Chapter 3

Elementary Theory of Supply

The Firm

It has earlier been pointed out that in elementary economics the household is considered to be the basic decision-making unit with respect to consumption. It gives households several attributes emphasizing their ownership of resources, and consequently, their ability to lease or sell these resources to companies and individual producers. The household which has become synonymous with the consumer is treated as an individual unit of behaviour who is consistent in his decisions.

The firm is the counterpart of the consumer on the production side of market theory. It is defined as the basic decision unit with respect to production. It is assumed to act as a single individual who makes consistent production decisions. The firm is often referred to as the producer. It buys raw materials, tools, equipment, machinery and other capital goods and hires labour services (factor inputs of production) to produce goods and services. It then sells its output to consumers, other firms and the government. Profit is assumed to be the main motive behind production decisions, though this need not be the case for some firms, such as voluntary organizations and government.

Determinants of Supply

The quantity supplied of a given product by firms is the amount they are able and willing to produce per period of time. Therefore, it is planned and not actual supply. Supply decisions by firms are influenced by a combination of various factors:

1. the price of the product (P_N)
2. The cost of production [price of factors of production] (P_F)
3. price of other goods [profit of alternative/joint production] (P_O)
4. State of technology [technological advances] (T_A)
5. Government policies (regulation and taxation) (G_P)
6. Goals of the firms (business objective) (G_F)
7. Other factors including special influences (ε_O)

The supply function can be summarized in mathematical form:

$$Q_n^s = f\ (P_N,\ P_F,\ P_O,\ T_A,\ G_P,\ G_F,\ \mathcal{E}_O,)$$

Where Q_n^s = the quantity supplied (e.g. in kilograms or air passenger seats) of good 'n' per time period (e.g. per week or per year); P_N = the product's own price (e.g. the price in € per peanut bag or per one way ticket London / Malta); P_T cost of production; P_0 = price of other goods; T_A = state of technology; G_P = government policy; G_F = goal of the firm; and $\mathcal{E}_O$ = any other specific factor

The impact of these factors on quantity supplied will be considered in turn.

1.   The Price of the Product (P_N)

The product's own price is a key determinant of the quantity supplied of a given good per period of time. Ceteris paribus, if the price of good 'A' goes up, the planned supply of good 'A' also rises; and if the supply price goes down, planned output will fall. Assuming costs to remain unchanged, if the selling price increases, the producer experiences a rise in profit at every price level. This stimulates the supplier to raise the quantity supplied of the good. Reductions in the supply price (everything else being constant), cause profit to shrink at all prices and output to contract. The positive relationship between the price and quantity supplied for a product is defined by the supply curve.

Table 3.1 shows a firm's supply schedule for restaurant meals per week (columns 1 and 2). It can be seen, for example, that as the supply price rises from €10 to €16, the quantity the firm is prepared to supply increases from 20 to 35 meals per week. Conversely if the price falls from €30 to €20, the number of meals the producer is willing to supply decreases from 60 to 44 meals. The data in Table 3.1 suggests a positive relation between price and quantity supplied.

Table 3.1: The Supply Schedule of Restaurant Meals

Column 1 P/Q	Column 2: Q/t Supply Schedule (S)	Column 3: Q_1/t Supply Schedule (S_1)	Column 4: Q_2/t Supply Schedule (S_2)
Price (€) / meal	Quantity of meals / week	Quantity of meals / week	Quantity of meals / week
10	20	40	0
16	35	55	15
20	44	64	24
23	50	70	30
30	60	80	40
38	70	90	50

A Movement along the Supply Curve

The data in Table 3.1 is plotted and exhibited in Figure 3.1. Figure 3.1 shows an upward sloping supply curve 'S'. Ceteris paribus, if the supply price falls from €38 to €10 per meal, the quantity of meals supplied will fall from 70 to 20 meals per week. This is shown by a movement along the curve from point 'a' to point 'b'. On the other hand, if the price rises from €12 to €38, the quantity supplied will also increase from 20 to 70 meals per week which is shown by a movement on the curve from 'b' to 'a'.

