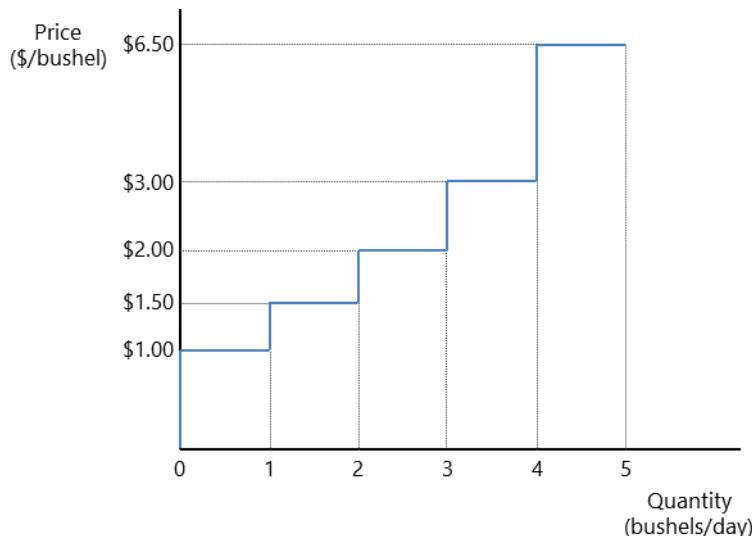
- **Marginal Benefit:** Extra **benefit accrued** by producing that unit
- **Marginal Cost:** Extra **cost of producing** that unit (opportunity cost, not just absolute cost)
- **Cost-Benefit Principle:** Action should be taken if the **marginal benefit > marginal cost**
- **Economic Surplus:** marginal benefit – marginal cost
- Thinking at the margin – should producer produce one extra fish or one extra apple?
  - Construct a table with **quantity, total time and marginal time** for all goods
  - Progressively check the marginal benefit to find the best option

Apples (\$1.90 each)			Fish (\$0.50 each)		
Units	Total time	Marginal time	Units	Total time	Marginal time
1	1	1	1	0.5	0.5
2	2.5	1.5	2	1	0.5
3	4.5	2	3	1.5	0.5
4	7.5	3	4	2	0.5
5	14	6.5	5	2.5	0.5

We choose to produce: apple (\$1.90 vs \$1 for this hour), apple (\$1.90 vs \$1.50), fish (\$1.90 vs \$2) etc

## 2.1.1 INTERPRETING THE SUPPLY CURVE

- Supply Curve is the relationship between price and quantity supplied
  - Law of Supply:** tendency for a producer to offer more when price increases
  - If price of apples were increased from \$1.90, we will see an increase in the units of apples produced
  - Since fish are fixed at \$1 per hour, we look at the marginal time to derive the curve:



- Horizontal interpretation:** At a certain price, the **quantity is how many units producer is willing to supply**
- Vertical interpretation:** At a certain quantity, the **price is the minimum amount of money producer is willing to accept** to offer that marginal unit
- Producer reservation price:** minimum price producer is willing to accept to produce the good

## 2.2 Deriving the Supply Curve

- Sunk cost:** Once paid, cannot be recovered
- Fixed cost (FC):** Cost associated with a fixed factor of production
- Variable cost (VC):** Varies with quantity produced

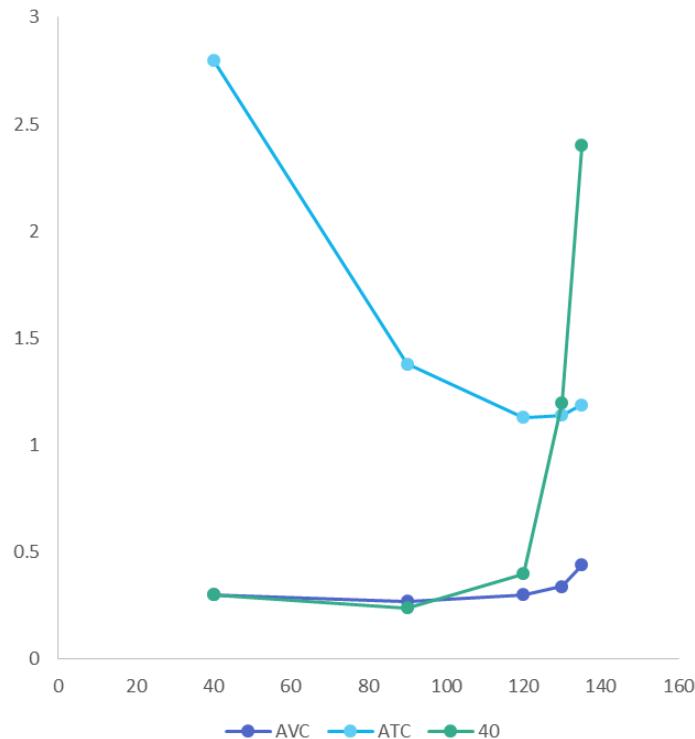
To get the **optimal number of employees/optimal quantity**, always make a table:

Workers W	Quantity Q of cans	FC	VC	Total Cost TC	Average		Marginal Cost MC
					AVC	ATC	
0	0	\$100	\$0	\$100	-	-	-
1	40	\$100	\$12	\$112	0.30	2.80	0.30
2	90	\$100	\$24	\$124	0.27	1.38	0.24
3	120	\$100	\$36	\$136	0.30	1.13	0.40
4	130	\$100	\$48	\$148	0.34	1.14	1.20
5	135	\$100	\$60	\$160	0.44	1.19	2.40

- From the table:
  - Total Cost (TC) =  $VC + FC$
  - **Average variable cost (AVC)** =  $\frac{VC}{Q}$
  - **Average total cost (ATC)** =  $\frac{TC}{Q}$
  - **Marginal cost (MC)** =  $\frac{\Delta TC}{\Delta Q}$
- **Cost-benefit principle** states that the firm should hire as long as **marginal benefit is bigger than marginal cost**.
  - If each can sells for \$1.20 each, **follow the MC column down until  $MB < MC$** .  
Here we hire **4 workers**.
  - If each can sells for \$0.40 each, follow MC column down and we hire **3 workers**.

