

7 ELASTICITY OF DEMAND

7.1 Price Elasticity of Demand

Price Elasticity of Demand measures the **responsiveness** of demand for a product following a change in its own price. The **formula** for calculating the co-efficient of elasticity of demand is:

Percentage change in quantity demanded divided by Percentage change in price

If the demand increased by 10% due to a fall in a good's own price of 5%, the price elasticity of demand for a product would be 2.

Since changes in price and quantity nearly always move in opposite directions, economists usually do not bother to put in the minus sign. We are more concerned with the **co-efficient of price elasticity of demand**.

7.2 Different values for price elasticity of demand

- ▶ **If $Ped = 0$** then demand is said to be perfectly inelastic. This means that demand does not change at all when the price changes
- ▶ **If Ped is between 0 and 1** (i.e. the percentage change in demand from A to B is smaller than the percentage change in price), then demand is inelastic. Producers know that the change in demand will be proportionately smaller than the percentage change in price
- ▶ **If $Ped = 1$** (i.e. the percentage change in demand is exactly the same as the percentage change in price), then demand is said to be unit elastic. A 15% rise in price would lead to a 15% contraction in demand leaving total spending by the same at each price level.
- ▶ **If $Ped > 1$** , then demand responds more than proportionately to a change in price. For example a 20% increase in the price of a good might lead to a 30% drop in demand. The price elasticity of demand for this price change is -1.5

7.3 What Determines Price Elasticity of Demand?

Several factors can be identified – some of which will be more important than others when we apply this idea to different markets. The main factors though to influence the value of price elasticity of demand (Ped) are as follows:

- ▶ **The number of close substitutes for a good / uniqueness of the product** – the more close substitutes the more elastic is the demand for a particular product. If a consumer has a wide choice of product, they can more easily switch their demand if the price of one product changes relative to others in the market. Another related factor is the **cost of switching between different products**. Consider for example the financial expense of changing the central heating system in your home, or perhaps the cost of switching from one mobile phone supplier to another when you might have become “locked-in” to using one supplier through a contractual agreement. When the costs of substitution are relatively high, this can make demand for a good quite price inelastic
- ▶ **The degree of necessity of consumption or whether the good is a luxury** – goods and services deemed by consumers to be **necessities** tend to have an inelastic demand whereas luxuries will tend to have a more elastic demand following a price change because consumers can do without **luxuries** when their budgets are stretched. I.e. in an economic slowdown or a recession we can often make do without luxury or discretionary items of spending.
- ▶ **The % of a consumer's income allocated to spending on the good** – goods and services that take up a significant proportion of a household's monthly or annual income will tend to have a more elastic demand than products where large price changes makes little or no difference to someone's ability to purchase the product. For example consumers are sensitive to changes in the prices of foreign holidays and new cars, whereas the demand for milk, newspapers and magazines is much affected by price changes. Price elasticity of demand nearly always varies according to the **income group of consumers** that we are considering. Take for example the current issue of introducing “top-up” fees for university courses in England and Wales. How will the demand for higher education courses be affected? Evidence from the United States is that students from high and middle ability and incomes had a tuition fee elasticity of around -0.29 (low) and students from lower income groups or of lower ability are more sensitive to changes in fees.

- ▶ **The time period allowed following a price change** – demand tends to be more price elastic, the longer that we allow consumers to respond to a price change by varying their purchasing decisions. In the short run, the demand for a product is often thought to be price inelastic, because it takes time for consumers both to notice and then to respond to price fluctuations.
- ▶ **Whether the good is subject to habitual consumption** – when this occurs demand is inelastic – the consumer becomes much less sensitive to the price of the good in question. Clearly, examples such as cigarettes and alcohol might come into this category. What of the price elasticity of demand for energy drinks such as Red Bull and Lucozade?
- ▶ **Peak and Off Peak Demand.** Demand for certain products can be high at **peak times** (e.g. the demand for package holidays during summer holidays; the demand for restaurant meals during the Festive period) but consumer demand is much lower at off-peak periods. Demand tends to be less elastic at peak times – a feature that suppliers can take advantage of when setting prices. Demand is more elastic at off-peak times, leading to lower prices for consumers.
- ▶ **The breadth of definition of a good or service** – if a good is broadly defined, i.e. the demand for petrol or meat, demand is often fairly inelastic. But specific brands of petrol or beef are likely to be more elastic following a price change

