

Chapter 2

Demand Theory

Determinants of Demand

There are many factors that influence the demand for a commodity. Among the determinants of demand, four are of particular interest because they influence the individual consumer demand as well as the market demand:

1. the price of the commodity (P_n)
2. the price of other goods (P_0), namely the price of substitute goods (P_s) and the price of complements (P_c)
3. income (Y)
4. tastes or preferences (T) [i.e. fashion, trends, advertising]

Factors that influence market rather than the individual demand include population demographics (P_d), the distribution of income (D_y), and any other factor having an impact on demand (ϵ).

The demand function for a product 'n' can be summarized in mathematical form:

$Q^n_d = f(P_n, P_s, P_c, Y, T, \epsilon)$ where:

Q^n_d = the quantity demanded (e.g. in kilograms or hotel beds) for good 'n' (e.g. nuts or tourism) per time period (e.g. per week or month)

P_n = the price of the good itself (e.g. the price in € per bag of nuts or per five-day holiday in Malta)

P_s = the price (in €) of a substitute good (e.g. the price of crisps per bag, a substitute to nuts or a holiday in Spain a substitute to Malta)

P_c = the price of a complementary good (e.g. the price of beer, a complement to nuts or the price of travel insurance, a complement to tourism)

Y = income (in € per month)

T = tastes or preferences (say a change in preferences in favour of nuts or a holiday in the USA)

ϵ = all other factors (e.g. age, sex and size composition of the population, religion, weather, climate or culture)

The product's own price (P_n), prices of other goods (P_0), income (Y) and tastes (T) will be discussed first.

The Price of the Commodity (P_n)

The demand for a product is influenced by its own price. If there is no change in other factors that influence the demand for the product (*ceteris paribus* condition), a rise in the price will generally lead to a fall in the quantity demanded, while a price fall results in an increase in the product demand. This negative relationship between the price and quantity demanded for a commodity is known as the demand function. This can be depicted in the form of a negatively sloped demand curve as in Figure 2.1.

In Figure 2.1 (a), *ceteris paribus*, a fall in the price of nuts, from P_1 to P_2 causes the quantity demanded for nuts to rise from Q_1 to Q_2 . In Figure 2.1 (b), a rise in the price of a holiday in Malta, from P_2 to P_1 , leads to a fall in the number of tourists visiting Malta, from Q_2 to Q_1 . As can be observed, a change in the product's own price will cause a **movement along** or an **extension** of the demand schedule. A change in any other factor influencing demand (except the product's own price) causes a shift in the demand curve.

