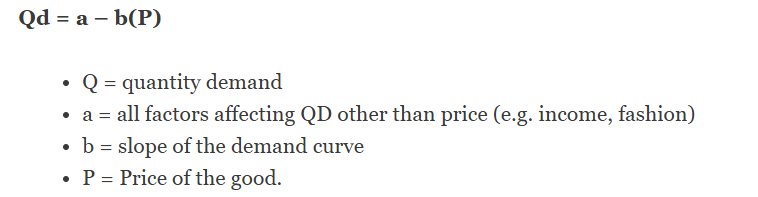
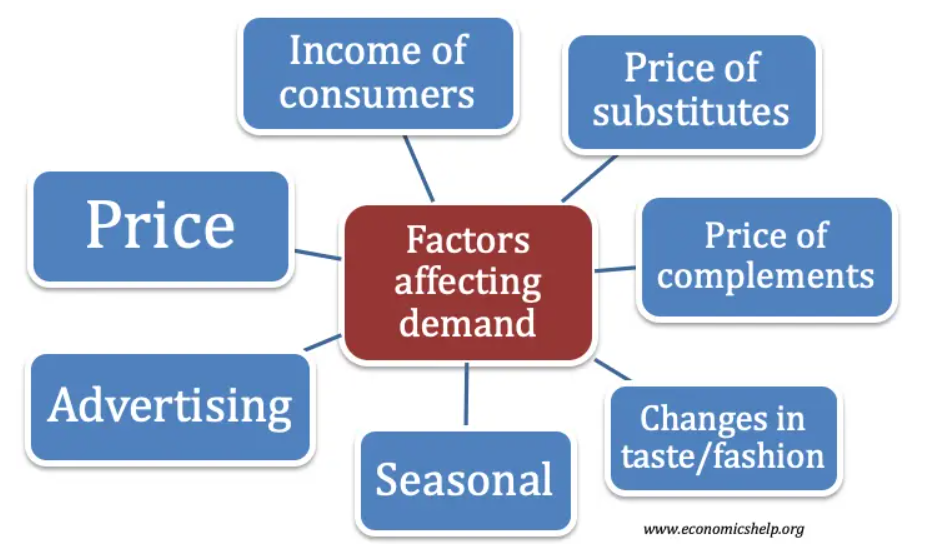
# Demand Curve Formula

Demand is the amount of goods consumers are willing to buy.



Demand depends on several factors, such as price, perceived quality, advertising, income, confidence of consumers and change in taste.



# Dividing the features based on the Factors affecting demand

**Price of substitutes –** Sales of 90 octane, 95 octane, Auto Diesel, consumption of oil

**Income of consumers –** GDP gross national income, Foreign direct investments, GDP: FCE households, Tax income profit, Household income

**Price of complements –** New vehicle registrations, vehicle sales, vehicle sales Asia: SL, Port stay duration, Number of vessels in Colombo port, fuel manufacture

**Price –** Diesel User Price, Petrol User price

**Seasonal –** Imports of refined products, Colombo port calls

There isn’t any data provided after 2014, so I will be considering fuel consumption mainly as a target variable, the proxy feature’s weights will be determined by checking the correlation of the features against the fuel consumption feature.

**Summary of all the correlation answers**  
GDP: Gross National Income : 0.5771154097165387  
Foreign Direct Investments : 0.016701608742766813  
GDP FCE Households : 0.6213174075360737  
Tax income profits\_gains : 0.6797987093453305  
Household\_income : -0.7464069423338254  
Sales 90 Octane : 0.7638219560761796  
Sales 95 Octane : 0.7767870472492998  
Sales Auto Diesel : 0.9642519644854153  
Consumption\_Oil : 0.9598220451897032  
New Vehicle Registrations : 0.710940691420204  
Vehicle Sales : 0.8283821219636843  
Vehicle Sales Asia : -0.07213670624393759  
No.of Vessels Colombo : 0.17888589812176617  
Port Stay Duration : nan  
Fuel\_other\_manufacture : nan  
Diesel User Price : 0.42929679961766626  
Petrol User Price : -0.8393110671118198  
Imports of Refined Products : 0.6530356879648631  
Colombo port calls : nan

fuel\_consumption : 0.9999999999999998  
petroleum\_imports\_crudeOil : 0.7242259405166621  
Taxes\_on\_Customs\_and\_Other\_Import Duties : -0.7757441984816745  
GDP Goods and Services : 0.7256692082264405  
Government Debt : nan  
Tax on Export : 0.4514010595209357  
Tax Goods & Services : -0.7490537772963195  
Tax Road Transport : 0.7285810018850449

Correlation between fuel\_consumption and Income of Consumers: 0.01178330649220857

Correlation between fuel\_consumption and Price of Substitute: 0.9567724317957925

Correlation between fuel\_consumption and Price of Complements: 0.78387068377676

Correlation between fuel\_consumption and Price: -0.15192262464733997

Correlation between fuel\_consumption and Seasonal: 0.6530356879648683

**Setting weights to the following**Sales 90 Octane : 0.7638219560761796  
Sales 95 Octane : 0.7767870472492998  
Sales Auto Diesel : 0.9642519644854153  
Consumption\_Oil : 0.9598220451897032

Vehicle Sales : 0.8283821219636843

Petrol User Price : -0.8393110671118198

Taxes\_on\_Customs\_and\_Other\_Import Duties : -0.7757441984816745

Correlation between fuel\_consumption and Price of Substitute: 0.9567724317957925

Correlation between fuel\_consumption and Price of Complements: 0.78387068377676

**Checking which combinations of features with weights will give the best demand column**

demand = ((w1\*ciec[price\_of\_substitutes].mean(axis=1, skipna=True))  + (w9\*ciec['Taxes\_on\_Customs\_and\_Other\_Import Duties '].fillna(0)) +

 (w5\*ciec['Sales Auto Diesel']).fillna(0)+(ciec['fuel\_consumption'].fillna(0)))

0.9855394883281556

demand = ((w1\*ciec[price\_of\_substitutes].mean(axis=1, skipna=True))  +

 (w5\*ciec['Sales Auto Diesel']).fillna(0)+(ciec['fuel\_consumption'].fillna(0)))

0.9844749204311413

demand = ((w1\*ciec[price\_of\_substitutes].mean(axis=1, skipna=True))  + (w9\*ciec['Taxes\_on\_Customs\_and\_Other\_Import Duties '].fillna(0)) +

          (w7\*ciec['Vehicle Sales'].fillna(0)) +

 (w5\*ciec['Sales Auto Diesel']).fillna(0)+(ciec['fuel\_consumption'].fillna(0)))

0.9850625656911131

demand = ((w1\*ciec[price\_of\_substitutes].mean(axis=1, skipna=True))  + (w9\*ciec['Taxes\_on\_Customs\_and\_Other\_Import Duties '].fillna(0)) +

           (w6\*ciec['Consumption\_Oil'].fillna(0)) +

 (w5\*ciec['Sales Auto Diesel']).fillna(0)+(ciec['fuel\_consumption'].fillna(0)))

0.9854523518055429