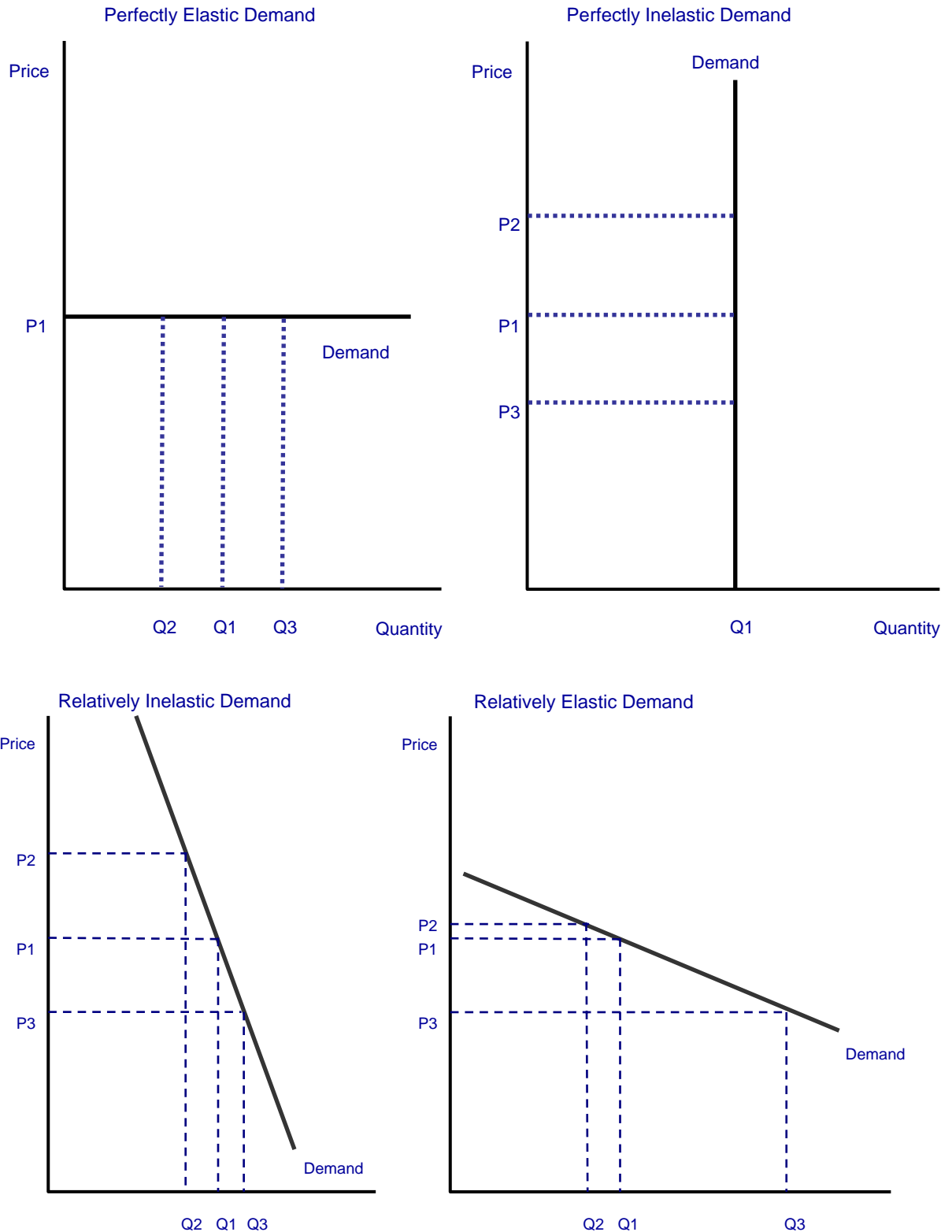
Price elasticity of demand can vary according to whether the market price of a product is rising or falling. Consumers' behaviour can change quite differently depending on where they see prices heading in the future.

