

Index Numbers

The most likely tasks in this area fall into the following groups:

- ☞ Calculation and interpretation of simple indices
- ☞ Use of indices to remove the effects of inflation
- ☞ Use of indices to analyse price variances

Calculation and Interpretation of Simple Indices

Whilst not a regularly examined task, it is possible that a brief illustration of the way that indices work would be required as part of a report.

An index number is the value of a variable (e.g. price) in one year as a percentage of the value of the same variable in a given base year.

Example

The price of a commodity has changed as follows:

2006	£10
2007	£12
2008	£15
2009	£16
2010	£14

Calculate and interpret a price index for the product, using 2006 as the base year.

Solution

If 2006 is base year, its index is 100.

For 2007 the index is $\text{£}12 / \text{£}10 \times 100 = 120$

For 2008 the index is $\text{£}15 / \text{£}10 \times 100 = 150$

For 2009 the index is $\text{£}16 / \text{£}10 \times 100 = 160$

For 2010 the index is $\text{£}14 / \text{£}10 \times 100 = 140$

Note that when presenting indices, the % sign is omitted.

The interpretation is simple. Between 2006 and 2007, the price of the product went up by 20%. Between 2006 and 2009, it increased by 60%, and so on.

Care must be taken. Between 2007 and 2009, the index has risen by 40 points, but this does not indicate that prices in this period have risen by 40%. Comparing the prices of £16 and £12, it is clear that prices have risen by $33\frac{1}{3}\%$ (this can also be seen by comparing the two indices).

Use of Indices to Remove the Effects of Inflation

This is a common use of index numbers, particularly when trying to forecast. Trends in historic data can be distorted by the effects of inflation. If these effects can be removed, the true pattern may be identified.

As well as the simple indices referred to above, weighted indices may be calculated using a number of different products. These will then give an indication of the *general* level of inflation, either for a particular industry, or even for the economy as a whole (for example, the Retail Price Index or RPI).

Example

A purchasing supervisor is concerned that the price paid for a component has risen steadily over the last few years, and is wondering how efficiently the purchasing staff are doing their jobs. The following data is available:

Year	Price	RPI (1997=100)
2006	£216	108
2007	£246	123
2008	£264	132
2009	£282	141
2010	£302	151

Evaluate the concerns of the purchasing supervisor.

Solution

To identify the true trend in prices, the effects of general inflation must be removed from the prices. The RPI is used to do this; prices are converted to those which would have prevailed in 2006, had there been no general inflation (any year for which an index is given could have been chosen).

Each price is subjected to a “*multiply by what you want, divide by what you’ve got*” calculation.

For example, the 2007 price was £246. We *want* this measured in 2006 terms, so multiply by the 2006 index. We’ve *got* it in 2007 terms, so divide by the 2007 index:

$$£246 \times 108 / 123 = £216$$

Prices from 2008 – 2010 are converted similarly:

2008	£264	x	108 / 132	=	£216
2009	£282	x	108 / 141	=	£216
2010	£302	x	108 / 151	=	£216

The above shows that the increases in price are entirely explained by the general inflation experienced since 2006. Put another way, the increases in purchase price have exactly kept pace with general inflation. Perhaps the supervisor's concerns are unfounded.

However, remember that the RPI relates to the economy as a whole, and may not be applicable to this particular product. In any economy, some prices will rise whilst others will fall; the RPI represents a type of average. An appraisal would be more meaningful if an index for this industry were used, or even one for this type of product.

Use of Indices to Analyse Price Variances

This area has already been seen under the heading of "Standard Costing," but is explained a bit more here.

Once a price variance has been calculated, information will often be given about relevant indices when the budget was set and when the period actually started. The indices are used to convert the standard price to a more up to date figure. The idea is that the buying manager can do little to combat the effects of general price inflation, and so should not be made responsible for that part of the variance.

Example

The standard price of materials was set at £3.75 per kg some weeks ago, when a price index for this material was 125. The accounting period for which the standard is to be used is about to commence, and the index has risen to 135.

Restate the standard price at the general price levels prevailing at the start of the period.

Solution

The "*multiply by what you want, divide by what you've got*" rule is used again here:

$$\begin{aligned} \text{Price at current levels} &= \text{old price} \quad \times \quad \text{current index} / \text{old index} \\ &= \quad \quad \quad \text{£3.75} \quad \times \quad \quad \quad 135 \quad / \quad 125 \\ &= \quad \quad \quad \text{£4.05} \end{aligned}$$

The £4.05 price should give a much fairer appraisal of the buying manager, since the increase from £3.75 to £4.05 was down to (uncontrollable) general price inflation.