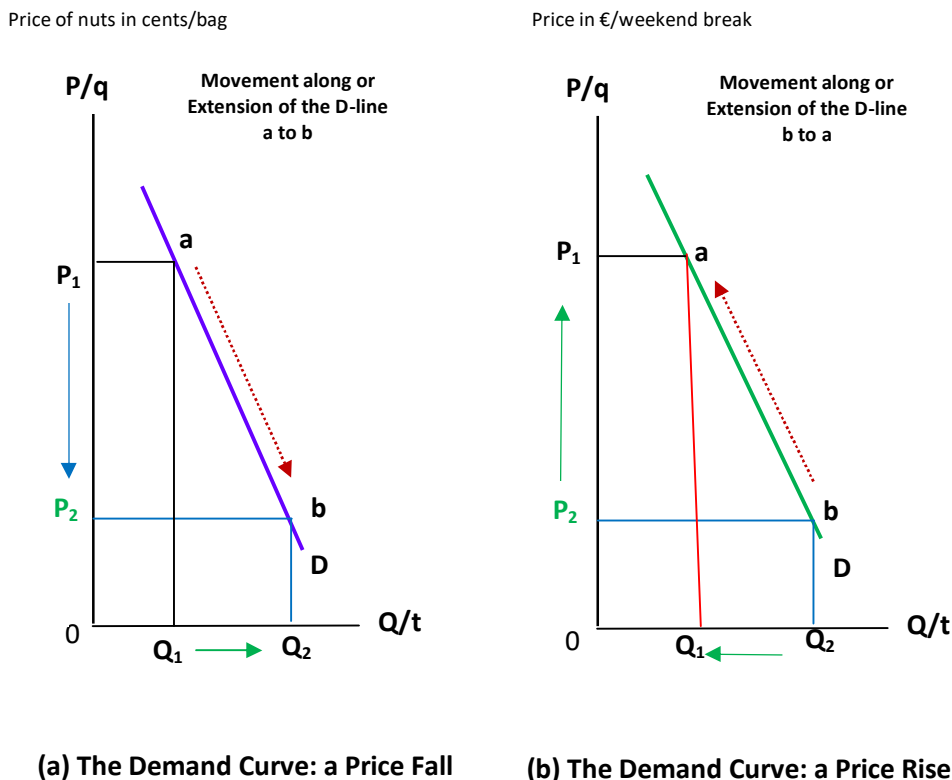


Figure 2.1: The Demand Function

Prices of Other Goods: (i) The price of substitute goods

All goods and services can be substituted by alternative commodities, although not necessarily to the same extent. For example, butter is a good substitute to margarine but a table is a poor substitute to a chair. The greater the availability of close substitutes, the higher the rate of substitution between goods because of a wider choice. A consumer shops around and is generally prepared to consume more of a cheaper substitute. To firms, the degree of available substitution among consumer goods represents the extent of competition because they know that consumers are price sensitive. Understandably, a firm selling peanuts is more concerned with changes in the price of crisps than price movements in sirloin steak. Similarly, Maltese hoteliers are more concerned with changes in the price of a holiday in Spain than price fluctuations in automobiles.

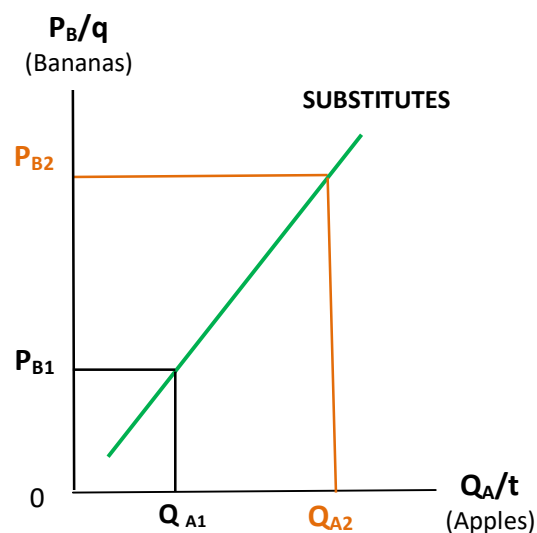


Figure 2.2 Substitute Goods

In general, *ceteris paribus*, a rise in the price of a good B causes the quantity demanded for a substitute good A to increase since the price of good A becomes relatively cheaper. A consumer normally demands more of a cheaper good A and less of the expensive good B. Similarly, if the price of good B falls, the demand for substitute good A falls as it becomes relatively more expensive. This positive relationship between the price of good B and the quantity demanded for a substitute good A is illustrated in Figure 2.2.

In Figure 2.2, when the price of a good B is P_{B1} , quantity demanded for substitute good A is Q_{A1} . If the price of good B goes

up to P_{B2} , the quantity demanded for substitute good A will rise to Q_{A2} . Conversely, if the price of B falls from P_{B2} to P_{B1} , the demand for its substitute good A will fall from Q_{A2} to Q_{A1} .

While a change in the price of the product's own price (P_n) causes a movement along the demand curve, changes in other factors influencing demand results in a shift in the demand curve. This means that at each and every price level, the quantity demanded will change. This can be shown through an examination of the effect of changes in the price of good B on the quantity demanded of a substitute good A.

Figure 2.3 (a) shows the demand schedule for peanuts D_1 . A fall in the price of crisps, ceteris paribus, causes the demand for peanuts to shift leftwards from D_1 to D_2 . At every level of price, the quantity demanded for peanuts contracts because consumers switch from the more expensive peanuts to the relatively cheaper crisps. Thus, at P_{B1} quantity demanded for peanuts will fall from Q_{A1} to Q_{A2} , and at P_{B2} from Q_{A3} to Q_{A1} .

