



Understanding numerical data

● Index numbers

Index numbers show changes in the value of an item relative to an initial (or base) value. The base is usually set equal to 100 so if the value of the item falls to 96 it has fallen by 4 out of 100, i.e. 4%. Similarly if the value falls to 89 it has fallen by 11 out of 100, i.e. 11%. If, by comparison, the value has risen to 123, this means it has increased by 23 out of 100, i.e. 23%.

The purpose of using index numbers is that it makes it easier for the reader to identify percentage changes in an item. In table A, for example, we can see that compared to 1996, unit costs have increased by 5% by 1997. By 1998 unit costs have increased by 12% compared to their value in 1996.

Table A: Unit costs

Year	Index number
1996	100 (base)
1997	105
1998	112

Notice that we do not actually know what the unit costs are, only how much they have gone up or down as a percentage. Index numbers show how an item has changed; they do not show the actual value of the item itself. For example, you may be able to see that something has increased by 12% even though you do not know what the actual number was to begin with.

Table B: Number of units produced

Year	Index number
1995	100 (base)
1996	82
1997	77
1998	117

In table B we can see that the number of units produced in 1996 is 18% lower than in 1995. In 1997 it was 23% lower than it was in 1995; by 1998 it was 17% higher. Once again, we do not know how many units have been produced; we simply know how much production has altered.

Notice also that the index number always refers back to the

base. The number of units produced in 1998 was 17% higher than the base figure in 1995, *not* 17% higher than 1997. To calculate the change from 1997 to 1998 you must do a standard percentage calculation. In this case the increase is 40 (i.e. $117 - 77$), therefore the percentage increase from 1997 to 1998 is $(40/77) \times 100 = 52\%$.

Index numbers are used for many different variables including exchange rates, price levels, wage levels, sales and unit costs. In each case they show the relative changes in these items.

● Index number exercises ●

Sales

Year	Index number
1995	100 (base)
1996	102
1997	107
1998	127
1999	95

Questions

- 1 How much higher were sales in 1996 compared to 1995?
- 2 What were sales in 1998 compared to 1995?
- 3 What were sales in 1999 compared to 1995?
- 4 What was the value of sales in 1998?
- 5 How much higher were sales in 1997 compared to 1996?