Figure 3.1: Movement along the Supply Curve
(Extension or Contraction)


Quantity of Meals Supplied per Week
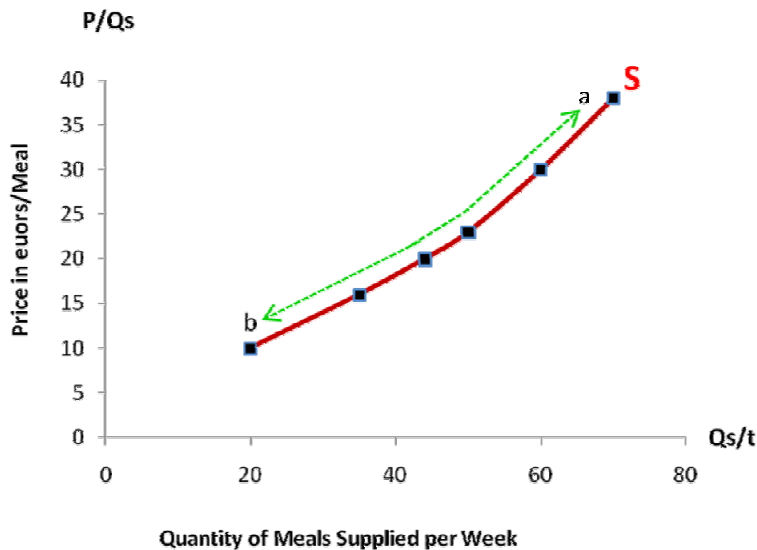
A Shift in the Supply Curve

A change in the product's own price causes a movement along the supply curve. However, a change in any other factor influencing supply causes a shift in the supply curve. This is illustrated in Figure 3 4.2.

In Figure 3.2 a rightward shift in the supply curve from S to S_1 means an increase in the quantity supplied at each price level (Refer to Table 3.1, columns 1, 2 and 3). Thus, while at the price of €38 originally 50 meals were provided, now at the same price the producer is willing to produce 90 meals. Similarly, at €23, originally 50 meals were supplied (curve S) which increases to 70 meals after the shift from S to S_1, A fall in the supply due to

a change in any factor impacting supply, except for the product's own price, will cause a leftward shift of the supply curve from S to S_2. At every price level less will be supplied (Refer to Table 3.1, columns 1, 2 and 4).

Figure 3.2: Shifts in the Supply Curve

Quantity of Meals Supplied per Week
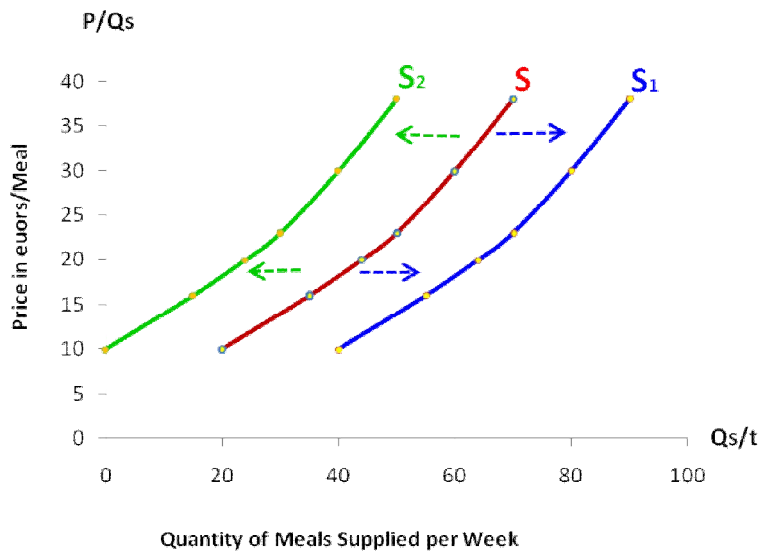
The main factors that have a significant impact on planned supply and which cause the supply curve to shift, have been listed earlier to include: the cost of production, price of other goods, technology, government policy, other special influences ad goals of the firm. These supply determinants will be discussed in the same order.