Figure 2.3 (b) shows the impact of a rise in the price of a weekend holiday break in Spain on tourism in Malta. The demand for tourism in Malta is represented by the line D_1 . As Spanish holidays are now more expensive, Malta will experience a rise in tourist volume exhibited by a rightward shift in the demand curve from D_1 to D_2 . Consequently, at P_{B1} , demand increases from Q_{A1} to Q_{A2} , and at P_{B2} the number of tourists will rise from Q_{A2} to Q_{A3} .

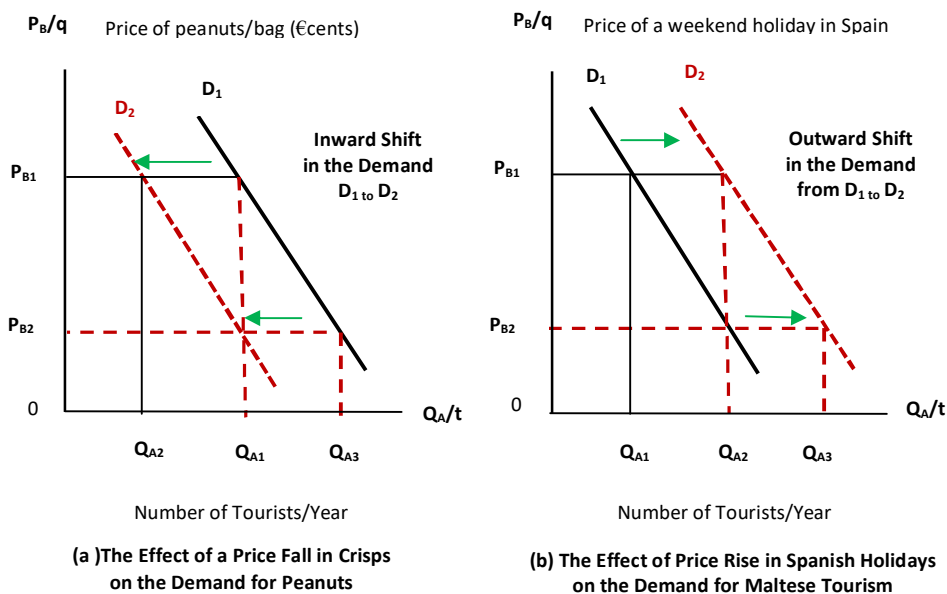


Figure 2.3: Shifts in the Demand Function: Substitutes

Prices of other Goods: (ii) the price of complementary goods

Most commodities not only have available substitute goods but also complementary goods. Many goods are jointly demanded, though the degree to which they depend on each other varies. There are many examples of complementary goods: gin and tonic; petrol and cars; t-shirts and jeans; furniture and accommodation; textbooks and college education; insurance and property.

In general, if product A and product B are two complementary goods, *ceteris paribus*, the demand for good A is negatively related to the price of good B. In other words, if the price of good B goes up, the demand for its complementary good A falls; and if the price of good B falls the demand for good A rises. The relationship between two complementary goods, A and B is illustrated in Figure 2.4

In Figure 2.4, the price of product B is depicted on the vertical line (Y-axis). The horizontal line (X-axis) shows the quantity demanded of complementary good A. If the price of good B falls from P_{B1} to P_{B2} , the quantity demanded for its complement, good A, increases from Q_{A1} to Q_{A2} . A rise in the price of good B from P_{B2} to P_{B1} lowers the demand for good A from Q_{A2} to Q_{A1}