Real-world estimates of price elasticity of demand for various products can be researched using the internet. Consider a few examples shown below

UK farmers' price elasticity of demand with respect to changes in the prices of herbicides and pesticides	-0.28 to -0.45	Source: DEFRA			
Estimated elasticity of demand in the UK for beer, wines and spirits (1993-96)		Source: IFS			
Beer	-0.76	Wine	-1.69	Spirits	-0.86
Estimated price elasticity of demand for cigarettes		Source: Tobacco Manufacturers			
For a price decrease	-0.37	For a price increase	-0.77		
Estimated price elasticity of demand for air transport (response to changes in air fares e.g. brought about by the introduction of an aviation fuel tax)		Source: UK Department for Aviation			
Ped for air transport is estimated overall to be -0.8 with an elasticity of demand of -1.3 in the leisure market and an elasticity of demand of -0.5 in the business market					

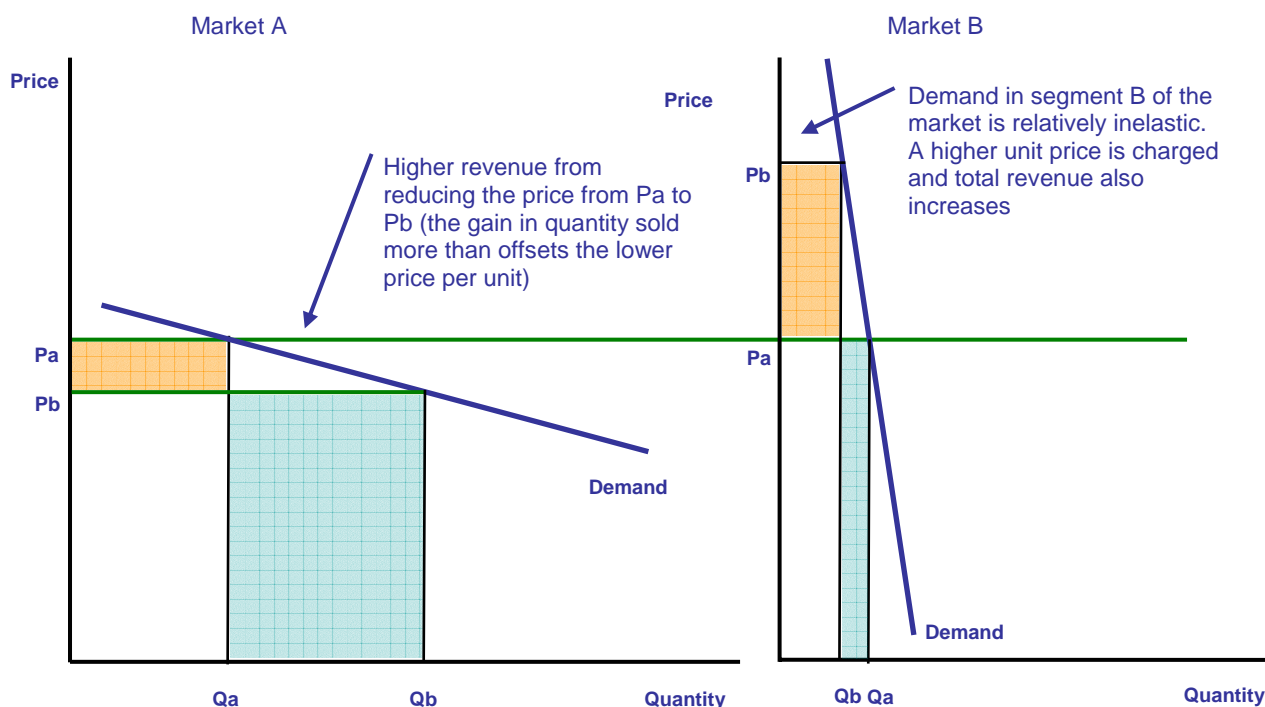
Try this site on [estimates for the price elasticity of demand for cocoa](#) across various countries

