At very low levels of output, there is usually a decline in the AFC – as fixed costs are being dispersed over a greater amount of output. But at higher levels of output, ATC will slope upwards as AVC dominates. Together, this gives the ATC the U-shape curve.

2.4.4 RELATIONSHIP BETWEEN ATC, AVC AND MC

As a rule, MC passes through the minimum of ATC and AVC.

If MC curve lies below the ATC curve, it will drag that curve downwards – so ATC is decreasing when MC is below it.

If MC curve is above the ATC, it will pull that curve upwards – so, ATC is increasing when MC is above it.

ATC must be at its minimum when it is intersected by MC. For the same reasons, MC intersects AVC at its minimum.

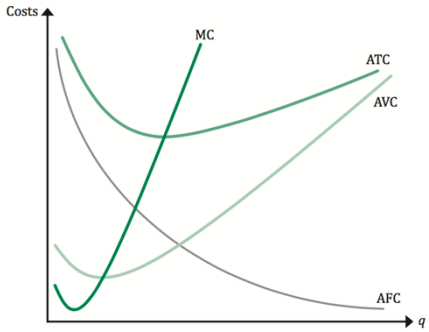


FIGURE 7.3 The typical shape of the average total cost curve, the average fixed cost curve, the average variable cost curve and the marginal cost curve. Note, the *MC* curve intersects the *ATC* curve from below at its minimum. The *MC* curve also intersects the *AVC* curves from below the minimum of *AVC*

2.5 LONG-RUN AVERAGE COSTS

In the long run, all inputs are variable. So, there are no fixed costs.

- Efficient long run costs are sustained when the combination of outputs that a firm produces results in the desired quantity of the goods at the lowest possible cost.

As all production factors are variable,

- If a firm doesn't want to produce anything, its costs are zero.
- A firm production a positive output has more flexibility to adjust all of its inputs
- So, long run costs should not be higher than a short-run costs (for a given level of output)

2.5.1 LONG-RUN MARGINAL COST

Marginal cost of increasing output by one unit must take into account the fact that all inputs can be varied to achieve this increase. Thus, for the same level of output, the long-run marginal cost will be **less than** or **equal** to short-run marginal costs.

The extra flexibility in the long run, means that a firm might be able to increase its output at a lower cost than the short run.

- Marginal revenue (MR) is the additional revenue that the firm received from selling one extra unit of a good
- For a monopolist, the marginal revenue incorporates two effects:
    - Output effect: as you sell more units, you obtain extra revenue from the additional units sold
    - Price effects: as you sell more units, price falls and you lose revenue on the existing units sold
- Hence, MR is not the same as the market price: MR is always below P
- Note: there is no price effect for the competitive firm, only an output effect
    - Price is invariant to the quantity it sells: MR=P=AR is constant for any q supplied

Deriving MR from monopolist's demand curve

- MR is the change in total revenue when the firm sells one more unit
- $MR = \frac{dTR}{dq}$
- From TR = $(ab - bq^2)$ – where a is the y intercept,

MONOPOLY AND PROFIT MAXIMIZATION

Profits will be maximized when a monopolist sets marginal revenue equal to marginal cost (MR=MC)

- If If MR > MC, the monopolist can increase its profit by selling one extra unit.
- If MR < MC, profit falls from selling the last unit, so it would be better off from not selling that unit.

For a competitive firm P =MR=MC, whereas for monopolists P>MR=MC. This means that for a single price monopoly, P>MC at the optimal quantity supplied (which a competitive firm continues to produce until P=MC)

MONOPOLY PROFITS

Monopolist's profit is $\pi = TR - TC \rightarrow \pi = (TR/q - TC/q)*q \rightarrow \pi = (P-ATC)*q$

Where, P-ATC is the profit per unit sold, and q is the quantity sold.