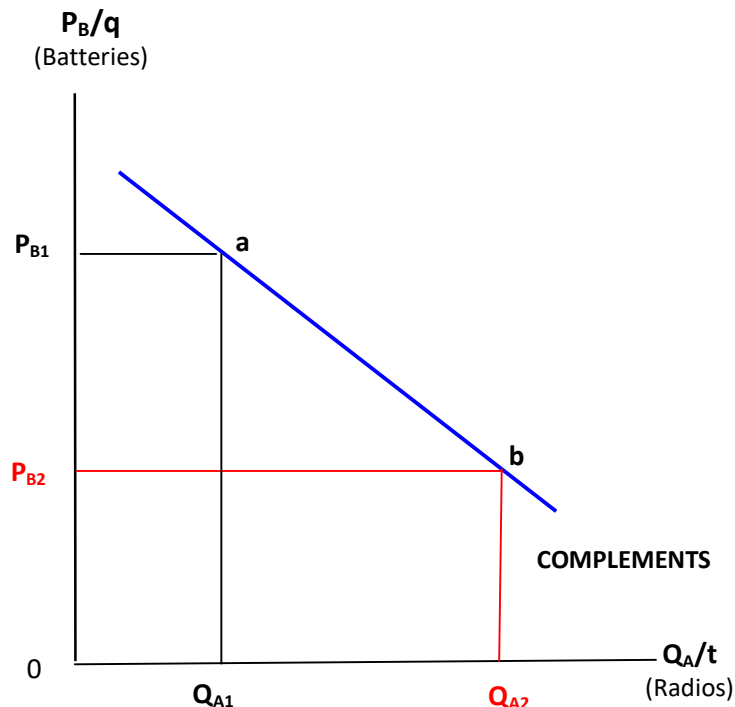


Figure 2.4: Complements

Changes in the price of good B causes shifts in the demand curve for its complementary good A

In Figure 2.5 (a), the demand line for peanuts is given by D_1 . Everything else remaining unchanged, an increase in the price of beer leads to a fall in beer consumption and therefore to a fall in the demand for peanuts. This is manifested in an inward shift in the demand schedule for peanuts, from D_1 to D_2 . At every price level, there is less demand for peanuts. That is, at P_{B1} , demand decreases from Q_{A1} to Q_{A2} ; and at P_{B2} demand will fall from Q_{A3} to Q_{A1} .

Figure 2.5 (b) shows the demand curve for tourism in Malta. As the dependence (complementarities) of Maltese tourism on air travel is very high, a fall in airfares causes the demand curve for tourism to shift to the right from D_1 to D_2 . At P_{B1} , the demand for vacations in Malta increases from Q_{A1} to Q_{A2} ; and at P_{B2} , from Q_{A2} to Q_{A3} . The introduction of low cost airlines in Malta, and the resulting lower airfares, is one reason for increased tourism.