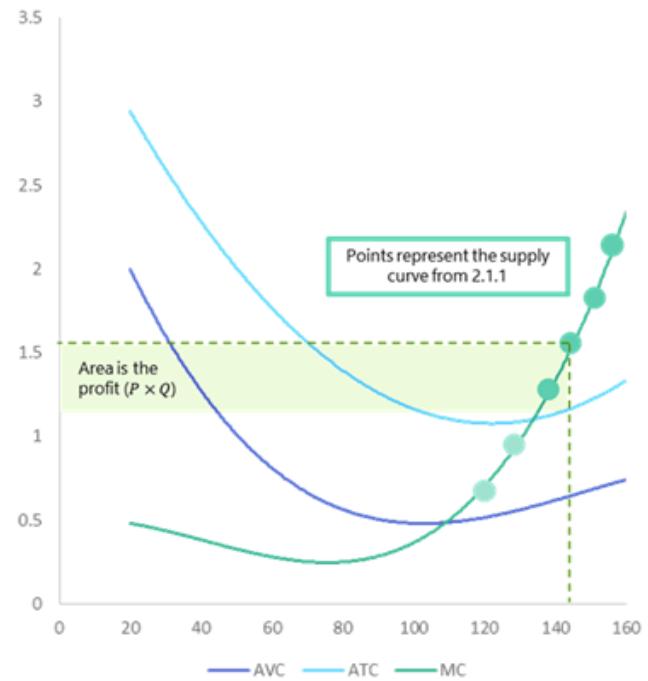
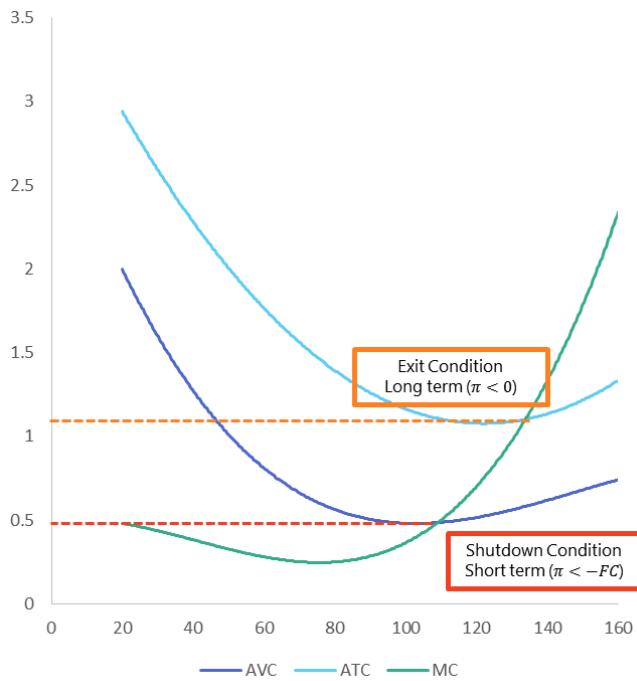
### 2.2.1 COST CURVES

- Cost curves: graphing AVC, ATC and MC
- **Profit ( $\pi$ )**: total revenues – total costs =  $P \times Q - TC$
- If cans sell at \$1.20 and we hire 4 workers (above), our profit is  $\$1.20 \times 130 - \$148 = \$8$ .
- If cans sell at \$0.40 and we hire 3 workers, profit  $\$0.40 \times 120 - \$136 = -\$88 > -FC$
- If cans sell at \$0.24, profit  $\$0.24 \times 90 - \$124 = -\$102.40 < -FC$



- **Short run**: where 1 cost is fixed. Shutdown when  $\pi_{production} < -FC$ , e.g. at \$0.24
- **Long run**: where all costs are variable. Shutdown when  $\pi < 0$ , e.g. at \$0.40
- Note that since we want marginal cost equal to marginal benefit, the marginal cost curve must be **above AVC** for short run and **above ATC** for long run.

## 2.3 Continuous Model for Supply Curve



- MC curve dips down and then up due to **decrease in productivity** with more workers
- MC meets ATC and AVC at their **minimal points**, because ATC and AVC are averages that take average of all marginal costs. If we take the next worker and MC is lower than ATC, then ATC decreases. This occurs until  $MC = ATC$ .

### 2.3.1 SHIFTS IN SUPPLY CURVE (TIEON)

1. **Technology:** increase production amount
2. **Input prices:** changing costs of factors of production/resources
3. **Expectation of change in demand:** if more people will buy good, produce more
4. **Other products:** if another product firm produces has increased demand, reduce this supply
5. **Number of suppliers:** The more suppliers, the larger shift to right in aggregate supply

## 2.4 Elasticity

- **Elasticity:** Measures the **responsiveness** of supply **when price changes**
- **Elasticity at A:**  $\epsilon = \frac{P_A}{Q_A} \times \frac{1}{\text{slope}}$

Elastic  $\epsilon > 1$



Unit  $\epsilon = 1$

Unit

Inelastic  $\epsilon < 1$



### 2.5 Factors of Price Elasticity of Supply (AFMIT)

1. **Availability of raw materials:** More available to access materials, more elastic
2. **Factors mobility:** easier to move factors of production/resources, more elastic
3. **Inventory and excess capacity:** more space, more elastic
4. **Time horizon:** more time, more elastic