7.4 Demand Curves with Different Price Elasticity



- ▶ When demand is **perfectly inelastic** ($P_{ed} = \text{zero}$) any change in market price causes no change in demand
- ▶ When demand is **perfectly elastic** ($P_{ed} = \text{infinity}$) there will be one ruling price in the market unless the demand curves shifts. Producers can sell any amount they want at the ruling price
- ▶ When demand is **elastic** (see Market A) a rise in price will cause a more than proportionate fall in demand and total spending on the good will fall

- ▶ When demand is **inelastic** (see market B) a rise in price causes a less than proportionate fall in demand and total spending will rise



7.4.1 How Businesses Make Use of Price Elasticity of Demand?

Firms can use price elasticity of demand (PED) estimates to predict:

- ▶ The effect of a change in price on quantity demanded
- ▶ The effect of a change in price on total revenue & expenditure
- ▶ The likely price volatility in a market following unexpected changes in supply – important for commodity producers
- ▶ The effect of a change in indirect tax on price and quantity demanded and also whether the business is able to pass on some or all of the tax onto the consumer
- ▶ Information on the price elasticity of demand can be utilised as part of a policy of price discrimination (or yield management). This is where a monopoly supplier decides to charge different prices for the same product to different segments of the market e.g. peak and off peak rail travel

7.5 Income Elasticity of Demand

Income elasticity of demand measures the relationship between a **change in quantity demanded** and a **change in real income**.

The formula for income elasticity is:

Percentage change in quantity demanded DIVIDED BY Percentage change in income

7.5.1 Normal Goods

Normal goods have a **positive income elasticity of demand** so as consumers' income rises, so more is demanded at each price level

Necessities have an income elasticity of demand of between 0 and +1

Luxuries have an income elasticity of demand $> +1$ i.e. the demand rises more than proportionate to a change in income

7.5.2 Inferior Goods

Inferior goods have a negative income elasticity of demand. Demand falls as income rises.

Within a given market, the income elasticity of demand for various products can vary. For example, in the market for overseas holidays, the income elasticity for full-board in 3 or 4 star hotels will be higher than for self-catering apartments in the same location.

Staying within the holiday sector, income elasticity will vary between different destinations. Spanish tourist resorts seek to attract high volumes of tourists in low-cost accommodation from consumers with a lower average income than specialist activity holidays in purpose built resorts who are prepared to pay premium prices for higher quality sporting and leisure facilities.

Detailed information on household spending on different goods and services is provided each year from the Family Household Spending Survey. From this we can make estimates of income elasticity of demand for different categories of goods and services.

For example, the income elasticity of demand is strongly positive for

- ▶ Overseas travel
- ▶ Wines and spirits
- ▶ Consumer durables such as audio visual equipment, 3rd generation mobile phones and new kitchens
- ▶ Sports and leisure facilities (including gym membership and sports clubs)
- ▶ In contrast, income elasticity of demand is lower for
- ▶ Basic household foods
- ▶ Mass transport (bus and rail)
- ▶ Cigarettes and Beer

7.5.3 How Businesses Use Estimates of Income Elasticity of Demand?

Knowledge of income elasticity of demand for different products helps firms predict:

- ▶ Effects of forecast economic growth on sales. Economic growth increases incomes
- ▶ Luxury goods experience a proportionately larger increase in demand e.g. if YED for product is 2, a 10% increase in growth and income results in a 20% increase in quantity demanded.
- ▶ Necessities experience a proportionately smaller increase in demand e.g. if YED for product is 0.3, a 10% increase in growth and income results in just a 3% increase in quantity demanded.
- ▶ **The effect of a business cycle on sales.** Economies experience a business, economic or trade cycle where actual GDP moves up and down in a regular pattern causing booms and slowdowns or perhaps a recession.