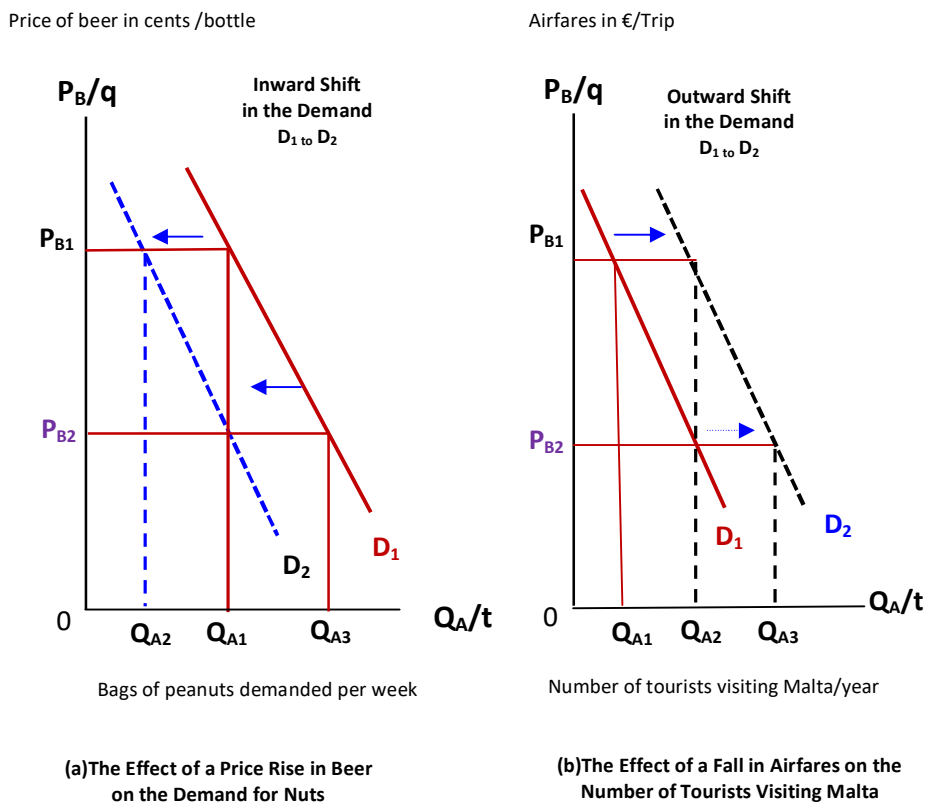


Figure 2.5: Shifts in the Demand Function: Complementary Goods

Income

Another important factor influencing the demand for a commodity is the level of income. *Ceteris paribus*, a consumer will generally buy more goods if he experiences an increase in his income. Goods whose consumption increases with higher income and falls with lower income are known as normal goods (positively related). At some level of income, the demand for some goods tends to be negatively related to income. They are called inferior goods (although there is nothing intrinsically inferior about them). As income increases, the demand for these goods falls because consumers can afford to substitute them by what they perceive as affordable better quality goods. This explains, for example, why the demand for aerial TV may initially increase with more income, but at some higher level of income and product availability, the demand for these goods and services falls as consumers switch to cable or satellite television. The demand for some goods such as salt and pepper may even be constant or unresponsive to higher levels of income. The relationship between changes in income and quantity demanded is shown in Figure 2.6.

Figure 2.6 shows the relationship between income and the potential stages of a product cycle. As income rises from 0 to Y_1 , quantity demanded increases from 0 to Q_2 (normal good). As income rises from Y_1 to Y_2 , the demand levels off and remains constant at Q_2 . Further increases in income from Y_2 to Y_3 reduce the demand for the good from Q_2 to Q_1 .

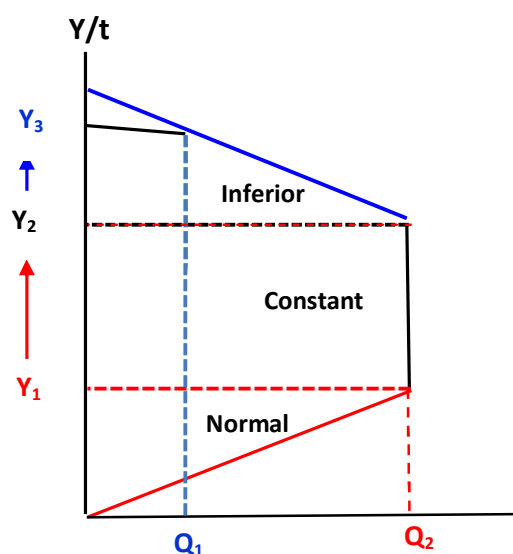


Figure 2.6: The Income Effect

In practice, most goods are normal and any changes in income cause the demand to change, shifting inwards or outwards the demand curve.

Figure 2.7 (a) shows the general case where a fall in income causes the demand for a product A to shift inwards from D_1 to D_2 . Thus, at various price levels the demand falls. For example, at P_1 , demand falls from Q_1 to Q_2 . Similarly, at price P_2 , quantity demanded falls from Q_3 to Q_1 . If income rises, this causes the demand curve for product A to shift from D_1 to D_3 . More will be demanded at P_1 , from Q_1 to Q_3 ; and at P_2 from Q_3 to Q_4 .