Monopolist's profits given AR per unit sold; $AR=P^m$ and ATC^m

Total revenue = ~~P^m*Q^m~~ [Price at level of demand – Price(M)] x units at level of demand

total cost = ATC^m*Q^m

If A increases $1, Y will change by 1/(1-b). For example, if b=0.2, a one $1 increase in A increases Y by $2.

The factor 1/(1-b) is the expenditure multiplier.

EXAMPLE ON HOW TO FIND MUTIPLIER

$$PAE = C + I(planned) + G + X - M$$
$$C = \bar{C} + bY \ (where\ b\ is\ the\ marginal\ propoensity\ to\ consume)$$
$$PAE = (\bar{C} + I + G + X - M) + bY$$
$$the\ things\ in\ the\ brackets\ are\ exogenous\ spending\ as\ it\ is\ not\ related\ to\ income$$
$$PAE = Y$$
$$therefore, Y = (\bar{C} + I + G + X - M) + bY$$
$$Y(1 - b) = (\bar{C} + I + G + X - M)$$
$$Y = \frac{(\bar{C} + I + G + X - M)}{1 - b}$$

Let's suppose that the slope of the curve is 0.5 → b=1/2 and GDP increases $1

Change in Y = 1 +1/2+1/4+1/8+ … = 2

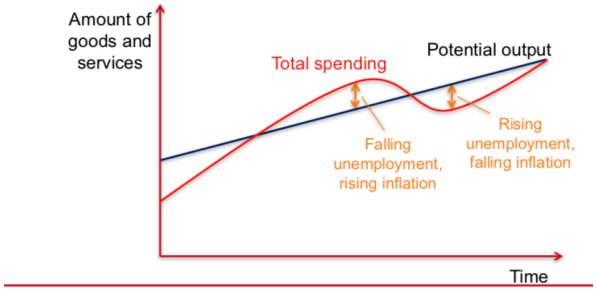
IN A CONTEXT WITH TAX

$$C = \bar{C} + bY_d$$
$$Y_d = Y - T - tY$$
$$\rightarrow where\ T\ is\ lump\ sum\ tax\ and\ not\ depement\ on\ tax\ and\ tY\ is\ proportional\ tax$$

GDP AT PURCHASING POWER PARITY

Often when comparing countries, it makes sense to adjust for the fact that different costs of similar goods and services. GDP at PPP uses international prices to measures a country's real GDP.

For example, the cost of Big Mac allows should be the same in every country at PPP exchange rates.

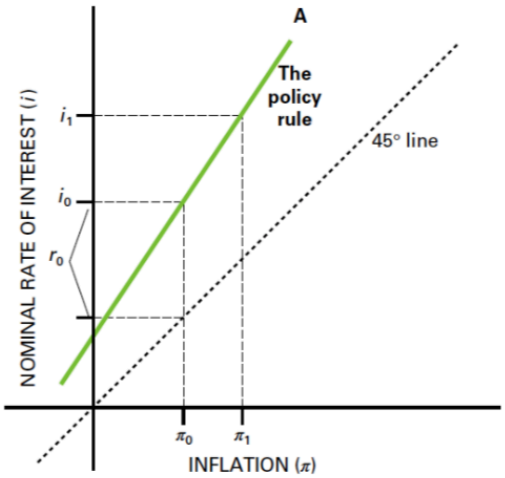


real values matter for aggregate expenditure

nominal interest rate = real interact rate + inflation

Nominal interest rise (fall) by more than increase (decrease) in inflation to stabilise inflation and output

- × To increase nominal interest rate, real interest rate must exceed and be greater than the rate of increase for inflation
- × In the example below, the nominal interest rate is increasing faster than inflation



Monetary policy transmission

1. Intertemporal substitution
   - × A reduction in interest rate reduces the return on savings, and encourages households to decrease savings and increase current consumption
   - ×
2. Investment
   - × When interest rates are reduced firms have more investment opportunities generating sufficiently high interest rates to justify going ahead