The business cycle means incomes rise and fall. Luxury Products with a high income elasticity experience greater sales volatility over the business cycle than necessities where demand from consumers is less sensitive to changes in the economic cycle

7.6 Cross Price Elasticity of Demand

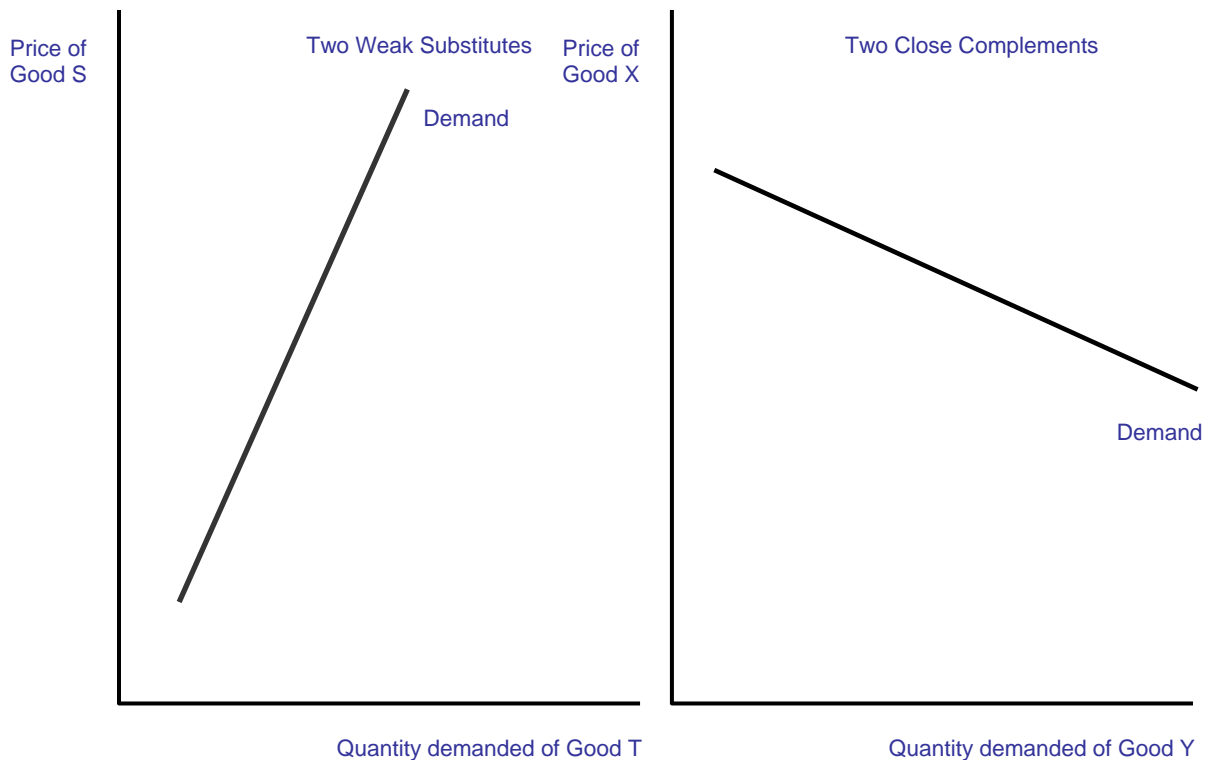
Cross price elasticity (CPed) measures the responsiveness of demand for good X following a change in the price of good Y (a related good).

With cross price elasticity we make an important distinction between **substitute** products and **complementary goods and services**

- ▶ **Substitutes:** With **substitute goods** such as brands of cereal or washing powder, an increase in the price of one good will lead to an increase in demand for the rival product. Cross price elasticity will be positive. In recent years, the [prices of new cars have been falling](#). This should increase the demand for new cars and reduce the demand for second hand cars and mass transport services such as bus travel (*ceteris paribus*)
- ▶ **Complements:** With goods that are in **complementary demand** such as the demand for DVD players and DVD videos, when there is a fall in the price of DVD players we expect to see more DVD players bought, leading to an expansion in market demand for DVD videos. The cross

price elasticity of demand for two complements is negative

- ▶ **Un-related products:** When there is no relationship between two products, the cross price elasticity of demand is zero