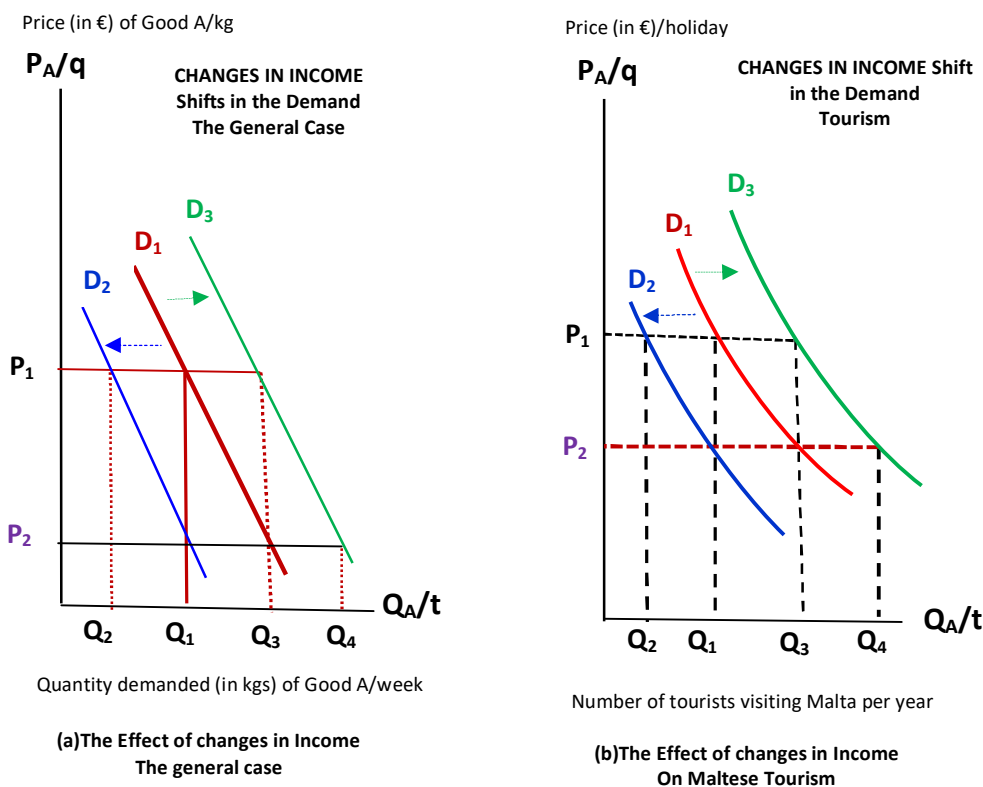


Figure 2.7: Shifts in the Demand Function: Changes in Income

Figure 2.7 (b) shows the effect on Maltese tourism resulting from changes in income. An increase in the income of foreign tourists will shift the demand for Maltese tourism rightwards from D_1 to D_3 . Thus, at every price level, the demand for holidays in Malta rises: at P_1 , demand increases from Q_1 to Q_3 . Conversely, a fall in the income of foreign tourists leads to a fall in demand for tourism in Malta from D_1 to D_2 , causing the volume of tourists to fall from Q_1 to Q_2 at P_1 and from Q_3 to Q_1 at P_2 .

Tastes or Preferences (T)

Tastes or preferences have a major impact on demand. Tastes involve personal preferences and incorporate subjective factors as well as influences such as advertising, trends, and fashion which attempt to shape consumer tastes and demand. For some commodities, such as clothes and shoes, changes in fashion can bring significant changes in demand. The more fashionable a product becomes the higher the demand for it, and vice versa. Advertising through various media plays a significant role in shaping consumer tastes and preferences. Consumer purchasing decisions are constantly being shaped and reshaped by marketing ploys so that consumer behaviour is significantly influenced by perception-forming agents.

Consumer preferences for time and leisure determine the demand for many commodities offered by the travel and tourism industries. Likewise, their preferences for risk which can range from complete aversion to outright gambling are critical for insurance products and their pricing. In general, everything else remaining constant, if tastes are in favour of a product, the demand for it rises; otherwise the demand for the commodity will fall. Any change in preferences shifts the demand for a product which is illustrated in Figure 3.8