2. **Cost of production (price of factors of production) (P_F)**

Everything else remaining constant, a change in the cost of production causes the market supply curve to shift. If costs rise, supply falls at all prices, causing the supply curve to shift to the left. If costs fall, supply rises at every price level, shifting the supply curve to the right. The price of the factors of production represents input costs. Any production requires a combination of raw materials, capital and labour inputs to produce goods and services. They are bought at a price and denote the firm's costs. If the costs of production rise without a change in the supply price, profit will fall and supply will contract at each price level. In Figure 3.2, for example, an increase in the salary of kitchen staff increases the production costs of meals, leading to an inward shift in the

supply curve from S to S_2. However, a reduction in electricity rates or a fall in the price of fruit, vegetables, fish and meat, ceteris paribus, increases the profit margin so that the market supply of meals rises. In Figure 3.2, this is illustrated by a rightward shift in the supply curve from S to S_1.

3. Prices of Other Goods (P_O)

To producers, prices are often indicative of profits. If a firm is producing good 'A', ceteris paribus a rise in the price of a good 'B' causes the supply curve of 'A' to shift leftwards as it becomes relatively less profitable at every price level. Conversely, a fall in the price of 'B' makes good 'A' more profitable to produce, so that the supply of 'A' rises, leading to a rightward shift in the supply

Some goods are in competitive supply. In other words, some good can be quite easily produced using the same factors of production. These goods are usually substitute goods. Thus, a change in the price of one good will affect the supply of the other. The relative profitability indicated by relative prices will determine supply decisions. Hence, an increase in the price of wheat may induce farmers to switch from corn production to the more profitable wheat, causing the supply curve of corn to shift leftwards, denoting less quantity of corn at every price level. Conversely, a fall in the price of wheat leads to a rise the market supply of corn.

In the case of jointly produced goods (strong complements), an expansion or a contraction in the output of one good gives rise to a parallel expansion or contraction in the supply of its by-products.

For example, it is impossible to increase the production of mutton without increasing the production of sheep skin. Thus, a rise in price of mutton leads to an expansion in the quantity of mutton supplied, which in turn leads to an expansion in sheep skin. Similarly, a fall in the price of mutton results in a contraction of the supply of sheep skin. This causes the supply curve of sheep skin to shift to the left, showing less quantity supplied at all prices.

4. Technology (T_A)

Firms evaluate technological advances in terms of their contribution to cost reduction, productivity improvement and profit growth. As technological changes bring about innovative cost-saving techniques and higher profitability,

firms are willing to produce more at any given price than before, causing the supply curve to shift to the right. For example, greater knowledge of irrigation, fertilization and crop genetics makes it less costly and more profitable to produce agricultural goods. Similarly, a revolution in information technology and electronic engineering has made it feasible to produce more computers and televisions at any price than before.

Advances in technology can be interpreted in the wider sense to mean any development in knowledge and science that result in higher output of goods and services from the same or lower quantity of factor inputs. For example, superior teamwork or a better understanding of motivational forces can lead to higher productivity in the same way as physical sciences can enhance production through innovation in production methods.

5. **Government Policy (G_P)**

Government policies and measures can have a significant effect on production decisions and consequently on the market supply of commodities. Trade policies can open up markets increasing the supply of goods or discourage trade, causing supply to contract. For example, Malta's accession to the EU increased its potential to supply more goods to millions of consumers. Similarly, free trade agreements open up the EU market to third world countries with enormous potential to augment their supply of goods and services.

Government policy and regulation also can affect planned output. Thus, environmental and health considerations have the potential to influence t h e choice of technologies used, the structure of production costs and the market supply curve. They can impact on competition and hence on prices and supply. For instance, in the domestic energy sector, government regulations can influence both the number of firms that can compete and the prices they charge for their goods and services.

In the labour market, minimum wage legislation can significantly raise input prices while tax legislation can affect prices and supply.. A rise in indirect tax has the same effect as a rise in the cost of production. If the VAT rate increases from 18% to 21%, profits will fall at each price level, shifting the supply curve vertically upward by the amount of the tax. A subsidy (which is a negative tax) has exactly the opposite effect. A subsidy is a direct payment to producers in addition to any revenues received from sales. Thus, profit grows

at any price level. For example, government subsidies to low cost carriers generate extra revenues to airlines, increasing their profitability and their willingness to offer more routes and passenger seats.