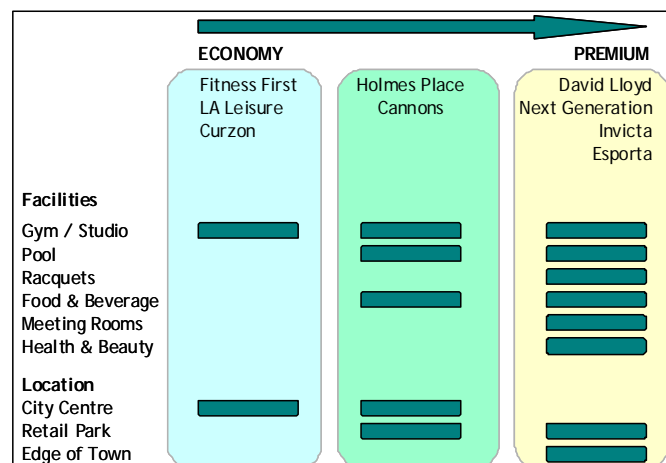


How can firms make use of cross price elasticity of demand?

Firms can use cross elasticity of demand (XED) estimates to predict:

- ▶ **The impact of a rival's pricing strategies on demand for their own products:** If a competitor cuts the price of a rival product, firms use XED to predict the effect on the quantity demanded and total revenue of their own product.
- ▶ **Pricing strategies for complementary goods:** For example, popcorn and cinema tickets have a high negative XED value – they are strong complements. Popcorn has a very high mark up i.e. pop corn costs pennies to make but sells for more than a pound. If firms have a reliable estimate for XED they can estimate the effect, say, of a two-for-one cinema ticket offer on the demand for popcorn. The additional profit from extra popcorn sales may more than compensate for the lower cost of entry.

7.6.1 Case Study: Price and Income Elasticity of Demand for Health Clubs



The UK health club market is split between two broad segments: **economy and premium operators.**

Cannons, Esporta and David Lloyd Leisure are three of the best known names trading in the Premium segment, offering large units with a range of squash courts, swimming pools, specialist classes, and health and beauty services alongside traditional gym equipment. Memberships cost from £40-£100 per month.

At the other end of the sector are economy operators such as Fitness First and LA Fitness. They run smaller, less sophisticated clubs, offering good quality but basic facilities located close to large offices or residential areas. The typical cost of membership is £25-£40 per month.

The difference in facilities offered has significant capital investment implications for the health club operators. Economy operators such as Fitness First minimise the risk that a gym may not prove popular in a particular area by spending just £1m—£1.2m opening relatively small units of around 20,000 sq ft each. In sharp contrast, David Lloyd regularly invests over £10 in its larger clubs, with the average nearer to £5m.

Price Elasticity of Demand

Regular gym users regard their health club visits as an important feature of their weekly exercise regime. They are unlikely to cancel a membership if fees rise from time to time. The majority of gym members pay their subscriptions using direct debit. They may take some time to realise that their monthly charge has changed.

For most consumers, having made the decision to commit to a membership of between £25—£50 per month, a small rise in fees is unlikely to lead to a cancelled membership.

Some towns and cities are well served by health clubs in both the premium and economy segments of the market. When there is genuine market competition, price elasticity of demand should be higher.

Income Elasticity of Demand

Income elasticity measures the responsiveness of demand to a change in consumers' real income. Although some fitness fanatics may regard their membership as a necessity (giving a low but positive value for income elasticity), for many consumers, an individual or family membership is often seen as a luxury item in their annual budget – an item of discretionary spending that can be dispensed with if income falls or consumer confidence declines.

Normal luxury products have a highly positive income elasticity of demand. When the economy is strong, and incomes and employment are rising, we expect to see strong growth in market demand for health and fitness activities. This encompasses health clubs together with other activities (including sports-based holidays). In an economic slowdown, discretionary spending on health clubs may fall—although in the short term, thousands of members are committed to an annual fee.