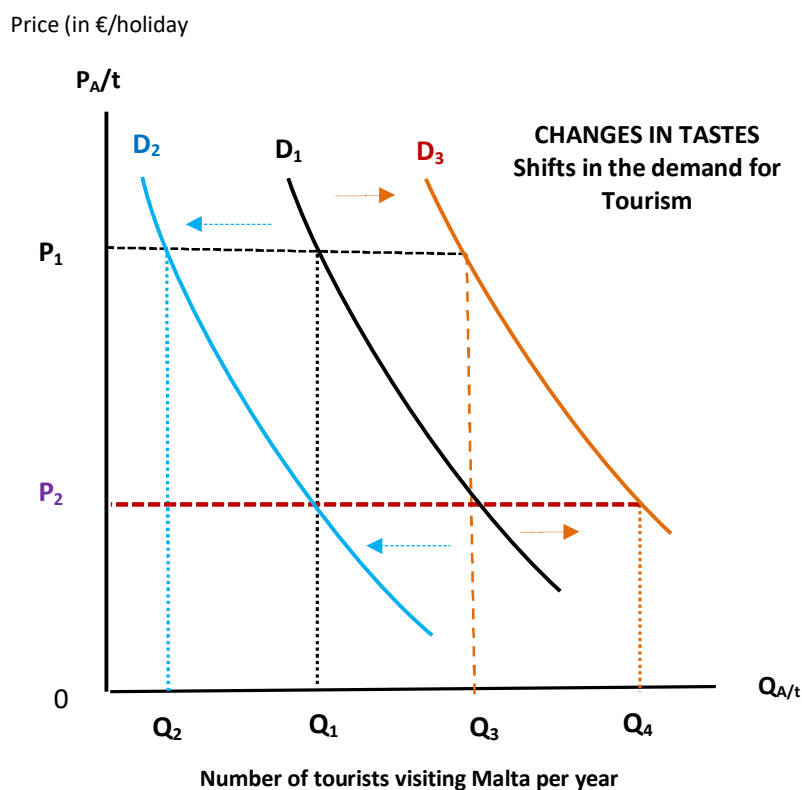


Figure 2.8: The Effect of Tourists' Preferences on Maltese Tourism

In Figure 2.8, the demand for tourism in Malta is represented by the demand curve D_1 . If international tourists find it trendy to visit the United States or some exotic place in Asia, tourism to Malta decreases. Similarly, if there is a major negative perception towards Malta because of indiscriminate hunting, tourists with an environmental conscience will contribute to lower tourism in Malta. This is shown by a leftward shift in the demand curve from D_1 to D_2 . The number of tourists contracts at every price level. At P_1 , tourism falls from Q_1 to Q_2 ; and at P_2 from Q_3 to Q_1 . If, however, Mediterranean island tourism becomes the latest fashion in travelling, then the demand for tourism in Malta is likely to increase. This is shown by a rightward shift in the demand curve from D_1 to D_3 . Thus, at P_1 , tourism grows from Q_1 to Q_3 ; and at P_2 , from Q_3 to Q_4 .

Population

The characteristics of a population are key determinants of the market demand. The higher the size of the population, the higher is the demand for a commodity. For example, the demand for tourism is higher in China than in Malta. The sex structure of the population also affects demand. If a population is significantly female dominated, the demand for say cosmetics and fashion clothes will be higher than in countries whose population is male dominated. Similarly, the age composition of a population affects demand. In an ageing population, the demand for nursing, old people's homes and medicine will be rising faster than the demand for toys and primary education. Changes in the population demographics cause the demand curve to shift.

Distribution of Income (Y_D)

Ceteris paribus, a redistribution of income in favour of the lower income groups tends to increase the demand for normal goods. Low income consumers tend to proportionally spend more out their income than higher income groups.

Other Specific Factors (ϵ)

The list of potential influences on demand is endless. There are many determinants of demand that are specific to the good in question. For example, climate, culture, geographic position, and religion may have a significant impact on the demand for tourism but no effect on to the demand for steel.

The Market Demand Curve

The market demand curve represents how much all consumers are willing to buy of a commodity at different price levels. This is normally obtained by observing total quantities directly. In theory, however, to enhance our understanding of the relationship between individual demand curves for individual consumers and the market demand curve, individual consumer demand schedules can be summated horizontally to obtain the market demand curve. This is demonstrated in Table 2.1.