6. Goals of the Firm (G_F)

In economics, the classical assumption is that firms maximize profit. Therefore, more profits mean more supply and lower profits mean a fall in the willingness of firms to produce. However, not all firms have profit maximization as their key objective. For example, the mission of churches is that of saving souls, while that of a defence department is to provide security. Non-profit organizations, clubs and charitable institutions may have other business aims than profit.

Unless otherwise stated, the main underlying assumption of supply theory is that of profit maximization.

Special Influences ($\mathcal{E}_o$)

There are many other factors that are of special interest to the supply of specific goods. Weather is an important determinant of the supply of certain agricultural commodities such as grapes and subsequently wine. Favourable weather conditions can produce a bumper harvest while unfavourable weather can 1ead to a poor harvest and a decrease in supply. Similarly, snow is of special importance to skiing resorts. Price expectations can also have a strong bearing on crop production. If farmers expect future prices of potatoes to fall, they may reduce their planned supply of the crop.

The Market Supply Curve

Before proceeding to an examination of price determination in a competitive market, it is useful to define the market supply curve for a product since most of the analysis that follows, refers to the market supply curve.

Figure 3.1 represents the supply curve for an individual firm. The market supply curve is the total supply of a commodity that all firms taken together are willing and able to produce per period of time. Again the market supply curve is obtained by observing directly total quantities supplied. Theoretically, the market supply curve can be derived by summing up the quantities supplied by all individual firms.

Figure 3.3 shows the market supply curve as the horizontal summation of two individual supply curves. If there are only two firms in a market, Firm 1 and Firm 2, then the market supply curve (SM) is the addition of Firm 1's supply schedule (S1) and that of Firm 2 (S2): $S_M = S_1 + S_2$.

Figure 3.3: The Derivation of the Market Supply Curve

Firm 1 + Firm 2 = Market
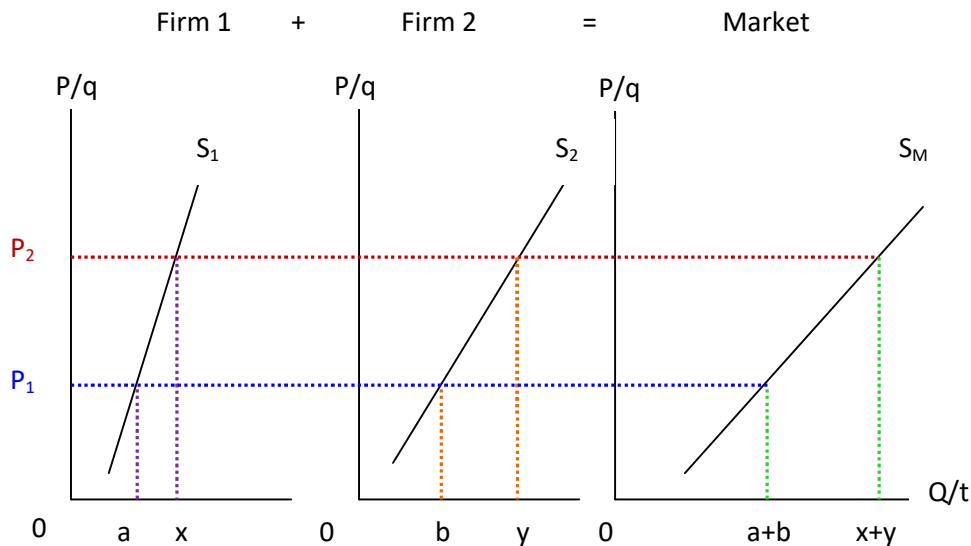
Summary

The supply for a commodity shows the relationship between the good's own price and the quantity supplied. Ceteris paribus, a fall in the price leads to a fall in the quantity supplied, while a rise in the price causes supply to fall. This relationship is depicted by an upward sloping (positive) supply curve. The market supply curve is the summation of individual supply schedules. Any change in the commodity's own price is shown by a movement along the supply curve. Any change in any other factor causes a leftward or rightward shift in the whole supply curve. The main factors that influence the supply causing its curve to shift include: the cost of production, the price of other goods, technology, government policy, other special influences and the goals of the firm