Table 2.1: Market Demand Schedule for Peanuts

	Individual Demand Consumer 1	Individual Demand Consumer 2	Market Demand Consumer 1 + 2
Price (cents) (per Bag)	Quantity Demanded (peanut bags/month)	Quantity Demanded (peanut bags/month)	Quantity Demanded (peanut bags/month)
30	35	25	60
45	25	20	45
60	15	15	30
75	5	10	15

Table 2.1 shows the demand schedules for two individuals, Consumer 1 and Consumer 2. At the price of 30 cents per peanut bag, Consumer 1 demands 35 bags per month while Consumer 2 demands 25 bags. As the price rises to 45 cents, the demand for Consumer 1 and Consumer 2 falls to 25 and 20 bags respectively. At the higher prices of 60 and 75 cents, the corresponding demand for peanuts of Consumer 1 contracts to 15 and 5 while that of Consumer 2 falls to 15 and 10. Their demand schedule as expected is downward sloping.

If the market consists only of these two consumers, then the market demand curve can be derived by adding the quantities demanded by each individual consumer at different price levels. Thus, for example, at a price of 30 cents per bag, the aggregate demand is 60 bags per month, at 45 cents 45 bags, at 60 cents 30 bags and at 75 cents 15 bags. The market demand curve is negatively sloped since it is based on two downward sloping individual demand curves.

The derivation of the market demand curve is also illustrated in Figure 2.9. The data in Table 3.1 is plotted to obtain the individual consumer demand curves D_1 and D_2 . If the two demand schedules are added together, the market demand line D_M is obtained ($D_1 + D_2 = D_M$). Thus, at the price of 75 cents per bag of peanuts, from D_1 , consumer 1 will demand five peanut bags per month, and from D_2 , consumer 2 will demand 10 bags. The market demand line D_M , shows the aggregation of separate consumer demand lines.

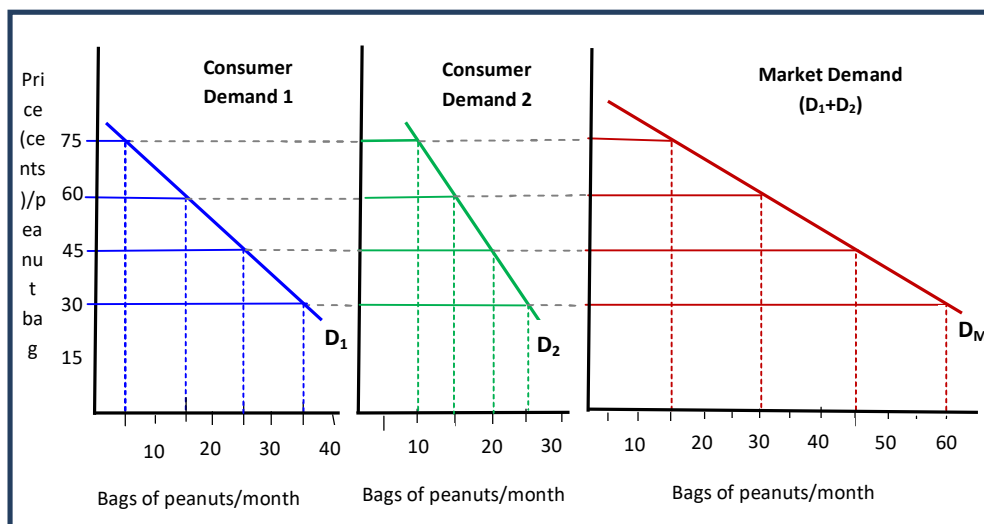


Figure 2.9: The derivation of the Market Demand Curve

Summary

The demand for a commodity shows the relationship between the good's own price and the quantity demanded for it. *Ceteris paribus*, a fall in the price leads to a rise in the quantity demanded while a rise in the price causes demand to fall. This relationship is manifested in a negatively sloping demand curve. The market demand curve is the summation of individual demand curves. Any change in the commodity's own price is shown by a movement along the demand curve. Any change in any other factor causes a leftward or rightward shift in the demand curve. The main factors that influence demand causing it to shift include: the price of substitute goods and complementary goods, income, tastes, population demographics, the distribution of income, and any other specific factor that can have an impact on a particular good.

